FY 2019 MS4 Annual Report
in Compliance with
Watershed Based Permit NMR04A000

County of Bernalillo

State of New Mexico

Natural Resource Services

December 1, 2019

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1 USGS SIR "Characterization and Load Estimation of Polychlorinated Biphenyls (PCBs) From Selected Rio Grande Tributary Stormwater Channels in the Albuquerque Urbanized Area, New Mexico, 2017–18"
2 Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy
3 Bernalillo County Stormwater Facilities Map
4 MRGSQT Outcomes Report
5 CMC Discharge Monitoring Reports (DMRs)
6 Stormwater Management Program (SWMP)

Annual Report Format

National Pollutant Discharge Elimination System Stormwater Program
MS4 Annual Report Form

Check box if you are submitting an individual Annual Report with cooperative program elements ☒

Check box if you are submitting an individual Annual Report with individual program elements ☐

Check box if this is a new name, address, etc. ☐

1. MS4(s) Information

Bernalillo County
Name of MS4

Kali | Bronson | Stormwater Prog. Compl. Manager
Name of Contact Person (First) | (Last) | (Title)

(505) 848-1544 | kbronson@bernco.gov
Telephone (including area code) | E-mail

2400 Broadway Blvd. SE, Building N
Mailing Address

Albuquerque | NM | 87102
City | State | ZIP code

What size population does your MS4(s) serve? 111,000 NPDES number NMR04A008

What is the reporting period for this report? (mm/dd/yyyy) From Jul 1, 2018 to Jun 30, 2019

2. Water Quality Priorities

A. Does your MS4(s) discharge to waters listed as impaired on a state 303(d) list? ☒ Yes ☐ No

B. If yes, identify each impaired water, the impairment, whether a TMDL has been approved by EPA for each, and whether the TMDL assigns a wasteload allocation to your MS4(s). Use a new line for each impairment, and attach additional pages as necessary.

Impaired Water	Impairment	Approved TMDL		TMDL assigns WLA to MS4	
Rio Grande NM 2105_50 (Islet	E. coli	☒ Yes	☐ No	☒ Yes	☐ No
Rio Grande NM 2105_50 (Islet	Dissolved Oxygen	☐ Yes	☒ No	☐ Yes	☐ No
Rio Grande NM 2105_50 (Islet	PCBs-Fish Consumption Advi	☐ Yes	☒ No	☐ Yes	☐ No
Rio Grande NM 2105.1_51 (Ti	E. coli (no impairment, has TM	☒ Yes	☐ No	☒ Yes	☐ No

2. B. Continued

Impaired Water	Impairment	Approved TMDL		TMDL assigns WLA to MS4	
Rio Grande NM 2105.1_51 (Ti	Dissolved Oxygen	☐ Yes	☒ No	☐ Yes	☐ No
Rio Grande NM 2105.1_51 (Ti	Temperature	☐ Yes	☒ No	☒ Yes	☐ No
Rio Grande NM 2105.1_51 (Ti	PCBs-Fish Consumption Advi	☐ Yes	☒ No	☐ Yes	☐ No
Tijeras Arroyo NM-9000.A_00	Nutrients	☒ Yes	☐ No	☒ Yes	☐ No

C. What specific sources contributing to the impairment(s) are you targeting in your stormwater program?

Pet waste (E. coli); septic waste (E. coli); household waste (nutrients & potential PCBs); grease-FOG (DO, nutrients & E. co

D. Do you discharge to any high-quality waters (e.g., Tier 2, Tier 3, outstanding natural resource waters, or other state or federal designation)? ☐ Yes ☒ No

E. Are you implementing additional specific provisions to ensure their continued integrity? ☐ Yes ☐ No

3. Public Education and Public Participation

A. Is your public education program targeting specific pollutants and sources of those pollutants? ☒ Yes ☐ No

B. If yes, what are the specific sources and/or pollutants addressed by your public education program?

Pet waste, septic system waste, trash & debris, and household hazardous waste.

C. Note specific successful outcome(s) (e.g., quantified reduction in fertilizer use; NOT tasks, events, publications) fully or partially attributable to your public education program during this reporting period.

Please refer to the attached Annotations document for public education program and outcome information.

D. Do you have an advisory committee or other body comprised of the public and other stakeholders that provides regular input on your stormwater program? ☒ Yes ☐ No

4. Construction

A. Do you have an ordinance or other regulatory mechanism stipulating:

Erosion and sediment control requirements? ☒ Yes ☐ No

Other construction waste control requirements? ☒ Yes ☐ No

Requirement to submit construction plans for review? ☒ Yes ☐ No

MS4 enforcement authority? ☒ Yes ☐ No

B. Do you have written procedures for:

Reviewing construction plans? ☒ Yes ☐ No

Performing inspections? ☒ Yes ☐ No

Responding to violations? ☒ Yes ☐ No

C. Identify the number of active construction sites ≥ 1 acre in operation in your jurisdiction at any time during the reporting period. 14

D. How many of the sites identified in 4.C did you inspect during this reporting period? 14

E. Describe, on average, the frequency with which your program conducts construction site inspections.

On average, 3 site inspections are conducted for each project. A minimum of 1 inspection occurs with as many as 5 insp

F. Do you prioritize certain construction sites for more frequent inspections? ☒ Yes ☐ No

If Yes, based on what criteria? All construction sites are inspected. If there are prior or current co

G. Identify which of the following types of enforcement actions you used during the reporting period for construction activities, indicate the number of actions, or note those for which you do not have authority:

☐ Yes	Notice of violation	0	No Authority	☐
☐ Yes	Administrative fines		No Authority	☒
☒ Yes	Stop Work Orders	1	No Authority	☐
☐ Yes	Civil penalties		No Authority	☒
☐ Yes	Criminal actions	0	No Authority	☐
☐ Yes	Administrative orders	0	No Authority	☐
☐ Yes	Other			

H. Do you use an electronic tool (e.g., GIS, data base, spreadsheet) to track the locations, inspection results, and enforcement actions of active construction sites in your jurisdiction? ☒ Yes ☐ No

I. What are the 3 most common types of violations documented during this reporting period?

Absence of or improperly placed rain gages; SWPPP book not on-site/not immediately available; mud/dirt tracking issu

J. How often do municipal employees receive training on the construction program? annually

5. Illicit Discharge Elimination

A. Have you completed a map of all outfalls and receiving waters of your storm sewer system? ☒ Yes ☐ No

B. Have you completed a map of all storm drain pipes and other conveyances in the storm sewer system? ☒ Yes ☐ No

C. Identify the number of outfalls in your storm sewer system. 5

D. Do you have documented procedures, including frequency, for screening outfalls? ☒ Yes ☐ No

E. Of the outfalls identified in 5.C, how many were screened for dry weather discharges during this reporting period?

All

F. Of the outfalls identified in 5.C, how many have been screened for dry weather discharges at any time since you obtained MS4 permit coverage? All

G. What is your frequency for screening outfalls for illicit discharges? Describe any variation based on size/type.

Maintenance crew screens all outfalls on a regular basis. At a minimum, the screening occurs at least quarterly.

H. Do you have an ordinance or other regulatory mechanism that effectively prohibits illicit discharges? ☒ Yes ☐ No

I. Do you have an ordinance or other regulatory mechanism that provides authority for you to take enforcement action and/or recover costs for addressing illicit discharges? ☒ Yes ☐ No

J. During this reporting period, how many illicit discharges/illegal connections have you discovered? 29

K. Of those illicit discharges/illegal connections that have been discovered or reported, how many have been eliminated? 27

L. How often do municipal employees receive training on the illicit discharge program? See Annotations docum

6. Stormwater Management for Municipal Operations

A. Have stormwater pollution prevention plans (or an equivalent plan) been developed for:

All public parks, ball fields, other recreational facilities and other open spaces	☒ Yes	☐ No
All municipal construction activities, including those disturbing less than 1 acre	☒ Yes	☐ No
All municipal turf grass/landscape management activities	☒ Yes	☐ No
All municipal vehicle fueling, operation and maintenance activities	☒ Yes	☐ No
All municipal maintenance yards	☒ Yes	☐ No
All municipal waste handling and disposal areas	☒ Yes	☐ No

Other See Annotations document

B. Are stormwater inspections conducted at these facilities? ☒ Yes ☐ No

C. If Yes, at what frequency are inspections conducted? Bi-annual

D. List activities for which operating procedures or management practices specific to stormwater management have been developed (e.g., road repairs, catch basin cleaning).

Procedures in place for drainage and street sweeping, but not formalized as written protocols.

E. Do you prioritize certain municipal activities and/or facilities for more frequent inspection? ☐ Yes ☒ No

F. If Yes, which activities and/or facilities receive most frequent inspections?

G. Do all municipal employees and contractors overseeing planning and implementation of stormwater-related activities receive comprehensive training on stormwater management? ☒ Yes ☐ No

H. If yes, do you also provide regular updates and refreshers? ☒ Yes ☐ No

I. If so, how frequently and/or under what circumstances? Please see Annotations document for full response

7. Long-term (Post-Construction) Stormwater Measures

A. Do you have an ordinance or other regulatory mechanism to require:

Site plan reviews for stormwater/water quality of all new and re-development projects?	☒ Yes	☐ No
Long-term operation and maintenance of stormwater management controls?	☒ Yes	☐ No
Retrofitting to incorporate long-term stormwater management controls?	☐ Yes	☒ No

B. If you have retrofit requirements, what are the circumstances/criteria?

C What are your criteria for determining which new/re-development stormwater plans you will review (e.g., all projects, projects disturbing greater than one acre, etc.)?

All development & redevelopment projects with land disturbances >= 1 ac. See Annotations document for full response

D. Do you require water quality or quantity design standards or performance standards, either directly or by reference to a state or other standard, be met for new development and re-development? ☒ Yes ☐ No

E. Do these performance or design standards require that pre-development hydrology be met for:

Flow volumes	☒ Yes	☐ No
Peak discharge rates	☒ Yes	☐ No
Discharge frequency	☐ Yes	☒ No
Flow duration	☐ Yes	☒ No

F. Please provide the URL/reference where all post-construction stormwater management standards can be found.

https://www.bernco.gov/public-works/post-construction-storm-water-management-new-re-development.aspx

G. How many development and redevelopment project plans were reviewed during the reporting period to assess impacts to water quality and receiving stream protection? 95

H. How many of the plans identified in 7.G were approved? 62

I. How many privately owned permanent stormwater management practices/facilities were inspected during the reporting period? 64

J. How many of the practices/facilities identified in I were found to have inadequate maintenance? none

K. How long do you give operators to remedy any operation and maintenance deficiencies identified during inspections? 30 days

L. Do you have authority to take enforcement action for failure to properly operate and maintain stormwater practices/facilities? ☒ Yes ☐ No

M. How many formal enforcement actions (i.e., more than a verbal or written warning) were taken for failure to adequately operate and/or maintain stormwater management practices? none

N. Do you use an electronic tool (e.g., GIS, database, spreadsheet) to track post-construction BMPs, inspections and maintenance? ☒ Yes ☐ No

O. Do all municipal departments and/or staff (as relevant) have access to this tracking system? ☒ Yes ☐ No

P. How often do municipal employees receive training on the post-construction program? annually

8. Program Resources

A. What was the annual expenditure to implement MS4 permit requirements this reporting period? $2,417,656

B. What is next year's budget for implementing the requirements of your MS4 NPDES permit? $1,159,034

C. This year what is/are your source(s) of funding for the stormwater program, and annual revenue (amount or percentage) derived from each?

Source:	Amount $	OR %
1/8th Environmental Gross Receipts Tax	226,500	
General Fund Revenues	$1.92 M	
Open Space Mill Levy	266,400	

D. How many FTEs does your municipality devote to the stormwater program (specifically for implementing the stormwater program; not municipal employees with other primary responsibilities)? 7

E. Do you share program implementation responsibilities with any other entities? ☒ Yes ☐ No

Entity	Activity/Task/Responsibility	Your Oversight/Accountability Mechanism
	Please refer to the attached	
	Annotations document for information	

9. Evaluating/Measuring Progress

A. What indicators do you use to evaluate the overall effectiveness of your stormwater management program, how long have you been tracking them, and at what frequency? These are not measurable goals for individual management practices or tasks, but large-scale or long-term metrics for the overall program, such as macroinvertebrate community indices, measures of effective impervious cover in the watershed, indicators of in-stream hydrologic stability, etc.

Indicator	Began Tracking (year)	Frequency	Number of Locations
Example: E. coli	2003	Weekly April–September	20
Please refer to the attached			
Annotations document for information			

B. What environmental quality trends have you documented over the duration of your stormwater program? Reports or summaries can be attached electronically, or provide the URL to where they may be found on the Web.

Given data collected (3 years, 7 samples) by Compliance Monitoring Coop. (CMC), trends have not yet been identified.

10. Additional Information

Please attach any additional information on the performance of your MS4 program, including information required in Parts I.C and III.B. If providing clarification to any of the questions on this form, please provide the question number (e.g., 2C) in your response.

Certification Statement and Signature

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. ☐ Yes ☐ No

Federal regulations require this application to be signed as follows: **For a municipal, State, Federal, or other public facility**: by either a principal executive or ranking elected official.

Signature	Name of Certifying Official, Title	Date (mm/dd/yyyy)
	ROGER A. PAUL, P.E. DEP. CO. MANAGER - PUBLIC WORKS	11/20/19

Annual Report Annotations

1. MS4 Information

Page 1: What size does your MS4 serve? Bernalillo County is 1,160 square miles and is New Mexico's most populous county with more than 678,000 residents. Bernalillo County government provides a wide range of public services to residents who live in Albuquerque, Los Ranchos de Albuquerque, Tijeras, and the **111,000 residents** who live outside the village and city limits in the unincorporated areas of the County. This population includes residents who live both within and outside of the urbanized area.

2. Water Quality Priorities

Page 1-2: Impaired waters. Text box in the Environmental Protection Agency (EPA) Annual Report pdf form truncates text. For clarity during public review, impaired waters include:

Impaired Water*	Impairment
Rio Grande NM-2105_50 (Isleta Pueblo bnd to Tijeras Arroyo)	E. coli**
Rio Grande NM-2105_50 (Isleta Pueblo bnd to Tijeras Arroyo) & Rio Grande NM-2105_51 (Tijeras Arroyo to Alameda Bridge)	Dissolved Oxygen
Rio Grande NM-2105_50 (Isleta Pueblo bnd to Tijeras Arroyo) & Rio Grande NM-2105_51 (Tijeras Arroyo to Alameda Bridge)	PCBs - Fish Consumption Advisory
Rio Grande NM-2105_51 (Tijeras Arroyo to Alameda Bridge)	Temperature, water
Tijeras Arroyo NM-9000.A_001 (Four Hills Bridge to headwaters)	Nutrients***

*Impaired water designation from New Mexico Environment Department (NMED) Surface Water Quality Bureau 2018-2020 State of New Mexico CWA §303(d)/§305(b) Integrated List & Report.

**Though most of the Rio Grande through Albuquerque is not impaired for E. coli, there is a TMDL for E. coli from Isleta Pueblo Boundary to Angostura Diversion. Bernalillo County's northern boundary is at Alameda Bridge.

***A TMDL for nutrients in the Tijeras Arroyo was finalized on 10/12/2017.

3. Public Education and Public Participation

Page 2: Item 3C. Note specific successful outcome(s) (e.g., quantified reduction in fertilizer use; NOT tasks, events, publications) fully or partially attributable to your public education program during this reporting period.

The table below summarizes the Bernalillo County Public Outreach program during this reporting period. Additional information on the outreach programs is available upon request.

Throughout the reporting period of July 1, 2018, through June 30, 2019, the Bernalillo County Public Outreach programs connected with and educated thousands of Bernalillo County residents. In addition, during this reporting period Bernalillo County re-joined the Mid-Rio Grande Stormwater Quality Team (MRGSQT). Overall, the educational programs and outreach activities conducted by Bernalillo County and the MRGSQT during this reporting period connected an estimated 617,450 times with County residents. Outreach results are estimated

from the MRGSQT Outcomes Report, Bernalillo County website statistics, monthly newsletters, presentations, education outreach activities, and various public events results. The table below provides a summary of Bernalillo County outreach efforts and outcomes.

Public Education Outreach	Date	Successful Outcome
Bernalillo County website pages related to MS4 program and stormwater	July 1, 2018 - June 30, 2019	Analytics show webpages had 1,708 page views.
Bernalillo County Septic Systems Permits, “Unpermitted” and Aging System Wastewater System Campaign” Outreach Program	July 1, 2018 - June 30, 2019	Bernalillo County had 714 total wastewater operator permits, 386 total wastewater system permits, as well as 28 septic abandonments and connections to public sewer utilities. Bernalillo County sent letters through the “unpermitted and aging wastewater system campaign” which resulted in an estimated 330 properties permitted (included in the total numbers listed above) for septic systems in FY 2019.
Bernalillo County Septic Systems Permits, PIPE and TANK direct mail outreach	July 1, 2018 - June 30, 2019	The Bernalillo County PIPE and TANK program sent direct mail outreach to 100 residents in FY 2019. The focus area for this outreach was in Albuquerque’s South Valley.
Bernalillo County / City of Albuquerque (COA) Cooperative Household Hazardous Waste (HHW) Collection Center	July 1, 2018 - June 30, 2019	Bernalillo County contributed over $123,000 to support joint efforts with COA for the HHW collection center. In FY 2019, 1,895 County residents and 10,799 COA residents participated in the Hazardous Waste Collection Programs. Approximately 403,800 pounds of HHW were disposed of at the Advanced Chemical Transport (ACT) HHW Collection Center.
Bernalillo County HHW Neighborhood Collection Events	July 1, 2018 - June 30, 2019	In FY 2019, Bernalillo County hosted 10 HHW weekend neighborhood collection events in association with mini-cleanup events. During the 10 events, 279 individuals participated and 11,570 pounds of HHW were collected at a cost of $25,581. Most 2019 collection events were held in the East Mountain area and the South Valley. A HHW report is available upon request. The HHW report includes historical trend analysis for this outreach

Public Education Outreach	Date	Successful Outcome
		program as well as specific collection data per location.
BernCo at A Glance Monthly Newsletters	July 1, 2018 - June 30, 2019	500 hardcopies of each newsletter are printed and distributed via County offices and provided at neighborhood association meetings by the neighborhood coordinator. The neighborhood coordinator also sends the monthly electronic newsletter to all County and City neighborhood associations. It is estimated that these monthly newsletters reach 1,000 people per month and 12,000 people annually.
Bosque Environmental Monitoring Program (BEMP) Monitoring and Educational Outreach Programs	July 1, 2018 - June 30, 2019	- Reached approximately 9,000 people (with repeats) throughout New Mexico through their outreach activities. - Bernalillo County classrooms participated in monthly monitoring programs at 17 monitoring sites. - BEMP provided in-classroom and field-based educational programming for 35 Bernalillo county schools. - BEMP launched a pilot after-school program at five schools with both classroom activities and immersive trips to the field. - Several additional outreach programs including Horizon's Program Super Saturdays and summer programs.
Bernalillo County Employee Training - Stormwater Quality Training and IDDE Training	July 1, 2018 - June 30, 2019	Bernalillo County began using a video training service - Excal Visual, Inc. in FY 2018. Since starting this training, 69 people completed the IDDE training and 39 completed the Rain Check Training (general stormwater quality training). Additionally, Bernalillo County showed the Stormwater Quality Video to 642 new County employees.
Master Naturalists Volunteering at Bernalillo County Open Space	July 1, 2018 - June 30, 2019	Master Naturalists volunteer at the Bernalillo County Open Space work day events as well as with tour and education events for the public. Since the program began in 2010, there have been 512

Public Education Outreach	Date	Successful Outcome
		registered volunteers. In FY 2019, there were 336.75 documented volunteer hours.
EPA Region 6 Stormwater Conference - 2018 Planning Committee	July 2018 – August 2018	The 2018 EPA Region 6 Stormwater Conference in Albuquerque, NM began planning activities in Oct. 2017. Bernalillo County took on a major role in planning this conference.
EPA Region 6 Stormwater Conference – Our Water, Our Future: Communication, Collaboration, and Adaptive Management for Improved Stormwater Quality, Albuquerque, NM	August 19-23, 2018	Bernalillo County was a key sponsor, committee chair, and organizer for this regional stormwater conference. Bernalillo County presented an Early Bird Workshop on MS4 and Watershed-Based MS4 Permits, led a field trip to visit the Tijeras Remediation Project rehabilitation project and Valle de Oro Urban Wildlife Refuge, and presented on Advancing Green Infrastructure, Low Impact Development and Sustainable Practices in Bernalillo County. Attendance at the conference was estimated at 350 people.
East Mountain Celebration	September 23, 2018	This is a family-friendly event, and kids enjoyed free activities like face painting, fun jumps, a petting zoo, and obstacle courses. Bernalillo County had a water quality booth which provided information to educate County residents on stormwater quality, water conservation methods and incentive programs, and groundwater monitoring program at the festival. Attendance included approximately 500-600 people.
RiverXchange Watershed Presentation at Bandelier Elementary School	October 17-18, 2018	Bernalillo County supports RiverXchange which gave a presentation to four 4th grade classes. Attendance included approximately 100 people.
Green Stormwater Infrastructure/Low Impact Development Presentation at 56th Annual UNM Paving & Transportation Conference	January 7, 2019	Bernalillo County gave a presentation in cooperation with Tess Houle of MRWM about the role of green stormwater infrastructure and low impact development in transportation and streets, disconnected impervious areas, stormwater quality and quantity, and stormwater regulations. Attendance included approximately 645 people.

Public Education Outreach	Date	Successful Outcome
Local news channel KRQE – Green Stormwater Infrastructure and Low Impact Development improvements and stormwater quality interview	January 30, 2019	A representative from Bernalillo County appeared on the local news to give an interview about a completed project involving improvements in Green Stormwater Infrastructure and Low Impact Development and stormwater quality. The average daily views for this interview are estimated to be approximately 4,500 people.
Second Street Southwest Corridor Improvements Ribbon-Cutting Ceremony	January 30, 2019	Bernalillo County hosted a public ceremony that discussed the improvements made to Second Street, including green stormwater infrastructure and low impact development improvements, with the local community. Attendance included approximately 75 people, 17 of which were children from the local community center. Promotional media material reached approximately 144,000 (through Facebook, Twitter, and Nextdoor app).
Sunport Commerce Center Public Meeting	February 7, 2019	Bernalillo County held a public meeting which provided an overview of the design overlay process for the Sunport Commerce Center and presented the draft document of proposed stormwater quality improvements. Attendance included approximately 50 people.
Landscape for Life Training	February 2-March 30, 2019 (5 Saturdays)	Bernalillo County gave a training on residential stormwater management methods including rain gardens, rainwater catchment, and residential stormwater quality. Attendance included 55 participants at the first event, 36 of which attended all five events and received a free rain barrel.
Sponsorship of New Mexico Land and Water Summit	February 27 – March 1, 2019	Bernalillo County provided the New Mexico Land Water Summit with a sponsorship of $5000. Topics discussed at the summit included green stormwater infrastructure, watershed restoration and management, and public outreach and engagement. Attendees included 137 professionals in the fields of hydrology,

Public Education Outreach	Date	Successful Outcome
		landscape architecture, landscaping, and engineering.
Earth Day Celebration with the Forest Service	April 26, 2019	Bernalillo County spoke with Forest Service employees about water conservation programs in Bernalillo County and donated a rain barrel for a free drawing. Attendance included approximately 200 people.
Singing Arrow Public Meeting	May 16, 2019	Bernalillo County held a public meeting to get community feedback on a signage around watershed protection and stormwater quality. Attendance included approximately 12 people.
South Valley Pride Day	April 28, 2019	Bernalillo County set up a booth and provided education and outreach regarding land use impacts on stormwater and the river, human activities and their impacts to stormwater, and provided activities kids can do to reduce stormwater pollution Attendance included approximately 2,000 people.
Paws and Claws Family Festival	May 18, 2019	Bernalillo County Animal Care and Resource Center opened in early 2019. To celebrate the opening, the center held a festival focusing on pet care and adoption. Information about picking up after your pet to protect stormwater was provided. Attendance included approximately 500 people.
Abrazos Environmental Justice Community Day	May 18, 2019	Bernalillo County provided education about land use impacts on stormwater and the river, human activities and their impacts on stormwater, and activities kids can do to reduce stormwater pollution. Attendance included approximately 250 people.
Business Outreach Mailings	May 19, 2019	Bernalillo County developed brochures with stormwater quality information specific to various sectors of business including automotive, parking lots, contractors' yards, landscaping, mobile carpet cleaning, fueling stations, and

Public Education Outreach	Date	Successful Outcome
		printing. The brochures were sent to 530 people.
Tijeras Creek Watershed Collaborative Youth Conservation Corp. Workday	June 26, 2019	Bernalillo County is a partner in the Tijeras Creek Watershed Collaborative. The Youth Conservation Corp. completed a work day helping to restore the creek.
Tijeras Creek Watershed Collaborative Tijeras Creek Remediation Project (TCRP) Forest Health Outreach Program	June 27, 2019	Bernalillo County is a partner in the Tijeras Creek Watershed Collaborative. The TCRP conducted an outreach program.
Tijeras Creek Watershed Collaborative Rocky Mountain Youth Corps. Tijeras Creek Tour	June 28, 2019	Bernalillo County is a partner in the Tijeras Creek Watershed Collaborative. The Tijeras Creek Watershed Collaborative gave a tour of the creek to Rocky Mountain Youth Corps. students.

In addition, during this reporting period, Bernalillo County re-joined the Mid-Rio Grande Stormwater Quality Team (MRGSQT). The MRGSQT outreach efforts are summarized annually in the Summary for Outcomes Report; a copy of this report is included in Attachment 4. Through the MRGSQT collaborative an estimated 581,448 people were reached (with duplicates) with a stormwater quality/stormwater pollution prevention message during FY 2019.

4. Construction

Page 4: Item 4I. What are the three most common types of violations documented during this reporting period? Text box in the EPA Annual Report pdf form does not allow enough space to enter complete response. Complete response:

> There was one formal (stop work) violation during this inspection period related to the track-out pad; the issue was addressed and corrected by the site operator. Typically, if inspectors find any issues/inconsistencies during an inspection, they will inform the site manager and are usually able to resolve the issue without needing enforcement. The three most common issues encountered during inspections include: Stormwater Pollution Prevention Plan (SWPPP) document not located on-site, Best Management Practice (BMP) maintenance issues, and absence of or improperly placed rain gages.

5. Illicit Discharge Elimination

Page 4: Item 5L. How often do municipal employees receive training on the illicit discharge program? Text box in the EPA Annual Report pdf form does not allow enough space to enter complete response. Complete response:

County employees receive training on the illicit detection and discharge elimination program upon hire, and certain departments receive annual training specific to their department responsibilities. Bernalillo County started using training videos provided through Excal Visual, Inc. in FY 2018 and continued their use in FY 2019.

6. Stormwater Management for Municipal Operations

Page 4: Item 6A. Have stormwater pollution prevention plans (or an equivalent plan) been developed for? "Other" text box in the EPA Annual Report pdf form does not allow enough space to enter complete response. Complete response:

Procedures are in place in the County's Pollution Prevention and Good Housekeeping Program document. The Stormwater Program Compliance Manager will continue to coordinate with specific departments to formalize and improve this program.

7. Long-term (Post-Construction) Stormwater Measures

Page 4: Item 7C. What are your criteria for determining which new/re-development stormwater plans you will review (e.g., all projects, projects disturbing greater than one acre, etc.)? Text box in the EPA Annual Report pdf form does not allow enough space to enter complete response. Complete response:

All development and re-development projects with land disturbances equal to or greater than one (1) acre, including sites which disturb less than one (1) acre but are part of a larger common plan of development, that discharge into the County's storm drainage system within the urbanized area of the County, are required to have post-construction water quality BMPs. The County reviews site plans and evaluates the effectiveness of the post-construction BMP based on site conditions. BMPs are inspected upon project completion.

Page 5: Item 7G. How many development and redevelopment project plans were reviewed during the reporting period to assess impacts to water quality and receiving stream protection? Text box in the EPA Annual Report pdf form does not allow enough space to enter complete response. Complete response:

Total number of projects reviewed in FY 2019 = 95

Total number of projects approved in FY 2019 = 62

Total number of projects still in review (not approved yet) that started in FY 2019 = 33

Number of projects reviewed that were void or withdrawn in FY 2019 = 3

8. Program Resources

Page 6: Item 8E. Do you share program implementation responsibilities with any other entities? Text box in the EPA Annual Report pdf form does not allow enough space to enter complete response. Complete response:

Entities	Activity/Task/Responsibility	Your Oversight/ Accountability Mechanism
Bernalillo County AMAFCA COA NMDOT-District 3 UNM Sandoval County Village of Corrales City of Rio Rancho Village of Los Ranchos Kirtland Air Force Base Town of Bernalillo SSCAFCA ESCAFCA Sandia National Laboratory (DOE)	MS4 Technical Advisory Group (TAG) – various cooperative activities	Intergovernmental Agreement
Bernalillo County AMAFCA COA NMDOT-District 3 UNM Sandoval County Village of Corrales City of Rio Rancho Village of Los Ranchos Town of Bernalillo SSCAFCA ESCAFCA	MS4 Compliance Monitoring Cooperative (CMC) – Wet Weather Monitoring	Intergovernmental Agreement and Memorandum of Understanding for Delegation of Authority to AMAFCA for Data Entry into netDMR System
Bernalillo County AMAFCA COA NMDOT-District 3 Sandoval County Village of Corrales City of Rio Rancho Village of Los Ranchos Town of Bernalillo SSCAFCA ESCAFCA Ciudad Soil and Water Conservation District	Mid-Rio Grande Stormwater Quality Team (MRGSQT) – various cooperative public education and outreach activities	Intergovernmental Agreement
Bernalillo County Village of Los Ranchos COA NMDOT-District 3 AMAFCA	Development Review – Construction and Post-Construction Stormwater Management	Intergovernmental Agreement

Entities	Activity/Task/Responsibility	Your Oversight/ Accountability Mechanism
Bernalillo County ABCWUA COA AMAFCA NMDOT Village of Los Ranchos	Capacity, Management, Operations and Maintenance (CMOM) Plan Spill Response, emphasis on Fats, Oils and Grease (FOG)	Intergovernmental Agreement
Bernalillo County COA AMAFCA NMDOT-District 3 Village of Los Ranchos ABCWUA MRGCD	Investigation and resolution of IDDE	Shared without cost allocation
Bernalillo County COA	Household Hazardous Waste Collection Program	Cost share for fixed collection facility
Bernalillo County AMAFCA	GSI/LID Impediments Assessment and Report	Shared without cost allocation
Bernalillo County AMAFCA	Gross Debris Study	Shared without cost allocation
Bernalillo County USGS	Preliminary Assessment of PCB Loads into the Rio Grande from Selected Stormwater-Collection Basins in Bernalillo County, Albuquerque Metropolitan Area, Albuquerque, NM	Cooperative agreement with cost agreement
Bernalillo County AMAFCA USACE US Bureau of Reclamation USEPA USFWS	Ecohydrologic and Water Quality Investigations of Valle de Oro National Wildlife Refuge and Albuquerque South Valley Commons	Cooperative agreement with cost agreement
Bernalillo County COA AMAFCA SSCAFCA	Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy	Shared without cost allocation
Bernalillo County The Nature Conservancy Canon de Carnuel Land Grant UNM Ciudad Soil and Water Conservation District	Tijeras Creek Watershed Collaborative (TCWC)	Shared without cost allocation

Entities	Activity/Task/Responsibility	Your Oversight/ Accountability Mechanism
Adaptive Terrain Systems COA NMDOT-District 3 USGS USFWS Cibola National Forest Rocky Mountain Youth Corps. Talking Talons Youth Leadership	Tijeras Creek Watershed Collaborative (TCWC)	Shared without cost allocation

9. Evaluating/Measuring Progress

Page 6: Item 9A. What indicators do you use to evaluate the overall effectiveness of your stormwater management program, how long have you been tracking them, and at what frequency? These are not measurable goals for individual management practices or tasks, but large-scale or long-term metrics for the overall program, such as macroinvertebrate community indices, measures of effective impervious cover in the watershed, indicators of in-stream hydrologic stability, etc. Text box in the EPA Annual Report pdf form does not allow enough space to enter complete response. Complete response:

Indicator	Began Tracking (year)	Frequency of Evaluation	Number of Locations or Indicator Tracked and FY 2019 Results
Public Education and Outreach, number of people reached.	2014	Variable; several times annually	No. of people reached: FY 2019 = 617,450 people
Mailings with water bills, number of residences reached.	2014	Typically, Annually	FY 2019, County could not get on schedule to send mailing for this fiscal year
Septic system issues resolved.	2012	Annually	No. of septic issues resolved: FY 2019 = 1,100 septic system permits issued, 28 septic systems abandoned
Recycling Waste Diversion Program	2013	Annually	Tons of waste recycled: FY 2019 = 189.48 tons of household hazardous waste recycled & diverted from landfill through this program
Household Hazardous Waste Collection – Cooperative Program with COA	2014	Annually	No. of participants: FY 2019 = 12,694 participants Program Cost for County: FY 2019 = $123,175

Indicator	Began Tracking (year)	Frequency of Evaluation	Number of Locations or Indicator Tracked and FY 2019 Results
Household Hazardous Waste Collection – County only Collection Events	2014	Annually	No. of County participants: FY 2019 = 279 participants No. of County events: FY 2019 = 10 events

Page 6: Item 9B. What environmental quality trends have you documented over the duration of your stormwater program? Reports of summaries can be attached electronically or provide the URL to where they may be found on the web. Text box in EPA Annual Report PDF form does not allow enough space to enter complete response. Complete response:

- AMAFCA, with environmental consultant CDM Smith, completed a "Middle Rio Grande E. coli Analysis and Research" project and report in April 2015. This report assembled data collected by the US Geological Survey (USGS), NMED, and the Bosque Environmental Monitoring Program (BEMP) on E. coli in the Middle Rio Grande and analyzed this data to develop the larger picture of E. coli in the Rio Grande (Isleta Pueblo boundary to Alameda Street Bridge) segment. http://www.amafca.org/documents/2015_Annual_Report/AMAFCA%202015%20(Jan%20to%20June)%20Annual%20Report%20II.A%20-%20VI.pdf
- Bosque Environmental Monitoring Program (BEMP) Invoices & Reports for FY 2016 through FY 2019 (available upon request).
- Given the data (three years, seven samples) collected from the Compliance Monitoring Cooperative (CMC), observable trends have not yet been identified. CMC Monitoring Memos are available upon request.
- Additional supporting data is available upon request.

10. Additional Information

Bernalillo County's Stormwater Management Program (SWMP) Plan has been updated as required in the MS4 Permit. It is provided as Attachment 6 to this Annual Report and is accessible online at: https://www.bernco.gov/public-works/epa-regulation-of-stormwater-in-bernalillo-county.aspx or available for review upon request. The current SWMP version is Revision 1, December 2019.

Page 6: Item 10. Additional Information. Please attach any additional information on the performance of your MS4 program, including information required in Parts I.C, I.D, and III.B.

10.1 Compliance with Water Quality Standards – PCBs - Part I.C.1.e

The MS4 Permit requires submittal of a proposed PCB strategy to EPA within two years from effective date of permit (two years from effective date of Permit is December 22,

2016) and submittal of progress reports with the third and subsequent Annual Reports. The progress for FY 2019 is summarized below.

In FY 2019, Bernalillo County and USGS continued a monitoring program to evaluate PCBs in water and soil samples at four locations with Bernalillo County (Alameda, Paseo, Sanchez Farms, and Adobe Acres). The three objectives of this study are:

1) Characterize PCB concentrations in soil and water samples.
2) Determine/estimate storm-water discharges from the four basins.
3) Use PCB and discharge data to estimate PCB loads for the four basins.

The USGS completed sample collection for PCB analysis and reviewed the results. The USGS used modelled rainfall-runoff simulated discharge to calculate PCB event loads. USGS completed their analysis and published the USGS Scientific Investigation Report (SIR). The USGS progress reports for this PCB Program are available upon request. The final USGS report is included in Attachment 1 to this Annual Report.

Related to this section of the MS4 Permit and addressing concerns regarding PCBs in channel drainage areas, Bernalillo County included provisions in their Stormwater Quality Ordinance (Section 38-415) that allows for the County to request an evaluation of the site for PCBs as part of the development and redevelopment processes. The evaluation may require soil sampling on the site as well as downstream and may require the owner to include on-site BMPs.

10.2 Discharges to Impaired Waters with Approved TMDLs - Part I.C.2.b.(i) and TABLE 1.a - TMDL Bacteria Program- Part I.C.2.b.(iii)

FY 2019 – Annual Report Progress Report: The MS4 Permit requires an annual progress report on the targeted controls for Escherichia coli (E. coli) bacteria. The segment of the Rio Grande that flows through Albuquerque, designated as Rio Grande NM-2015_50 (Isleta Pueblo boundary to Tijeras Arroyo), also referenced as Rio Grande Basin 20.6.4.105, in the 2018-2020 State of New Mexico Clean Water Act (CWA) 303(d)/305(d) Integrated List and Report, is considered to be impaired for E. coli because the quality of the water does not support the designated uses for that segment. The amount of E. coli bacteria in the water has been found to exceed the water quality standard, so a Total Maximum Daily Load (TMDL) has been adopted by the New Mexico Water Quality Commission (NMED, 2010). This Annual Report serves as a progress report for the Bernalillo County TMDL Bacteria Program for FY 2019.

Sanitary Sewer Systems: Sanitary sewer systems that run through the County MS4 are owned, operated, and maintained by the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). The County works cooperatively with ABCWUA under their Capacity, Management, Operations, and Maintenance (CMOM) program to address any leaks and/or spills from the sanitary sewer system. Because the County does not own, operate, or maintain the sanitary sewer system, it does not have any specific MS4 Permit measurable goals related to this target area in this SWMP. In FY 2019, the

County continued to work cooperatively with the ABCWUA under their CMOM program to address any leaks and/or spills from the sanitary sewer system. The ABCWUA CMOM Annual Report is available online (https://www.abcwua.org/Sewer_System.aspx) or upon request.

On-Site Sewage Facilities: Related to targeted controls for on-site sewage facilities, the County administers the septic system permitting program in the unincorporated portions of Bernalillo County under the Bernalillo County Wastewater Ordinance, ensuring the proper disposal of septic waste and proper operation and maintenance of septic systems. The County used its existing Well and Wastewater permitting process to distribute information about proper septic system maintenance to 100 percent of new septic permit holders in FY 2019. Issuance of County septic permits included an information packet with recommended pumping/maintenance schedules and "do's and don'ts" of septic system care. The County issued 1,100 wastewater discharge and operator permits in FY 2019. In addition, the County continued its campaign to permit 100 percent of unpermitted septic systems. This campaign met its measurable annual goal of contacting a minimum of 300 unpermitted system or aging system owners per year with the intent of verifying status and education regarding proper operation of the systems. As a result of the FY 2019 campaign, 233 properties were resolved (applied for and received permits). Financial assistance was provided to low income and disadvantaged residents through the Bernalillo County Partners in Improving and Protecting the Environment (PIPE) program. In FY 2019, three septic systems replacements were made, two households were connected to the City sanitary sewer, and six septic system evaluations were completed under the PIPE and TANK program. In addition, 28 septic systems were vacated in FY 2019, and residents were required to connect to the City sanitary sewer system.

Bernalillo County septic outreach and educational materials are available online: http://www.bernco.gov/public-works/wastewater-septic-systems.aspx with additional links available on this webpage. Many of the website text and downloadable brochures are also available in Spanish. Additional supporting documentation for these programs is available upon request. Bernalillo County continued evaluation of septic tanks greater than 30 years in age, as required by the amended Wastewater Systems Ordinance: http://www.bernco.gov/public-works/aging-septic-system-inspections.aspx.

Illicit Discharges and Dumping: To address targeted controls for Illicit Discharges and Dumping, Bernalillo County's Illicit Detection and Discharge Elimination (IDDE) program includes efforts that target sources of bacteria, trash, and debris, as well as other pollutants. Refer to the SWMP - Table 6: Illicit Discharges and Improper Disposal and to Section 10.I of this Annual Report for additional information. Bernalillo County has an Illicit Discharge Detection and Elimination Program plan, an illegal dumping website page (http://www.bernco.gov/illegal-dumping), illegal dumping ordinance, and reporting hotline (505-314-0310) that includes illicit discharge reporting.

Animal Sources: Bernalillo County addresses targeted controls for reducing pet waste through its public outreach and educational programs and events. Bernalillo County Ordinance, Chapter 6, addresses animal waste disposal. Animal waste complaints are also addressed through zoning enforcement and special use permit review. In addition, Bernalillo County has 57 dog waste dispensers that it maintains. Bernalillo County pet waste educational materials are available online on several web pages:

http://www.bernco.gov/public-works/stormwater-pet-waste.aspx
https://www.bernco.gov/poopfairy
http://www.bernco.gov/uploads/FileLinks/1b856fddafa84b4fa9272b5bd6b5ab41/BC_pet_waste_fact_sheet_1.pdf
http://www.bernco.gov/uploads/FileLinks/1b856fddafa84b4fa9272b5bd6b5ab41/BC_pet_waste_fact_sheet_2.pdf
http://www.bernco.gov/uploads/FileLinks/1b856fddafa84b4fa9272b5bd6b5ab41/BC_pet_waste_fact_sheet_3.pdf

In 2017, Bernalillo County and AMAFCA provided support to UNM Master Student Sergio Lozoya's research project focused on understanding the success of the "There is No Poop Fairy" campaign in Bernalillo County. A literature review helped to formulate community surveys, which were used to measure the reach and influence of the outreach campaign. This campaign, with its short and simple message, was found to be successful within Bernalillo County.

Residential Education: Related to resident education as a targeted control for this program, the County utilized a combination of existing and new educational materials (such as the "Project W.E.T. Kids in Discovery Series" and the Enviroscape watershed model), County-created brochures, and educational materials and promotional items,

including pet-waste focused materials from the previous Public Education and Outreach efforts from the prior permit term. Supporting documentation for these programs is available upon request.

The County also used its website and/or social media as a venue for distributing materials and posts about stormwater quality. The County typically has one mailing which is included with ABCWUA water bills to County residents; in FY 2019 the County could not get their mailing onto the ABCWUA's schedule. The program also utilized existing County processes to provide education on a neighborhood scale through on-going opportunities such as community and neighborhood association meetings and distribution of information through neighborhood newsletters. In FY 2019, monthly "BernCo at a Glance" newsletters were printed and available electronically (bi-weekly).

In addition, during this reporting period Bernalillo County re-joined the Mid-Rio Grande Stormwater Quality Team (MRGSQT). The MRGSQT outreach efforts are summarized annually in the Summary for Outcomes Report; a copy of this report is included in Attachment 4. Additional information of the MRGSQT outreach efforts is available on their website: http://www.keeptheriogrand.org/.

Throughout the reporting period, July 1, 2018 through June 30, 2019, the Bernalillo County Public Outreach and MRGSQT programs were able to connect and educate hundreds of thousands of Bernalillo County Residents. Overall, these educational programs and outreach activities conducted by Bernalillo County and the MRGSQT during this reporting period connected an estimated 617,450 times with County residents. This outreach is estimated from MRGSQT Outcomes Report, Bernalillo County website, monthly newsletters, and various public events results. Additional information is provided in Section 10.K of this Annual Report and in the Annual Report Annotations, 3. Public Education and Public Participation section of this attachment.

Business Education: Related to business education as a targeted control for this program, in FY 2019 Bernalillo County, in cooperation with AMAFCA, developed flyers and generated a mailing to selected businesses whose operations have the potential to impact stormwater quality in unincorporated Bernalillo County. The purpose of the mailing was to educate and promote best management practices to protect stormwater quality. Business types identified for the mailing included automotive repair, printing, carpet cleaning, fueling stations, landscaping, and contractors' yards.

Available E. coli Monitoring Data: AMAFCA, with environmental consultant CDM Smith, completed a "Middle Rio Grande E. coli Analysis and Research" project and report in April 2015. This report assembled data collected by the US Geological Survey (USGS), NMED, and BEMP on E. coli in the Middle Rio Grande – and analyzed this data to develop a larger picture of E. coli in the Rio Grande (Isleta Pueblo boundary to Alameda Street Bridge) segment. This report also compares the Rio Grande, in terms of E. coli, to other rivers. The report addresses the basis of the E. coli water quality standard,

provides a summary of findings regarding how the federal objectives were derived, and discusses the applicability of the federally recommended bacteria objectives to waterbodies. Finally, the report describes the Best Management Practices (BMPs) that have been used to remove E. coli from stormwater. The use of warning-type BMPs is examined for possible use in the Albuquerque area. The E. coli loading and load allocation calculations related to the CMC monitoring program are available upon request for the cooperative monitoring completed in FY 2019.

Stormwater Monitoring: Finally, in this program to address targeted controls for E. coli, the County is conducting stormwater monitoring in accordance with Table 10, Wet Weather Monitoring Program, Part III.A.1. The goals and plan for this program are described in the Wet Weather Monitoring Program portion of the SWMP and of this Annual Report (Item 10.M). During FY 2019, the cooperative monitoring program established in FY 2016 continued sampling and collected the one required remaining dry season sample; all of the seven samples required in the MRG MS4 Permit have been obtained.

10.3 Discharges to Impaired Waters Without Approved TMDLs - Part I.C.2.b.(ii) and TABLE 1.b - TMDL Nutrient Program - Part I.C.2.b.(iii)

The 2018-2020 State of New Mexico CWA 303(d)/305(d) Integrated List and Report identifies the Tijeras Arroyo Assessment Unit – Four Hills Bridge to Headwaters as impaired for nutrients. A TMDL for nutrients in this assessment unit of the Tijeras Arroyo was approved by the EPA in October 2017. Bernalillo County, in cooperation with COA and NMDOT, continues to voluntarily participate in the Pre-TMDL Cooperative Nutrient Study for Tijeras Arroyo under the NPDES Permit No. NMR04A000. The results of these studies will be used to guide the overall program plan and goals. Samples were collected during dry weather and wet weather events. For the reporting period for year four of this study, sample results show generally low concentration for nutrient-related constituents of concern. Exceedances for total nitrogen were observed for two wet weather sampling events in June and July 2018, with a maximum concentration for nitrate of 1.4 mg/L. Total phosphorus concentrations exceeded the threshold for one dry weather event and one wet weather event in July 2018, with a maximum concentration of 9.0 mg/L. Results from year four of this study will be submitted to NMED by December 1, 2019.

In FY 2019, public education and outreach targeting fertilizer (nutrient source) continued to be included in several Bernalillo County brochures. Additional supporting documentation is available upon request.

In FY 2019, Bernalillo County continued involvement with the Tijeras Creek Watershed Collaborative (TCWC) which meets regularly to address the watershed and restorative work for the Tijeras Creek. In FY 2019, the group supported multiple education and outreach activities including work days with Bernalillo Master Naturalists and Youth Conservation Corps volunteers at the Tijeras Creek Remediation Project; tours of the Tijeras Creek projects; and development of an online interactive GIS map of the watershed. Related to the TCWC, Ciudad Soil and Water Conservation District took the lead in beginning a Watershed Based Plan for the Upper Tijeras Arroyo Watershed. A grant application to further support this effort was also completed in FY 2019.

Bernalillo County continued its septic system initiative targeting residents in the East Mountain area and within the Upper Tijeras Arroyo watershed. There are multiple collaborative efforts in the Tijeras Arroyo watershed related to septic system education and outreach. In FY 2019, Bernalillo County joined the Mid Rio Grande Stormwater Quality Team (MRGSQT), which assists with support of septic system education and outreach. In addition, the Ciudad Soil & Water Conservation District (a partner to Bernalillo County in both the TCWC and the MRGSQT), has septic system education brochures available online and conducts public outreach in the Tijeras area.

10.4 Endangered Species Act (ESA) Requirements - Dissolved Oxygen (DO) Strategy in the Receiving Waters of the Rio Grande - Part I.C.3.a

For this part of the MS4 Permit, Bernalillo County is providing a summary of findings and activities undertaken under Part I.C.3.a.(i) of the MS4 Permit for FY 2019. The SWMP, submitted with the FY 2016 Annual Report and updated and submitted with this FY 2019 Annual Report, also includes descriptions of controls implemented (and/or proposed controls to be implemented) along with corresponding measurable goals. Bernalillo County's Stormwater Management Program (SWMP) Plan is accessible online at: https://www.bernco.gov/public-works/epa-regulation-of-stormwater-in-bernalillo-county.aspx or available for review upon request. The current SWMP version is Revision 1, December 2019.

In FY 2019, no specific structural elements, topographical and/or geographical formations, or County operations have been identified as contributing to reduced DO in the receiving waters of the Rio Grande within the jurisdictional area.

Structural elements within County facilities that address potential low DO include a duckbill check valve stormwater outlet for the Sanchez Farms outfall and release of

stormwater into the Bosque prior to outfall into the Rio Grande. Where stormwater is released into the Bosque upstream of the Rio Grande, stormwater flows rarely make it to the river and instead spread, slow, and infiltrate in the Bosque. Future projects at Valle de Oro National Wildlife Refuge and McEwen Pond area are planned to address water quality concerns. Bernalillo County has continued teaming with USGS, AMAFCA, US Army Corps of Engineers, US Bureau of Reclamation, USEPA, and US Fish & Wildlife Service on a water quality data collection project: "Ecohydrologic and Water Quality Data Collection at Valle de Oro National Wildlife Refuge and the Albuquerque South Valley Community Commons." The objectives of this project are to: (1) assess the baseline status of water resources prior to site plan implementation at the Refuge and McEwen Pond; (2) characterize changes in the quantity and quality of water that result from site plan implementation; and (3) provide relevant data to stakeholders.

The County also addressed pollutants that have the potential to affect stormwater quality (including pollutants that affect DO levels) in FY 2019 through public education and outreach, the sediment pollutant load reduction strategy, construction and post-construction requirements, pollution prevention and good housekeeping program, and the wastewater permitting process to address and regulate septic systems. See the applicable sections of the Annual Report for additional information.

10.5 Endangered Species Act (ESA) Requirements -Sediment Pollutant Load Reduction Strategy - Part I.

FY 2019 – Annual Report Progress Report:

This section of the Annual Report serves as Bernalillo County's annual assessment of the progress of this program. In FY 2019, the County tracked and estimated the volume of sediment removed from each stormwater facility.

Approximately 764 cubic yards (351 tons) of sediment, trash, and vegetation (green waste) was removed from County catch basins, wet wells, storm sewer lines, County ponds, channels, and rights-of-way.

In FY 2019, Bernalillo County, along with AMAFCA, COA, and SSCAFCA, took the lead on completing the "Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy", June 2019. This report meets the MS4 Permit requirements for the sediment assessment, baseline sediment loading estimates, monitoring, and program evaluation. This report is included as Attachment 2 to this Annual Report.

10.6 Construction Site Stormwater Runoff Control - Part I.D.5.a

FY 2019 – Annual Report Progress Report:

This section of the Annual Report assesses and documents the success of this program and includes the MS4 Permit required reporting. The County's program was successful in that 100 percent of all construction projects cumulatively disturbing one or more acres as required in Part I.D.a.(iii) were inspected in FY 2019.

The frequency of site reviews = On average, three site inspections are conducted for each project. A minimum of one inspection occurs with as many as five inspections, depending on the duration and complexity of the construction project.

Number of site inspections = 18 (100 percent of sites)
Number of enforcement activities = 1

A stop work order was issued for a project until the track out protection was established, and off-site tracking was swept before work continued.

The cumulative number of site inspections and enforcement activities over the MS4 Permit term are:

Cumulative Number of site inspections = 123 (100 percent of sites)
Cumulative Number of enforcement activities = 3

In FY 2019, there were several opportunities to incorporate GSI/LID/sustainable practices. These opportunities are based on commercial sites permitted (this includes new projects, renovation, tenant improvements, road projects, residential and commercial developments, and units from strip mall areas).

10.7 Post-Construction Stormwater Management in New Development and Redevelopment - Part I.D.5.b

The MS4 Permit for this section requires the following information be included in each Annual Report:

Include a summary and analysis of all maintenance, inspections and enforcement, and the number and frequency of inspections performed annually.

Section 7 of the EPA Annual Report Form includes this information for FY 2019.

A cumulative listing of the annual modifications made to the Post-Construction Stormwater Management Program.

In February 2016, Bernalillo County began requiring a Stormwater Post-Construction Evaluation form for all new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale. This form requires the applicant to evaluate opportunities for the use of Green Stormwater Infrastructure/Low Impact Development (GSI/LID) techniques in the site design. This form is available online: https://www.bernco.gov/uploads/FileLinks/590808d5c7dd4e0cbfaf3009cf1affb9/STORMWATER_POST_CONSTRUCTION_RECOMMENDATIONS_SITE_EVALUATION_NEW_MS4.pdf.

In June 2017, Bernalillo County enacted a stormwater quality ordinance that addresses post construction stormwater management. In December 2017, Bernalillo County created a Guidance Document for Stormwater Post-Construction Best Management Practices (BMPs). Post-Construction stormwater management

information is available on the County's website at: https://www.bernco.gov/public-works/post-construction-storm-water-management-new-re-development.aspx

Report the number of MS4-owned properties and infrastructure that have been retrofitted with control measures designed to control the frequency, volume, and peak intensity of stormwater discharges.

In FY 2018, Bernalillo County completed two projects that included GSI/LID retrofits - Alameda Drain Trial Project and Second Street Southwest improvements. In addition, Bridge Boulevard, which was in designed in FY 2018, includes GSI/LID elements. In FY 2019, Bernalillo County received a grant from the National Recreation and Parks Association Great Urban Parks and through this grant, completed additional Second Street trail improvements including GSI/LID installations, connecting the local community center to Valle de Oro. Cumulatively, during the WSB MS4 Permit term, the County installed an inlet retrofit for the Adobe Acres stormwater facility to improve water quality. The County also included drainage improvements and retrofits with other construction work, such as road improvement projects. The Vista del Rio Road improvement project includes drainage improvements along the public right of way as well as a new detention pond to accommodate additional stormwater runoff volume. Other improvement projects (IP) that are in planning or construction phases that include drainage improvements are the Sunset Road IP, Tower Road SW Roadway and Utility Improvement, Goff Boulevard Improvements, Sunset Gardens Road, and Woodward Road IP, Barcelona Storm Drain Phase 1, intersection of Coors and Blake, among others.

In FY 2019, the County continued to meet with MS4s to discuss areas requiring drainage and water quality retrofits, project priorities, and multi-agency funding. The County's membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) facilitates this cooperation and coordination with other MS4s in the Middle Rio Grande.

As required in Part I.D.5.b.(vi), report the tabulated results for Impervious Area (IA) and Directly Connected Impervious Area (DCIA) and its estimation methodology.

A GIS study was completed by Bernalillo County to estimate the impervious area (IA) in Bernalillo County and within the Middle Rio Grande MS4 Area/Albuquerque Urbanized Area (UA). Bernalillo County continued working cooperatively on this Permit activity during FY 2019 by sharing GIS information with other MS4s, as requested. The GIS study used land use codes, land use categories, and percent impervious fields.

There was no notable change in the impervious area (IA) for unincorporated Bernalillo County within the UA from FY 2018 to FY 2019, which is approximately 10,393 acres. The directly connected impervious area (DCIA) is 0 acres.

10.8 Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations - Part I.D.5.c

Bernalillo County continued to maintain BMPs in place for minimizing impacts to stormwater quality from the County equipment and vehicle maintenance yards, as well as BMPs that address other County facilities/activities, including maintenance and parks and recreation.

Bernalillo County continued to work cooperatively with the COA to maintain the Household Hazardous Waste Collection Center and continued to conduct public household hazardous waste collection events. Approximately 1,895 Bernalillo County and 10,799 City of Albuquerque residents participated in the Hazardous Waste Collection Programs. With this cooperative collection program, over 400,000 pounds of household hazardous waste were collected; 94 percent of the collected waste was able to be recycled and diverted from the landfill. In addition, approximately 279 Bernalillo County residents participated in the nine County led Household Hazardous Waste (HHW) weekend collection events. At these neighborhood collection events, 11,570 pounds of HHW were collected at a cost of $25,581 to Bernalillo County.

Included in this FY 2019 Annual Report, as required by the MS4 Permit, is a cumulative summary of retrofit evaluations conducted during the permit term on existing flood control devices, structures, and drainage ways to benefit water quality. Refer to Section 10.G for the cumulative summary of retrofits. Bernalillo County continued to utilize a stormwater control ranking process to schedule and prioritize stormwater projects and continued to incorporate stormwater quality BMPs into all new flood control projects when feasible. In FY 2017 through FY 2018, Bernalillo County participated in AMAFCA led Project Schedule meetings, where AMAFCA, NMDOT, Bernalillo County, COA, UNM, Middle Rio Grande Conservancy District (MRGCD), and Los Ranchos met to discuss and prioritize projects, including ranking of water quality facilities. The results of these meetings were incorporated into the AMAFCA 2018 Project Schedule – Planned Water Quality Facilities report. Planning meetings for the AMAFCA 2020 Project Schedule will occur in FY 2020.

Other sections in this Annual Report discuss relevant elements of this Control Measure, including Illicit Discharge and Improper Disposal (Section 10.I), Control of Floatables (Section 10.J), and Public Education and Outreach (Section 10.K).

10.9 Illicit Discharges and Improper Disposal - Part I.D.5.e

The County continued its education program to promote, publicize, and facilitate public reporting of illicit connections or discharges, and distribution of outreach materials. Additional information is available in the Public Education and Outreach Section, of this Annual Report. Bernalillo County has an illegal dumping website page (http://www.bernco.gov/illegal-dumping), an illicit discharge website page (http://www.bernco.gov/public-works/illicit-discharge-.aspx), and a hotline (505-314-0310) that includes illicit discharge reporting. Illicit discharges can also be reported by

email to water@bernco.gov and through a web based form available at https://www.bernco.gov/public-works/report-water-waste.aspx. Bernalillo County continued to use an electronic database for tracking IDDE complaints.

The County's IDDE Program Plan includes procedures for outfall screening. The timing of outfall screening is important to consider when scheduling field days. Given the arid climate of this region, outfall inspections can be conducted during the wet or dry seasons and should have an antecedent dry period of at least 72 hours after a rain event greater than 0.1 inch in magnitude. Outfall and outlet locations are screened annually in November and December. During annual screening, field personnel will record observations on an outfall monitoring form and collect photographs. If discharges from outfall locations are observed during screening, samples will be collected as described in the IDDE Program Plan.

In FY 2019, the County completed a review of the IDDE complaint records. There were 29 violations that indicated possible illicit discharges or illegal disposal and were categorized as follows: 10 illegal dumping; 11 surfacing sewage; 4 grey water; 2 oil/automotive fluids; 0 fats/oil/grease; and 2 industrial discharges. Additional information is available upon request. As a program enhancement and in conjunction with USGS and AMAFCA, Bernalillo County installed a rainfall gauge in the South Valley in the Upper Tijeras Watershed in FY 2018 to better understand runoff and evaluate monitoring locations and needs. The County also worked cooperatively with AMAFCA, COA, NMDOT, Village of Los Ranchos, MRGCD, and the ABCWUA (through CMOM) for notification of illicit discharges. The County continued evaluating its Illicit Discharge Detection and Elimination (IDDE) program and is utilizing methodologies consistent with "Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments" as appropriate.

10.10 Control of Floatables Discharges - Part I.D.5.f

This section of the Annual Report serves as Bernalillo County's annual assessment of the progress of this program. In FY 2019, the County tracked and estimated the volume of floatables and trash removed from each stormwater control facility.

Approximately 764 cubic yards (CY) of trash, debris, and vegetation was removed from County catch basins, wet wells, storm sewer lines, County ponds, channels, and rights-of-way.

The composition of floatables and gross pollutants is considered consistent with the updated 2016 AMAFCA/Bernalillo County Gross Pollutant. Using the 2016 study's waste characterization percentages, qualities of wood, rock (greater than one inch), plastics, metals, and paper were estimated. The waste characterization determination is summarized in the table below:

Trash & Debris Total Volume Removed* (CY)	Wood, 42.9 %	Rock > 1", 38.5%	Plastic, 16.5%	Metals, 1.6%	Paper, 0.5%
535 CY	229 CY	206 CY	88 CY	9 CY	3 CY

* The percentages used do not include the sediment amounts found in the Gross Pollutant Study; therefore, the volume of sediment removed is not included in this analysis.

Related, the County Solid Waste Program held several Cleanup Events and collected 2,880 CY of trash that was property disposed of at a landfill. These County Cleanup events are another program that supports removal of floatables from the watershed.

10.11 Public Education and Outreach on Stormwater Impacts - Part I.D.5.g

FY 2019 Public Education and Outreach activities are listed in the table in Section 3 of this Annotation to the Annual Report. To summarize, throughout the reporting period, July 1, 2018 through June 20, 2019, the Bernalillo County Public Outreach programs were able to connect and educate thousands of Bernalillo County Residents. Overall, these educational programs and outreach activities conducted by Bernalillo County and the MRGSQT during this reporting period connected an estimated 617,450 times with County residents. This outreach is estimated from the Bernalillo County website, monthly newsletters, mailing inserts, and various public events results.

The County uses its Bernalillo County Greenprint website highlighting for its community-driven conservation plan (http://web.tplgis.org/bernco/). The purpose of the Greenprint is to guide where public funds should be spent to protect open space and farmland and expand access to local parks and trails throughout Bernalillo County. The Story Map allows users to see the areas and efforts that protect water quality in rivers and streams. The mapping portal provides an online interactive map of County water quality infrastructure. As part of the Greenprint process, areas where natural recharge occurs within the Rio Grande Basin were mapped. These areas are considered high priority areas for protection in the Greenprint.

The County continued to utilize a combination of existing and new educational materials (such as the "Project W.E.T. Kids in Discovery Series" and the Enviroscape watershed model), County-created brochures, and/or other educational materials and promotional items. The County also uses its website and social media as a venue for distributing materials and posts about water quality. Additional documentation related to these materials is available upon request.

In FY 2018 and FY 2019, Bernalillo County and AMAFCA worked cooperatively to create BMP brochures for specific industries (Contractors, Food Preparation or Service, Parking Lots and Drive Through Lanes, Fueling Stations, Vehicle and Equipment Repair, and Landscaping). These brochures were created in both English and Spanish and were

mailed out to over 600 businesses. Examples of these educational and outreach brochures are available upon request.

In FY 2019, the County was not able to fit into the ABCWUA mailing schedule. The County aims to generate one mailing (possibly electronic format) in FY 2020 to residents of unincorporated Bernalillo County addressing one or more of the following topics on a rotating basis: illicit discharge reporting, proper disposal of household hazardous waste including lawn and garden chemicals and used motor oil, FOG, animal sources/pet wastes, litter control, and public participation in the MS4 process. The County provided monthly “BernCo at a Glance” newsletters to residents (mailed and electronic delivery) which also focused on pet waste and stormwater education. Additional documentation is available upon request.

The Valle de Oro National Wildlife Refuge represents a significant local riparian restoration area for the County for stormwater education and outreach. In FY 2019, the County continued to sponsor and support events to educate and involve members of the community about local riparian restoration and clean-up opportunities at the refuge.

Bernalillo County has started using training videos through Excal Visual, Inc. for Pollution Prevention/Good Housekeeping and Illicit Discharge and Detection Trainings. These trainings are required for new employees and annually for select existing employees. In FY 2019, 115 employees received this training.

10.12 Public Involvement and Participation - Part I.D.5.h

The County continued to provide public accessibility of the current SWMP and Annual Report online via the Internet and during normal business hours at the Bernalillo County Public Works main office for public inspection and copying consistent with any applicable federal, state, tribal, or local open records requirements. Bernalillo County adhered to the MS4 Public Notice requirements in Part III.B and provided at least 45-days public notice for this draft Annual Report, allowing public input to be considered before submitting the final Annual Report.

Bernalillo County reviewed the program requirements listed in Public Involvement and Participation Control Measure of the MS4 Permit for the program elements during the Annual Report process. In addition, as part of the Annual Report process, the Stormwater Program Manager reviewed the program requirements and determined that the overall existing program is effective. Some of the MS4 Permit requirements in this section overlap with the Public Education and Outreach Control Measure (refer to Section 10.K in this report). For example, opportunities to utilize volunteers and assessment of public behavioral change following a public education event are part of the Public Education and Outreach program.

Bernalillo County continued to include in its public involvement and participation program: funding groups such as Valle de Oro National Wildlife Refuge (NWR),

Bernalillo County Master Naturalist Program, Rocky Mountain Youth Corps programs, and the Bosque Ecosystem Monitoring Program (BEMP). The County also provided an IDDE hotline reporting phone number and website. In addition, the County is a member of the Water Protection Advisory Board (WPAB), allowing involvement with the ABCWUA, the COA, other Board participants, and the public.

10.13 Wet Weather Monitoring Program - Part III.A.1

During this FY 2019 Annual Report reporting period, sampling continued with the cooperative monitoring program following the monitoring scheme that was approved by EPA and NMED in June 2016. Monitoring plan information is available upon request. The Compliance Monitoring Cooperative (CMC) collected one dry season sample in FY 2018; bringing the total collected samples to seven of the seven required samples for the WSB MS4 Permit Wet Weather Monitoring. With the FY 2019 sample, the CMC has met the required Permit minimum of monitoring three events during the wet season and has obtained one of the two events required in the dry season.

Attachment 1

USGS SIR "Characterization and Load Estimation of Polychlorinated Biphenyls (PCBs) From Selected Rio Grande Tributary Stormwater Channels in the Albuquerque Urbanized Area, New Mexico, 2017-18"

Prepared in cooperation with Bernalillo County

Characterization and Load Estimation of Polychlorinated Biphenyls (PCBs) From Selected Rio Grande Tributary Stormwater Channels in the Albuquerque Urbanized Area, New Mexico, 2017–18

Open-File Report 2019–1106

U.S. Department of the Interior
U.S. Geological Survey

Characterization and Load Estimation of Polychlorinated Biphenyls (PCBs) From Selected Rio Grande Tributary Stormwater Channels in the Albuquerque Urbanized Area, New Mexico, 2017–18

By Zachary M. Shephard, Kathleen E. Conn, Kimberly R. Beisner,
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U.S. Department of the Interior
DAVID BERNHARDT, Secretary

U.S. Geological Survey
James F. Reilly II, Director

U.S. Geological Survey, Reston, Virginia: 2019

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Conversion Factors

U.S. customary units to International System of Units

Multiply	By	To obtain
	Length	
inch (in.)	2.54	centimeter (cm)
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
yard (yd)	0.9144	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square foot (ft^2)	929.0	square centimeter (cm^2)
square foot (ft^2)	0.09290	square meter (m^2)
square mile (mi^2)	259.0	hectare (ha)
square mile (mi^2)	2.590	square kilometer (km^2)
	Volume	
cubic foot (ft^3)	28.32	cubic decimeter (dm^3)
cubic foot (ft^3)	0.02832	cubic meter (m^3)
acre-foot (acre-ft)	1,233	cubic meter (m^3)
acre-foot (acre-ft)	0.001233	cubic hectometer (hm^3)
	Flow rate	
cubic foot per second (ft^3/s)	35.315	cubic meter per second (m^3/s)
	Mass	
pound (lb)	35.315	kilogram (kg)

Datum

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Supplemental Information

Concentrations of chemical constituents in water are given in either milligrams per liter (mg/L) or nanograms per liter (ng/L).

Specific conductance is given in microsiemens per centimeter (µS/cm).

Concentrations of chemical constituents in soil are given in nanograms per kilogram dry weight (ng/kg dw).

Load masses for runoff events are given in milligrams (mg).

Abbreviations

AHYMO	Arid Lands Hydrologic Model
AISWS	Albuquerque International Sunport Weather Station
AMAFCA	Albuquerque Metropolitan Arroyo Flood Control Authority
ATSDR	Agency for Toxic Substances and Disease Registry
DEM	digital elevation model
DPM	Development Process Manual
E. coli	*Escherichia coli*
EPA	U.S. Environmental Protection Agency
GOES	Geostationary Operational Environmental Satellite
MS4	municipal separate storm sewer systems
NMED	New Mexico Environment Department
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NWIS	National Water Information System
PCB	polychlorinated biphenyl
R^2	coefficient of determination
RPD	relative percent difference
SSC	suspended sediment concentration
SSCAFCA	Southern Sandoval County Flood Control Authority
SWMP	stormwater management plan
TOC	total organic carbon
TSS	total suspended solids
USGS	U.S. Geological Survey

Characterization and Load Estimation of Polychlorinated Biphenyls (PCBs) From Selected Rio Grande Tributary Stormwater Channels in the Albuquerque Urbanized Area, New Mexico, 2017–18

By Zachary M. Shephard, Kathleen E. Conn, Kimberly R. Beisner, Alanna D. Jornigan, and Christina F. Bryant

Abstract

In cooperation with the New Mexico County of Bernalillo, the U.S. Geological Survey characterized potential polychlorinated biphenyl (PCB) concentration and estimated loading into the Rio Grande from watersheds that are under the county's jurisdiction. Water and sediment samples were collected in 2017–18 from six sites within four stormwater drainage basins in the Albuquerque, New Mexico, urbanized area for the analysis of PCB congeners and other water-quality constituents during dry and wet seasons. Also, the rainfall-runoff model Arid Lands Hydrologic Model (AHYMO) was used to estimate stormwater discharge at the two sample collection sites not affected by pump station operation. Along with the PCB analysis, the discharge data were used to estimate total PCB stormflow event loads for eight events in these urban Rio Grande tributaries. PCBs were detected in 34 of 36 water samples at concentrations as high as 65.8 nanograms per liter and in 12 of 13 sediment samples at concentrations as high as 163,000 nanograms per kilogram dry weight. Six of the 36 water samples exceeded the New Mexico surface-water quality standard for protection of wildlife habitat and aquatic life of 14 nanograms per liter for PCBs. None of the water samples exceeded the U.S. Environmental Protection Agency's National Pollutant Discharge Elimination System permit level limit of 200 nanograms per liter for PCBs in stormwater systems discharging into the Rio Grande. PCB concentrations in water samples in this study were not linearly related to antecedent precipitation or measured water-quality parameters, but PCB concentrations had a statistically significant positive Kendall's tau correlation with total suspended solids for water samples and with total organic carbon for sediment samples. The PCB congener profiles indicate that sources to stormwater drainage basins in Bernalillo County originate both from legacy sources, such as Aroclors (for example, in landfills and old building materials), and from current-use sources, such as yellow pigments (for example, in printed materials and packaging in urban litter or refuse). Total PCB stormflow event loads were calculated with average potential minimum and maximum event loads of 0.73 and 4.32 milligrams per storm event, respectively, at the Adobe Acres pump station site and 56.78 and 315.13 milligrams per storm event at the Sanchez Farms inflow at Albuquerque, N. Mex., site.

Introduction

The U.S. Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) permit program was introduced in 1972 and authorized by the Clean Water Act (EPA, 2019a). The NPDES permit program works to control water pollution by regulating point sources that discharge into waters of the United States. Urbanized areas that subsequently discharge stormwater into large water bodies through municipal separate storm sewer systems (MS4s), like many of the urbanized areas of New Mexico, are considered point sources by NPDES standards and are therefore subject to regulation (EPA, 2019b). By 1999 the EPA had completed a two-phase NPDES permitting process for MS4s, which requires implementation of a stormwater management plan (SWMP). The SWMP describes the stormwater control practices that will be implemented consistent with permit requirements to minimize the discharge of pollutants from the sewer system (EPA, 2019c).

Bernalillo County, which encompasses the city boundary of Albuquerque, New Mexico, and the designated Albuquerque urbanized area (fig. 1) is subject to regulation under the EPA NPDES permitting process for stormwater runoff. Accurate hydrologic and water-quality data are critical to the implementation of the Bernalillo County SWMP. To meet this data need, the U.S. Geological Survey (USGS), in cooperation with the New Mexico County of Bernalillo, began collecting water samples to assess water quality from four stormwater drainage basins in Albuquerque's urbanized area (fig. 1) in 2004. The sample collection continued uninterrupted through the end of the county's fiscal year 2014 (June 30, 2014). To fulfill EPA monitoring requirements

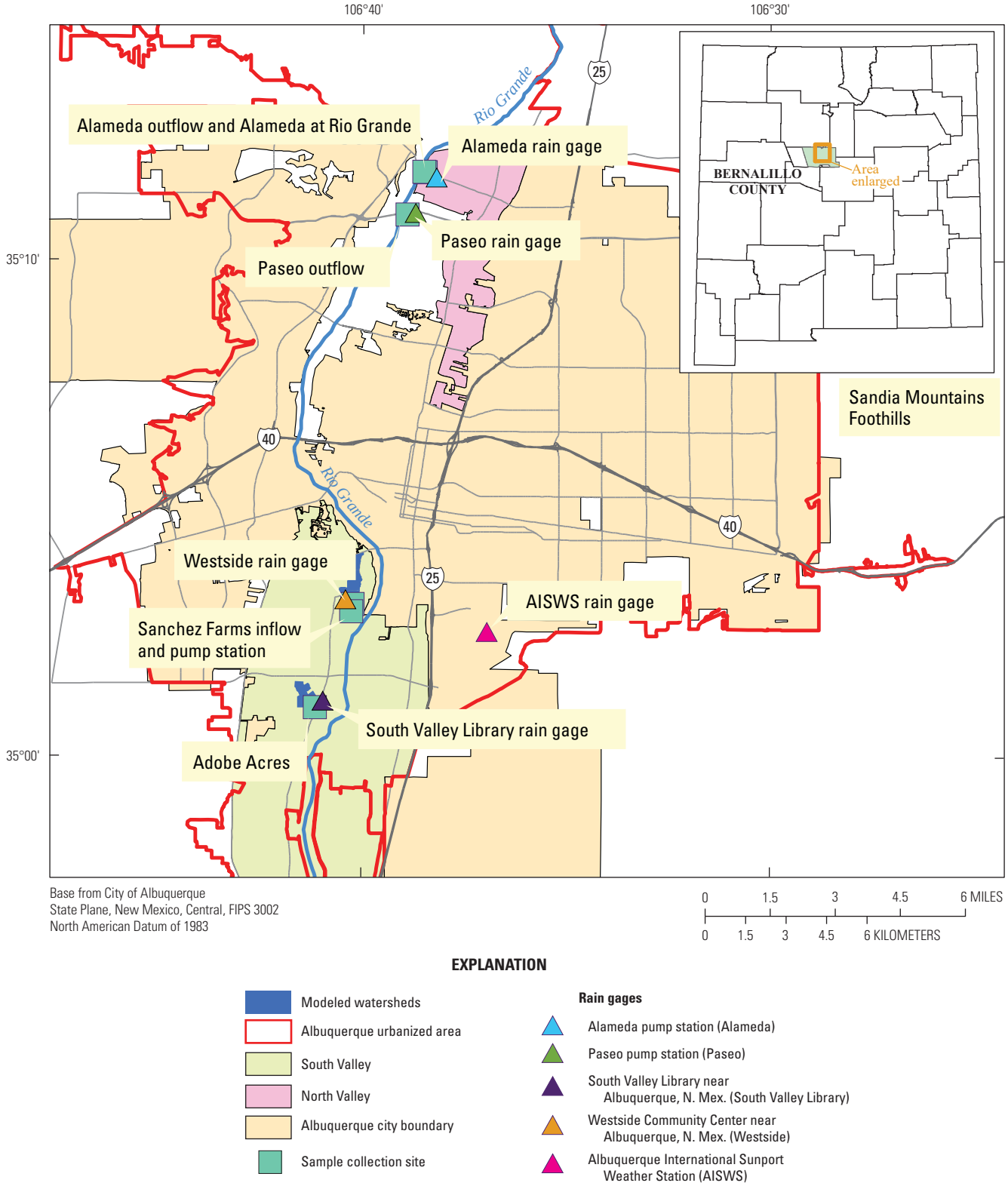


Figure 1. City of Albuquerque, New Mexico, including the urbanized area, and location of water and sediment sample collection sites and rain gages.

outlined in the NPDES permit, these samples were analyzed for trace metals, nutrients, chemical oxygen demand, biological oxygen demand, *Escherichia coli* (*E. coli*) bacteria, total organic carbon (TOC), and the field properties of specific conductance, pH, and water temperature. Results of these analyses are publicly available through the USGS National Water Information System (NWIS) (USGS, 2019a).

Independent of Bernalillo County's normal compliance monitoring and sampling, the NPDES permit also requires the county to complete a study of potential polychlorinated biphenyl (PCB) concentrations and loading into the Rio Grande from watersheds that are under its jurisdiction. Therefore, in 2017 the USGS in cooperation with Bernalillo County initiated a preliminary investigation of PCB concentrations in water and sediment, and of corresponding PCB loads, in the Albuquerque urbanized area to help determine potential contributions of PCBs into the Rio Grande from the county's four primary stormwater pumping outflows.

History and Chemistry of PCBs

PCBs are a class of chemical compounds that contain between 1 and 10 chlorine atoms attached to a biphenyl molecule (fig. 2). The different combinations of the number and location of the chlorine atoms result in 209 individual compounds, known as congeners. The congeners can be categorized by the number of chlorine atoms into groups called homologs, from monochlorobiphenyls, which have 1 chlorine atom, to decachlorobiphenyls, which have 10 chlorine atoms.

This family of human-made chemicals was produced in the United States from 1929 to 1977, primarily by Monsanto Chemical Company (ATSDR 2000), before Congress banned the manufacturing, processing, distribution in commerce, and use of PCBs under the Toxic Substances Control Act and the Resource Conservation and Recovery Act in 1976. PCBs were manufactured as different mixtures of individual congeners under the trade name of Aroclors, and were used as coolants and lubricants in transformers, capacitors, and other electrical equipment because of their insulating properties and very high boiling point. They were also used as plasticizers in rubbers, resins, and carbonless paper and were used in sealants, caulking compounds, paints, pigments, dyes, and inks. More than 1.5 billion pounds of PCBs were manufactured in the United States between 1929 and 1977 (Agency for Toxic Substances and Disease Registry [ATSDR], 2000). Some production is still allowed through exemptions, and there is inadvertent generation of PCBs as manufacturing byproducts. In 1982, the EPA identified 70 manufacturing processes likely to inadvertently generate PCBs and estimated an annual production of 100,090 pounds per year (Panero and others, 2005). PCB congener 11, or PCB-11, and the nonachloro- and decachloro-congeners (containing 9 and 10 chlorine atoms, respectively, including PCB-206, -207, -208, and -209) have been detected in current-use pigments and dyes (Stone, 2016). Sources of current-use PCBs to the environment may include effluents from ink and dye manufacturing and from pulp mills repulping postconsumer paper, as well as leaching from printed magazines, newspapers, fabrics, and packaging materials in landfills, and collection systems where litter can accumulate (Hu and Hornbuckle, 2010; Rodenburg and others, 2010; Guo and others, 2014). The relative contributions of PCBs to the environment from additional unpermitted nonpoint releases, such as from paints, agricultural chemicals, plastic materials, and detergents, are unknown and need further investigation. The stormwater systems targeted for sampling in this study are in the Albuquerque urbanized area; therefore, potential sources of PCBs to the basins include precipitation-derived transport of legacy Aroclor PCBs, for example, from landfills or illicit dump sites, as well as leaching of current-use PCBs, for example, from urban litter or refuse that accumulates within the basins.

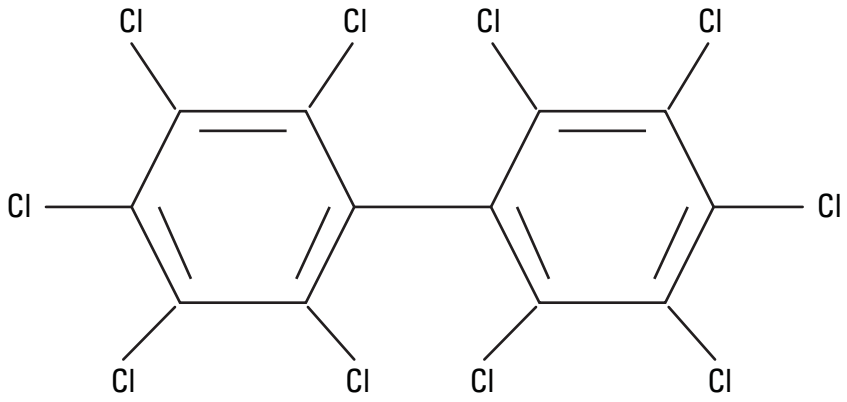


Figure 2. Chemical structure of a polychlorinated biphenyl containing 10 chlorine atoms (decachlorobiphenyl). There are 209 possible structures, called congeners, each containing between 1 and 10 chlorine atoms attached at different locations on the central biphenyl molecule.

Despite the ban on production of PCBs in the 1970s, legacy PCBs can still be released to the environment from hazardous waste sites, illegal or improper disposal of industrial wastes and consumer products, leaks from old transformers and other products, leaching from caulking materials, and burning of some wastes in incinerators (ATSDR, 2000). The stable chemical properties of PCBs that were useful in industrial applications make them some of the most persistent chemicals in the environment. Over time, PCBs move from one environmental compartment to another. For example, PCBs volatilize and can be deposited on land surfaces through wet and dry deposition (Nelson and others, 1998), stormwater runoff can carry land surface chemicals into rivers and oceans (Andersson and others, 2015), PCBs partition from water to sediment and settle in river and bed sediments (Andersson and others, 2015), and ingestion of resuspended contaminated sediments by aquatic organisms can result in bioaccumulation in organisms and biomagnification up the food chain (Ruus and others, 2012; Desforges and others, 2018).

Humans can be exposed to PCBs by ingesting contaminated drinking water and food, especially fish from contaminated waters, and by inhaling contaminated air. Additional exposure routes near known hazardous waste sites include interaction with contaminated sediment, for example, through recreation. A wide range of adverse health effects have been associated with exposure to PCBs in humans and animals, including liver, thyroid, dermal, and ocular changes; immunological alterations; neurodevelopmental changes; reduced birth weight; reproductive toxicity; and cancer (ATSDR, 2000).

Purpose and Scope

This report presents a preliminary assessment of PCB concentrations and loading in stormwater runoff events from four selected Rio Grande tributary watersheds that are under Bernalillo County's jurisdiction in the Albuquerque urbanized area, New Mexico. PCB concentrations were determined in water and sediment samples collected from four stormwater drainage basins from summer 2017 to fall 2018. Also, estimates of stormwater discharge hydrographs at the sampled basin outflow points for two sampling locations were made using a rainfall-runoff computer simulation model. The total PCB concentrations and discharge estimates were used to estimate PCB loads from the two stormwater drainage basin outlet points. The results described in this report provide insights into PCB concentrations and loadings in the Rio Grande, as well as the health of the Rio Grande as a whole, and can be used to assist in fulfilling the county's NPDES permit requirements for the EPA.

Study Site Descriptions

The study area is in the City of Albuquerque urbanized area, located in north-central New Mexico (fig. 1). The eastern part of the city is built upon the alluvial fans of the Sandia Mountains foothills, and the western part lies along the Rio Grande river terrace and flood plain. Elevation in the city ranges from about 5,000 to 7,000 feet (Veenhuis, 2003). The land area of the City of Albuquerque is approximately 188 square miles, and the U.S. Census Bureau estimated the population to be 560,218 people in 2018 (U.S. Census Bureau, 2018). There were an estimated 243,402 housing units in the City of Albuquerque as of 2017 (U.S. Census Bureau, 2017). The Albuquerque urbanized area has a stormwater infrastructure system of natural and concrete-lined arroyo channels, as well as underground storm drainage pipes, that help direct stormwater runoff through the city and into the Rio Grande. These channels are ephemeral and typically only have measurable discharge following intense rainstorm events or from rapid snowmelt. Water-quality and sediment samples were collected at six different locations near the outfalls of four small urban drainage channels: Alameda, Paseo, Sanchez Farms, and Adobe Acres. Aerial imagery of each sample collection site is shown in figure 3.

The Albuquerque urbanized area has a semiarid climate; average annual precipitation is about 8 inches in the lower elevations near the Rio Grande and increases to about 12 inches at the foothills of the Sandia Mountains (NOAA, 2019). According to the National Weather Service's Albuquerque International Sunport Weather Station (AISWS), more than one-half of the annual precipitation in the Albuquerque urbanized area occurs as rainstorms from July through October (NOAA, 2019). These monsoon rainstorms are typically small convective cells that move rapidly through the area, are often intense, and can result in flash flooding. On rare occasion, large frontal storms that originate from remnant hurricanes in the Gulf of Mexico move into the area (Veenhuis, 2003).

Water-Quality and Sediment Sample Collection Site Descriptions

Water-quality and sediment samples were collected at six sites within four stormwater drainage basins. The Alameda and Sanchez Farms watersheds each had two sites and the Adobe Acres and Paseo watersheds had one site each (fig. 3).

Alameda Watershed Water-Quality and Sediment Sample Collection Sites

There were two water-quality sample collection sites near the outlet of the Alameda stormwater drainage basin (fig. 3*C*). The Alameda pump station outflow (USGS site identification number 351146106382801) water-quality and sediment sample collection site (hereafter Alameda outflow) is a small concrete-lined basin (fig. 4*A*) approximately 70 yards east of the Rio Grande. Water is pumped into the concrete basin from a stormwater pump station located just to the east of the site. With sufficient pumping volume, the water flows from the concrete-lined collection basin down a straight unlined canal towards the Rio Grande. Standing water remains in the basin when water is not being pumped into it. Some fine-grained substrate has settled into the concrete basin.

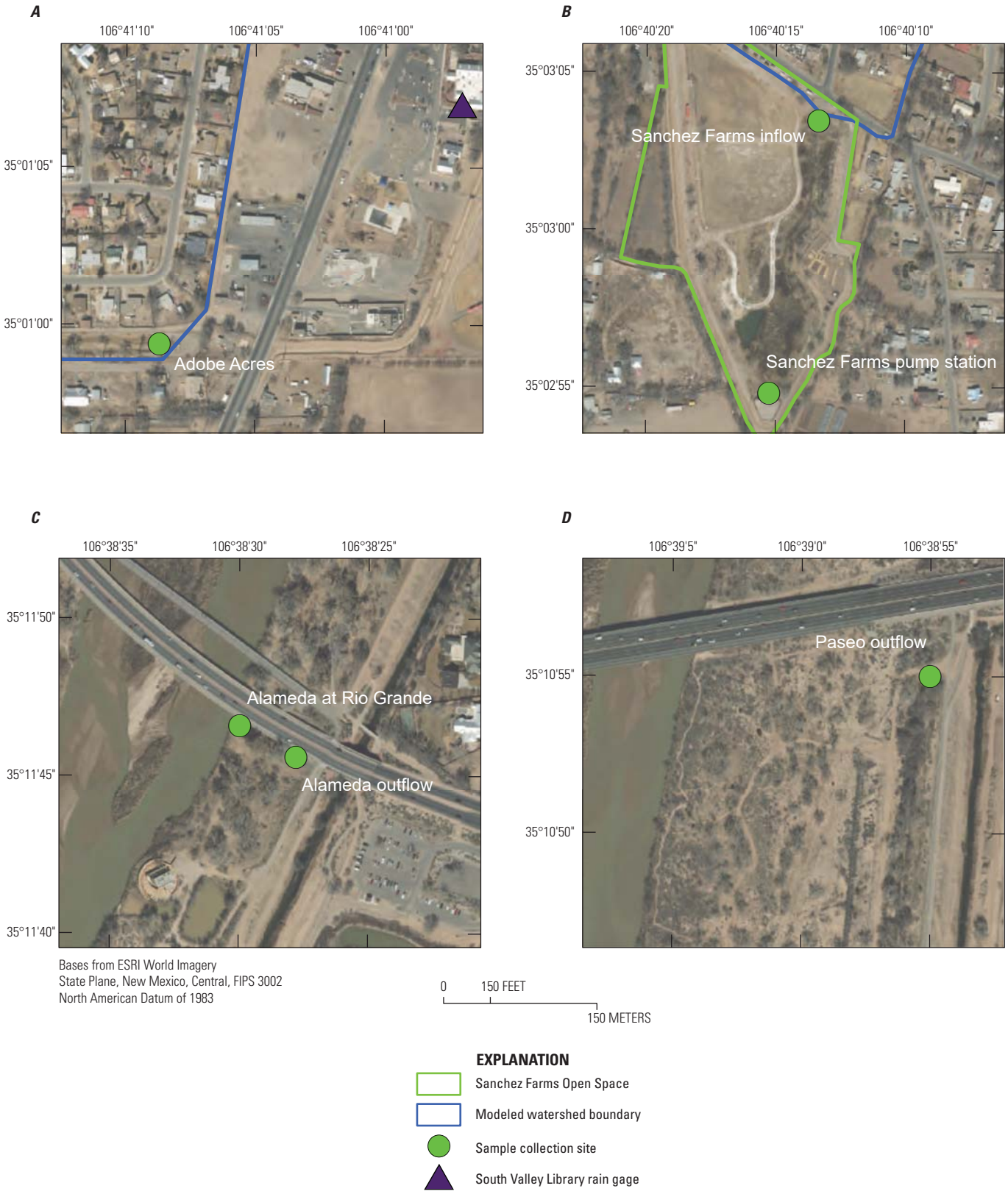


Figure 3. Aerial views of the sample collection sites in the Albuquerque urbanized area, Bernalillo County, New Mexico. *A*, Adobe Acres pump station (Adobe Acres); *B*, Sanchez Farms inflow at Albuquerque, N. Mex. (Sanchez Farms inflow) and pump station (Sanchez Farms pump station); *C*, Alameda pump station outflow (Alameda outflow) and Alameda pump at Rio Grande Inlet (Alameda at Rio Grande); and *D*, Paseo pump station outflow (Paseo outflow).

Figure 4. Ground views of water-quality and sediment sample collection sites, Alameda stormwater drainage basin, Albuquerque urbanized area, Bernalillo County, New Mexico. *A*, Alameda pump station outflow (Alameda outflow), looking west (concrete-lined basin in foreground). *B*, Alameda pump at Rio Grande Inlet (Alameda at Rio Grande), looking west (also seen in the background of *A*).

Figure 4. Ground views of water-quality and sediment sample collection sites, Alameda stormwater drainage basin, Albuquerque urbanized area, Bernalillo County, New Mexico. *A*, Alameda pump station outflow (Alameda outflow), looking west (concrete-lined basin in foreground). *B*, Alameda pump at Rio Grande Inlet (Alameda at Rio Grande), looking west (also seen in the background of *A*).

The Alameda pump at Rio Grande Inlet (USGS site identification number 351147106383001) water-quality and sediment sample collection site (hereafter Alameda at Rio Grande) (fig. 4*B*) is located within the unlined outflow channel from the Alameda outflow concrete basin. Samples were collected near a small footbridge that crosses the canal. The site is typically dry except during runoff events when stormwater is pumped through the concrete basin and down the unlined channel. Given a sufficient pump volume, water flows through the channel and directly into the Rio Grande. Small volumes of standing water have been observed in the channel on days following storm events. The substrate in the collection basin is muddy with branches and sticks.

Paseo Watershed Water-Quality and Sediment Sample Collection Site

The Paseo pump station outflow (USGS site identification number 351055106385501) water-quality and sediment sample collection site (hereafter Paseo outflow) is located approximately 250 yards east of the Rio Grande (fig. 3*D*). This site is below an outflow pipe that discharges water from a stormwater pump located to the east of the site (fig. 5). The water then flows from the collection site down an unlined canal in a sinuous path through a section of the Rio Grande flood plain. During this study, stormwater was always observed to infiltrate the ground surface before reaching the Rio Grande. The bed material at the site is muddy, and there are some cattails (*Typha latifolia*) and other aquatic vegetation growing along the canal near the collection site.

Sanchez Farms Watershed Water-Quality and Sediment Sample Collection Sites

There are two water-quality and sediment sample collection sites in the Sanchez Farms Open Space recreation area (fig. 3*B*). The Sanchez Farms inflow at Albuquerque, N. Mex. (USGS site identification number 350304106401310) (hereafter Sanchez Farms inflow), water-quality and sediment sample collection site is located on the northern end of the Sanchez Farms Open Space recreation area (fig. 6*A*). This site is at the entrance where stormwater flows into a concrete basin through subsurface stormwater drainage pipes. This concrete basin has small openings near the top of the retaining walls that allow water to spill out if a sufficient volume of water enters the basin (fig. 6*A*). Water that flows out of the basin openings then flows to the south through a constructed wetland towards the Sanchez Farms pump station water-quality and sediment sample collection site (described in the next section). Collecting samples at the Sanchez Farms inflow and pump station, which are upgradient and downgradient, respectively, of the wetland, may indicate potential mitigating effects of the wetland on water quality. Urban litter or refuse, a potential PCB source, including clothing, fast food containers, and other packaging waste, has been observed to frequently accumulate in the concrete basin.

The Sanchez Farms pump station (USGS identification number 350255106401510) water-quality and sediment sample collection site is located on the southern end of the Sanchez Farms Open Space recreation area (fig. 6*B*). Between stormflow events, there is a shallow pool of standing water at this site. Water-quality and sediment samples were collected in the pool, just upgradient from a stormwater pump that is located behind a large metal grate. Cattails are abundant along the banks at this site, and the substrate is primarily decaying cattails with some fine sediment. Water from this site must first be mobilized by the pump station through an underground pipe before reaching the Rio Grande, which is approximately 0.40 mile east of the pump station, though travel distance through underground pipes from the site to the Rio Grande may be longer.

Adobe Acres Watershed Water-Quality and Sediment Sample Collection Site

The Adobe Acres pump station (USGS identification number 350059106410810) (hereafter Adobe Acres) water-quality and sediment sample collection site (fig. 3*A*) is located at the eastern end of an unlined drainage canal that flows into a stormwater pump station (fig. 7). Before water reaches the pump station, it flows through a metal grate and enters a small concrete basin, where the samples were collected. Cattails and other emergent aquatic vegetation are abundant on the surface of the water in the unlined channel just before the concrete basin. When sediment is disturbed in the area, there is a strong hydrogen sulfide odor, likely from decaying vegetation. Water that leaves this site is then mobilized by the pump station through an underground pipe before reaching the Rio Grande, which is approximately 0.75 mile east of the pump station, though travel distance through underground pipes from the site to the Rio Grande may be longer.

Rain Gage Site Descriptions

Four rain gages were used for precipitation event summary and characterization in this study, as well as for rainfall-runoff model input data. The four rain gages were located near the sample collection sites and are assumed to be representative of the precipitation conditions within each watershed. The rain gage locations are shown in figure 1.

Alameda Pump Station Rain Gage

The Alameda pump station rain gage (USGS identification number 351140106381230) (fig. 1) (hereafter Alameda rain gage) is located within the Bernalillo County Alameda pump station outflow lockup, on an adobe wall circling the pump station catwalk. The rain gage is mounted on a heavy brick foundation, which is securely mounted on a Bernalillo County electrical box that is approximately 9 feet above land surface.

Figure 5. Ground view of water-quality and sediment sample collection site, Paseo pump station outflow (Paseo outflow), Albuquerque urbanized area, New Mexico, looking northeast.

Figure 6. Ground views of water-quality and sediment sample collection sites, Sanchez Farms, Albuquerque urbanized area, New Mexico. *A*, Sanchez Farms inflow at Albuquerque, N. Mex. (Sanchez Farms inflow), looking south. *B*, Sanchez Farms pump station downgradient from constructed wetlands at Sanchez Farms, looking west.

Figure 6. Ground views of water-quality and sediment sample collection sites, Sanchez Farms, Albuquerque urbanized area, New Mexico. *A*, Sanchez Farms inflow at Albuquerque, N. Mex. (Sanchez Farms inflow), looking south. *B*, Sanchez Farms pump station downgradient from constructed wetlands at Sanchez Farms, looking west.—Continued

Figure 7. Ground view of water-quality and sediment sample collection site, Adobe Acres pump station (Adobe Acres), Albuquerque urbanized area, New Mexico, looking west.

Paseo Pump Station Rain Gage

The Paseo pump station rain gage (USGS identification number 351057106384330) (fig. 1) (hereafter Paseo rain gage) is located within the Bernalillo County Paseo pump station lockup on the roof of a maintenance shed. The rain gage is mounted on a stainless-steel pipe structure and sits approximately 20 feet above land surface. This gage reports data in real time (USGS, 2019b).

Westside Community Center Near Albuquerque, N. Mex., Rain Gage

The Westside Community Center near Albuquerque, N. Mex., rain gage (350310106402430) (figs. 1 and 8) (hereafter Westside rain gage) is located on the roof of the Westside Community Center in Albuquerque. The rain gage is mounted on a stainless-steel pipe structure and sits approximately 25 feet above land surface. This gage reports data in real time (USGS, 2019b).

South Valley Library Near Albuquerque, N. Mex., Rain Gage

The South Valley Library near Albuquerque, N. Mex., rain gage (USGS identification number 350107106405730) (figs. 1, 3, and 9) (hereafter South Valley Library rain gage) is located on the roof of the South Valley Library in Albuquerque. The rain gage is mounted on a stainless-steel pipe structure and sits approximately 35 feet above land surface. This gage reports data in real-time (USGS, 2019b).

Methods

The four primary Bernalillo County outflows to the Rio Grande where water and sediment samples were collected were the Alameda pump station and Paseo pump station in the North Valley and Sanchez Farms pump station and Adobe Acres pump station in the South Valley (fig. 1). In the absence of observed discharge data, the rainfall-runoff model AHYMO (City of Albuquerque, 2018), which has been developed for use in the Albuquerque area (City of Albuquerque, 1997), was used to estimate stormwater discharge at two of the sampled outflow sites: just before the Sanchez Farms inflow and Adobe Acres. Discharges at the Paseo outflow and Alameda outflow sites are dependent upon the operation of the pump stations, whereas discharges at the Sanchez Farms inflow and Adobe Acres are from direct urban runoff. Therefore, in this study, discharges were simulated only at the Sanchez Farms inflow and Adobe Acres sampling sites. These estimated discharge values, along with the PCB concentrations measured in the stormwater samples, were used to estimate total PCB stormflow event loads in the two corresponding Rio Grande tributary watersheds.

Since 2008, precipitation data have also been collected by the USGS at the four previously discussed gage locations (fig. 1), one near each of the four sampled watersheds. Precipitation data are a component of the stormwater monitoring data collection activities required by the NPDES permit for Bernalillo County. These data have been collected in accordance with standard USGS protocols for the collection of precipitation data (USGS, 2009) and have been stored in the NWIS database (USGS, 2019b). Additionally, water-quality and sediment samples were collected following USGS protocols (USGS, variously dated), and analytical results were stored in the NWIS database (USGS, 2019a).

Water and Sediment Sample Collection Methods

Wet season water and sediment samples that coincided with the monsoon season in New Mexico were collected from July through October 2017 and 2018 in response to recorded precipitation events of 0.25 inch or greater at any of the three real-time USGS rain gages (Paseo, Westside, and South Valley Library) located near sampling sites. Dry season samples were defined as being collected in December 2017 and November 2018.

Water

Field properties (temperature, pH, and specific conductance) were measured in the water body prior to sample collection. Water samples were collected as dip samples using a glass compositing container. Wet season samples were collected as a composite of five samples over time for a total duration of 25 minutes to 2 hours, depending on the duration of the storm event.

TOC samples were preserved with sulfuric acid. Samples were kept on ice until returning to the laboratory and then were stored in a refrigerator and shipped overnight on ice to the analyzing laboratory.

Sediment

Sediment samples were collected from bed sediment by using a US BMH-53 hand-held piston-type bed-material sampler. A composite of three to six sediment core plugs were combined in a stainless-steel bowl and homogenized with a stainless-steel spatula; after homogenization a subsample was transferred to the sediment sampling container. Samples were stored on ice in a refrigerator and shipped overnight on ice to the analyzing laboratory.

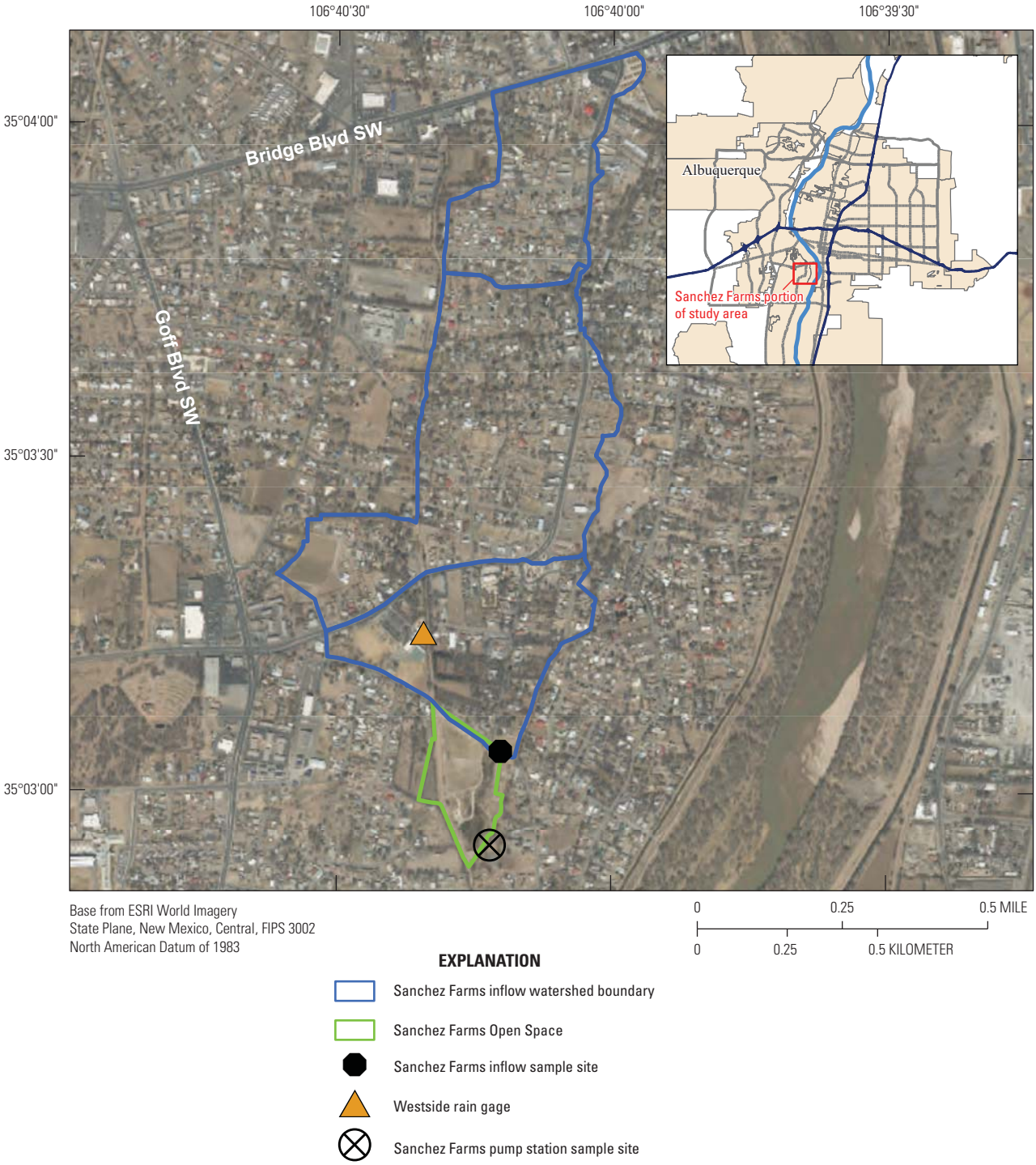


Figure 8. Delineated Sanchez Farms inflow at Albuquerque, N. Mex. (Sanchez Farms inflow), watershed boundary and Westside Community Center near Albuquerque, N. Mex., rain gage (Westside rain gage), Albuquerque, New Mexico.

Figure 9. Delineated Adobe Acres pump station (Adobe Acres) watershed boundary and South Valley Library near Albuquerque, N. Mex., rain gage (South Valley Library rain gage) Albuquerque, New Mexico.

Analytical Methods for Water and Sediment Samples

Water samples were analyzed for suspended sediment concentration (SSC), total suspended solids (TSS), TOC, and PCB congeners. SSC and percent fine sediment with a particle-size diameter smaller than 0.0625 mm (analyzed on a subset of eight samples) were analyzed at the USGS New Mexico Sediment Laboratory located in Albuquerque, New Mexico. RTI Laboratories, located in Livonia, Michigan, analyzed TSS by using SM-2540D (American Public Health Association, American Water Works Association, and Water Environment Federation, 2018a) and TOC by using SM-5310B (American Public Health Association, American Water Works Association, and Water Environment Federation, 2018b). Two hundred and nine PCB congeners were analyzed in water samples by Cape Fear Analytical, a subcontract laboratory for RTI Laboratories located in Wilmington, North Carolina, by using EPA method 1668 (EPA, 2008).

Sediment samples were analyzed for percent moisture, organic carbon, and PCB congeners. In the sediment samples, Cape Fear Analytical analyzed the 209 PCB congeners by using EPA method 1668 (EPA, 2008) and RTI Laboratories analyzed percent moisture by using ASTM D2216 (ASTM International, 2019) and organic carbon by using SW9060A (EPA, 2015).

Quality Assurance

In addition to the environmental samples collected in the field, as quality assurance for water samples, one equipment blank and two field blank samples were collected using certified organic free blank water from the USGS National Field Supply Service. Five samples were collected as replicate water samples. The replicate samples were sequential (collected after the main environmental sample) to assess field and laboratory variability. Not every replicate and blank have results for all analytes, but every analyte has results in at least one sample, with the exception of the field blank, which did not measure for SSC or specific conductance.

As quality assurance for sediment samples, one field blank was collected using certified clean silica sand that was in contact with the sediment coring device and stainless-steel bowl. Three replicate samples were collected for the sediment samples as a separate subsample from the homogenized sediment in the stainless-steel bowl. Not every replicate has results for all analytes, but every analyte has results in at least one replicate sample. The sediment field blank was not analyzed for organic carbon but was analyzed for all other analytes.

Data Analysis

Field notes and laboratory analytical reports were compared with the data in the NWIS database for completeness and accuracy (USGS, 2019b). Analytical chemistry results reported from the laboratory were checked to assess whether laboratory quality assurance and quality control were within the acceptable criteria outlined for USGS contract laboratory reporting. Data were analyzed and approved after confirming that the quality assurance and quality control were acceptable and the laboratory and database results agreed. Environmental sample data are publicly available in NWIS (USGS, 2019b).

PCBs are summarized in the report as total PCBs, the sum of all detected congener concentrations in a sample. Total PCB concentrations in water samples were compared against the New Mexico Environment Department (NMED) surface-water quality standards of 14 nanograms per liter (ng/L) for the protection of wildlife habitat and aquatic life (NMED, 2018) and against the minimum qualification level of 200 ng/L in the NPDES permit (NMED, 2018). The minimum qualification level is defined as "… the minimum quantification level for a constituent determined by official published documents of the United States Environmental Protection Agency" (NMED, 2018). Total PCB concentrations in sediment samples were compared against a threshold effect concentration of 40,000 nanograms per kilogram dry weight (ng/kg dw) and a midrange effect threshold of 400,000 ng/kg dw, derived from a compilation of literature studies of benthic toxicity testing (MacDonald and others, 2000).

Simple linear regressions were calculated in Microsoft Excel between TSS and SSC and between total PCBs in water and other water-quality and hydrologic parameters to identify surrogate parameters for predicting water PCB concentrations that are easier and less costly to collect than PCBs. Nonparametric statistical method analysis to calculate Kendall's tau was performed in the statistical programing language R by using the cor.test function (R Core Team, 2018). A p-value of less than (<) 0.05 (95-percent confidence level) was used to indicate statistical significance.

Collection of Precipitation Data

Precipitation data were collected using unheated Onset Corporation dual tipping bucket gages with 6.125-inch-diameter funnel rain gages, with the exception of the Alameda rain gage, which had a 6.5-inch-diameter funnel. The tipping buckets tip one time per 0.01 inch of water. Data collected by the Alameda rain gage were stored in 5-minute intervals on a ruggedized HOBO Event data recorder. The Paseo, Westside, and South Valley Library rain gages are real-time gages, which transmit data to USGS offices typically every 1 to 4 hours. Real-time data are available on NWIS as they are collected (USGS, 2019b). All collected data were reviewed and approved according to USGS guidelines. Data are stored at 5-minute intervals on a Satlink2 data collection platform, which allows transmission to NWIS by way of a Geostationary Operational Environmental Satellite (GOES) top-hat antenna. Data collection equipment (including the Satlink2 and its battery) is housed in a 1- by 1- by 1.5-foot metal shelter mounted on a stainless-steel pipe structure. Precipitation data were collected following protocols outlined in USGS (2009).

Rainfall-Runoff Modeling

Simulated discharge from an urban rainfall-runoff model was used for the PCB load calculations in this report. A total of eight events were modeled at two outfall locations, Adobe Acres and Sanchez Farms inflow.

AHYMO Rainfall-Runoff Model

Rainfall-runoff modeling in this study was conducted using the Arid Lands Hydrologic Model (AHYMO) (City of Albuquerque, 2018) software program. AHYMO was adapted from the United States Department of Agriculture Agricultural Research Service Hydrologic Model (HYMO) (Williams and Hann, 1973) in an effort by the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) to better represent New Mexico hydrologic conditions. AHYMO has undergone several iterations of development since its inception; however, the most recent version of AHYMO, AHYMO-S4-R2, was released in 2018 after the consulting firm C.E. Anderson transferred ownership of the program to the City of Albuquerque (City of Albuquerque, 2018). The model was originally verified for physical and hydrologic conditions characteristic of the greater Albuquerque area and has been considered a useful tool by local engineers and hydrologists for the past two decades (Schoener, 2010). Guidance for setting up model simulations has been developed by local hydrology and engineering professionals and is documented in chapter 22 of the Albuquerque "Development Process Manual" (DPM) (City of Albuquerque, 1997).

AHYMO Equations and Procedures

AHYMO generates continuous discharge data given an input rainfall distribution and selected basin characteristics. Following the guidance of the DPM, simulated discharge values are calculated using a split-hydrograph approach, as documented in Anderson and Heggen (1991). In this approach, runoff volume is calculated for hydrographs for both pervious and impervious areas by using separate initial abstraction (precipitation depth that must be exceeded before direct runoff begins) and uniform infiltration rates (constant rainfall infiltration loss rate after the initial abstraction). Initial abstraction values and uniform infiltration rates are determined by "land treatment" types, which are described in tables A-4, A-5, A-6, and A-7 in chapter 22 section 2 of the DPM (City of Albuquerque, 1997). Areal watershed percentages of land treatment types are dependent on land use and land parcel size and were populated in the model by following the guidance of table D-3 in section 2 of the Southern Sandoval County Flood Control Authority (SSCAFCA) DPM (SSCAFCA, 2009). Time of concentration, lag time, and time to peak for transforming the runoff volume to the basin outlet are computed by AHYMO with the Soil Conservation Service Upland Method, first identified by the City of Albuquerque DPM (City of Albuquerque, 1997). This approach utilizes different equations based on the subbasin reach length.

Model Preparation

Prior to assessing the basin characteristics that determine the input parameters for AHYMO, the urban watershed boundaries were delineated using a methodology similar to Parece and Campbell (2015). This approach followed the general workflow of first determining the topographic-based watershed boundary and then modifying this boundary by incorporating the effects of urban stormwater infrastructure such as storm pipes, artificial channels, and road gutters that can divert stormflow either into or out of the topographically determined watershed. This was done by using automated geographic information system tools, with some additional manual delineation based on aerial photography and knowledge of the landscape. The initial topographic watershed was created by using the tools available in the Hydrology toolbox in Esri software ArcMap version 10.6.1, with a digital elevation model (DEM) as the initial input. The DEM was created from a 2-foot contour shapefile available from the City of Albuquerque (https://www.cabq.gov/gis/geographic-information-systems-data), with a final cell size of 50 by 50 feet. A final manual adjustment of the watershed boundary was made to account for irregularities and resolution issues with the input DEM, though some uncertainty remained in the final delineated watershed boundary because of potentially missing spatial storm drainage data and because of a lack of field verification. Additional geospatial analysis was conducted in ArcMap version 10.6.1 to derive the additional AHYMO data input requirements of basin channel length, basin centroid distance, and slope.

Precipitation data from the Westside rain gage were used as input data for the Sanchez Farms inflow rainfall-runoff model, and precipitation data from the South Valley Library rain gage were used for the Adobe Acres rainfall-runoff model. Precipitation data were reformatted to incremental inches starting from the beginning of each simulated rainfall response event. The watershed boundaries and their spatial relations to the Westside and South Valley Library rain gages are shown in figures 8 and 9, respectively.

Discharge values were simulated through rainfall-runoff modeling at the Sanchez Farms inflow and the Adobe Acres sites. Discharge at Alameda outflow, Alameda at Rio Grande, and Paseo outflow is dependent on operation of the stormflow pumps and therefore cannot be accurately simulated. The Sanchez Farms pump station site is located in a wetland, and discharge at that point is highly uncertain because of the large groundwater contribution and the unknown contribution to flow from the Sanchez Farms inflow concrete overflow basin. Therefore, load calculations, which are dependent on discharge, were determined for only the Sanchez Farms inflow and the Adobe Acres sites.

Rainfall-runoff modeling in this report was conducted without altering the initial abstraction values and constant infiltration rates suggested by the Albuquerque DPM because there were no measured discharge data with which to calibrate the model simulation data. The suggested model parameter values were empirically determined for the Albuquerque area but have not been calibrated for the specific subwatersheds in this study. The model results in this study have therefore not been verified. Also, AHYMO is an event-based stormflow model and does not account for base-flow input. During dry periods, however, stream discharge has been observed in the field at the Adobe Acres site, which can likely be attributed to groundwater-fed base flow. This base-flow discharge at the Adobe Acres site may be strongly affected by anthropogenic factors. The discharge results for Adobe Acres therefore represent the inflow volume from direct stormwater runoff but likely do not reflect the actual combined event and base-flow discharge.

Load Calculation Methods

Methods for calculating PCB loads are described in this section. In addition, the methods for addressing uncertainty associated with calculating loads is described.

Concentration Discharge Calculation

Total PCB loads were calculated using a simple *concentration x discharge* approach with the following equation (Meals and others, 2013),

$$load = \sum_{i=1}^{n} c_i q_i \Delta t$$

where over a set of n products, c is concentration, q is discharge, and Δt is the time interval over which the concentration and discharge measurements apply. In this study, concentration was in units of nanograms per liter, discharge was calculated in cubic feet per second (ft^3/s) and converted to liters per second, and the time step for the model simulations was 300 seconds, or 5 minutes. Loads were calculated for each individual stormflow event during which water samples were collected.

Load Calculation Uncertainty

Because of the flashiness of stormwater runoff in the Albuquerque urbanized area, only one composite sample was collected during each stormflow event over the course of 25 minutes to 2 hours; a higher sampling frequency during an event would increase the accuracy of the load calculation. Most samples were collected during the falling limb of the stormflow hydrograph (as determined by AHYMO), and it is possible that concentrations in the rising limb or peak of the hydrograph may exhibit different concentrations. Because of the low sampling frequency, the concentration at the time of sampling was assumed to be constant for the duration of the stormflow event. Assuming a constant concentration is a source of uncertainty in the load calculation because contaminant concentrations can be dependent on the magnitude of discharge, and discharge rates do not remain constant for the duration of an event.

To address the combined concentration and discharge uncertainty, total PCB event load estimates were constrained on the basis of the potential minimum and maximum loads for each event at each site. The potential minimum event loads for each event were estimated by applying the lowest measured concentration of total PCBs among all samples collected at a respective site to each stormflow event load calculation at that respective site. Likewise, the potential maximum loads were estimated by applying the highest measured total PCB concentration among all samples collected at a respective site to each stormflow event load calculation at that respective site. Each event therefore is reported with three separate load calculations: an estimated event load based on the concentration collected during the event, a potential minimum event load based on the lowest total PCB concentration collected at the site, and a potential maximum event load based on the maximum total PCB concentration measured at the site.

Precipitation in Albuquerque Near the Rio Grande

This section characterizes precipitation in Albuquerque, and details specific storm events during the study. In addition, this section highlights the importance of having multiple rain gages in the study area, due to the spatial heterogeneity of precipitation in Albuquerque.

Annual and Monsoon Season Precipitation 2008–18

The NOAA AISWS gage is the primary source of weather information for the Albuquerque metropolitan area. During the period from 2008 through 2018 at the AISWS gage (NOAA, 2019), an average of 64 percent of the annual precipitation total occurred between July and October, and 6 years had higher than average (7.90 inches) annual precipitation totals and higher than average (5.06 inches) monsoon precipitation totals (2008, 2010, 2013, 2014, 2015, and 2018). However, a higher than average percentage of total precipitation as monsoon rainfall did not always occur in years when monsoon precipitation itself was higher than average; 2009 and 2011 had lower than average monsoon

and annual precipitation totals, but 70 and 68 percent of their annual precipitation occurred between the months of July and October, respectively. Conversely, just 50 percent of precipitation in 2015 occurred during the monsoon months (fig. 10).

Data from the AISWS are often used to characterize precipitation in the Albuquerque area, but precipitation that falls as a result of convective thunderstorms is often highly localized (Gupta and others, 2002). Additionally, the AISWS is in the southwest quadrant of the city; thus, the Bernalillo County rain gages operated by the USGS offer a more widespread survey of precipitation within the City of Albuquerque that better characterize the spatial heterogeneity of rainfall. Precipitation measured from July through October for 2008–18 for each of the four Bernalillo County rain gages (fig. 11) shows generally similar precipitation values for the pair of sites in the north (Alameda rain gage and Paseo rain gage) and the south (Westside rain gage and South Valley Library rain gage).

The funnel of the Alameda rain gage was partially clogged from July 26, 2017, through September 28, 2017, during which time 2.45 inches of precipitation were recorded. Because of quality-assurance standards, the data collected while the gage was clogged were removed from the NWIS database. Prior analysis of data from other rain gages in the Albuquerque urbanized area with partially clogged funnels indicates that, while precipitation intensity data are strongly affected by the clogged funnel, cumulative precipitation data remain similar to the estimated inverse-distance weighted total. The inverse-distance weighted total precipitation is an estimated value of precipitation calculated by taking the average precipitation value of surrounding gages and weighting them by applying the inverse of the distance to each known point. Because the clogged gage data remained similar to the estimated data, the 2.45 inches of precipitation that were omitted from the approved data in NWIS have been added to annual and monsoon totals recorded at that gage for the purposes of this report. These annual and monsoon precipitation values are considered estimates in this study, despite their corroboration by raw data collected at the site during this period (fig. 11).

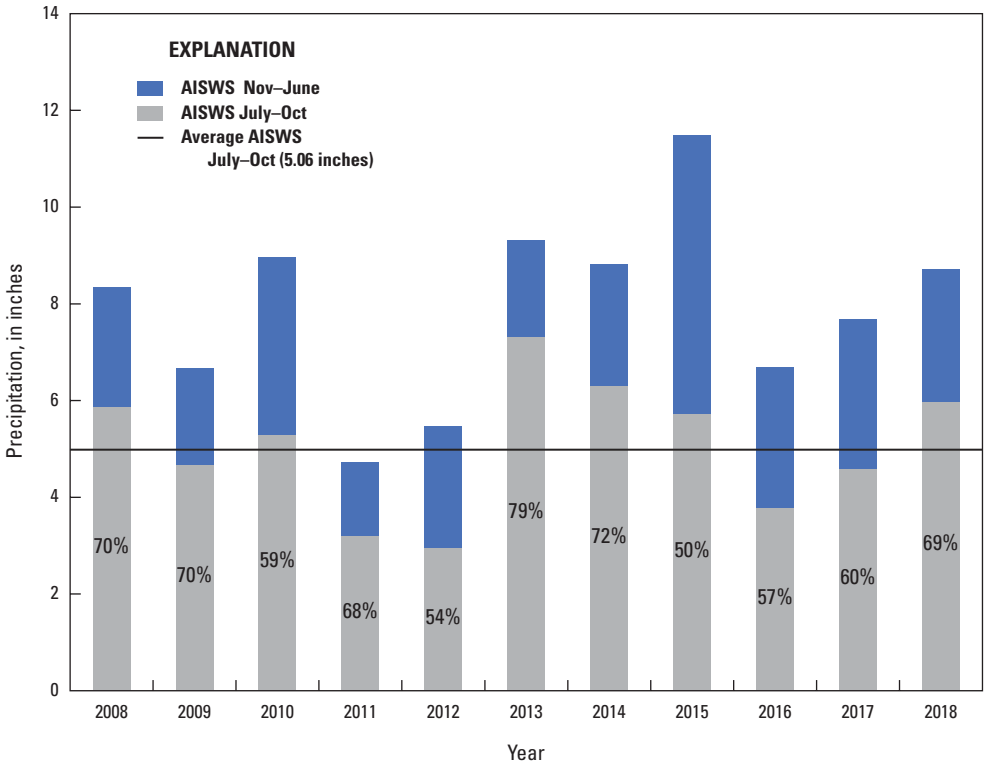


Figure 10. Annual precipitation at the National Weather Service Albuquerque International Sunport Weather Station (AISWS), 2008–18. Gray bars represent inches of precipitation from July through October; number is percent of total precipitation that fell during these months. [Data from NOAA, 2019].

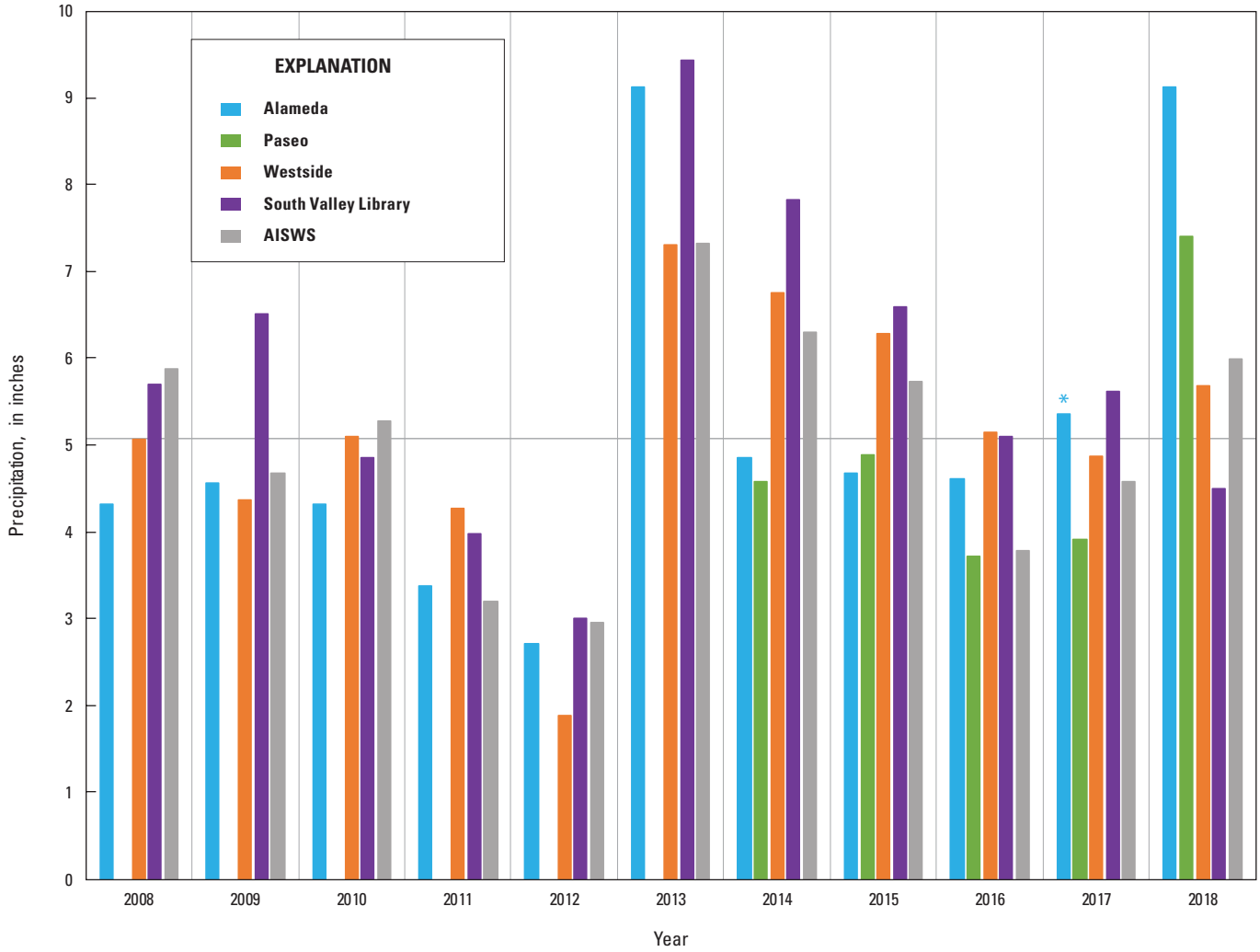


Figure 11. Precipitation measured at Alameda pump station (Alameda), Paseo pump station (Paseo), Westside Community Center near Albuquerque, N. Mex. (Westside), and South Valley Library near Albuquerque, N. Mex. (South Valley Library), rain gages and National Weather Service Albuquerque International Sunport Weather Station (AISWS) for July through October 2008–18. Solid black line represents the average July through October precipitation at AISWS. Asterisk (*) for Alameda rain gage in 2017 represents 2.45 inches of precipitation that was added as an estimate because the gage funnel was clogged at this time.

Precipitation Events 2017–18

Precipitation occurrence was considered as an isolated event if a substantial amount of precipitation over a continuous period was observed with more than 24 hours between precipitation measurements.

The largest 2017 precipitation event occurred on September 27, 2017 (fig. 12*A*, table 1). At the Paseo rain gage, this event occurred from 11:10 through 22:30; 0.98 inch of precipitation was recorded, although almost all of that precipitation fell during the 5.5-hour period from 17:00 through 22:30. The event at the Westside rain gage occurred over a 5.75-hour period from 16:35 through 22:20; 1.07 inches of precipitation were recorded. The event at the South Valley Library rain gage occurred from 12:45 to 22:15; 1.25 inches of precipitation was recorded, although almost all of that precipitation fell during the 5.5-hour period from 16:45 to 22:15.

In 2018, the largest event at all four rain gages occurred on October 23, 2018, to October 24, 2018 (fig. 12*B*, table 1). The Alameda rain gage recorded 1.65 inches of precipitation from 06:25 on October 23, 2018, through 11:45 on October 24, 2018; approximately 84 percent of that precipitation fell from 14:40 on October 23, 2018, to 11:45 on October 24, 2018. The Paseo rain gage recorded 1.61 inches of precipitation from 06:25 on October 23, 2018, through 11:20 on October 24, 2018; approximately 83 percent of that precipitation fell from 14:55 on October 23, 2018, to 11:20 on October 24, 2018. The Westside rain gage recorded 1.45 inches of precipitation from 06:15 on October 23, 2018, through 11:25 on October 24, 2018; approximately 83 percent of that precipitation fell from 14:25 on October 23, 2018, to 11:25 on October 24, 2018. The South Valley Library rain gage recorded 1.54 inches of precipitation from 06:10 on October 23, 2018, through 11:35 on October 24, 2018; about 78 percent of that precipitation fell from 15:10 on October 23, 2018, to 11:35 on October 24, 2018.

The maximum 5-minute intensity for the period of record did not necessarily coincide with the maximum precipitation event at each gage. The maximum 5-minute precipitation intensity at the Alameda rain gage and the Paseo rain gage both occurred on July 26, 2018; the Alameda rain gage recorded 0.33 inch per 5 minutes of precipitation at 19:35, and the Paseo rain gage recorded 0.50 inch per 5 minutes of precipitation at 19:50. The maximum 5-minute precipitation intensity at both the Westside rain gage and the South Valley Library rain gage was 0.38 inch per 5 minutes at 23:45 on September 28, 2017.

Chemical Concentrations

This section characterizes PCB concentrations in stormwater and sediment samples collected in the study area and discusses potential sources of PCBs on the basis of congener profiles. In addition, PCB concentration relations to additional water-quality properties or constituents are discussed.

Quality-Control Samples

No constituents were detected in the water equipment blank sample or the two water field blank samples. This included TOC (less than 2 milligrams per liter [mg/L]), TSS (less than 2 mg/L), SSC (less than 0.5 mg/L), and PCB congeners. Detection levels for individual PCB congeners ranged from 0.020 to 0.120 ng/L in the equipment blank sample, from 0.021 to 0.130 ng/L in one field blank sample, and from 0.100 to 0.610 ng/L in the other field blank sample. PCB-4 was detected in a laboratory blank sample at 0.107 ng/L (reporting level of 0.100 ng/L). PCB-4 detections in five environmental samples associated with that laboratory blank were censored as nondetects because they were detected at concentrations within two times the laboratory blank concentration (0.110 to 0.180 ng/L). The relative percent difference (RPD) between water field replicate samples was 1.2 and 2.1 percent for specific conductance for two sets of replicates, 5.3 to 40 percent for TOC for five sets of replicates, 8.3 to 103 percent for TSS for five sets of replicates, and 4 to 126 percent for SSC for four sets of replicates. Most of the PCB congeners were below detection in the five sets of water field replicate samples. A few were detected at concentrations near the reporting level in one of the paired samples and below the reporting level in the other paired sample. The RPDs for congeners detected in both samples of a pair were 0 to 25 percent (PCB-11), 43 percent (PCB-110/115), and 50 percent (PCB-118).

PCB congeners were not detected in the sediment field blank sample. Detection levels for individual congeners ranged from 1.7 to 10 ng/kg dw. The RPD between sediment field replicate samples was 0, 5.2, and 12.5 percent for organic carbon for three sets of replicates; 2.9 percent for PCB-11 (detected in both samples of one of two replicate pairs); and 6.1 and 14.9 percent for PCB-118 (detected in both samples of two of two replicate pairs). Two congeners were detected in one sample and not the paired replicate (220 and less than 230 ng/kg dw for PCB-153/168 and 570 and less than 600 ng/kg dw for PCB-187). The remaining congeners were not detected in the sediment field replicate samples. Other than the five censored PCB-4 detections for water samples, the results of the field and laboratory quality-control samples were satisfactory and indicated that the data could be used as reported.

PCBs in Water and Sediment Samples

PCBs in water and sediment samples collected for this study are presented in this section of the report. Concentrations for the PCB congeners are available in NWIS (USGS, 2019b).

A

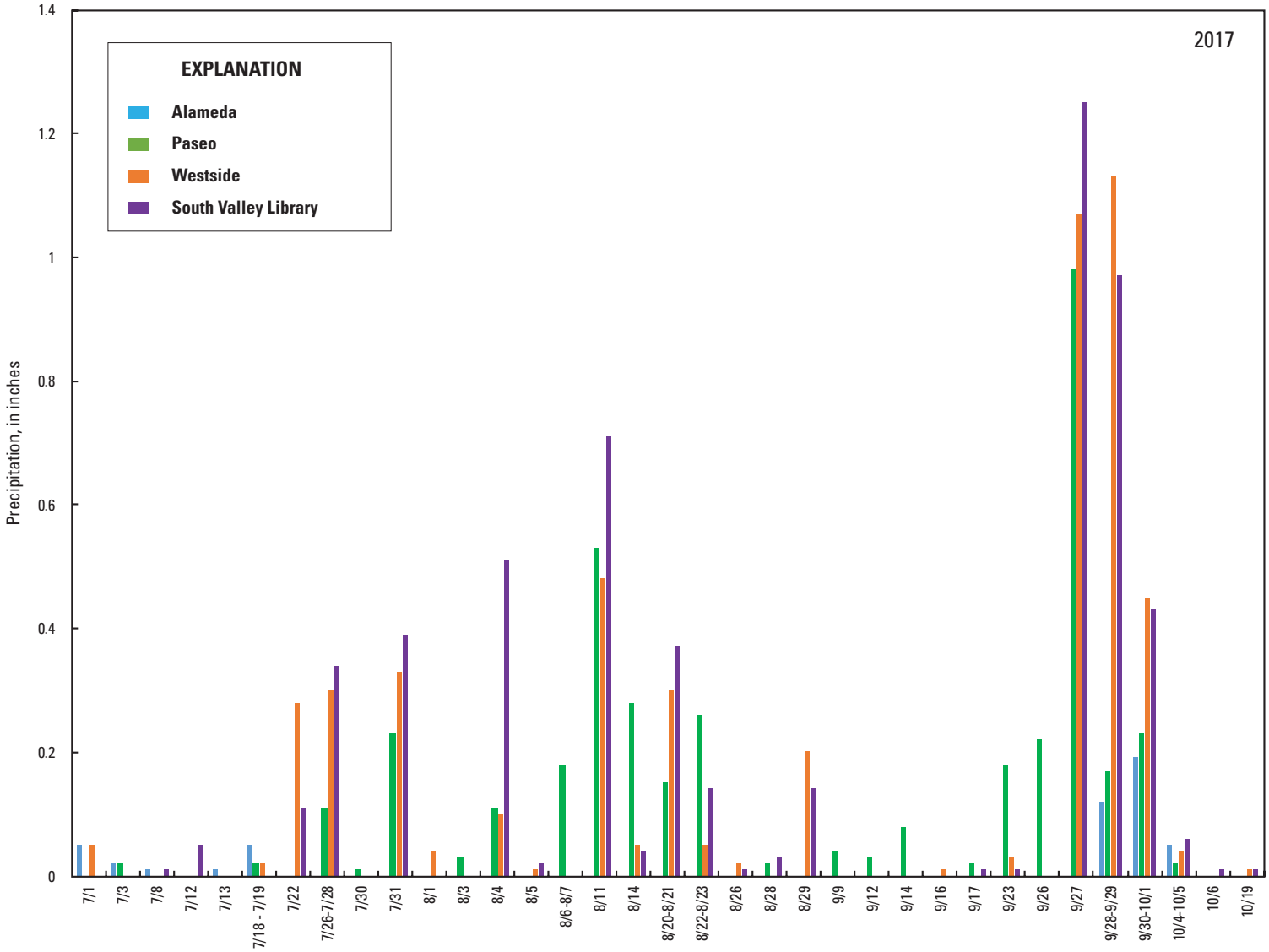


Figure 12. Total precipitation by event at the Alameda pump station (Alameda), Paseo pump station (Paseo), Westside Community Center near Albuquerque, N. Mex. (Westside), and South Valley Library near Albuquerque, N. Mex. (South Valley Library), rain gages, July through October. *A*, 2017. *B*, 2018.

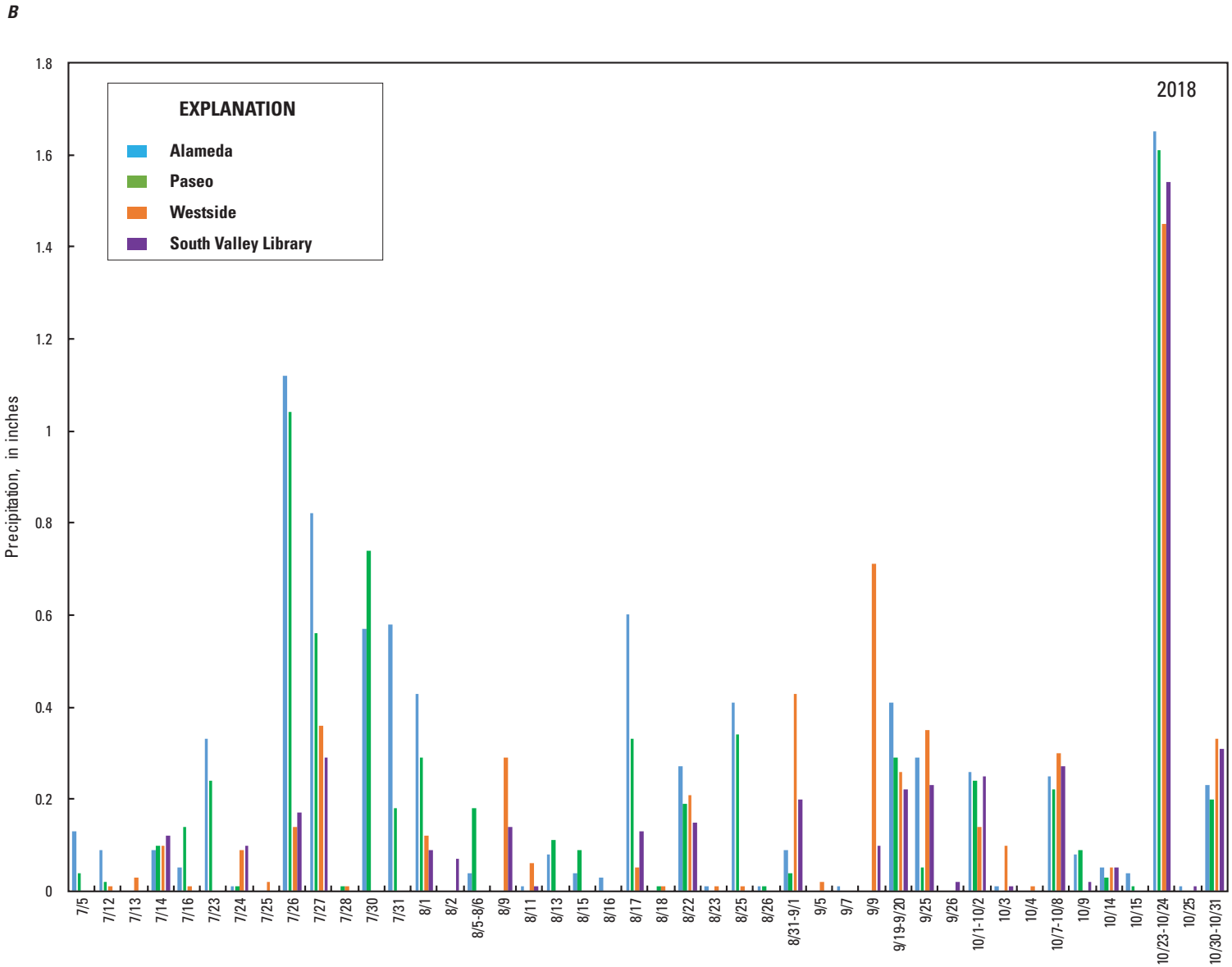


Figure 12. Total precipitation by event at the Alameda pump station (Alameda), Paseo pump station (Paseo), Westside Community Center near Albuquerque, N. Mex. (Westside), and South Valley Library near Albuquerque, N. Mex. (South Valley Library), rain gages, July through October. *A*, 2017. *B*, 2018.

Table 1. Precipitation event and intensity maximum values, Bernalillo County, New Mexico, 2017–18.

[Values represent precipitation measured between July 1 and October 31. in., inch; h:m, hour:minute; NA, not available; Alameda funnel clogged 7/26/2017 to 9/28/2017]

Site (rain gage) name and number	2017–18		2017			2018		
	Maximum 5-minute intensity (in.)	Date	Maximum precipitation event (in.)	Date	Duration (h:m)	Maximum precipitation event (in.)	Date	Duration (h:m)
Alameda (351140106381230)	0.33	7/26/2018	NA	NA	NA	1.65	10/23–10/24/2018	29:20
Paseo (351057106384330)	0.50	7/26/2018	0.98	9/27/2017	11:20	1.61	10/23–10/24/2018	28:55
Westside (350310106402430)	0.38	9/28/2017	1.07	9/27/2017	5:45	1.45	10/23–10/24/2018	29:10
South Valley Library (350107106405730)	0.38	9/28/2017	1.25	9/27/2017	9:30	1.54	10/23–10/24/2018	29:25

Water Samples

PCBs were detected in 34 of 36 water samples (table 2); PCB-11 was the only congener detected in 12 of those samples (USGS, 2019b). Concentrations of total PCBs in the 34 water samples with PCB detections were binned into three groups: (1) high concentrations, which exceeded the New Mexico surface-water quality standard for protection of wildlife habitat and aquatic life of 14 ng/L (NMED, 2018), (2) medium concentrations, from 0.700 to 14 ng/L, and (3) low concentrations, with concentrations less than 0.700 ng/L. The 0.700-ng/L value was chosen as the threshold between low and medium concentrations because this was the highest total PCB concentration in samples with PCB-11 as the only detected congener. Six water samples had high total PCB concentrations exceeding the 14 ng/L criteria (20.3–65.8 ng/L), whereas the remaining 30 samples were below the criteria. Two of these 30 samples had PCB concentrations below detection (<0.096 and <0.650 ng/L). Twelve of these samples had low total PCB concentrations (0.110–0.690 ng/L), and the remaining 16 had medium concentrations (0.800–7.62 ng/L) (table 2). None of the 36 water samples exceeded the NPDES permit level of 200 ng/L (NMED, 2018).

There were multiple orders of magnitude of variation in PCB concentrations, both between sites and at the same site over time, indicative of short-duration, high-concentration inputs of PCBs characteristic of urban stormwater runoff. For example, at Alameda at Rio Grande, total PCB concentrations increased from 0.260 ng/L on July 24, 2018, to 46.8 ng/L on July 26, 2018, and returned to 0.480 ng/L on July 27, 2018 (table 2). The timing of the high PCB concentration pulse corresponded to a large precipitation event (24-hour antecedent precipitation on July 26 was 1.12 inches at the Alameda rain gage), which suspended fine particulate matter in the water column (SSC increased from 47 to 299 mg/L, and percent fine material increased from 72 to 99 percent). During this same precipitation event, PCB concentrations also were high at Sanchez Farms pump station (20.3 ng/L on July 28, 2018), medium at Sanchez Farms inflow (6.09 ng/L on July 28, 2018) and low at Paseo outflow (0.350 and 0.580 ng/L on July 27, 2018), indicating high variability in the timing and magnitude of PCB concentrations between stormwater drainage basins across the watershed (table 2).

The highest total PCB concentration was measured at the Sanchez Farms pump station on September 25, 2018 (65.8 ng/L) (table 2). The two Sanchez sites had four of the six high PCB concentrations in water, and all samples from these two sites had either medium or high PCB concentrations, except for one sample without PCB detections at Sanchez Farms pump station. The two other high concentrations occurred at Alameda at Rio Grande on July 26, 2018 (46.8 ng/L), and Adobe Acres on July 12, 2017 (21.3 ng/L) (table 2). The other five water samples at Alameda at Rio Grande and nine samples at Adobe Acres had medium or low PCB concentrations. All of the water samples from the Alameda outflow and Paseo outflow had medium or low PCB concentrations or no PCB detections.

On 3 days, paired water samples were collected first at Sanchez Farms inflow and then, 1 to 10 hours later, at Sanchez Farms pump station (table 2, July 28, 2018, October 23, 2018, and November 2, 2018). Water travels from the Sanchez Farms inflow basin through a constructed wetland to the Sanchez Farms pump station. The traveltime between the two stations is unknown. Comparison of water quality at these two stations provides a first qualitative understanding of processes occurring in the wetland. Water temperatures were 1.8 to 11.9 degrees Celsius warmer in the inflow sample as compared to the pump station sample. On 2 of the 3 days (July 28, 2018, and October 23, 2018), TOC, SSC, and TSS were higher in the pump station sample than in the inflow sample, whereas on the third day (November 2, 2018) the reverse was true for TOC and TSS (no SSC data were available for November 2, 2018, for the pump station sample). Most notably, specific conductance on these three days was 278 to 644 microsiemens per centimeter (µS/cm) at the pump station, which was 1.4 to 5.1 times higher than in the paired inflow station sample. Concentrations of PCBs were in the medium (0.700–14 ng/L) or high (greater than 14 ng/L) categories in all six samples,

Table 2. Concentrations of polychlorinated biphenyls and other measurements of water quality in stormwater drainage basin water samples, Bernalillo County, New Mexico, 2017–18.

[h:m, hour:minute. Total PCBs, sum of detected concentrations of 209 polychlorinated biphenyl congeners, in nanograms per liter, rounded to three significant figures. Total PCB concentration bin: L, low concentrations less than 0.700 nanograms per liter; M, medium concentrations from 0.700 to 14.0 nanograms per liter; H, high concentrations greater than 14.0 nanograms per liter. PCBs, polychlorinated biphenyls; ng/L, nanogram per liter; µS/cm, microsiemens per centimeter; mg/L, milligram per liter; mm, millimeter; in., inch; -, not analyzed for; NC, noncomposite sample; <, less than; ND, not detected]

Sampling date	Sample start time (h:m)	Sample end time (h:m)	Total PCBs (ng/L)	Total PCB concen-tration bin	Water temper-ature (degrees Celsius)	pH	Specific conduc-tance (µS/cm)	Total organic carbon (mg/L)	Total suspended solids (mg/L)	Suspended sediment concen-tration (mg/L)	Suspended sediment, sieve diameter (percent smaller than 0.0625 mm)	24-hour antecedent rainfall at associated rain gage (in.)	72-hour antecedent rainfall at associated rain gage (in.)
Alameda Pump at Rio Grande inlet (351147106383001)													
9/27/2017	21:45	23:15	1.59	M	16.4	8.4	75	24	230	376	-	0.98	1.23
7/24/2018	1:00	2:50	0.260	L	24.8	7.1	204	59	48	47	72	0.33	0.33
7/26/2018	22:00	22:40	46.8	H	23.5	8.2	111	14	93	299	99	1.12	1.13
7/27/2018	23:20	23:55	0.480	L	22.8	8.1	77	13	72	78	97	0.81	1.93
8/17/2018	20:00	20:30	0.690	L	26.5	7.8	138	33	100	86	95	0.54	0.61
10/23/2018	10:22	11:02	0.600	L	16.2	8.6	183	44	75	74	-	0.27	0.27
Alameda pump station outflow (351146106382801)													
7/12/2017	8:30	NC	5.08	M	23.1	7.8	509	62	570	330	-	0	0
12/12/2017	11:00	NC	0.140	L	6.7	7.8	635	54	24	-	-	0	0
11/2/2018	10:45	NC	0.110	L	10.4	7.6	156	13	10	16	-	0	0.2
11/7/2018	15:00	NC	0.120	L	15.4	7.9	190	11	12	13	-	0	0
Paseo pump station outflow (351055106385501)													
12/12/2017	14:00	NC	<0.096	ND	7.8	8.3	712	2.9	7	-	-	0	0
7/27/2018	13:30	14:10	0.350	L	21.6	7.9	111	15	120	457	100	1.04	1.05
7/27/2018	14:30	NC	0.580	L	22.2	8.1	162	14	590	476	88	1.04	1.05
Sanchez Farms inflow (350304106401310)													
8/4/2017	18:15	19:30	23.4	H	24.5	7.9	216	70	220	317	-	0.08	0.08
7/28/2018	1:00	1:40	6.09	M	24.6	7.6	90	12	46	63	-	0.36	0.52
10/23/2018	17:25	18:00	33.8	H	17.2	8.5	85	11	55	75	-	0.29	0.54
11/2/2018	11:45	NC	4.32	M	17.7	7.0	457	82	73	94	-	0	0.33

Table 2. Concentrations of polychlorinated biphenyls and other measurements of water quality in stormwater drainage basin water samples, Bernalillo County, New Mexico, 2017–18.—Continued

[h:m, hour:minute. Total PCBs, sum of detected concentrations of 209 polychlorinated biphenyl congeners, in nanograms per liter, rounded to three significant figures. Total PCB concentration bin: L, low concentrations less than 0.700 nanograms per liter; M, medium concentrations from 0.700 to 14.0 nanograms per liter; H, high concentrations greater than 14.0 nanograms per liter. PCBs, polychlorinated biphenyls; ng/L, nanogram per liter; µS/cm, microsiemens per centimeter; mg/L, milligram per liter; mm, millimeter; in., inch; -, not analyzed for; NC, noncomposite sample; <, less than; ND, not detected]

Sampling date	Sample start time (h:m)	Sample end time (h:m)	Total PCBs (ng/L)	Total PCB concen-tration bin	Water temper-ature (degrees Celsius)	pH	Specific conduc-tance (µS/cm)	Total organic carbon (mg/L)	Total suspended solids (mg/L)	Suspended sediment concen-tration (mg/L)	Suspended sediment, sieve diameter (percent smaller than 0.0625 mm)	24-hour antecedent rainfall at associated rain gage (in.)	72-hour antecedent rainfall at associated rain gage (in.)
Sanchez Farms pump station (350255106401510)													
7/28/2017	11:00	13:00	1.67	M	24.2	7.5	941	36	93	701	79	0.23	0.29
12/14/2017	10:30	NC	3.44	M	0.6	8.1	2,000	5.9	8	-	-	0	0
7/28/2018	1:00	1:45	20.3	H	21.9	7.4	458	29	110	106	-	0.36	0.52
9/1/2018	9:55	10:35	6.31	M	18.4	7.8	1,410	21	210	110	71	0.42	0.42
9/9/2018	23:25	23:50	7.41	M	19.1	7.8	351	18	58	86	-	0.71	0.71
9/25/2018	20:50	21:30	65.8	H	18.0	8.3	828	15	130	-	-	0.35	0.35
10/23/2018	18:15	18:55	7.62	M	15.4	8.0	278	19	94	93	-	0.29	0.54
11/2/2018	12:15	NC	2.39	M	5.8	7.6	644	14	34	-	-	0	0.33
11/7/2018	13:20	NC	<0.650	ND	6.4	7.5	1,530	12	12	220	-	0	0.33
Adobe Acres pump station (350059106410810)													
7/12/2017	11:30	NC	21.3	H	26.0	7.5	922	18	12,000	45,100	-	0	0
7/28/2017	9:00	11:00	1.02	M	26.0	7.4	339	22	180	537	-	0.27	0.34
8/21/2017	5:45	7:15	0.80	M	19.2	7.5	187	14	92	-	-	0.37	0.37
9/27/2017	21:15	NC	1.62	M	17.9	7.8	82	8.0	57	68	-	1.07	1.07
12/14/2017	9:10	NC	5.76	M	2.4	8.1	1,060	14	2,800	-	-	0	0
8/9/2018	23:20	0:00	1.76	M	24.4	7.6	356	30	78	82	-	0.14	0.14
9/20/2018	10:45	11:25	0.320	L	21.6	7.1	347	19	37	50	-	0.22	0.22
10/8/2018	9:55	10:35	0.340	L	13.8	7.9	265	12	19	17	-	0.27	0.27
11/2/2018	12:45	NC	0.230	L	13.1	7.3	747	4.6	16	19	-	0	0.31
11/7/2018	12:10	NC	1.07	M	13.5	7.1	968	11	340	496	-	0	0

with no upstream to downstream pattern: on October 23, 2018, PCB concentrations were in the high category in the inflow and in the medium category at the pump station; on July 28, 2018, the reverse was true; and on November 2, 2018, both samples had concentrations in the medium category.

Sediment Samples

Total PCBs (sum of 209 congeners) were detected in 12 of 13 sediment samples, ranging over multiple orders of magnitude from 340 to 163,000 ng/kg dw (table 3). Concentrations of total PCBs in the 13 sediment samples were binned into three categories: (1) high concentrations equal to or greater than 40,000 ng/kg dw, a threshold effect concentration below which adverse toxic effects on sediment-dwelling organisms are not expected to occur (MacDonald and others, 2000); (2) low concentrations less than 4,000 ng/kg dw, a 10-fold safety factor lower than the threshold effect concentration; and (3) medium concentrations from 4,000 to less than 40,000 ng/kg dw. There was one high concentration sample, collected at Sanchez Farms inflow on July 28, 2018, containing total PCBs of 163,000 ng/kg dw. The remaining 12 samples were below this threshold value. There were four medium-concentration samples (concentration ranges of 9,370–27,700 ng/kg dw) collected from Alameda at Rio Grande and Sanchez Farms pump station. The remaining samples had low concentrations (concentration ranges of 340–2,410 ng/kg dw). No samples exceeded an additional threshold of 400,000 ng/kg dw of PCBs, above which adverse toxic effects on sediment-dwelling organisms are expected to occur frequently. Organic carbon in the sediment samples ranged from 6,100 to 250,000 milligrams per kilogram (mg/kg) dw, or 0.61 to 25 percent of total sediment by dry weight (table 3).

Table 3. Concentrations of polychlorinated biphenyls and organic carbon in stormwater drainage basin sediment samples, Bernalillo County, New Mexico, 2017–18.

[h:m, hour:minute; PCB, polychlorinated biphenyl; ng/kg dw, nanogram per kilogram dry weight; concentration bin: L, low PCB concentrations less than 4,000 nanograms per kilogram dry weight; M, medium PCB concentrations from 4,000 to less than 40,000 nanograms per kilogram dry weight; H, high PCB concentrations 40,000 nanograms per kilogram dry weight and higher; ng/kg OC, nanogram per kilogram organic carbon; log K_D, sediment-water partition coefficient, where K_D (L/kg) = total PCBs concentration in bed sediment (ng/kg dw) / total PCBs concentration in unfiltered water (ng/L); log K_{OC}, organic carbon-water partition coefficient, where K_{OC} (L/kg organic carbon) = total PCBs concentration in organic carbon-normalized bed sediment (ng/kg organic carbon) / total PCBs concentration in unfiltered water (ng/L); -, no water sample collected on this day; <, less than]

Sampling date	Sample time (h:m)	Total PCBs (ng/kg dw)	Concentration bin	Organic carbon (mg/kg dw)	Organic carbon (percent)	Total PCBs (ng/kg OC)	log K_D	log K_{OC}
Alameda pump at Rio Grande Inlet (351147106383001)								
7/24/2018	3:00	13,200	M	78,000	7.8	169,000	4.71	5.81
7/26/2018	23:00	9,370	M	46,000	4.6	204,000	2.30	3.64
Alameda pump station outflow (351146106382801)								
12/12/2017	11:00	940	L	77,000	7.7	12,200	3.83	4.94
Paseo pump station outflow (351055106385501)								
7/12/2017	9:45	1,420	L	14,000	1.4	101,000	-	-
12/12/2017	14:00	<2,600	L	15,000	1.5	<173,000	-	-
7/27/2018	14:20	1,110	L	24,000	2.4	46,300	3.28	4.90
Sanchez Farms inflow at Albuquerque, N. Mex. (350304106401310)								
7/28/2018	1:45	163,000	H	250,000	25	653,000	4.43	5.03
Sanchez Farms pump station (350255106401510)								
7/28/2017	11:00	2,410	L	29,000	2.9	83,100	3.16	4.70
12/14/2017	10:30	27,700	M	160,000	16	173,000	3.91	4.70
7/28/2018	2:00	25,100	M	110,000	11	228,000	3.09	4.05
Adobe Acres pump station (350059106410810)								
7/28/2017	9:00	1,770	L	7,400	0.74	239,000	3.24	5.37
12/14/2017	9:10	1,700	L	91,000	9.1	18,700	2.47	3.51
8/10/2018	0:10	340	L	6,100	0.61	55,700	2.29	4.50

The three sediment samples with greater than 10 percent organic carbon content were from the two Sanchez Farms sites. Organic carbon-normalized PCB concentrations—that is, total PCBs (ng/kg OC)—ranged from 12,200 to 653,000 ng/kg organic carbon (table 3).

One paired set of sediment samples was collected on the same day (July 28, 2018) from the Sanchez Farms inflow and the Sanchez Farms pump station. Concentrations of PCBs and organic carbon were greatly reduced between the inflow and the pump station, from 163,000 to 25,100 ng/kg dw of PCBs and from 25 to 11 percent organic carbon. Though further controlled study that accounts for traveltime between the two sampling locations is needed, the intervening wetland may help to attenuate high pulses of sediment-bound PCBs from the inflow to the pump station. In contrast, the paired water samples collected on the same day (July 28, 2018), in which the pump station PCB concentration was more than three times higher than the inflow PCB concentration and the pump station organic carbon concentration was more than two times higher than the inflow organic carbon concentration. Further study is needed to determine if there are additional sources of PCBs and organic carbon to the pump station, for example, from groundwater, that may explain the elevated concentrations in water at the pump station as compared to the inlet station.

PCB concentrations were compared in 11 pairs of simultaneously collected water and sediment samples to determine an instantaneous sediment-water partition coefficient (K_D) and organic carbon-water partition coefficient (K_{OC}) at the time of sample collection, where

K_D liters per kilogram = Total PCB concentration in bed sediment nanograms per kilogram dry weight/total PCB concentration in unfiltered water nanograms per liter; and

K_{OC} liters per kilogram organic carbon = Total PCB concentration in organic carbon-normalized bed sediment nanograms per kilogram organic carbon /total PCB concentration in unfiltered water nanograms per liter.

Sediment-water partition coefficients ranged from log K_D = 2.29 to 4.71 (table 3), with a median of 3.26. Organic carbon-water partition coefficients ranged from log K_{OC} = 3.51 to 5.81 (table 3). These values are on the low end but within the range of literature values and calculated values based on PCB partition theory, which generally range from log K_{OC} = 4 to 6 (Schwarzenbach and others, 2003). Strongly hydrophobic compounds such as PCBs preferentially partition to solids rather than remain dissolved in water. The PCB concentrations in water samples from these stormwater drainage basins likely fluctuate rapidly, especially during the short-duration, high-intensity stormwater runoff events captured in this study. One of the lowest log K_D values (2.30) was determined during the large precipitation storm on July 26, 2018, when very high PCB concentrations were measured in the water. Two days earlier, on July 24, 2018, at the same site, the PCB concentrations in the water sample were near the detection level, resulting in the highest log K_D of 4.71.

Relation of PCB Concentrations to Other Water-Quality Properties or Constituents

Water temperature ranged from 0.6 to 26.5 degrees Celsius at the time of sample collection for the 36 water samples (table 2). Values of pH ranged from 7.0 to 8.6, and specific conductance ranged from 75 to 2,000 µS/cm. TOC in water samples ranged from 2.9 to 82 mg/L. TSS ranged from 7 to 12,000 mg/L. SSC (for which 29 of the 36 water samples were analyzed) ranged from 13 to 45,100 mg/L. The percent fine material in the eight available suspended sediment samples ranged from 71 to 100 percent. There was a strong linear relation between TSS and SSC for concentrations as high as approximately 100 mg/L (fig. 13, coefficient of determination (R^2) = 0.881), and then the relation devolved above approximately 100 mg/L. TSS and SSC also were significantly positively correlated using the nonparametric Kendall's tau test (Kendall's tau = 0.8; p-value = 3.8E−6). The sample with extremely high TSS (12,000 mg/L) and SSC (45,100 mg/L) was removed from figure 13 for visualization purposes but remained in the dataset (table 2). The day when this high-concentration suspended sediment sample was collected at Adobe Acres (July 12, 2017) also was the day when the only high PCB concentration in water was determined at Adobe Acres (21.3 ng/L, table 2). The authors hypothesize that the PCBs measured in the water sample were sorbed to the high amount of suspended sediment. This was the first sampling event of the study, with no antecedent precipitation. The source or cause of the high SSC is unknown and may have been a sampling artifact, such as the bed sediment being disturbed by the individual collecting the water sample.

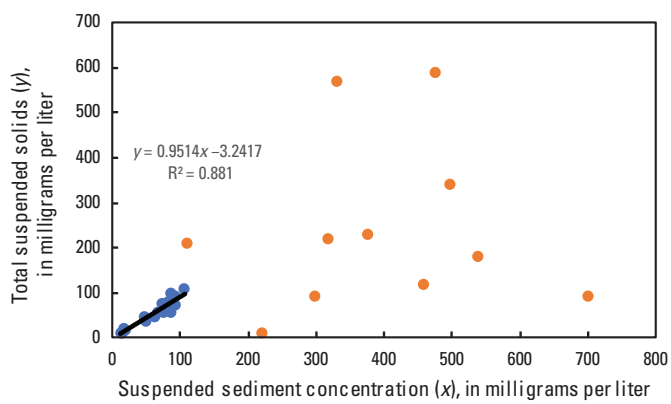


Figure 13. Relation between suspended sediment concentration and total suspended solids in water samples collected from stormwater drainage basins, Bernalillo County, New Mexico, 2017–18. One high value greater than 10,000 milligrams per liter was excluded for visualization.

Simple linear regressions were developed between total PCBs in water and other water-quality and hydrologic parameters to identify surrogate parameters for predicting water PCB concentrations that are easier and less costly to collect than PCBs. There was no linear relation between PCB concentrations in water and SSC (fig. 14*A*, $R^2 = 0.0002$), TSS (fig. 14*B*, $R^2 = 0.00008$), TOC (fig. 14*C*, $R^2 = 0.0008$), specific conductance (fig. 14*D*, $R^2 = 0.00001$), 24-hour antecedent precipitation (fig. 14*E*, $R^2 = 0.0229$), or 72-hour antecedent precipitation (fig. 14*F*, $R^2 = 0.0242$). The water samples with high PCB concentrations (greater than 14 ng/L) had SSC values greater than or equal to 75 mg/L (75 to 45,000 mg/L), when available (one sample with high PCBs had no corresponding SSC value, table 2). However, there were many samples with SSC values greater than 200 mg/L and low or medium PCB concentrations. The samples with high PCB concentrations had TSS values less than 250 mg/L, with the exception of one very high TSS value of 12,000 mg/L. Other samples with the highest TSS values (500–3,000 mg/L) had low or medium PCB concentrations. The water samples with high PCB concentrations had TOC values from 11 to 70 mg/L, and there were many water samples with TOC values greater than 20 mg/L that had low or medium PCB concentrations. The samples with the six highest PCB concentrations had specific conductance values less than 1,000 µS/cm.

Sampling events during the wet season targeted stormwater runoff immediately following a precipitation event, so the 24-hour antecedent precipitation often contributed most of the 72-hour antecedent precipitation total, resulting in similar graphs for these two precipitation periods (fig. 14*E* and *F*). The six highest PCB concentrations in water samples were not linearly related to antecedent precipitation and occurred over a range of precipitation from 0 to greater than 1 inch.

There were no strong, simple linear relations between PCB concentration in water and explanatory variables including SSC, TSS, TOC, specific conductance, or 24-hour or 72-hour antecedent precipitation total. High SSC or high percent fine sediment did not indicate high PCB concentrations. However, based on the physicochemical properties of PCBs, if two samples are collected at the same location and time, theoretically the one with higher SSC, higher percent fine sediment, and (or) higher TOC will have the higher PCB concentration. This is because PCBs are hydrophobic and preferentially sorb to particulates, rather than remain dissolved in water, and preferentially sorb to organic matter on fine sediment such as silts and clays, which have large surface areas as compared to sandy material (Karickhoff and others, 1979; Schwarzenbach and Westall, 1981).

Nonparametric analysis identified one significant water correlation: total PCBs and TSS were significantly positively correlated (Kendall's tau = 0.4, p-value = 0.0007). When only the SSC values less than 100 mg/L were considered, there was also a significant positive correlation between total PCBs and SSC less than 100 mg/L (Kendall's tau = 0.3; p-value = 0.019). In sediment, total PCBs were significantly positively correlated with organic carbon content (Kendall's tau = 0.62, p-value = 0.003). The results indicate that none of the explanatory variables in this study—SSC, TSS, TOC, specific conductance, or antecedent precipitation—are a singular simple, linear proxy of water PCB concentration in these stormwater systems. However, the SSC in the water sample likely is one important variable. PCB concentrations in water likely are a function of a complex mix of variables, including timing of sample collection on the hydrograph or pump cycle. Particulates and associated contaminants often have the highest concentration at the beginning of a precipitation event as they are first washed off the land surface, with decreasing concentrations throughout the remainder of the event (Gilbreath and McKee, 2015). The small area of the watersheds in this study likely minimizes the difference in traveltimes between areas of the watershed that may have different PCB contributions from different particle sources. Watershed characteristics also may affect PCB concentrations. For example, the prevalence of urban litter or refuse such as food containers and magazines with PCB-containing inks (Stone, 2016) may leach PCBs into the water and sediment in the storm drain system.

PCB Congener Profiles and Source Implications

Approximately 11 congeners (or coeluting congers) were detected frequently and consistently contributed the highest proportions to the total PCB concentration in water and sediment samples (table 4; USGS, 2019b). PCB-11 was the most frequently detected congener in water samples—in all 34 samples with detected PCBs—and often was the only detected congener in a sample, with detected concentrations ranging from 0.110 to 2.20 ng/L. PCB-11 was detected less frequently in sediment samples—7 of 12 samples with detected PCBs. Other than PCB-11, the remaining frequently detected congeners in water samples (detected in more than 55 percent of samples, or 20 or more samples) were all pentachloro (containing five chlorines) congeners such as PCB-110/115 and PCB-118 or hexachloro (containing six chlorines) congeners such as PCB-129/138/163, PCB-147/149, and PCB-153/168. These pentachloro and hexachloro congeners also were the most frequently detected congeners in sediment samples (table 4). PCB-118 was detected in all 12 sediment samples with detected PCBs. In addition, PCB-90/101/113 and PCB-99 were detected frequently in sediment samples (but less frequently in water samples). The congeners with the highest concentrations in water and sediment samples were PCB-110/115, PCB-118, and PCB-129/138/163.

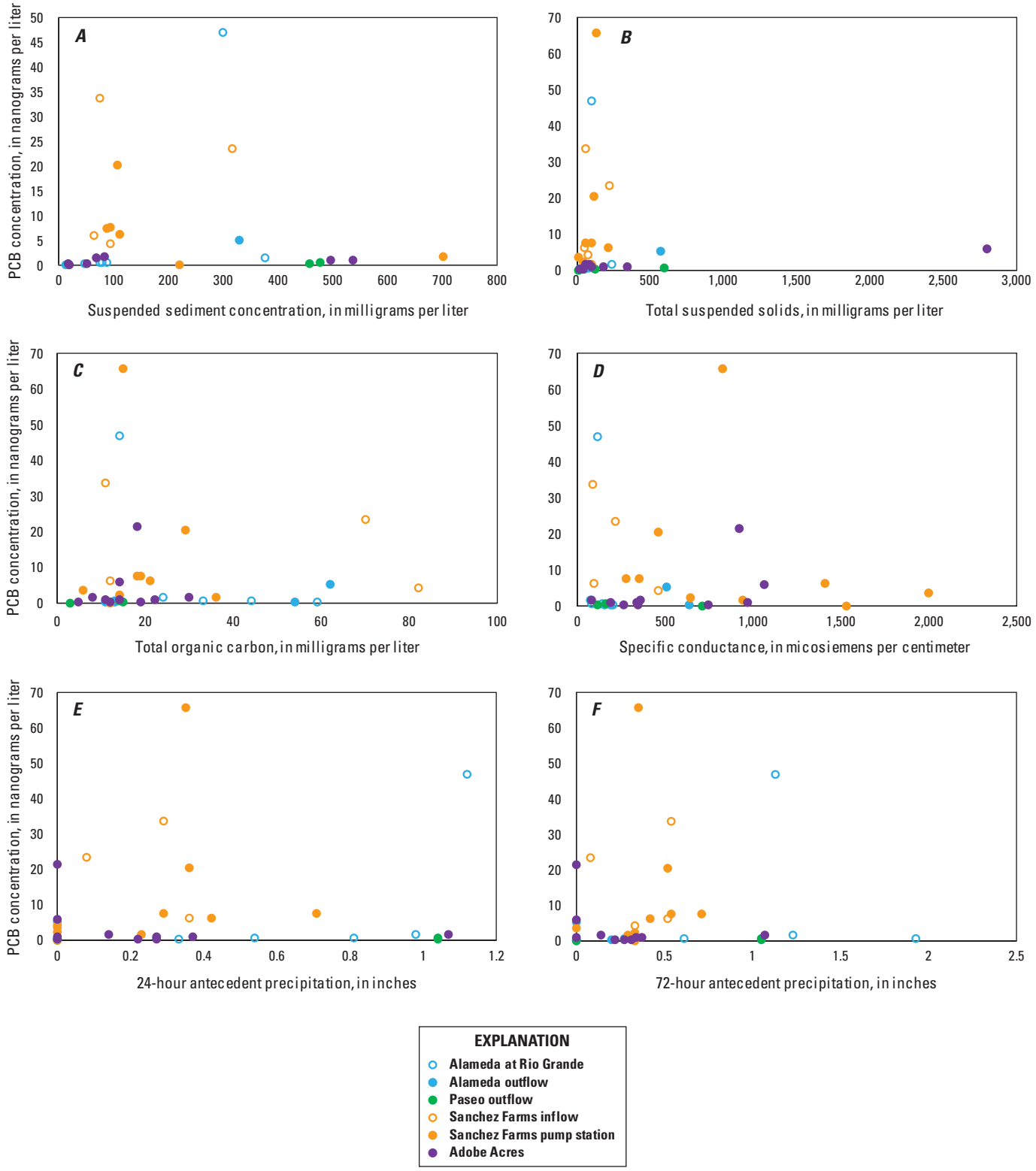


Figure 14. Relations between polychlorinated biphenyl concentration in water samples collected from stormwater drainage basins, Bernalillo County, New Mexico, 2017–18, and *A*, suspended sediment concentration; *B*, total suspended solids; *C*, total organic carbon; *D*, specific conductance; *E*, 24-hour antecedent precipitation; and *F*, 72-hour antecedent precipitation.

Table 4. Polychlorinated biphenyl congeners detected in more than 55 percent of stormwater drainage basin water or sediment samples, Bernalillo County, New Mexico, 2017–18.

[More than 55 percent is 20 or more water samples and 8 or more sediment samples. Less frequently detected congeners are reported in the table when they were detected frequently in the other matrix type. ng/L, nanogram per liter; ng/kg dw, nanogram per kilogram dry weight; PCB, polychlorinated biphenyl]

Congener(s)	Homolog group	Water		Sediment	
		Number of detections (out of 36 samples)	Maximum concentration (ng/L)	Number of detections (out of 13 samples)	Maximum concentration (ng/kg dw)
PCB-11	Di	34	2.20	7	2,300
PCB-90/101/113	Penta	17	3.70	8	10,000
PCB-95	Penta	20	1.90	8	5,500
PCB-99	Penta	16	1.40	8	4,300
PCB-105	Penta	19	2.70	8	7,900
PCB-110/115	Penta	21	6.40	9	17,000
PCB-118	Penta	22	5.90	12	18,000
PCB-129/138/163	Hexa	20	8.20	8	18,000
PCB-132	Hexa	20	2.50	8	5,600
PCB-147/149	Hexa	20	4.10	8	7,500
PCB-153/168	Hexa	20	4.90	8	10,000

There were three distinct PCB congener profiles in the water and sediment samples across the six sites and over time. The first profile contained only PCB-11; it was the only congener detected in the 12 water samples with low PCB concentrations (table 2). For example, the two Paseo outflow water samples with PCB concentrations above the reporting level and three of the four Alameda outflow water samples had this profile (example profiles shown in fig. 15*A* and *B*, respectively). The four water samples with low PCB concentrations at Alameda at Rio Grande and the three water samples with low PCB concentrations at Adobe Acres also had this PCB-11 profile.

The second profile in the water and sediment samples was dominated by pentachloro and hexachloro congeners, in addition to PCB-11. The pentachloro congeners included PCB-110/115 and PCB-118 and hexachloro congeners such as PCB-129/138/163, PCB-147/149, and PCB-153/168. This profile was common in the water and sediment samples with high PCB concentrations (tables 2 and 3). For example, all of the Sanchez Farms inflow and Sanchez Farms pump station water and sediment samples with PCB detections had this profile (examples shown in fig. 15*C* and *D*, respectively). The Adobe Acres sediment samples and medium- and high-concentration water samples also had this profile (fig. 15*E*). PCB-11 contributed a higher percentage to the total PCB concentration at the Adobe Acres site as compared to the Sanchez Farms sites.

Three water samples and two sediment samples were collected during a large precipitation event on July 24, 2018, through July 28, 2018, at Alameda at Rio Grande. One water sample and one sediment sample were collected on July 24, 2018, as the storm was beginning (0.33 inch of rain had fallen in the previous 24 hours). One water sample and one sediment sample were collected 2 days later, on July 26, 2018, after 1.12 inches of rain had fallen in the previous 24 hours. A water sample was collected the next day, on July 27, 2018, as the storm was ending (0.81 inch of rain in the previous 24 hours). The early-storm and late-storm water samples (collected on July 24, 2018, and July 27, 2018, respectively) had the first PCB congener profile, with PCB-11 as the only detected congener. The PCB congener profiles of the sediment samples resembled the second profile. The July 26, 2018, water sample had a unique congener profile (fig. 15*F*). This third distinct congener profile had lower proportions of low-chlorine congeners such as PCB-110 and PCB-118 and higher proportions of high-chlorine congeners such as PCB-147/149, PCB-153/168, PCB-170, PCB-174, and PCB-180/193 as compared to the second profile.

When water and sediment samples at a site had detections of congeners besides PCB-11, the PCB congener profile was similar in water and sediment, for all sites (for example, fig. 15*C*–*E*), with the one exception described earlier (water sample collected on July 26, 2018, at Alameda at Rio Grande, fig. 15*F*). The profiles indicate that the source of PCBs to each stormwater drainage basin is similar and that there is not preferential partition of individual congeners between water and sediment. The different signature of the water sample at Alameda at Rio Grande indicates that there was a distinct PCB source in water to that site during the July 26, 2018, precipitation event that was not reflected in the sediment samples collected on July 24, 2018, or July 26, 2018. Subsequent water samples had low PCB concentrations, and no sediment samples were collected after that July 2018 event to help identify the unique signature in settling sediment.

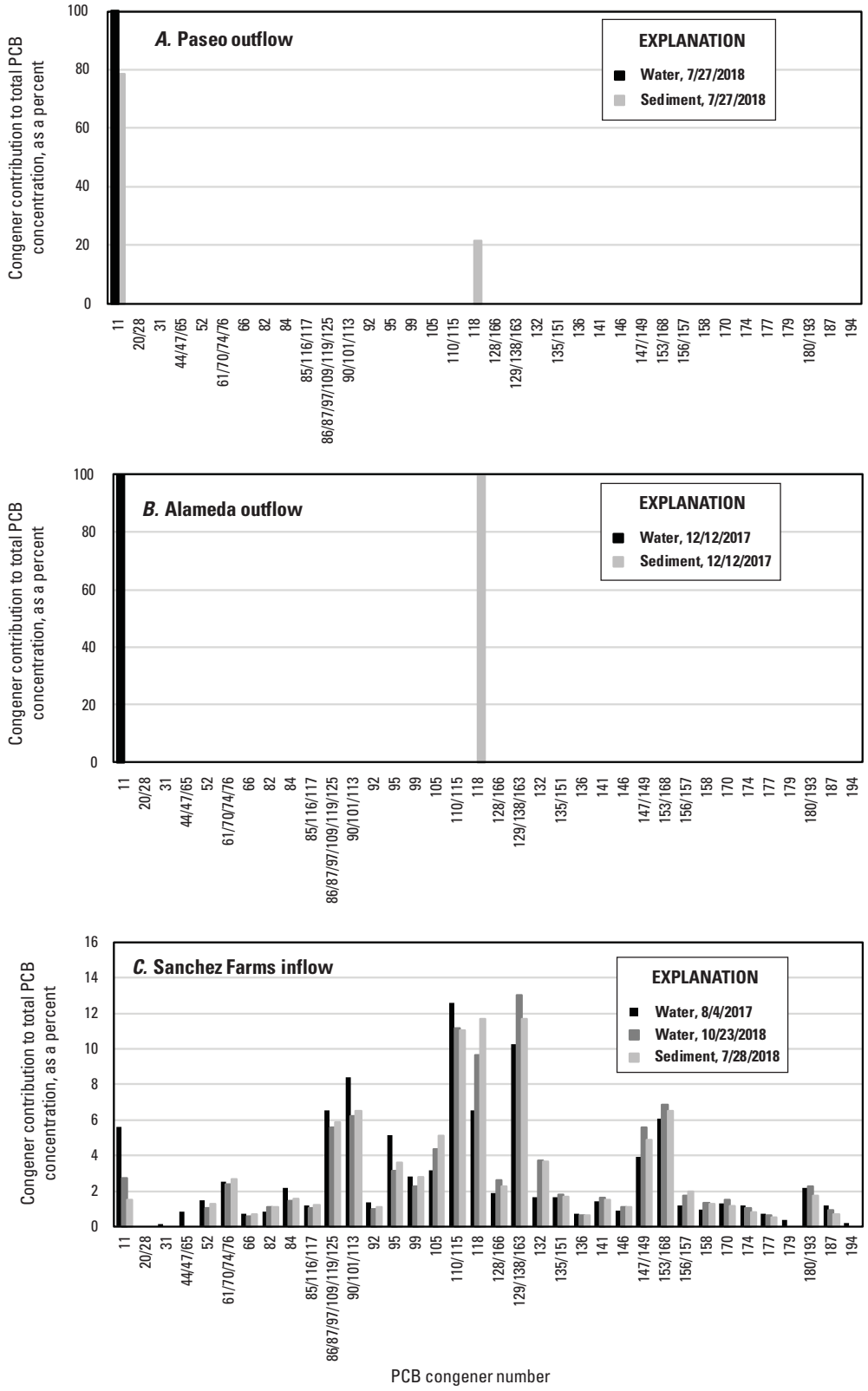


Figure 15. Example polychlorinated biphenyl congener profiles in water and sediment samples at *A*, Paseo pump station outflow (Paseo outflow); *B*, Alameda pump station outflow (Alameda outflow); *C*, Sanchez Farms inflow at Albuquerque, N. Mex. (Sanchez Farms inflow); *D*, Sanchez Farms pump station; *E*, Adobe Acres pump station (Adobe Acres); and *F*, Alameda pump at Rio Grande Inlet (Alameda at Rio Grande), Bernalillo County, New Mexico, 2017–18 (if a congener contributed more than 1 percent of the total PCB concentration in any sample, it was included in all plots).

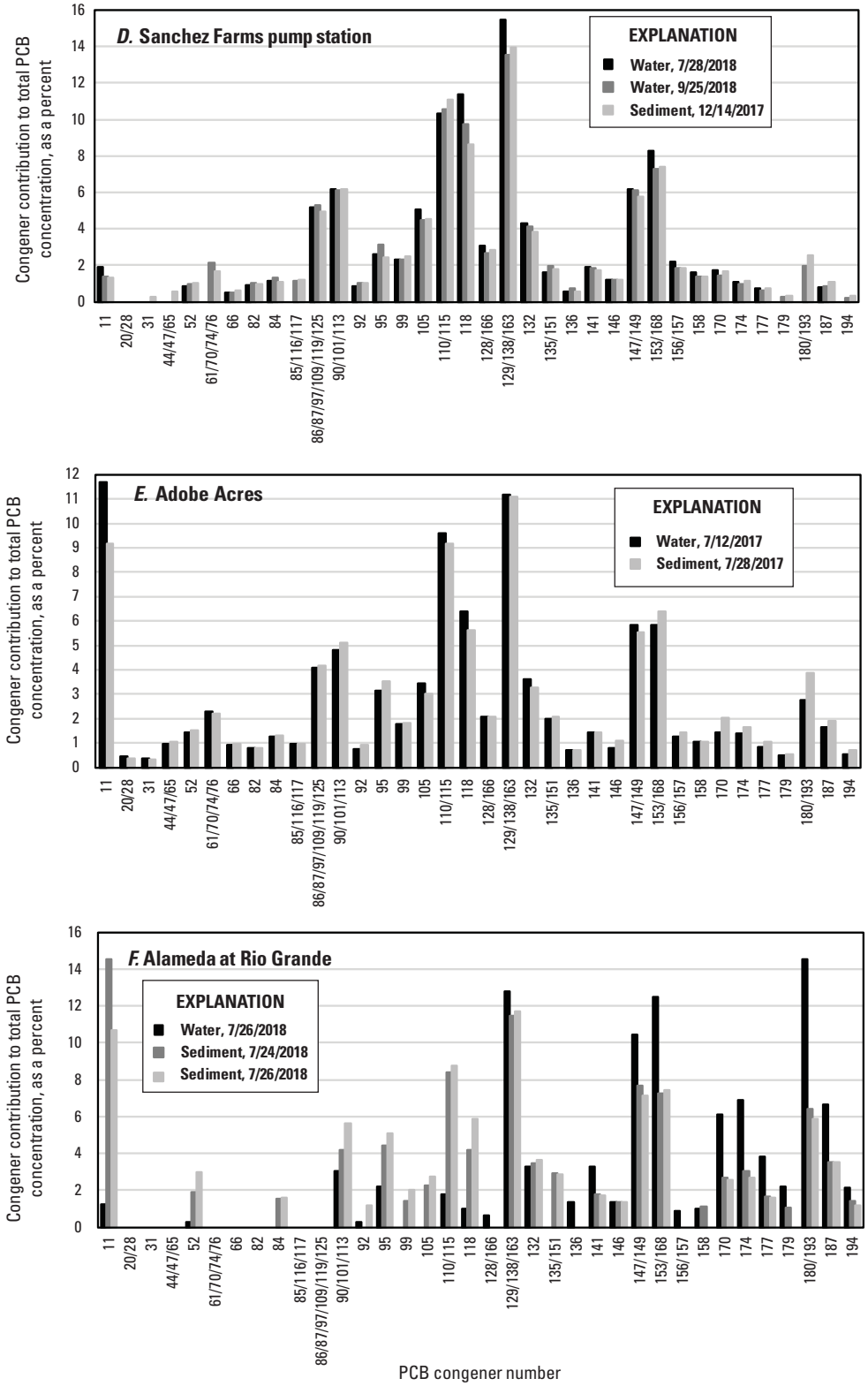


Figure 15. Example polychlorinated biphenyl congener profiles in water and sediment samples at *A*, Paseo pump station outflow (Paseo outflow); *B*, Alameda pump station outflow (Alameda outflow); *C*, Sanchez Farms inflow at Albuquerque, N. Mex. (Sanchez Farms inflow); *D*, Sanchez Farms pump station; *E*, Adobe Acres pump station (Adobe Acres); and *F*, Alameda pump at Rio Grande Inlet (Alameda at Rio Grande), Bernalillo County, New Mexico, 2017–18 (if a congener contributed more than 1 percent of the total PCB concentration in any sample, it was included in all plots).—Continued

The first congener profile discussed previously for water and sediment samples was predominantly PCB-11. PCB-11 is a common laboratory contaminant regularly detected in quality-control samples at PCB analytical laboratories. In this study, PCB-11 was not detected in the equipment blank, field blank, or laboratory blank samples by the analytical laboratory (see "Quality-Control Samples" section). PCB-11 was not a major component of historical Aroclor formulations and has been identified in modern sources of PCBs, for example, as a component of diarylide yellow pigments used in food packaging, color newspapers, and magazines (Hu and Hornbuckle, 2010; Rodenburg and others, 2010; Guo and others, 2014). Therefore, it is an indicator of current-use PCBs rather than historical Aroclor-sourced PCBs. Reported concentrations of PCB-11 in source materials such as printed paper and fabric materials, pigments, inks, and paints have ranged from part-per-billion or lower levels to a few reports of concentrations exceeding the 50 part-per-million total PCB EPA standard by more than 20 times (Shang and others, 2014). PCB-11 is the predominant congener in yellow pigment samples, sometimes accounting for more than 99 percent of the total PCB concentration (Shang and others, 2014). Congeners found to co-occur with PCB-11 in source materials, typically contributing less than 10 percent of the total PCB concentration, include PCB-28, PCB-52, and PCB-77 (Shang and others, 2014). In this study, PCB-20/28 was detected in two water samples with PCB-11 concentrations greater than 1 ng/L. PCB-52 was detected in 17 water samples, and PCB-77 was detected in 5 water samples, including 4 samples with total PCBs greater than 14 ng/L. These three congeners contributed less than 1 percent of the total PCB concentration in Aroclor mixtures, supporting the hypothesis that some of the PCBs present in the storm drain system samples in this study were from current-use sources rather than legacy Aroclor sources. Stormwater runoff washes contaminants from impervious surfaces in urban areas like parking lots. Urban litter collects in the sampled stormwater drainage basins, and leaching of inked materials such as food containers, color newspapers, and magazines is a possible source.

The second profile discussed previously contains PCB-11 and many other congeners used in Aroclor mixtures. PCB-118 is the predominant congener in Aroclor 1254; Aroclor 1254 also has large contributions from PCB-61/70/74/76, PCB-110/115, PCB-86/87/97/109/119/125, PCB-105, and PCB-129/138/163 (fig. 16*A*). PCB-129/138/163 also makes a large contribution to Aroclor 1260 (fig. 16*B*), along with PCB-147/149, PCB-153/168, and PCB-180/193. The second profile discussed for water and sediment samples resembles a mixture of Aroclor 1254 and Aroclor 1260. For example, a representative profile—the water sample collected on July 12, 2017, at Adobe Acres—resembles a theoretical mixture of 50 percent Aroclor 1254 and 50 percent Aroclor 1260 in addition to containing PCB-11 (fig. 16*C*). The third profile discussed previously, which occurred in only one water sample collected on July 26, 2018, at Alameda at Rio Grande, resembled pure Aroclor 1260 (fig. 16*B*).

The six water samples with the highest PCB concentrations were collected in July through October, during the wet season. It is likely that contaminants such as PCBs accumulate on the land surface and on airborne particulates during the dry spring and early summer seasons and are washed into the storm drain systems during the wet season. Water samples collected after the wet season in November and December had low or medium PCB concentrations. The samples were collected after no precipitation had occurred, and likely there had been time for processes that can reduce PCB concentrations in water to occur, such as settling of suspended particulates in the bottom sediment of the basins, photolysis, and volatilization.

PCB sources to stormwater drainage basins in the Albuquerque urbanized area appear to originate both from legacy sources (Aroclor mixtures) and from current-use sources (for example, pigments). Alameda at Rio Grande had a distinctly Aroclor 1260-dominant signature in the one high-concentration water sample collected after more than 1 inch of precipitation had fallen in the previous 24 hours (July 26, 2018). The two sediment samples collected during the same precipitation event at that site had a mixed Aroclor 1260/1254 congener signature that was prevalent in all other medium- and high-concentration water and sediment samples collected from the other stormwater drainage basins in the study. Aroclor 1260 was approximately 11 percent of the total U.S. production of PCBs (Brown, 1994) and was produced predominantly for four uses: in transformers, in hydraulic fluids, as a plasticizer in synthetic resins, and in dedusting agents (Nisbet and Sarofim, 1972; Erickson, 1997). The similarity of the PCB profile in the July 26, 2018, water sample at Alameda at Rio Grande to Aroclor 1260 (fig. 16*B*) indicates a point source, such as a contaminated site or spill source, of relatively unweathered Aroclor 1260 that can be transported by rainfall runoff to Alameda at Rio Grande. Single, point sources of Aroclor 1260 contamination have been identified in the Delaware River Basin (Du and others, 2008) and New York/New Jersey harbor (Panero and others, 2005).

PCB-11 often was the only congener detected in water samples and was detected at concentrations as high as 2.2 ng/L (table 4). It was not detected in quality-control samples including laboratory blanks and equipment blanks. It is the primary PCB congener in many yellow pigments, inks, and paints (Shang and others, 2014), and a growing body of literature indicates that yellow pigment manufacturing is the primary source of PCB-11 to the environment (Litten and others, 2002; Hu and Hornbuckle, 2010). This indicates that current-use products containing yellow pigments, such as color magazines, printed paper and fabrics, and printed food containers, are one source of PCBs to these stormwater drainage basins.

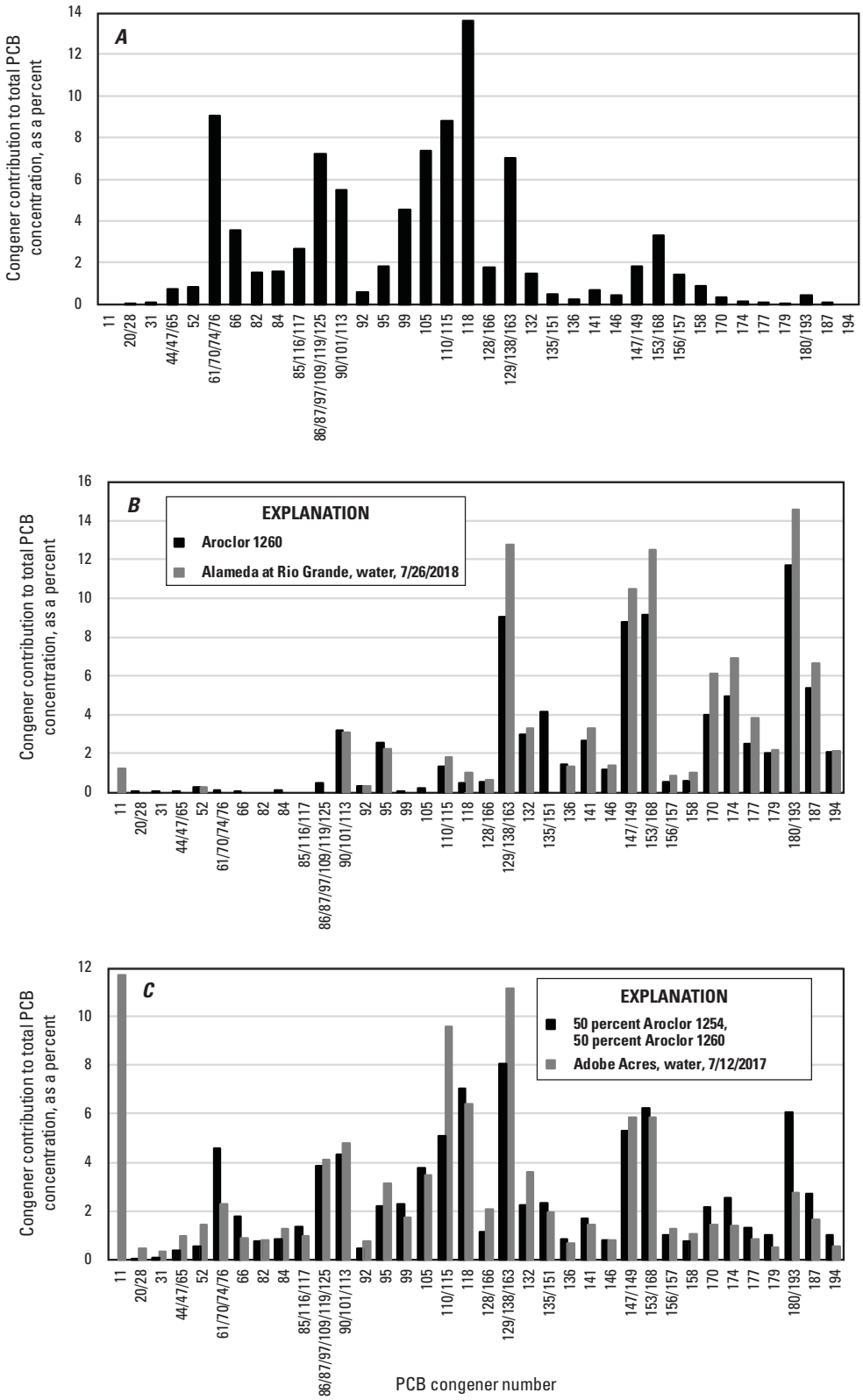


Figure 16. Polychlorinated biphenyl congener profiles of *A*, Aroclor 1254; *B*, Aroclor 1260 compared to the profile of the water sample collected on 7/26/2018 at Alameda Pump at Rio Grande Inlet (Alameda at Rio Grande); and *C*, a theoretical mixture of 50 percent Aroclor 1254 and 50 percent Aroclor 1260 compared to the profile of the water sample collected on 7/12/2017 at Adobe Acres pump station (Adobe Acres) (Aroclor profiles from Frame and others, 1996; if a congener contributed more than 1 percent of the total PCB concentration in any sample, it was included in all plots).

Nonachloro (PCB-206, -207, -208) and decachloro (PCB-209) congeners also have been suggested as indicators of current-use PCBs, as they were not part of legacy Aroclor mixtures and have been measured in phthalocyanine green pigments (Anezaki and Nakano, 2014) and as byproducts from the manufacture of titanium dioxide (Du and others, 2008). Nonachloro and decachloro PCB congeners were rarely detected and, when detected, were present at low concentrations in the water samples from the stormwater drainage basins in this study. Nonachloro and decachloro PCB congeners were detected in four sediment samples, though at very low concentrations (less than 3 percent of the total PCB concentration), indicating that products containing these high-molecular-weight PCB congeners were not a major source of PCBs to the stormwater drainage basins during the sampling events.

Environmental weathering processes alter the source PCB composition. Each individual congener has unique physiochemical properties, such as solubility, volatility, and microbial dechlorination, that affect the extent of weathering processes. The weathering typically results in a PCB profile in environmental water and sediment samples that does not match any single source profile but rather represents the source plus weathering plus mixing with other weathered sources.

PCB Concentration Site Comparison and Context With Previous Studies

The results of this study quantitatively confirm that there are measurable concentrations of PCBs in water and sediment in the four stormwater systems sampled in the study area. High concentrations exceeding the New Mexico surface-water quality standard for protection of wildlife habitat and aquatic life of 14 ng/L (NMED, 2018) were detected multiple times in water at the Sanchez Farms sites, and most of the remaining samples at those sites had medium concentrations (0.700–14 ng/L) (table 2). The one sediment sample in the study that exceeded the threshold effect concentration of 40,000 ng/kg dw was from Sanchez Farms inflow (163,000 ng/kg dw) (table 3). Alameda at Rio Grande had a single high-concentration water sample and two medium-concentration sediment samples during a large precipitation event in July 2018. Alameda outflow had one medium-concentration water sample; the remaining water samples and sediment samples had low concentrations of PCBs. Paseo outflow had low or nondetectable PCB concentrations in water and sediment throughout the study. Adobe Acres had a single high-concentration water sample in July 2017, which may have been related to the very high SSC (45,100 mg/L) (table 2). About one-half of the remaining water samples at Adobe Acres had medium-concentration levels of PCBs. The remaining Adobe Acres water samples and the three sediment samples at that site had low concentrations of PCBs.

Water and sediment samples from the Sanchez Farms sites had the highest PCB concentrations of any site. At the Sanchez Farms sampling sites, water flows through a constructed wetland from Sanchez Farms inflow to Sanchez Farms pump station. The wetland appears to reduce sediment-bound PCB concentrations and sediment organic content; this reduction may be caused by strong sorption of PCBs to soil organic matter and clay rather than by uptake of PCBs in plants through the roots (Mackova and others, 2009). No upstream-to-downstream pattern was apparent for PCB concentrations in water. Specific conductance increased between the inflow station and the pump station. Additional sampling at a higher spatial and temporal resolution within the Sanchez Farms Open Space recreation area may elucidate sources of water and contaminants contributing to the wetland system, including groundwater and an upgradient pond; traveltimes; and chemical processes including settling of particulates, volatilization, and plant uptake within the wetlands.

The PCB concentrations in urban stormwater in the Albuquerque urbanized area, measured in this study (<0.096–65.8 ng/L) were similar to the range of PCB concentrations measured in the Upper Rio Grande watershed including urban runoff in Los Alamos (0.1–144 ng/L), northern New Mexico tributaries of the Rio Grande (0.28–29.5 ng/L), and Rio Grande and Rio Chama river water samples collected during baseline and storm events (not detected–51.4 ng/L) (Los Alamos National Laboratory, 2012). The PCB concentrations measured in this study also were within the range of stormwater-affected river samples collected over eight wet seasons from the Guadalupe River, California, between 2003 and 2014 (sum of 40 PCB congeners ranged from 0.69 to 167 ng/L; McKee and others, 2017). Sources of PCBs in the Guadalupe River were found to predominantly reflect Aroclors 1254 and 1260 (McKee and others, 2017), similar to the results of this study.

Concentrations of PCBs in sediment from urban stormwater drainage basins in the Albuquerque urbanized area measured in this study (340–163,000 ng/kg dw) were within the range of reported values in urban river sediments in the Rhone River, France, of 3,500–300,000 ng/kg dw (Desmet and others, 2012) and similar to values at Leon Creek, San Antonio, Texas, of 200–8,700 ng/kg dw at the low end but could be much higher (Wilson, 2016). PCBs were cited as most likely to be the congener mixture of Aroclor 1260 in Leon Creek (Wilson, 2016).

AHYMO Rainfall-Runoff Modeling Results

Six stormflow events were simulated at Adobe Acres, and two events were simulated at the Sanchez Farms inflow, for a total of eight simulated events. A summary of the simulated stormflow event data and their associated estimated PCB event loads can be found in table 5. The delineated area of the Adobe Acres watershed was 0.22 square mile, which had only one subwatershed for AHYMO modeling purposes (figs. 1, 3*A*, and 9). The Sanchez Farms watershed was divided into three subwatersheds, which totaled in area of 1.03 square miles.

Adobe Acres Pump Station Stormflow Events

The average total estimated runoff volume for all Adobe Acres stormflow events was 1.86 acre-feet, with an average peak discharge rate of 11.99 ft^3/s (table 5). The cumulative event precipitation depth total for these events averaged 0.43 inch. Although several of the events spanned 2 calendar days, each stormflow event occurred in a relatively short time span, all lasting less than 14 hours. In addition to being short duration, the stormflow events were also relatively flashy. From the time the model determined as the start of discharge (discharge = 0.1 ft^3/s) to the time of the peak discharge rate, the average time was 2 hours and 32 minutes. However, some of the events had multiple local peaks in discharge (fig. 17). In the case of the stormflow event that occurred between September 19, 2018, and September 20, 2018 (fig. 17*C*), peak discharge was not reached on the first local peak, so the time to peak discharge was 8 hours and 10 minutes (table 5). With the exception of this event, the remaining stormflow events reached peak discharge in less than 3 hours, and peak discharge for two events occurred in less than 1 hour. The shortest time to peak discharge was just 30 minutes during the stormflow event between October 7, 2018, and October 8, 2018.

Sanchez Farms Inflow Stormflow Events

The two simulated events at the Sanchez Farms inflow varied significantly in terms of total cumulative precipitation and total runoff volume. The event between July 27, 2018, and July 28, 2018, had a cumulative precipitation of 0.36 inch and runoff volume of 2.23 acre-feet, and the event between October 23, 2018, and October 24, 2018, had a cumulative precipitation of 1.45 inches and runoff volume of 12.90 acre-feet (table 5). The later event was relatively long and was the only simulated event to exceed the duration of 24 hours. This event was associated with multiple spikes in precipitation and multiple local peaks in discharge, so it had the highest total runoff volume of any stormflow event at either of the outflow sites included in simulations (fig. 18). The event between July 27, 2018, and July 28, 2018, had a lower total runoff volume but a slightly higher peak discharge of 17.74 ft^3/s, compared to 16.63 ft^3/s for the October 23, 2018, to October 24, 2018, stormflow event. The runoff total volume and peak discharge rates of either stormflow event at this site exceeded the average total volume and peak discharge rate values of the stormflow events at the Adobe Acres site.

Table 5. Summary of load calculations and model simulation results for Adobe Acres pump station (Adobe Acres) and Sanchez Farms inflow at Albuquerque, N. Mex. (Sanchez Farms inflow), sites, Albuquerque, New Mexico, 2017–18.

[h:m, hour:minute; mg, milligram; in., inch; ft^3/s, cubic foot per second]

Discharge event date(s)	Discharge event start time (h:m)	Discharge event end time (h:m)	Estimated event load (mg)	Potential minimum event load (mg)	Potential maximum event load (mg)	Cumulative event precipitation total (in.)	Total runoff volume (acre-feet)	Peak discharge (ft^3/s)	Time to peak (h:m)
Adobe Acres pump station (350059106410810)									
7/28/2017	1:35	8:55	1.01	0.32	1.75	0.27	0.81	4.49	1:25
8/9–8/10/2018	20:55	1:10	0.34	0.06	0.34	0.14	0.16	1.31	1:30
8/21/2017	1:05	9:20	1.47	0.59	3.24	0.37	1.50	16.84	2:45
9/19–9/20/2018	22:30	10:50	0.26	0.26	3.24	0.22	0.67	1.97	8:10
9/27–9/28/2017	16:55	6:10	14.26	2.82	15.50	1.28	7.14	41.45	0:55
10/7–10/8/2018	20:55	7:50	0.36	0.34	1.88	0.27	0.87	5.86	0:30
Averages			2.95	0.73	4.32	0.43	1.86	11.99	2:32
Sanchez Farms inlet (350304106401310)									
7/27–7/28/2018	22:25	7:05	16.71	16.71	92.74	0.36	2.23	17.74	1:05
10/23–10/24/2018	6:35	17:50	537.51	96.85	537.51	1.45	12.90	16.63	26:15
Averages			277.11	56.78	315.13	0.91	7.56	17.19	13:40

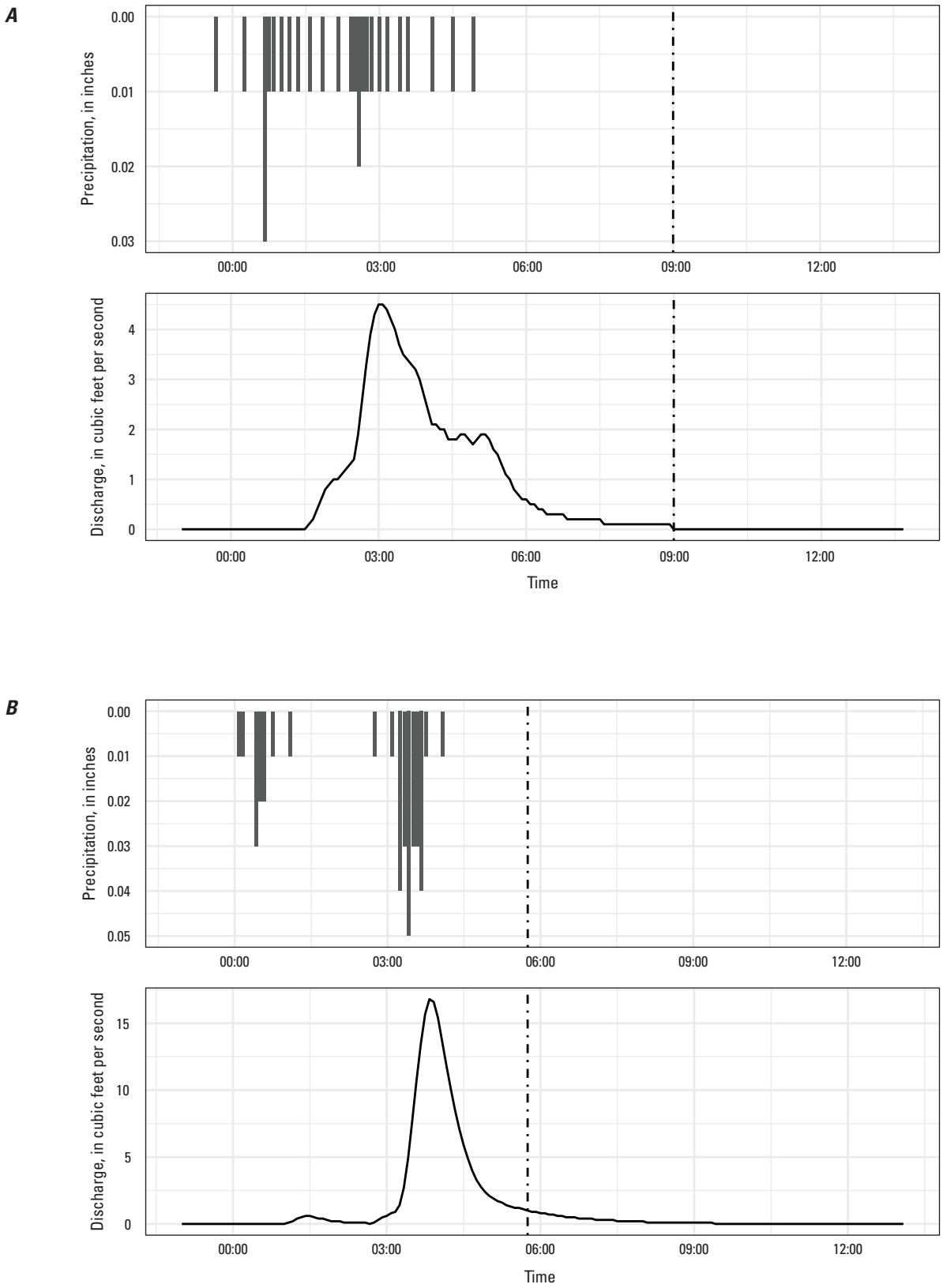
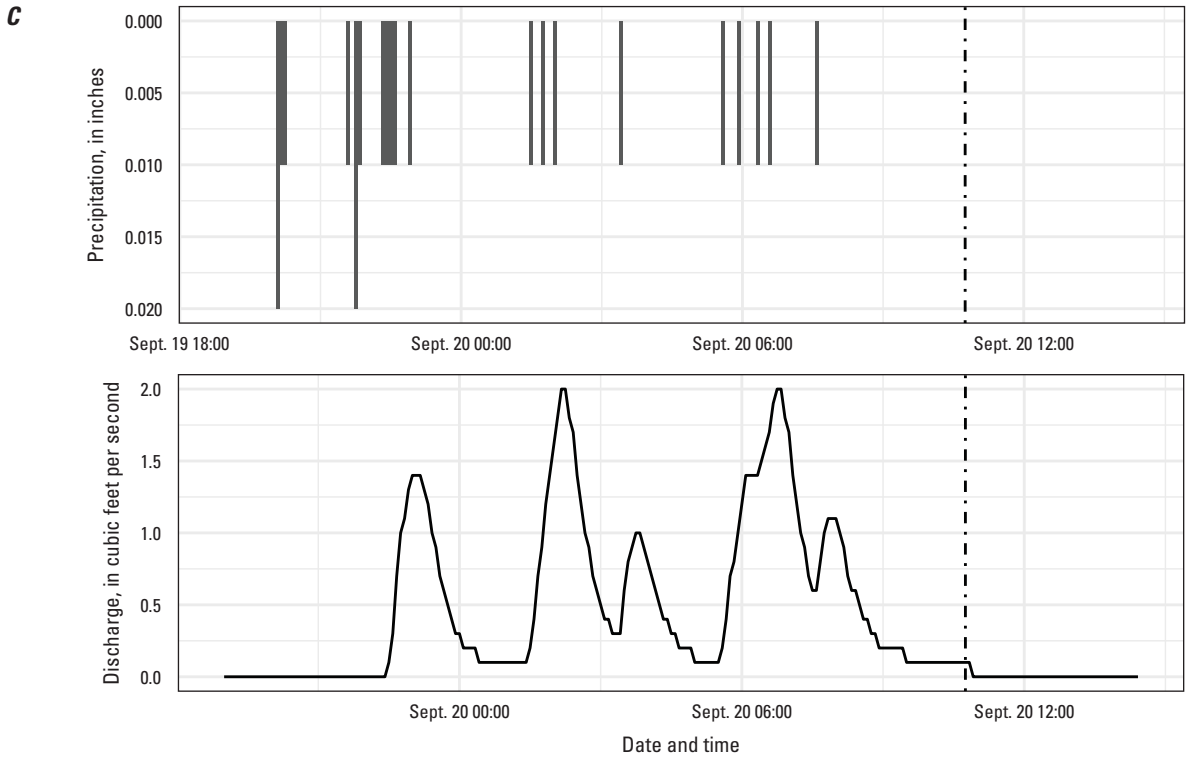


Figure 17. Precipitation and discharge results at the Adobe Acres pump station (Adobe Acres) site for *A*, 7/28/17; *B*, 8/21/17; *C*, 9/19–9/20/18; *D*, 9/27–9/28/17; *E*, 10/7–10/8/18; and *F*, 8/9–8/10/18. The dashed line on each graph represents the time at which a water-quality sample was collected.



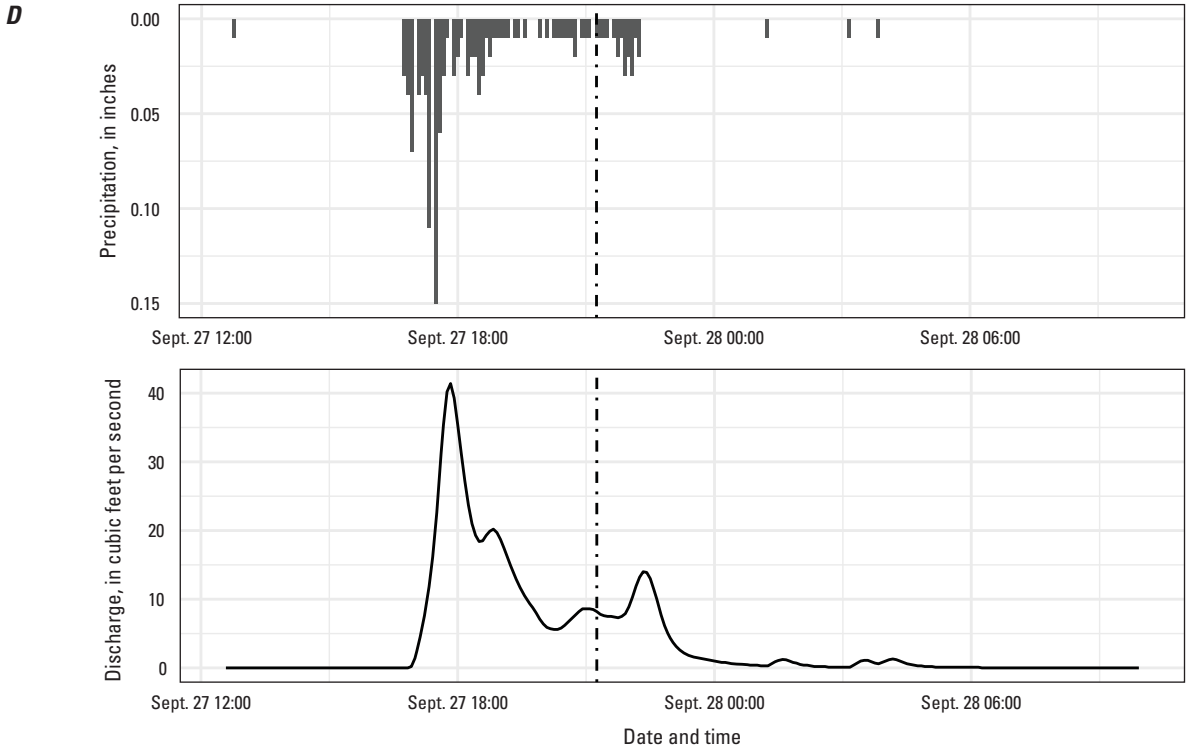


Figure 17. Precipitation and discharge results at the Adobe Acres pump station (Adobe Acres) site for *A*, 7/28/17; *B*, 8/21/17; *C*, 9/19-9/20/18; *D*, 9/27-9/28/17; *E*, 10/7-10/8/18; and *F*, 8/9-8/10/18. The dashed line on each graph represents the time at which a water-quality sample was collected.—Continued

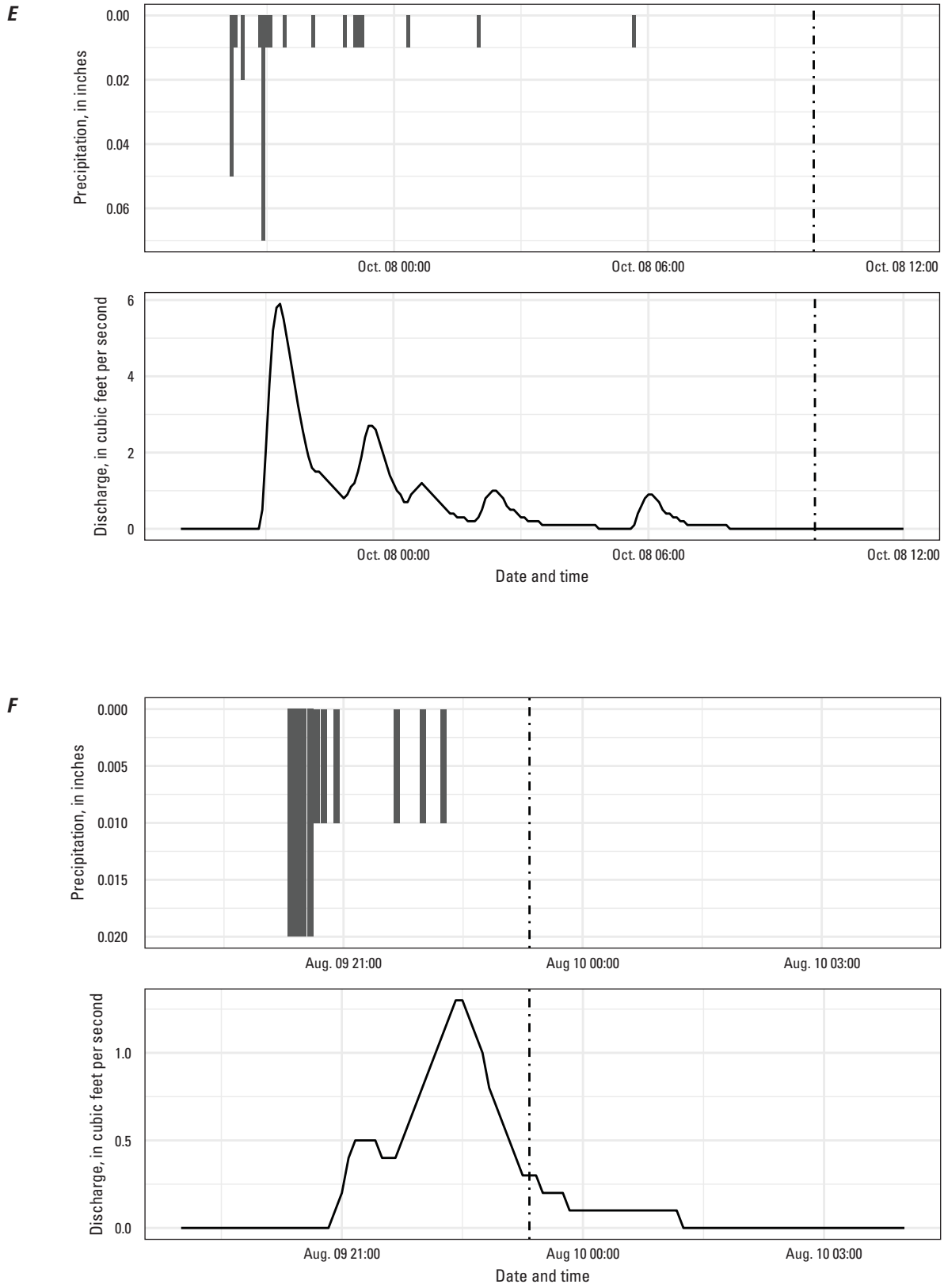


Figure 17. Precipitation and discharge results at the Adobe Acres pump station (Adobe Acres) site for *A*, 7/28/17; *B*, 8/21/17; *C*, 9/19-9/20/18; *D*, 9/27-9/28/17; *E*, 10/7-10/8/18; and *F*, 8/9-8/10/18. The dashed line on each graph represents the time at which a water-quality sample was collected.—Continued

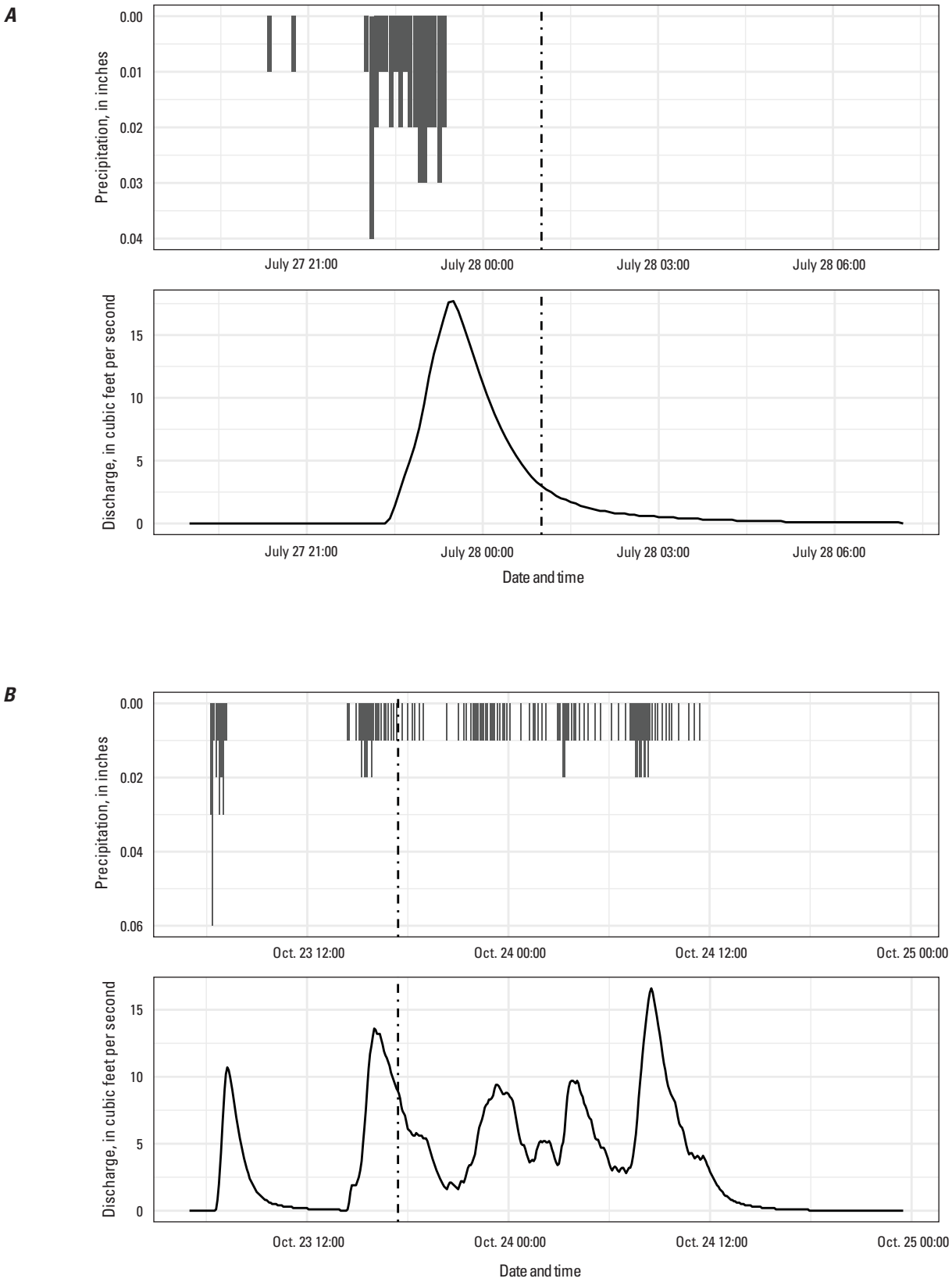


Figure 18. Precipitation and discharge results at the Sanchez Farms inflow at Albuquerque, N. Mex. (Sanchez Farms inflow), site for *A*, 7/27-7/28/18; and *B*, 10/23-10/24/18. The dashed line on each graph represents the time at which a water-quality sample was collected.

PCB Load Estimates

Because of the short duration and time to peak of the stormflow events, as well as the related difficult sampling efforts, only one water-quality sample was collected per stormflow event. A disadvantage of collecting only one sample per event is that the analysis is limited by the lack of understanding of the relation between discharge and total PCB concentrations, as it relates to the variability of discharge magnitude over the course of a single event and long-term trends across subsequent events. Additionally, most samples were collected during the falling limb of the stormflow hydrograph (as determined by AHYMO), and it is possible that concentrations in the rising limb or peak of the hydrograph may exhibit different concentrations. However, in this study, the discrete total PCB concentration is assumed to be consistent for the duration of each stormflow event. Additionally, because of a lack of observed discharge data at the study sites, the model results have not been verified. The total PCB event load results presented in this study have a high degree of uncertainty and should be considered as relative values, with the potential minimum and maximum PCB load estimates being approximate constraints on the uncertainty. Future studies could increase the accuracy of event load estimates by increasing the sampling frequency during stormflow events, as well as by collecting field discharge measurements either to help calibrate and validate the model results or to be used directly in load calculations.

Adobe Acres Pump Station PCB Load Estimates

At the Adobe Acres site, the average estimated PCB event load during the period of study (runoff volume ranging from 0.16 to 7.14 acre-feet) was 2.95 milligrams (mg), with average potential minimum and maximum event loads of 0.73 and 4.32 mg, respectively (fig. 19, table 5). The stormflow event with the largest total PCB loads occurred between September 27, 2017, and September 28, 2017, with an estimated total PCB load of 14.26 mg, based on the PCB concentration of the sample collected during the event, with potential minimum and maximum event loads of 2.82 and 15.50 mg, respectively. The stormflow event with the smallest estimated event load occurred between September 19, 2018, and September 20, 2018, with an estimated total PCB load of 0.26 mg, with potential minimum and maximum event loads of 0.26 and 3.24 mg, respectively. The potential minimum and maximum event loads occurred at the same time of year (late September), but 1 year apart, indicating that the total volume of runoff may be a more important factor than the time of year the event occurs in terms of effect on PCB loads.

The largest total PCB load (14.26 mg) at the Adobe Acres site, which was calculated for the event between September 27, 2017, and September 28, 2017, was in response to the largest magnitude stormflow event sampled, which was a result of a cumulative precipitation total of

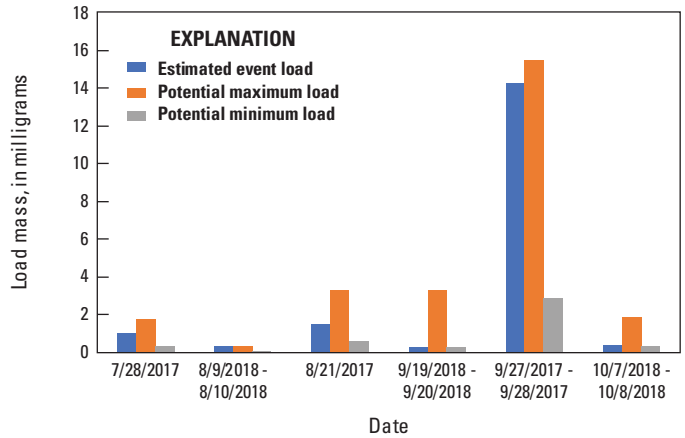


Figure 19. Estimated event load, as well as the potential maximum and minimum event loads, for each sampled stormflow event at the Adobe Acres pump station (Adobe Acres) site, Albuquerque, New Mexico, 2017–18.

1.28 inches (approximately three times higher than the average cumulative precipitation of 0.43 inch for all events modeled at Adobe Acres) and produced 7.14 acre-feet of stormflow runoff (table 5). The total PCB concentration measured on this date (1.62 ng/L) (table 2) was higher than the average concentrations during the simulated events at this site of 0.98 ng/L. The lowest estimated PCB event load was associated with a relatively small magnitude stormflow event between September 19, 2018, and September 20, 2018, which had a runoff volume of 0.67 acre-feet and peak discharge of 1.97 ft^3/s. This second smallest event recorded at Adobe Acres had a lower than average total PCB concentration of 0.320 ng/L (table 2). The event with the lowest minimum constraint on PCB event loads of 0.06 mg occurred between August 9, 2018, and August 10, 2018, and was associated with the lowest magnitude stormflow event with a total runoff volume of 0.16 acre-feet and peak discharge of 1.31 ft^3/s (table 5).

Sanchez Farms Inflow PCB Load Estimates

At the Sanchez Farms inflow site, of the two events for which discharge was simulated (runoff volume ranging from 2.23 to 12.90 acre-feet), the average estimated PCB event load was 277.11 mg, with minimum and maximum average event loads of 56.78 and 315.13 mg, respectively (fig. 20, table 5). For the stormflow event between July 27, 2018, and July 28, 2018, the estimated PCB event load was 16.71 mg, with a potential minimum estimated event load of 16.71 mg and a potential maximum estimated event load of 92.74 mg. For the stormflow event between October 23, 2018, and October 24, 2018, the estimated event load was 537.51 mg, with a potential minimum event load of 96.85 mg, and a potential maximum event load of 537.51 mg. The magnitude of this

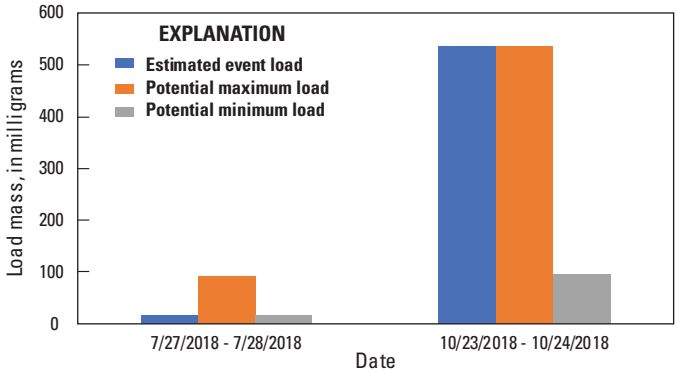


Figure 20. Estimated event load, as well as the maximum and minimum potential event loads, for each sampled stormflow event at the Sanchez Farms inflow at Albuquerque, N. Mex. (Sanchez Farms inflow) site, Albuquerque, New Mexico, 2017–18.

load, which was the largest calculated load at either of the two sites, was associated with a large total runoff volume of 12.90 acre-feet, which was the largest volume out of the eight sampled stormflow events between Adobe Acres and Sanchez Farms inflow. The event between July 27, 2018, and July 28, 2018, had the second largest event load out of the eight sampled stormflow events between the two sites, which was associated with the third largest total runoff volume between the two sites. The large runoff volumes of the stormflow events at the Sanchez Farms inflow site relative to the Adobe Acres site are a key determinant in the higher estimated event loads.

Implications for PCB Stormwater Concentrations and Loads Into the Rio Grande

The six water samples with the highest PCB concentrations (20.3–65.8 ng/L) exceeded the New Mexico surface-water quality standard for protection of wildlife habitat and aquatic life of 14 ng/L (NMED, 2018) (table 2). These exceedances occurred in July, August, September, and October. The remaining 30 samples had PCB concentrations below the standard (<0.096–7.62 ng/L) and were collected from July through December (table 2). None of the 36 water samples exceeded the NPDES permit level of 200 ng/L. One sediment sample, collected at Sanchez Farms inflow on July 28, 2018, containing a total PCB concentration of 163,000 ng/kg dw (table 3), exceeded a literature threshold effect concentration of 40,000 ng/kg dw of PCBs, below which adverse toxic effects on sediment-dwelling organisms are not expected to occur (MacDonald and others, 2000). The remaining 12 sediment samples (table 3) had total PCB concentrations below this threshold value. These water and sediment PCB concentration threshold values are based on laboratory toxicity tests and do not address nontoxic adverse effects, such as chronic, accumulative effects on systems such as the endocrine system. They also do not address effects on organisms exposed to a mixture of chemicals with additive or synergistic effects, as is usually present in urban stormwater runoff and receiving waters, such as mixtures of PCBs, metals, polycyclic aromatic hydrocarbons, and pharmaceutically active compounds.

Discharges simulated at the Sanchez Farms inflow and Adobe Acres sites, as well as the associated loads, do not flow directly into the Rio Grande. It is unknown how much of this stormwater reaches the Rio Grande, as it first flows into the pump stations before being pumped and routed to the river. The outflow from the stormwater collection basin at Paseo outflow is routed into a channel in the flood plain of the Rio Grande. Following large magnitude precipitation events during July through October in 2017 and 2018, the Paseo outflow channel was visited to assess the downstream migration of the pump station outflow water. On field visits, the water from the outflow channel reached a berm. Ponded water was not observed to have moved past the berm at the end of the flood-plain channel, nor was there visual evidence of flow moving past the berm towards the Rio Grande in 2017 and 2018.

Summary

In cooperation with the New Mexico County of Bernalillo, the U.S. Geological Survey (USGS) characterized potential polychlorinated biphenyl (PCB) concentrations and loading into the Rio Grande from watersheds that are under the county's jurisdiction. This report represents the results of a preliminary assessment of PCB concentrations and loading from stormwater runoff events from four Rio Grande tributary watersheds in the Albuquerque urbanized area, Bernalillo County, New Mexico. These results provide insights into PCB concentrations and loadings in the Rio Grande, as well as the health of the Rio Grande as a whole, and can be used to assist in fulfilling Bernalillo County's National Pollutant Discharge Elimination System (NPDES) permit requirements for the U.S. Environmental Protection Agency (EPA).

Precipitation data in this study were collected at four sites: Alameda pump station (Alameda) rain gage, Paseo pump station (Paseo) rain gage, Westside Community Center near Albuquerque, N. Mex. (Westside) rain gage, and South Valley Library near Albuquerque, N. Mex. (South Valley Library) rain gage. These four Bernalillo County rain gages operated by the USGS offer a widespread precipitation dataset that helps characterize the heterogeneity of precipitation events in the Albuquerque urbanized area. Generally, the sites in the north (Alameda and Paseo rain gages) have similar precipitation values to each other, as do the sites in the south (Westside and South Valley Library rain gages). The largest 2017 precipitation event between July and October occurred on September 27, 2017. During this event, the Paseo rain

gage recorded 0.98 inch of rain, the Westside rain gage recorded 1.07 inches of rain, and the South Valley Library rain gage recorded 1.25 inches of rain. In 2018, the largest precipitation event between July and October at all four rain gages occurred on October 23, 2018, to October 24, 2018. The Alameda rain gage recorded 1.65 inches of rain, the Paseo rain gage recorded 1.61 inches of rain, the Westside rain gage recorded 1.45 inches of rain, and the South Valley Library rain gage recorded 1.54 inches of rain. The maximum 5-minute intensity for the period of record did not necessarily coincide with the maximum precipitation event at each gage. The maximum 5-minute precipitation intensity at the Alameda rain gage and the Paseo rain gage both occurred on July 26, 2018; the Alameda rain gage recorded 0.33 inch per 5 minutes of precipitation, and the Paseo rain gage recorded 0.50 inch per 5 minutes of precipitation. The maximum 5-minute precipitation intensity at both the Westside rain gage and the South Valley Library rain gage was 0.38 inch per 5 minutes on September 28, 2017.

PCBs were analyzed for in water and sediment samples collected from the stormwater drainage basins at the following sample collection sites: Alameda pump station outflow (Alameda outflow), Alameda pump at Rio Grande Inlet (Alameda at Rio Grande), Paseo pump station outflow (Paseo outflow), Sanchez Farms inflow at Albuquerque, N. Mex. (Sanchez Farms inflow), Sanchez Farms pump station, and Adobe Acres pump station (Adobe Acres). PCBs were detected in 34 of 36 water samples, and PCB-11 was the only congener detected in 12 of those samples. There were multiple orders of magnitude variation in PCB concentrations, both between sites and at the same site over time, indicative of short-duration, high-concentration inputs of PCBs characteristic of urban stormwater runoff likely affected by multiple variables including antecedent precipitation amount and intensity, pump operations, and point during the hydrograph when the sample was collected. Total PCB concentrations in six of 36 water samples exceeded the New Mexico surface-water quality standard for protection of wildlife habitat and aquatic life of 14 nanograms per liter (ng/L). None of the water samples had a total PCB concentration exceeding the NPDES permit level of 200 ng/L. There were no linear relations with variables such as suspended sediment concentration, total suspended solids, specific conductance, total organic carbon, or 24- or 72-hour antecedent precipitation. Nonparametric analysis determined that, for water samples, PCB and TSS were significantly positively correlated using the Kendall's tau test.

Approximately one third of the water samples contained only PCB-11, which is present in yellow pigments and indicates a current-use source of PCBs to the stormwater drainage basins such as urban litter. When additional congeners were detected, the profiles resembled a mixture of Aroclor 1254 and Aroclor 1260. A congener profile for one PCB water sample, collected on July 26, 2018, at Alameda at Rio Grande, resembled pure Aroclor 1260. This indicates that there is a point source, such as a contaminated site or spill source, of relatively unweathered Aroclor 1260 that can be transported by rainfall runoff to Alameda at Rio Grande. Additional study may be warranted to better understand the PCB dynamics within the Sanchez Farms wetland system, which contained the highest concentrations of PCBs measured in water and sediment samples in this study.

The rainfall-runoff model Arid Lands Hydrologic Model (AHYMO) was used to simulate discharge at the Sanchez Farms inflow site and the Adobe Acres site. Discharge at the remaining sites was dependent on stormflow pump operation and could not be determined. The simulated discharge and the total PCB concentrations measured at the Sanchez Farms inflow site and the Adobe Acres site were used to estimate total PCB event loads. A low sample frequency during the course of the stormflow events contributes to uncertainty with these load calculations. In addition, although AHYMO was developed to work specifically in the Albuquerque area, the rainfall-runoff models were not calibrated or verified with observed discharge data in the simulated subwatersheds. Because of this uncertainty, estimates on the potential minimum and maximum total PCB loads for each event at either site were made by applying minimum and maximum total PCB concentrations collected at each respective site to each event load calculation at that site. The estimated event loads were highly dependent on the total event runoff volume, rather than on total PCB concentration. The average estimated event loads at the Adobe Acres site for six events was 2.95 milligrams (mg), with average potential minimum and maximum loads of 0.73 and 4.32 mg, respectively. The highest estimated potential maximum event load was 15.50 mg, and the lowest estimated potential minimum event load was 0.26 mg. At the Sanchez Farms inflow site, the average estimated event loads for two measurable events was 277.11 mg, with average potential minimum and maximum loads of 56.78 and 315.13 mg, respectively. The highest estimated potential maximum event load was 537.51 mg, and the lowest estimated potential minimum event load was 16.71 mg.

During field visits, water pumped from the Paseo pump station was not observed to move past the flood plain channel into the Rio Grande in 2017 or 2018. The discharge simulated by AHYMO at Adobe Acres and Sanchez Farms inflow, and the associated PCB loads, first must be pumped to the Rio Grande. Because of the absence of pump station discharge data, and the observation that the pumped water must travel a short distance through the flood plain before directly entering the Rio Grande, the exact volume of this runoff that reaches the river is unknown.

The results of this study quantitatively confirm that there are measurable concentrations of PCBs in water and sediment in the four stormwater systems sampled in the Albuquerque urbanized area, Bernalillo County, New Mexico. Through a comprehensive PCB congener analysis and total PCB load estimates, this report provides preliminary estimates of the amounts of PCBs that could be contributing to the Rio Grande and describes the potential sources of PCBs in the Albuquerque urbanized area.

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Attachment 2

Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy

Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy

Prepared for **Bernalillo County *in cooperation with* Albuquerque Metropolitan Arroyo Flood Control Authority, City of Albuquerque, and Southern Sandoval County Flood Control Authority**

June 25, 2019

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A Laboratory Report for Spring 2019 Sediment Sampling

Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy

1. Introduction

Daniel B. Stephens & Associates, Inc. (DBS&A) has prepared this progress evaluation report for Bohannon Huston Inc. (BHI) for submittal to Bernalillo County (the County) in cooperation with the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), the City of Albuquerque (COA), and the Southern Sandoval County Flood Control Authority (SSCAFCA). A sediment load reduction strategy (the Strategy) is being implemented by the permittees to reduce stormwater-related pollutant loads associated with sediment into the receiving water of the Rio Grande. The Strategy is being developed in accordance with the Middle Rio Grande (MRG) watershed-based municipal separate storm sewer system (MS4) permit (Permit No. NMR04A000 [effective December 2014]) (the Permit). The Strategy includes the following elements:

- Sediment assessment
- Baseline sediment loading estimates
- Targeted controls and best management practices (BMPs)
- Monitoring and interim reporting to assess progress
- Progress evaluation and reporting regarding overall success of the Strategy
- Verification of no adverse effect to the critical habitat of any threatened or endangered species

DBS&A has assessed the overall success of the Strategy by compiling direct and indirect measurements of program effectiveness and conducting a supporting sediment sampling event. This report presents the progress evaluation and assessment of the Strategy. Section 2 provides a literature review regarding sediment loading and transport in the Middle Rio Grande, along with a list of likely species present. Section 3 discusses the supporting sediment sampling event conducted by DBS&A. Section 4 compiles available water quality and sediment

data, reviews results, and evaluates the Strategy's overall success. Section 5 summarizes the findings and recommendations of the Strategy evaluation and assessment.

2. Background

This section provides a review of relevant professional papers and reports regarding sediment loading and transport in the Middle Rio Grande.

2.1 City of Albuquerque 2016 Sediment Assessment

In cooperation with COA, AMAFCA, New Mexico Department of Transportation (NMDOT), and the University of New Mexico (UNM), the U.S. Geological Survey (USGS) conducted a sampling study of stormwater in the Albuquerque metropolitan area, with samples collected between 2011 and 2015 (DBS&A, 2016). A total of 6 sample locations were selected for investigation as areas that could be contributing to pollutants in sediment entering the Rio Grande during stormwater discharges because they discharge stormwater directly or indirectly to the Rio Grande (DBS&A, 2016). The sampling locations were located at the downstream ends of drainage basins, and included the following:

- North Diversion Channel (NDC) near Alameda (North Diversion Channel)
- Mariposa Diversion of San Antonio Arroyo (San Antonio Arroyo)
- COA Barelas Lift Station No. 32 (Barelas Pump Station)
- San Jose Drain at Woodward Road at Albuquerque (San Jose Drain)
- South Diversion Channel (SDC) above Tijeras Arroyo (South Diversion Channel)
- Tijeras Arroyo near Albuquerque (Tijeras Arroyo)

The report included a review and comparison of water quality data for total dissolved solids (TDS), total suspended solids (TSS), metals, and polychlorinated biphenyls (PCBs) from these locations with corresponding data from the Rio Grande within the greater Albuquerque area (DBS&A, 2016). In general, TDS and TSS concentrations detected in stormwater samples were similar to those detected in the samples collected from the Rio Grande; however, while TDS

concentrations from Rio Grande sampling locations exhibited less variability compared to concentrations measured at the outfalls, TDS concentrations in the Rio Grande samples also appeared typically higher, indicating that the detention ponds and other BMPs within the contributing watersheds to reduce sediment loading to the river are working and do reduce the amount of contaminants making it to the river. The TSS concentrations at the outfall locations varied widely, but more sediment was frequently contributed from the Tijeras Arroyo, SDC, and NDC outfalls; therefore, this report recommended implementation of additional sediment loading reduction BMPs should be targeted in these drainage areas. Total concentrations of lead, cadmium, and zinc appeared higher in outfall samples than in Rio Grande samples (DBS&A, 2016).

The total PCB concentration of the water samples was estimated by summing the individual congener concentrations using EPA method 1668. Total PCB concentrations in the sampled outfall locations ranged from not detected at two outfall locations to 0.123699 micrograms per liter (µg/L) at the NDC. Overall, the total PCB concentrations in stormwater are generally low, although higher concentrations are noted in the samples collected from the NDC and San Jose Drain outfall locations (DBS&A, 2016). Total PCB concentrations in the Rio Grande in the Albuquerque area have ranged from not detected at the Rio Grande upstream of the NDC location to 0.000276 µg/L at the Rio Grande near Isleta location. The detected total PCB concentration was below the New Mexico and Pueblo of Isleta water quality standard of 0.014 µg/L.

The report recommended that COA investigate several specific areas within its jurisdiction that may be contributing excessive levels of pollutants in sediment entering the Rio Grande during stormwater discharge events, targeting areas within Tijeras Arroyo (upstream of the concrete-lined area) and other arroyos that are contributing higher sediment loads (DBS&A, 2016). The recommended investigation would include analytical analyses to determine the presence or absence of near-surface PCB and metal concentrations in collected sediment, including from arroyo locations upgradient of the urbanized area to estimate background concentrations. These data would supplement historical stormwater analytical data and would allow for spatial comparison of PCB and metal concentrations in sediment between the various arroyos and upgradient background locations, as well as the results of previous investigations (DBS&A, 2016).

2.2 City of Albuquerque 2017 Sediment Sampling

This section summarizes a sampling event conducted by DBS&A in 2017 to characterize the presence or absence of near-surface PCB congeners and metal concentrations in sediment along stormwater channels and outfalls within the Albuquerque metropolitan area, including Tijeras Arroyo, as required by Part 1C-special conditions of the Permit (DBS&A, 2017). The sediment sample locations were determined based on a visual screening that focused on areas of sediment deposition (e.g., areas behind erosion control structures and areas of low flow velocities) or from areas that potentially contribute sediment during stormwater events to the Rio Grande. For comparison purposes, representative background sediment samples were collected from natural arroyo channels located upgradient of urbanized development (DBS&A, 2017).

Sediment samples for PCB and metals analyses were collected at or immediately below ground surface from 12 locations at channels, arroyos, and sediment outfalls maintained by AMAFCA (DBS&A, 2017). A total of 5 of these locations represented background samples collected from natural arroyos upgradient of urbanized development. Samples were analyzed for PCBs and selected metals using EPA methods 8082 and 6010B, respectively. The two common analytical tests for measuring PCB concentrations include EPA method 8082, which analyzes for Aroclors, and EPA method 1668, which analyzes for congeners (Storms et al., 2015).

A synthetic precipitation leaching procedure (SPLP) was conducted on the sediment samples to determine the mobility of aluminum, cadmium, chromium, lead, nickel, and zinc. The SPLP simulates exposure of the sediment to rainfall, and is useful in estimating the leaching potential of metals moving from sediment into stormwater (DBS&A, 2017).

Review of the laboratory analytical data indicates that there were no PCBs present at detectable concentrations in the sediment samples collected along stormwater channels and outfalls within the Albuquerque metropolitan area. Aluminum and zinc were detected in the sediment sample leachate, and may be contributing to stormwater concentrations for these metals (DBS&A, 2017).

2.3 Albuquerque Metropolitan Arroyo Flood Control Agency and City of Albuquerque PCB Program

In 2012, AMAFCA and COA developed a strategy for testing key locations within the NDC and San Jose Drain watersheds in order to investigate the presence of PCBs (AMAFCA, 2017c). The results from the 2012-2014 monitoring of the NDC watershed indicated the presence of PCBs at the Grantline and North Camino Inlets. Based on the data, MS4 partners concluded that there are no “hot spots” in the municipal area that are continuing to produce PCBs, with the possible exception of the Grantline and North Camino watersheds. In 2014-2017, AMAFCA continued activities to identify and eliminate controllable sources of PCBs specific to these two inlets. Specifically, historical PCB data for the NDC were reviewed and assessed, commercial and industrial properties that may have contributed PCBs to the North Camino and the Grantline Channel were identified, and past PCB releases from PNM in these areas were researched. A sampling event in July 2015 at the Grantline and North Camino Inlets detected low concentrations of Aroclor 1260 in only 2 of the 20 samples analyzed with EPA method 1668. Additional sampling in October 2015 and December 2016 detected low concentrations of Aroclor 1260 at the Grantline location. Based on the results of these sampling events, it was reported that the occurrences of PCBs are irregular, and that it is difficult to demonstrate correlation or continuity between individual sample sites. When detected, Aroclor 1260 concentrations were below regulatory levels for handling or disposal. Results of these investigations did not identify a source or sources of PCBs that represent a continuing impact to the waters of the Rio Grande (AMAFCA, 2017c).

2.4 U.S. Geological Survey and Bernalillo County PCB Program

The USGS has been conducting a surface water data collection program for the Bernalillo County Public Works Division since 2004. In 2010, they conducted a stormwater sediment screening program using EPA method 1668 to assess historical PCB discharges from 4 County stormwater systems. The results indicated that PCB Aroclors used for a wide range of applications prior to 1950 remain in the contributing watershed and are transported by stormwater. Further sampling at the County Sanchez Farms stormwater facility established that passive sediment removal followed by treatment in constructed wetlands effectively reduced the concentration of PCBs in stormwater.

The current project is supported by a 5-year Joint Funding Agreement for fiscal year (FY) 2014 through 2019 (USGS, 2018). The project objectives are to monitor and characterize stormwater quality for drainage basins in urbanized portions of Bernalillo County and to obtain rainfall data for water quality monitoring, storm flow predictions (flood frequency), and other hydrologic analyses. In FY2016, satellite telemetry instrumentation was installed at selected rain gages (Paseo Pump, Westside Community Center, and South Valley Library), allowing transmission of near real-time rainfall data; the rain gages at these sites are all functioning correctly (USGS, 2018).

The current focus of this program is on PCB and non-routine sampling, as the County participates with other National Pollutant Discharge Elimination System (NPDES) permittees in the Albuquerque metropolitan area in a larger cooperative, watershed-based sampling program. In 2017 and 2018, samples were collected under this program from 5 locations (Adobe Acres, Sanchez Pump Station, Sanchez Inflow, Paseo, and Alameda) (Table 1) and analyzed for PCBs, suspended sediment, TSS, total organic carbon, and field parameters of temperature, pH, and specific conductance. As shown in Table 1, during the 2018 monsoon period (July to September 2018), 18 environmental and 2 replicate samples were collected (USGS, 2018).

The USGS plans to prepare a detailed analysis of PCB congeners detected at concentrations above laboratory reporting limits, along with a thorough literature review to relate the results of this sampling to other studies and to define potential sources that may be contributing PCBs. The preliminary findings indicate that PCB 11 was found at nearly all of the sampling sites, and has been found in the air and water at many locations in the U.S. This suggests that its presence may be related to disposal of consumer goods that make their way into urban waterways (Rodenburg et al., 2010).

In the FY2019 dry season (November-June), the USGS plans to collect 10 samples plus 1 blank sample from the same 5 sampling locations listed above. They also plan to finalize their analysis and approval of the recent data, compare rainfall runoff models, select the model for use in computing discharge values from the sampled rain events, and prepare a report (USGS, 2018).

2.5 U.S. Geological Survey Water Quality Data

The USGS has an urban stormwater program in the Albuquerque metropolitan area, with data available online. The program began in 1976, when AMAFCA, COA, and USGS began collecting hydrologic data to help assess the quality and quantity of surface water resources to determine long-term trends in the Albuquerque area. The objectives of the program are to collect surface water, rainfall, and water quality data for monitoring of water quality, modeling rainfall/runoff, predicting storm flow, and performing other hydrologic analyses as needed by local and other government agencies (USGS, 2019a).

During any particular water year (October 1 to September 30) since 1976, a selected number of streamflow gaging stations and rain gages have been operational in the Albuquerque urban-data collection program. The project website currently has links to data for 11 surface water gages, 2 recording crest-state gages, 2 other crest-state gages, and 18 rain gages (USGS, 2019a). In addition, data are available in the USGS National Water Information System (NWIS) database for the discharge outfalls and for several stream gage locations along the Rio Grande within the greater Albuquerque area (USGS, 2019b). USGS data are discussed in Section 4.

2.6 Potential Species Present

Table 2 summarizes the likelihood of occurrence of state-listed species within the Middle Rio Grande MS4 Permit watershed. State-listed species with the likelihood of occurrence include 1 plant species (Parish's alkali grass), 1 fish species (Rio Grande silvery minnow), 1 mollusk species (paper pondshell), 7 bird species (southwestern willow flycatcher, brown pelican, bald eagle, peregrine falcon, neotropic cormorant, common black hawk, and gray vireo), and 1 mammal species (spotted bat).

Table 3 summarizes the likelihood of occurrence of federally listed species within the Middle Rio Grande MS4 Permit watershed. Federally listed species with the likelihood of occurrence include 1 fish species (Rio Grande silvery minnow) and 2 bird species (southwestern willow flycatcher and yellow-billed cuckoo).

2.7 Potential Effects to Any Threatened or Endangered Species

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA), as amended (16 United States Code [USC] 1531 et seq.) requires that federal agencies ensure that actions they authorize (such as through a permit), fund, or carry out do not jeopardize the existence of any species listed under the ESA, or destroy or adversely modify designated critical habitat of any listed species. To that end, all federal agencies must consult with the U.S. Fish and Wildlife Service (USFWS) (or with the National Marine Fisheries Service in the case of marine species) when any such action may affect a listed endangered or threatened species.

In the case of the Middle Rio Grande watershed-based permit (and its precursor, the Albuquerque MS4 permit), informal consultation between the EPA and the USFWS began in 2004. In June 2007, the USFWS informed the EPA that formal consultation was required on the permit based on new information that revealed that stormwater may adversely affect federally listed species. The EPA's request for consultation, in accordance with Section 7 of the ESA, was initially received on July 16, 2010 and subsequently amended in August 2013, and formal consultation was mutually extended in December 2013, February 2014, and June 2014.

In response to the EPA submitting a supplemental biological evaluation with effect determinations for both the southwestern willow flycatcher and the Rio Grande silvery minnow in 2013, the USFWS issued its biological opinion (BO) on August 21, 2014. In the BO, the USFWS first concurred with the EPA's determination that the proposed Permit "may affect, but is not likely to adversely affect" the southwestern willow flycatcher or its designated critical habitat. The EPA's revised determination that the proposed Permit "may affect, is likely to adversely affect" the silvery minnow and its critical habitat effectively triggered the need for the BO, together with its incidental take permit (ITP). In the BO, the USFWS stated that "[a]dverse effects to silvery minnow and its critical habitat will result from discharge of stormwater pulses that create low oxygen conditions in the North Diversion Channel Embayment and that subsequently convey that low oxygen water and any oxygen demanding pollutants into the MRG." However, the overall conclusion of the USFWS was that "issuance of the [proposed] MRG Watershed MS4 Permit [was] not likely to jeopardize the continued existence of the silvery minnow and [was] not likely to destroy or adversely modify designated critical habitat." As part of the BO, the USFWS thus issued an incidental take statement (ITS). Under the terms of

Section 7(b)(4) and Section 7(o)(2), take that is incidental to and not intended as part of the lead agency action is not considered to be prohibited take under the ESA, provided that such take is in compliance with the terms and conditions of this ITS.

As stated in the BO, the ITS will expire in 2019, effectively requiring the EPA to reinitiate consultation with the USFWS. Other factors compound the need for consultation. Most importantly, the western distinct population segment (DPS) of the yellow-billed cuckoo, including the Middle Rio Grande cuckoo population, became listed as threatened on November 3, 2014, after the 2014 BO had been released. Consultation is therefore needed with the USFWS regarding that species and, in the event of an adverse effect determination, another ITS would be required with its new set of reasonable and prudent measures (RPMs) and terms and conditions specific to the yellow-billed cuckoo. Also notable is the fact that the USFWS never withdrew or finalized its proposed rule to designate critical habitat for the species. An analysis of all likely effects of the Permit on the yellow-billed cuckoo would include consideration of its large insect fauna prey base and any risk of bioaccumulation. The cuckoo's adequate prey base is identified as one of the proposed critical habitat's primary constituent element (PCE) in the USFWS's proposed rule for the designation of critical habitat on August 15, 2014.

Another species recently added to the list of threatened and endangered species is the New Mexico meadow jumping mouse. Its listing as endangered was finalized in 2014 by the USFWS. The species is not known to occur in the MS4 Permit area, but a population was documented at nearby Isleta Pueblo. Informal consultation is therefore also recommended for the jumping mouse.

The 2014 BO identified management necessary to reduce adverse effects on the silvery minnow. In particular, it listed the following RPMs that the USFWS believed were necessary and appropriate "to minimize impacts of incidental take of the silvery minnow resulting from the proposed action:"

- Reduce the incidences of low dissolved oxygen associated with stormwater discharges occurring in the NDC Embayment and in the Middle Rio Grande downstream by 50 percent after two years and another 50 percent after four years from issuance of the Permit.

- Monitor oxygen and temperature in the water column in the NDC Embayment and in the Middle Rio Grande downstream to determine the effectiveness of the dissolved oxygen strategy implemented.

In the 2014 BO, terms and conditions of the ITS describe the steps necessary to implement the RPMs. The USFWS added a list of conservation recommendations, or discretionary actions recommended to be taken by the EPA while covered under the 2014–2019 ITS.

In conclusion, consultation with the USFWS should be reinitiated by the EPA during the next MS4 Permit development for the following reasons:

- To include discussions of potential effects on the yellow-billed cuckoo (and possibly the New Mexico jumping mouse) and verify a “may affect, is not likely to adversely affect” determination for that species.

- Regarding the silvery minnow, either obtain a new ITS with terms and conditions or, in the event that conditions have changed, seek concurrence from the USFWS for a new effects determination of “may affect, is not likely to adversely affect.”

2.8 Planned Projects

All AMAFCA and SSCAFCA projects are regional flood control and/or water quality improvement projects, and function to capture sediment pollutant load generated throughout the watershed. The AMAFCA project schedules identify future planning efforts, joint funding initiatives, design, and construction projects to be accomplished over a 6-year planning horizon (AMAFCA, 2017a). These projects are to be implemented in cooperation with other stakeholders (e.g., COA, the County). The projects listed in Tables 4a and 4b relate to sediment reduction and water quality improvements during the periods of 2016-2021 and 2017-2022, respectively. The AMAFCA project schedules include additional projects with other objectives (AMAFCA, 2015 and 2017a).

In addition to the specific projects, AMAFCA has allocated $400,000 per year for small projects throughout their jurisdiction, such as small stormwater quality enhancements and

enhancements to existing structures (AMAFCA, 2017a). All of these planned infrastructure improvements and studies are recommended to further reduce sediment loading and improve stormwater quality in the Albuquerque metropolitan area.

SSCAFCA projects planned for implementation within the next 5 years that have a water quality component include the following (Gatterman, 2019):

- Lisbon Detention Facility
- Industrial Park Water Quality Facility
- Tributary A Dam
- Unser Dam
- Venada Water Quality Dam
- Lomitas Negras Phase III (High Range and Aloe Ponds)
- Badger Dam

These projects are included in SSCAFCA's infrastructure capital improvements plan (ICIP) (Gatterman, 2019).

3. Sediment Sampling Event

In-stream samples collected in the Rio Grande by the Compliance Monitoring Cooperative (CMC) for the FY2018 wet season had analytical results that exceeded applicable water quality standards for PCBs, E. coli, and gross alpha (AMAFCA, 2018). Based on these findings, sediment data were collected in 2019 to characterize the presence or absence of near-surface PCBs, gross alpha, and metals (aluminum, cadmium, chromium, lead, nickel, and zinc) at water quality structures or sediment outfalls along channels or arroyos maintained by AMAFCA, COA, SSCAFCA, or the County. The locations were selected to assess the functionality of the existing water quality control structures and to focus on areas of sediment deposition (e.g., areas behind erosion control structures and low flow velocity areas). The sample locations and

analytical procedures were presented in the approved sampling and analysis plan (DBS&A, 2019), and are summarized along with the sample event results in the following subsections.

3.1 Locations and Collection Method

DBS&A personnel conducted sediment sampling above and below the water quality structures/ sediment collection areas in arroyos, channels, and erosion control structures, where sediment accumulates and has the potential to reach the Rio Grande. Dam locations were not chosen because sediment transport is hampered at these structures, and the sediment is removed before transport can occur to the Rio Grande. Table 5 and Figure 1 identify the 21 sediment sampling locations.

The sediment samples were collected 1 to 2 inches below ground surface. To minimize the potential for cross-contamination, sediment was collected using a new stainless steel spoon for each sample. Photographs and global positioning system (GPS) coordinates (3-meter accuracy) of sample locations were recorded, and soil characteristics were noted.

3.2 Laboratory Analysis

The samples were submitted to Hall Environmental Analysis Laboratory (HEAL) in Albuquerque, New Mexico for analysis of PCBs and selected metals using EPA methods 8082 and 6010B, respectively. The two common analytical tests for measuring PCB concentrations include EPA method 8082, which analyzes for Aroclors, and EPA method 1668, which analyzes for congeners (Storms et al., 2015). SPLP analysis was conducted on the sediment samples to determine the mobility of aluminum, cadmium, chromium, lead, nickel, and zinc. The SPLP simulates exposure of the sediment to rainfall, and is useful in estimating the leaching potential of metals moving from sediment into stormwater. Gross alpha was also analyzed using EPA method 900.0.

3.3 Sample Event Results

The analytical results show that none of the seven PCB Aroclors were detected at the sampling locations. Also, cadmium, chromium, and lead were not detected by the laboratory using the

SPLP method. Aluminum, nickel, zinc and gross alpha concentrations were detected at some locations. Concentrations from the March 28–29 and April 1, 2019 sampling event are shown on Figure 2 and Table 6. The laboratory report is provided as Appendix A.

Aluminum was detected in the sediment collected from each of the 21 sampling locations at concentrations ranging from 2.7 milligrams per liter (mg/L) (at Paseo del Norte Pump Station #42) to 160 mg/L (at the West I-40 Diversion Channel). Aluminum concentrations were lower after the water quality structures at the NDC Bathtub—33 mg/L in the sediment within the bathtub compared to the outfall sample concentration of 7.4 mg/L. At Sanchez Farm Inflow, the aluminum concentration was 14 mg/L compared to 7.3 mg/L at the outfall. The West I-40 Diversion Channel Sediment Collection area sample contained aluminum at a concentration of 160 mg/L compared to 9.2 mg/L in the outfall sample.

Nickel was detected at concentrations above the laboratory detection limit (0.010 mg/L) at 4 of the 21 locations. Nickel was detected in NDC Bathtub sediments at a concentration of 0.018 mg/L, in the West I-40 Sediment Collection Area at 0.074 mg/L, in Sanchez Farm Inflow sediment at 0.010 mg/L, and in the Tijeras/SDC Outfall sediment sample at 0.014 mg/L. Nickel concentrations were below the laboratory detection limit at the other 17 sediment sampling locations.

Zinc concentrations ranged from non-detect (<0.020 mg/L) in the sediment sample collected from the edge of the Rio Grande at Isleta Dam to 0.56 mg/L at the West I-40 Diversion Channel sediment collection area. The West I-40 collection area showed a drop in zinc concentration between the collection area (0.56 mg/L) and the outfall location (0.028 mg/L). A similar trend was observed at the NDC Bathtub, with zinc concentrations of 0.31 mg/L at the bathtub and 0.038 mg/L at the outfall. Sanchez Farm also showed a decrease in zinc concentration between the inflow (0.21 mg/L) and the duckbill outfall sample (0.15 mg/L). Additional sample locations yielded comparable concentrations between the locations upstream and downstream of water quality structures.

Gross alpha activities ranged from 0.597 picocuries per gram (pCi/g) in the sediment collected at Venada Arroyo Outfall to 22.9 pCi/g in sediment collected from the Sanchez Farms Inflow. The next highest gross alpha activity was measured in the sediment collected at Montoyas

Outfall at 21.2 pCi/g. The water quality structures do not appear to have a large impact on the gross alpha activities. Most of the sediment sample locations showed a higher gross alpha activity in the sediment collection area compared to the outfall location. For example, San Antonio Arroyo Pond sample contained a gross alpha activity of 10.8 ± 6.01 pCi/g compared to the San Antonio Arroyo Outfall location activity of 4.83 ± 4.43 pCi/g. The overall trend in the Rio Grande went from 4.67 ± 5.83 pCi/g at Rio Grande at Angastora Dam to 11.3 ± 5.42 pCi/g in the sediments collected at the Rio Grande at Isleta Dam.

4. Data Evaluation

Available water quality data were downloaded from the online USGS NWIS database (USGS, 2019b) along with compliance monitoring data from the MS4 permittees (AMAFCA, 2019; BHI, 2019) for the discharge outfalls and for several stream gage locations along the Rio Grande within the greater Albuquerque area (Figure 3 and Table 7). The data review provided in the COA 2016 sediment assessment report (summarized in Section 2) was updated with data for the Permit period. An additional location, Sanchez Farms Pump Station, was added for the update.

Figure 4a shows recent TDS concentrations for samples collected at the 7 outfall locations. Since 2003, TDS concentrations in the sampled outfall locations have ranged from 75 mg/L at SDC outfall to 940 mg/L at the Tijeras Arroyo outfall (Figure 4a). The TDS concentrations are highly variable within each of the outfalls, but overall concentrations are generally below 200 mg/L. None of the measured values in the stormwater samples at the outfalls exceeded the New Mexico water quality standard of 1,500 mg/L for the Rio Grande Basin for the Permit period.

Figure 4b shows recent TDS concentrations for samples collected from the Rio Grande stream gage locations within the greater Albuquerque area. Since 2003, TDS concentrations in the Rio Grande have ranged from 155 mg/L at the Rio Grande at Alameda Bridge stream gage to 450 mg/L at the Rio Grande at Isleta stream gage (Figure 4b). TDS concentrations in the Rio Grande typically appear to be between 150 and 350 mg/L. No TDS concentration exceeded the New Mexico water quality standard of 1,500 mg/L for the Rio Grande Basin during the Permit period.

Figure 5a shows recent TSS or suspended sediment concentrations for samples collected at the outfall locations. Since 2003, the TSS or suspended solids concentrations in the sampled outfall locations have ranged from not detected (less than 1 mg/L, shown as open symbols in Figure 5a) to 61,100 mg/L at the Tijeras Arroyo outfall (Figure 5a).

Figure 5b shows recent TSS or suspended sediment concentrations from the Rio Grande within the greater Albuquerque area. Since 2003, TSS or suspended sediment concentrations in the Rio Grande have ranged from 45 mg/L to 76,200 mg/L at the Rio Grande at Albuquerque stream gage (Figure 5b).

Available sample data collected for dissolved and total concentrations since 2003 from the outfalls and the Rio Grande were reviewed for the following metals: aluminum, cadmium, chromium, lead, nickel, and zinc. Figures 6a through 11f show the total and dissolved concentrations for these selected metals, along with the difference between total and dissolved metals concentrations (when positive).

4.1 Sediment Removal

DBS&A obtained sediment removal data from AMAFCA, SSCAFCA, the County, and COA. The measurement and subsequent consistent reporting of sediment removals is a challenge that these permittees are working to address in order to better understand sediment load reductions in the watershed. The following volumes of sediment were removed by these permittees in FY2018, FY2017, and FY2016:

- AMAFCA removed a total of 110,617 cubic yards of sediment from 30 locations in FY2018 (Chavez, 2019) (Table 8). This compares to their removal of 18,102 cubic yards of sediment in FY2017 (Table 9) and 32,124 cubic yards of sediment in FY2016 (Table 10). The FY2018 and FY2017 tables (Tables 8 and 9) also provide volumes removed by AMAFCA for trash, vegetation, and homeless debris.

- SSCAFCA records sediment removal data by the calendar year to correspond to their U.S. Army Corps of Engineers (USACE) Memorandum of Understanding period (Gatterman, 2019). Calendar year (CY) 2018 was not a large sediment removal year for

SSCAFCA, with a total of 42,150 cubic yards of sediment removed from three locations (Table 11). In 2017, SSCAFCA removed 16,025 cubic yards of sediment from the Lomitas Negras (a tributary of the Montoyas Arroyo); no earlier sediment removal data are available. More data will be collected going forward, and will be available by either fiscal or calendar year (Gatterman, 2019).

- The County's FY2018 total sediment removal volume was 190 cubic yards (Bronson, 2019). Table 12 provides information regarding the gross material removed by the County from catch basins, wet wells, storm sewer lines, County ponds, channels, and right-of-way in FY2016 through FY2018. Table 13 provides detail on the types of waste removed by the County in FY2018. Table 14 provides the waste characteristics for the non-sediment waste removed by the County in FY2018.

- The COA estimates that the total volumes of sediment they removed in FY2018 were 2,191 cubic yards from arroyos and catch basins and 4,585 cubic yards from street sweeping (Verhage, 2019). Table 15 provides the total volumes of silt, trash, debris, and vegetation removed by the COA from arroyos and catch basins in FY2016 through FY2018. Table 16 provides the volumes of sediment removed by the COA in FY2017 and FY2018 via street sweeping.

Table 17 summarizes the sediment removal data for permittees for FY2014 through FY2019. A total of 155,148 cubic yards of sediment was removed by the permittees in FY2018, and at least 266,453 cubic yards of sediment was removed by the permittees from 2014 to present. There are limited data available for the beginning of the Permit period, when the new tracking systems were being set up and implemented. The measurement and subsequent consistent reporting of sediment removals is a challenge that the permittees are working to address in order to better understand the sediment load reductions in the watershed. Data collection will be more complete going forward.

Figure 12 shows sediment removal by AMAFCA and SSCAFCA graphically for FY2018 (the SSCAFCA data are for CY2018). County and COA data are not included on this figure, as data for individual removal locations are not consistently recorded (Bronson, 2019), and the COA does not record individual location data for the materials removed (Verhage, 2019). As reported

in the 2016 COA sediment assessment report, the Barelas Pump Station and San Jose Drain sites are maintained by the COA and do not have documented sediment removal data. The COA employs several crews that routinely check and clean more than 30,000 storm drains within the city after large storm events. The 14 pump stations and 11 dams the COA maintains are inspected each year in May and June just prior to the monsoon season (DBS&A, 2016).

4.2 Baseline Sediment Loading Evaluation

Part I.C.3.b(ii) of the Permit states that the permittees must provide estimates of baseline total sediment loading and relative potential for contamination by these sediments from urban activities for drainage areas and/or watersheds draining directly to a surface waterbody. The Permit allows for a cooperative approach for this baseline estimate, which is what the watershed permittees have agreed to and is presented here.

A constituent load in a river, stream, or stormwater outfall is the mass or weight of a constituent that passes a cross section of a stream in a specified interval of time. Loads are expressed in mass units (e.g., tons, kilograms) and are considered for time intervals that are relative to the type of pollutant and the watershed area for which the loads are calculated. Loads are calculated from concentrations of constituents obtained from analyses of water samples and stream discharge, which is the volume of water that passes a cross section of the stream in a specific amount of time. Sediment-discharge measurements are usually available on a discrete or periodic basis. In the MS4 Permit area, outfall samples were collected by USGS and AMAFCA for analysis of suspended sediments typically 0 to 3 times a year since 2003.

Suspended sediment is defined as the portion of a water sample that is separated from the water by filtering. This solid material may be composed of organic and inorganic material that includes algae, industrial and municipal wastes, urban and agricultural runoff, and eroded material from geologic formations (e.g., sand and silt). These materials are transported to stream channels by overland flow related to stormwater runoff and cause varying magnitudes of turbidity. For the purpose of determining the baseline total sediment loading from outfalls, TSS is synonymous with sediment transported in the outfalls. Concentrations of TSS in mg/L are determined by laboratory analysis of periodic water grab samples at the outfalls. Table 18 summarizes the available TSS data reported by the USGS and AMAFCA at MS4 outfall

locations, and the corresponding water discharge values reported by the USGS. The reported discharge values include instantaneous value at the time of sample collection, the daily mean value on day of sample collection, the annual mean daily value of outfall, and the annual total discharge volume, if available.

The most commonly used method to calculate sediment-discharge records is based on the derivation of a temporal relation by interpolating between measured suspended sediment concentration values and using measured and estimated concentration values with time-weighted water discharge values to calculate suspended sediment discharges (Porterfield, 1972). The method used to calculate sediment-discharge records is dependent on the types and frequency of available data (Gray and Simões, 2008). Concentrations of suspended sediment at the five main outfalls into the Rio Grande are available infrequently during the Permit period, while discharge data were typically more robust. For this evaluation, concentration values are merged with discharge values and summed to derive suspended sediment discharges using the following equation (Gray and Simões, 2008):

$$Q_s = Q_w * C_s * k \qquad (1)$$

where Q_s = suspended sediment discharge (tons per day)

Q_w = water discharge (cubic feet per second [cfs])

C_s = mean concentration of suspended sediment in cross section (mg/L)

k = a coefficient based on the unit of measurement of water discharge that assumes a specific weight of 2.65 for sediment, and equals 0.0027 in inch-pound units

Estimated suspended sediment discharge from the five main outfalls into the Rio Grande is shown in Table 18 for 2012–2018. Per the Permit monitoring methodology, the samples were collected during any portion of the monitoring location's discharge hydrograph (i.e., first flush, rising limb, peak, and falling limb) after a discernible increase in flow at the tributary inlet. Therefore, the load value calculated using the discharge value at time of sample collection may not be representative of the load across the monitoring location's discharge hydrograph, but offers a snapshot of the sediment discharge during that particular storm event. For comparison, the sediment load was also calculated using the daily mean discharge, if available, which may be more indicative of the complete storm event. Finally the suspended sediment discharge was

calculated using the annual mean discharge for the year of sample collection if data were available. The highest sediment discharges based on discharge at time of collection were calculated at the NDC in May 2012 (7,7017.84 tons) and Tijeras Arroyo in July 2012 (4,485.35 tons). During the Permit period, the highest load (3,804.57 tons) was calculated at Tijeras Arroyo in September 2018.

Reliable estimation of sediment discharge presupposes that the data on which the estimates are based are comparable and reliable (Gray and Simoes, 2008); however, the data in the Middle Rio Grande Basin have not necessarily been derived or collected in a consistent manner. The USGS and AMFACA samples were collected and analyzed using different sample collection techniques, laboratories, and analytical methods. The availability, reliability, and comparability of data used to quantify coefficients for suspended load determine the accuracy of the results. Water discharge values were also not available for several sampling events in order to calculate the sediment discharge values, allow comparisons between outfalls, and determine the annual total load to the Rio Grande.

4.3 Pollutant Source Reduction Potential

Based on the results of the sediment assessment (DBS&A, 2016), the Permit Part I.C.3.b(ii) states that the permittee must provide relative potential for contamination of sediments by urban activities for drainage areas, sub-watersheds, impervious areas, and/or directly connected impervious areas draining to the Rio Grande. The sediment assessment (DBS&A, 2016) used the USGS *Summary of Urban Stormwater Quality in Albuquerque, New Mexico, 2003–12* (Storms et al., 2015) to summarize and review TDS, TSS, metals, and PCB congeners. The USGS (Storms et al., 2015) concluded that stormwater samples from outfalls with more urban development (i.e., industrial, commercial, and residential) had higher median concentrations of selected physical and chemical constituents (e.g., pH, specific conductance, TDS, and TSS) than stormwater samples collected from outfalls with less urban development (Storms et al., 2015).

As shown in Table 18, the TSS concentrations at the outfall locations varied widely, but more sediment was frequently contributed from the Tijeras Arroyo, SDC, and NDC outfalls. Therefore, implementation of additional sediment loading reduction BMPs should be targeted in

these drainage areas. The sediment assessment (DBS&A, 2016) reported that concentrations of lead, cadmium, and zinc (total concentrations) appeared higher in outfall samples than in Rio Grande samples.

The purpose and intent of the Strategy is to encourage permittees to look at how to reduce pollutants attached to sediments. The sediment assessment (DBS&A, 2016) determined that BMPs currently in operation by the permittees are reducing the volume of sediment discharged to the river (compared to not having the BMPs), thereby reducing pollutant loading to the Rio Grande.

Entities in the MRG that manage stormwater, including AMAFCA, the County, COA, and SSCAFCA, are currently planning installation of additional studies to improve stormwater quality and decrease the amount of sediment reaching the Rio Grande. Tables 4a and 4b list the projects that are proposed for implementation between 2016 and 2022 that will reduce sediment and/or improve water quality, as outlined in the AMAFCA 2016 and 2018 project schedules (AMAFCA, 2015 and 2017a). There are a total of 34 projects that relate to sediment reduction and/or water quality improvements on the 2016 project schedule (AMAFCA, 2015), and a total of 37 projects on the 2018 project schedule (AMAFCA, 2017a). The main project types include the following:

- Constructing channels, diversion structures, ponds, debris fences, and/or floating booms for drainage, to control flows, and/or to reduce floatables and debris
- Constructing new dams/ponds, enlarging existing ponds, or extending/adding infrastructure to collect and convey stormwater, increase capacities, reduce flooding, and keep from overwhelming facilities with stormwater
- Installing sediment control facilities or providing bank protection and grade control to reduce erosion
- Creating impediments and barriers for birds and humans to congregate to reduce point source pollution
- Monitoring stormwater quality and incorporating BMPs to enhance stormwater quality

Within the project schedules, the project sheets provide descriptions, objectives, locations, sponsors, and stakeholders for each specific project (AMAFCA, 2015 and 2017a). From the project sheets, it is clear which projects have water quality improvement as an objective. In some cases, the pollutant source reduction potential is quantified. These include the Tijeras sediment retention structure to be built to collect 15,000 to 30,000 cubic yards of sediment and debris before it enters the SDC and ultimately the Rio Grande (AMAFCA, 2015). The 2018 AMAFCA project schedule includes an update on this same project, and says that the Tijeras Sediment Facility Phase II project consists of constructing three separate basins with a total storage capacity of approximately 50,000 to 75,000 cubic yards of sediment (AMAFCA, 2017a). Phase II of the project includes constructing the remaining portions of the middle basin and the entirety of the easternmost basin, as well as the concrete box culvert that will connect the basins (AMAFCA, 2017a).

The projects listed on Tables 4a and 4b will have beneficial impacts to water quality; however, in most cases, the project sheets do not include information that quantifies the pollutant source reduction potential. Together, these projects have the potential to significantly reduce pollutant sources in the watershed, but a rigorous evaluation of the potential for pollutant source reduction cannot be completed using the information provided by the project schedules.

4.4 Strategy Evaluation

4.4.1 Monitoring and Interim Reporting to Assess Progress

AMAFCA prepares annual fiscal year reports to assess the status, implementation, and performance of the required permit activities and to present sediment and floatables removal, rainfall, and runoff data (AMAFCA, 2018).

In FY2016, AMAFCA completed the construction of the NDC outfall grade control structure modification and embayment regrading projects (AMAFCA, 2018). In FY2017, AMAFCA worked on facility plans for Tijeras Arroyo and Calabacillas Arroyo, analyzing the arroyos and drainage facilities and assessing the potential for future sediment BMPs in these arroyos (AMAFCA, 2018). In FY2018, AMAFCA began designing Phase II of the Tijeras Arroyo sediment removal system, and finalized the Tijeras Arroyo and Calabacillas Arroyo facility plans (AMAFCA, 2018).

4.4.2 BMPs/Water Quality Structures in the Watershed

AMAFCA reports that it has 127 stormwater quality debris facilities that annually remove an average of 50,000 cubic yards of sediment and 2,500 cubic yards of trash from stormwater before the runoff enters the Rio Grande (AMAFCA, 2015 and 2017). The locations of the BMPs/water quality structures in watershed for many of the cooperating permittees are shown on the AMAFCA maintenance map (Plate 1). The types and numbers of structures installed during the Permit period by AMAFCA and the County are summarized in Table 19.

4.4.3 Evaluation of Sediment in Stormwater Before and After BMP Installation

In 2017, AMAFCA cooperatively with the County completed a study characterizing gross pollutants collected in stormwater quality BMP structures (AMAFCA, 2017b). The objective was to evaluate removal of pollutants from stormwater (e.g., trash, sediment, and organic debris) by structural BMPs within the AMAFCA/Albuquerque drainage system and to update a previous study that was completed in 2005. The study included 13 locations throughout the Albuquerque metropolitan area, chosen to describe the debris at the most downstream end of the watershed before the final discharge point into the Rio Grande (AMAFCA, 2017b). The locations included Domingo Baca, La Cueva Manholes, La Cueva Water Quality, North Pino Pond, Piedras Marcadas #3, Piedras Marcadas #4, Piedras Marcadas #5, Piedras Marcadas #6, South Diversion Manholes (Baffle Chute), South Pino Pond, UNM Water Quality Manholes, West Bluff, and Woodward. The overall study procedure consisted of collecting, separating by sieve/visual inspection, and weighing materials caught by the structural BMPs (AMAFCA, 2017b).

The results of the study showed that sediment is the largest contributor to pollutants collected in stormwater quality BMP structures; on average, 98 percent of the pollutants removed consisted of sediment. Between 2005 and 2017, the total volume of debris captured during the studies decreased by approximately 30 percent; there was a significant increase in the percent of sediment debris being captured and a decrease in the percent of debris from other categories (AMAFCA, 2017b).

The AMAFCA Tijeras Arroyo sediment retention structure (AMAFCA, 2017a) is a regional stormwater quality improvement structure designed to capture sediment above the concrete section of Tijeras Arroyo. The project consists of three separate basins with a total storage capacity of approximately 50,000 to 75,000 cubic yards of sediment. The first basin was

completed in May 2017. The remaining portions of the middle basin and the entirety of the easternmost basin are currently under construction. There has been only one sample collected for TSS analyses below the BMP since May 2017 (Figure 5a). After completion of the Tijeras Arroyo sediment retention structure, the reduction of sediment in stormwater will be evaluated with future sampling events.

Since 2007, AMAFCA has overseen the construction of 48 new water quality facilities and BMPs, increasing the opportunities for debris to be intercepted before reaching the stormwater quality BMP structures. AMAFCA began recording annual sediment, vegetation, and debris volumes cleaned out of each BMP in 2016 (by fiscal year); therefore, a comparison of total debris volume between studies is not currently available, but will be in the future (AMAFCA, 2017b). This study implemented a method for comparing the performance of stormwater quality BMPs and began building a dataset for comparison in the future. Along with increased recordkeeping of total debris volumes removed from these BMPs, quantitative comparison between water quality structures in different drainage basins will be possible in the future, aiding in the evaluation of BMP performance and in prioritizing future projects (AMAFCA, 2017b).

5. Summary and Recommendations

This report provides progress evaluation and reporting regarding the overall success of the Strategy, which is being implemented by the permittees to reduce pollutant loads associated with sediment into the receiving water of the Rio Grande. The overall success of the Strategy has been assessed by compiling direct and indirect measurements of program effectiveness in this progress report and conducting a sediment sampling event in 2019.

5.1 Sampling

The March/April 2019 sediment sampling event was completed to characterize the presence or absence of near-surface PCBs and gross alpha at water quality structures within Bernalillo County. The 2019 sediment sampling event did not detect PCB congeners in sediments sampled above or below water quality structures/sediment collection areas located in arroyos, channels, and erosion control structures. These results are similar to those of the 2017 COA

study, which also did not detect PCBs in the sediment samples collected along stormwater channels and outfalls within the Albuquerque metropolitan area (DBS&A, 2017).

The 2017 and 2019 sediment studies used EPA method 8082 for PCB analysis, which provides procedures for 19 of the 209 possible PCB congeners. Several sampling studies by the County and the USGS used EPA method 1668A, a more robust analytical method appropriate for determining the concentrations of all 209 PCB congeners. The 2010 and recent USGS and County sediment and water quality studies indicated that PCB Aroclors remain in the MRG watershed and can be transported by stormwater. For compliance monitoring, Appendix F of the Permit states that "EPA Method 1668 should be utilized when PCB water column monitoring is conducted to determine compliance with permit requirements." For non-compliance sampling used for internal watershed monitoring, such as the 2019 sediment sampling event, EPA method 608 is applicable for PCB screening. If PCBs had been detected in this study using EPA method 608, EPA method 1668 would be recommended for future sampling events.

Gross alpha activity had not previously been sampled for in sediment collection areas and the outfall locations within the watershed. Most of the 2019 sediment sample locations showed a higher gross alpha activity in the sediment collection area compared to the outfall location, indicating that the collection areas are target areas for reducing sediment transport to the Rio Grande. Gross alpha activity may reflect naturally occurring radioactivity of the sediments, particularly where sources may be derived from volcanic and granitic terrain, as volcanic and granitic rocks are known sources of radioactive elements such as uranium and radium. The 2019 sampling event also characterized the presence of SPLP metals at water quality structures within Bernalillo County. Aluminum, nickel, and zinc were detected in the sediment sample leachate for some samples in the 2017 and 2019 sampling events. These sediment constituents may be contributing to stormwater concentrations of these metals (DBS&A, 2017).

5.2 Targeted Controls for Sediment/Pollution Removal

An important element of the Strategy is the use of targeted controls and BMPs to reduce sediment transport by stormwater into the receiving water of the Rio Grande. As shown in Table 17, a total of 155,148 cubic yards of sediment was removed by the permittees in FY2018 and at least 266,453 cubic yards of sediment was removed by the permittees during the Permit

period. AMAFCA in cooperation with the County completed a study characterizing gross pollutants collected in stormwater quality BMP structures (AMAFCA, 2017b). The results of the study showed that sediment is the largest contributor to pollutants collected in stormwater quality BMP structures; on average, 98 percent of the pollutants removed consisted of sediment (AMAFCA, 2017b). This study also implemented a method for comparing the performance of stormwater quality BMPs and began building a dataset for comparison in the future. Along with increased recordkeeping of total debris volumes removed from BMPs, quantitative comparison between water quality structures in different drainage basins will be possible in the future, aiding in the evaluation of BMP performance and prioritizing future projects.

5.3 Baseline Summary

The Strategy includes estimation of baseline total sediment loading and relative potential for contamination by these sediments from urban activities for areas or watersheds draining directly to a surface waterbody. Estimated suspended sediment discharge from the five main outfalls into the Rio Grande was calculated for 2012–2018 (Table 18). The highest sediment discharge into the Rio Grande during the Permit period was calculated to have occurred in the NDC and Tijeras Arroyo. The method used to calculate baseline total sediment loading is dependent on the types and frequency of available data. Data for the Middle Rio Grande Basin were not necessarily derived or collected in a consistent manner. Better coordination between agencies is recommended when collecting additional analytical samples and discharge measurements to improve the sediment discharge value calculations, allow improved comparisons between outfalls, and facilitate estimation of annual total load discharged to the Rio Grande.

5.4 Species Effects

The Strategy includes the verification of no adverse effect to the critical habitat of any threatened or endangered species. State-listed species with the likelihood of occurrence in the Permit area include Parish's alkali grass, Rio Grande silvery minnow, paper pondshell (mollusk), southwestern willow flycatcher, brown pelican, bald eagle, peregrine falcon, neotropic cormorant, common black hawk, gray vireo, and the spotted bat. Federally listed species with the likelihood of occurrence in the permit area include the Rio Grande silvery minnow, southwestern willow flycatcher, and yellow-billed cuckoo. Consultation with the USFWS should

be reinitiated by the EPA during the next MS4 Permit development to discuss potential effects on the yellow-billed cuckoo and possibly the New Mexico jumping mouse, to verify a “may affect, is not likely to adversely affect” determination for these species. Consultation with the USFWS should also be reinitiated to either obtain a new ITS with terms and conditions or, in the event that conditions have changed, seek concurrence from the USFWS for a new effects determination of “may affect, is not likely to adversely affect” for the Rio Grande silvery minnow.

The purpose and intent of the Strategy is to encourage permittees to evaluate how to reduce pollutant loads associated with sediment from entering the receiving waters of the Rio Grande. The entities collaborating under the Permit are working together to reduce pollutants in stormwater, and the Strategy is having beneficial effects. We recommend that permittees continue to operate and maintain the BMPs already in place to reduce pollutants and sediment loading, continue with the implementation of the proposed projects, and evaluate additional potential projects to reduce sediment loading. Data collection and reporting methods have improved over the Permit period, making additional information available for assessment and comparison in the future. Continued monitoring and assessment of the impaired waters will allow the permittees to evaluate progress toward sediment reduction and adaptively manage future efforts. The Strategy will likely need to be adapted as progress is made, new information is obtained through future studies, new practices and programs are developed, and the new Permit conditions are implemented.

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Figures

S:\PROJECTS\DB19.1073_BERNCO_SPLRS\GIS\MXDS\SEDIMENT_REMOVAL_2019\FIG01_WQ_SAMPLE_LOCATIONS_201903.MXD

2011 aerial photography from USDA NAIP.

Explanation

AMAFCA watershed

12-digit watershed

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Sediment Quality Sampling Locations

Figure 1

Daniel B. Stephens & Associates, Inc.

6/6/2019

JN WR14.0074

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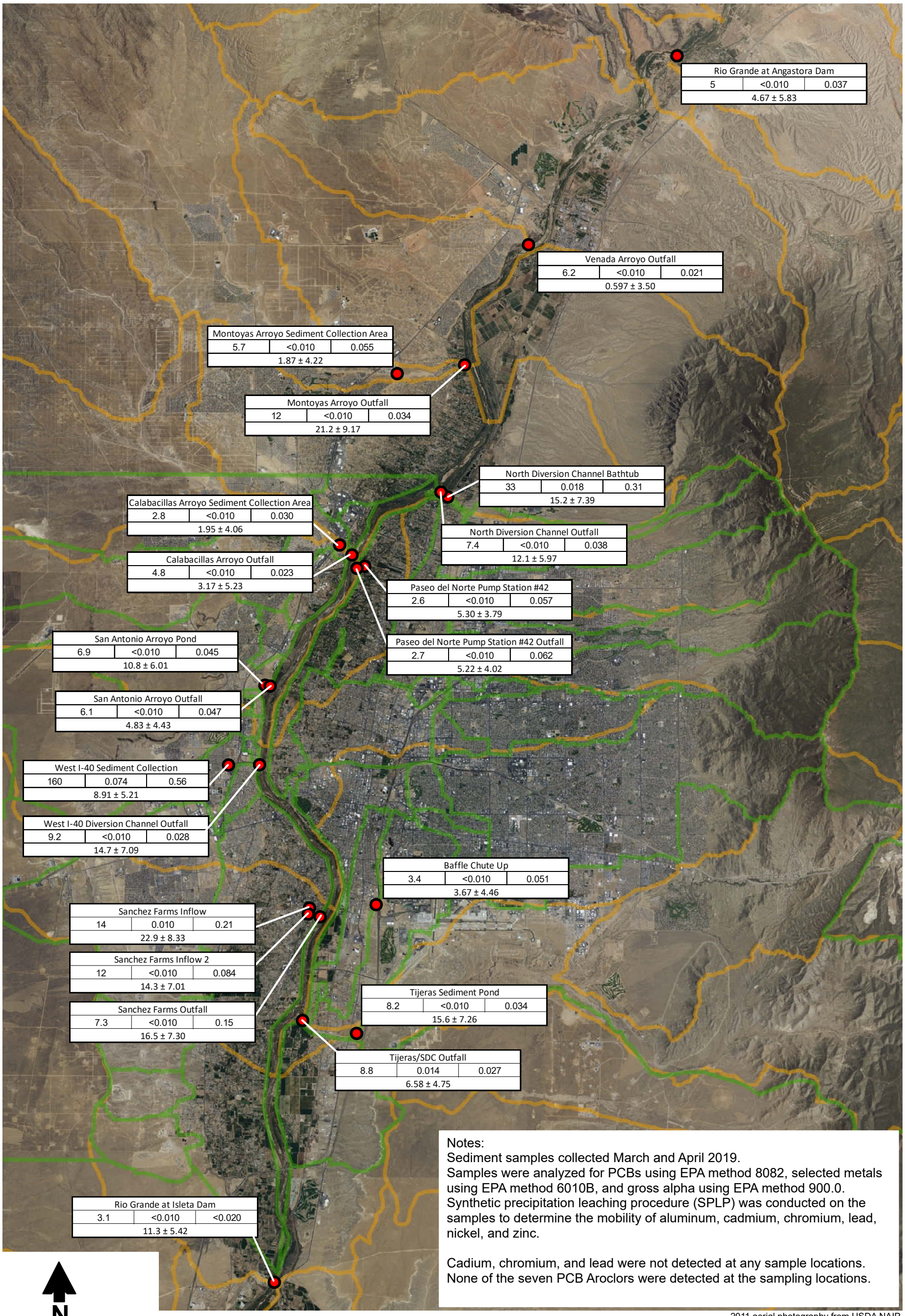


Notes:
Sediment samples collected March and April 2019.
Samples were analyzed for PCBs using EPA method 8082, selected metals using EPA method 6010B, and gross alpha using EPA method 900.0.
Synthetic precipitation leaching procedure (SPLP) was conducted on the samples to determine the mobility of aluminum, cadmium, chromium, lead, nickel, and zinc.

Cadium, chromium, and lead were not detected at any sample locations.
None of the seven PCB Aroclors were detected at the sampling locations.

2011 aerial photography from USDA NAIP

Explanation

- AMAFCA watershed
- USGS 12-digit watershed
- Sampling location

Location		
Aluminum (mg/L)	Nickel (mg/L)	Zinc (mg/L)
Gross alpha (EPA 900.0) (pCi/g)		

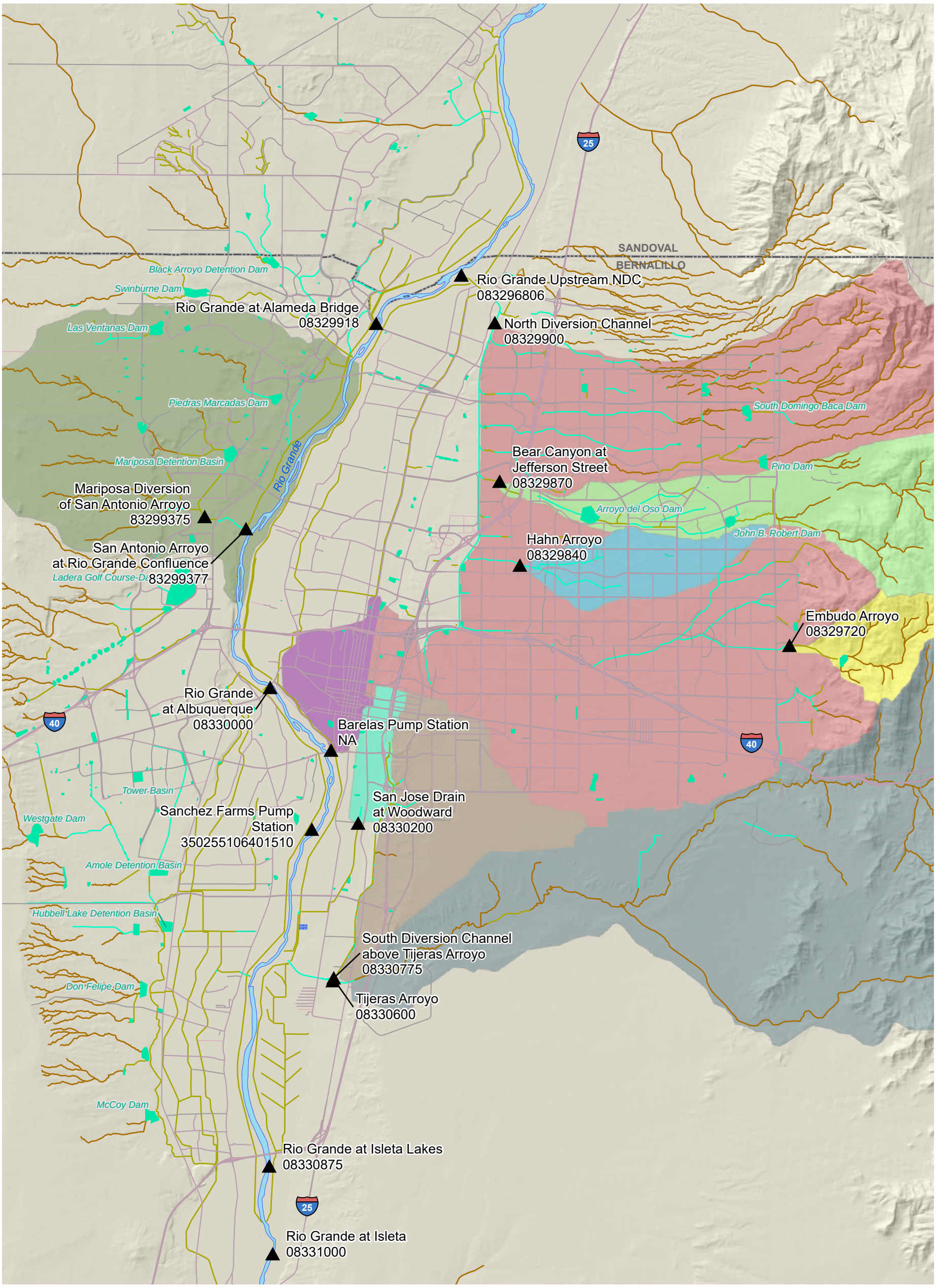
BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Sediment Quality Analytical Results

Figure 2

Daniel B. Stephens & Associates, Inc.
6/19/2019
JN DB19.1073

S:\PROJECTS\DB19.1073_BERNCO_SPLRS\GIS\MXDS\SEDIMENT_REMOVAL_2019\FIG03_WQ_OUTFALL_SAMPLING_LOCS_AND_STEAM_GAGES.MXD



BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

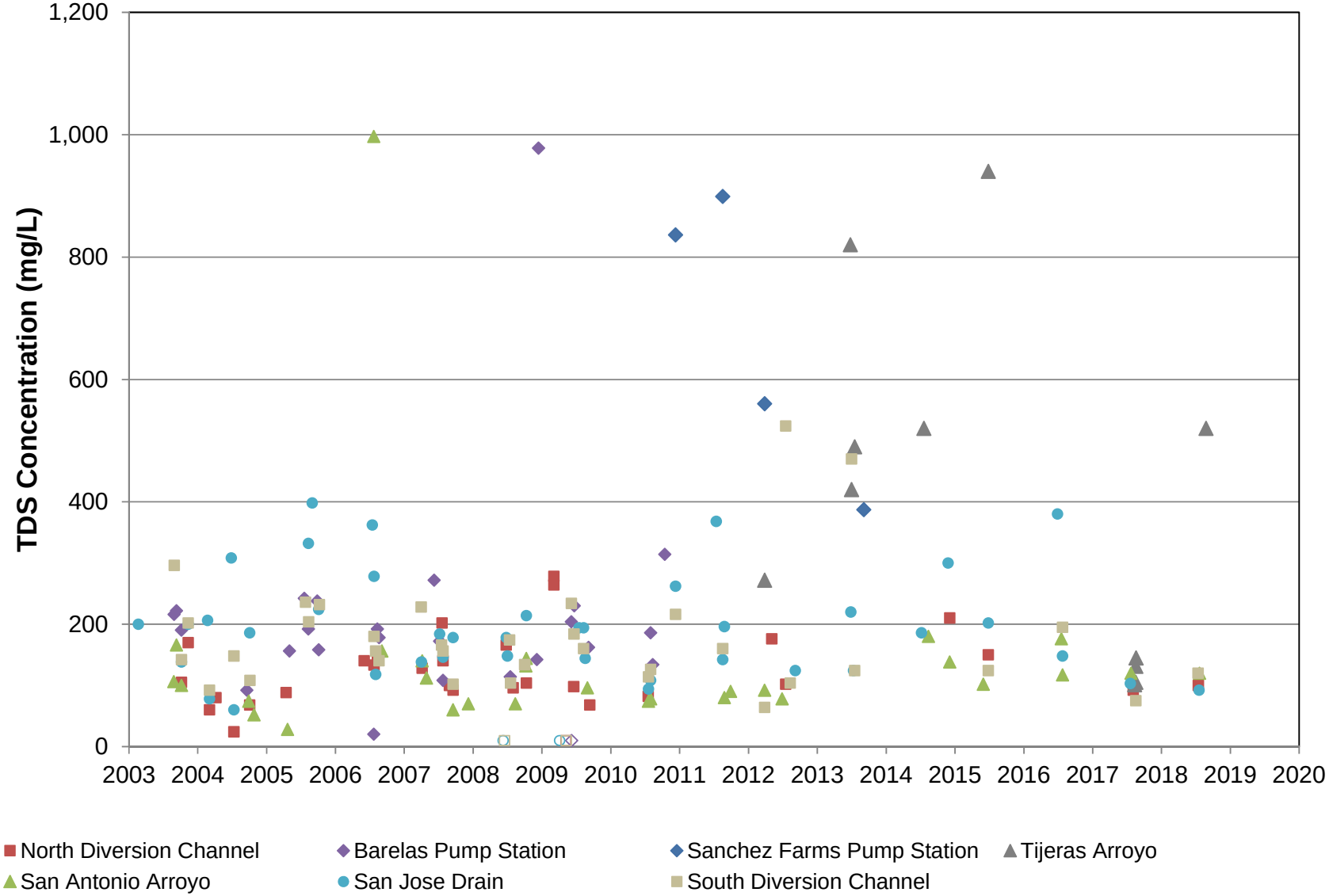
Outfall Sampling Locations and Stream Gages

Figure 3

Daniel B. Stephens & Associates, Inc.

6/17/2019

JN DB19.1073



Note: Open symbols denote non-detections (at detection limit).
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Dissolved Solids, Outfall Locations

Figure 4a

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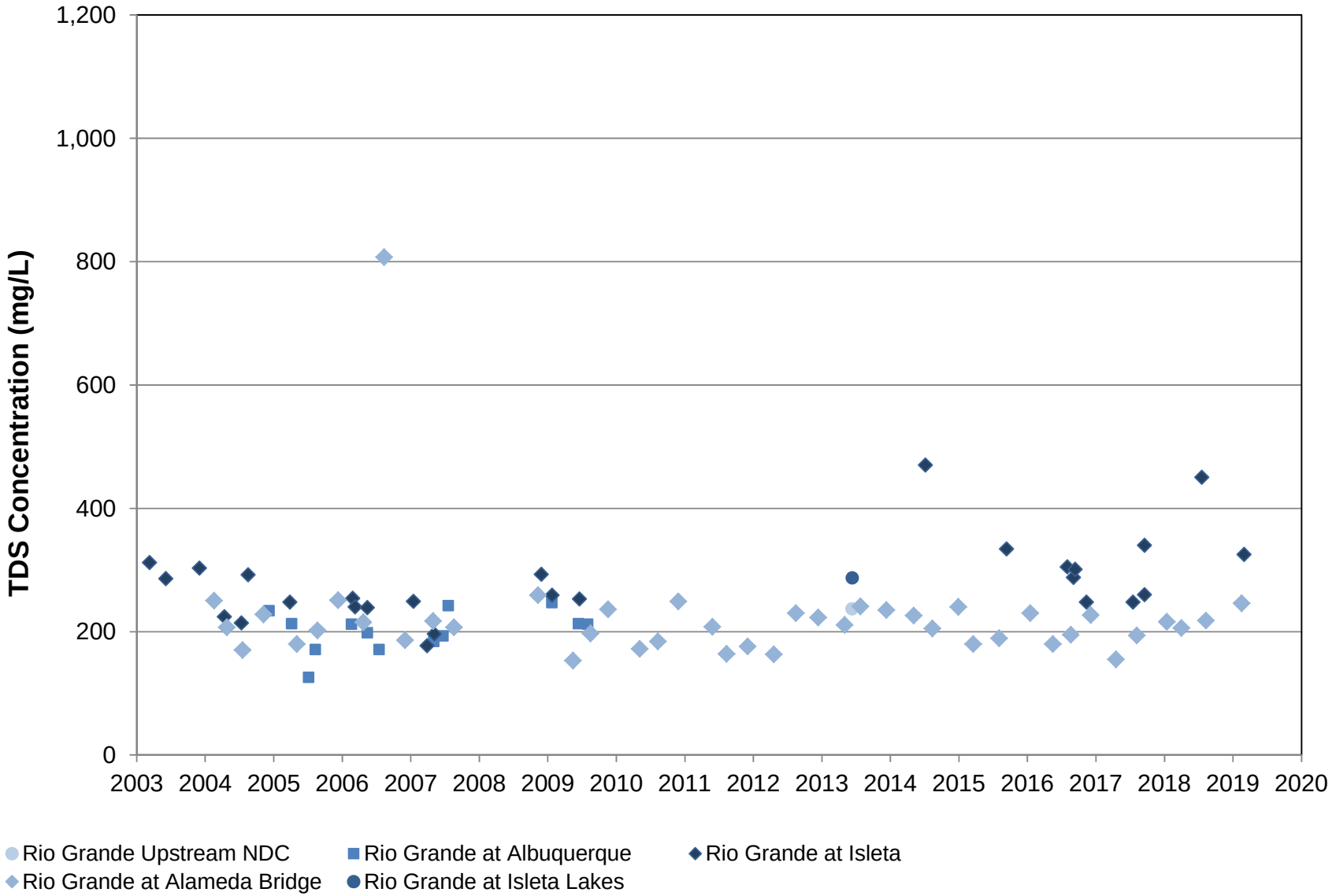

Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Dissolved Solids, Rio Grande Locations

Figure 4b

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Note: Open symbols denote non-detections (at detection limit).
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Suspended Solids or Suspended Sediment Outfall Locations

Figure 5a

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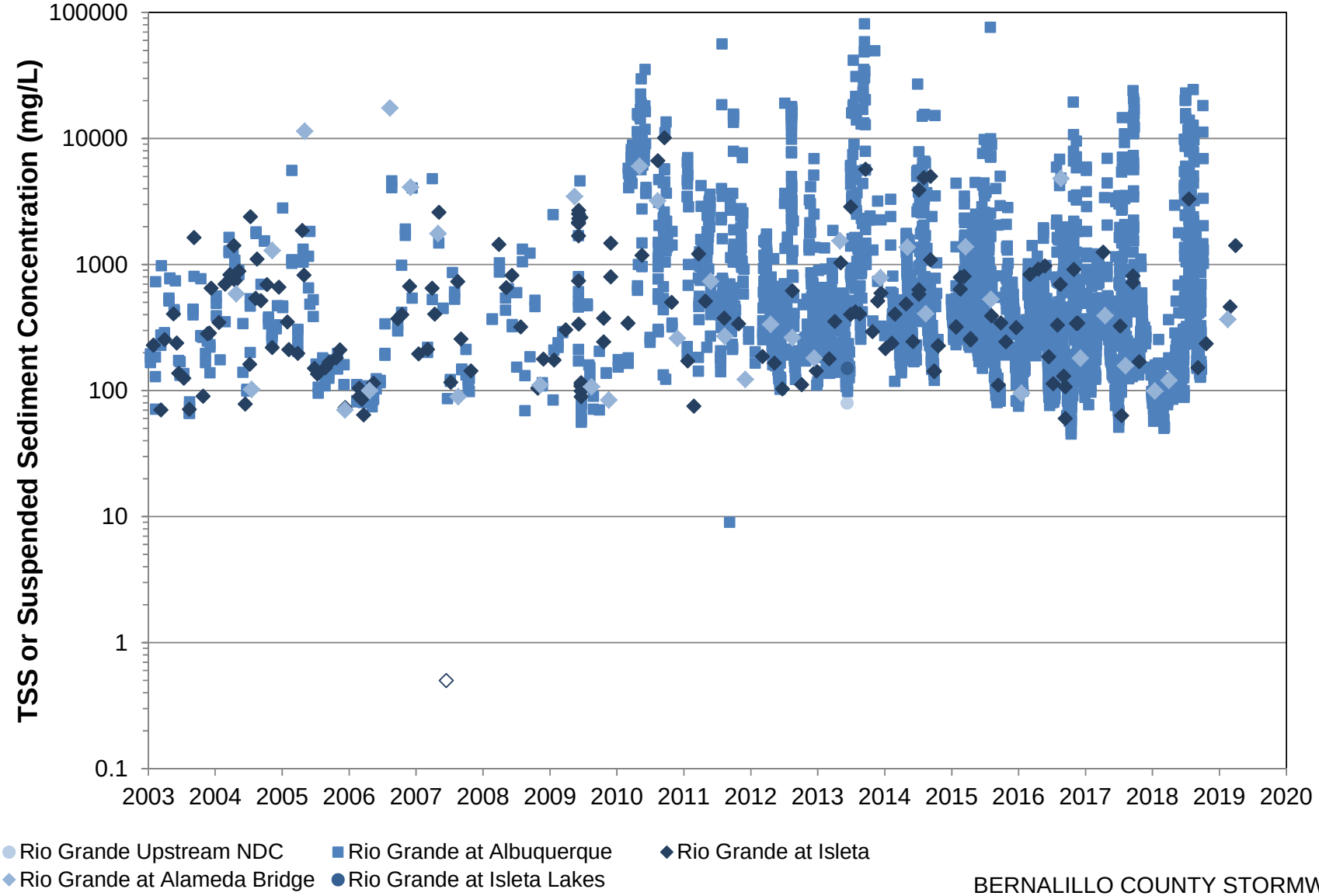

Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Suspended Solids or Suspended Sediment
Rio Grande Locations

Figure 5b

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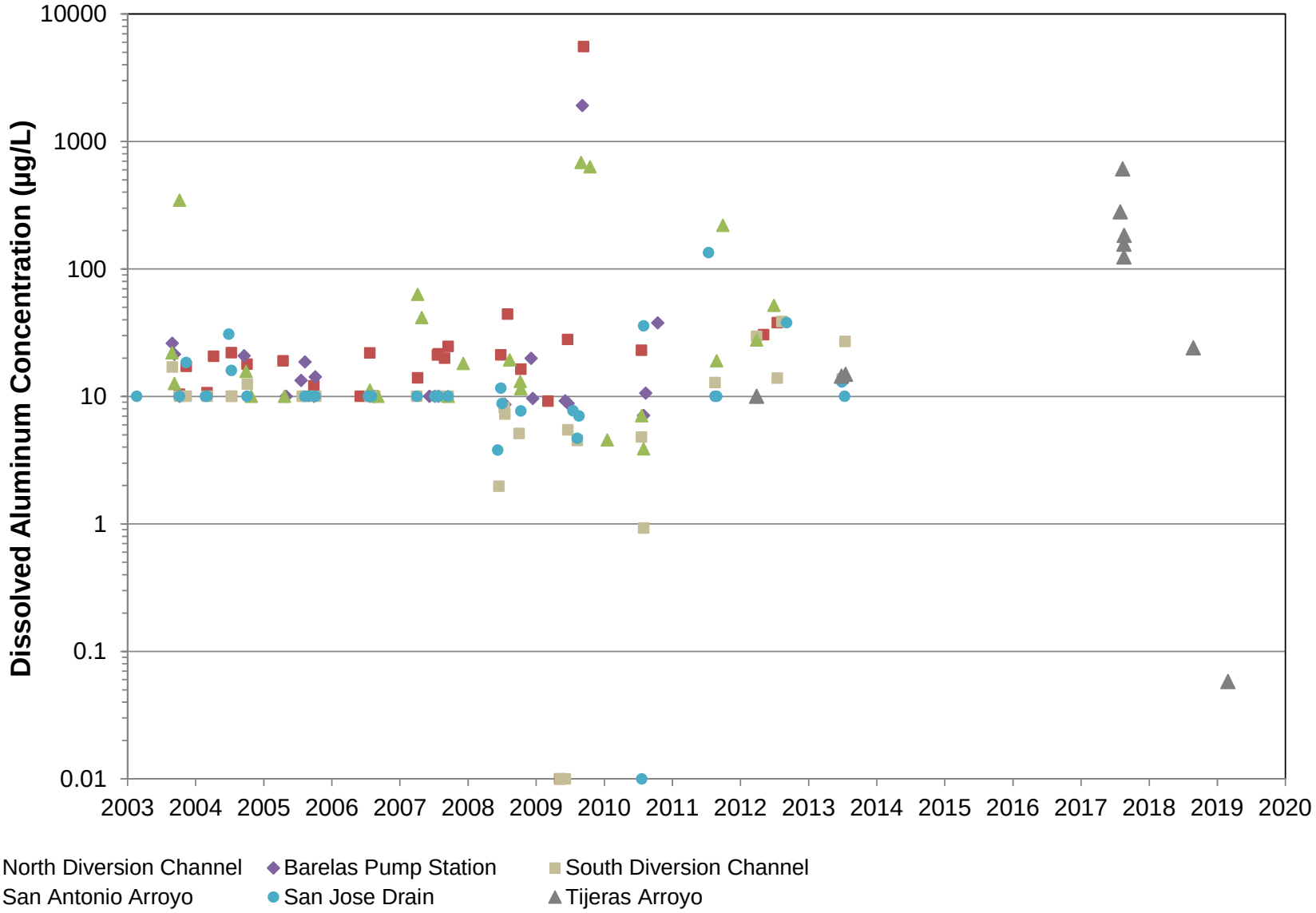

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Aluminum, Outfall Locations

Figure 6a

Daniel B. Stephens & Associates, Inc.

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Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Aluminum, Outfall Locations

Figure 6b

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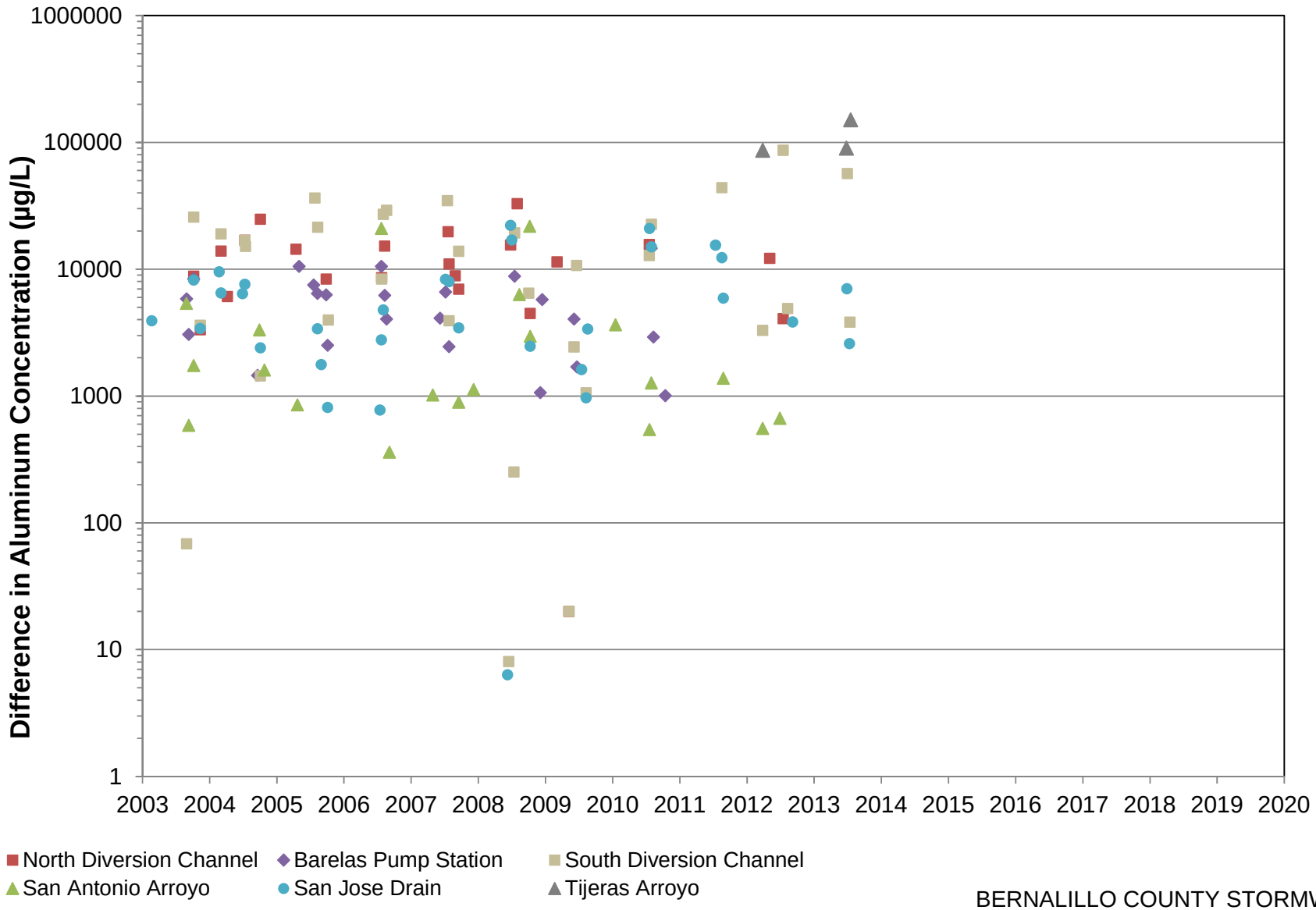

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Difference Between Total and Dissolved Aluminum
Outfall Locations

Figure 6c

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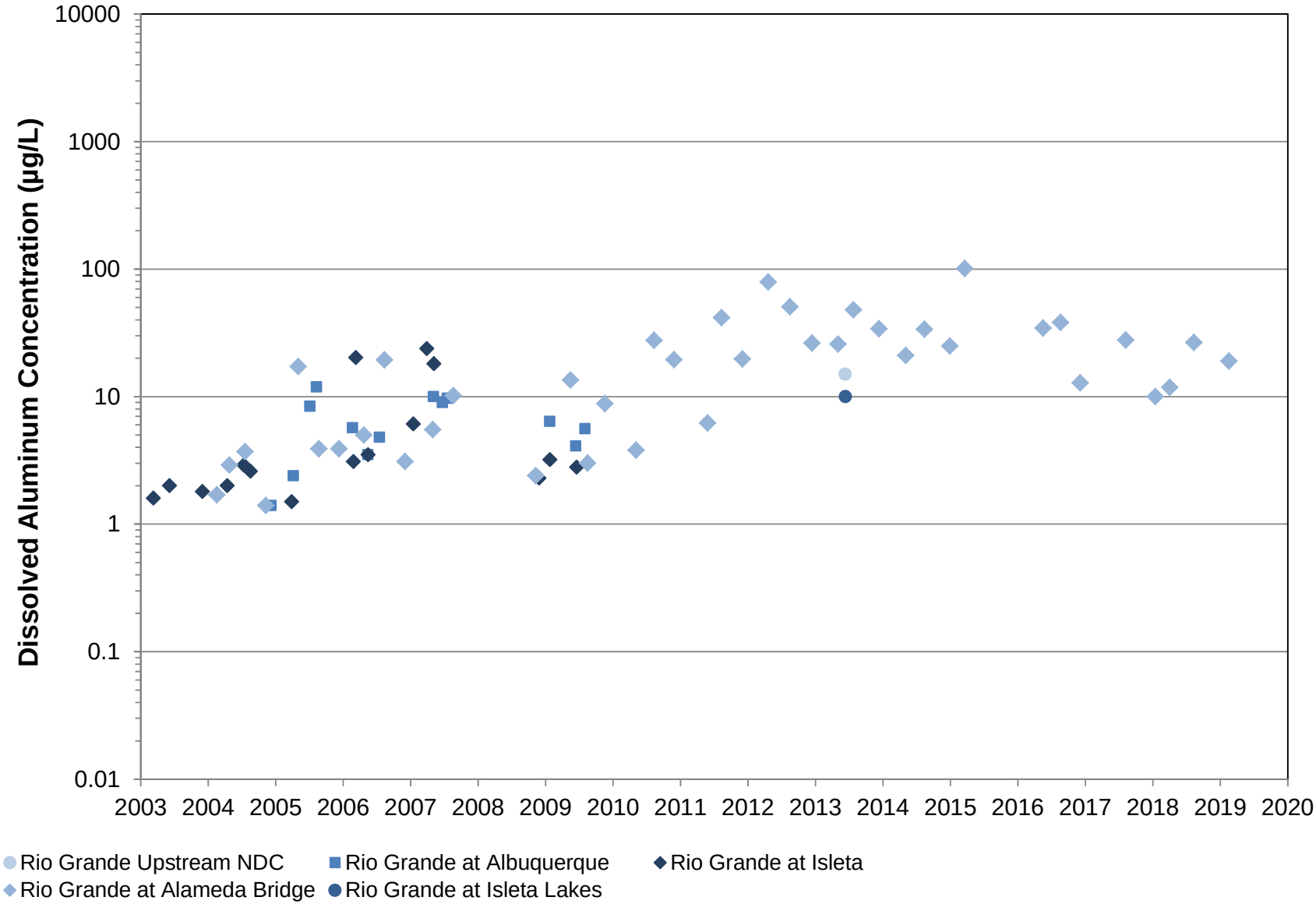

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Aluminum, Rio Grande Locations

Figure 6d

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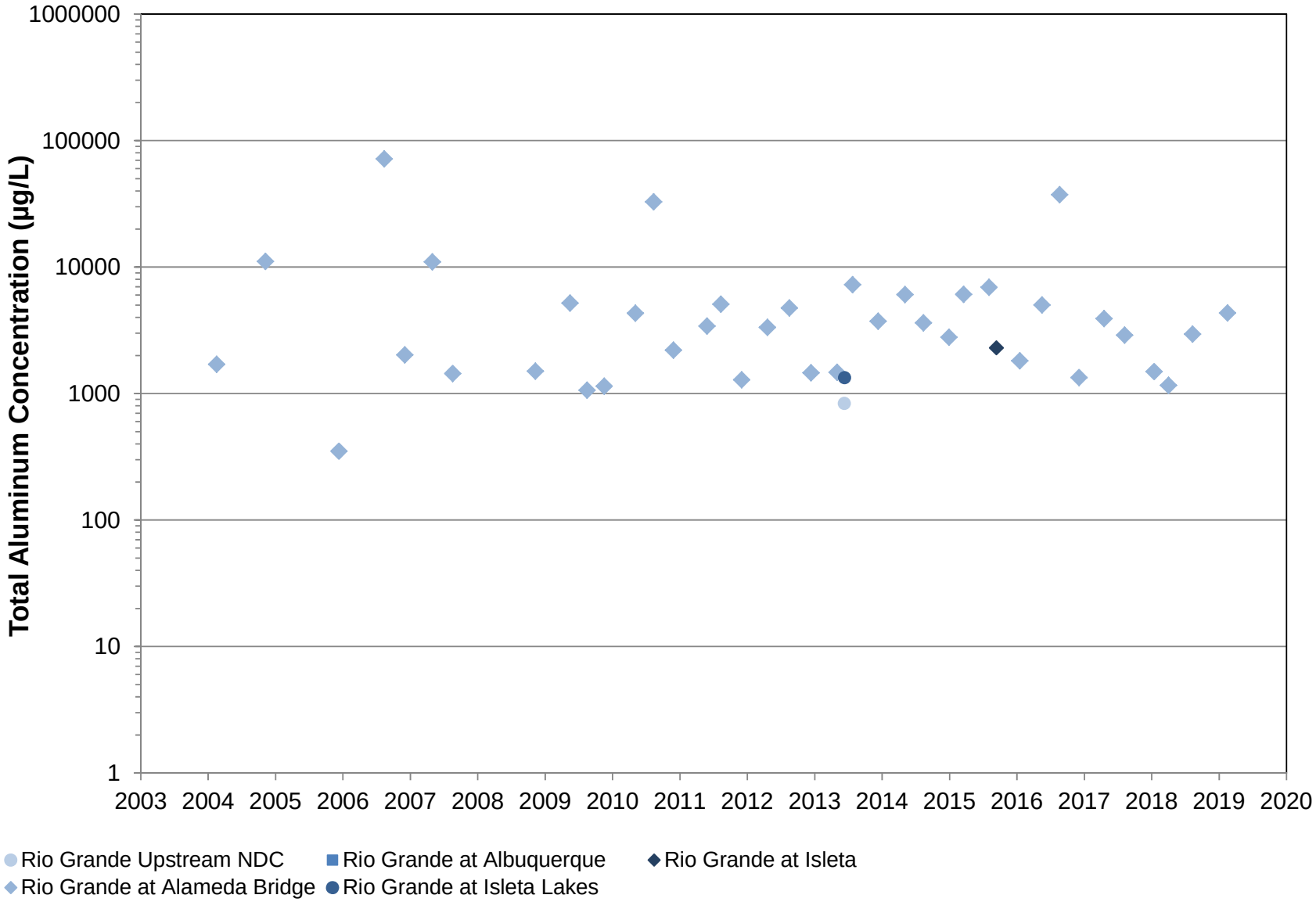

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Aluminum, Rio Grande Locations

Figure 6e

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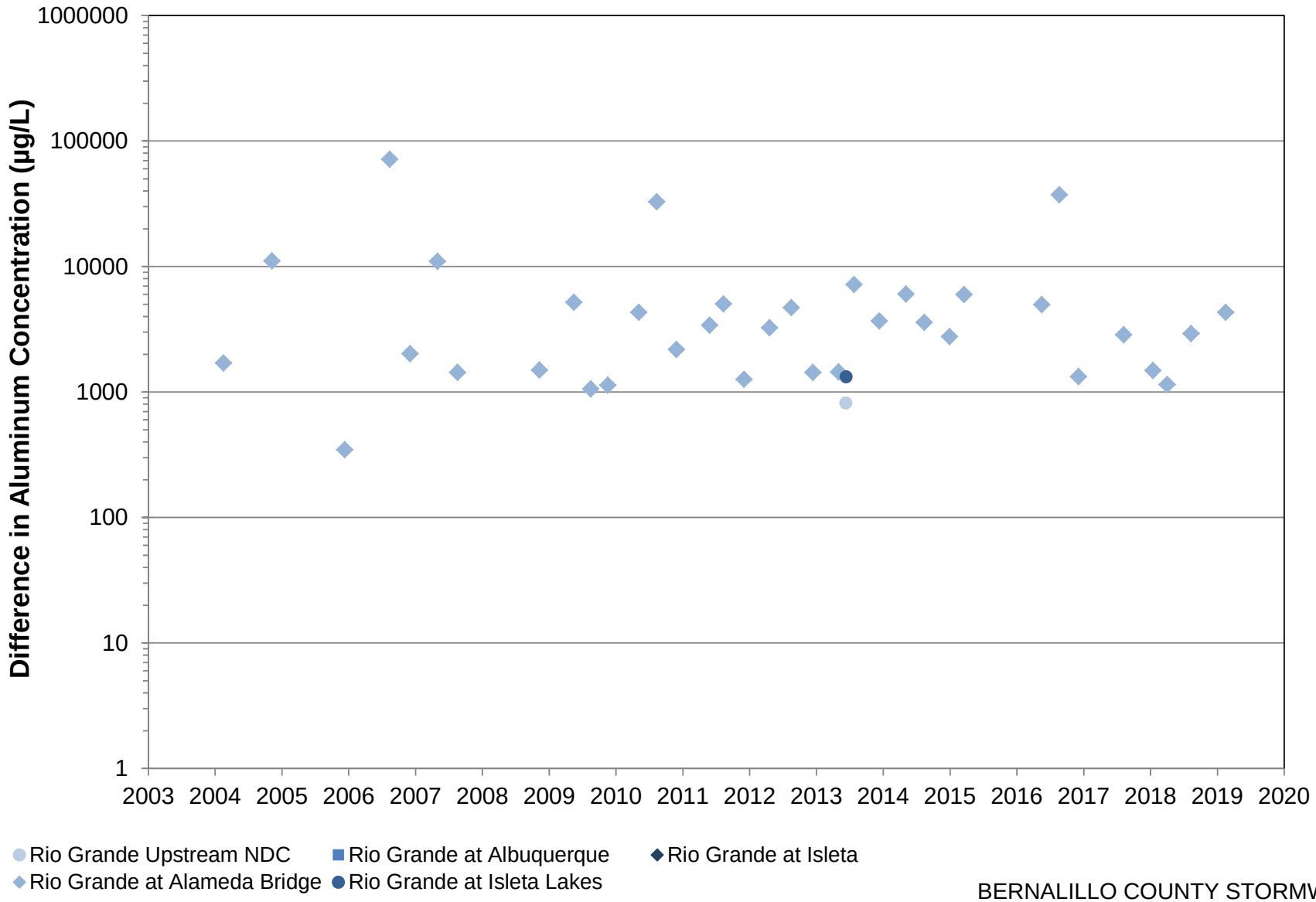

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Difference Between Total and Dissolved Aluminum
Rio Grande Locations

Figure 6f

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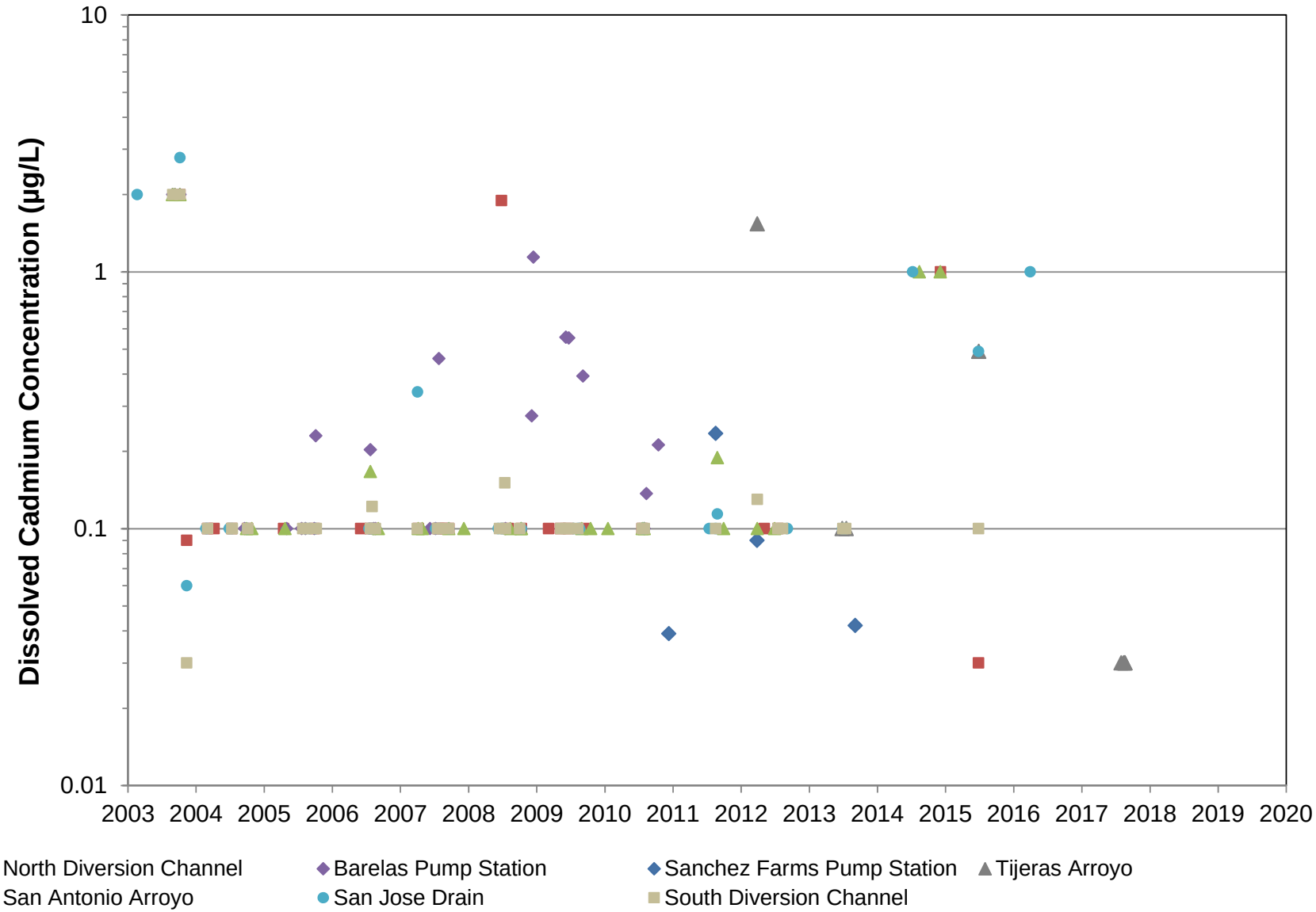

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Cadmium, Outfall Locations

Figure 7a

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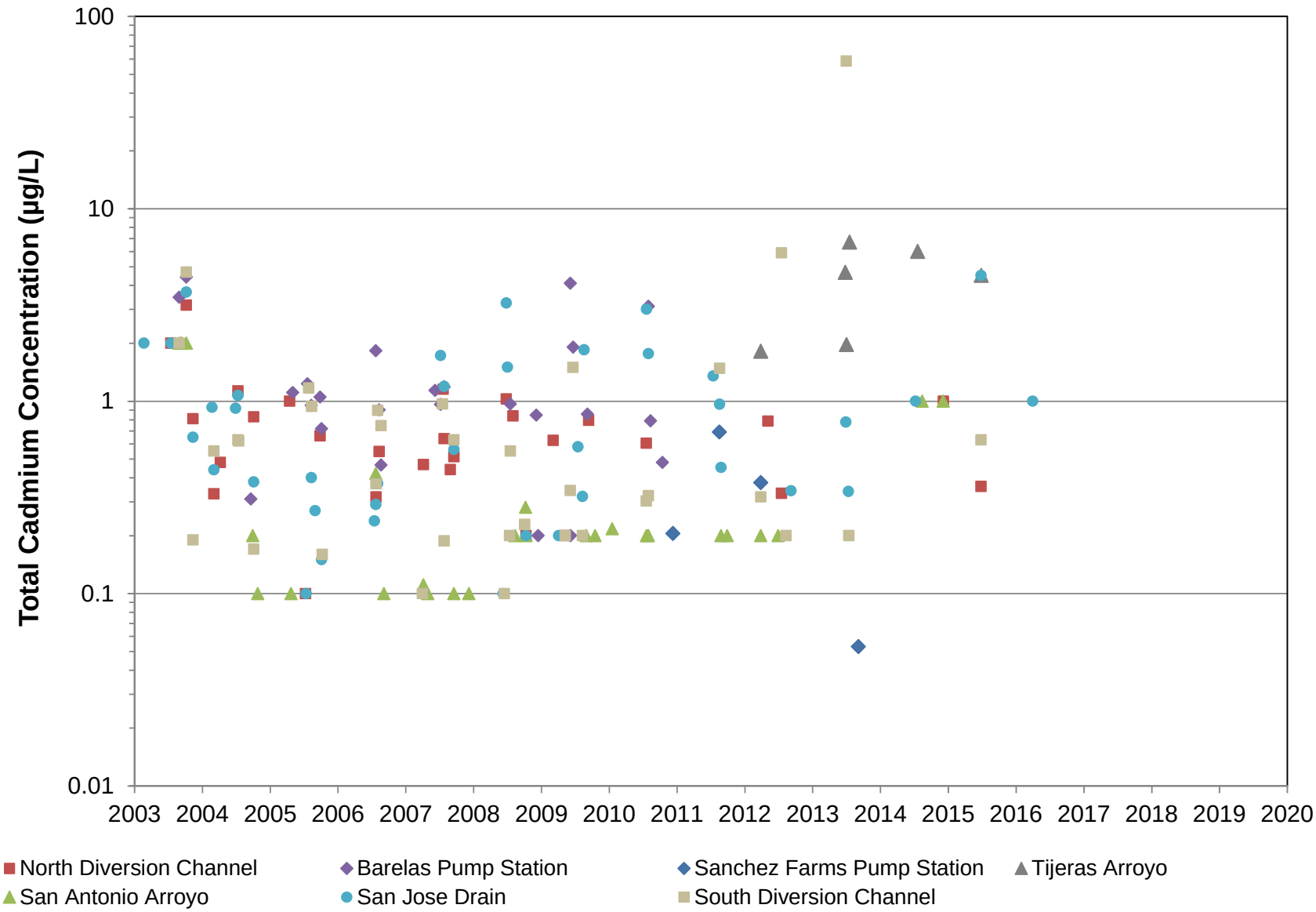

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Cadmium, Outfall Locations

Figure 7b

Daniel B. Stephens & Associates, Inc.

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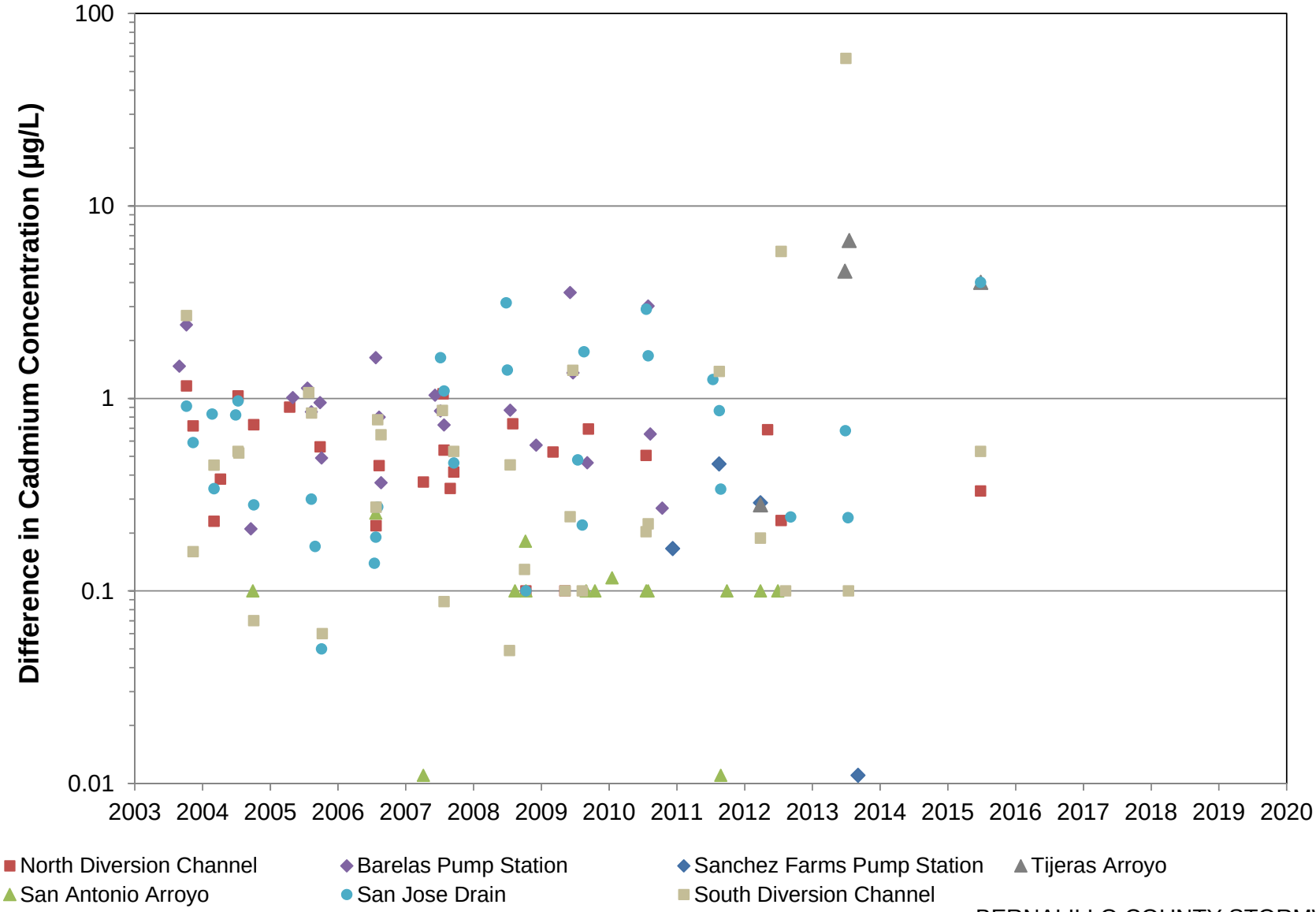

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Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Difference Between Total and Dissolved Cadmium Outfall Locations

Figure 7c

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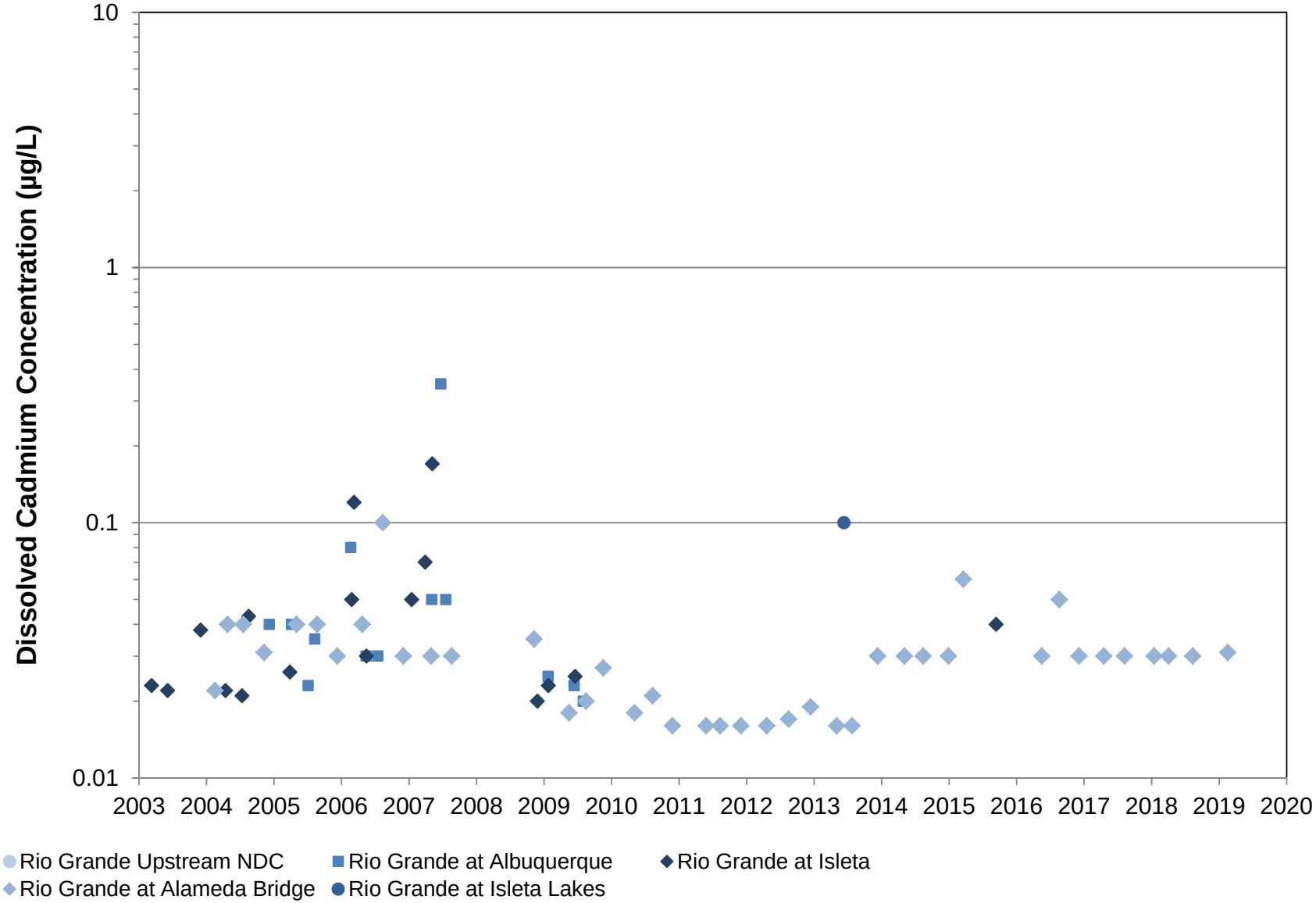


Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

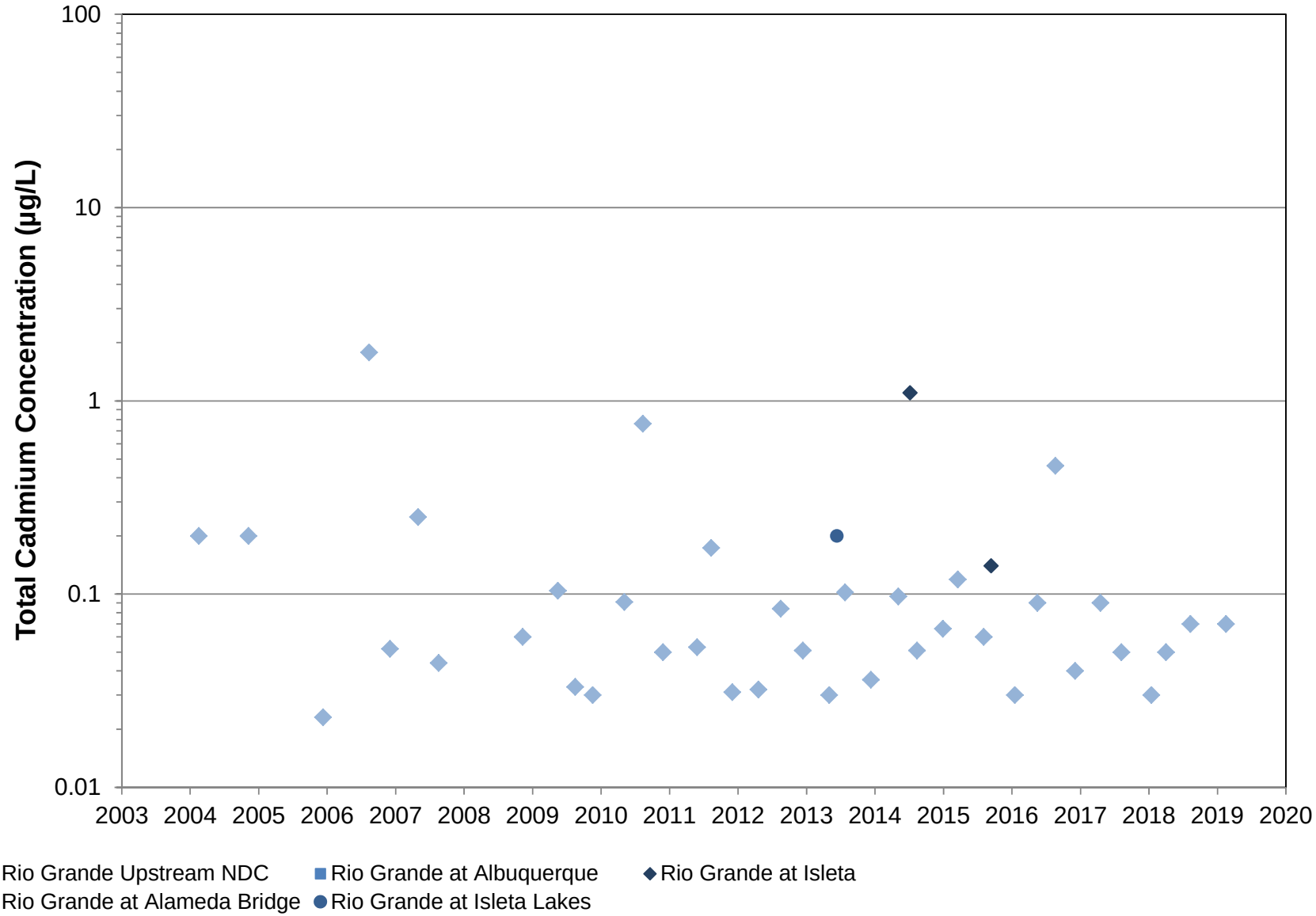
BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Cadmium, Rio Grande Locations

Figure 7d

Daniel B. Stephens & Associates, Inc.

6/6/19



Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Cadmium, Rio Grande Locations

Figure 7e

Daniel B. Stephens & Associates, Inc.

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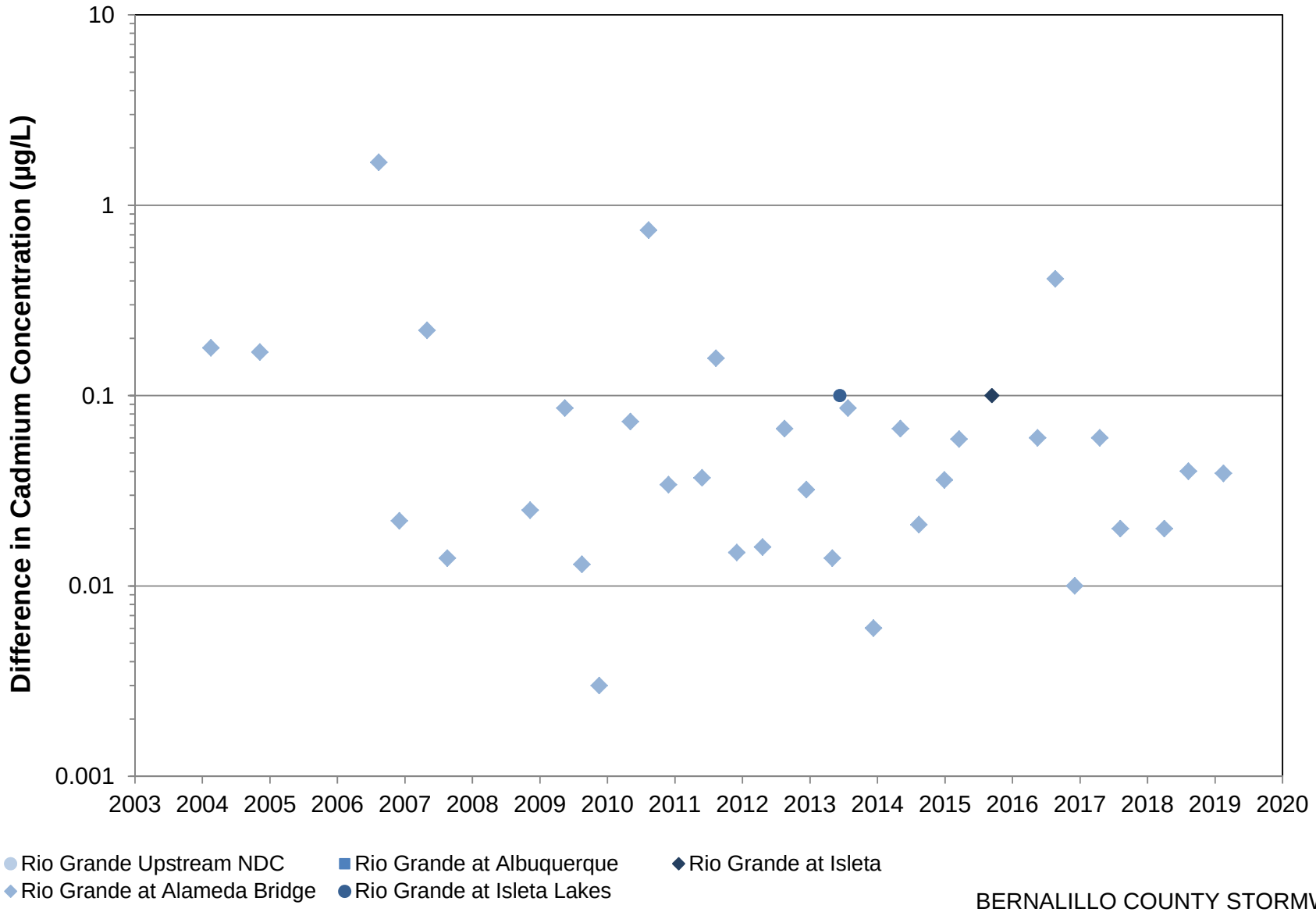


Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

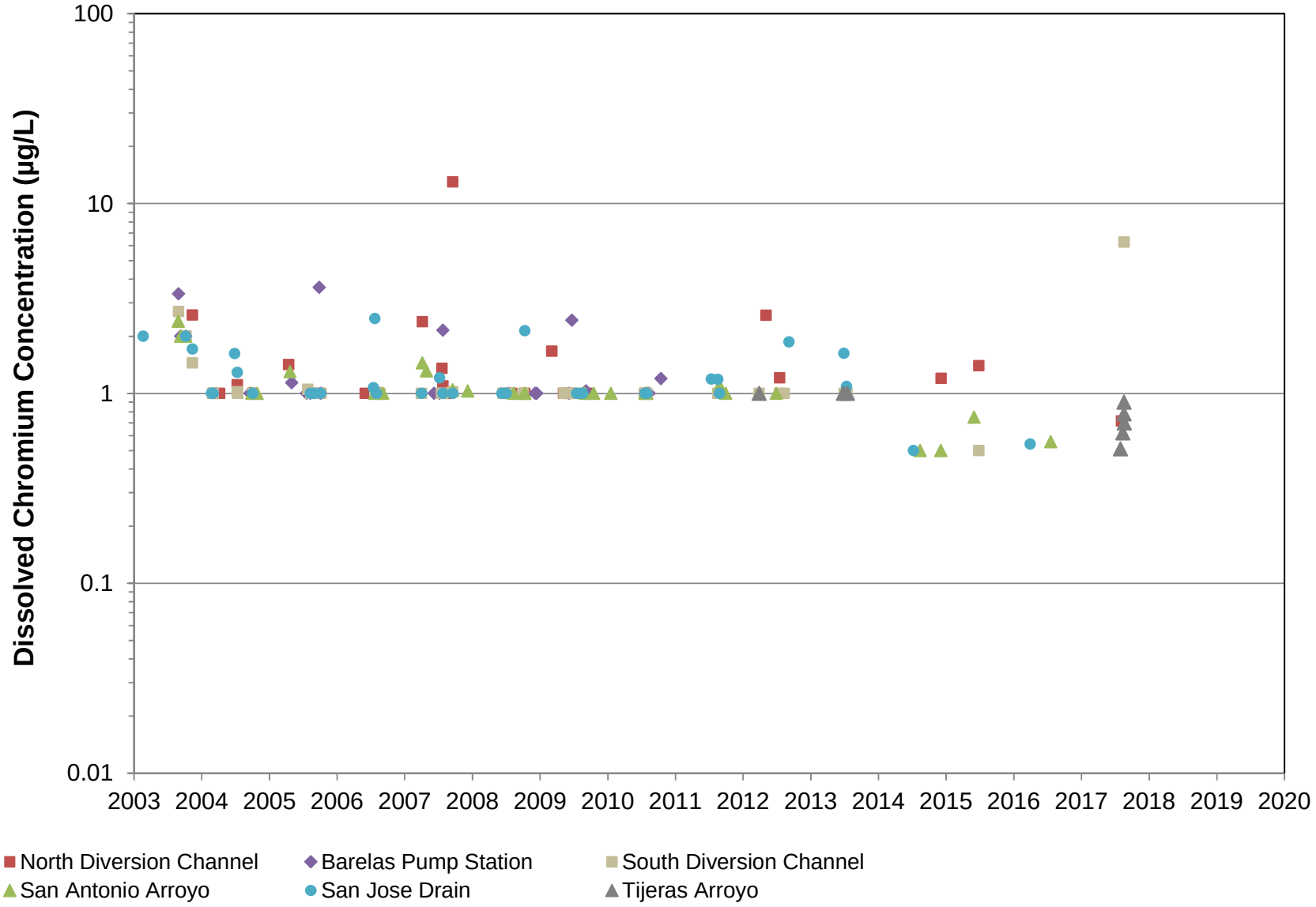
BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Difference Between Total and Dissolved Cadmium
Rio Grande Locations

Daniel B. Stephens & Associates, Inc.

6/6/19

Figure 7f



Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

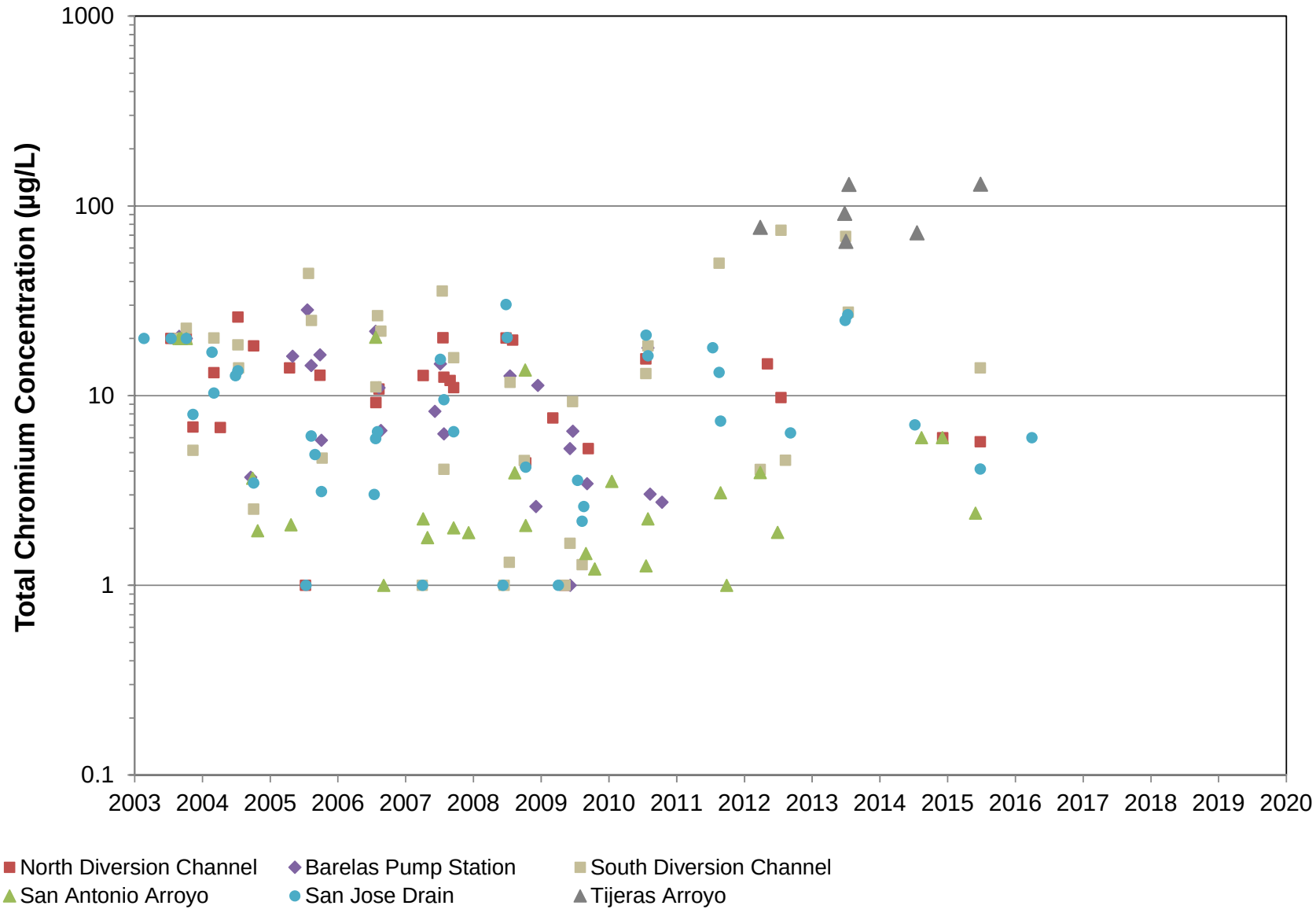
BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Chromium, Outfall Locations

Figure 8a

Daniel B. Stephens & Associates, Inc.

6/6/19



Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

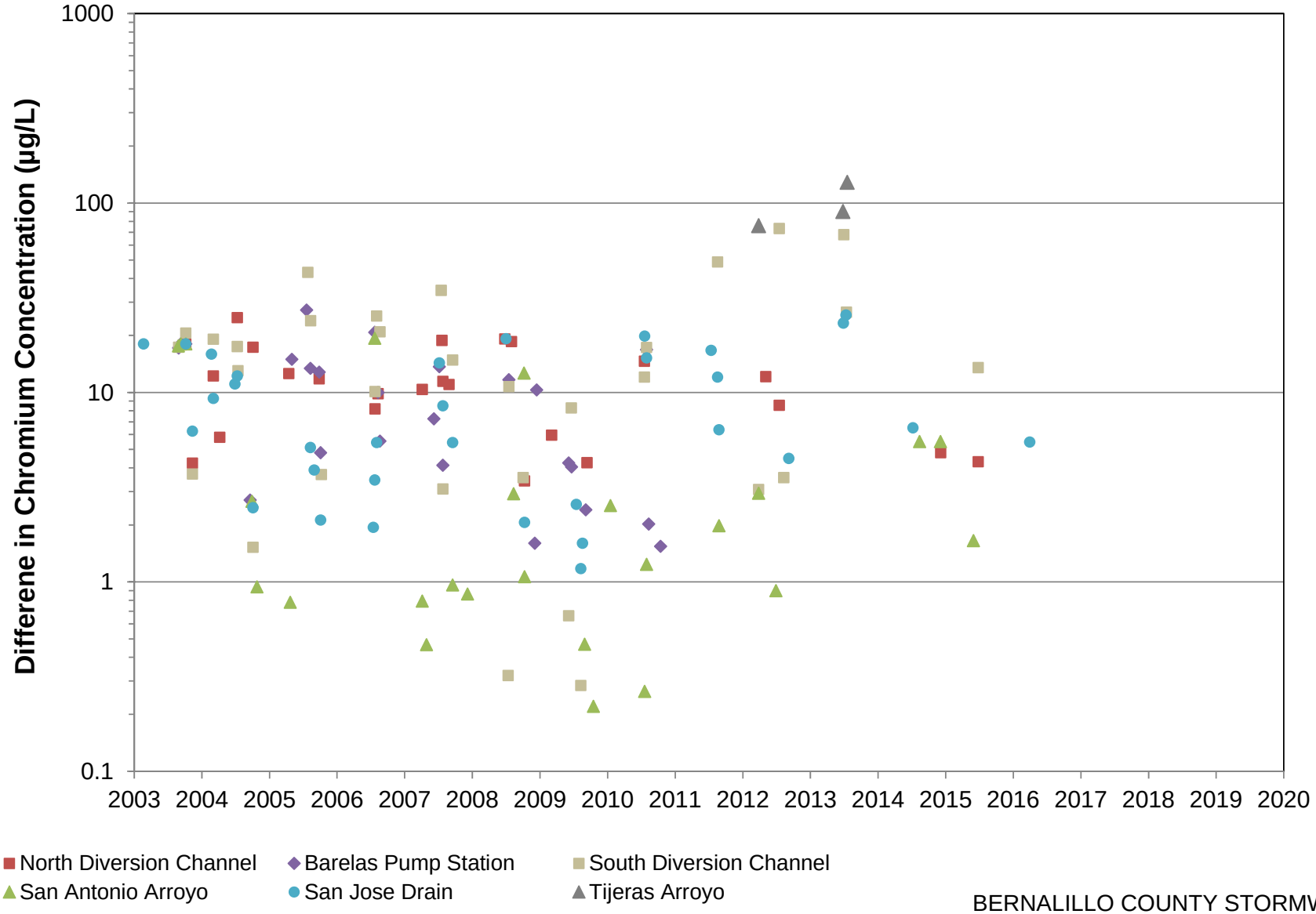
BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Chromium, Outfall Locations

Figure 8b

Daniel B. Stephens & Associates, Inc.

6/6/19



Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

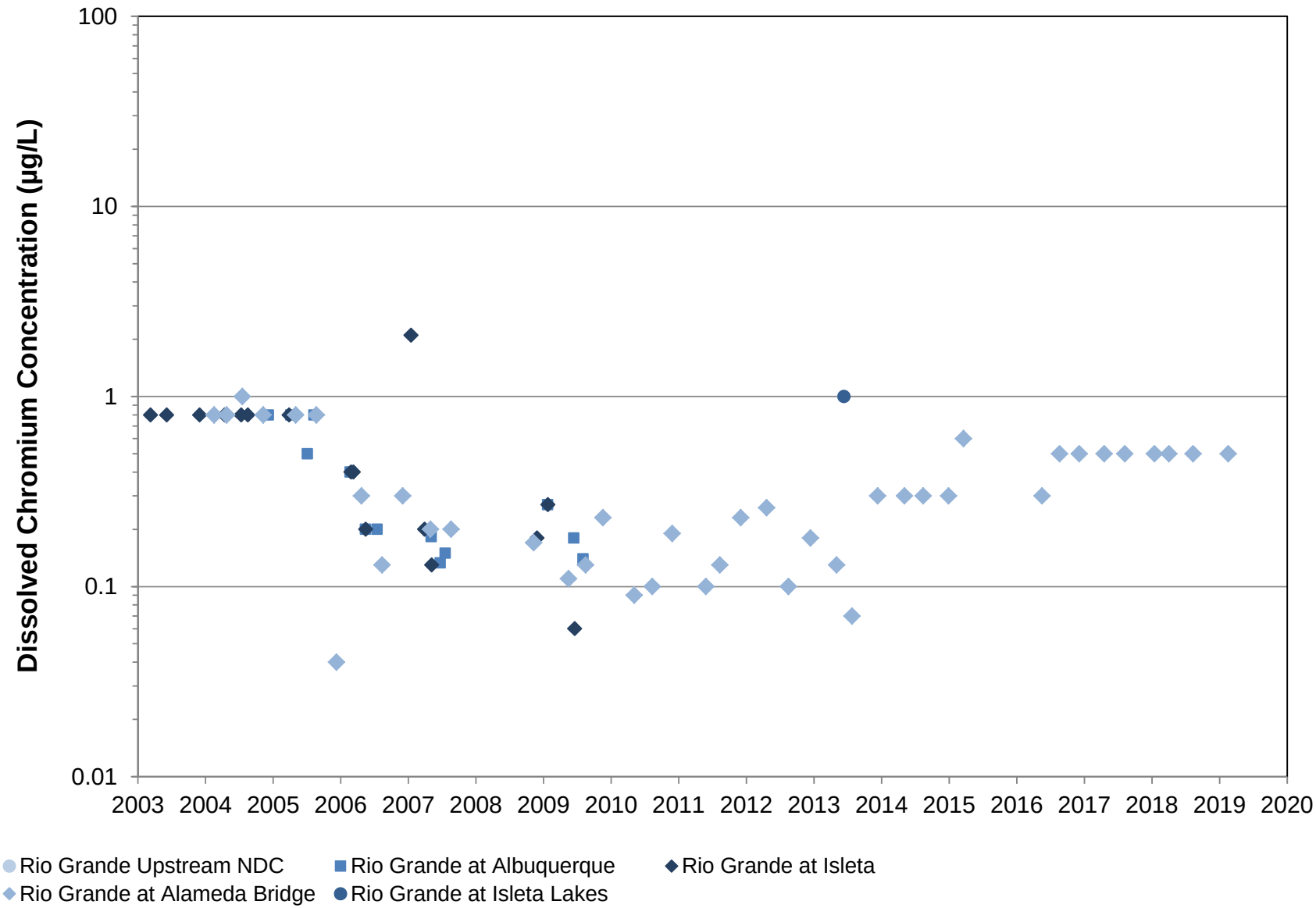
BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Difference Between Total and Dissolved Chromium Outfall Locations

Figure 8c

Daniel B. Stephens & Associates, Inc.

6/6/19



Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

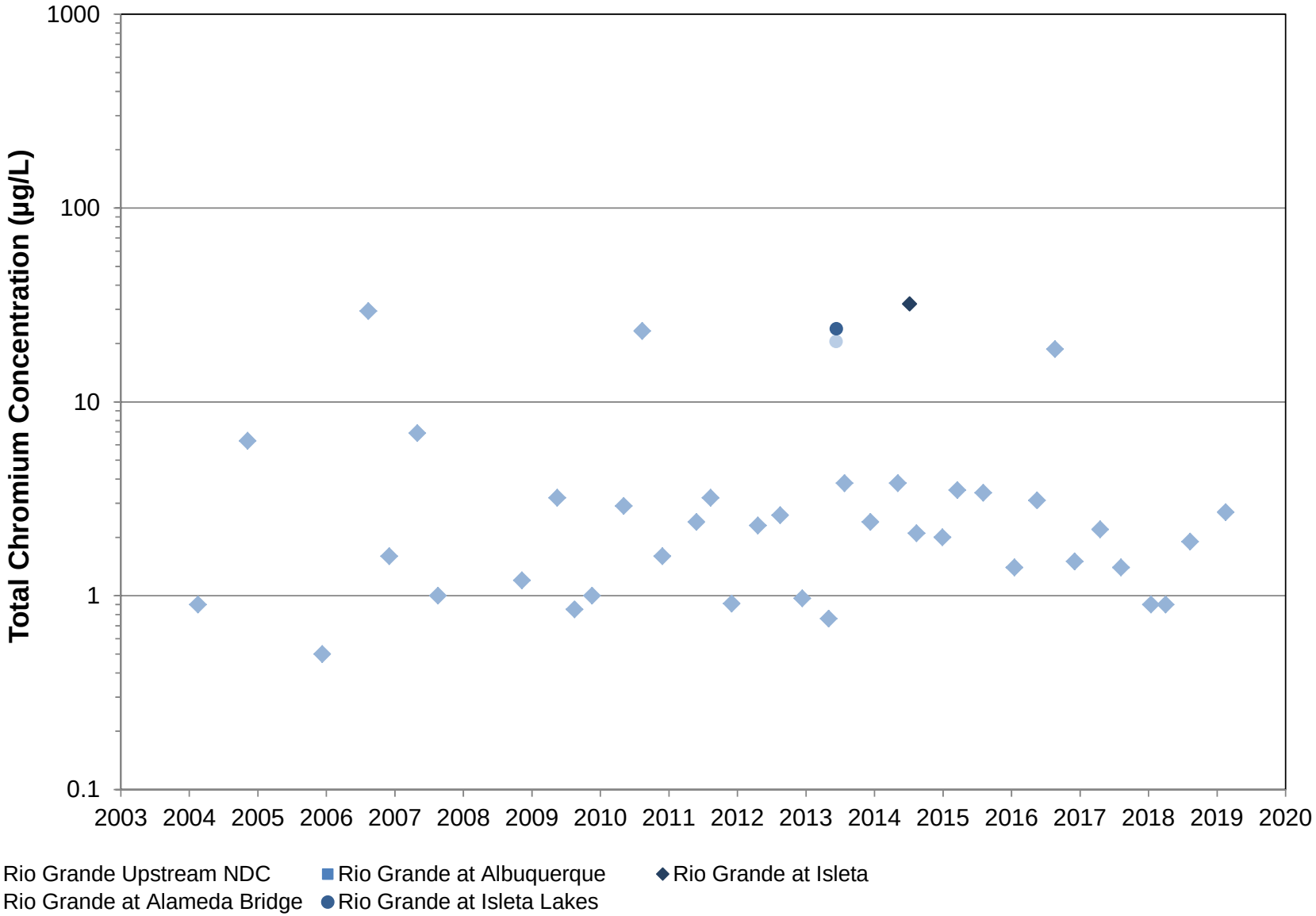
BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Chromium, Rio Grande Locations

Figure 8d

Daniel B. Stephens & Associates, Inc.

6/6/19



Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

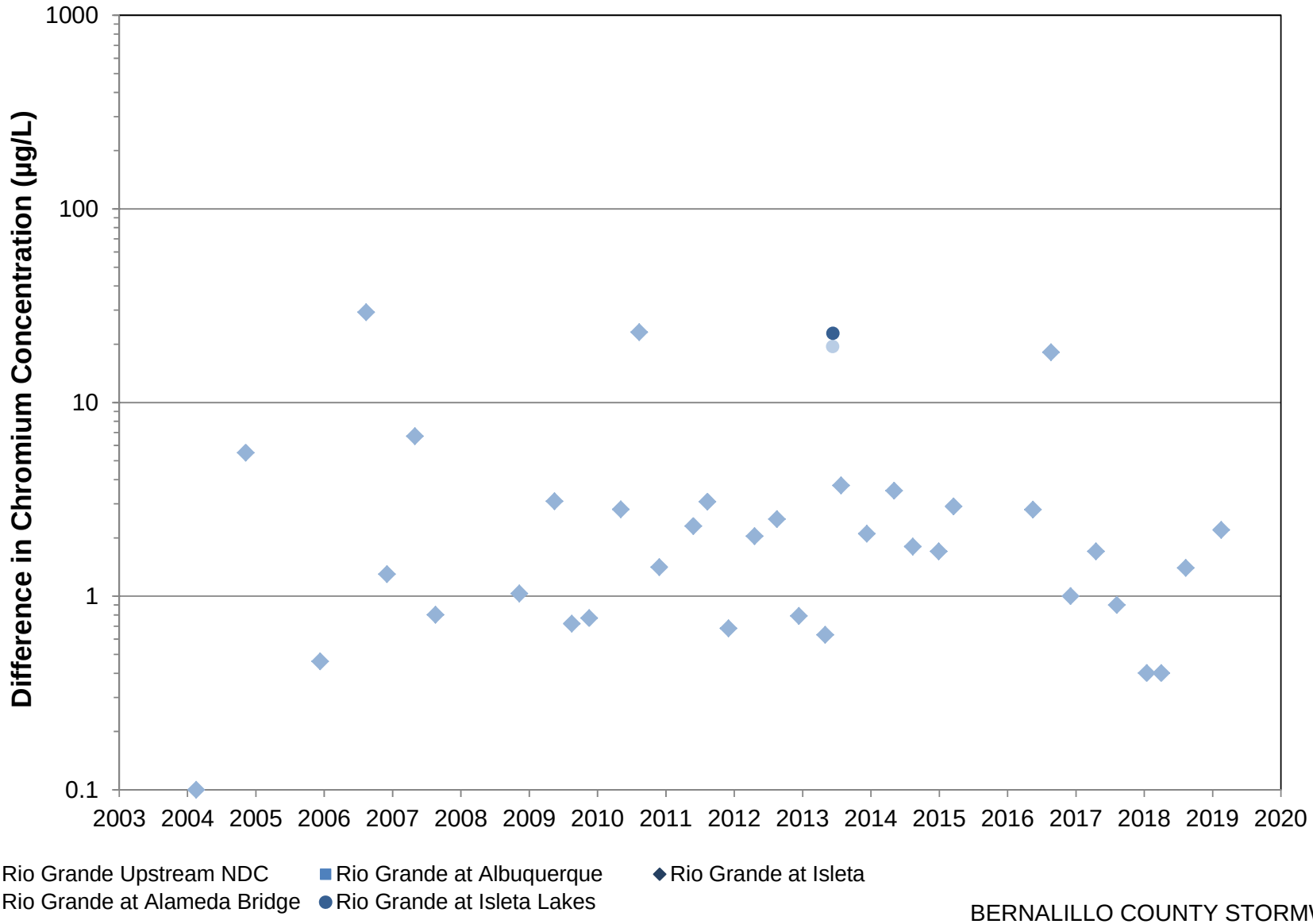
BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Chromium, Rio Grande Locations

Figure 8e

Daniel B. Stephens & Associates, Inc.

6/6/19



Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Difference Between Total and Dissolved Chromium
Rio Grande Locations

Figure 8f

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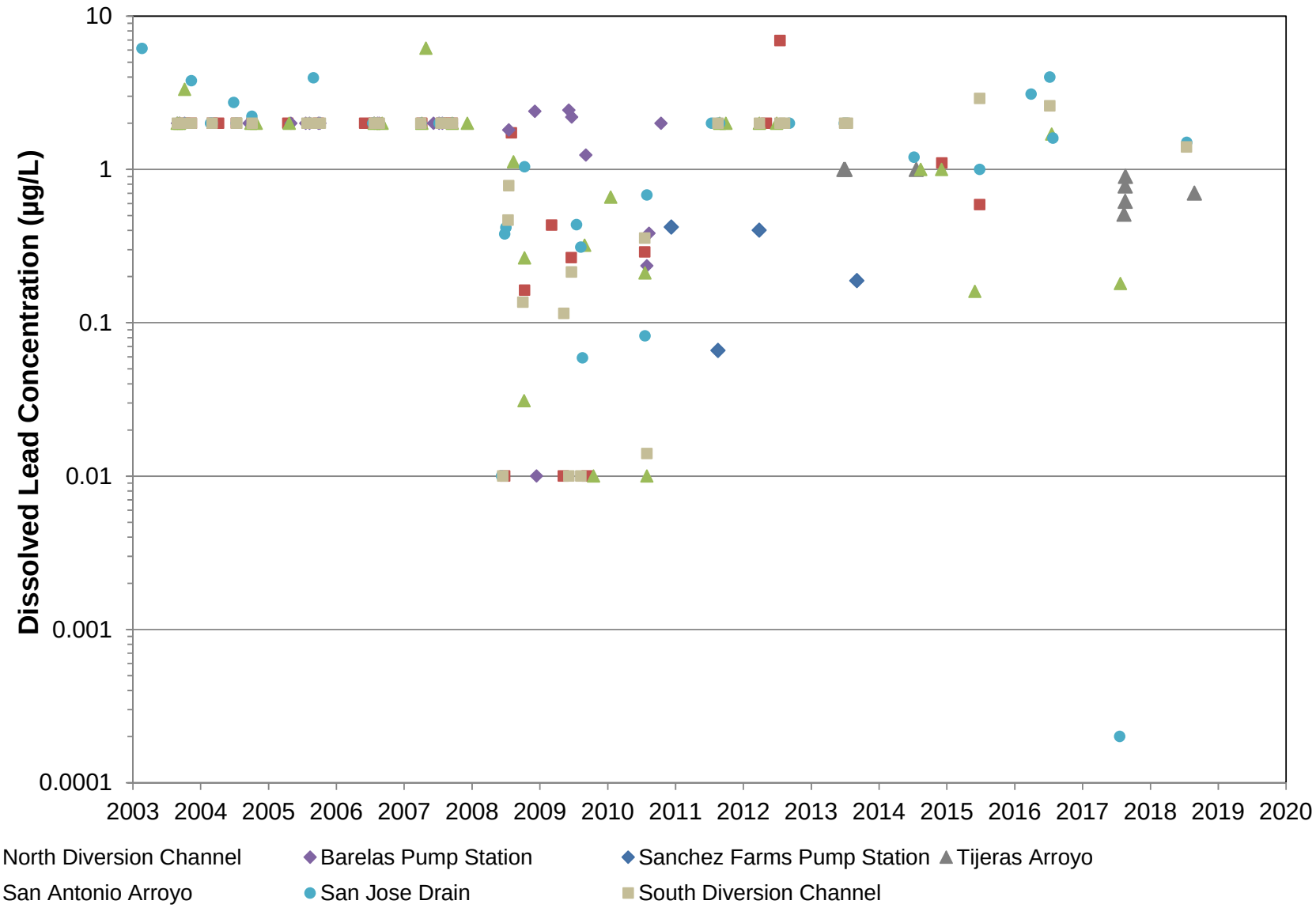

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Lead, Outfall Locations

Figure 9a

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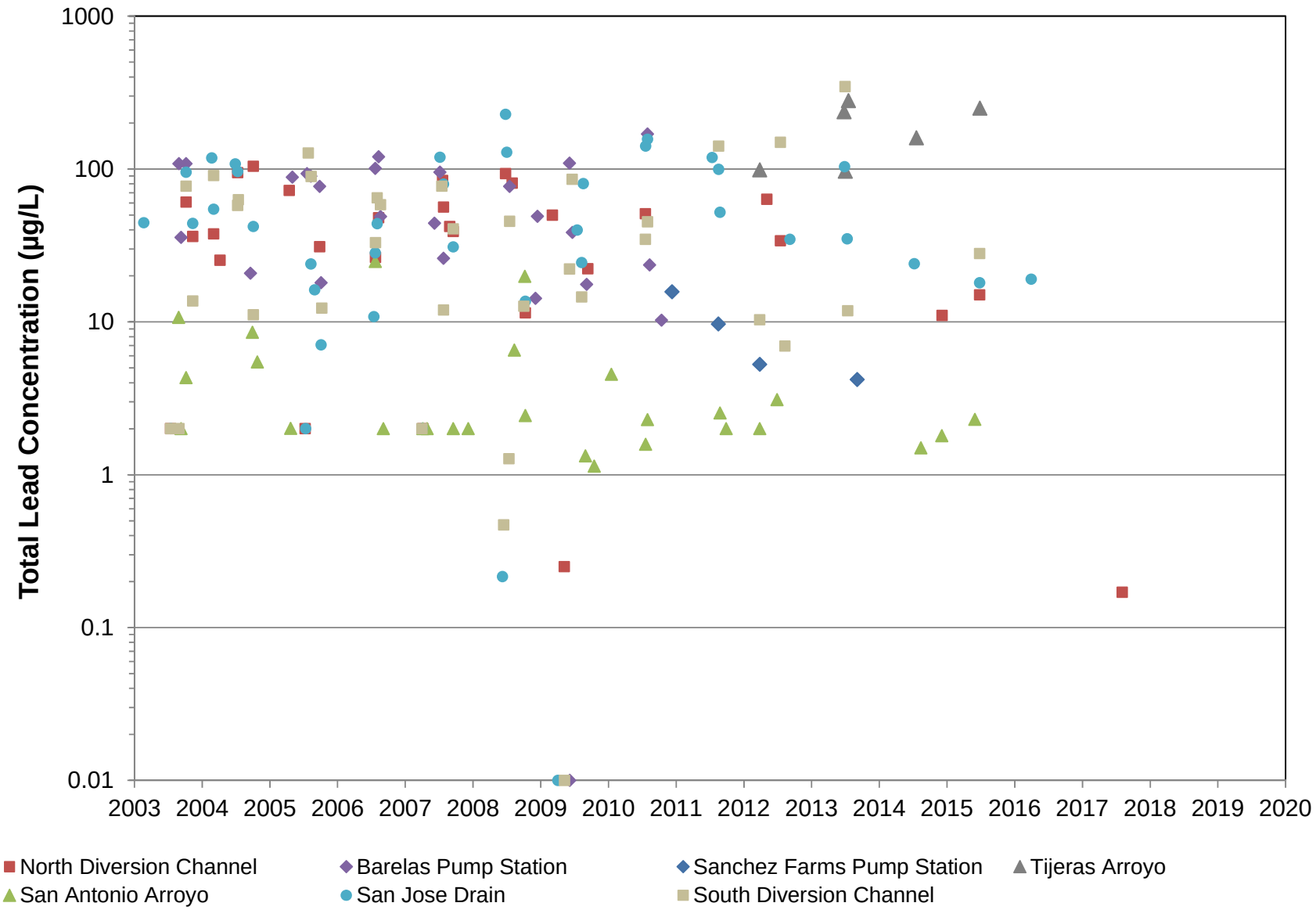

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Lead, Outfall Locations

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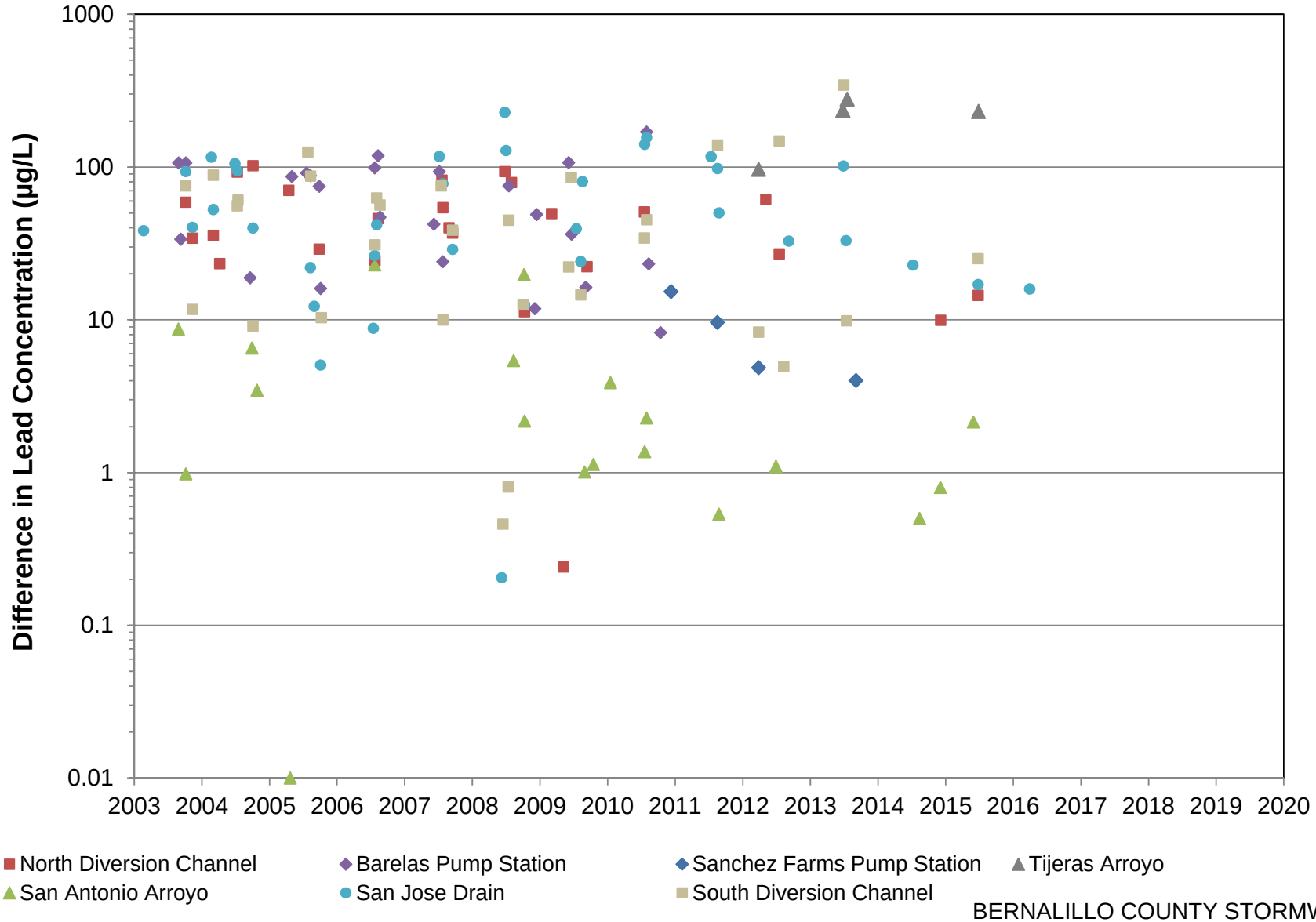
Figure 9b



Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Difference Between Total and Dissolved Lead
Outfall Locations

Figure 9c

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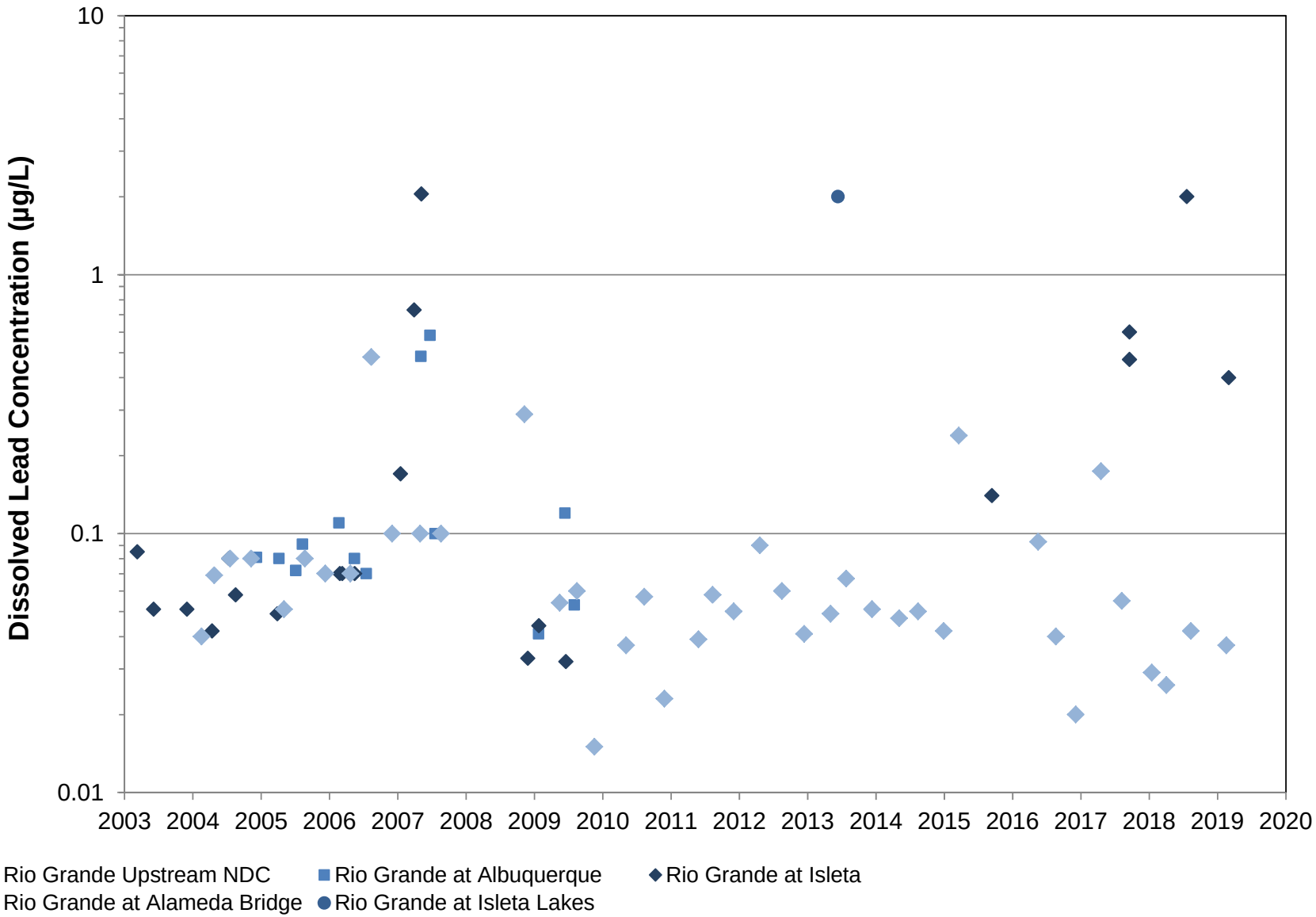

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Lead, Rio Grande Locations

Figure 9d

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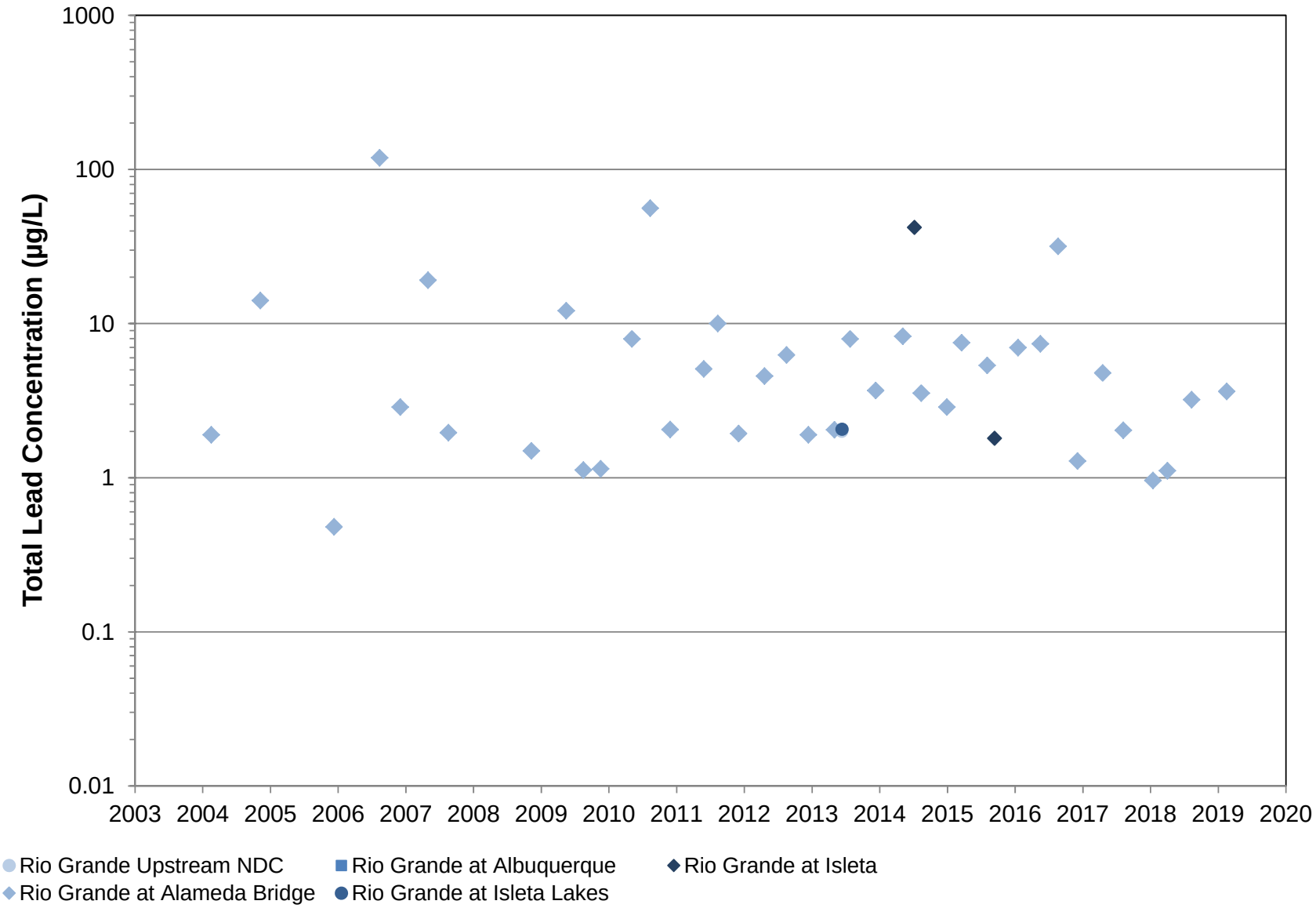

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Lead, Rio Grande Locations

Figure 9e

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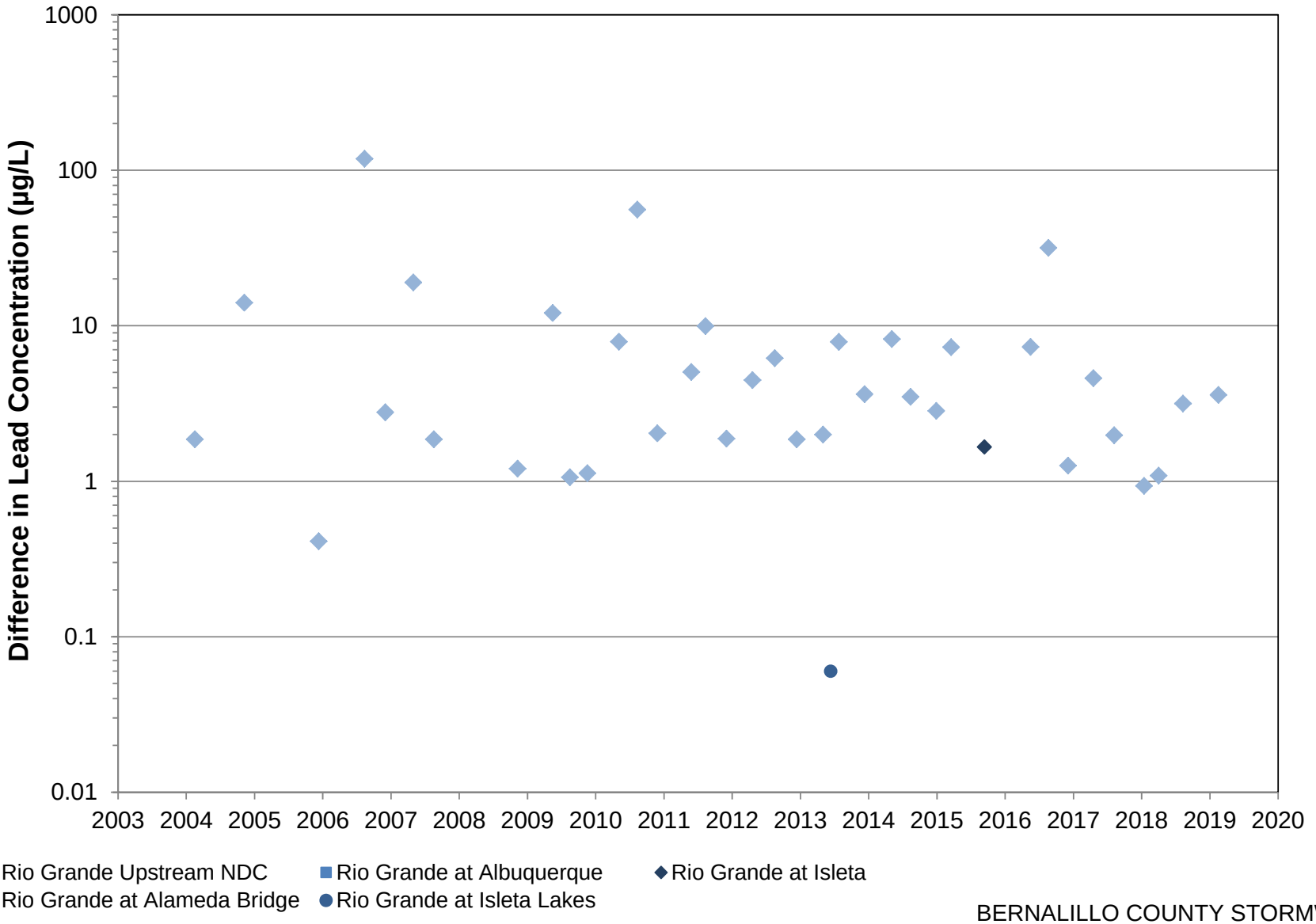

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Difference Between Total and Dissolved Lead
Rio Grande Locations

Figure 9f

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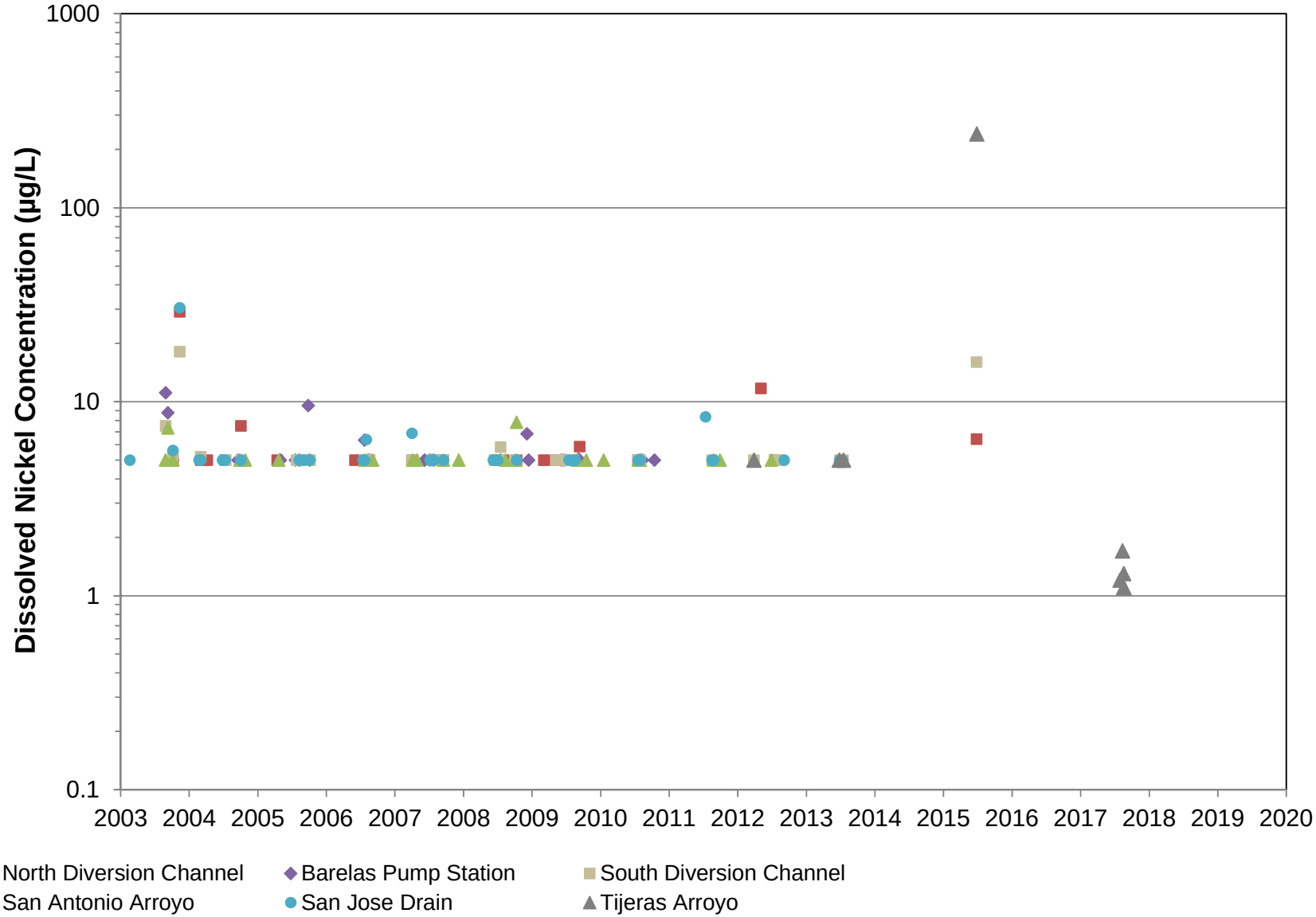

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Nickel, Outfall Locations

Figure 10a

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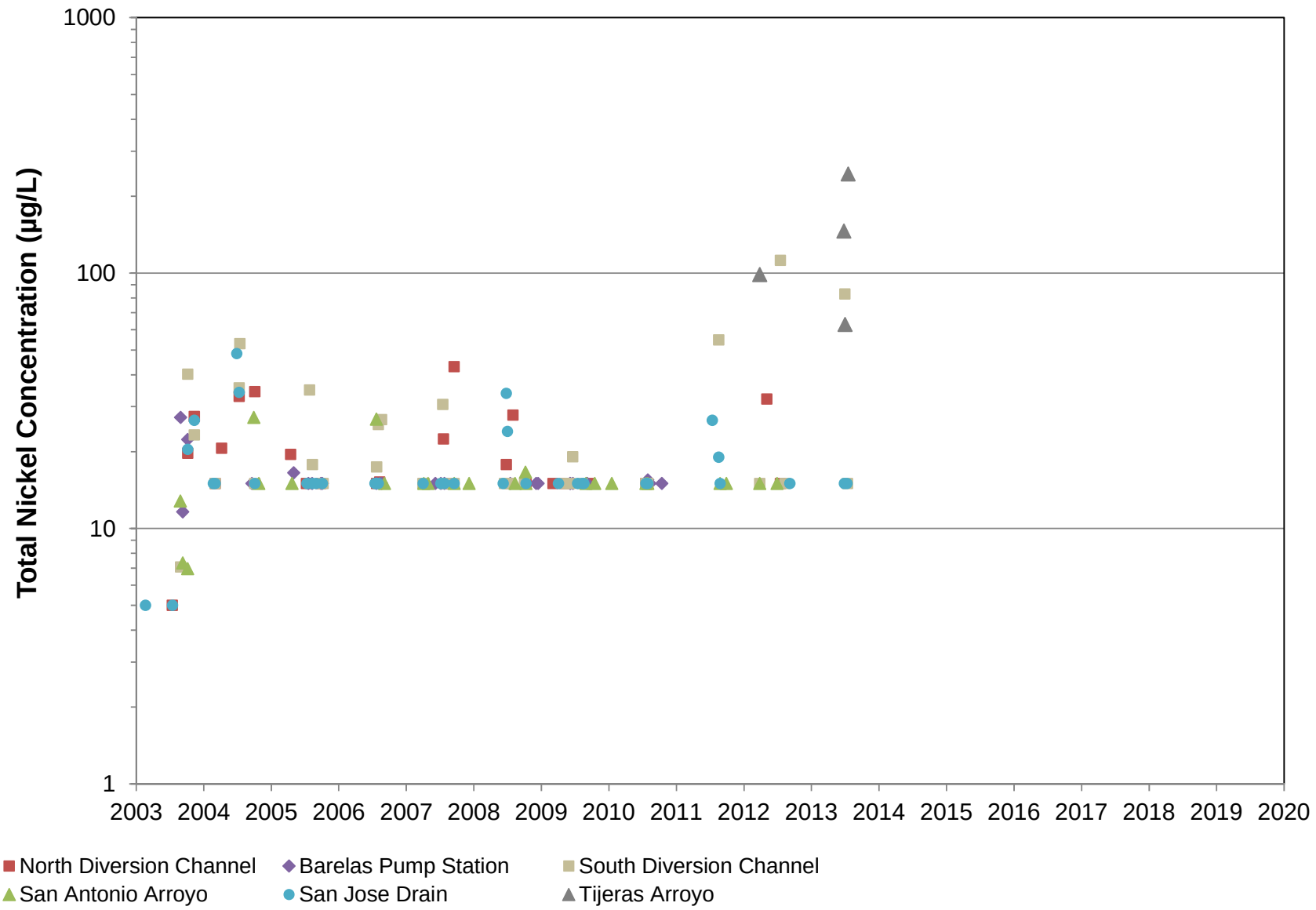


Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

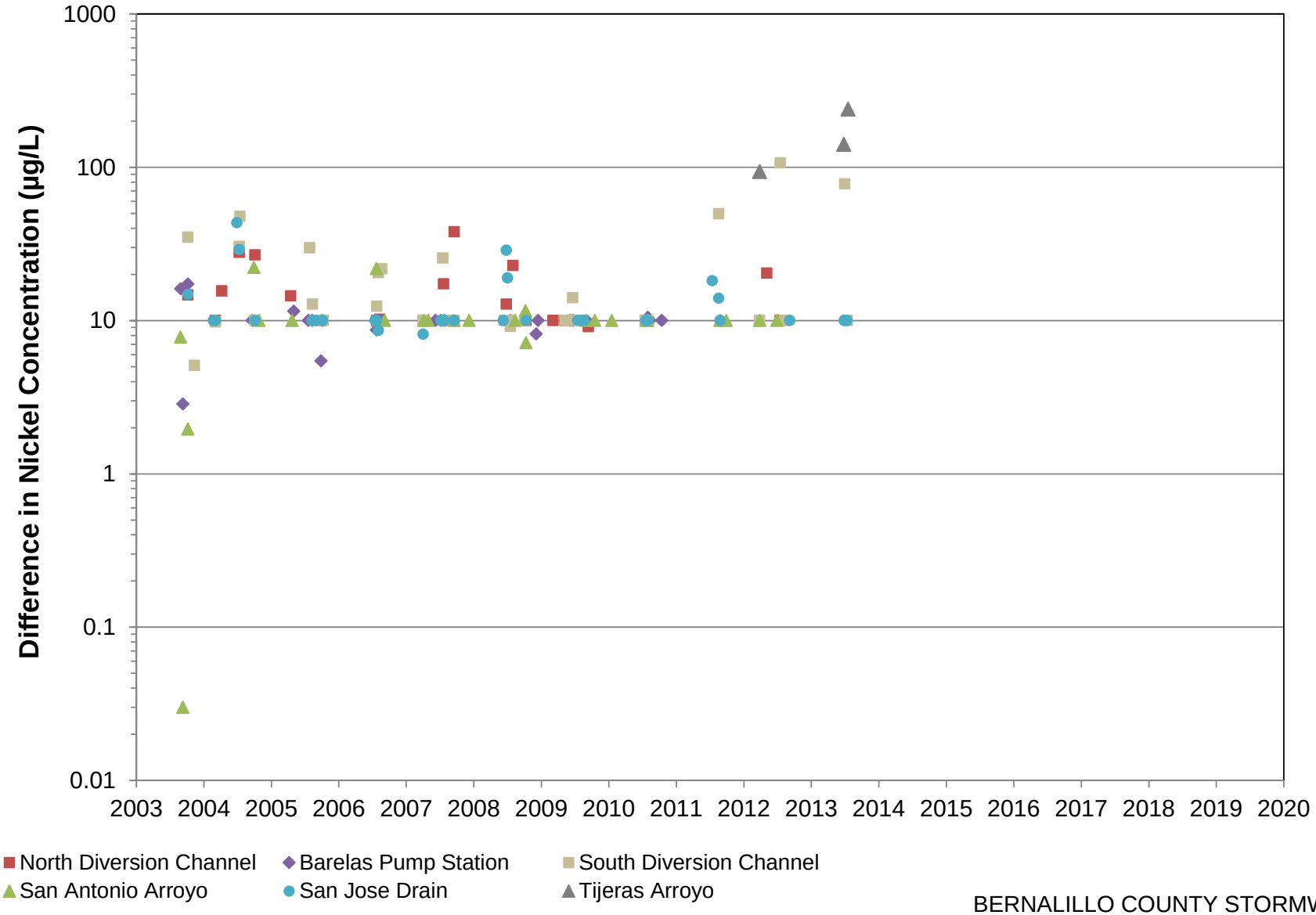
BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Nickel, Outfall Locations

Daniel B. Stephens & Associates, Inc.

6/6/19

Figure 10b



Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

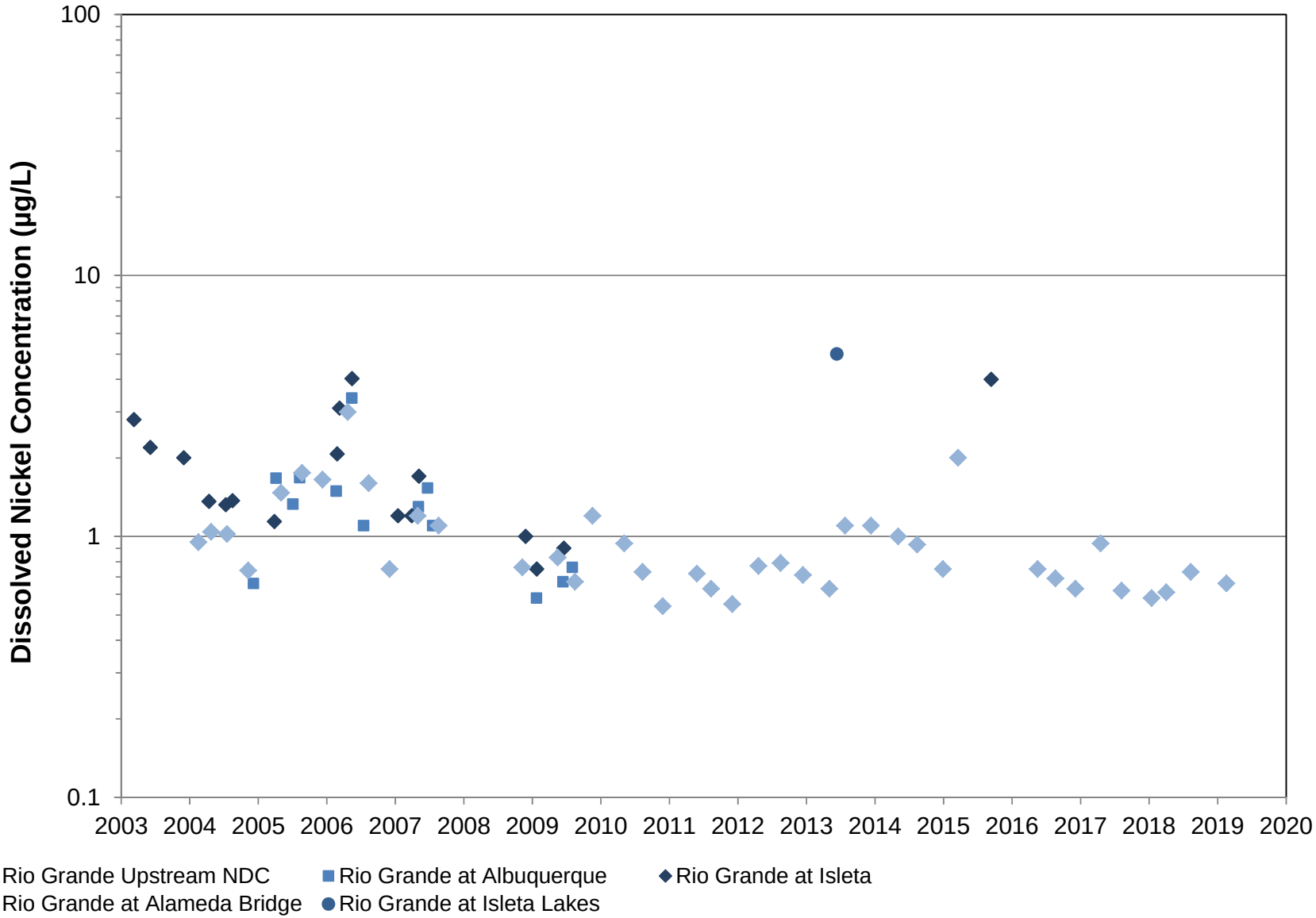
BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Difference Between Total and Dissolved Nickel Outfall Locations

Figure 10c

Daniel B. Stephens & Associates, Inc.

6/6/19



Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Nickel, Rio Grande Locations

Figure 10d

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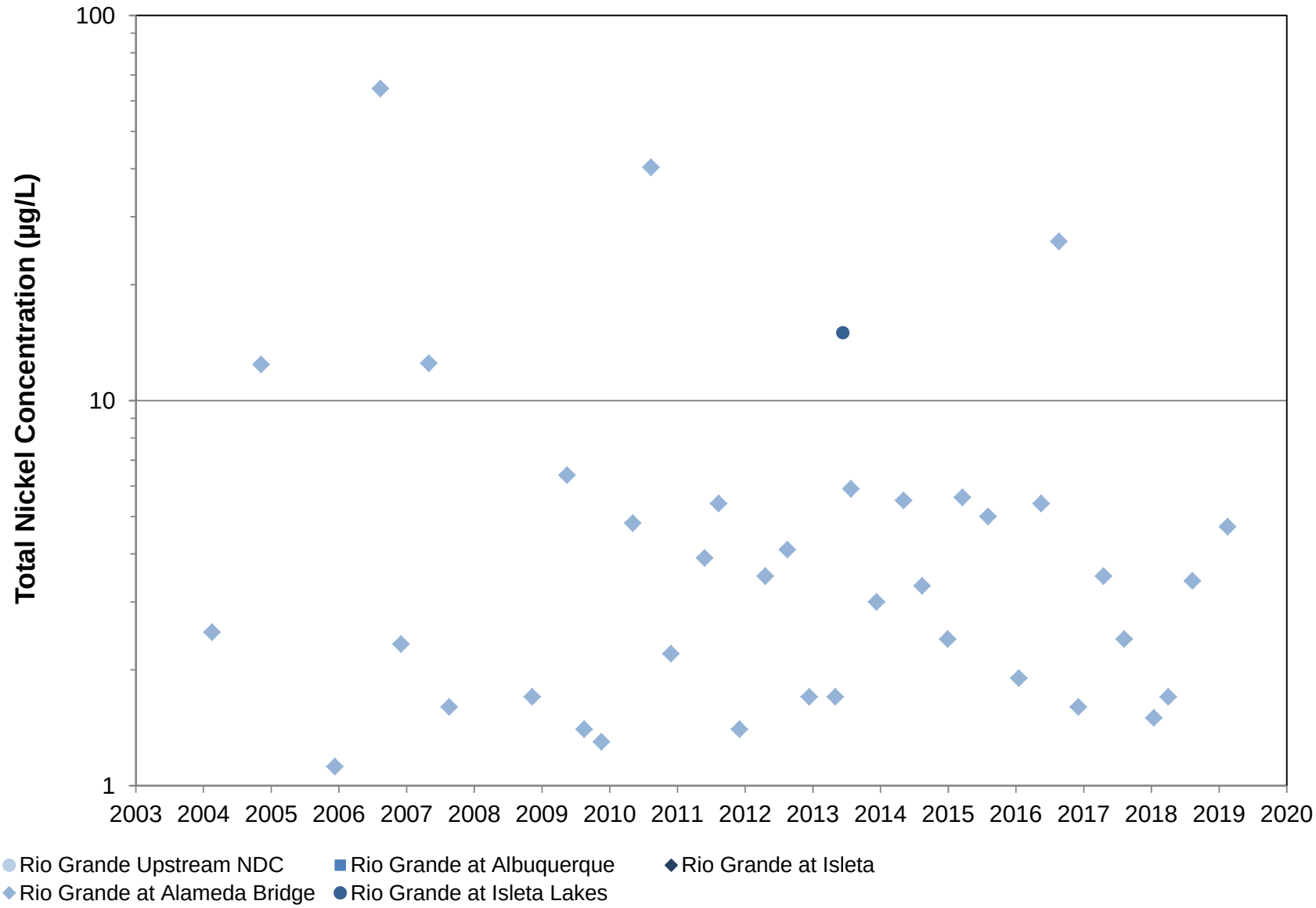

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Nickel, Rio Grande Locations

Figure 10e

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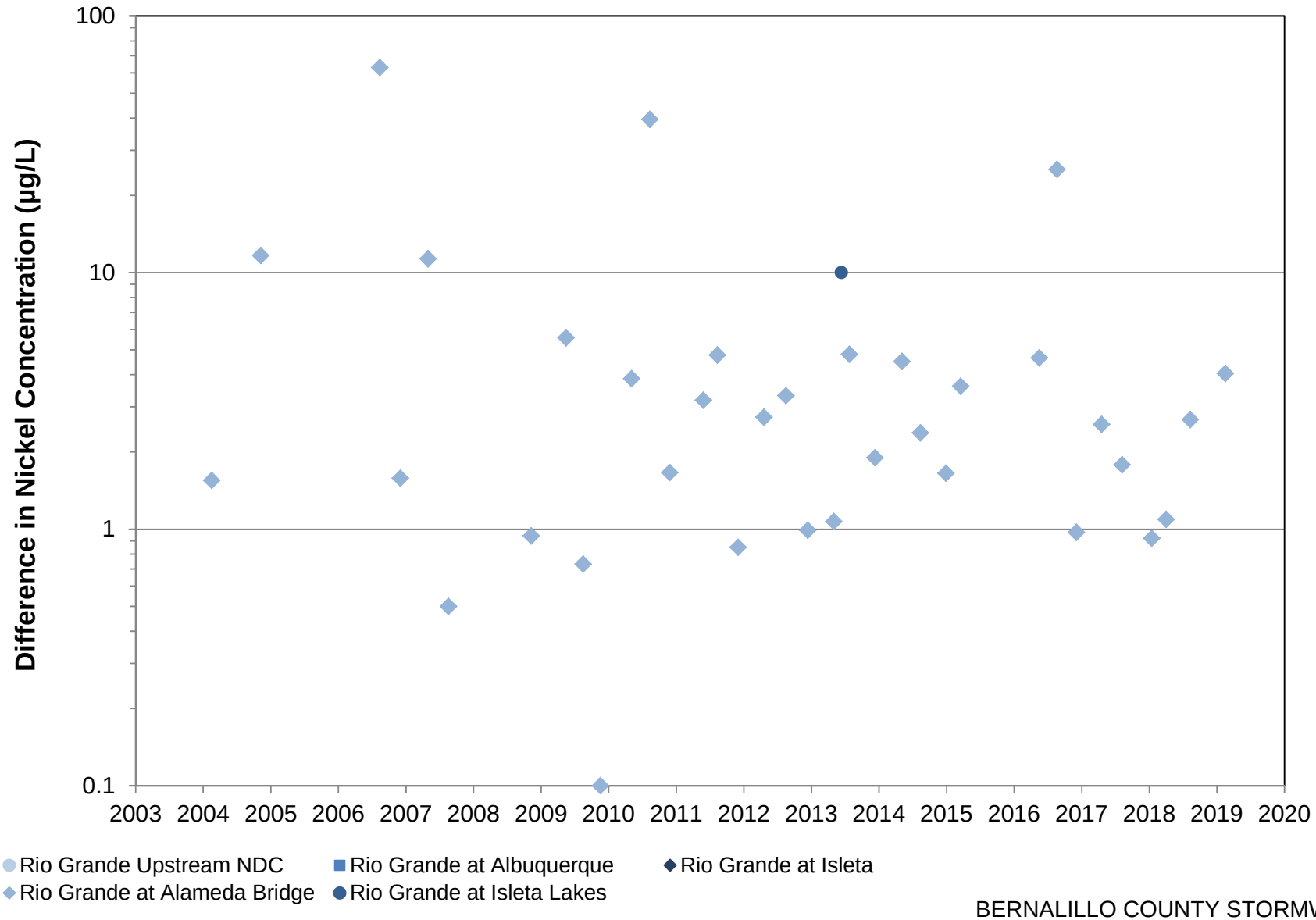

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Difference Between Total and Dissolved Nickel
Rio Grande Locations

Figure 10f

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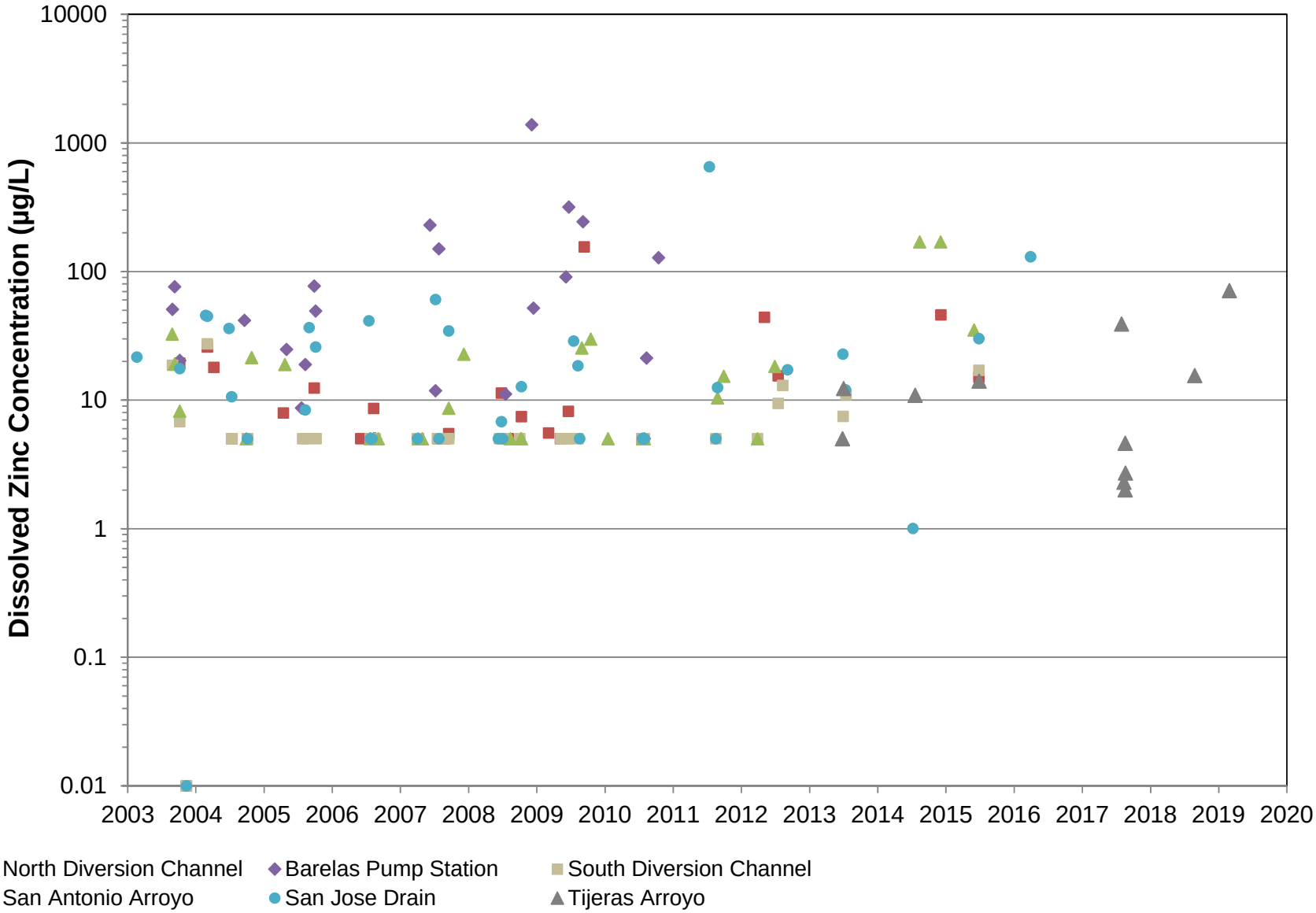

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Zinc, Outfall Locations

Figure 11a

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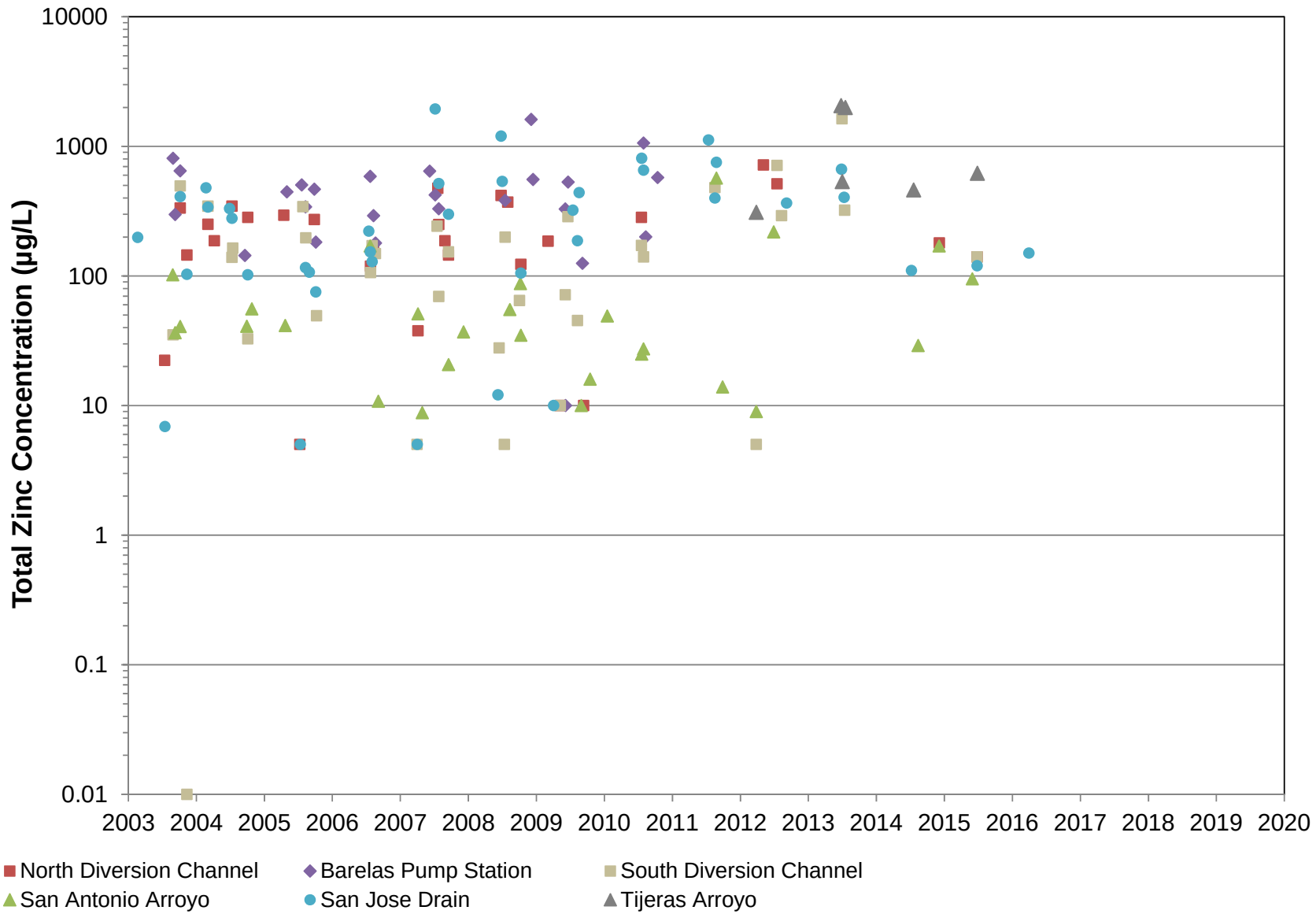

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Zinc, Outfall Locations

Figure 11b

Daniel B. Stephens & Associates, Inc.

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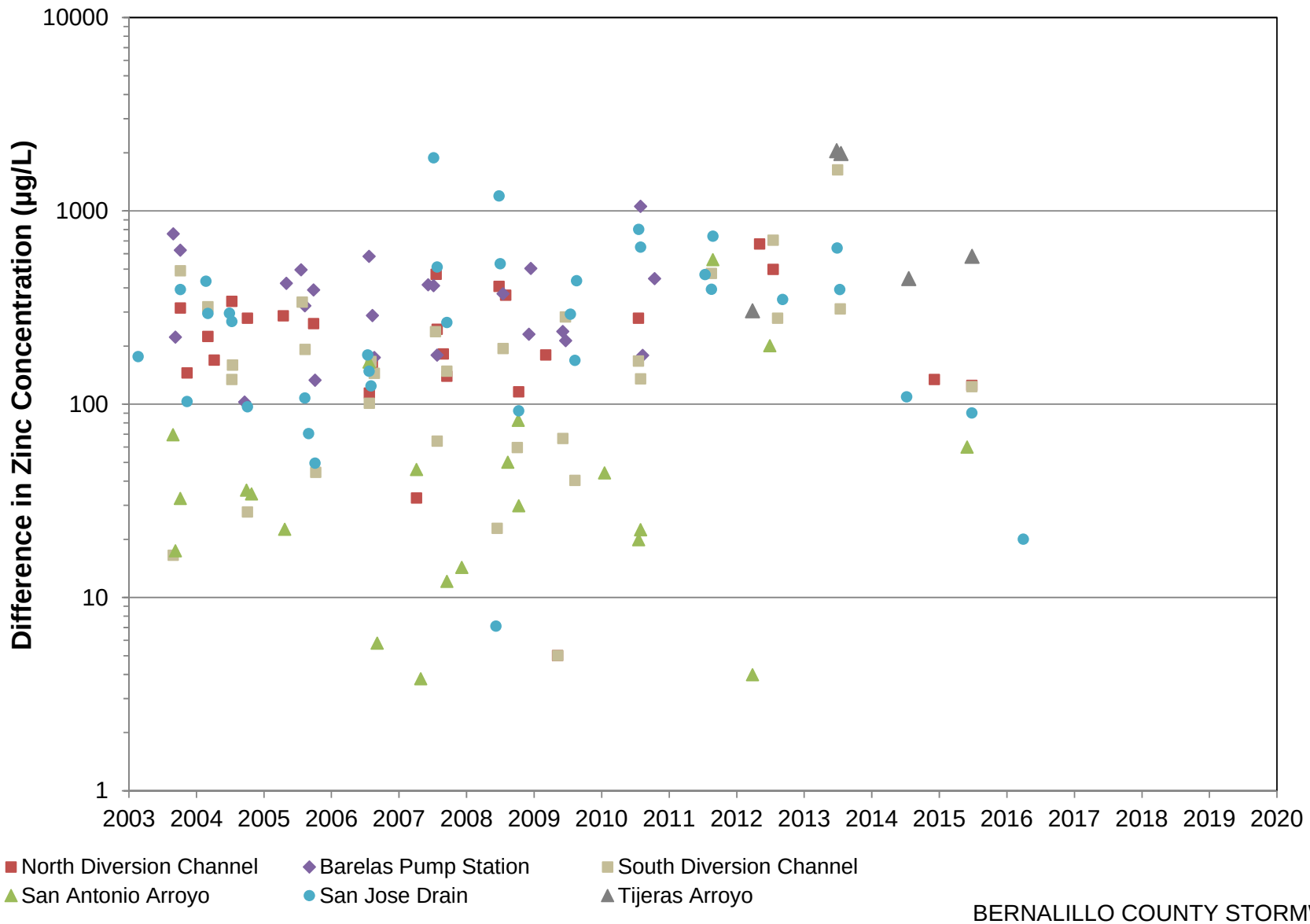

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Difference Between Total and Dissolved Zinc
Outfall Locations

Figure 11c

Daniel B. Stephens & Associates, Inc.

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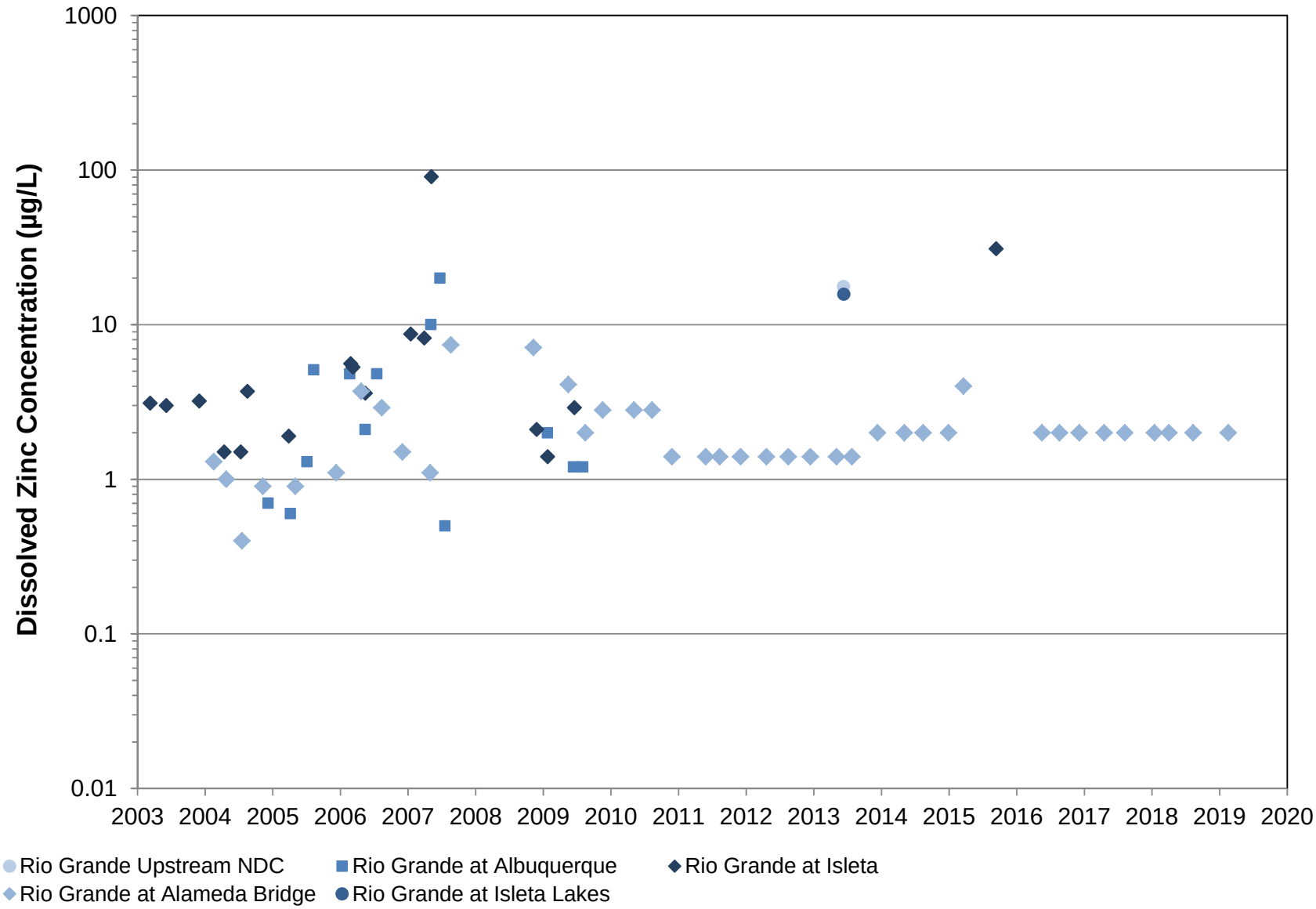

Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Dissolved Zinc, Rio Grande Locations

Figure 11d

Daniel B. Stephens & Associates, Inc.

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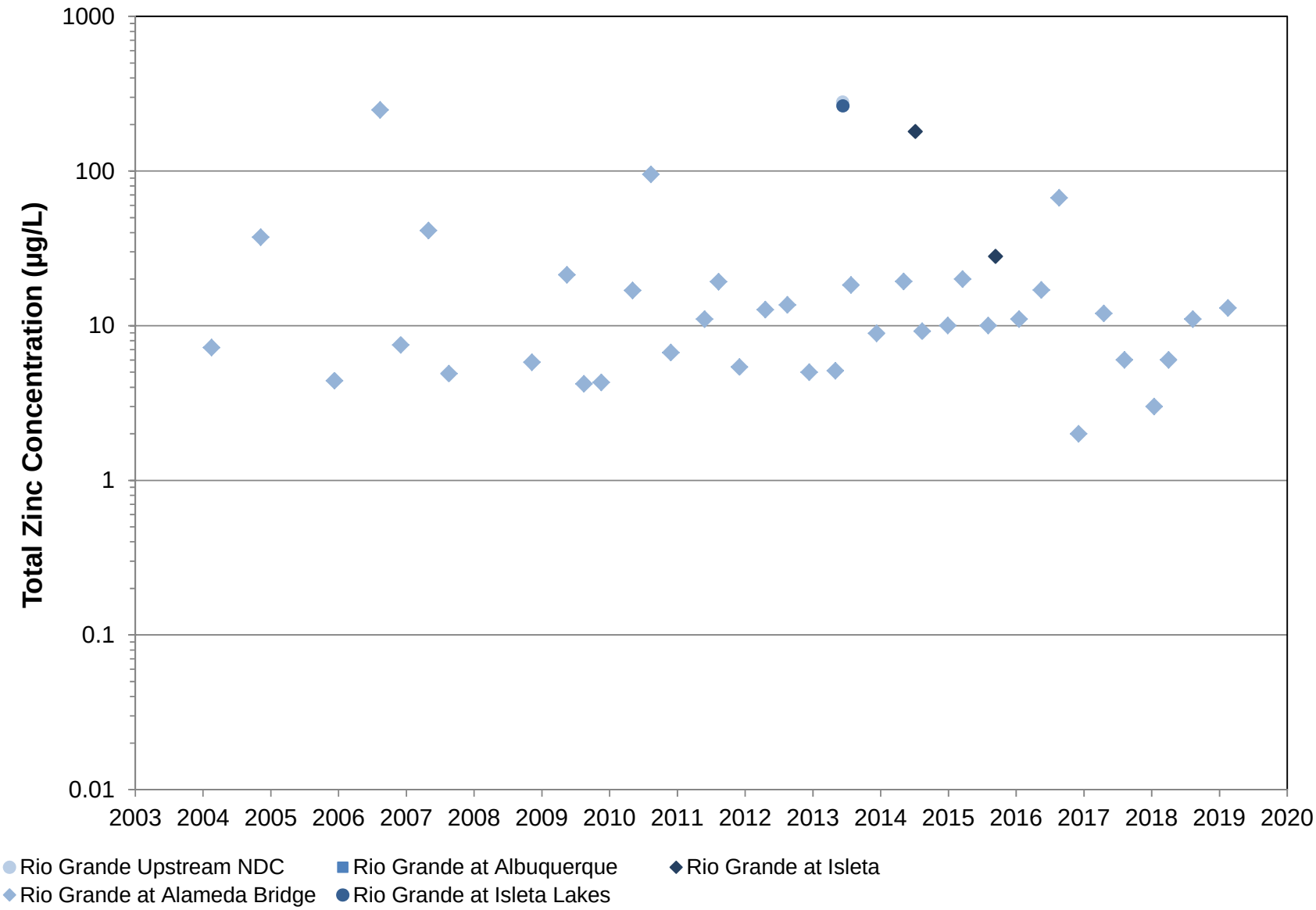


Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

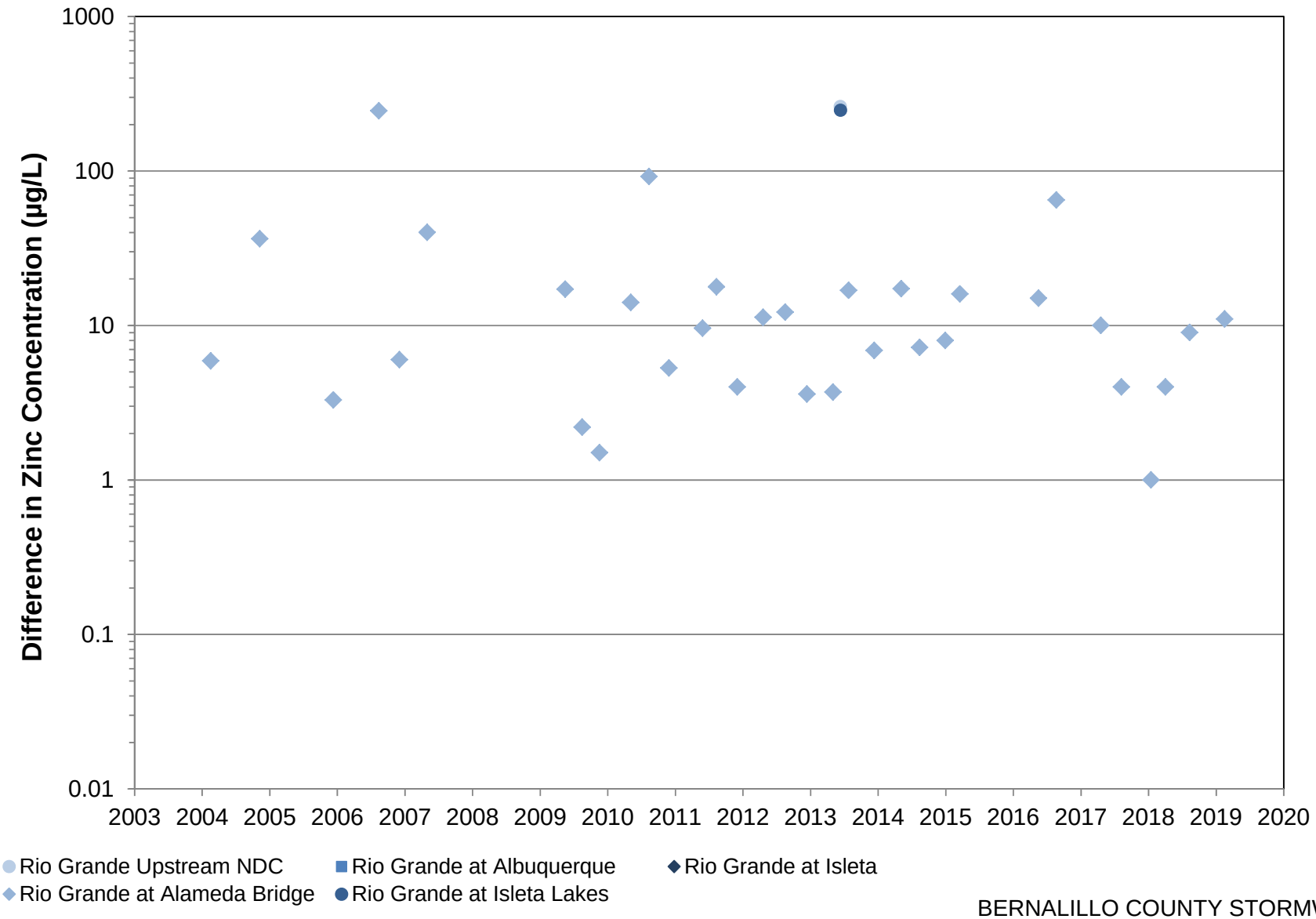
BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Total Zinc, Rio Grande Locations

Daniel B. Stephens & Associates, Inc.

6/6/19

Figure 11e



Note: Non-detections plotted at detection limit.
Sources: Storms et al., 2015; USGS, 2016; USGS, 2019b; AMAFCA, 2019; BHI, 2019

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

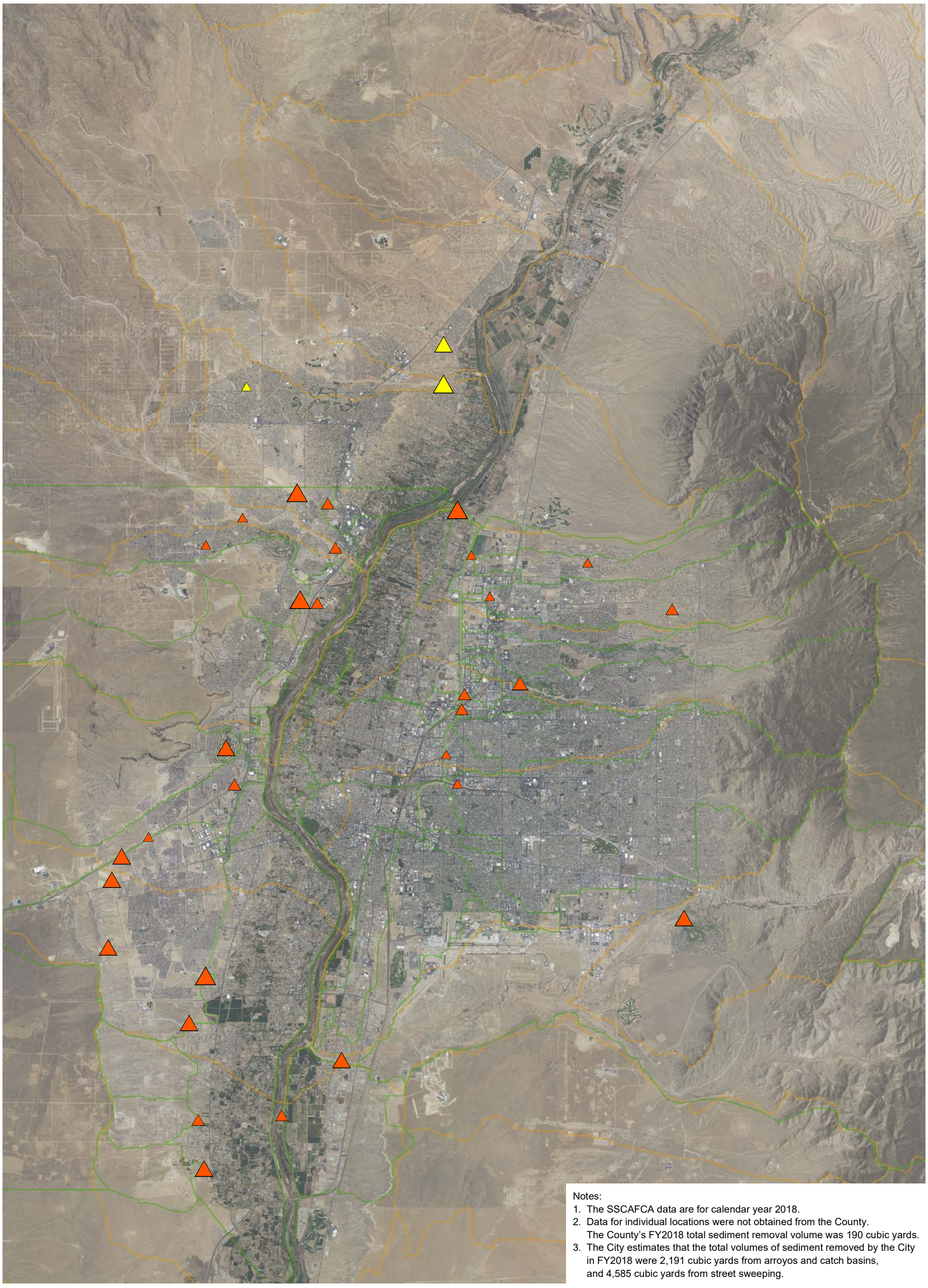
Difference Between Total and Dissolved Zinc
Rio Grande Locations

Daniel B. Stephens & Associates, Inc.

6/6/19

Figure 11f

S:\PROJECTS\DB19.1073_BERNCO_SPLRS\GIS\MXDS\SEDIMENT_REMOVAL_2019\FIG12_SEDIMENT_REMOVAL_VOLUMES_FY2018.MXD



Notes:
1. The SSCAFCA data are for calendar year 2018.
2. Data for individual locations were not obtained from the County. The County's FY2018 total sediment removal volume was 190 cubic yards.
3. The City estimates that the total volumes of sediment removed by the City in FY2018 were 2,191 cubic yards from arroyos and catch basins, and 4,585 cubic yards from street sweeping.

N

0 1.25 2.5 Miles

Explanation

Sediment removal location
- AMAFCA
- SSCAFCA
- AMAFCA watershed
- 12-digit watershed

Sediment removed (cubic yards)
- < 100
- 100 - 500
- 500 - 1000
- 1,000 - 10,000
- 10,000 - 35,000

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Sediment Removal Volumes, FY2018

Figure 12

Daniel B. Stephens & Associates, Inc.

6/6/2019 JN WR14.0074

Tables

Table 1. USGS-Bernalillo County PCB Study Sampling, Fiscal Years 2017 and 2018

Sample Location	Number of Samples Collected							
	FY17 Dry Season [a]		FY17 Monsoon [b]		FY18 Dry Season [a]		FY18 Monsoon [b]	
	Water	Sediment	Water	Sediment	Water	Sediment	Water	Sediment
Adobe Acres	1	—	3	1	1	1	2	1
Sanchez Pump Station	—	—	1	1	1	1	3	1
Sanchez Inflow	—	—	1	—	—	—	1	1
Paseo	—	1	—	—	1	1	2	1
Alameda	1	—	1		1	1	4	2
QA/QC (Blank sample)	—	—	1	1	2	2	1	1
Total	2	1	7	3	6	6	13	7

Source: USGS, 2018
[a] November 1 to June 30
[b] July 1 to October 31

Table 2. Likelihood of Occurrence of State-Listed Species in the Middle Rio Grande MS4 Permit Watershed
Page 1 of 6

Species Category	Species	Status	Notes on Distribution and Habitat Associations	Likelihood of Occurrence in the Watershed
Plants	Lady tresses orchid (*Spiranthes magnicamporum*)	ST	Found in moist to wet meadows in clearings in the northern mountains of New Mexico. Listed in Bernalillo County.	No. Possible occurrence at the higher, wetter elevations of the Sandia Mountains, likely outside the boundaries of the MS4 Permit watershed.
	Parish's alkali grass (*Puccinellia parishii*)	SE	Associated range-wide with alkaline springs, seeps, and seasonally wet areas that occur at the heads of drainages or on gentle slopes at 2,600 to 7,200 feet. The species requires continuously damp soils during its late winter to spring growing period. It frequently grows with *Distichlis stricta* (salt grass), *Sporobolus airoides* (alkali sacaton), *Carex* spp. (sedges), *Scirpus* spp. (bulrushes), *Juncus* spp. (rushes), *Eleocharis* spp. (spike rushes), and *Anemopsis californica* (yerba mansa).	Yes. The species is listed in Sandoval County and its elevational range overlaps that of the watershed. In addition, there may be alkaline springs within the watershed.
	Brack hardwall cactus (*Sclerocactus cloverae* ssp. *brackii*)	SE	Associated with sandy clay strata of the Nacimiento Formation in sparse shadscale scrub; elevational range extends from 5,000 to 6,400 feet. Listed in Sandoval County.	No. The watershed is not within the Nacimiento Formation.
	Pecos sunflower (*Helianthus paradoxus*)	SE	Associated with saturated, saline soils of desert springs (cienegas) or associated wetlands, ranging in elevation from 3,300 to 6,600 feet.	No. Not known to occur within the watershed boundaries (NMRPTC, 2006). Designated critical habitat for the species is located outside of the watershed boundaries.
Fish	Rio Grande silvery minnow (*Hybognathus amarus*)	SE	The Rio Grande silvery minnow is now found only in the 160-mile river reach from Cochiti Dam south to San Marcial. The reach represents only 5% of its former range.	Yes. The Rio Grande silvery minnow occurs in the Middle Rio Grande, with designated critical habitat located within the watershed boundaries.
Amphibians	Jemez Mountain salamander (*Plethodon newmexicanus*)	SE	The Jemez Mountains salamander is an endemic species occurring on talus slopes under rocks and surface debris in the Jemez Mountains.	No. The watershed boundaries are located outside of the Jemez Mountains. There is designated critical habitat for the species, but it is located outside of the watershed.

Note: Explanations and definitions are provided on the last page of the table.

Table 2. Likelihood of Occurrence of State-Listed Species in the Middle Rio Grande MS4 Permit Watershed
Page 2 of 6

Species Category	Species	Status	Notes on Distribution and Habitat Associations	Likelihood of Occurrence in the Watershed
Mollusks	Paper pondshell (*Utterbackia imbecillis*)	SE	One of the most widely distributed freshwater mussels in North America, occurring over a wide variety of substrata (mud to gravel) in reservoirs, lakes, rivers, and streams. The only known New Mexico population was documented by recent shells from Conchas Lake, San Miguel County—hundreds of miles from the nearest known occurrences in adjacent states and in northern Mexico (Río Conchos). In 2007, numerous live *U. imbecillis* were collected from the middle Rio Grande near Rio Rancho, Sandoval County, thus representing an introduction beyond the species' native range.	Yes. Based on the collection of paper pondshells in the Rio Grande in 2007, the species is likely to occur within the watershed in the Rio Grande.
	Wrinkled marshsnail (*Stagnicola caperata*)	SE	In New Mexico, the species is known from the Valles Caldera National Preserve, Jemez Mountains, Sandoval County.	No. The closest documented occurrence is in the Jemez Mountains, outside of the watershed boundaries.
Birds	Southwestern willow flycatcher (*Empidonax trailii extimus*)	SE	Found in dense, moist riparian vegetation communities along perennial rivers, where its diet consists primarily of insects. Suitable vegetation includes dense growth of willows (*Salix* spp.), arrow weed (*Pluchea sericea*), alder (*Alnus* spp.), and saltcedar (*Tamarix* sp.).	Yes. Known breeding territories and designated critical habitat occur south of the watershed. The species is known to migrate along the Middle Rio Grande within the watershed boundaries.
	Brown pelican (*Pelecanus occidentalis*)	SE	Brown pelicans are occasional visitors inland to New Mexico; they occur during all seasons, but are most frequent during the summer-fall period. Through 2005, there have been some 57 reports involving nearly 70 individual birds; these have been from 18 of New Mexico's 33 counties, with most from large lakes or along major rivers, including the Rio Grande. This coastal species breeds from California and the mid-Atlantic states southward to South America.	Yes. There is habitat for the brown pelican within the watershed along the Rio Grande, although this species is not known to breed in New Mexico.

Note: Explanations and definitions are provided on the last page of the table.

Table 2. Likelihood of Occurrence of State-Listed Species in the Middle Rio Grande MS4 Permit Watershed
Page 3 of 6

Species Category	Species	Status	Notes on Distribution and Habitat Associations	Likelihood of Occurrence in the Watershed
Birds (cont.)	Bald eagle (*Haliaeetus leucocephalus*)	ST	In New Mexico, bald eagles migrate and winter along the state's main rivers. Nesting has recently been documented in the state, but not within the boundaries of the watershed or in its vicinity.	Yes. Bald eagles are known to occur in late fall and winter within the boundaries of the watershed, primarily along the Middle Rio Grande.
	Aplomado falcon (*Falco femoralis*)	SE	The Aplomado falcon's historical range in New Mexico includes desert grasslands across the southern one-third of the state, north to Socorro County. The species requires extensive, unbroken desert grasslands characterized by relatively tall, dense grass cover and low woody plant densities.	No. The species was recorded once in Bernalillo County, but its regular distribution is south of the watershed.
	Peregrine falcon (*Falco peregrinus*)	ST	Peregrine falcons are often associated with open wetlands near cliffs. In New Mexico, breeding territories center on cliffs that are in wooded/forested habitats with large "gulfs" of air nearby, where these predators can forage. In winter, peregrine falcons are often found perched on snags in large wetlands	Yes. Peregrine falcons occur during migration and in winter at wetlands within the watershed.
	Least tern (*Sternula antillarum*)	SE	The Least tern occurs in New Mexico as a summer resident, with nesting documented only at and near Bitter Lake NWR. It also occurs as a rare vagrant at other large wetlands in the state.	No. Other than one sighting in 2006 along the Rio Grande in Albuquerque's South Valley, least terns are not known to occur in the watershed.
	Neotropic cormorant (*Phalacrocorax brasilianus*)	ST	This widespread waterbird of Central and South America reaches its northernmost breeding limits in New Mexico, where it nests at the Bosque del Apache NWR, with nonbreeders wandering north to Bernalillo County.	Yes. Nonbreeding neotropic cormorants have been documented within the boundaries of the watershed including at the Rio Grande Nature Center.
	Common black hawk (*Buteogallus anthracinus anthracinus)*	ST	The Common black hawk is found within wooded habitat along permanent streams. In New Mexico, the species is found along the Gila, San Francisco, and Mimbres Rivers in the southwest and the Rio Hondo in the southeastern part of the state. It occasionally nests along the Rio Grande, as far north as Albuquerque.	Yes. The Common black hawk has been documented along the Middle Rio Grande, within the boundaries of the watershed. Nesting is even possible where there are mature, well-developed, relatively isolated gallery forest stands of large trees.

Note: Explanations and definitions are provided on the last page of the table.

Table 2. Likelihood of Occurrence of State-Listed Species in the Middle Rio Grande MS4 Permit Watershed
Page 4 of 6

Species Category	Species	Status	Notes on Distribution and Habitat Associations	Likelihood of Occurrence in the Watershed
Birds (cont.)	Baird's sparrow (*Ammodramus bairdii*)	ST	The Baird's sparrow breeds in a fairly small geographic area of south-central Canada, Montana, North Dakota, and South Dakota. It winters on grasslands of the northern Mexican plateau, primarily in Chihuahua and Durango, but including portions of bordering states. The winter range extends into small portions of southern New Mexico, chiefly Otero Mesa and the Animas Valley, and may include other areas of suitable winter habitat, particularly in the southeastern portion of the state.	No. The watershed is located north of the known winter range of the Baird's sparrow, and lies far outside the species' breeding distribution.
	Common ground-dove (*Columbina passerina*)	SE	In New Mexico, Common ground-doves primarily occupy lowland riparian areas in the southwestern portion of the state. They occur most frequently in the lower Gila Valley (from Cliff south) and in Hidalgo County, especially in Guadalupe Canyon. They also occur rarely in the Rio Grande Valley from Socorro south. In the western and southwestern United States, habitat includes mesquite flats and river bottom woodlands, desert scrub and washes, and xeric riparian areas. Human-modified habitats include ranch lands and irrigation ditches.	No. The watershed lies north of the common ground-dove's distribution.
	Broad-billed hummingbird (*Cynanthus latirostris*)	ST	In New Mexico, the broad-billed hummingbird is largely restricted to the southwestern corner of the state. It is only known to breed in Guadalupe Canyon in Hidalgo County.	No. Guadalupe Canyon is located in the Peloncillo Mountains of southwestern New Mexico, far from the boundaries of the watershed.

Note: Explanations and definitions are provided on the last page of the table.

Table 2. Likelihood of Occurrence of State-Listed Species in the Middle Rio Grande MS4 Permit Watershed
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Species Category	Species	Status	Notes on Distribution and Habitat Associations	Likelihood of Occurrence in the Watershed
Birds (cont.)	Costa's hummingbird (*Calypte costae*)	ST	Costa's hummingbird is primarily a desert scrub species of the Sonoran and Mojave deserts, particularly along washes, canyons, and rocky slopes. At the eastern limit of its breeding range in New Mexico, it occupies more characteristic Chihuahuan desert shrub and foothill/montane shrub habitats. This species occurs in spring and early summer in Guadalupe Canyon (Hidalgo County), which is the key habitat area in the state. Vagrants have been recorded northward and eastward to the Rodeo area (Hidalgo County), near Cliff (Grant County), and near Las Cruces. The NMDGF also reported a rare winter occurrence in Sandoval County.	No. There is no breeding habitat within the watershed and it would be unlikely to occur even as a rare visitor.
	White-eared hummingbird (*Hylocharis leucotis*)	ST	This species typically occurs in montane pine (*Pinus* spp.) forest and in oak (*Quercus* spp.) and pine-oak woodland and adjacent riparian sites in Mexico. It reaches Arizona, and more rarely Texas and New Mexico, where it is thought to be accidental and transient in areas of desert scrub/rocky slopes, juniper savannah, pinon/juniper woodland, and ponderosa/oak forests. Accidental occurrence documented in the Sandia Mountains.	No. The white-eared hummingbird is not among the four hummingbird species known to occur regularly in the Middle Rio Grande Valley or the Sandia Mountains. The watershed is far outside the species' regular distribution.
	Bell's vireo (*Vireo bellii*)	ST	In New Mexico, Bell's vireos are locally distributed across the southern one-third of the state during the breeding season, including in the Rio Grande Valley north to San Antonio in Socorro County.	No. Unlikely to occur in the watershed based on its more southerly distribution.
	Gray vireo (*Vireo vicinior*)	ST	In New Mexico, Gray vireos are locally distributed across the western two-thirds of the state, where preferred habitat consists of chaparral-juniper, piñon-juniper, and piñon-madrone associations. They also occur in mid-elevation, montane scrub-oak with rocky slopes and scattered conifers. Gray vireos are often found in areas of moderate shrub cover (35-45%) with large amounts of bare ground between herbaceous plants.	Yes. Documented in the Sandia Mountains, where there is habitat for the gray vireo within the watershed.

Note: Explanations and definitions are provided on the last page of the table.

Table 2. Likelihood of Occurrence of State-Listed Species in the Middle Rio Grande MS4 Permit Watershed
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Species Category	Species	Status	Notes on Distribution and Habitat Associations	Likelihood of Occurrence in the Watershed
Birds (cont.)	Pacific marten (*Martes caurina*)	ST	Pacific martens prefer late successional stands of mesic, conifer-dominated forest at elevations ranging from 7,000 to 13,000 feet, primarily above 9,000 feet.	No. The nearest known Pacific marten population is located far outside of the watershed, in the Sangre de Cristo Mountains.
Mammals	Spotted bat (*Euderma maculatum*)	ST	The Spotted bat occupies a wide variety of habitat types. Resident species of ponderosa pine forests in June and July but wanders to lower elevations in late summer and autumn. Also believed to inhabit piñon-juniper woodlands, and netted-over streams or waterholds. Spotted bats are cliff dwellers with diurnal roosts in cracks and crevices of canyons and cliffs. Rocky cliffs are necessary to provide suitable cracks and crevices for roosting as is access to water.	Yes. The spotted bat has been recorded in Bernalillo, Sandoval, and Valencia Counties. There is the potential for occurrence within a variety of habitats within the watershed, but especially in areas with cliffs and access to water.
	Meadow jumping mouse (*Zapus luteus luteus*)	SE	Semiaquatic species associated with moist, grassy areas and wetlands along perennial water. Emergent herbaceous wetlands (i.e., beaked sedge and reed canarygrass alliances), and stringers of sedges in scrub-shrub wetlands (i.e., willow and alder alliances) are preferred, all along the edge of the water (Frey, 2006). Beavers have been found to play an important role in creating complex networks of wetland microhabitats used by the species.	No. Not known to occur within the watershed boundaries. There is no designated critical habitat for the species in the watershed.

SE = State endangered
ST = State threatened
SOC = Species of concern

Unless otherwise noted, habitat and distribution data were taken from the NMDGF (2019) Biota Information System of New Mexico (BISON-M), Cartron (2010), New Mexico Avian Conservation Partners, the NMDGF Threatened and Endangered Species 2018 Biennial Review, and the New Mexico Rare Plant Technical Council (NMRPTC) 2019 New Mexico Rare Plants database.

Table 3. Likelihood of Occurrence of Federally Listed Species in the Middle Rio Grande MS4 Permit Watershed
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Species Category	Species	Status	Notes on Distribution and Habitat Associations	Likelihood of Occurrence in the Watershed
Plants	Pecos sunflower (*Helianthus paradoxus*)	FT	Associated with saturated, saline soils of desert springs (cienegas) or associated wetlands, ranging in elevation from 3,300 to 6,600 feet.	No. Not known to occur within the watershed boundaries (NMRPTC, 2006). Designated critical habitat for the species is located outside of the watershed boundaries.
Fish	Rio Grande silvery minnow (*Hybognathus amarus*)	FE	The Rio Grande silvery minnow is now found only in the 160-mile river reach from Cochiti Dam south to San Marcial. The reach represents only 5% of its former range.	Yes. The Rio Grande silvery minnow occurs in the Middle Rio Grande, with designated critical habitat located within the watershed boundaries.
Amphibians	Jemez Mountains salamander (*Plethodon neomexicanus*)	FE	The Jemez Mountains salamander is an endemic species occurring on talus slopes under rocks and surface debris in the Jemez Mountains.	No. The watershed boundaries are located outside of the Jemez Mountains. There is designated critical habitat for the species, but it is located outside of the watershed.
Birds	Southwestern willow flycatcher (*Empidonax trailii extimus*)	FE	Found in dense, moist riparian vegetation communities along perennial rivers, where its diet consists primarily of insects. Suitable vegetation includes dense growth of willows (*Salix* spp.), arrow weed (*Pluchea sericea*), alder (*Alnus* spp.), and saltcedar (*Tamarix* sp.).	Yes. Known breeding territories and designated critical habitat occur south of the watershed. The species is known to migrate along the Middle Rio Grande within the watershed boundaries.
	Mexican spotted owl (*Strix occidentalis*)	FT	Primarily associated with deeply shaded, moist areas and steep topography, such as the lower slopes of steep canyons with a dense canopy of large coniferous or deciduous, riparian trees.	No. Formerly occupied some of the higher slopes of the Sandia Mountains. Not known to currently occur in the watershed.
	Yellow-billed cuckoo (*Coccyzus americanus*)	FT	In New Mexico, yellow-billed cuckoos are typically found in riparian woodlands along perennial water.	Yes. Yellow-billed cuckoos occur in spring and summer within the watershed boundaries along the Rio Grande. Critical habitat has been proposed for the species within the watershed boundaries, also along the Rio Grande corridor.

Note: Explanations and definitions are provided on the last page of the table.

Table 3. Likelihood of Occurrence of Federally Listed Species in the Middle Rio Grande MS4 Permit Watershed
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Species Category	Species	Status	Notes on Distribution and Habitat Associations	Likelihood of Occurrence in the Watershed
Mammals	New Mexico meadow jumping mouse (*Zapus hudsonius luteus*)	FE	Semiaquatic species associated with moist, grassy areas and wetlands along perennial water. Emergent herbaceous wetlands (i.e., beaked sedge and reed canarygrass alliances), and stringers of sedges in scrub-shrub wetlands (i.e., willow and alder alliances) are preferred, all along the edge of the water (Frey, 2006). Beavers have been found to play an important role in creating complex networks of wetland microhabitats used by the species.	No. Not known to occur within the watershed boundaries. There is no designated critical habitat for the species in the watershed.

Federal designations: Federal Endangered Species Act, U.S. Fish and Wildlife Service
FE = Federal endangered
FT = Federal threatened

Table 4a. AMAFCA Sediment Reduction and Water Quality Improvement Projects, 2016

Project	Project Location	AMAFCA District	Project Sponsors	Schedule	Cost	Project Description
AMAFCA miscellaneous projects	All areas	1–5	AMAFCA	2016-2021	$2,900,000	Miscellaneous concrete repairs, access control, and minor modifications to existing conveyance, detention, and stormwater quality facilities. These are generally small projects that will prevent future maintenance issues or decrease long-term maintenance cost.
Barelas Pump Station outfall - Bosque SWQ outfall improvements	Mid Valley	1	COA (lead), AMAFCA	2016-2017	$419,000	Construct meandering unlined channels from the basin of the pump station through the bosque with an outfall to the river in order to improve stormwater quality and keep floatables and debris out of the river.
Barr Main Canal improvements	South Valley	1	County (lead), AMAFCA, COA, ACOE	2018-2020	$4,792,000	Widen and deepen the existing irrigation channels to create a drainage system, improving stormwater quality and conveying stormwater to the Rio Grande.
Black Mesa Pump Station outfall upgrade	South Valley	1	County (lead), AMAFCA	2018-2019	$1,014,000	Excavate Black Mesa Pond on Malpais Road to 115 acre-feet to allow it to accept overflow runoff from the Los Padillas Drain and the Isleta Drain. This will keep runoff from overwhelming facilities within the Isleta Reservation. As part of the project, best management practices (BMPs) will be used to enhance stormwater quality.
Black Mesa Storm Drain (Don Felipe)	South Valley	1	AMAFCA (lead), COA	2017-2018	$4,803,000	This project will install a gravity outlet pipe and connect the outlet of the dam to the existing Black Mesa Three-Dam Outlet pipe. The new outlet will provide additional capacity in the dam for runoff from upstream development, reduce local flooding and drainage problems. In addition, a water quality facility for the enhancement of stormwater flows will be included.
Black Mesa Storm Drain (McCoy)	South Valley	1	AMAFCA (lead), ACOE	2016	$3,541,000	This project will install a gravity outlet pipe and connect the outlet of the dam to the existing Black Mesa Three-Dam Outlet pipe. The new outlet will provide additional capacity in the dam for runoff from upstream development and will reduce local flooding and drainage problems. In addition, a water quality facility for the enhancement of stormwater flows will be included.
Bobby Foster Storm Drain	South Valley	1	County (lead), AMAFCA	2018	$4,715,000	Install a trunk line storm drain in Broadway and Bobby Foster in order to collect runoff and convey it into the South Diversion Channel. This will address flooding, erosion, and sediment issues.
Calabacillas Arroyo Bank Monitoring and Enhancement 1 - Coors to the Rio Grande	Northwest Mesa	4	AMAFCA, Private	2016-2021	$500,000	The Calabacillas Arroyo bank monitoring and enhancement project will provide bank protection and grade control structures to maintain the arroyo in a natural state, while providing erosion protection to adjacent lands and controlling sediment transport in the arroyo.
Calabacillas Arroyo Bank Monitoring and Enhancement 2 - Eagle Ranch to Coors	Northwest Mesa	4	AMAFCA	2016-2021	$500,000	
Calabacillas Arroyo Bank Monitoring and Enhancement 3 - Black Diversion to Eagle Ranch	Northwest Mesa	4	AMAFCA, Private	2016-2021	$500,000	
Calabacillas Arroyo Bank Monitoring and Enhancement 4 - Golf Course to Unser Boulevard	Northwest Mesa	2	AMAFCA, Private	2016-2021	$500,000	
Calabacillas Arroyo Prudent Line Study	Northwest Mesa	2, 4	AMAFCA	2016	$200,000	Study the long-term erosion and bank-stability potential of the Calabacillas Arroyo downstream of the Swinburne Dam to determine what protective measures must be constructed to keep the arroyo within its confines.
Flood Control System Telemetry	All areas	1–5	AMAFCA	2016-2021	$1,550,000	To install automated telemetry for AMAFCA facilities to provide information regarding the volume of water in the facility, ambient conditions at that location, possible video reporting, and select water quality parameters. This will allow for focused observation by AMAFCA staff by providing information about the amount and quality of water moving through the system.

Table 4a. AMAFCA Sediment Reduction and Water Quality Improvement Projects, 2016

Project	Project Location	AMAFCA District	Project Sponsors	Schedule	Cost	Project Description
Hamilton Dam	Northeast Heights	4	AMAFCA	2016-2018	$8,156,000	Hamilton Dam will be a new dam designed to release flow rates as provided in the North Albuquerque Acres Drainage Management Plan. The 295-foot-wide and 36-foot-high dam will hold 104 acre-feet of stormwater and sediment, which will decrease the volume of water affecting the floodplain in neighborhoods below it.
Kirtland Air Force Base South Detention Basin	Southeast Heights	5	COA (lead), AMAFCA, U.S. Air Force	2016-2017	$1,481,000	Construct a 30 acre-foot detention pond to collect and limit runoff to prescribed peak flows. The basin will provide detention, water quality, and flood control for runoff that comes from Kirtland Air Force Base, and could also be designed to serve as a water quality structure to satisfy KAFB's EPA MS4 Permit requirements.
Karsten Area Restudy	South Valley	1	COA, AMAFCA	2017	$100,000	Study the South Broadway area near Karsten Road to determine where flooding and drainage issues occur. Storm drain capacities will be calculated and water quality improvement opportunities will be explored.
Las Ventanas Dam Stormwater Quality Upgrades	Northwest Mesa	2	AMAFCA, COA	2019	$391,000	The project will incorporate BMPs to enhance stormwater quality for flows coming into the Las Ventanas Dam, improving the quality of stormwater reaching the river and providing compliance with the EPA MS4 permit.
North Diversion Channel Indian School Stormwater Quality Pond	Northeast Heights	5	AMAFCA (lead), COA, UNM	2020-2021	$2,521,000	Project will create a stormwater quality facility to enhance stormwater quality from flows in the North Diversion Channel through diversion structures and pond(s), providing additional water quality and reuse opportunities for the University of New Mexico North Campus Golf Course and surrounding facilities.
North Diversion Channel I-40 Fecal Reduction Project	Northeast Heights	3	AMAFCA	2016	$931,000	Create impediments and barriers for birds and humans to congregate in this location, thereby reducing the point source of the E. coli concentration.
North Diversion Channel Outfall Stormwater Quality Facility Improvements, Debris Fence	Northeast Heights	4	AMAFCA	2016	$1,037,000	The North Diversion Channel outfall to the Rio Grande is the last opportunity to remove pollutants from urban stormwater before it enters the river for a contributing area of approximately one-third of the metropolitan area. The project will construct a series of low-profile debris fences in the settling basin, and will capture trash and debris coming into the settling area. This will significantly reduce the need for manual trash pick in the settling area.
North Diversion Channel Outfall Stormwater Quality Facility Improvements, Floating Boom	Northeast Heights	4	AMAFCA	2019-2020	$976,000	The project will construct a floating boom system that will collect floatables out of stormwater and deposit them in one location, which will significantly reduce the need for manual trash pick in the settling area.
North Fourth Street Storm Drain	North Valley	4	AMAFCA, County, VLR	2016-2018	$2,999,000	The project will address flooding in the area along 4th Street north of Paseo Del Norte, and will incorporate BMPs to enhance stormwater quality.
North Camino Arroyo Drainage Management Plan	Northeast Heights	4	AMAFCA, County	2020	$200,000	Prepare a Drainage Management and Stormwater Quality Plan for the North Camino Arroyo Watershed.
North Geologic Window Dam	Northwest Mesa	2	AMAFCA	2019-2021	$4,080,000	Construct a 173 acre-foot detention dam to control flows in the Boca Negra Arroyo as it enters the North Geologic Window, a parcel of land included in the Petroglyph National Monument.
Old Coors Ponding Area	Southwest Mesa	1	County (lead), AMAFCA	2016	$600,000	Construct a ponding area near the intersection of Old and New Coors that will provide relief from flooding and provide an opportunity to enhance stormwater quality.

Table 4a. AMAFCA Sediment Reduction and Water Quality Improvement Projects, 2016
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Project	Project Location	AMAFCA District	Project Sponsors	Schedule	Cost	Project Description
Pino Dam Emergency Spillway Modifications	Northeast Heights	4	AMAFCA	2017-2018	$3,826,000	Construct a secondary emergency spillway on the west or south side of the dam and/or add erosion resistant structural elements to the primary emergency spillway to remove potential for large erosion on the spillway.
Pond 2149	South Valley	1	County (lead), AMAFCA	2021	$351,000	Construct a pond between the Barr Main Canal and the Albuquerque Riverside Drain to collect runoff east of Second Street between Woodward and Rio Bravo. BMPs will be employed to enhance water quality.
South Diversion Channel Outfall Water Quality	South Valley	1	AMAFCA	2020-2021	$1,134,000	Construct a stormwater quality facility to enhance stormwater quality and remove sediment from flows in the South Diversion Channel prior to discharging to the Rio Grande.
South Second Street Drainage, Prosperity to SDC	South Valley	1	County	2016	$12,000,000	A phased project that will install storm drains and detention ponds to provide adequate drainage facilities for the area of 2nd Street between Prosperity and the South Diversion Channel.
Tijeras Arroyo Facility Plan	Southeast Heights	5	AMAFCA, KAFB, County, ABCWUA	2016	$200,000	Update the Tijeras Arroyo hydrologic and hydraulic analyses from the Four Hills Bridge to the confluence with the South Diversion Channel. This information will provide guidance for facilities that are required to keep the arroyo stable.
Tijeras Sediment Retention Structure	South Valley	1	AMAFCA	2016	$885,000	Construct a structure to divert stormwater flows from the Tijeras Arroyo into a stormwater quality facility and ported outlet to collect 15,000 to 30,000 cubic yards of sediment and debris before it enters the South Diversion Channel and ultimately the Rio Grande.
Upper Snow Vista Channel improvements Study	Southwest Mesa	2	AMAFCA	2016	$100,000	Conduct a study to determine where to place a detention structure in the Snow Vista watershed, which will optimize the existing capacity and allow for the removal of floatables and debris from the system.
Valle de Oro Drainage and Stormwater Quality Infrastructure	South Valley	1	AMAFCA, County, U.S. FWS	2016-2019	$4,877,340	Design and build stormwater conveyance and water quality infrastructure to reduce flooding in the Southeast Valley. The structure will detain about 48 acre-feet of runoff and reduce the pollutants before discharging to the Rio Grande bosque.
West I-40 Diversion Channel	Northwest Mesa	2	AMAFCA, COA, Private	2016	$3,065,000	Upgrade the existing earthen channel to the master planned facility. The upgrade will minimize maintenance costs, reduce sediment loads into the downstream La Presa Detention Pond, and allow for the stable, long-term conveyance of stormwater.

Table 4b. AMAFCA Sediment Reduction and Water Quality Improvement Projects, 2017
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Project	AMAFCA District	Project Sponsors	Schedule	Cost	Project Description
AMAFCA Telemetry	1–5	AMAFCA	2019-2023	$1,200,000	To install automated telemetry for AMAFCA facilities to provide information regarding the volume of water in the facility, ambient conditions at that location, possible video reporting, and select water quality parameters. This will allow for focused observation by AMAFCA staff by providing information about the amount and quality of water moving through the system.
Barelas Pump Station Outfall - Stormwater Quality	1	COA, AMAFCA	2018	$419,000	Construct meandering unlined channels from the basin of the pump station through the bosque with an outfall to the river in order to improve stormwater quality and keep floatables and debris out of the river.
Black Mesa Pump Station Outfall Upgrade	1	County, AMAFCA	2019-2020	$1,014,000	Excavate Black Mesa Pond on Malpais Road to 115 acre-feet to allow it to accept overflow runoff from the Los Padillas Drain and the Isleta Drain. This will keep runoff from overwhelming facilities within the Isleta Reservation. As part of the project, best management practices (BMPs) will be used to enhance stormwater quality.
Black Mesa Storm Drain (Don Felipe)	1	AMAFCA, County	2018-2019	$4,803,000	This project will install a gravity outlet pipe and connect the outlet of the dam to the existing Black Mesa Three-Dam Outlet pipe. The new outlet will provide additional capacity in the dam for runoff from upstream development and will reduce local flooding and drainage problems. In addition, a water quality facility for the enhancement of stormwater flows will be included.
Black Mesa Storm Drain (McCoy)	1	AMAFCA, ACOE, County	2018-2020	$3,541,000	This project will install a gravity outlet pipe and connect the outlet of the dam to the existing Black Mesa Three-Dam Outlet pipe. The new outlet will provide additional capacity in the dam for runoff from upstream development and will reduce local flooding and drainage problems. In addition, a water quality facility for the enhancement of stormwater flows will be included.
Calabacillas Arroyo Bank Monitoring and Enhancement 1 - Coors to the Rio Grande	4	AMAFCA	2019-2023	$500,000	The Calabacillas Arroyo bank monitoring and enhancement project will provide bank protection and grade control structures to maintain the arroyo in a natural state, while providing erosion protection to adjacent lands and controlling sediment transport in the arroyo.
Calabacillas Arroyo Bank Monitoring and Enhancement 2 - Eagle Ranch to Coors	4	AMAFCA	2018-2023	$500,000	
Calabacillas Arroyo Bank Monitoring and Enhancement 3 - Black Diversion to Eagle Ranch	4	AMAFCA	2018-2023	$500,000	
Calabacillas Arroyo Bank Monitoring and Enhancement 4 - Golf Course to Unser Boulevard	2	AMAFCA	2018-2023	$500,000	
Calabacillas Flow and Sediment Control	4	AMAFCA	2020-2022	$2,310,000	The grade control structures below Swinburne Dam are sized for the design outflow of the dam. To ensure that the peak outflow is not impacted by higher than normal inflow, a flow control structure may be needed on the main branch of the Calabacillas Arroyo. The design of this structure would have a sediment retention aspect to improve stormwater quality.
Calabacillas GC1A1 & GC1A Expansion	2	AMAFCA	2018	$1,500,000	Calabacillas Grade Control Structure 1a1 is needed to protect the spillway apron of Swinburne Dam, and Calabacillas Grade Control Structure 1a requires expansion. These structures will keep the Calabacillas Arroyo within the erosion setbacks identified when development in the area started.
Calabacillas-Corrales Stormwater Quality Facility	4	AMAFCA, MRGCD	2019-2020	$1,406,000	The Calabacillas-Corrales stormwater quality facility will be constructed adjacent to the Corrales Main Canal, near the Calabacillas Arroyo, to trap trash and debris at the overflow structure where stormwater is separated from irrigation water.

Table 4b. AMAFCA Sediment Reduction and Water Quality Improvement Projects, 2017
Page 2 of 4

Project	AMAFCA District	Project Sponsors	Schedule	Cost	Project Description
Chamisa Pond Expansion	2	AMAFCA, COA	2018-2019	$729,000	The expansion of the Chamisa Pond will provide additional storage of diverted runoff from the Upper Piedras Marcadas watershed, reducing flow to the Piedras Marcadas Dam, which is near capacity. The expansion project will include pond modifications to reduce sediment and trash resulting in improvements in stormwater quality.
GE Pond	1	COA, AMAFCA, County	2018-2019	$4,042,000	The future GE pond is adjacent to the San Jose Drain at the site of a former GE manufacturing facility. The pond will provide additional system capacity for the storm drainage network in the area, and will provide stormwater quality opportunities.
Gibson Louisiana Regional Drainage Facility	5	AMAFCA, COA, U.S. Air Force	2018	$1,481,000	Construct a 30 acre-foot detention pond to collect and limit runoff to prescribed peak flows. The basin will provide detention, water quality, and flood control for runoff that comes from Kirtland Air Force Base (KAFB), and could also be designed to serve as a water quality structure to satisfy KAFB's EPA MS4 Permit requirements.
Hamilton Dam	4	AMAFCA	2018-2022	$7,256,000	Hamilton Dam will be a new dam designed to release flow rates as provided in the North Albuquerque Acres Drainage Management Plan. The 295-foot-wide and 36-foot-high dam will hold 104 acre-feet of stormwater and sediment, which will decrease the volume of water affecting the floodplain in neighborhoods below it.
Karsten Area Restudy	1	COA, AMAFCA	2018	$100,000	The Karsten Area Restudy will determine where flooding and drainage issues occur in the South Broadway area near Karsten Road. The capacities of the current storm drains and drainage infrastructure will be analyzed to make recommendations for future facilities, including those for water quality improvement.
Las Ventanas Dam Stormwater Quality Upgrades	2	AMAFCA, COA	2018-2019	$425,000	The project will incorporate BMPs to enhance stormwater quality for flows coming into the Las Ventanas Dam, improving the quality of stormwater reaching the river and providing compliance with the EPA MS4 permit.
Lower Bear Tributary Stormwater Quality Facility	3	AMAFCA, COA	2018	$400,000	Regional flood control and stormwater quality improvements will be made on the Lower Bear Tributary, increasing the efficiency of the storm drainage system in the Bear Arroyo Watershed by providing a series of regional BMP structures to collect debris, reduce peak runoff flows, and enhance stormwater quality before discharging into the North Diversion Channel and ultimately the Rio Grande.
Max's Inlet Stormwater Quality Upgrade	1	AMAFCA	2023	$745,000	A sediment control facility will be installed to reduce maintenance, control sediment, and reduce floatables before they are discharged into the South Diversion Channel, and ultimately the Rio Grande.
McEwen Pond GI/LID Improvements	1	County, AMAFCA	2018	$100,000	The USGS will monitor stormwater quality pre- and post-installation of green infrastructure (GI) and low impact development (LID) structural features in the pond. The purpose of this pilot project is to sample stormwater before and after processing in the pond, to evaluate the performance of GI BMPs relative to stormwater quality.
Miscellaneous Construction Projects	1–5	AMAFCA	2018-2023	$2,400,000	Small projects throughout the AMAFCA jurisdiction that are too small to be bid independently are combined for better pricing. Typical projects include access control, small stormwater quality enhancements, and enhancements to existing structures.
North Diversion Channel Indian School Stormwater Quality Pond	5	AMAFCA, COA, UNM	2020-2022	$2,521,000	Project will create a stormwater quality facility to enhance stormwater quality from flows in the North Diversion Channel through diversion structures and pond(s), providing additional water quality and reuse opportunities for the University of New Mexico North Campus Golf Course and surrounding facilities.

Table 4b. AMAFCA Sediment Reduction and Water Quality Improvement Projects, 2017
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Project	AMAFCA District	Project Sponsors	Schedule	Cost	Project Description
North Diversion Channel Outfall Stormwater Quality Facility Improvements, Debris Fence	4	AMAFCA	2018-2019	$1,037,000	The North Diversion Channel outfall to the Rio Grande is the last opportunity to remove pollutants from urban stormwater before it enters the river for a contributing area of approximately one-third of the metropolitan area. The project will construct a series of low-profile debris fences in the settling basin, and will capture trash and debris coming into the settling area. This will significantly reduce the need for manual trash pick in the settling area.
North Diversion Channel Outfall Stormwater Quality Facility Improvements, Floating Boom	4	AMAFCA	2019-2020	$976,000	The project will construct a floating boom system that will collect floatables out of stormwater and deposit them in one location, significantly reducing the need for manual trash pick in the settling area.
North Geologic Window Dam	2	AMAFCA	2018-2023	$4,080,000	Construct a 173 acre-foot detention dam to control flows in the Boca Negra Arroyo as it enters the North Geologic Window, a parcel of land included in the Petroglyph National Monument.
Pino Dam Emergency Spillway Modifications	4	AMAFCA	2021-2023	$3,826,000	Pino Dam is an earthen dam near Tramway Boulevard and San Antonio Drive, and the spillway has the potential to undergo headcutting if the dam spillway is operating. The proposed modifications will involve either constructing a secondary emergency spillway on the west or south side of the dam and/or adding erosion resistant structural elements to the primary emergency spillway to remove potential for large erosion on the spillway.
South Diversion Channel Outfall Stormwater Quality	1	AMAFCA	2022-2023	$1,134,000	Construct a stormwater quality facility to enhance stormwater quality and remove sediment and debris from flows in the South Diversion Channel prior to discharging to the Rio Grande.
South Domingo Baca Diversion Channel Extension (Hawks Landing)	4	AMAFCA	2018	$40,000	AMAFCA will cost-share with the developer of the Hawk's Landing Subdivision to extend the box culvert at Tramway to provide better access for maintenance of the existing Morgan Flood Wall of the South Domingo Baca Arroyo.
South Pino Bank Monitoring and Enhancement	4	AMAFCA	2018-2021	$200,000	Grade control structures and bank protection may be applied to South Pino Arroyo to prevent lateral erosion and vertical degradation issues if it begins to migrate outside of the designated limits.
Swinburne Dam Regional Stormwater Quality and Sediment Facility	2	AMAFCA	2019-2021	$1,900,000	Design and construction of a water quality pond within the confluence of the west and main branches of the Calabacillas arroyo, capable of holding "first flush" flows, sediment, and debris. The project will incorporate BMPs to enhance stormwater quality for flows coming into the Swinburne Dam, improving the quality of stormwater reaching the river and providing compliance with the EPA MS4 permit.
Tijeras Sediment Facility - Phase II	1	AMAFCA	2018	$2,885,000	The Tijeras Arroyo Sediment Retention Structure is a regional stormwater quality improvement structure designed to capture sediment above the concrete section of the Tijeras Arroyo. The project consists of three separate basins with a total storage capacity of approximately 50,000 to 75,000 cubic yards of sediment. The second phase of the project will construct the remaining portions of the middle basin and the entirety of the easternmost basin.
Upper Bear Tributary Stormwater Quality	3	AMAFCA, COA	2018	$100,000	Regional flood control and stormwater quality improvements will be made to the Upper Bear Tributary to increase the efficiency of the storm drainage system in the Bear Arroyo Watershed, use a regional BMP structure to collect trash and debris, reduce peak runoff flows, and enhance stormwater quality before discharging into the North Diversion Channel and ultimately into the Rio Grande.

Table 4b. AMAFCA Sediment Reduction and Water Quality Improvement Projects, 2017
Page 4 of 4

Project	AMAFCA District	Project Sponsors	Schedule	Cost	Project Description
Upper Calabacillas Facility Plan	2, 4	AMAFCA	2019	$250,000	The Upper Calabacillas Facility Plan will evaluate the Calabacillas Arroyo from the south edge of Swinburne Dam to the north edge of the AMAFCA jurisdiction. The goal of the plan will be to evaluate the existing grade control structures, evaluate the risks for lateral and vertical erosion, and identify any possible areas for enhancing stormwater quality.
Upper Piedras Marcadas Pond	2	AMAFCA, COA	2018-2020	$1,972,500	A 20 acre-foot detention pond will be constructed to accommodate runoff from future development of the Upper Piedras Marcadas watershed. The pond will safely discharge runoff to prescribed rate and will provide enhanced water quality.
Upper Snow Vista Channel improvements Study	2	AMAFCA	2019	$100,000	Conduct a study to determine where to place a detention structure in the Snow Vista watershed, which will optimize the existing capacity and allow for the removal of floatables and debris from the system.
Valle de Oro Drainage and Stormwater Quality Infrastructure	1	AMAFCA, County, USFWS	2018-2021	$4,058,000	Design and build stormwater conveyance and water quality infrastructure to reduce flooding in the Southeast Valley. The structure will detain about 48 acre-feet of runoff and reduce the pollutants before discharging to the Rio Grande bosque.

Table 5. Sediment Sampling Locations

Location Number	Location Name	Location Type	Sample Name	UTM Coordinates (13 South)	
				X	Y
1	Rio Grande at Angastora Dam	Channel	RG-AngDam-20190328	363833.0003	3916193.8
2	Venada Arroyo Outfall	Outfall	VenadaOut-20190328	357382.3828	3908197.686
3	Montoyas Arroyo Sediment Collection Area	Sediment collection area	MontoyasSed-20190328	351699.6197	3902755.6
4	Montoyas Arroyo Outfall	Outfall	MontoyasOut-20190328	354589.2239	3903096.698
5	North Diversion Channel Bathtub	Sediment bathtub	NDCSed-20190329	353793.887	3897456.278
6	North Diversion Channel Outfall	Sediment outfall	NDCOut-20190329	353509.1619	3897671.736
7	Calabacillas Arroyo Sediment Collection Area	Sediment collection area	CalabacillasSed-20190328	349152.031	3895462.701
8	Calabacillas Arroyo Outfall	Outfall	CalabacillasOut-20190328	349671.2993	3895029.944
9	Paseo del Norte Pump Station #42	Sediment collection area	PND42Sed-20190401	350207.6757	3894536.456
10	Paseo del Norte Pump Station #42 Outfall	Outfall	PND42Out-20190401	349879.0053	3894453.06
11	San Antonio Arroyo Pond	Sediment trap	SanAntonioSed-20190328	345885.4605	3889511.904
12	San Antonio Arroyo Outfall	Arroyo	SanAntonioOut-20190328	346099.8779	3889469.334
13	West I-40 Sediment Collection	Sediment collection area	WestI40DCSed-20190329	344280.8468	3886118.504
14	West I-40 Diversion Channel Outfall	Outfall	WestI40DCOut-20190329	345608.3936	3886109.168
15	Sanchez Farms Inflow	Sediment collection in	SanchezFarmIn-20190329	347664.3861	3879957.902
16	Sanchez Farms Inflow 2	Sediment collection in	SanchezFarmIn2-20190329	347612.313	3879704.803
17	Sanchez Farms Outfall	Sediment collection out	SanchezFarmOut-20190329	348112.1614	3879578.055
18	Baffle Chute Up	Sediment collection area	BaffleUp-20190329	350516.2491	3880066.078
19	Tijeras Sediment Pond	Sediment pond	TijerasSed-20190329	349610.9911	3874573.293
20	Tijeras/SDC Outfall	Channel	SDCOut-20190329	347309.4176	3875153.382
21	Rio Grande at Isleta Dam	Channel	RG-IsletaDam-20190329	345964.6597	3863979.558

Table 6. March/April 2019 Sediment Analytical Results

Sample Location	Location Type	Sample Date	Concentration, PCBs (EPA method 8082) (mg/kg)								Concentration, SPLP Metals (EPA method 6010B) (mg/L)						Gross Alpha (EPA 900.0) (pCi/g)
			Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCBs	Aluminum	Cadmium	Chromium	Lead	Nickel	Zinc	
Rio Grande at Angastora Dam	Channel	3/28/2019	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	5.0	<1.0	<5.0	<5.0	<0.010	0.037	4.67 ± 5.83
Venada Arroyo Outfall	Outfall	3/28/2019	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	6.2	<1.0	<5.0	<5.0	<0.010	0.021	0.597 ± 3.50
Montoyas Arroyo Sediment Collection Area	Sediment collection area	3/28/2019	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	5.7	<1.0	<5.0	<5.0	<0.010	0.055	1.87 ± 4.22
Montoyas Arroyo Outfall	Outfall	3/28/2019	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	12	<1.0	<5.0	<5.0	<0.010	0.034	21.2 ± 9.17
North Diversion Channel Bathtub	Sediment bathtub	3/29/2019	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	33	<1.0	<5.0	<5.0	0.018	0.31	15.2 ± 7.39
North Diversion Channel Outfall	Sediment outfall	3/29/2019	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	7.4	<1.0	<5.0	<5.0	<0.010	0.038	12.1 ± 5.97
Calabacillas Arroyo Sediment Collection Area	Sediment collection area	3/28/2019	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	2.8	<1.0	<5.0	<5.0	<0.010	0.030	1.95 ± 4.06
Calabacillas Arroyo Outfall	Outfall	3/28/2019	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	4.8	<1.0	<5.0	<5.0	<0.010	0.023	3.17 ± 5.23
Paseo del Norte Pump Station #42	Sediment collection area	4/01/2019	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	2.6	<1.0	<5.0	<5.0	<0.010	0.057	5.30 ± 3.79
Paseo del Norte Pump Station #42 Outfall	Outfall	4/01/2019	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	2.7	<1.0	<5.0	<5.0	<0.010	0.062	5.22 ± 4.02
San Antonio Arroyo Pond	Sediment trap	3/28/2019	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	6.9	<1.0	<5.0	<5.0	<0.010	0.045	10.8 ± 6.01
San Antonio Arroyo Outfall	Arroyo	3/28/2019	<0.041	<0.041	<0.041	<0.041	<0.041	<0.041	<0.041	<0.041	6.1	<1.0	<5.0	<5.0	<0.010	0.047	4.83 ± 4.43
West I-40 Sediment Collection	Sediment collection area	3/29/2019	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	160	<1.0	<5.0	<5.0	0.074	0.56	8.91 ± 5.21
West I-40 Diversion Channel Outfall	Outfall	3/29/2019	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	9.2	<1.0	<5.0	<5.0	<0.010	0.028	14.7 ± 7.09
Sanchez Farms Inflow	Sediment collection in	3/29/2019	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	14	<1.0	<5.0	<5.0	0.010	0.21	22.9 ± 8.33
Sanchez Farms Inflow 2	Sediment collection in	3/29/2019	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	12	<1.0	<5.0	<5.0	<0.010	0.084	14.3 ± 7.01
Sanchez Farms Outfall	Sediment collection out	3/29/2019	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	7.3	<1.0	<5.0	<5.0	<0.010	0.15	16.5 ± 7.30
Baffle Chute Up	Sediment collection area	3/29/2019	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	3.4	<1.0	<5.0	<5.0	<0.010	0.051	3.67 ± 4.46
Tijeras Sediment Pond	Sediment pond	3/29/2019	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	8.2	<1.0	<5.0	<5.0	<0.010	0.034	15.6 ± 7.26
Tijeras/SDC Outfall	Channel	3/29/2019	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	8.8	<1.0	<5.0	<5.0	0.014	0.027	6.58 ± 4.75
Rio Grande at Isleta Dam	Channel	3/29/2019	<0.021	<0.021	<0.021	<0.021	<0.021	<0.021	<0.021	<0.021	3.1	<1.0	<5.0	<5.0	<0.010	<0.020	11.3 ± 5.42

PCBs = Polychlorinated biphenyls
EPA = U.S. Environmental Protection Agency
mg/kg = Milligrams per kilogram
SPLP = Synthetic precipitation leaching procedure
mg/L = Milligrams per liter
pCi/g = Picocuries per gram

Table 7. Outfall Water Quality Sampling Locations

Site Name	Site Number	USGS Station Number	Drainage Area (mi^2)	Land Use (%)					Station Location
				Agricultural	Commercial	Industrial	Open Space	Residential	
North Diversion Channel	UR-9900	08329900	92	36	15	4	4	41	Concrete-lined channel
San Antonio Arroyo	UR-300	083299375	31	73	1	14	1	11	Natural unlined channel
Barelas Pump Station	UR-400B	NA	4	9	34	10	12	35	Stormwater pumping station
San Jose Drain	UR-500	08330200	2	18	30	9	2	41	Concrete-lined channel
Sanchez Farms Pump Station	UR-804	350255106401510	—	—	—	—	—	—	—
South Diversion Channel	UR-200	08330775	11	30	28	21	8	13	Natural unlined channel
Tijeras Arroyo	UR-330600	08330600	135	—	5 [a]	—	90	5 [a]	Natural unlined channel

Source: Storms et al., 2015

[a] Estimated value

USGS = U.S. Geological Survey

mi^2 = Square miles

NA = Not applicable

— = Not provided

Table 8. AMAFCA Sediment, Trash, Vegetation, and Homeless Debris Removal, Fiscal Year 2018
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Location Code	Location	Volume (cubic yards)			
		Sediment	Trash	Vegetation	Homeless Debris
10005	98th St. Pond	36	0.0	0.0	0.0
10010	Amole Dam	25,504	112.0	0.0	0.0
10012	AMAFCA Yard	0	0.0	0.0	0.0
10015	Baca Channel	12	0.0	12.0	0.0
10020	Bear Canyon Arroyo	581	147.0	36.0	0.0
10025	Bear Canyon Training Dike	0	0.0	0.0	0.0
10030	Bear Canyon Tributary	0	0.0	0.0	0.0
10035	Black Arroyo Dam	11,145	0.0	0.0	0.0
10040	Black Mesa Storm Drain	0	0.0	0.0	0.0
10045	Boca Negra Dam	0	0.0	0.0	0.0
10050	Borrega Dam and Channel	6,260	9.9	0.0	0.0
10055	Cabezon Channel	0	0.0	0.0	0.0
10060	Calabaciallas Main Arroyo	169	0.0	13.0	0.0
10065	Corrales Main	320	0.0	0.0	0.0
10070	Camino Channel	52	0.0	0.0	0.0
10075	Candelaria Inlet	42	0.0	0.0	0.0
10080	Cottonwood Crossings Pond	0	0.0	0.0	0.0
10085	Don Felipe Dam	0	9.0	0.0	0.0
10086	Domingo Baca Water Quality Structure	0	13.3	12.0	0.0
10090	East Amole Surge Pond	0	6.0	0.0	0.0
10095	El Camino Pond	0	0.0	0.0	0.0
10100	Embudo Channel	60	65.5	0.0	9.0
10105	Fountain Hills Pond	0	0.0	0.0	0.0
10110	Grandmas Pond	0	0.0	0.0	0.0

Source: Chavez, 2019

Table 8. AMAFCA Sediment, Trash, Vegetation, and Homeless Debris Removal, Fiscal Year 2018
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Location Code	Location	Volume (cubic yards)			
		Sediment	Trash	Vegetation	Homeless Debris
10115	Grantline Inlet & Water Quality Pond	302	6.0	13.0	0.0
10120	Hahn Channel	0	0.0	0.0	15.0
10125	Hubbell Dam & Spillway	0	30.8	0.0	0.0
10130	John B. Robert Dam	0	0.0	0.0	0.0
10135	Kinney Dam	0	4.7	0.0	1.0
10140	La Cueva System & Water Quality Features	30	0.0	13.0	0.0
10145	La Cueva Training Dike	0	0.0	0.0	0.0
10150	La Cueva Tributary	0	0.0	0.0	0.0
10160	Ladera Channel @ 98th Street	0	0.0	0.0	0.0
10165	Ladera System- Dams & Mirehaven	1,494	25.3	0.0	0.0
10170	Ladera Training Dike	0	0.0	0.0	0.0
10175	La Ventanas Dam & N. Branch PM Channel	54	52.0	0.0	0.0
10180	Los Indios Diversion Channel & Sediment Basin	0	0.0	6.0	0.0
10185	Little Window	0	0.0	0.0	0.0
10190	Los Padillas Spillway Diversion	0	0.0	0.0	0.0
10195	McCoy Dam	5,658	0.0	0.0	0.0
10205	Malpais	0	0.0	0.0	0.0
10210	Mariposa Diversion Channel	0	5.2	0.0	0.0
10215	North Camino Channel & Water Quality Manholes	0	0.0	0.0	0.0
10220	North Camino Sunset Hills	0	0.0	0.0	0.0
10225	North Diversion Channel	10,592	753.7	184.0	40.0
10230	North Domingo Baca Dam & Channel	0	0.0	18.0	0.0
10235	North Domingo Baca Trailer Park Ponds	0	0.0	0.0	0.0
10240	North La Cueva Arroyo	0	0.0	0.0	0.0

Source: Chavez, 2019

Table 8. AMAFCA Sediment, Trash, Vegetation, and Homeless Debris Removal, Fiscal Year 2018
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Location Code	Location	Volume (cubic yards)			
		Sediment	Trash	Vegetation	Homeless Debris
10245	North Pino Channel & Water Quality Features	0	0.0	6.0	0.0
10250	North Pino Diversion	0	0.0	0.0	0.0
10255	Octopus Pond & Channel	0	0.0	0.0	0.0
10265	Piedras Marcadas Dam & Mid Branch PM Channel	19,458	51.3	0.0	0.0
10270	Pino Dam	0	0.0	0.0	0.0
10275	Ponds 187/187A	0	0.0	0.0	0.0
10280	Powerline Channel	9,252	133.1	0.0	0.0
10285	Raymac Dam	347	6.0	30.0	0.0
10290	Rinconada Channel	0	0.0	0.0	0.0
10295	Sacate Blanco Diversion Channel	0	0.0	0.0	0.0
10300	San Antonio Arroyo & Atrisco Diversion	0	5.2	0.0	0.0
10305	Seven Bar Channel	156	0.0	0.0	0.0
10310	Signal Ave. Training Dike	0	0.0	0.0	0.0
10312	Southwest Valley Projects	0	0.0	0.0	0.0
10315	Skyview Detention Pond	0	5.0	0.0	0.0
10320	Snow Vista Pond and Channel	0	31.4	0.0	0.0
10325	South Diversion Channel & Water Quality Structure	9,532	103.5	0.0	0.0
10330	South Domingo Baca Channel	0	0.0	0.0	0.0
10335	South Domingo Baca Dam	262	0.0	0.0	0.0
10340	South La Cueva	0	0.0	0.0	0.0
10345	South Pino Channel & Water Quality Facility	0	10.9	0.0	0.0
10350	Swinburne Dam	18	12.0	0.0	0.0
10355	Tramway Channel - Drop Structure	0	0.0	0.0	0.0
10360	Tijeras Arroyo Hidden Valley	4,262	0.0	0.0	0.0

Source: Chavez, 2019

Table 8. AMAFCA Sediment, Trash, Vegetation, and Homeless Debris Removal, Fiscal Year 2018
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Location Code	Location	Volume (cubic yards)			
		Sediment	Trash	Vegetation	Homeless Debris
10365	UNM Water Quality Manholes	0	0.0	0.0	0.0
10366	Valle De Oro Drainage	216	0.0	0.0	0.0
10370	Vineyard Channel & Water Quality Structure	132	30.0	18.0	0.0
10375	West Bluff, Laurelwood Ponds & WQ Structure	451	0.0	0.0	0.0
10380	West Calabacillas DS & WQ Ponds	0	0.0	0.0	0.0
10385	West I-40 Channel & Storm Drains	1,412	29.5	0.0	0.0
10390	Westgate Dam	2,808	6.0	0.0	0.0
	Total	110,617	1,664.2	361.0	65.0

Source: Chavez, 2019

Table 9. AMAFCA Sediment, Trash, Vegetation, and Homeless Debris Removal, Fiscal Year 2017
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Location Code	Location	Volume (cubic yards)			
		Sediment	Trash	Vegetation	Homeless Debris
10005	98th St. Pond	0	0.0	0.0	
10010	Amole Dam	0	198.7	26.0	
10015	Baca Channel	0	0.0	0.0	
10020	Bear Canyon Arroyo	0	5.2	0.0	
10025	Bear Canyon Training Dike	0	0.0	0.0	
10030	Bear Canyon Tributary	0	0.0	0.0	
10035	Black Arroyo Dam	3,790	13.0	219.0	
10040	Black Mesa Storm Drain	0	0.0	0.0	
10045	Boca Negra Dam	0	0.0	0.0	
10050	Borrega Dam and Channel	182	0.0	0.0	
10055	Cabezon Channel	144	3.1	0.0	
10060	Calabacillas Main Arroyo	24	53.7	96.0	
10065	Corrales Main	515	5.2	0.0	
10070	Camino Channel	0	0.0	0.0	
10075	Candelaria Inlet	0	0.0	0.0	18.0
10080	Cottonwood Crossings Pond	0	0.0	13.0	
10085	Don Felipe Dam	0	0.0	0.0	
10086	Domingo Baca Water Quality Structure	0	5.0	26.0	
10090	East Amole Surge Pond	0	0.0	0.0	
10095	El Camino Pond	0	0.0	0.0	
10100	Embudo Channel	0	64.7	37.0	24.0
10105	Fountain Hills Pond	0	0.0	0.0	
10110	Grandmas Pond	0	3.3	0.0	
10115	Grantline Inlet & Water Quality Pond	0	13.0	0.0	

Source: Chavez, 2019

Table 9. AMAFCA Sediment, Trash, Vegetation, and Homeless Debris Removal, Fiscal Year 2017
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Location Code	Location	Volume (cubic yards)			
		Sediment	Trash	Vegetation	Homeless Debris
10120	Hahn Channel	25	0.0	0.0	
10125	Hubbel Dam & Spillway	120	10.4	6.0	
10130	John B. Robert Dam	0	0.0	26.0	
10135	Kinney Dam	13	22.4	0.0	
10140	La Cueva System & Water Quality Features	36	5.0	0.0	
10145	La Cueva Training Dike	0	0.0	0.0	
10150	La Cueva Tributary	0	0.0	0.0	
10160	Ladera Channel @ 98th Street	228	0.0	0.0	
10165	Ladera System- Dams & Mirehaven	1,555	0.0	39.0	
10170	Ladera Training Dike	0	0.0	0.0	
10175	La Ventanas Dam & N. Branch PM Channel	0	15.6	2.0	
10180	Los Indios Diversion Channel & Sediment Basin	0	0.0	0.0	
10185	Little Window	0	0.0	0.0	
10190	Los Padillas Spillway Diversion	0	0.0	0.0	
10195	McCoy Dam	0	0.0	0.0	
10205	Malpais	0	0.0	0.0	
10210	Mariposa Diversion Channel	12	0.0	0.0	
10215	North Camino Channel & Water Quality Manholes	0	0.0	0.0	
10220	North Camino Sunset Hills	0	0.0	0.0	
10225	North Diversion Channel	3,551	1,014.9	13.0	51.0
10230	North Domingo Baca Dam & Channel	0	2.4	0.0	
10235	North Domingo Baca Trailer Park Ponds	0	3.0	13.0	
10240	North La Cueva Arroyo	0	0.0	0.0	
10245	North Pino Channel & Water Quality Features	666	10.9	26.0	

Source: Chavez, 2019

Table 9. AMAFCA Sediment, Trash, Vegetation, and Homeless Debris Removal, Fiscal Year 2017
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Location Code	Location	Volume (cubic yards)			
		Sediment	Trash	Vegetation	Homeless Debris
10250	North Pino Diversion	0	0.0	0.0	
10255	Octopus Pond & Channel	273	0.0	0.0	
10265	Piedras Marcadas Dam & Mid Branch PM Channel	174	35.9	6.0	
10270	Pino Dam	0	0.0	0.0	
10275	Ponds 187/ 187A	52	0.0	26.0	
10280	Powerline Channel	738	10.4	0.0	
10285	Raymac Dam	383	0.0	24.0	
10290	Rinconada Channel	0	0.0	0.0	
10295	Sacate Blanco Diversion Channel	0	0.0	0.0	
10300	San Antonio Arroyo & Atrisco Diversion	181	0.0	65.0	
10305	Seven Bar Channel	0	0.0	0.0	
10310	Signal Ave. Training Dike	0	0.0	0.0	
10312	Southwest Valley Projects	0	0.0	78.0	
10315	Skyview Detention Pond	0	0.0	0.0	
10320	Snow Vista Pond and Channel	0	38.5	13.0	
10325	South Diversion Channel & Water Quality Structure	4,183	59.2	0.0	
10330	South Domingo Baca Channel	0	2.4	0.0	
10335	South Domingo Baca Dam	0	0.0	0.0	
10340	South La Cueva	0	0.0	0.0	
10345	South Pino Channel & Water Quality Facility	441	172.6	39.0	
10350	Swinburne Dam	0	0.0	42.0	
10355	Tramway Channel - Drop Structure	0	0.0	0.0	
10360	Tijeras Arroyo Hidden Valley	0	66.0	12.0	
10365	UNM Water Quality Manholes	0	0.0	0.0	

Source: Chavez, 2019

Table 9. AMAFCA Sediment, Trash, Vegetation, and Homeless Debris Removal, Fiscal Year 2017
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Location Code	Location	Volume (cubic yards)			
		Sediment	Trash	Vegetation	Homeless Debris
10366	Valle De Oro Drainage	0	0.0	0.0	
10370	Vineyard Channel & Water Quality Structure	52	5.0	0.0	
10375	West Bluff, Laurelwood Ponds & WQ Structure	182	5.0	65.0	
10380	West Calabacillas DS & WQ Ponds	0	0.0	0.0	
10385	West I-40 Channel & Storm Drains	582	13.0	13.0	
10390	Westgate Dam	0	0.0	0.0	
	Total	18,102	1,857.5	925.0	93.0

Source: Chavez, 2019

Table 10. AMAFCA Sediment Removal, Fiscal Year 2016
Page 1 of 3

Location Code	Location	Sediment Volume (cubic yards)
10005	98th St. Pond	0
10010	Amole Dam	18
10015	Baca Channel	0
10020	Bear Canyon Arroyo	0
10025	Bear Canyon Training Dike	0
10030	Bear Canyon Tributary	0
10035	Black Arroyo Dam	2,628
10040	Black Mesa Storm Drain	0
10045	Boca Negra Dam	0
10050	Borrega Dam and Channel	0
10055	Cabezon Channel	286
10060	Calabacillas Main Arroyo	1,190
10065	Corrales Main	2,877
10070	Camino Channel	0
10075	Candelaria Inlet	0
10080	Cottonwood Crossings Pond	0
10085	Don Felipe Dam	4,420
10086	Domingo Baca Water Quality Structure	54
10090	East Amole Surge Pond	156
10095	El Camino Pond	0
10100	Embudo Channel	0
10105	Fountain Hills Pond	0
10110	Grandmas Pond	0
10115	Grantline Inlet & Water Quality Pond	0
10120	Hahn Channel	0
10125	Hubbel Dam & Spillway	186
10130	John B. Robert Dam	0
10135	Kinney Dam	468
10140	La Cueva System & Water Quality Features	26
10145	La Cueva Training Dike	0
10150	La Cueva Tributary	0
10160	Ladera Channel @ 98th Street	0
10165	Ladera System- Dams & Mirehaven	222
10170	Ladera Training Dike	0
10175	La Ventanas Dam & N. Branch PM Channel	0
10180	Los Indios Diversion Channel & Sediment Basin	0

Source: Chavez, 2019

Table 10. AMAFCA Sediment Removal, Fiscal Year 2016
Page 2 of 3

Location Code	Location	Sediment Volume (cubic yards)
10185	Little Window	0
10190	Los Padillas Spillway Diversion	24
10195	McCoy Dam	0
10205	Malpais	0
10210	Mariposa Diversion Channel	52
10215	North Camino Channel & Water Quality Manholes	0
10220	North Camino Sunset Hills	0
10225	North Diversion Channel	3,418
10230	North Domingo Baca Dam & Channel	104
10235	North Domingo Baca Trailer Park Ponds	26
10240	North La Cueva Arroyo	0
10245	North Pino Channel & Water Quality Features	0
10250	North Pino Diversion	0
10255	Octopus Pond & Channel	0
10265	Piedras Marcadas Dam & Mid Branch PM Channel	0
10270	Pino Dam	0
10275	Ponds 187/187A	0
10280	Powerline Channel	1,404
10285	Raymac Dam	869
10290	Rinconada Channel	0
10295	Sacate Blanco Diversion Channel	0
10300	San Antonio Arroyo & Atrisco Diversion	67
10305	Seven Bar Channel	0
10310	Signal Ave. Training Dike	0
10312	Southwest Valley Projects	0
10315	Skyview Detention Pond	0
10320	Snow Vista Pond and Channel	486
10325	South Diversion Channel & Water Quality Structure	10,331
10330	South Domingo Baca Channel	76
10335	South Domingo Baca Dam	0
10340	South La Cueva	0
10345	South Pino Channel & Water Quality Facility	0
10350	Swinburne Dam	0
10355	Tramway Channel - Drop Structure	0
10360	Tijeras Arroyo Hidden Valley	0
10365	UNM Water Quality Manholes	0

Source: Chavez, 2019

Table 10. AMAFCA Sediment Removal, Fiscal Year 2016
Page 3 of 3

Location Code	Location	Sediment Volume (cubic yards)
10366	Valle De Oro Drainage	0
10370	Vineyard Channel & Water Quality Structure	0
10375	West Bluff, Laurelwood Ponds & WQ Structure	620
10380	West Calabacillas DS & WQ Ponds	0
10385	West I-40 Channel & Storm Drains	2,116
10390	Westgate Dam	0
	Total	32,124

Source: Chavez, 2019

Table 11. SSCAFCA Sediment Removal, Fiscal Year 2017 and Calendar Year 2018

Location	Volume (cubic yards)	
	FY2017	CY2018
Lisbon Channel	NA	100
Lower Montoyas Water Quality Facility	NA	35,000
Lomitas Negras Water Quality Facility	16,025	7,050
Total	16,025	42,150

Source: Gatterman, 2019
NA = Data not available

Table 12. Bernalillo County Gross Material Removal, Fiscal Years 2016–2018

Material	Location	Fiscal Year	Volume (cubic yards)
Trash, debris, and vegetation	Catch basins, wet wells, and storm sewer lines	2016	63 (84.5 tons)
		2017	120 (55.2 tons)
		2018	759 [a] (349 tons)
Debris including sediment, vegetation, and trash	County ponds, channels, and right-of-way	2016	737
		2017	574
		2018	— [a]

Source: Bronson, 2019
[a] The fiscal year (FY) 2018 volume includes both material types (the County began using a different tracking method in FY2017).

Table 13. Bernalillo County Gross Material Removal, Fiscal Year 2018

Time Period	Weight (tons)				Volume (cubic yards)	
	Green waste	Municipal Waste	Sediment	Total	Total [a]	Total (without sediment)
July 2017–January 2018	67.7	33.9	33.9	135.5	294	221
January 2018–June 2018	106.8	53.4	53.4	213.6	464	348
	50%	25%	25%	349.1	759	569 [b]

Source: Bronson, 2019
[a] Uses conversion factor of 0.46 ton per cubic yard, from the County's average weight measurement at the landfill (FY2017 maintenance manager notes).
[b] The total volume of sediment removed in FY2018 was 190 cubic yards (total – total without sediment in FY2018).

Table 14. Bernalillo County Waste Characteristics, Fiscal Year 2018

Waste Type	Volume Removed (cubic yards)	Percent of Total [a]
Wood	244	42.9
Rock > 1-inch	219	38.5
Plastic	94	16.5
Metal	9	1.6
Paper	3	0.5
Total	569	100

Source: Bronson, 2019

[a] Waste type percentages come from the 2016 AMAFCA/BernCo gross pollutant study, and do not include sediment.

Table 15. City of Albuquerque Silt, Trash, Debris, and Vegetation Removed from Arroyos and Catch Basins, Fiscal Years 2016–2018

Fiscal Year	Total Volume [a] (cubic yards)	Sediment Volume [b] (cubic yards)
2016	3,240	1,620
2017	3,454	1,727
2018	4,382	2,191

Source: Verhage, 2019

[a] The City tracks removal data on a monthly basis, but does not subdivide the volumes removed by location.

[b] The City estimates that 50% of the total volume of material removed is sediment, 40% vegetation, and 10% trash (7.5% plastic, 2% paper, 0.5% metal). For FY2018, the estimate for the volume of sediment removed by the City from arroyos and catch basins was 2,191 cubic yards.

Table 16. City of Albuquerque Street Sweeper Sediment Removal Fiscal Years 2017 and 2018

Fiscal Year	Area	Total Miles Swept	Volume [a] (cubic yards)
2017	East Side	23,866	3,166
	West Side	23,000	3,228
	Total	46,866	6,394
2018	East Side	22,319	2,785
	West Side	20,189	3,328
	Total	42,508	6,113

Source: Verhage, 2019

[a] The City estimates that material removed via street sweeping is 75% sediment, 20% trash, and 5% vegetation (the estimate for sediment removal via street sweeping in FY2018 is 4,585 cubic yards).

Table 17. Sediment Removal, Fiscal Years 2014–2018

Entity	Sediment Removal Volume (cubic yards)					
	FY2014	FY2015	FY2016	FY2017	FY2018	Total
AMAFCA	NA	34,976	32,124	18,102	110,617	195,819
SSCAFCA [a]	NA	NA	NA	16,025	42,150	58,175
Bernalillo County [b]	NA	310	737	574	190	1,811
City of Albuquerque [c]	2,764	2,346	1,620	1,727	2,191	10,648
Total	2,764	37,632	34,481	36,428	155,148	266,453

[a] SSCAFCA 2018 volume is for calendar year 2018.

[b] FY2016 and FY2017 volumes are for sediment, vegetation, and trash.

[c] 2014 and 2015 City of Albuquerque volumes are for the calendar years.

NA = Data not available

Table 18. Estimated Middle Rio Grande Sediment Baseline Loading
Page 1 of 2

Outfall	Sample Date	Sample Time	Total Suspended Solids (mg/L)	USGS NWIS Water Discharge Values				Calculated Sediment Discharge (tons per day)			TSS Data Source
				Mean Daily Discharge (cfs)	Discharge at Sample Collection (cfs)	Annual Mean Discharge (cfs)	Annual Total Discharge Volume (cubic feet)	Suspended Sediment Discharge using Daily Mean Discharge	Suspended Sediment Discharge using Discharge at Sample Collection Time	Suspended Sediment Discharge using Annual Mean Discharge	
USGS 08329900 North Floodway Channel Near Alameda, NM	5/11/2012	17:30	1,520	82	1,710	7	2,680	340	7,000	30	USGS
	7/23/2012	18:00	1,190	34	463	—	—	110	1,500	24	
	12/14/2014	16:05	170	82	30	7	2,480	38	14	3.1	AMAFCA
	7/06/2015	16:30	110	146	77	11	3,980	43	23	3.2	
	8/15/2017	9:10	4	11	7	—	—	0.1	0.1	—	
	7/27/2018	9:47	46	256	17	—	—	32	2.1	—	
USGS 083299377 San Antonio Arroyo at Rio Grande Confluence	4/03/2012	11:00	16	—	—	—	—	—	—	—	USGS
	7/05/2012	18:50	41	—	—	—	—	—	—	—	
	8/22/2014	11:00	16	—	—	—	—	—	—	—	AMAFCA
	12/13/2014	16:23	39	—	—	—	—	—	—	—	
	6/10/2015	15:36	54	—	—	—	—	—	—	—	
	7/29/2016	17:26	130	—	21	—	—	—	7.4	—	
	8/04/2016	19:03	74	—	3	—	—	—	0.6	—	
	8/04/2017	17:25	6	—	23	—	—	—	0.4	—	
USGS 08330200 San Jose Drain at Woodward Rd	9/12/2012	18:30	218	3	11	—	—	5	5.1	—	USGS
	7/05/2013	16:45	650	1	3	0	—	0.3	0	0.4	
	7/16/2014	19:00	160	3	31	0	89	1.4	13	0.1	AMAFCA
	12/04/2014	16:30	96	2	—	—	—	0.6	—	0.1	
	7/06/2015	19:09	110	18	6	0	87	5.4	1.7	0.1	
	8/04/2016	22:45	160	2	18	0	80	0.9	7.7	0.1	
	7/31/2017	16:26	11	1	11	0	47	0	0.3	0	
	7/31/2018	16:26	100	0	0	0	59	0	0	0	
USGS 08330775 South Diversion Channel Above Tijeras Arroyo	4/03/2012	9:16	260	14	—	0	130	10	—	0.3	USGS
	7/23/2012	17:20	6,980	10	238	—	—	190	4,500	6.7	
	8/16/2012	22:00	122	4	21	—	—	1.2	6.9	0.1	
	7/08/2013	21:55	8,740	13	190	1	350	320	4,500	23	
	7/26/2013	4:36	108	94	23	—	—	28	6.6	0.3	
	7/06/2015	19:00	560	96	86	1	307	140	130	1.3	AMAFCA
	8/04/2016	22:45	60	5	58	0	152	0.8	9.4	0.1	
	8/29/2017	19:46	120	11	92	1	230	3.7	30	0.2	
	7/26/2018	0:11	1,100	42	129	—	—	120	380	—	

mg/L = Milligrams per liter
USGS NWIS = U.S. Geological Survey National Water Information System
AMAFCA = Albuquerque Metropolitan Arroyo Flood Control Authority
— = Data not available

Table 18. Estimated Middle Rio Grande Sediment Baseline Loading
Page 2 of 2

Outfall	Sample Date	Sample Time	Total Suspended Solids (mg/L)	USGS NWIS Water Discharge Values				Calculated Sediment Discharge (tons per day)			TSS Data Source
				Mean Daily Discharge (cfs)	Discharge at Sample Collection (cfs)	Annual Mean Discharge (cfs)	Annual Total Discharge Volume (cubic feet)	Suspended Sediment Discharge using Daily Mean Discharge	Suspended Sediment Discharge using Discharge at Sample Collection Time	Suspended Sediment Discharge using Annual Mean Discharge	
USGS 08330600 Tijeras Arroyo	4/03/2012	9:01	5,770	6	9	0	98	88	140	4.2	USGS
	7/03/2013	3:52	10,010	40	298	1	462	1,080	8,100	34	
	7/09/2013	21:15	6,490	4	—	—	—	76	—	22	
	7/26/2013	3:41	448	32	19	—	—	39	23	1.5	
	7/07/2015	13:33	3,600	—	—	—	—	—	—	—	AMAFCA
	9/06/2018	21:17	61,000	0	23	—	—	23	3,800	—	

mg/L = Milligrams per liter
USGS NWIS = U.S. Geological Survey National Water Information System
AMAFCA = Albuquerque Metropolitan Arroyo Flood Control Authority
— = Data not available

Table 19. Best Management Practices and Water Quality Structures Installed During Permit Period
Page 1 of 3

Project Name	Water Quality Facility	Receiving Facility	Project Location	Maintained by
Fiscal Year 2016				
ABQ Health Partners	Water quality pond	South Diversion Channel	I-25/Sunport	Private
Adobe Acres Stormwater Facility	Inlet retrofit	Rio Grande	Isleta Blvd/Camino Del Valle	Bernalillo County
Vista del Rio Road Improvements	Water quality pond	Atrisco Drain	Isleta Blvd/Perry Rd	Bernalillo County
Mountain View Elementary School	Water quality pond	South Diversion Channel	2nd St/Prosperity	APS
Green Jeans Development Water	Harvesting ponds, tanks, bioswales	Embudo Arroyo	I-40/Carlisle	Private
Juan Tabo Hills Estates Subdivision	Water quality manholes and pond	Tijeras Arroyo	South Juan Tabo	Private/COA
Presbyterian Health Clinic	Water quality ponds	Fountain Hills Pond	Paseo del Norte/Eagle Ranch	Private
Westside Baseball Complex	Water quality ponds	Ladera Dam 5S	Arroyo Vista Blvd	COA
Hawk's Landing Subdivision	Water quality manholes	South Domingo Baca Dam	Paseo del Norte/ Tramway Blvd	Private
Unser Blvd Improvements Project	Water quality inlet	San Antonio Diversion Channel	Unser/Dellyne	COA
North Domingo Baca Park, Phase 9	Small ponding area	Kinney Dam	Louisiana/Carmel	COA
The Foothills Development	Water quality manholes	Pino Dam	Tramway/San Antonio	—
Stone Systems	Water quality pond	South Diversion Channel	Los Picaros Rd/Bobby Foster Rd	Private
Piedras Marcadas Dam Outfall Water Quality Improvement project	Water quality pond	Corrales Main Canal	Coors Blvd/Eagle Ranch Rd	—
Pond 187 Pond Outfall project	Water quality pond	Isleta Drain	La Fonda Road	AMAFCA
Pond 187A/Conveyance project	Water quality pond	Isleta Drain	Don Andres Rd/Rio Grande High School	AMAFCA/County
Ladera Dam 8 Ported Outlet Structure	Water quality pond	San Antonio Diversion Channel	Ladera Dr /Ouray Rd	AMAFCA/COA

See last page of table for notes and definitions.

Table 19. Best Management Practices and Water Quality Structures Installed During Permit Period
Page 2 of 3

Project Name	Water Quality Facility	Receiving Facility	Project Location	Maintained by
Fiscal Year 2017				
Independence Square	Pond	South Pino Arroyo	Jefferson/Osuna	Private
Balloon Fiesta Parking Area	Ponds/parking lot treatment	North Diversion Channel	North Edith	AIBF (onsite)/County
I-25/Rio Bravo Improvements	Ponds/inlets	South Diversion Channel	Rio Bravo	NMDOT
Stormcloud Unit 4	Water quality pond	Mirehaven Arroyo	Tierra Pintada	Private
State Employees CU Pond North Diversion Channel Montgomery/Carlisle Private	Water quality pond	North Diversion Channel	Montgomery/Carlisle	Private
NM Mutual Office	Parking lot ponds/riprap rundown	North Camino Channel	Balloon Fiesta Drive	Private
APS Northwest Complex Ph. 1	Pond	Ladera Dam 5S	Arroyo Vista Drive	APS
2nd Street FLAP Project	Pond/landscaped areas	2nd Street Channel	South 2nd Street	County
Tijeras Arroyo Sediment Removal System	Basins	Tijeras Arroyo	Interstate 25/Bobby Foster Rd	AMAFCA
Hawk's Landing	Proposed water quality manholes	South Domingo Baca Arroyo	Tramway/Paseo del Norte	Private
Independence Square - DRB 1005517	Proposed BMPs	South Pino Arroyo	Jefferson - Between Osuna and Ellison	Private
Superior Express Car Wash - EPC 1000936	Proposed bioswales	Black Arroyo	Unser/Crown	Private
Global Storage Coors - EPC 1003993	Proposed permeable pavement	CoA Storm Drain - Sequoia Outfall	Coors/Sequoia Rd	Private
Fiscal Year 2018				
Ladera Dam 6 Ported Outlet	Ported dam outlet	San Antonio Diversion Channel	Ladera Dr/Ouray Rd	AMAFCA
Swinburne Dam	Water quality structures	Calabacillas Arroyo	Unser/Crown	AMAFCA
Domingo Baca Improvements	Water quality structures	Domingo Baca	Jeffferson/Paseo del Norte	AMAFCA
Kirtland Drainage Project	Water quality pond	South Diversion Channel	Gibson Ave	AMAFCA

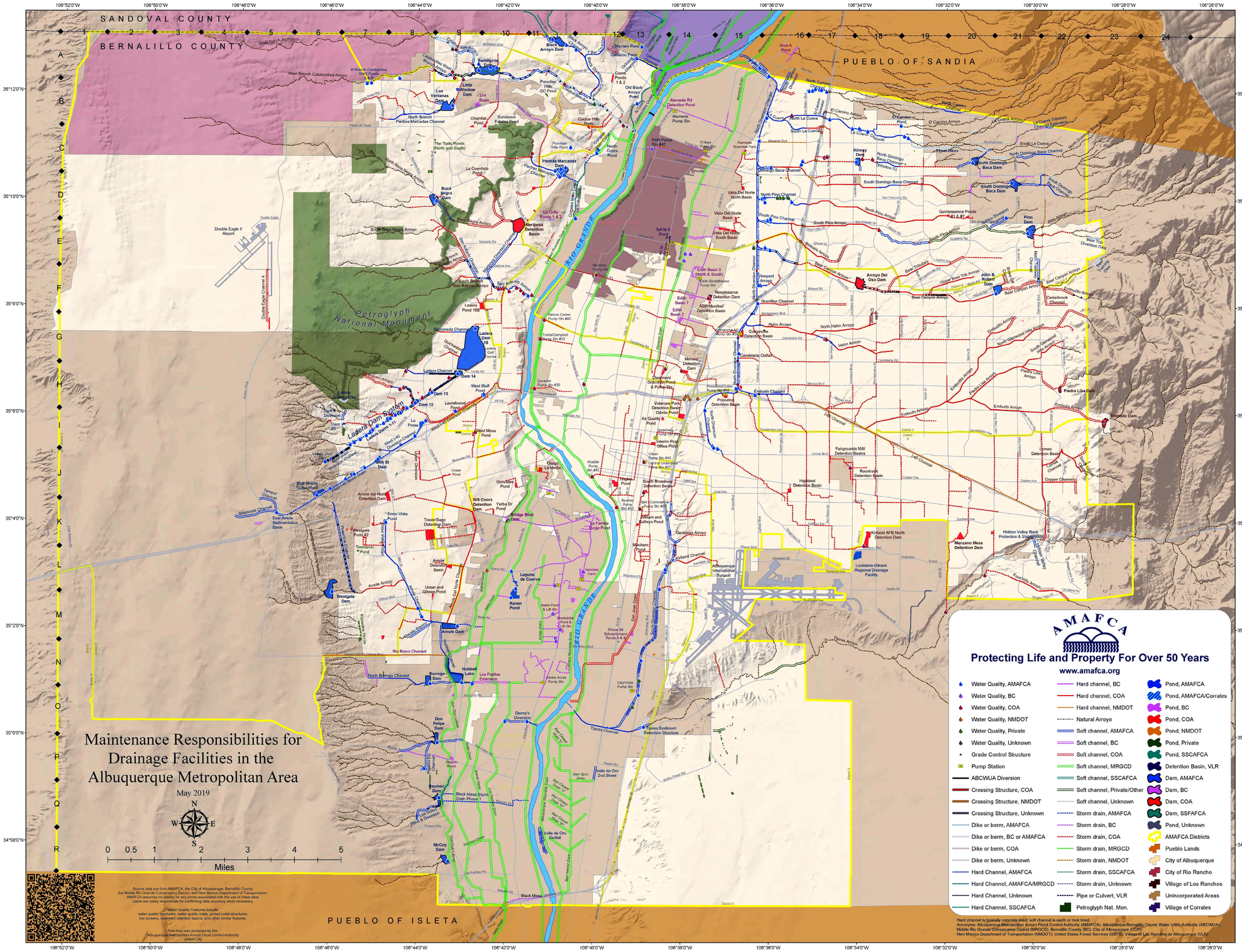
See last page of table for notes and definitions.

Table 19. Best Management Practices and Water Quality Structures Installed During Permit Period
Page 3 of 3

Project Name	Water Quality Facility	Receiving Facility	Project Location	Maintained by
Fiscal Year 2018 (cont.)				
2nd Street Improvement Project	Water quality ponds, GI/LID	Barr Main Channel	2nd Street/Desert Rd	AMAFCA/County
Alameda Drain Trail	GI/LID	Rio Grande	I-40/2nd Street	County
Fiscal Year 2019				
Las Ventanas Water Quality Facility	Debris fences	Calabacillas Arroyo	Paradise Blvd/Universe Blvd	AMAFCA
Lower Bear Tributary Water Quality Facility	BMP structures	Bear Arroyo	Wyoming/Osuna	AMAFCA
Tijeras Arroyo Sediment Removal System Phase II	Basins	Tijeras Arroyo	I-25/Bobby Foster Rd	AMAFCA

Sources: AMAFCA, 2015, 2016, 2017, and 2019; Bernalillo, 2019
AMAFCA = Albuquerque Metropolitan Arroyo Flood Control Authority
County = Bernalillo County
COA = City of Albuquerque
BMP = Best management practice
GI/LID = Green infrastructure and low impact development

Plate



Source: Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA)

BERNALILLO COUNTY STORMWATER
SEDIMENT POLLUTANT LOAD REDUCTION
PROGRESS EVALUATION REPORT

Plate 1. AMAFCA Maintenance Map

Daniel B. Stephens & Associates, Inc.
6/6/2019 JN DB19.1073

S:\Projects\DB19.1073_BernCo_SPR\BS\GIS\MXDs\Sediment_Removal_2019\AMAFCA_Figure.mxd

Appendix A

Laboratory Report for Spring 2019 Sediment Sampling

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

May 14, 2019

Chad Johannesen
Daniel B. Stephens & Assoc.
6020 Academy NE Suite 100
Albuquerque, NM 87109
TEL: (505) 822-9400
FAX: (505) 822-8877

RE: Bern Co Sed Load OrderNo.: 1904057

Dear Chad Johannesen:

Hall Environmental Analysis Laboratory received 21 sample(s) on 4/1/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order **1904057**
Date Reported: **5/14/2019**

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: RG-AngDam-20190328
Project: Bern Co Sed Load
Collection Date: 3/28/2019 10:40:00 AM
Lab ID: 1904057-001
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	5.0	0.20		mg/L	5	5/1/2019 9:34:10 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 11:59:27 AM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 11:59:27 AM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 11:59:27 AM	44155
Nickel	ND	0.010		mg/L	1	4/6/2019 11:59:27 AM	44155
Zinc	0.037	0.020		mg/L	1	5/1/2019 8:48:57 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.026		mg/Kg	1	4/15/2019 10:57:42 PM	44045
Aroclor 1221	ND	0.026		mg/Kg	1	4/15/2019 10:57:42 PM	44045
Aroclor 1232	ND	0.026		mg/Kg	1	4/15/2019 10:57:42 PM	44045
Aroclor 1242	ND	0.026		mg/Kg	1	4/15/2019 10:57:42 PM	44045
Aroclor 1248	ND	0.026		mg/Kg	1	4/15/2019 10:57:42 PM	44045
Aroclor 1254	ND	0.026		mg/Kg	1	4/15/2019 10:57:42 PM	44045
Aroclor 1260	ND	0.026		mg/Kg	1	4/15/2019 10:57:42 PM	44045
Surr: Decachlorobiphenyl	75.2	31.9-130		%Rec	1	4/15/2019 10:57:42 PM	44045
Surr: Tetrachloro-m-xylene	81.6	21.2-142		%Rec	1	4/15/2019 10:57:42 PM	44045

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: Venada Out-20190328
Project: Bern Co Sed Load
Collection Date: 3/28/2019 11:55:00 AM
Lab ID: 1904057-002
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	6.2	0.20		mg/L	5	5/1/2019 9:38:40 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:04:06 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:04:06 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:04:06 PM	44155
Nickel	ND	0.010		mg/L	1	4/6/2019 12:04:06 PM	44155
Zinc	0.021	0.020		mg/L	1	5/1/2019 8:53:08 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.022		mg/Kg	1	4/15/2019 11:30:41 PM	44045
Aroclor 1221	ND	0.022		mg/Kg	1	4/15/2019 11:30:41 PM	44045
Aroclor 1232	ND	0.022		mg/Kg	1	4/15/2019 11:30:41 PM	44045
Aroclor 1242	ND	0.022		mg/Kg	1	4/15/2019 11:30:41 PM	44045
Aroclor 1248	ND	0.022		mg/Kg	1	4/15/2019 11:30:41 PM	44045
Aroclor 1254	ND	0.022		mg/Kg	1	4/15/2019 11:30:41 PM	44045
Aroclor 1260	ND	0.022		mg/Kg	1	4/15/2019 11:30:41 PM	44045
Surr: Decachlorobiphenyl	78.8	31.9-130		%Rec	1	4/15/2019 11:30:41 PM	44045
Surr: Tetrachloro-m-xylene	89.2	21.2-142		%Rec	1	4/15/2019 11:30:41 PM	44045

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: Montoyas Sed-20190328
Project: Bern Co Sed Load
Collection Date: 3/28/2019 1:30:00 PM
Lab ID: 1904057-003
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	5.7	0.20		mg/L	5	5/1/2019 9:40:09 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:05:33 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:05:33 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:05:33 PM	44155
Nickel	ND	0.010		mg/L	1	4/6/2019 12:05:33 PM	44155
Zinc	0.055	0.020		mg/L	1	5/1/2019 8:54:37 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.024		mg/Kg	1	4/16/2019 12:03:43 AM	44045
Aroclor 1221	ND	0.024		mg/Kg	1	4/16/2019 12:03:43 AM	44045
Aroclor 1232	ND	0.024		mg/Kg	1	4/16/2019 12:03:43 AM	44045
Aroclor 1242	ND	0.024		mg/Kg	1	4/16/2019 12:03:43 AM	44045
Aroclor 1248	ND	0.024		mg/Kg	1	4/16/2019 12:03:43 AM	44045
Aroclor 1254	ND	0.024		mg/Kg	1	4/16/2019 12:03:43 AM	44045
Aroclor 1260	ND	0.024		mg/Kg	1	4/16/2019 12:03:43 AM	44045
Surr: Decachlorobiphenyl	71.2	31.9-130		%Rec	1	4/16/2019 12:03:43 AM	44045
Surr: Tetrachloro-m-xylene	79.2	21.2-142		%Rec	1	4/16/2019 12:03:43 AM	44045

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: Montoyas Out-20190328
Project: Bern Co Sed Load
Collection Date: 3/28/2019 2:10:00 PM
Lab ID: 1904057-004
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	12	0.20		mg/L	5	5/1/2019 9:45:58 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:07:03 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:07:03 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:07:03 PM	44155
Nickel	ND	0.010		mg/L	1	4/6/2019 12:07:03 PM	44155
Zinc	0.034	0.020		mg/L	1	5/1/2019 8:56:05 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.023		mg/Kg	1	4/16/2019 12:36:44 AM	44045
Aroclor 1221	ND	0.023		mg/Kg	1	4/16/2019 12:36:44 AM	44045
Aroclor 1232	ND	0.023		mg/Kg	1	4/16/2019 12:36:44 AM	44045
Aroclor 1242	ND	0.023		mg/Kg	1	4/16/2019 12:36:44 AM	44045
Aroclor 1248	ND	0.023		mg/Kg	1	4/16/2019 12:36:44 AM	44045
Aroclor 1254	ND	0.023		mg/Kg	1	4/16/2019 12:36:44 AM	44045
Aroclor 1260	ND	0.023		mg/Kg	1	4/16/2019 12:36:44 AM	44045
Surr: Decachlorobiphenyl	76.0	31.9-130		%Rec	1	4/16/2019 12:36:44 AM	44045
Surr: Tetrachloro-m-xylene	84.4	21.2-142		%Rec	1	4/16/2019 12:36:44 AM	44045

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: Calabacitas Out-20190328
Project: Bern Co Sed Load
Collection Date: 3/28/2019 3:50:00 PM
Lab ID: 1904057-005
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	4.8	0.040		mg/L	1	5/1/2019 8:57:34 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:08:32 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:08:32 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:08:32 PM	44155
Nickel	ND	0.010		mg/L	1	4/6/2019 12:08:32 PM	44155
Zinc	0.023	0.020		mg/L	1	5/1/2019 8:57:34 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.022		mg/Kg	1	4/16/2019 1:09:45 AM	44045
Aroclor 1221	ND	0.022		mg/Kg	1	4/16/2019 1:09:45 AM	44045
Aroclor 1232	ND	0.022		mg/Kg	1	4/16/2019 1:09:45 AM	44045
Aroclor 1242	ND	0.022		mg/Kg	1	4/16/2019 1:09:45 AM	44045
Aroclor 1248	ND	0.022		mg/Kg	1	4/16/2019 1:09:45 AM	44045
Aroclor 1254	ND	0.022		mg/Kg	1	4/16/2019 1:09:45 AM	44045
Aroclor 1260	ND	0.022		mg/Kg	1	4/16/2019 1:09:45 AM	44045
Surr: Decachlorobiphenyl	65.6	31.9-130		%Rec	1	4/16/2019 1:09:45 AM	44045
Surr: Tetrachloro-m-xylene	73.6	21.2-142		%Rec	1	4/16/2019 1:09:45 AM	44045

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: Calabacitas Sed-20190328
Project: Bern Co Sed Load
Collection Date: 3/28/2019 4:15:00 PM
Lab ID: 1904057-006
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	2.8	0.040		mg/L	1	5/1/2019 8:59:03 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:10:01 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:10:01 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:10:01 PM	44155
Nickel	ND	0.010		mg/L	1	4/6/2019 12:10:01 PM	44155
Zinc	0.030	0.020		mg/L	1	5/1/2019 8:59:03 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.022		mg/Kg	1	4/16/2019 1:42:44 AM	44045
Aroclor 1221	ND	0.022		mg/Kg	1	4/16/2019 1:42:44 AM	44045
Aroclor 1232	ND	0.022		mg/Kg	1	4/16/2019 1:42:44 AM	44045
Aroclor 1242	ND	0.022		mg/Kg	1	4/16/2019 1:42:44 AM	44045
Aroclor 1248	ND	0.022		mg/Kg	1	4/16/2019 1:42:44 AM	44045
Aroclor 1254	ND	0.022		mg/Kg	1	4/16/2019 1:42:44 AM	44045
Aroclor 1260	ND	0.022		mg/Kg	1	4/16/2019 1:42:44 AM	44045
Surr: Decachlorobiphenyl	58.0	31.9-130		%Rec	1	4/16/2019 1:42:44 AM	44045
Surr: Tetrachloro-m-xylene	61.6	21.2-142		%Rec	1	4/16/2019 1:42:44 AM	44045

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: San Antonio Sed-20190328
Project: Bern Co Sed Load
Collection Date: 3/28/2019 4:50:00 PM
Lab ID: 1904057-007
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	6.9	0.20		mg/L	5	5/1/2019 9:47:29 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:11:30 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:11:30 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:11:30 PM	44155
Nickel	ND	0.010		mg/L	1	4/6/2019 12:11:30 PM	44155
Zinc	0.045	0.020		mg/L	1	5/1/2019 9:00:32 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.13		mg/Kg	1	4/16/2019 2:15:47 AM	44045
Aroclor 1221	ND	0.13		mg/Kg	1	4/16/2019 2:15:47 AM	44045
Aroclor 1232	ND	0.13		mg/Kg	1	4/16/2019 2:15:47 AM	44045
Aroclor 1242	ND	0.13		mg/Kg	1	4/16/2019 2:15:47 AM	44045
Aroclor 1248	ND	0.13		mg/Kg	1	4/16/2019 2:15:47 AM	44045
Aroclor 1254	ND	0.13		mg/Kg	1	4/16/2019 2:15:47 AM	44045
Aroclor 1260	ND	0.13		mg/Kg	1	4/16/2019 2:15:47 AM	44045
Surr: Decachlorobiphenyl	118	31.9-130		%Rec	1	4/16/2019 2:15:47 AM	44045
Surr: Tetrachloro-m-xylene	134	21.2-142		%Rec	1	4/16/2019 2:15:47 AM	44045

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: San Antonio Out-20190328
Project: Bern Co Sed Load
Collection Date: 3/28/2019 5:05:00 PM
Lab ID: 1904057-008
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	6.1	0.20		mg/L	5	5/1/2019 9:48:58 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:12:59 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:12:59 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:12:59 PM	44155
Nickel	ND	0.010		mg/L	1	4/6/2019 12:12:59 PM	44155
Zinc	0.047	0.020		mg/L	1	5/1/2019 9:02:01 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.041		mg/Kg	1	4/16/2019 2:48:46 AM	44045
Aroclor 1221	ND	0.041		mg/Kg	1	4/16/2019 2:48:46 AM	44045
Aroclor 1232	ND	0.041		mg/Kg	1	4/16/2019 2:48:46 AM	44045
Aroclor 1242	ND	0.041		mg/Kg	1	4/16/2019 2:48:46 AM	44045
Aroclor 1248	ND	0.041		mg/Kg	1	4/16/2019 2:48:46 AM	44045
Aroclor 1254	ND	0.041		mg/Kg	1	4/16/2019 2:48:46 AM	44045
Aroclor 1260	ND	0.041		mg/Kg	1	4/16/2019 2:48:46 AM	44045
Surr: Decachlorobiphenyl	110	31.9-130		%Rec	1	4/16/2019 2:48:46 AM	44045
Surr: Tetrachloro-m-xylene	125	21.2-142		%Rec	1	4/16/2019 2:48:46 AM	44045

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** NDC Sed-20190329
Project: Bern Co Sed Load **Collection Date:** 3/29/2019 9:00:00 AM
Lab ID: 1904057-009 **Matrix:** SEDIMENT **Received Date:** 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	33	0.40		mg/L	10	5/1/2019 9:50:27 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:18:56 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:18:56 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:18:56 PM	44155
Nickel	0.018	0.010		mg/L	1	5/1/2019 9:07:53 AM	44155
Zinc	0.31	0.020		mg/L	1	5/1/2019 9:07:53 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.11		mg/Kg	1	4/16/2019 3:54:43 AM	44045
Aroclor 1221	ND	0.11		mg/Kg	1	4/16/2019 3:54:43 AM	44045
Aroclor 1232	ND	0.11		mg/Kg	1	4/16/2019 3:54:43 AM	44045
Aroclor 1242	ND	0.11		mg/Kg	1	4/16/2019 3:54:43 AM	44045
Aroclor 1248	ND	0.11		mg/Kg	1	4/16/2019 3:54:43 AM	44045
Aroclor 1254	ND	0.11		mg/Kg	1	4/16/2019 3:54:43 AM	44045
Aroclor 1260	0.13	0.11		mg/Kg	1	4/16/2019 3:54:43 AM	44045
Surr: Decachlorobiphenyl	138	31.9-130	S	%Rec	1	4/16/2019 3:54:43 AM	44045
Surr: Tetrachloro-m-xylene	152	21.2-142	S	%Rec	1	4/16/2019 3:54:43 AM	44045

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: NDC Out-20190329
Project: Bern Co Sed Load
Collection Date: 3/29/2019 9:30:00 AM
Lab ID: 1904057-010
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	7.4	0.20		mg/L	5	5/1/2019 9:51:56 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:20:27 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:20:27 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:20:27 PM	44155
Nickel	ND	0.010		mg/L	1	5/1/2019 9:09:24 AM	44155
Zinc	0.038	0.020		mg/L	1	5/1/2019 9:09:24 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.052		mg/Kg	1	4/16/2019 4:27:42 AM	44045
Aroclor 1221	ND	0.052		mg/Kg	1	4/16/2019 4:27:42 AM	44045
Aroclor 1232	ND	0.052		mg/Kg	1	4/16/2019 4:27:42 AM	44045
Aroclor 1242	ND	0.052		mg/Kg	1	4/16/2019 4:27:42 AM	44045
Aroclor 1248	ND	0.052		mg/Kg	1	4/16/2019 4:27:42 AM	44045
Aroclor 1254	ND	0.052		mg/Kg	1	4/16/2019 4:27:42 AM	44045
Aroclor 1260	ND	0.052		mg/Kg	1	4/16/2019 4:27:42 AM	44045
Surr: Decachlorobiphenyl	110	31.9-130		%Rec	1	4/16/2019 4:27:42 AM	44045
Surr: Tetrachloro-m-xylene	126	21.2-142		%Rec	1	4/16/2019 4:27:42 AM	44045

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: West I40DC-20190329
Project: Bern Co Sed Load
Collection Date: 3/29/2019 10:45:00 AM
Lab ID: 1904057-011
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	160	2.0		mg/L	50	5/1/2019 9:53:25 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:21:56 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:21:56 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:21:56 PM	44155
Nickel	0.074	0.010		mg/L	1	5/1/2019 9:10:53 AM	44155
Zinc	0.56	0.020		mg/L	1	5/1/2019 9:10:53 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.13		mg/Kg	1	4/16/2019 5:00:39 AM	44045
Aroclor 1221	ND	0.13		mg/Kg	1	4/16/2019 5:00:39 AM	44045
Aroclor 1232	ND	0.13		mg/Kg	1	4/16/2019 5:00:39 AM	44045
Aroclor 1242	ND	0.13		mg/Kg	1	4/16/2019 5:00:39 AM	44045
Aroclor 1248	ND	0.13		mg/Kg	1	4/16/2019 5:00:39 AM	44045
Aroclor 1254	ND	0.13		mg/Kg	1	4/16/2019 5:00:39 AM	44045
Aroclor 1260	ND	0.13		mg/Kg	1	4/16/2019 5:00:39 AM	44045
Surr: Decachlorobiphenyl	120	31.9-130		%Rec	1	4/16/2019 5:00:39 AM	44045
Surr: Tetrachloro-m-xylene	134	21.2-142		%Rec	1	4/16/2019 5:00:39 AM	44045

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Project: Bern Co Sed Load
Lab ID: 1904057-012 **Matrix:** SEDIMENT

Client Sample ID: West I40DC Out-20190329
Collection Date: 3/29/2019 11:40:00 AM
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	9.2	0.20		mg/L	5	5/1/2019 9:54:54 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:23:25 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:23:25 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:23:25 PM	44155
Nickel	ND	0.010		mg/L	1	5/1/2019 9:12:30 AM	44155
Zinc	0.028	0.020		mg/L	1	5/1/2019 9:12:30 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.033		mg/Kg	1	4/16/2019 7:45:36 AM	44129
Aroclor 1221	ND	0.033		mg/Kg	1	4/16/2019 7:45:36 AM	44129
Aroclor 1232	ND	0.033		mg/Kg	1	4/16/2019 7:45:36 AM	44129
Aroclor 1242	ND	0.033		mg/Kg	1	4/16/2019 7:45:36 AM	44129
Aroclor 1248	ND	0.033		mg/Kg	1	4/16/2019 7:45:36 AM	44129
Aroclor 1254	ND	0.033		mg/Kg	1	4/16/2019 7:45:36 AM	44129
Aroclor 1260	ND	0.033		mg/Kg	1	4/16/2019 7:45:36 AM	44129
Surr: Decachlorobiphenyl	59.2	31.9-130		%Rec	1	4/16/2019 7:45:36 AM	44129
Surr: Tetrachloro-m-xylene	64.8	21.2-142		%Rec	1	4/16/2019 7:45:36 AM	44129

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: Sanchez Farm In-20190329
Project: Bern Co Sed Load
Collection Date: 3/29/2019 1:15:00 PM
Lab ID: 1904057-013
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	14	0.20		mg/L	5	5/1/2019 9:56:23 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:24:54 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:24:54 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:24:54 PM	44155
Nickel	0.010	0.010		mg/L	1	5/1/2019 9:13:59 AM	44155
Zinc	0.21	0.020		mg/L	1	5/1/2019 9:13:59 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.047		mg/Kg	1	4/16/2019 11:05:19 AM	44129
Aroclor 1221	ND	0.047		mg/Kg	1	4/16/2019 11:05:19 AM	44129
Aroclor 1232	ND	0.047		mg/Kg	1	4/16/2019 11:05:19 AM	44129
Aroclor 1242	ND	0.047		mg/Kg	1	4/16/2019 11:05:19 AM	44129
Aroclor 1248	ND	0.047		mg/Kg	1	4/16/2019 11:05:19 AM	44129
Aroclor 1254	ND	0.047		mg/Kg	1	4/16/2019 11:05:19 AM	44129
Aroclor 1260	ND	0.047		mg/Kg	1	4/16/2019 11:05:19 AM	44129
Surr: Decachlorobiphenyl	79.2	31.9-130		%Rec	1	4/16/2019 11:05:19 AM	44129
Surr: Tetrachloro-m-xylene	83.2	21.2-142		%Rec	1	4/16/2019 11:05:19 AM	44129

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: Sanchez Farm In2-20190329
Project: Bern Co Sed Load
Collection Date: 3/29/2019 1:40:00 PM
Lab ID: 1904057-014
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	12	0.20		mg/L	5	5/1/2019 9:57:53 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:26:22 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:26:22 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:26:22 PM	44155
Nickel	ND	0.010		mg/L	1	5/1/2019 9:15:28 AM	44155
Zinc	0.084	0.020		mg/L	1	5/1/2019 9:15:28 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.022		mg/Kg	1	4/16/2019 11:38:20 AM	44129
Aroclor 1221	ND	0.022		mg/Kg	1	4/16/2019 11:38:20 AM	44129
Aroclor 1232	ND	0.022		mg/Kg	1	4/16/2019 11:38:20 AM	44129
Aroclor 1242	ND	0.022		mg/Kg	1	4/16/2019 11:38:20 AM	44129
Aroclor 1248	ND	0.022		mg/Kg	1	4/16/2019 11:38:20 AM	44129
Aroclor 1254	ND	0.022		mg/Kg	1	4/16/2019 11:38:20 AM	44129
Aroclor 1260	ND	0.022		mg/Kg	1	4/16/2019 11:38:20 AM	44129
Surr: Decachlorobiphenyl	60.0	31.9-130		%Rec	1	4/16/2019 11:38:20 AM	44129
Surr: Tetrachloro-m-xylene	63.2	21.2-142		%Rec	1	4/16/2019 11:38:20 AM	44129

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: Sanchez Farm Out-20190329
Project: Bern Co Sed Load
Collection Date: 3/29/2019 2:30:00 PM
Lab ID: 1904057-015
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	7.3	0.20		mg/L	5	5/1/2019 9:59:22 AM	44155
Cadmium	ND	1.0		mg/L	1	4/6/2019 12:27:51 PM	44155
Chromium	ND	5.0		mg/L	1	4/6/2019 12:27:51 PM	44155
Lead	ND	5.0		mg/L	1	4/6/2019 12:27:51 PM	44155
Nickel	ND	0.010		mg/L	1	5/1/2019 9:16:57 AM	44155
Zinc	0.15	0.020		mg/L	1	5/1/2019 9:16:57 AM	44155
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.025		mg/Kg	1	4/16/2019 12:11:22 PM	44129
Aroclor 1221	ND	0.025		mg/Kg	1	4/16/2019 12:11:22 PM	44129
Aroclor 1232	ND	0.025		mg/Kg	1	4/16/2019 12:11:22 PM	44129
Aroclor 1242	ND	0.025		mg/Kg	1	4/16/2019 12:11:22 PM	44129
Aroclor 1248	ND	0.025		mg/Kg	1	4/16/2019 12:11:22 PM	44129
Aroclor 1254	ND	0.025		mg/Kg	1	4/16/2019 12:11:22 PM	44129
Aroclor 1260	ND	0.025		mg/Kg	1	4/16/2019 12:11:22 PM	44129
Surr: Decachlorobiphenyl	67.2	31.9-130		%Rec	1	4/16/2019 12:11:22 PM	44129
Surr: Tetrachloro-m-xylene	75.2	21.2-142		%Rec	1	4/16/2019 12:11:22 PM	44129

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Project: Bern Co Sed Load
Lab ID: 1904057-016 **Matrix:** SEDIMENT

Client Sample ID: Baffle Up2-20190329
Collection Date: 3/29/2019 3:40:00 PM
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	3.4	0.040		mg/L	1	5/1/2019 9:18:26 AM	44237
Cadmium	ND	1.0		mg/L	1	5/1/2019 9:18:26 AM	44237
Chromium	ND	5.0		mg/L	1	5/1/2019 9:18:26 AM	44237
Lead	ND	5.0		mg/L	1	4/10/2019 1:10:34 PM	44237
Nickel	ND	0.010		mg/L	1	5/1/2019 9:18:26 AM	44237
Zinc	0.051	0.020		mg/L	1	5/1/2019 9:18:26 AM	44237
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.22		mg/Kg	1	4/16/2019 12:44:24 PM	44129
Aroclor 1221	ND	0.22		mg/Kg	1	4/16/2019 12:44:24 PM	44129
Aroclor 1232	ND	0.22		mg/Kg	1	4/16/2019 12:44:24 PM	44129
Aroclor 1242	ND	0.22		mg/Kg	1	4/16/2019 12:44:24 PM	44129
Aroclor 1248	ND	0.22		mg/Kg	1	4/16/2019 12:44:24 PM	44129
Aroclor 1254	ND	0.22		mg/Kg	1	4/16/2019 12:44:24 PM	44129
Aroclor 1260	ND	0.22		mg/Kg	1	4/16/2019 12:44:24 PM	44129
Surr: Decachlorobiphenyl	0	31.9-130	S	%Rec	1	4/16/2019 12:44:24 PM	44129
Surr: Tetrachloro-m-xylene	0	21.2-142	S	%Rec	1	4/16/2019 12:44:24 PM	44129

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: Tijeras Sed-20190329
Project: Bern Co Sed Load
Collection Date: 3/29/2019 4:15:00 PM
Lab ID: 1904057-017
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	8.2	0.20		mg/L	5	5/1/2019 10:05:12 AM	44237
Cadmium	ND	1.0		mg/L	1	5/1/2019 9:26:43 AM	44237
Chromium	ND	5.0		mg/L	1	5/1/2019 9:26:43 AM	44237
Lead	ND	5.0		mg/L	1	4/10/2019 1:19:31 PM	44237
Nickel	ND	0.010		mg/L	1	5/1/2019 9:26:43 AM	44237
Zinc	0.034	0.020		mg/L	1	5/1/2019 9:26:43 AM	44237
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.024		mg/Kg	1	4/16/2019 1:17:27 PM	44129
Aroclor 1221	ND	0.024		mg/Kg	1	4/16/2019 1:17:27 PM	44129
Aroclor 1232	ND	0.024		mg/Kg	1	4/16/2019 1:17:27 PM	44129
Aroclor 1242	ND	0.024		mg/Kg	1	4/16/2019 1:17:27 PM	44129
Aroclor 1248	ND	0.024		mg/Kg	1	4/16/2019 1:17:27 PM	44129
Aroclor 1254	ND	0.024		mg/Kg	1	4/16/2019 1:17:27 PM	44129
Aroclor 1260	ND	0.024		mg/Kg	1	4/16/2019 1:17:27 PM	44129
Surr: Decachlorobiphenyl	40.8	31.9-130		%Rec	1	4/16/2019 1:17:27 PM	44129
Surr: Tetrachloro-m-xylene	46.0	21.2-142		%Rec	1	4/16/2019 1:17:27 PM	44129

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** SDC Out-20190329
Project: Bern Co Sed Load **Collection Date:** 3/29/2019 5:00:00 PM
Lab ID: 1904057-018 **Matrix:** SEDIMENT **Received Date:** 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	8.8	0.20		mg/L	5	5/1/2019 10:06:43 AM	44237
Cadmium	ND	1.0		mg/L	1	5/1/2019 9:28:15 AM	44237
Chromium	ND	5.0		mg/L	1	5/1/2019 9:28:15 AM	44237
Lead	ND	5.0		mg/L	1	4/10/2019 1:21:00 PM	44237
Nickel	0.014	0.010		mg/L	1	5/1/2019 9:28:15 AM	44237
Zinc	0.027	0.020		mg/L	1	5/1/2019 9:28:15 AM	44237
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.023		mg/Kg	1	4/16/2019 1:50:28 PM	44129
Aroclor 1221	ND	0.023		mg/Kg	1	4/16/2019 1:50:28 PM	44129
Aroclor 1232	ND	0.023		mg/Kg	1	4/16/2019 1:50:28 PM	44129
Aroclor 1242	ND	0.023		mg/Kg	1	4/16/2019 1:50:28 PM	44129
Aroclor 1248	ND	0.023		mg/Kg	1	4/16/2019 1:50:28 PM	44129
Aroclor 1254	ND	0.023		mg/Kg	1	4/16/2019 1:50:28 PM	44129
Aroclor 1260	ND	0.023		mg/Kg	1	4/16/2019 1:50:28 PM	44129
Surr: Decachlorobiphenyl	53.2	31.9-130		%Rec	1	4/16/2019 1:50:28 PM	44129
Surr: Tetrachloro-m-xylene	60.8	21.2-142		%Rec	1	4/16/2019 1:50:28 PM	44129

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: RG-Isleta Dam-20190329
Project: Bern Co Sed Load
Collection Date: 3/29/2019 5:30:00 PM
Lab ID: 1904057-019
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	3.1	0.040		mg/L	1	5/1/2019 9:29:44 AM	44237
Cadmium	ND	1.0		mg/L	1	5/1/2019 9:29:44 AM	44237
Chromium	ND	5.0		mg/L	1	5/1/2019 9:29:44 AM	44237
Lead	ND	5.0		mg/L	1	4/10/2019 1:22:29 PM	44237
Nickel	ND	0.010		mg/L	1	5/1/2019 9:29:44 AM	44237
Zinc	ND	0.020		mg/L	1	5/1/2019 9:29:44 AM	44237
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.021		mg/Kg	1	4/16/2019 2:23:31 PM	44129
Aroclor 1221	ND	0.021		mg/Kg	1	4/16/2019 2:23:31 PM	44129
Aroclor 1232	ND	0.021		mg/Kg	1	4/16/2019 2:23:31 PM	44129
Aroclor 1242	ND	0.021		mg/Kg	1	4/16/2019 2:23:31 PM	44129
Aroclor 1248	ND	0.021		mg/Kg	1	4/16/2019 2:23:31 PM	44129
Aroclor 1254	ND	0.021		mg/Kg	1	4/16/2019 2:23:31 PM	44129
Aroclor 1260	ND	0.021		mg/Kg	1	4/16/2019 2:23:31 PM	44129
Surr: Decachlorobiphenyl	51.6	31.9-130		%Rec	1	4/16/2019 2:23:31 PM	44129
Surr: Tetrachloro-m-xylene	62.8	21.2-142		%Rec	1	4/16/2019 2:23:31 PM	44129

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Project: Bern Co Sed Load
Lab ID: 1904057-020 **Matrix:** SEDIMENT

Client Sample ID: PND42 Sed-20190401
Collection Date: 4/1/2019 2:00:00 PM
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	2.6	0.040		mg/L	1	5/1/2019 9:31:12 AM	44237
Cadmium	ND	1.0		mg/L	1	5/1/2019 9:31:12 AM	44237
Chromium	ND	5.0		mg/L	1	5/1/2019 9:31:12 AM	44237
Lead	ND	5.0		mg/L	1	4/10/2019 1:23:58 PM	44237
Nickel	ND	0.010		mg/L	1	5/1/2019 9:31:12 AM	44237
Zinc	0.057	0.020		mg/L	1	5/1/2019 9:31:12 AM	44237
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.26		mg/Kg	1	4/16/2019 2:56:32 PM	44129
Aroclor 1221	ND	0.26		mg/Kg	1	4/16/2019 2:56:32 PM	44129
Aroclor 1232	ND	0.26		mg/Kg	1	4/16/2019 2:56:32 PM	44129
Aroclor 1242	ND	0.26		mg/Kg	1	4/16/2019 2:56:32 PM	44129
Aroclor 1248	ND	0.26		mg/Kg	1	4/16/2019 2:56:32 PM	44129
Aroclor 1254	ND	0.26		mg/Kg	1	4/16/2019 2:56:32 PM	44129
Aroclor 1260	ND	0.26		mg/Kg	1	4/16/2019 2:56:32 PM	44129
Surr: Decachlorobiphenyl	0	31.9-130	S	%Rec	1	4/16/2019 2:56:32 PM	44129
Surr: Tetrachloro-m-xylene	0	21.2-142	S	%Rec	1	4/16/2019 2:56:32 PM	44129

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc.
Client Sample ID: PND42 Out-20190401
Project: Bern Co Sed Load
Collection Date: 4/1/2019 1:15:00 PM
Lab ID: 1904057-021
Matrix: SEDIMENT
Received Date: 4/1/2019 3:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 6010B: SPLP METALS						Analyst:	**ELS**
Aluminum	2.7	0.040		mg/L	1	5/1/2019 9:32:41 AM	44237
Cadmium	ND	1.0		mg/L	1	5/1/2019 9:32:41 AM	44237
Chromium	ND	5.0		mg/L	1	5/1/2019 9:32:41 AM	44237
Lead	ND	5.0		mg/L	1	4/10/2019 1:25:28 PM	44237
Nickel	ND	0.010		mg/L	1	5/1/2019 9:32:41 AM	44237
Zinc	0.062	0.020		mg/L	1	5/1/2019 9:32:41 AM	44237
EPA METHOD 8082A: PCB'S						Analyst:	**TOM**
Aroclor 1016	ND	0.23		mg/Kg	1	4/16/2019 3:29:32 PM	44129
Aroclor 1221	ND	0.23		mg/Kg	1	4/16/2019 3:29:32 PM	44129
Aroclor 1232	ND	0.23		mg/Kg	1	4/16/2019 3:29:32 PM	44129
Aroclor 1242	ND	0.23		mg/Kg	1	4/16/2019 3:29:32 PM	44129
Aroclor 1248	ND	0.23		mg/Kg	1	4/16/2019 3:29:32 PM	44129
Aroclor 1254	ND	0.23		mg/Kg	1	4/16/2019 3:29:32 PM	44129
Aroclor 1260	ND	0.23		mg/Kg	1	4/16/2019 3:29:32 PM	44129
Surr: Decachlorobiphenyl	0	31.9-130	S	%Rec	1	4/16/2019 3:29:32 PM	44129
Surr: Tetrachloro-m-xylene	0	21.2-142	S	%Rec	1	4/16/2019 3:29:32 PM	44129

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 1904057
Pace Project No.: 30287865

Sample: 1904057-001B RG-AngDam-2019032 **Lab ID: 30287865001** Collected: 03/28/19 10:40 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**4.67 ± 5.83 (12.2) C:NA T:NA**	pCi/g	04/15/19 07:42	12587-46-1	

Sample: 1904057-002B RG-Venada Out-201 **Lab ID: 30287865002** Collected: 03/28/19 11:55 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**0.597 ± 3.50 (8.54) C:NA T:NA**	pCi/g	04/15/19 07:42	12587-46-1	

Sample: 1904057-003B Montoyas Sed-2019 **Lab ID: 30287865003** Collected: 03/28/19 13:30 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**1.87 ± 4.22 (9.52) C:NA T:NA**	pCi/g	04/15/19 07:42	12587-46-1	

Sample: 1904057-004B Montoyas Out-2019 **Lab ID: 30287865004** Collected: 03/28/19 14:10 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**21.2 ± 9.17 (12.8) C:NA T:NA**	pCi/g	04/15/19 07:42	12587-46-1	

Sample: 1904057-005B CalabacitasOut-20 **Lab ID: 30287865005** Collected: 03/28/19 15:50 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**3.17 ± 5.23 (11.4) C:NA T:NA**	pCi/g	04/15/19 07:42	12587-46-1	

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(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 1904057
Pace Project No.: 30287865

Sample: 1904057-006B CalabacitasSed-20 **Lab ID: 30287865006** Collected: 03/28/19 16:15 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**1.95 ± 4.06 (9.08) C:NA T:NA**	pCi/g	04/15/19 07:42	12587-46-1	

Sample: 1904057-007B SanAntonio Sed-20 **Lab ID: 30287865007** Collected: 03/28/19 16:50 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**10.8 ± 6.01 (9.00) C:NA T:NA**	pCi/g	04/15/19 07:42	12587-46-1	

Sample: 1904057-008B SanAntonio Out-20 **Lab ID: 30287865008** Collected: 03/28/19 17:05 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**4.83 ± 4.43 (8.33) C:NA T:NA**	pCi/g	04/15/19 07:42	12587-46-1	

Sample: 1904057-009B NDC Sed-20190329 **Lab ID: 30287865009** Collected: 03/29/19 09:00 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**15.2 ± 7.39 (10.9) C:NA T:NA**	pCi/g	04/15/19 07:42	12587-46-1	

Sample: 1904057-010B NDC Out-20190329 **Lab ID: 30287865010** Collected: 03/29/19 09:30 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**12.1 ± 5.97 (8.39) C:NA T:NA**	pCi/g	04/15/19 07:43	12587-46-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 1904057
Pace Project No.: 30287865

Sample: 1904057-011B West I40DC-201903 **Lab ID: 30287865011** Collected: 03/29/19 10:45 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**8.91 ± 5.21 (8.12) C:NA T:NA**	pCi/g	04/15/19 07:43	12587-46-1	

Sample: 1904057-012B West I40DC Out-20 **Lab ID: 30287865012** Collected: 03/29/19 11:40 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**14.7 ± 7.09 (10.5) C:NA T:NA**	pCi/g	04/15/19 07:43	12587-46-1	

Sample: 1904057-013B Sanchez Farm In-2 **Lab ID: 30287865013** Collected: 03/29/19 13:15 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**22.9 ± 8.33 (8.73) C:NA T:NA**	pCi/g	04/15/19 07:43	12587-46-1	

Sample: 1904057-014B Sanchez Farm In2- **Lab ID: 30287865014** Collected: 03/29/19 13:40 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**14.3 ± 7.01 (10.2) C:NA T:NA**	pCi/g	04/15/19 07:43	12587-46-1	

Sample: 1904057-015B Sanchez Farm Out- **Lab ID: 30287865015** Collected: 03/29/19 14:30 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**16.5 ± 7.30 (9.66) C:NA T:NA**	pCi/g	04/15/19 07:43	12587-46-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 1904057
Pace Project No.: 30287865

Sample: 1904057-016B Baffle Up2-201903 **Lab ID: 30287865016** Collected: 03/29/19 15:40 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**3.67 ± 4.46 (9.17) C:NA T:NA**	pCi/g	04/15/19 07:43	12587-46-1	

Sample: 1904057-017B Tijeras Sed-20190 **Lab ID: 30287865017** Collected: 03/29/19 16:15 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**15.6 ± 7.26 (10.7) C:NA T:NA**	pCi/g	04/15/19 07:43	12587-46-1	

Sample: 1904057-018B SDC Out-20190329 **Lab ID: 30287865018** Collected: 03/29/19 17:00 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**6.58 ± 4.75 (8.09) C:NA T:NA**	pCi/g	04/15/19 07:43	12587-46-1	

Sample: 1904057-019B RG-Isleta Dam-201 **Lab ID: 30287865019** Collected: 03/29/19 17:30 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**11.3 ± 5.42 (6.90) C:NA T:NA**	pCi/g	04/15/19 08:00	12587-46-1	

Sample: 1904057-020B PND42 Sed-2019040 **Lab ID: 30287865020** Collected: 04/01/19 14:00 Received: 04/04/19 09:45 Matrix: Solid
PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**5.30 ± 3.79 (6.01) C:NA T:NA**	pCi/g	04/15/19 08:00	12587-46-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 1904057
Pace Project No.: 30287865

Sample: 1904057-021B PND42 Out-2019040 **Lab ID: 30287865021** Collected: 04/01/19 13:15 Received: 04/04/19 09:45 Matrix: Solid

PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 9310	**5.22 ± 4.02 (6.22)** **C:NA T:NA**	pCi/g	04/12/19 08:00	12587-46-1	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 1904057
Pace Project No.: 30287865

QC Batch: 337662
QC Batch Method: EPA 9310
Associated Lab Samples: 30287865021

Analysis Method: EPA 9310
Analysis Description: 9310 Gross Alpha/Beta

METHOD BLANK: 1643413
Associated Lab Samples: 30287865021

Matrix: Solid

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Gross Alpha	0.014 ± 0.0621 (0.156) C:NA T:NA	pCi/g	04/12/19 07:52	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 1904057
Pace Project No.: 30287865

QC Batch: 337930 Analysis Method: EPA 9310
QC Batch Method: EPA 9310 Analysis Description: 9310 Gross Alpha/Beta
Associated Lab Samples: 30287865001, 30287865002, 30287865003, 30287865004, 30287865005, 30287865006, 30287865007, 30287865008, 30287865009, 30287865010, 30287865011, 30287865012, 30287865013, 30287865014, 30287865015, 30287865016, 30287865017, 30287865018, 30287865019, 30287865020

METHOD BLANK: 1644563 Matrix: Solid
Associated Lab Samples: 30287865001, 30287865002, 30287865003, 30287865004, 30287865005, 30287865006, 30287865007, 30287865008, 30287865009, 30287865010, 30287865011, 30287865012, 30287865013, 30287865014, 30287865015, 30287865016, 30287865017, 30287865018, 30287865019, 30287865020

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Gross Alpha	0.092 ± 0.0846 (0.153) C:NA T:NA	pCi/g	04/15/19 07:42	

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QUALIFIERS

Project: 1904057
Pace Project No.: 30287865

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

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TNI - The NELAC Institute.

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QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1904057**
14-May-19

Client: Daniel B. Stephens & Assoc.
Project: Bern Co Sed Load

Sample ID: **MB-44045** SampType: **MBLK** TestCode: **EPA Method 8082A: PCB's**
Client ID: **PBS** Batch ID: **44045** RunNo: **59194**
Prep Date: **4/3/2019** Analysis Date: **4/15/2019** SeqNo: **1993125** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.025								
Aroclor 1221	ND	0.025								
Aroclor 1232	ND	0.025								
Aroclor 1242	ND	0.025								
Aroclor 1248	ND	0.025								
Aroclor 1254	ND	0.025								
Aroclor 1260	ND	0.025								
Surr: Decachlorobiphenyl	0.041		0.06250		66.0	31.9	130			
Surr: Tetrachloro-m-xylene	0.041		0.06250		66.0	21.2	142			

Sample ID: **LCS-44045** SampType: **LCS** TestCode: **EPA Method 8082A: PCB's**
Client ID: **LCSS** Batch ID: **44045** RunNo: **59194**
Prep Date: **4/3/2019** Analysis Date: **4/15/2019** SeqNo: **1993127** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	0.12	0.025	0.1250	0	94.0	35.9	162			
Aroclor 1260	0.091	0.025	0.1250	0	73.0	37.9	147			
Surr: Decachlorobiphenyl	0.043		0.06250		69.2	31.9	130			
Surr: Tetrachloro-m-xylene	0.045		0.06250		72.0	21.2	142			

Sample ID: **1904057-011AMS** SampType: **MS** TestCode: **EPA Method 8082A: PCB's**
Client ID: **West I40DC-201903** Batch ID: **44045** RunNo: **59194**
Prep Date: **4/3/2019** Analysis Date: **4/16/2019** SeqNo: **1993144** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	0.14	0.13	0.1271	0	109	33.5	145			
Aroclor 1260	0.14	0.13	0.1271	0	108	39.1	160			
Surr: Decachlorobiphenyl	0.078		0.06355		122	31.9	130			
Surr: Tetrachloro-m-xylene	0.086		0.06355		136	21.2	142			

Sample ID: **1904057-011AMSD** SampType: **MSD** TestCode: **EPA Method 8082A: PCB's**
Client ID: **West I40DC-201903** Batch ID: **44045** RunNo: **59194**
Prep Date: **4/3/2019** Analysis Date: **4/16/2019** SeqNo: **1993146** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.12	0.1231	0	97.0	33.5	145	200	36.6	
Aroclor 1260	0.14	0.12	0.1231	0	111	39.1	160	0.287	39	
Surr: Decachlorobiphenyl	0.071		0.06155		116	31.9	130	0	0	
Surr: Tetrachloro-m-xylene	0.079		0.06155		128	21.2	142	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1904057**
14-May-19

Client: Daniel B. Stephens & Assoc.
Project: Bern Co Sed Load

Sample ID: **MB-44129** SampType: **MBLK** TestCode: **EPA Method 8082A: PCB's**
Client ID: **PBS** Batch ID: **44129** RunNo: **59194**
Prep Date: **4/4/2019** Analysis Date: **4/16/2019** SeqNo: **1993147** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.025								
Aroclor 1221	ND	0.025								
Aroclor 1232	ND	0.025								
Aroclor 1242	ND	0.025								
Aroclor 1248	ND	0.025								
Aroclor 1254	ND	0.025								
Aroclor 1260	ND	0.025								
Surr: Decachlorobiphenyl	0.037		0.06250		58.8	31.9	130			
Surr: Tetrachloro-m-xylene	0.041		0.06250		66.0	21.2	142			

Sample ID: **LCS-44129** SampType: **LCS** TestCode: **EPA Method 8082A: PCB's**
Client ID: **LCSS** Batch ID: **44129** RunNo: **59194**
Prep Date: **4/4/2019** Analysis Date: **4/16/2019** SeqNo: **1993148** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	0.12	0.025	0.1250	0	99.7	35.9	162			
Aroclor 1260	0.084	0.025	0.1250	0	67.0	37.9	147			
Surr: Decachlorobiphenyl	0.034		0.06250		54.4	31.9	130			
Surr: Tetrachloro-m-xylene	0.039		0.06250		62.0	21.2	142			

Sample ID: **1904057-012AMS** SampType: **MS** TestCode: **EPA Method 8082A: PCB's**
Client ID: **West I40DC Out-201** Batch ID: **44129** RunNo: **59194**
Prep Date: **4/4/2019** Analysis Date: **4/16/2019** SeqNo: **1993151** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	0.081	0.032	0.07957	0	102	33.5	145			
Aroclor 1260	0.088	0.032	0.07957	0	111	39.1	160			
Surr: Decachlorobiphenyl	0.035		0.03978		88.8	31.9	130			
Surr: Tetrachloro-m-xylene	0.033		0.03978		84.0	21.2	142			

Sample ID: **1904057-012AMSD** SampType: **MSD** TestCode: **EPA Method 8082A: PCB's**
Client ID: **West I40DC Out-201** Batch ID: **44129** RunNo: **59194**
Prep Date: **4/4/2019** Analysis Date: **4/16/2019** SeqNo: **1993154** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aroclor 1016	0.060	0.030	0.07490	0	80.0	33.5	145	30.5	36.6	
Aroclor 1260	0.060	0.030	0.07490	0	80.6	39.1	160	37.5	39	
Surr: Decachlorobiphenyl	0.032		0.03745		85.6	31.9	130	0	0	
Surr: Tetrachloro-m-xylene	0.032		0.03745		86.4	21.2	142	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1904057**
14-May-19

Client: Daniel B. Stephens & Assoc.
Project: Bern Co Sed Load

Sample ID: **MB-44155** SampType: **MBLK** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **PBW** Batch ID: **44155** RunNo: **58945**
Prep Date: **4/5/2019** Analysis Date: **4/6/2019** SeqNo: **1982213** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Nickel	ND	0.010								

Sample ID: **LCS-44155** SampType: **LCS** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **LCSW** Batch ID: **44155** RunNo: **58945**
Prep Date: **4/5/2019** Analysis Date: **4/6/2019** SeqNo: **1982214** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	ND	1.0	0.5000	0	105	80	120			
Chromium	ND	5.0	0.5000	0	102	80	120			
Lead	ND	5.0	0.5000	0	104	80	120			
Nickel	0.52	0.010	0.5000	0	104	80	120			

Sample ID: **1904057-001AMS** SampType: **MS** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **RG-AngDam-201903** Batch ID: **44155** RunNo: **58945**
Prep Date: **4/5/2019** Analysis Date: **4/6/2019** SeqNo: **1982226** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	ND	1.0	0.5000	0	0	75	125			S
Chromium	ND	5.0	0.5000	0	0	75	125			S
Lead	ND	5.0	0.5000	0	104	75	125			
Nickel	0.53	0.010	0.5000	0	105	75	125			

Sample ID: **1904057-001AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **RG-AngDam-201903** Batch ID: **44155** RunNo: **58945**
Prep Date: **4/5/2019** Analysis Date: **4/6/2019** SeqNo: **1982227** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	ND	1.0	0.5000	0	0	75	125	0	20	S
Chromium	ND	5.0	0.5000	0	0	75	125	0	20	S
Lead	ND	5.0	0.5000	0	102	75	125	0	20	
Nickel	0.52	0.010	0.5000	0	104	75	125	0.898	20	

Sample ID: **MB-44237** SampType: **MBLK** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **PBW** Batch ID: **44237** RunNo: **59041**
Prep Date: **4/9/2019** Analysis Date: **4/10/2019** SeqNo: **1987320** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1904057**
14-May-19

Client: Daniel B. Stephens & Assoc.
Project: Bern Co Sed Load

Sample ID: **MB-44237** SampType: **MBLK** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **PBW** Batch ID: **44237** RunNo: **59041**
Prep Date: **4/9/2019** Analysis Date: **4/10/2019** SeqNo: **1987320** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0								

Sample ID: **LCS-44237** SampType: **LCS** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **LCSW** Batch ID: **44237** RunNo: **59041**
Prep Date: **4/9/2019** Analysis Date: **4/10/2019** SeqNo: **1987321** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0	0.5000	0	98.5	80	120			

Sample ID: **1904057-016AMS** SampType: **MS** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **Baffle Up2-20190329** Batch ID: **44237** RunNo: **59041**
Prep Date: **4/9/2019** Analysis Date: **4/10/2019** SeqNo: **1987361** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0	0.5000	0	103	75	125			

Sample ID: **1904057-016AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **Baffle Up2-20190329** Batch ID: **44237** RunNo: **59041**
Prep Date: **4/9/2019** Analysis Date: **4/10/2019** SeqNo: **1987362** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	5.0	0.5000	0	101	75	125	0	20	

Sample ID: **MB-44155** SampType: **MBLK** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **PBW** Batch ID: **44155** RunNo: **59555**
Prep Date: **4/5/2019** Analysis Date: **5/1/2019** SeqNo: **2006739** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.040								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Nickel	ND	0.010								
Zinc	ND	0.020								

Sample ID: **LCS-44155** SampType: **LCS** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **LCSW** Batch ID: **44155** RunNo: **59555**
Prep Date: **4/5/2019** Analysis Date: **5/1/2019** SeqNo: **2006740** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1904057**
14-May-19

Client: Daniel B. Stephens & Assoc.
Project: Bern Co Sed Load

Sample ID: **LCS-44155** SampType: **LCS** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **LCSW** Batch ID: **44155** RunNo: **59555**
Prep Date: **4/5/2019** Analysis Date: **5/1/2019** SeqNo: **2006740** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.56	0.040	0.5000	0	112	80	120			
Cadmium	ND	1.0	0.5000	0	102	80	120			
Chromium	ND	5.0	0.5000	0	100	80	120			
Lead	ND	5.0	0.5000	0	98.2	80	120			
Nickel	0.49	0.010	0.5000	0	98.0	80	120			
Zinc	0.50	0.020	0.5000	0	99.9	80	120			

Sample ID: **MB-44237** SampType: **MBLK** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **PBW** Batch ID: **44237** RunNo: **59555**
Prep Date: **4/9/2019** Analysis Date: **5/1/2019** SeqNo: **2006742** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.040								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Nickel	ND	0.010								
Zinc	ND	0.020								

Sample ID: **LCS-44237** SampType: **LCS** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **LCSW** Batch ID: **44237** RunNo: **59555**
Prep Date: **4/9/2019** Analysis Date: **5/1/2019** SeqNo: **2006743** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.64	0.040	0.5000	0	128	80	120			S
Cadmium	ND	1.0	0.5000	0	104	80	120			
Chromium	ND	5.0	0.5000	0	102	80	120			
Lead	ND	5.0	0.5000	0	98.9	80	120			
Nickel	0.49	0.010	0.5000	0	98.0	80	120			
Zinc	0.54	0.020	0.5000	0	108	80	120			

Sample ID: **1904057-001AMS** SampType: **MS** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **RG-AngDam-201903** Batch ID: **44155** RunNo: **59555**
Prep Date: **4/5/2019** Analysis Date: **5/1/2019** SeqNo: **2006778** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Zinc	0.52	0.020	0.5000	0.03667	96.2	75	125			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1904057**
14-May-19

Client: Daniel B. Stephens & Assoc.
Project: Bern Co Sed Load

Sample ID: **1904057-001AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **RG-AngDam-201903** Batch ID: **44155** RunNo: **59555**
Prep Date: **4/5/2019** Analysis Date: **5/1/2019** SeqNo: **2006779** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Zinc	0.52	0.020	0.5000	0.03667	97.0	75	125	0.810	20	

Sample ID: **1904057-016AMS** SampType: **MS** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **Baffle Up2-20190329** Batch ID: **44237** RunNo: **59555**
Prep Date: **4/9/2019** Analysis Date: **5/1/2019** SeqNo: **2006797** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	4.7	0.040	0.5000	3.355	278	75	125			S
Cadmium	ND	1.0	0.5000	0	0	75	125			S
Chromium	ND	5.0	0.5000	0	0	75	125			S
Nickel	0.49	0.010	0.5000	0	98.4	75	125			
Zinc	0.54	0.020	0.5000	0.05139	97.4	75	125			

Sample ID: **1904057-016AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **Baffle Up2-20190329** Batch ID: **44237** RunNo: **59555**
Prep Date: **4/9/2019** Analysis Date: **5/1/2019** SeqNo: **2006798** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	4.8	0.040	0.5000	3.355	293	75	125	1.51	20	S
Cadmium	ND	1.0	0.5000	0	0	75	125	0	20	S
Chromium	ND	5.0	0.5000	0	0	75	125	0	20	S
Nickel	0.49	0.010	0.5000	0	98.3	75	125	0.0631	20	
Zinc	0.55	0.020	0.5000	0.05139	100	75	125	2.56	20	

Sample ID: **1904057-001AMS** SampType: **MS** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **RG-AngDam-201903** Batch ID: **44155** RunNo: **59555**
Prep Date: **4/5/2019** Analysis Date: **5/1/2019** SeqNo: **2006807** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	8.1	0.20	0.5000	5.037	618	75	125			S

Sample ID: **1904057-001AMSD** SampType: **MSD** TestCode: **EPA Method 6010B: SPLP Metals**
Client ID: **RG-AngDam-201903** Batch ID: **44155** RunNo: **59555**
Prep Date: **4/5/2019** Analysis Date: **5/1/2019** SeqNo: **2006808** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	7.8	0.20	0.5000	5.037	548	75	125	4.42	20	S

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: DBS Work Order Number: 1904057 RcptNo: 1

Received By: **Desiree Dominguez** 4/1/2019 3:00:00 PM DD

Completed By: **Desiree Dominguez** 4/1/2019 3:45:02 PM DD

Reviewed By: 4/2/19

LB: DAD 4/2/19

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? Yes ☑ No ☐
    (Note discrepancies on chain of custody)
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? Yes ☑ No ☐
    (If no, notify customer for authorization.)

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? _____
Checked by: DAD 4/2/19

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.8	Good	Not Present			
2	5.1	Good	Not Present			

Chain-of-Custody Record

Client: DBJA

Mailing Address:

Phone #:

email or Fax#:

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Bern Co Sed Load

Project #: DB19.1073 B3

Project Manager: Chad Johannesen

Sampler: E. Bastien

On Ice: ☒ Yes ☐ No

# of Coolers: 2

Cooler Temp (including CF): 4.8°c 5.1°c

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1904057	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	PCB (SW-846 8082 method)	SPLP metal (EPA 6010)	Gross Alpha (EPA 900.0)			
3/28/19	10:40	Sed.	RG-Ang Park-20190328	3 glass-4oz jars		-001											X	X	X			
3/28/19	11:55		Venada Out-20190328		None	-002											X	X	X			
3/28/19	13:30		Montoyas Sed-20190328			-003											X	X	X			
3/28/19	14:10		Montoyas Out-20190328			-004											X	X	X			
3/28/19	15:50		Calabacillas Out-20190328			-005											X	X	X			
3/28/19	16:15		Calabacillas Sed-20190328			-006											X	X	X			
3/28/19	16:50		San Antonio Sed-20190328			-007											X	X	X			
3/28	17:05		San Antonio Out-20190328			-008											X	X	X			
3/29	9:00		NDC Sed-20190329			-009											X	X	X			
3/29	9:30		NDC Out-20190329			-010											X	X	X			
3/29	10:45		West I40 DC-20190329			-011																
3/29	11:40		West I40 DC Out-20190329			-012																

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
4/1/19	15:00	Elizabeth Bastien	[illegible]	COO	4/1/19	15:00
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks: SPLP metals by 6010 of 4/2/19

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Chain-of-Custody Record

Client: DBSA

Mailing Address:

Phone #:

email or Fax#:

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Bern Co Sed Load

Project #: DB19.1073 P3

Project Manager: Chad Johannesen

Sampler: E. Bastien

On Ice: ☒ Yes ☐ No

# of Coolers: 2

Cooler Temp (including CF): 4.8°c 5.1°c

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1904057	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	PCB (method SW-846 8082)	SPLP metals (EPA 6020A)	Gross Alpha (EPA 900.0)			
3/29/19	13:15	Sed	Sanchez Farm In-20190329	3-4oz glass	None	-013											X	X	X			
	13:40		Sanchez Farm IN2-20190329			-014											X	X	X			
	14:30		Sanchez Farm Out-20190329			-015											X	X	X			
	15:40		Baffle Up 2-20190329			-016											X	X	X			
	16:15		Tijeras Sed-20190329			-017											X	X	X			
	17:00		SDC Out-20190329			-018											X	X	X			
	17:30		RG-Isleta Dam-20190329			-019											X	X	X			
4/1/19	14:00		PND 42 Sed-20190401			-020											X	X	X			
4/1/19	13:15		PND 42 Out-20190401			-021											X	X	X			
						EB 4/1/19																

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
4/1/19	15:00	[signature]	[signature]	COO	4/1/19	15:00
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Table 2. Required Volume, Containers, Preservatives, and Holding Times

Analyte	Method	Volume and Container	Preservative	Holding Time [a]
PCBs	SW-846 8082	125-mL wide-mouth glass jar	Store at 4 ± 2°C	14 days
SPLP metals [b]	EPA 6020A	4-oz glass jar	Store at 4 ± 2°C	6 months
Gross alpha	EPA 900.0	4-oz glass jar	Store at 4 ± 2°C	180 days

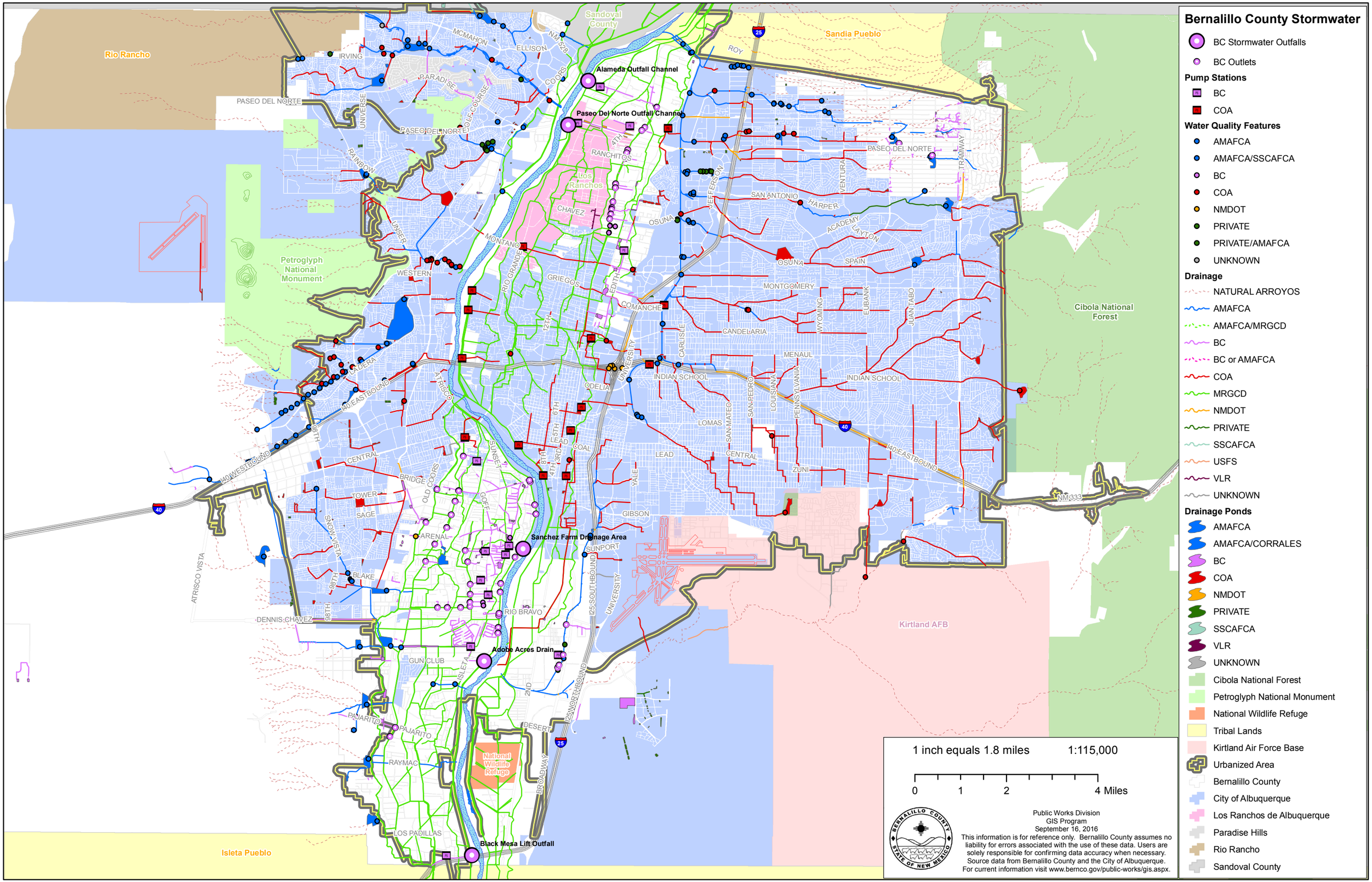
[a] Holding time is measured from the time of sample collection to the time of sample extraction and analysis
[b] Aluminum, cadmium, chromium, nickel, lead, and zinc
PCBs = Polychlorinated biphenyls
mL = Milliliter(s)
SPLP = Synthetic precipitation leaching procedure
EPA = U.S. Environmental Protection Agency
oz = Ounce(s)

This attachment is available in digital format on the Bernalillo County Public Works website:

https://www.bernco.gov/public-works/epa-regulation-of-stormwater-in-bernalillo-county.aspx

Attachment 3

Bernalillo County Stormwater Facilities Map


Bernalillo County Stormwater
BC Stormwater Outfalls
BC Outlets
Pump Stations
BC
COA
Water Quality Features
AMAFCA
AMAFCA/SSCAFCA
BC
COA
NMDOT
PRIVATE
PRIVATE/AMAFCA
UNKNOWN
Drainage
NATURAL ARROYOS
AMAFCA
AMAFCA/MRGCD
BC
BC or AMAFCA
COA
MRGCD
NMDOT
PRIVATE
SSCAFCA
USFS
VLR
UNKNOWN
Drainage Ponds
AMAFCA
AMAFCA/CORRALES
BC
COA
NMDOT
PRIVATE
SSCAFCA
VLR
UNKNOWN
Cibola National Forest
Petroglyph National Monument
National Wildlife Refuge
Tribal Lands
Kirtland Air Force Base
Urbanized Area
Bernalillo County
City of Albuquerque
Los Ranchos de Albuquerque
Paradise Hills
Rio Rancho
Sandoval County
1 inch equals 1.8 miles
1:115,000
0
1
2
4 Miles
Public Works Division
GIS Program
September 16, 2016
This information is for reference only. Bernalillo County assumes no liability for errors associated with the use of these data. Users are solely responsible for confirming data accuracy when necessary. Source data from Bernalillo County and the City of Albuquerque.
For current information visit www.bernco.gov/public-works/gis.aspx.
Rio Rancho
Sandoval County
Sandia Pueblo
Petroglyph National Monument
Cibola National Forest
Kirtland AFB
Isleta Pueblo
Los Ranchos
Alameda Outfall Channel
Paseo Del Norte Outfall Channel
Sanchez Farm Drainage Area
Adobe Acres Drain
Black Mesa Lift Outfall
National Wildlife Refuge
PASEO DEL NORTE
MONTANO
I-25
I-40
NM 528
NM 333
RIO GRANDE
RIO BRAVO
I-25 SOUTHBOUND
I-25 NORTHBOUND
I-40 EASTBOUND
I-40 WESTBOUND
UNIVERSITY
COMANCHE
INDIAN SCHOOL
CENTRAL
LOMAS
LEAD
COAL
GIBSON
SUNPORT
DESERT
BROADWAY
ISLETA
2ND
GUN CLUB
DENNIS CHAVEZ
ATRISCO VISTA
98TH
SNOW VISTA
BLAKE
ARENAL
SAGE
TOWER
BRIDGE
OLD COORS
GOFF
SUNSET
LOS PADILLAS
RAYMAC
PAJARITO
CHAVEZ
GRIEGOS
RANCHITOS
OSUNA
SAN ANTONIO
HARPER
ACADEMY
LAYTON
SPAIN
MONTGOMERY
CANDELARIA
MENAUL
ZUNI
YALE
ODELIA
ATRISCO
MADERA
WESTERN
UNSER
RAINBOW
UNIVERSE
PARADISE
GOLF COURSE
IRVING
MCMAHON
ELLISON
COORS
ROY
JEFFERSON
VENTURA
TRAMWAY
WYOMING
EUBANK
JUAN TABO
CARLISLE
SAN PEDRO
LOUISIANA
PENNSYLVANIA
SAN MATEO
EDITH
4TH
6TH
8TH
2ND
1ST
3RD
5TH
7TH

Attachment 4

MRGSQT Outcomes Report

Mid Rio Grande Stormwater Quality Team

www.keeptheriograND.org

Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) • City of Albuquerque
Bernalillo County • Town of Bernalillo • Village of Corrales • Ciudad Soil and Water Conservation District
Eastern Sandoval County Arroyo Flood Control Authority (ESCAFCA) • Village of Los Ranchos de Albuquerque
NM Department of Transportation (NMDOT) • City of Rio Rancho • Sandoval County
Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA)

Outcomes Report

for

Fiscal Year 2018-2019

(July 1, 2018 - June 30, 2019)

presented by

Phyllis Baker and Cristofer Romero

CWA STRATEGIC COMMUNICATIONS

The Middle Rio Grande Stormwater Quality Team (MRGSQT) formed in 2004 for the purpose of providing education and outreach to the residents of the Middle Rio Grande on how to reduce stormwater pollution. The MRGSQT focuses its education efforts on children, adults, and businesses and how they can become stewards of our watershed by keeping trash and pollutants out of the Rio Grande. The MRGSQT provides an annual summary of education and outreach activities for each fiscal year (FY). During FY2019 (July 1, 2018 to June 30, 2019), the MRGSQT continued its educational outreach by:

- Partnering with the Bosque Ecosystem Monitoring Program (BEMP), Arroyo Classroom and RiverXchange
- Continuing to post relevant information to its website and Facebook page
- Participating in high-profile community events, including the Los Ranchos Lavender Festival, the NM State Fair Parade, the Corrales Harvest Festival, the Rio Rancho Children's Water Festival and New Mexico's Animal Humane Society's Doggie Dash and Dawdle
- Updating the team's interactive kiosk with robust analytics software to track participant interaction and installing it at Albuquerque's RudOlfo Anaya North Valley Library
- Participating in a variety of community events throughout the year
- Updating their matrix designed to address MS4-related topics and planning future programs and activities designed to correspond with permit-mandated topics, including proper hazardous waste disposal appropriate pet waste disposal, stormwater pollution reduction and awareness of hazardous chemicals
- Continuing to update and improve the team's website **keeptheriograng.com.**

As required by the EPA, many team partners and supporters produced municipal water quality reports (also called Consumer Quality Reports) to their customers. These reports include information on stormwater quality and pollution prevention. Specialty advertising giveaways relating to stormwater quality awareness were ordered/reordered for use at public events. MRGSQT's annual budget is $50,000. This excludes Type 9 items, donated hours by team members and funding for Arroyo Classroom, RiverXchange and BEMP is $50,000. The contractor, CWA Strategic Communications (CWA), donated $1,965.15 in services during the 12-month period. Following is a review of the activities in which the Team has participated.

In calculating the number of people reached during each of the events summarized below, there is likely to be some duplication based on how the numbers were calculated, people attending more than one event, etc. However, this will be a small percentage and the estimates should be reasonably accurate.

WEBSITE (www.keeptheriograng.org)

The team contracted with CWA to redesign the website; the new site was launched in October 2018. Content and links were updated and new material added. The site is now more user-friendly and offers Team members an easy way to upload, store and share materials.

FACEBOOK PAGE

In conjunction with the SQT website, a Facebook page continues to post information at: (https://www.facebook.com/Keeptheriogrand). The page has 151 "Likes" (a 7% increase from the previous year) and the team occasionally boosts posts during events to obtain more visibility.

Estimated number of individuals reached by this activity: 151
Permit Reference(s): Part 1.C.2.b(i)(e) Discharges to Impaired Waters with an Approved TMDL, Impairment for Bacteria; Part 1.C.3.a Endangered Species Act Requirements, Dissolved Oxygen Strategy; Part 1.D.5.e Illicit Discharges and Improper Disposal; Part 1.D.5.e Control of Floatables; Part 1.D.5.g, Public Education and Outreach on Stormwater Impacts.
Audience(s): Children, Adults

EVENTS

Between July 1, 2018, and June 30, 2019, MRGSQT members and their partner agencies reported participating in a total of 77 community outreach/educational events reaching adults and children. ***Details can be found in Exhibit 1 at the end of this report.***

Estimated number of individuals reached by these community outreach/education events: 73,130
Permit Reference(s): Part 1.C.2.b(i)(e) Discharges to Impaired Waters with an Approved TMDL, Impairment for Bacteria; Part 1.C.3.a Endangered Species Act Requirements, Dissolved Oxygen Strategy; Part 1.D.5.c(i)(f) and (h) Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations; Part 1.D.5.e Illicit Discharges and Improper Disposal; Part 1.D.5.e Control of Floatables; Part 1.D.5.g, Public Education and Outreach on Stormwater Impacts.
Audience(s): Children, Adults

GENERAL MATERIALS DISTRIBUTION/STORMWATER AWARENESS SURVEY

As appropriate, team members distribute materials at events in return for event attendees filling out a stormwater awareness survey. Total distribution correlates to number of surveys completed.

STORMWATER QUALITY TEAM Inventory July 1, 2018 through June 30, 2019.			
Item	**Starting Qty as of 7/1/2018**	**Distributed**	**Ending Qty as of 6/30/2019**
"Keep the Rio Grand" Bumper Stickers	750	500	250
"Reduce Stormwater Pollution at Home" Brochure	100	16	84
Dog-Shaped Poop Bag Dispensers	2,586	836	1,750
"Don't Contaminate the River" Oval Stickers	5,260	1,510	3,750
Poop Emoji Squeezies	3,840	2,376	1,464
Morphing Fish Bags	3,417	917	2,500
Silicone Pet Food Can Lids	1,767	456	1,311
New Pet Rack Cards	4,900	506	4,394
FOG Rack Cards	4,900	488	4,412
No Poop Fairy Rack Cards	4,900	473	4,427
Professionals Harmful Chemicals Rack Card	4,900	180	4,720
Reduce Stormwater Pollution at Home Rack Card	4,900	542	4,358
Large Stormwater display - 8 ft			1
Tabletop Stormwater display - 6 ft			1
SQT 6' x 3' banner			3
TOTAL DISTRIBUTION		**8,800**	

Sample surveys and survey analytics can be found in Exhibit 2 at the end of this report.

Total estimated number of people completing stormwater awareness survey: 394
Permit Reference(s): Part 1.C.2.b(i)(e) Discharges to Impaired Waters with an Approved TMDL, Impairment for Bacteria; Part 1.C.3.a Endangered Species Act Requirements, Dissolved Oxygen Strategy; Part 1.D.5.c(i)(f) and (h) Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations; Part 1.D.5.e Illicit Discharges and Improper Disposal; Part 1.D.5.e Control of Floatables; Part 1.D.5.g, Public Education and Outreach on Stormwater Impacts.
Audience(s): Children, Adults

EDUCATIONAL ACTIVITIES

Educational Kiosk at Albuquerque's Rudolfo Anaya North Valley Public Library.

The team's interactive kiosk completed its successful run at Rio Rancho's Loma Colorado Public Library. The kiosk was updated with analytics software to enable the Team to better understand how it was used and which elements were used most frequently and when. In November 2018 the kiosk was installed in Albuquerque's Rudolfo Anaya North Valley Library, where it continues to educate citizens (primarily children) about stormwater issues. The kiosk features:

Stormwater Quality Team Creates Interactive Kiosk for Children

Maps, Games and Videos Highlight Stormwater Runoff System and Its Link to Rio Grande

The Mid Rio Grande Stormwater Quality Team has created a kiosk to teach children about our area's stormwater runoff system and what they can do to keep from polluting that system and the Rio Grande. The three-sided kiosk, which debuted at the Downtown Children's Library, uses touch and video screens to engage and teach children that everything entering the stormwater system can end up in the Rio Grande – and provides practical tips on what they can do to keep our river clean.

The three-sided kiosk uses interactive screens to engage and teach kids that "all roads lead to the Rio Grande" and offers information on how people can help keep the river clean.

INTERACTIVE STORMWATER SYSTEM MAP Children can press various points on a map to learn the role various arroyos and channels play in our stormwater system and how to keep from polluting that system.

"SCOOP THE POOP" GAME Children can select the dog they want and learn how to pick up after that dog. Information panels explain how to properly dispose of dog and cat waste and also explore common types of hazardous materials that pollute the Rio Grande, endangering the wildlife and people who rely on the river.

INTERACTIVE EDUCATIONAL SCREEN allows children to watch a variety of educational videos produced by the Stormwater Team and reminds them that everything they throw on the ground flows to the Rio Grande.

For more information visit **www.keeptheriogrand.org**

- An interactive stormwater system map of the Middle Rio Grande that allows children to press various points to learn the roles arroyos and channels play in the stormwater system and how to keep from polluting that system. The system stretches from Bernalillo on the north through Rio Rancho and into Albuquerque.
- A "Scoop the Poop" game that allows children to choose a dog and learn how to properly pick up after their dog. This is important because pet waste is a major source of *E. coli* contamination in the Rio Grande.
- An educational panel on common types of trash, debris and chemicals that pollute the Rio Grande including appliances and electronics; automotive products such as oil, batteries and gasoline; fertilizers and pesticides; household cleaners, yard waste; and prescription and over-the-counter medicines.
- A touchscreen that includes facts about each arroyo and the Rio Grande.
- A touchscreen that allows viewers to select and watch stormwater-related videos:
  - Rio the Duck
  - Keep the Rio Grande
  - Scoop the Poop!
  - 100 Billion Gallons
  - Arroyo Safety
  - Respect Your Arroyos

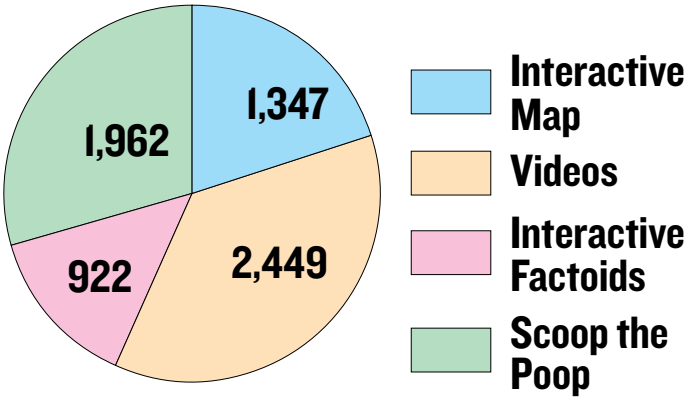
The software platform on the kiosk was upgraded to allow the games to be posted on websites and played online.

From November 1, 2018 to June 30, 2019, 48,256 people visited the Rudolfo Anaya North Valley Library and had the opportunity to view information presented by the kiosk and interact with the kiosk *(the kiosk was undergoing upgrades between July 1 and October 30.)*

Of the 48,256 visitors, approximately 6,680 (primarily) children interacted with the kiosk.

Total estimated number of people reached by these educational activities: 48,256
Permit Reference(s): Part 1.C.2.b(i)(e) Discharges to Impaired Waters with an Approved TMDL, Impairment for Bacteria; Part 1.C.3.a Endangered Species Act Requirements, Dissolved Oxygen Strategy; Part 1.D.5.c(i) (f) and (h) Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations; Part 1.D.5.e Illicit Discharges and Improper Disposal; Part 1.D.5.e Control of Floatables; Part 1.D.5.g, Public Education and Outreach on Stormwater Impacts.
Audience(s): Children, Adults

Additional analytics can be found in Exhibit 3.



Total people interacting with kiosk: 6,680

Number of Views by Video

Date	Rio the Duck	Keep the Rio Grand	Scoop the Poop!	100 Billion Gallons	Arroyo Safety	Respect Your Arroyos
Nov-18	75	47	81	33	43	25
Dec-18	60	27	48	3	36	2
Jan-19	60	52	80	43	28	--
Feb-19	100	60	11	61	21	--
Mar-19	87	37	100	43	30	--
Apr-19	36	16	53	31	25	--
May-19	74	27	66	37	35	--
Jun-19	119	80	148	71	33	--

Stormwater Kiosk Interactive Metrics

Month	Metric	Map	Videos	Factoids	Scoop the Poop
Nov-18	People	173	306	12	218
	Touches	1720	306	366	533
Dec-18	People	122	223	84	162
	Touches	1587	223	252	409
Jan-19	People	167	283	12	235
	Touches	1743	283	32	598
Feb-19	People	178	376	13	263
	Touches	1928	376	39	675
Mar-19	People	198	327	13	280
	Touches	2331	327	360	730
Apr-19	People	132	18	75	211
	Touches	1536	18	12	378
May-19	People	158	270	10	259
	Touches	1862	270	22	567
Jun-19	People	219	483	15	334
	Touches	3436	483	356	822

STUDENTS AND TEACHERS REACHED THROUGH PARTNER EDUCATIONAL PROGRAMS – ARROYO CLASSROOM, RIVERXCHANGE AND BOSQUE ECOSYSTEM MONITORING PROGRAM (BEMP)

Arroyo Classroom

The Arroyo Classroom program utilizes natural arroyos as outdoor classrooms and brings native animals into the classroom to educate third grade students about the watershed and its importance as wildlife habitat. In the 2018-2019 school year, the program served 34 classes within the Rio Rancho Public School System, reaching approximately 34 teachers and 790 students.

For more information, see Exhibit 4, Arroyo Classroom's 2018-2019 report to the Mid Rio Grande Stormwater Quality Team.

RiverXchange

RiverXchange is an innovative, long-term outreach program that integrates water resource topics with computer technology, student writing and a hands-on curriculum to meet specific, measurable outcomes.

Since 2007, the program has enabled upper elementary classes from New Mexico to become "high tech pen pals" with classes outside the state to share what they learn about the geography, culture and ecology of their local river and watershed. Including these partner classes, the program has served over 18,000 students during the last 12 years. Each student spends about 25 hours engaged with the program over the course of the school year. The curriculum incorporates hands-on activities and multiple classroom presentations by local water resources experts. During the 2018-2019 season, 36 fifth-grade classes, 20 of which were Title I schools, participated in RiverXchange in New Mexico. RiverXchange worked with 22 classes (558 students) in Bernalillo County and 14 classes (396 students) in Sandoval County.

For more information, see Exhibit 5, RiverXchange's 2018-2019 report to the Mid Rio Grande Stormwater Quality Team.

BEMP

The main objective of the *Stormwater Science* outreach education program of the Bosque Ecosystem Monitoring Program (BEMP) is to teach students that the health of the Rio Grande is directly related to the health of the surrounding watershed. The *Stormwater Science* program includes a 1.5-hour classroom activity, and a 4-to 5-hour study trip to the Rio Grande. During the 2018-2019 school-year 2017 students and 547 teachers participated in *Stormwater Science* activities in their classrooms, in the field or both. The classroom program was delivered to 599 students in 33 classrooms at 13 different schools in Rio Rancho, Albuquerque and Belen.

For more information, see Exhibit 6, BEMP's 2018-2019 report to the Mid Rio Grande Stormwater Quality Team.

Total estimated number of people reached by these educational activities: 9,604
Permit Reference(s): Part 1.C.2.b(i)(e) Discharges to Impaired Waters with an Approved TMDL, Impairment for Bacteria; Part 1.C.3.a Endangered Species Act Requirements, Dissolved Oxygen Strategy; Part 1.D.5.c(i)(f) and (h) Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations; Part 1.D.5.e Illicit Discharges and Improper Disposal; Part 1.D.5.e Control of Floatables; Part 1.D.5.g, Public Education and Outreach on Stormwater Impacts; Part 1.D.5.h Public Involvement and Participation.
Audience(s): Children, Adults

PUBLIC EDUCATION CAMPAIGNS ON PROPER DISPOSAL OF FATS, OILS & GREASE

In November and December 2018, the City of Rio Rancho ran a public education campaign on how to dispose of cooking grease properly. The campaign was timed to coincide with the holiday cooking season (Thanksgiving through Christmas). The FOG campaign included:

Digital Outdoor Boards – Alternating the red and green images, two boards ran for two weeks (11/12-11/25) and four boards ran one week (11/19-11/25). In December, all six boards ran the week before Christmas (12/17-12/23). A total estimated audience of 184,321 adults (18 years of age and older) with duplication was reached.

Movie Theaters – One 30-second spot played in Rio Rancho's 14-plex Premiere Theater for two weeks in November (11/16-11/22) and two weeks in December (12/15-12/28), reaching approximately 28,000 people with possible `duplication.

In addition, the City of Rio Rancho published an article in its Fall-Winter 2018 newsletter. *"Fats, Oils and Grease Can Harm Water Pipes"* offered information about the damage fats, oils and grease can do to sewer mains. The newsletter was mailed to 37,000 water utility customers.

Total estimated audience reached: 249,321
Permit Reference(s): Part 1.C.2 Discharges to Impaired Waters with and without an Approved TMDL; Part 1.C.3.a; Endangered Species Act Requirements, Dissolved Oxygen Strategy; Part 1.D.5.c(i)(f) Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations; Part 1.D.5.e Illicit Discharges and Improper Disposal; Part 1.D.5.g, Public Education and Outreach on Stormwater Impacts.
Audience(s): Children, Adults

Fats, Oils and Grease Can Harm Water Pipes

PIPES CLOGGED WITH DISCARDED FAT can cause raw sewage to back up into your home or overflow into parks, yards and streets. They cause:

- Increased calls for a plumber.
- Unpleasant and expensive cleanups at your expense.
- Potential contact with disease-causing organisms.
- Increased cost for local sewer departments, causing higher sewer bills for all customers.

Avoid clogged pipes – never pour grease down a sink or into a toilet.

- Scrape grease and food scraps into a disposable container, or place in a trash can (after cooling).
- Don't put food scraps in the garbage disposal – this shreds solids into smaller pieces but doesn't prevent grease from going down the drain.
- Use a strainer in the sink to catch food scraps and other solids.

NEVER POUR
Fats, Oils or Grease
Down the Drain.
It Can Clog Sewer Pipes.

ALWAYS PUT
Cooled Fats, Oils or
Grease in the Trash.
Keep Sewer Pipes Clog-Free.

505.896-8715 · rrnm.gov

Get Your **FREE**
"Cease the Grease" Spatula*
Stop by the Utilities Department Environmental Programs
(City Hall Room 250)
**While supplies last*

Rio Rancho Utilities :: Fall-Winter 2018 :: 3

ARROYO SAFETY CAMPAIGN

MRGSQT member SSCAFCA continued its Arroyo Safety Campaign by producing a one-minute video in collaboration with the Rio Rancho High School Tree Stewards group geared toward high school students. Conceptualized by the students, the spot uses humor to share arroyo safety messages and emphasize the importance of keeping trash and debris out of arroyos.

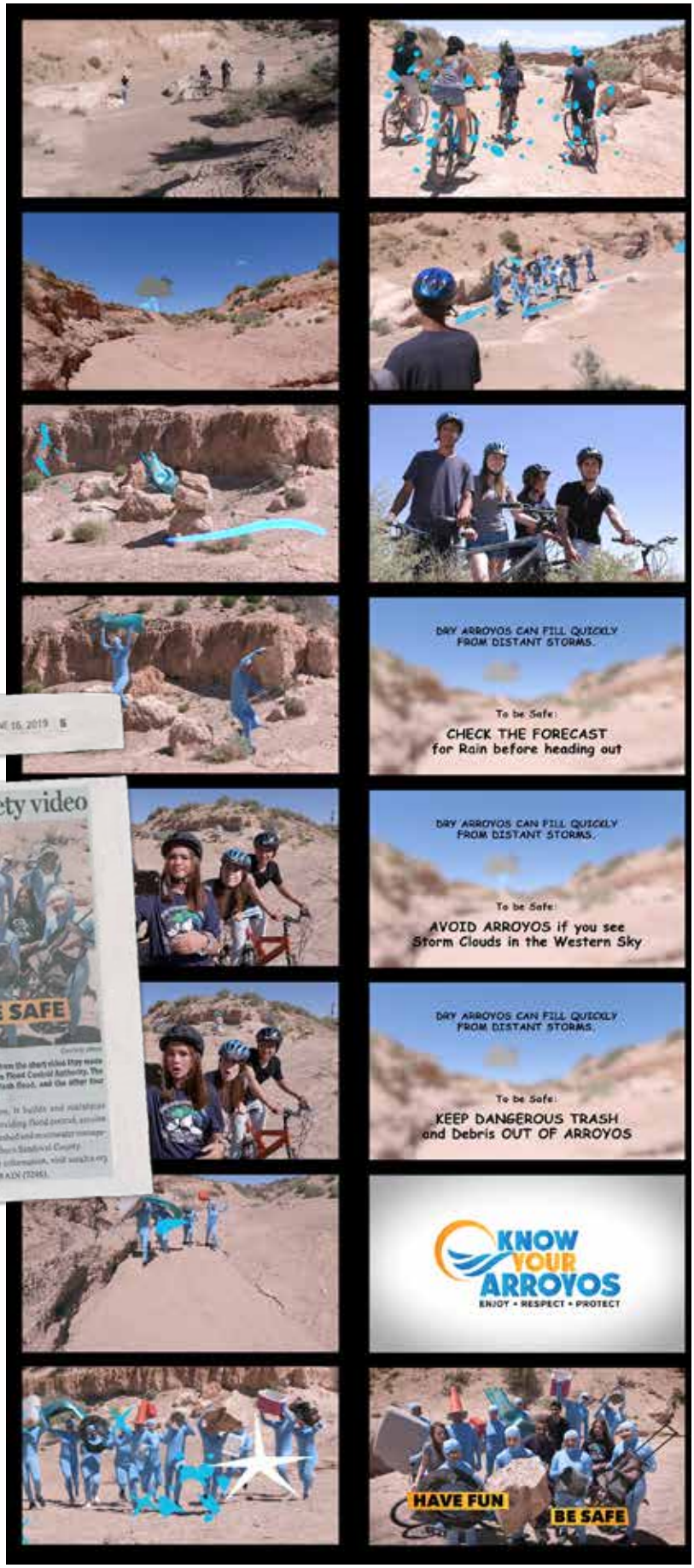
The video was posted on the Stormwater Quality Team's website **www.keeptheriograng.org,** YouTube, Instagram, Facebook and, of course, SSCAFCA's website. Analytics indicate that the spot garnered 5,152 views on social media, earned 46 Facebook followers and 593 "likes." The spot also ran for two weeks in Rio Rancho's 14-plex Premiere Theater, where it reached 14,000 people. To see the spot visit: **https://www.sscafca.org/know-your-arroyos/**

In addition, the *Rio Rancho Observer* ran an article about the spot, reaching 23,500 people.

NEWS RROBSERVER.COM | SUNDAY, JUNE 16, 2019 5

SSCAFCA report creates humorous flash-flood safety video

HAVE FUN BE SAFE



Total estimated audience reached: 43,291
Permit Reference(s): Permit Reference(s): Part 1.C.2 Discharges to Impaired Waters with and without an Approved TMDL; Part 1.C.3.a Endangered Species Act Requirements, Dissolved Oxygen Strategy; Part 1.D.5.c(i)(f) and (h) Pollution Prevention/ Good Housekeeping for Municipal/Co-permittee Operations; Part 1.D.5.e Illicit Discharges and Improper Disposal; Part 1.D.5.g, Public Education and Outreach on Stormwater Impacts.
Audience(s): All ages, especially high school students

SSCAFCA also created and ran alternating ads in the *Rio Rancho Observer* during monsoon season.

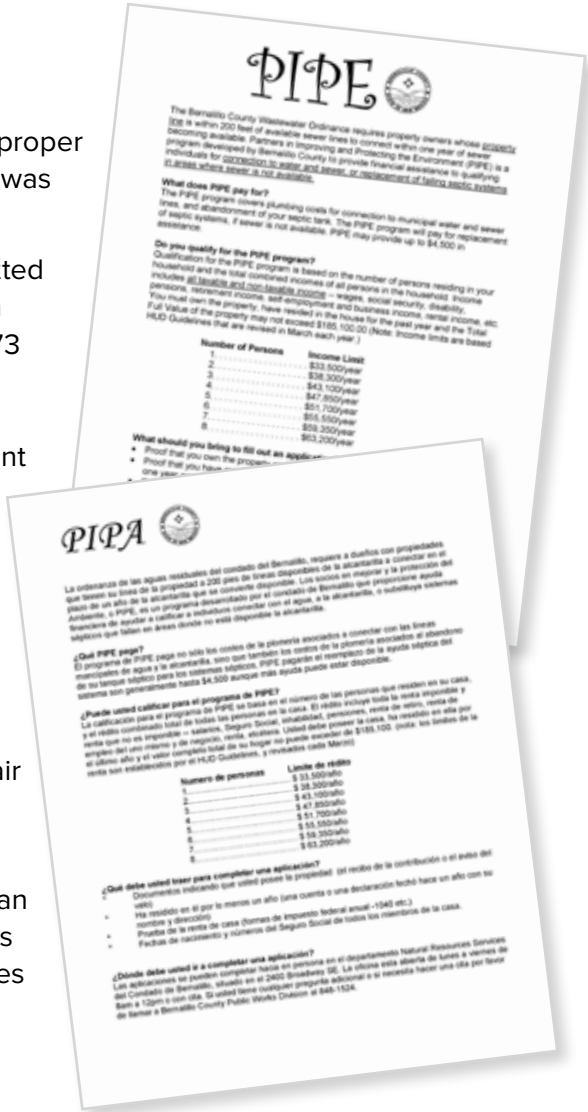
Total estimated audience reached: 94,000
Permit Reference(s): Part 1.D Stormwater Management Program; Part 1.C.2 Discharges to Impaired Waters with and without an Approved TMDL; Part 1.D.5.c(i)(f) and (h) Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations; Part 1.D.5.g, Public Education and Outreach on Stormwater Impacts.
Audience(s): All ages

SEPTIC SYSTEM EDUCATION, OUTREACH AND ENFORCEMENT PROGRAM

Bernalillo County administers the septic system permitting program in the unincorporated portions of Bernalillo County under the Bernalillo County Wastewater Ordinance, ensuring the proper disposal of septic waste and proper operation and maintenance of septic systems. The wastewater ordinance was passed in 2015.

The County began a campaign in 2012 to get unpermitted systems permitted or properly abandoned, with an established goal of contacting a minimum of 300 unpermitted system or aging system owners per year. To date, 1,773 system owners have been contacted, resulting in 813 responses and 727 resolved. Resolution means either no system was present or the property was vacant; resulted in permit or connection to sewer or repair/replacement to get into compliance; or intended/listed for clerk filing or future legal action (in process and determination). In FY19, the County targeted the East Mountain Area, including the Upper Tijeras Arroyo watershed, and closed 233 septic systems.

Beginning in 1993, the PIPE Program has provided assistance to income-qualified residents by providing contractors to connect residences to water and sewer services. Beginning in 1998, the TANK Program provides assistance to income qualified residents with the replacement and/or repair of failing septic systems in areas of the County without sewer availability.



Total estimated audience reached: 1,500
Permit Reference(s): Part 1.C.2.b(i)(e) Discharges to Impaired Waters with an Approved TMDL, Impairment for Bacteria; Part 1.C.3.a Endangered Species Act Requirements, Dissolved Oxygen Strategy; Part 1.D.5.e Illicit Discharges and Improper Disposal; Part 1.D.5.g, Public Education and Outreach on Stormwater Impacts.
Audience(s): Adults

NM STATE FAIR PARADE FLOAT

AMAFCA created a float for the State Fair Parade, which takes place every September in Albuquerque. With signs saying “Keep the Rio Grand” and “There is No Poop Fairy,” the team borrowed a concept developed by Greenville County Soil and Water Conservation District in South Carolina. A staff member dressed up as the “Poop Fairy” and tossed Poop Emoji Squeezies to the crowd.

Total estimated audience reached: 50,000
Permit Reference(s): Part 1.C.2.b(i)(e) Discharges to Impaired Waters with an Approved TMDL, Impairment for Bacteria; Part 1.D.5.e Illicit Discharges and Improper Disposal; Part 1.D.5.e Control of Floatables; Part 1.D.5.g, Public Education and Outreach on Stormwater Impacts; Part 1.D.5.h, Public Involvement and Participation.
Audience(s): All ages

CHILDREN’S WATER FESTIVAL

The 2018 Children’s Water Festival was held October 22-23, 2018 at the Santa Ana Star Center in Rio Rancho. An estimated 1,500 fourth-grade students attended from 64 classrooms and one group of home-schoolers.

The Festival serves to educate fourth-grade school children about water and its relationship to humans, animals and other natural resources in a fun and interactive atmosphere. Its vision is to introduce students and teachers to new ideas, options, and solutions so they will conserve and protect water for the future; lay the foundation for further learning; and reach as many students and teachers as possible.

Total estimated audience reached: 1,500
Permit Reference(s): Part 1.C.2.b(i)(e) Discharges to Impaired Waters with an Approved TMDL, Impairment for Bacteria; Part 1.C.3.a Endangered Species Act Requirements, Dissolved Oxygen Strategy; Part 1.D.5.c(i)(f) and (h) Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations; Part 1.D.5.e Illicit Discharges and Improper Disposal; Part 1.D.5.e Control of Floatables; Part 1.D.5.g Public Education and Outreach on Stormwater ImpactsAudience
Audience(s): fourth-graders

For more information, see Exhibit 7, Children’s Water Festival Report, 2018-2019

HOUSEHOLD HAZARDOUS WASTE COLLECTION

Total estimated participants (includes City of Albuquerque, Bernalillo County and AMAFCA): 14,648
Permit Reference(s): Part 1.C.2.b(i)(e) Discharges to Impaired Waters with and without an Approved TMDL; Part 1.D.5.c(i)(f) Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations; Part 1.D.5.e Illicit Discharges and Improper Disposal; Part 1.D.5.e Control of Floatables; Part 1.D.5.g Public Education and Outreach on Stormwater Impacts
Audience(s): Adults

For more detailed breakdowns please see Exhibit 8.

Diverted from Landfill by City of Albuquerque and Bernalillo County (includes recycled and destroyed) – Weight in pounds	
FISCAL YEAR 2018-2019	
July 2018	39,373
August 2018	42,054
September 2018	39,728
October 2018	29,818
November 2018	37,332
December 2018	14,723
January 2019	24,021
February 2019	34,877
March 2019	23,120
April 2019	34,670
May 2019	39,664
June 2019	44,389
TOTAL	**403,769 lbs.**

Diverted from River by AMAFCA	
FISCAL YEAR 2018-2019	
Trash Removed	**1,858 cubic yards**
Vegetation Removed	**150 cubic yards**
Sediment Removed	**53,948 cubic yards**
Homeless Debris Removed	**50 cubic yards**
Dog Waste Removed	**6,142 lbs.**

Diverted from Landfill at 10 Household Hazardous Waste collection events in East Mountains, Northeast Heights and South Valley by Bernalillo County	
FISCAL YEAR 2018-2019	
TOTAL COLLECTED	**11,570 lbs.**

DONATIONS/SPONSORSHIPS

Stormwater Team members donated $139,000 to organizations for additional educational and training programs:

MEMBER	AMOUNT DONATED	RECIPIENT	PURPOSE
City of Albuquerque	$43,000	The Nature Conservancy	For Education and Outreach
AMAFCA	$2,000	Land and Water Summit	For Public Involvement and Participation
AMAFCA	$5,000	2018 EPA Region 6 Stormwater Conference	For Public Involvement and Participation
Bernalillo County	$5,000	Land and Water Summit	For Public Involvement and Participation
Bernalillo County	$5,000	2018 EPA Region 6 Stormwater Conference	For Public Involvement and Participation
Bernalillo County	$75,000	BEMP	For Education and Outreach
City of Rio Rancho	$10,000	Children's Water Festival	For Education and Outreach
City of Rio Rancho	$2,000	Land and Water Summit	For Public Involvement and Participation
Mid Rio Grande Stormwater Quality Team	$5,000	Land and Water Summit	For Public Involvement and Participation
SSCAFCA	$2,000	Land and Water Summit	For Public Involvement and Participation
SSCAFCA	$1,000	Children's Water Festival	For Education and Outreach

ESTIMATED TOTAL NUMBER OF PEOPLE REACHED THROUGH ALL ADVERTISING, EDUCATIONAL AND PUBLIC OUTREACH ACTIVITIES DURING 2018-2019:

Obviously, some people were reached by more than one activity, but in gross numbers an estimated **581,448** people were reached with a stormwater quality/stormwater pollution prevention message during the 2018-2019 fiscal year.

Exhibit 1
Event Participation 2018-2019

NAME OF PROGRAM/EVENT	EVENT DATE	TYPE OF AUDIENCE	MS4 CATEGORY	TOTAL REACHED	NOTES
2018					
Rocky Mountain Youth Corp w/Rio Rancho for AMAFCA cleanup at North Diversion Channel	7/7/18	Youth, Adults	SWP	25	Rolling River presentation
National Association of Flood & Stormwater Management Agencies (NAFSMA) Annual Meeting in Santa Fe, NM	7/11/18	Adults	SWP	250	AMAFCA, SSCAFCA, and BernCo delivered presentations.
"There is No Poop Fairy" float in State Fair Parade	7/13/18	All Ages	AS, PW, SWP	50,000	Provided education information about Scoop the Poop, There is no Poop Fairy, why it is important to pick up after your pet as well as proper household hazardous waste disposal.
Environmental Fair at Isleta Youth Center	7/14/18	All Ages		400	
EPA Region 6 Stormwater Conference "Stormwater Permitting"	8/19-23/2018	Adults	SWP	350	AMAFCA delivered 5 presentations at the EPA R6 conference, and hosted field trips at two water quality facility and a design charrette at another water quality facility. Bernalillo County delivered 3 presentations including watershed-based plan implementation, outreach and education, and GI/LID impediments. AMAFCA and Bernalillo County also co-chaired planning of conference.
Welcome Day for UNM Students	8/21/18	College Students	SWP	106	Rolling River presentation
Cancer Services of NM Retreat at Marriott Pyramid	9/9/18	Adults	SWP	25	Rolling River presentation
RMYC/BCMN Rolling River training at Valle de Oro National Wildlife Refuge	9/15/18	Adults	SWP	10	Rolling River presentation
Enviroscape demo for NMED DOE Oversight at Los Alamos	9/18/18	Adults	SWP	10	Enviroscape presentation
East Mountain Celebration at Los Vecinos Community Center	9/23/18	Adults	SWP	500-600	Natural Resources Services table in Bernalillo County tent. Provided information to educate County residents on stormwater quality, water conservation methods and incentive programs, and groundwater monitoring program
Corrales Harvest Festival	9/29-30, 2018	All Ages	AS, PW, SWP	10,000	Booth handing out information, SWAG and collecting surveys to determine public knowledge regarding stormwater issues
Environmental Science class presentation at Nex+Gen Academy	10/2/18	Students	SWP	60	Enviroscape presentation
USFS Mexico Interdependence Day at NHCC	10/6/18	Adults	SWP	25	Rolling River presentation
CNM Environmental Science class ES presentation at Sanchez Farm	10/8/18	Students	SWP	25	Enviroscape presentation
RiverXchange watershed presentation at Bandelier Elementary	10/17-18, 2018	Children	SWP	100	RiverXchange presentation to four 4th grade classes
Rio Rancho Children's Water Festival	10/22/18	Elementary Students and Teachers	SWP	1,500	Students attended from 64 classrooms and one small group of home-schoolers; Bernalillo Elementary School, St. Thomas Aquinas, and all of the elementary schools in Rio Rancho Public Schools. The students attend three 30-minute presentations in a half-day format. Up to 17 classes from three to four schools were on-site at one time. Schools attended a morning or afternoon program.

AS: Animal Sources
CON: Construction
HHW: Household Hazardous Waste
ID: Illicit Discharges
PW: Pet Waste
SSS: Septic & Sanitary Sewer Systems
SWP: General Stormwater Pollution Prevention

NAME OF PROGRAM/EVENT	EVENT DATE	TYPE OF AUDIENCE	MS4 CATEGORY	TOTAL REACHED	NOTES
Children's Water Festival	10/21/18	Children	SWP	125	Rolling River presentation
Children's Water Festival	10/22/18	Children	SWP	125	Rolling River presentation
EPA R6 Manager's Meeting in Dallas, TX	10/25/18	Adults	SWP	50	AMAFCA and BernCo presented at the EPA R6 Manager's Meeting in Dallas, TX;
Animal Humane's Doggie Dash and Dawdle	11/4/18	All Ages	AS, PW, SWP	4,000	Animal Humane's signature event and largest fundraiser
John Baker	12/3/18	All Ages	SWP	31	Planted 27 poles
Colinas del Norte	12/7/18	All Ages	SWP	43	Planted 24 poles
CdN*	12/11/18	All Ages	SWP	53	Planted 45 shrubs
GOK	12/14/18	All Ages	SWP	49	Planted 42 poles
2019					
"GSI/LID in Transportation" at 56th Annual UNM Paving & Transportation Conference	1/7/19	Adults	SWP	645	Presentation in cooperation with Tess Houle, MRWM. GI/LID in transporation/streets, disconnected impervious areas, stormwater quality and quantity, stormwater regulations.
Earth Guardians	1/19/19	Students	SWP	15	Planted 70 poles
Troop 444	1/26/19	Students	SWP	9	Planted 48 poles
Jewish Congregation	1/27/19	All Ages	SWP	56	Planted 42 poles
Bosque school	1/30/19	All Ages	SWP	19	Planted 14 poles
KRQE TV interview on "GSI/LID improvements, stormwater qualiy"	1/30/19	Adults	SWP	4,500	KRQE 7am Morning Show | 2nd Street Corridor Projects Open House
Second Street SW Corridor Improvments Ribbon-Cutting Ceremony	1/30/19	Adults	SWP	75	Public ceremony that discussed the improvements along 2nd Street, including GI/LID improvements, with local community
Bosque School	1/31/19	All Ages	SWP	17	Planted 12 poles
Bosque School PM Session	1/31/19	All Ages	SWP	22	Planted 22 poles
Bosque School	2/1/19	All Ages	SWP	17	Planted 12 poles
Peace Corps	2/2/19	All Ages	SWP	35	Planted 70 poles
Bosque School	2/6/19	All Ages	SWP	19	Planted 9 poles
7 Bar	2/7/19	All Ages	SWP	59	Planted 17 poles
Sunport Commerce Center Public Meeting at Mountain View Community Center	2/7/19	Adults	SWP	50	The proposed design overlay will establish additional criteria in order to achieve quality development of this plan area beyond what is currently required under its existing industrial zone designation. The design overlay process includes but is not restricted to architecture, landscaping, fencing and walls. The public meeting will provide an overview of the design overlay process and the draft document. Included stormwater quality improvements.
Cub Scout Pack	2/9/19	All Ages	SWP	20	Planted 27 poles
Holy Ghost	2/13/19	All Ages	SWP	54	Planted 68 poles
Monte Vista (reschedule)	2/15/19	All Ages	SWP	22	Planted 38 poles
UNM Water Resources Class	2/15/19	College Students	SWP	20	AMAFCA gave presentation.
2019 BEMP Crawford Symposium	2/15/19	All Ages	SWP	500	AMAFCA mentored a student group that presented on water quality data.
Enterprise company	2/23/19	Adults	SWP	6	Planted 36 poles
Landscape for Life Training at Hubble House	2/23/19	Adults	SWP	55	Residential stormwater management- rain gardens, rainwater catchment, residential stormwater quality

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NAME OF PROGRAM/EVENT	EVENT DATE	TYPE OF AUDIENCE	MS4 CATEGORY	TOTAL REACHED	NOTES
New Mexico Land and Water Summit	2/27-3/1/2019	Adults	SWP	137	Provided sponsorship of $5000 - Attendees included professionals, hydrology, landscape architecture, landscaping, engineering. AMAFCA hosted a field trip at a water quality facility and was a member of the planning committee for the 2019 Land and Water Summi
Whittier	3/22/19	All Ages	SWP	9	Planted 10 shrubs
Inez Elementary	3/28/19	All Ages	SWP	77	Planted 68 shrubs
Holy Ghost	4/3/19	All Ages	SWP	39	Planted 55 poles
Cancer Services of NM Retreat at Marriott Pyramid	4/14/19	Adults	SWP	30	Rolling River presentation
Earth Day Event	4/20/19	All Ages	SWP	300	
Annunciation Catholic School Earth Day	4/26/19	Students	SWP	25	Rolling River presentation
Bosque School Earth Day	4/26/19	Students	SWP	60	Enviroscape presentation
Earth Day Celebration, Forest Service	4/26/19	Adults	SWP	200	Spoke with Forest Service employees about water conservation programs in Bernalillo County, donated rain barrel for free drawing.
South Valley Pride Day at Westside Community Center	4/28/19	All ages	SWP	2,000	Provided education about land use impacts to stormwater and the river, human activities and their impacts, things kids can do to reduce SW pollution.
Singing Arrow Public Meeting re: Watershed protection	5/16/19	Adults	SWP	12	Meeting with local community to discuss signage project. Community feedback about signage for watershed protection/stormwater quality'
Abrazos Environmental Justice Community Day at Valle de Oro	5/18/19	Adults	SWP	250	Provided education about land use impacts to stormwater and the river, human activities and their impacts, things kids can do to reduce SW pollution.
Abrazos Justice Day	5/18/19	Adults	SWP		Honoring the rights to a healthy environment in which we live, work, play and go to school.
Paws and Claws Family Festival, Bernco County Animal Care and Resource Center Opening event	5/18/19	All ages	AS, PW, SWP	500	Provided education information about Scoop the Poop, There is No Poop Fairy, why it is important to pick up after your pet as well as proper household hazardous waste disposal.
Business outreach	5/19/19	Adults	SWP	530	Brochures developed with stormwater quality information specific to various sectors of business including automotive, parking lots, contractors' yards, landscaping, mobile carpet cleaners, fueling stations, printers.
Copper Spring Cleanup	Spring 2019	Adults	HHW, SWP	58	Collected 35 lbs. of dog poop, 4 bags of trash, 2 bags mixed recycling, 1 5-gal. bucket of glass, 0.5 bags of aluminum, 450 feet of eroded trails closed and planted with cactus, maintenance on 1/2 mile of trail, about 220 feet of trail rerouted
Indian School Spring Cleanup	Spring 2019	Adults	HHW, SWP	46	Collected 90 lbs. dog poop, 2.5 bags of trash, 1 bag mixed recycling, 2 5-gal. buckets of glass, 0.5 bags of aluminum, 1 pallet, 2 sections of wire mesh fencing, maintenance on 3 trails sections, cactus planted to close off several unofficial trails.
Menaul Spring Cleanup	Spring 2019	Adults	HHW, SWP	27	Collected 33 lbs. dog poop, 1 bag of trash, 1 bag mixed recycling, 1 5-gal. buckets of glass, 2 pieces of rebar, 11 golf balls, 420 feet of trail rerouted, 840 feet of trail maintained, cactus planted to close off one trail section

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NAME OF PROGRAM/EVENT	EVENT DATE	TYPE OF AUDIENCE	MS4 CATEGORY	TOTAL REACHED	NOTES
Piedra Lisa Spring Cleanup	Spring 2019	Adults	HHW, SWP	53	Collected 35 lbs. dog poop, 1 bag of trash, 1 bag mixed recycling, 2.5 gal. of glass, 0.5 bags of aluminum, 1000 feet of trail maintained, cactus planted on 5 sections of social trails, several sections of rock steps built
River Cleanup	Spring 2019	Adults	HHW, SWP	60	Collected 9 bags mixed recycling, 3 5-gal. buckets of glass and 1.5 bags of aluminum. Also filled the dump trailer plus 4 pickup trucks with: 3 shopping carts, 1 bath tub filled with medical supplies, 23 tires, 3 mattresses and a jumble of rusty car parts.
Rt. 66 Spring Cleanup	Spring 2019	Adults	HHW, SWP	40	C+A35:F78sh, 1 tire, several pieces of sheet metal, 8 eroded roads closed
TOTAL REACHED				**73,130**	

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Exhibit 2
Sample Surveys and Survey Analytics 2018-2019

Mid Rio Grande Stormwater Quality Team

www.keeptheriogrand.org

Please Tell Us What You Think!

What is your zip code? _____

Please tell us which category best describes your age:

- ☐ Younger than 18
- ☐ 18-30
- ☐ 31-50
- ☐ 51-65
- ☐ Older than 65

Storm water runoff is defined as rainfall that doesn't soak into the ground and collects on the ground surface. Do you think that storm water runoff affects the quality of water in the Rio Grande?

☐ Yes ☐ No ☐ Unsure

Which of the following would you be willing to do or are you currently doing at home or at work to improve the quality of storm water runoff? Check all that apply:

a. Pick up after your dog/pet and dispose of waste in the trash

☐ Currently Do ☐ Will Do ☐ Won't Do

b. Reduce, reuse, and recycle trash

☐ Currently Do ☐ Will Do ☐ Won't Do

c. Pay an additional minor monthly fee on your water bill

☐ Would Do ☐ Won't Do

Note: If you answered "Would Do" above, how much would you be willing to pay?

☐ $1 ☐ $2 ☐ $3 ☐ $5 ☐ more than $5

Turn over to complete the survey

d. Reduce use of toxic chemicals outdoors (pesticides, herbicides, overuse of fertilizers)

☐ Currently Do ☐ Will Do ☐ Won't Do

e. Fix oil leaks on cars or trucks

☐ Currently Do ☐ Will Do ☐ Won't Do

f. Wash vehicle(s) at full- or self-service car wash

☐ Currently Do ☐ Will Do ☐ Won't Do

g. Dispose of household hazardous waste (such as paints or batteries), appliances and electronic devices properly at a collection facility or during a recycling event

☐ Currently Do ☐ Will Do ☐ Won't Do

h. Keep chemicals and trash, including leaf litter from blowers and swimming pool water, out of street gutters

☐ Currently Do ☐ Will Do ☐ Won't Do

Please make any comments below:

_____

_____

_____

_____

_____

_____

_____

_____

If you would like a reply, please list your name and email or daytime phone number:

_____

_____

_____

Stormwater Quality Survey Trends

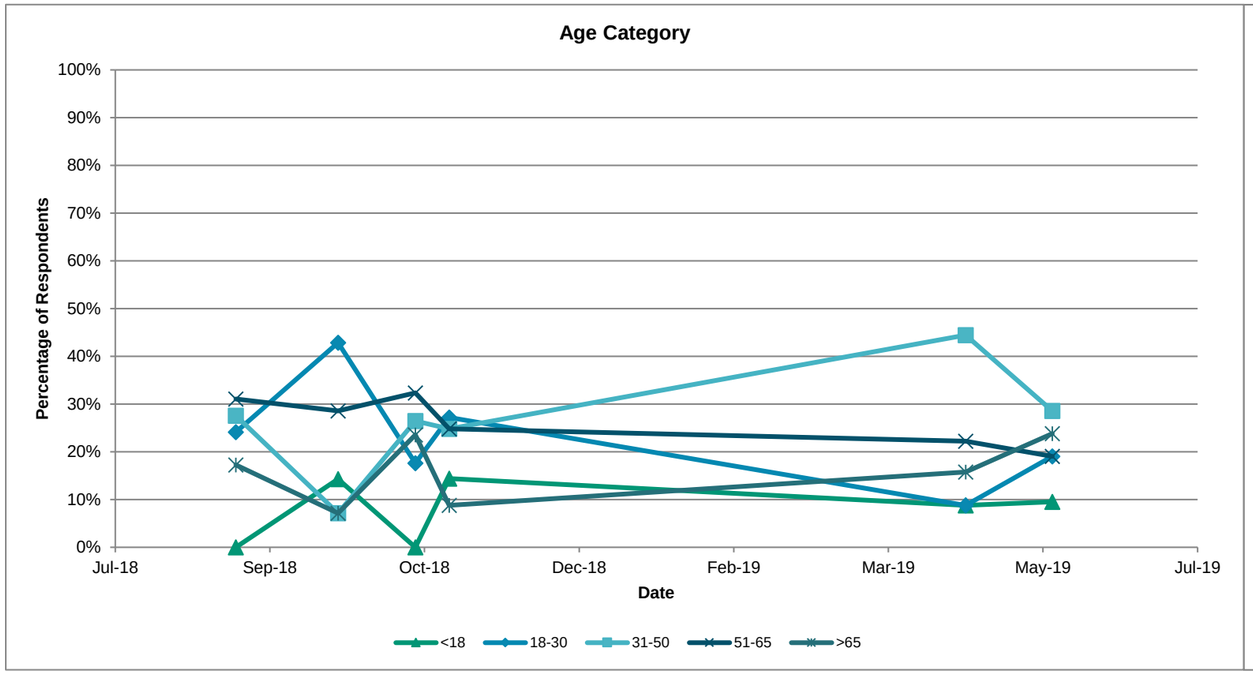
The Middle Rio Grande Storm Water Quality Team organized a short survey addressing various water quality issues affecting the Rio Grande. The following table reflects the tallied results of the 10-question voluntary questionnaire from July 1, 2018 – June 30, 2019.

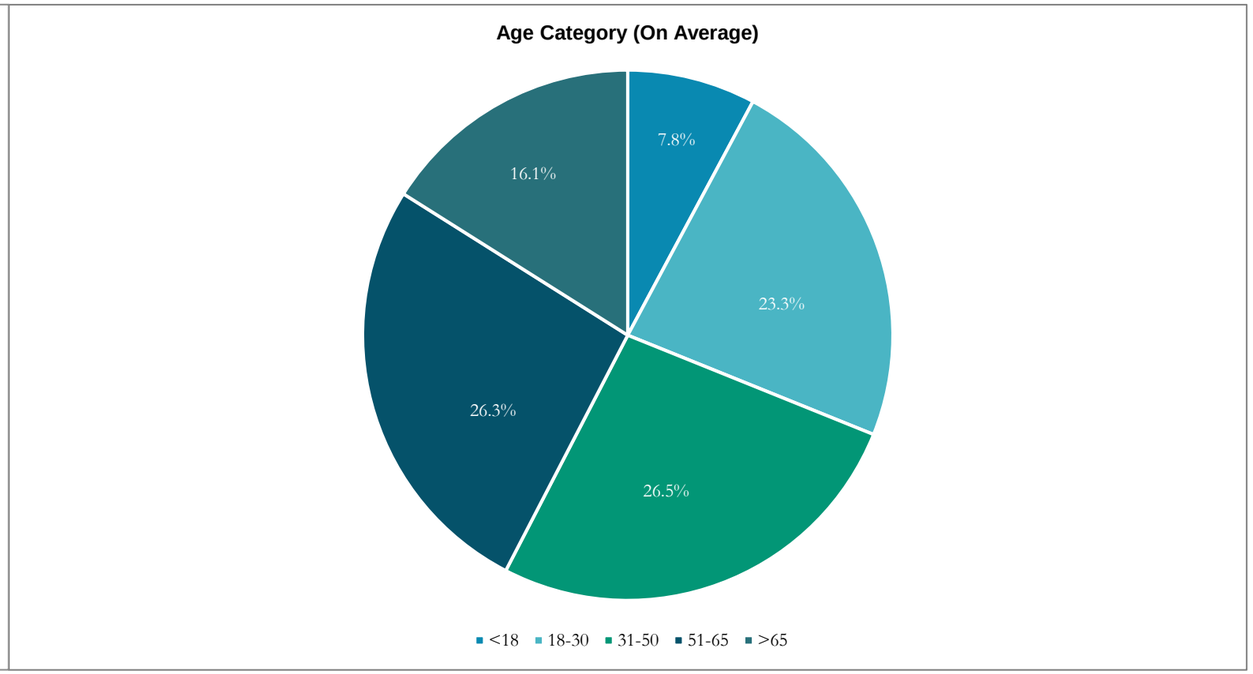
NAME OF EVENT HERE →		*El VdO 2018*	*2018 Harvest*	*Mayors Summit*	*2018 Doggie Dash*	*Earth Fest*	*Vdo 2019*	*AVERAGE % OF RESPONDENTS*
DATE OF EVENT HERE →		**Aug-18**	**Sep-18**	**Oct-18**	**Nov-18**	**Apr-19**	**May-19**	
Survey Question	Answer	% Of Respondents						
Age Category	<18	0%	14%	0%	14%	9%	10%	7.0%
	18-30	24%	43%	18%	27%	9%	19%	19.9%
	31-50	28%	7%	26%	25%	44%	29%	34.7%
	51-65	31%	29%	32%	25%	22%	19%	26.1%
	>65	17%	7%	24%	9%	16%	24%	12.4%
Stormwater Runoff	Yes	72%	85%	82%	79%	82%	86%	80%
	No	7%	8%	9%	4%	5%	0%	5%
	Unsure	21%	8%	9%	17%	13%	14%	15%
Pick up after pet	Currently do	85%	92%	84%	95%	84%	85%	82%
	Will do	15%	8%	16%	4%	11%	15%	14%
	Won't do	0%	0%	0%	1%	5%	0%	4%
Reduce, Recycle, and Recycle Trash	Currently do	83%	85%	94%	94%	83%	95%	89%
	Will do	17%	15%	3%	6%	16%	5%	10%
	Won't do	0%	0%	3%	0%	2%	0%	1%
Pay Minor Fee	Would Do	68%	100%	65%	70%	76%	89%	69%
	Won't Do	32%	0%	35%	30%	24%	11%	31%
If Would Do, How Much?	$1	15%	17%	30%	31%	45%	25%	29%
	$2	35%	17%	30%	27%	23%	13%	24%
	$3	20%	17%	15%	14%	10%	25%	16%
	$5	20%	33%	15%	25%	13%	19%	24%
	>$5	10%	17%	10%	3%	8%	19%	7%
Reduce Use of Toxic Chemicals	Currently do	88%	83%	81%	71%	77%	86%	75%
	Will Do	8%	8%	13%	23%	19%	14%	21%
	Won't Do	4%	8%	6%	6%	5%	0%	5%
Fix Oil Leaks on Vehicle(s)	Currently do	83%	83%	84%	76%	77%	95%	78%
	Will Do	17%	17%	9%	9%	19%	5%	17%
	Won't Do	0%	0%	6%	3%	4%	0%	4%
Wash Vehicles at Full or Self Service Car wash	Currently Do	64%	50%	72%	77%	73%	90%	72%
	Will Do	24%	42%	13%	15%	18%	10%	18%
	Won't Do	12%	8%	16%	8%	9%	0%	10%
Dispose Household Hazardous Waste	Currently Do	72%	67%	94%	71%	73%	81%	75%
	Will Do	28%	33%	3%	26%	25%	19%	21%
	Won't Do	0%	0%	3%	3%	1%	0%	4%
Keep Chemicals/Trash Out of Street Gutters	Currently Do	83%	75%	88%	79%	76%	90%	76%
	Will Do	17%	25%	9%	20%	24%	10%	21%
	Won't Do	0%	0%	3%	1%	1%	0%	3%
Percent of Zip Codes w/in AMAFCA Jurisdiction		88%	71%	96%	83%	90%	85%	72%

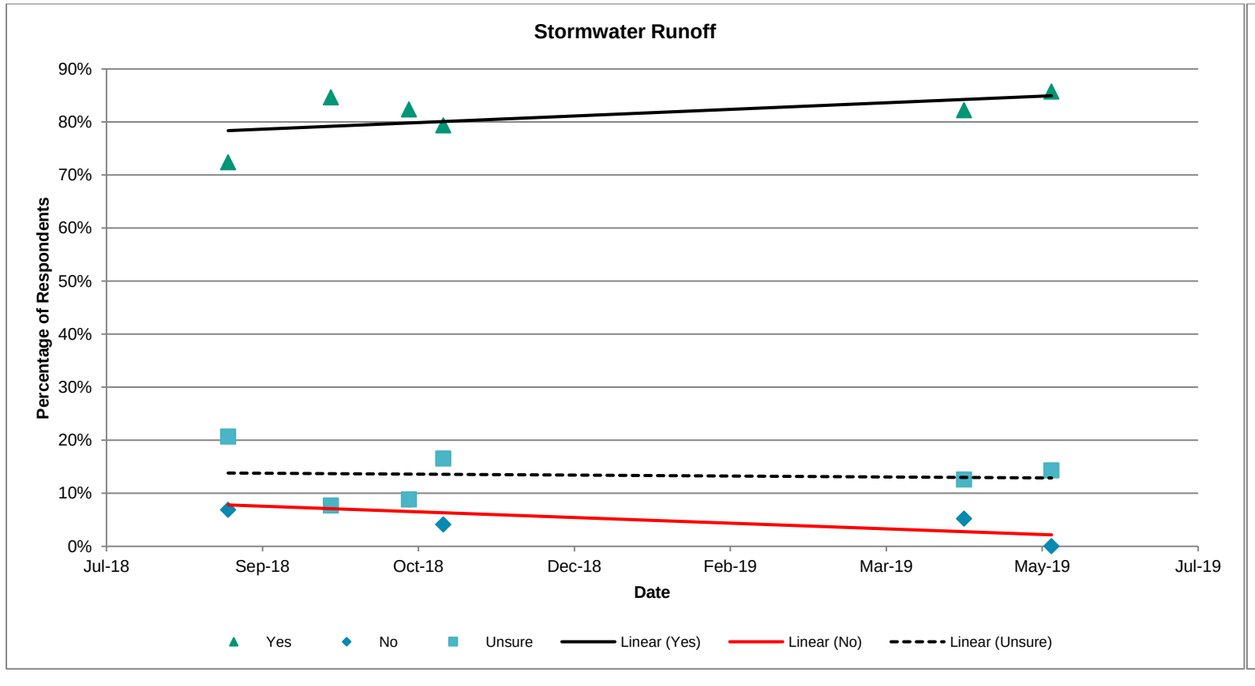
Total Number of Surveys Recorded: 394

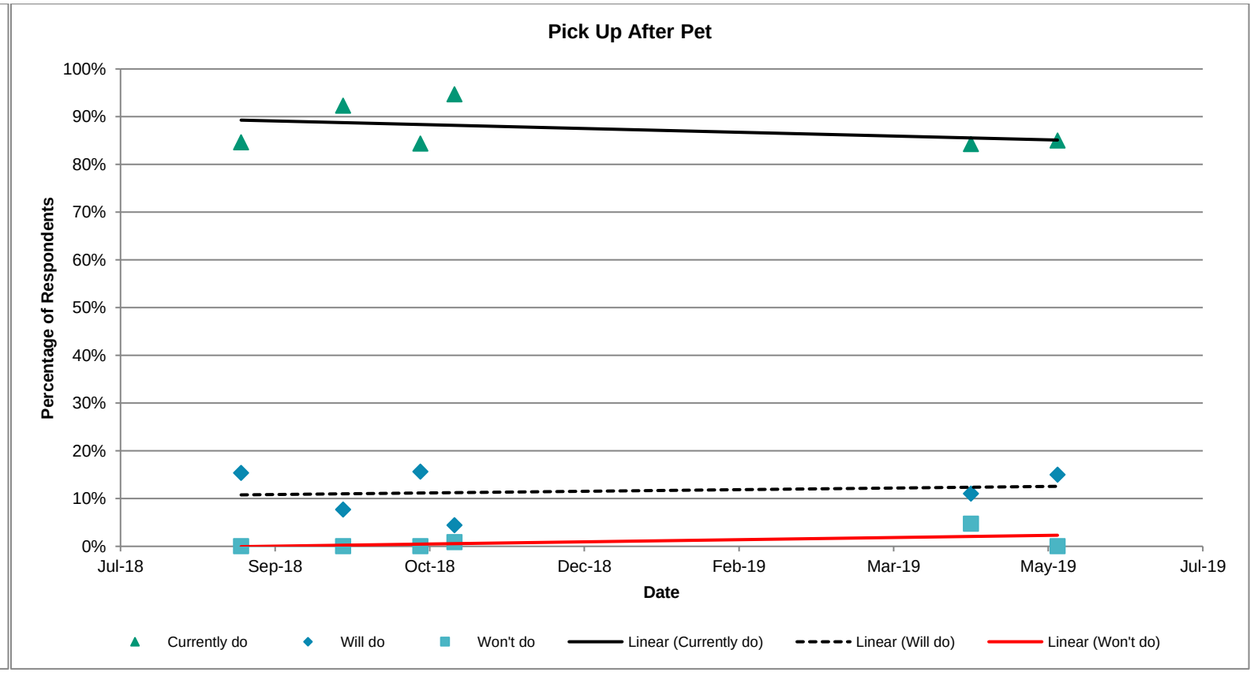
Stormwater Quality Survey Trends

The following graphics show how tallied results vary from event to event over the course of July 2018 to June 2019. A simple linear regression is computed to visualize a very general direction of trend. A more sophisticated confidence analysis is proposed at the end of this report.

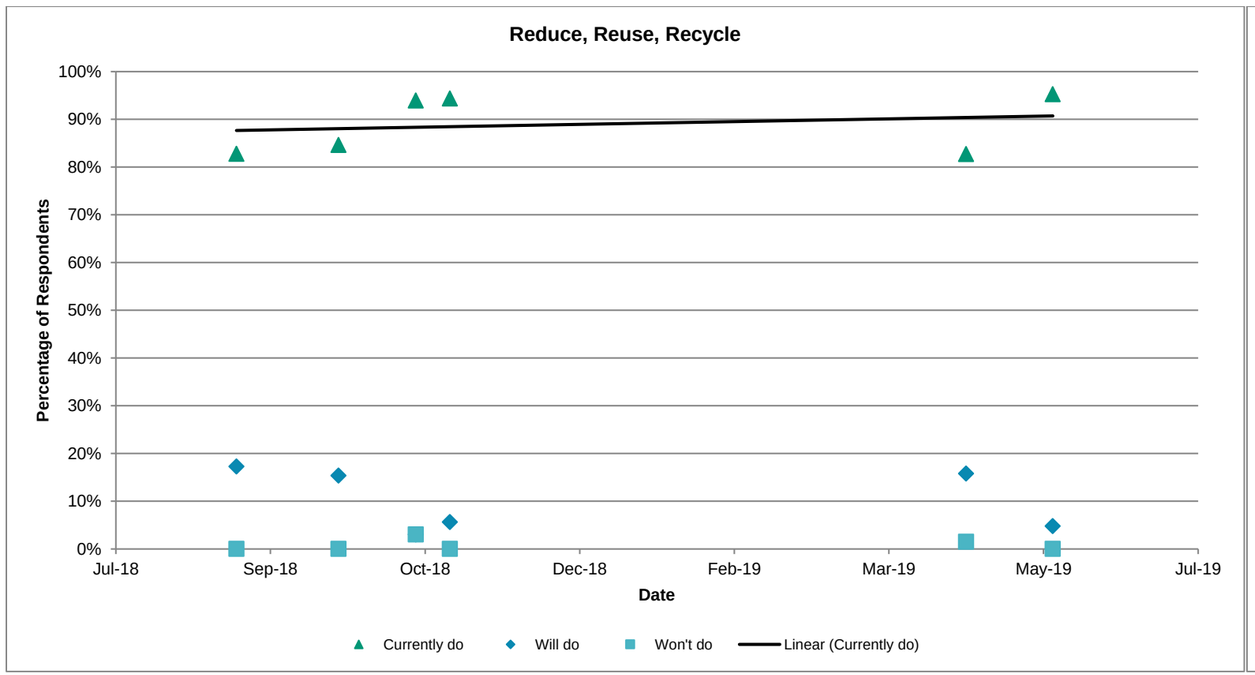


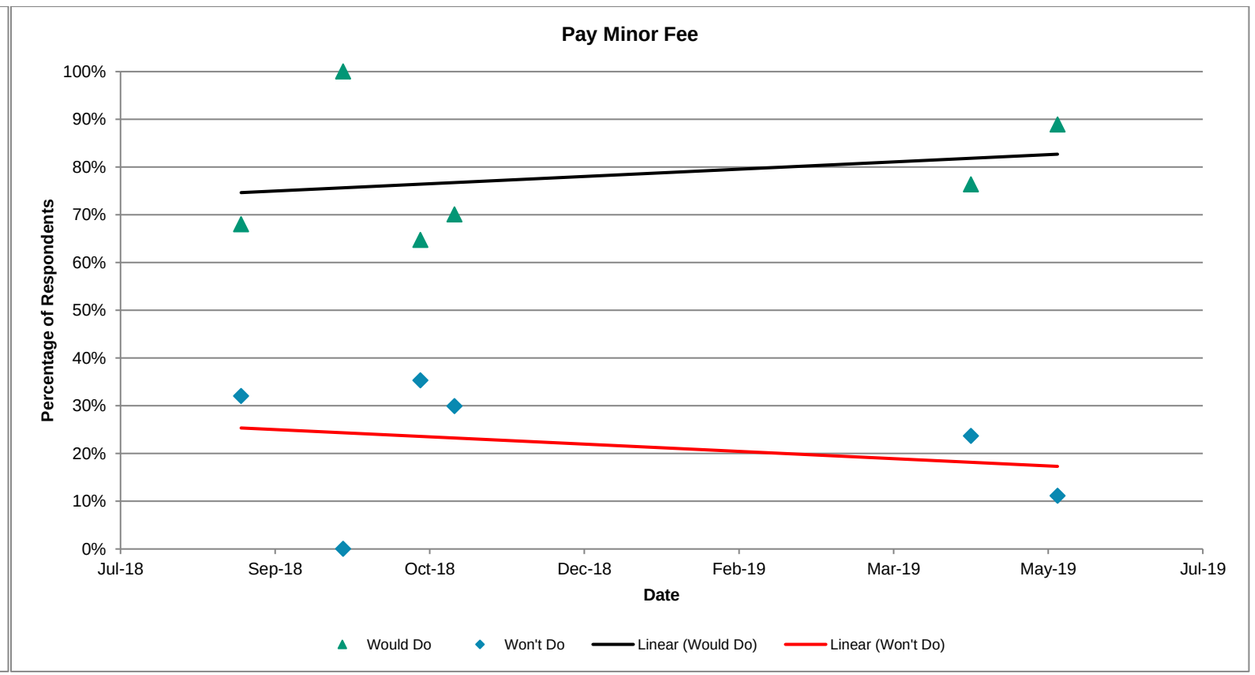


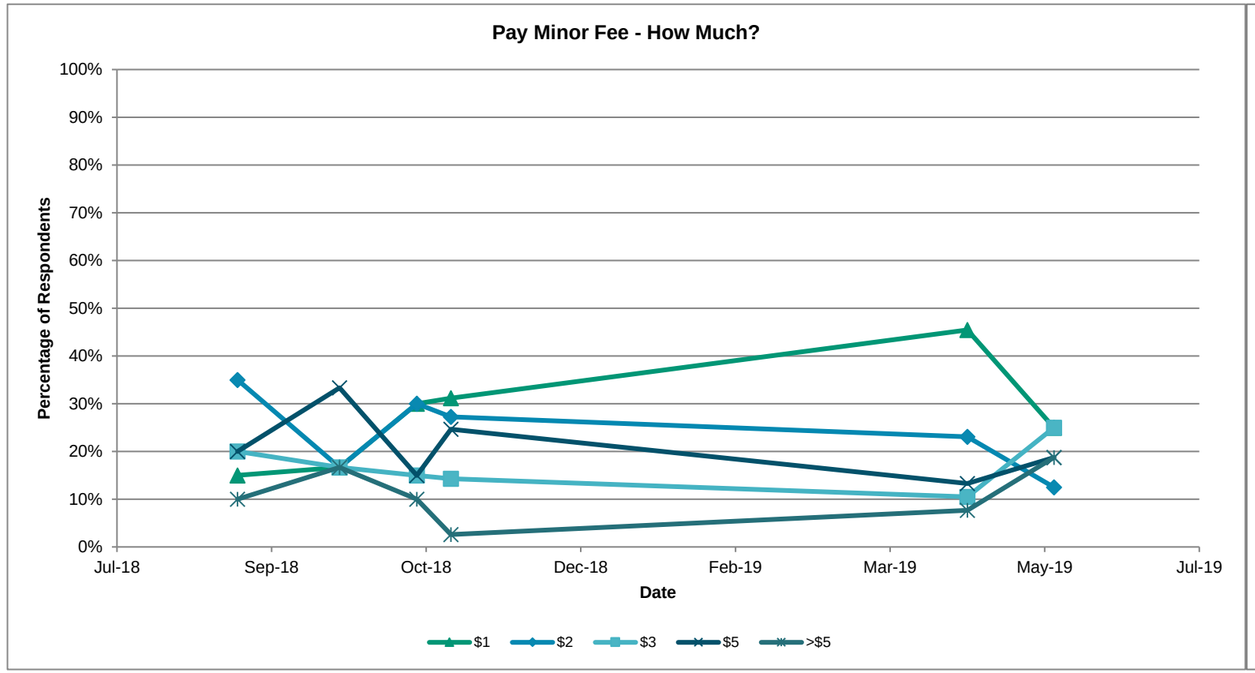


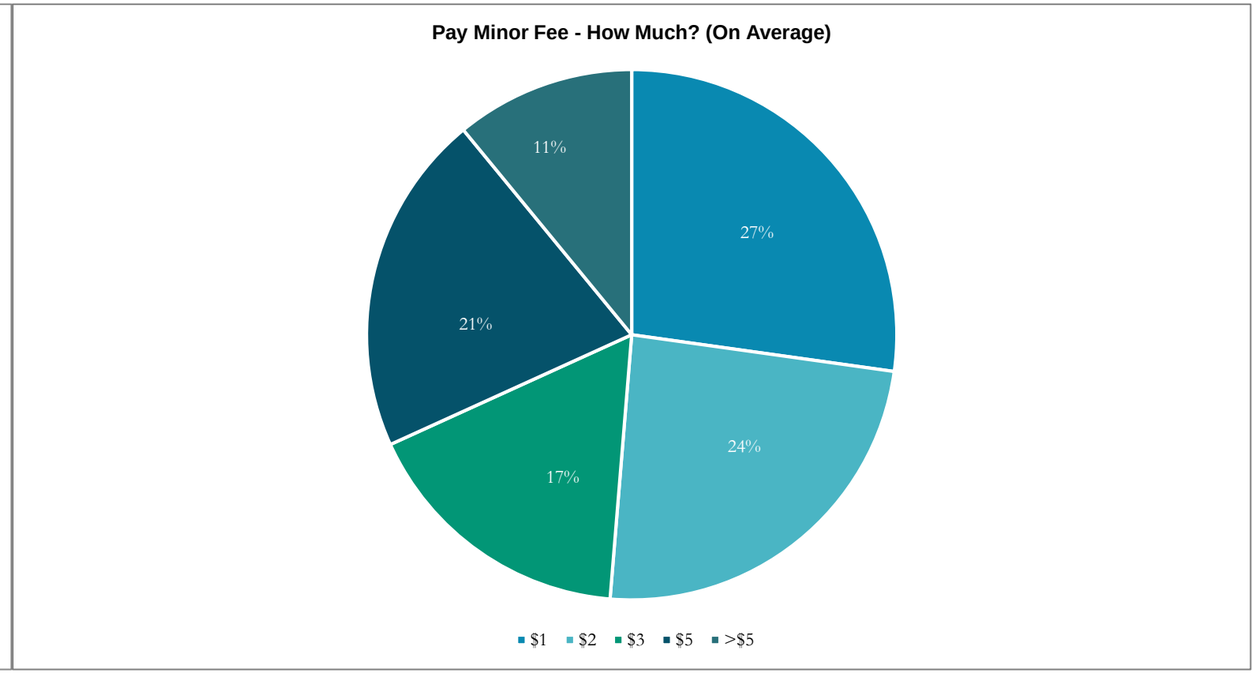


Stormwater Quality Survey Trends

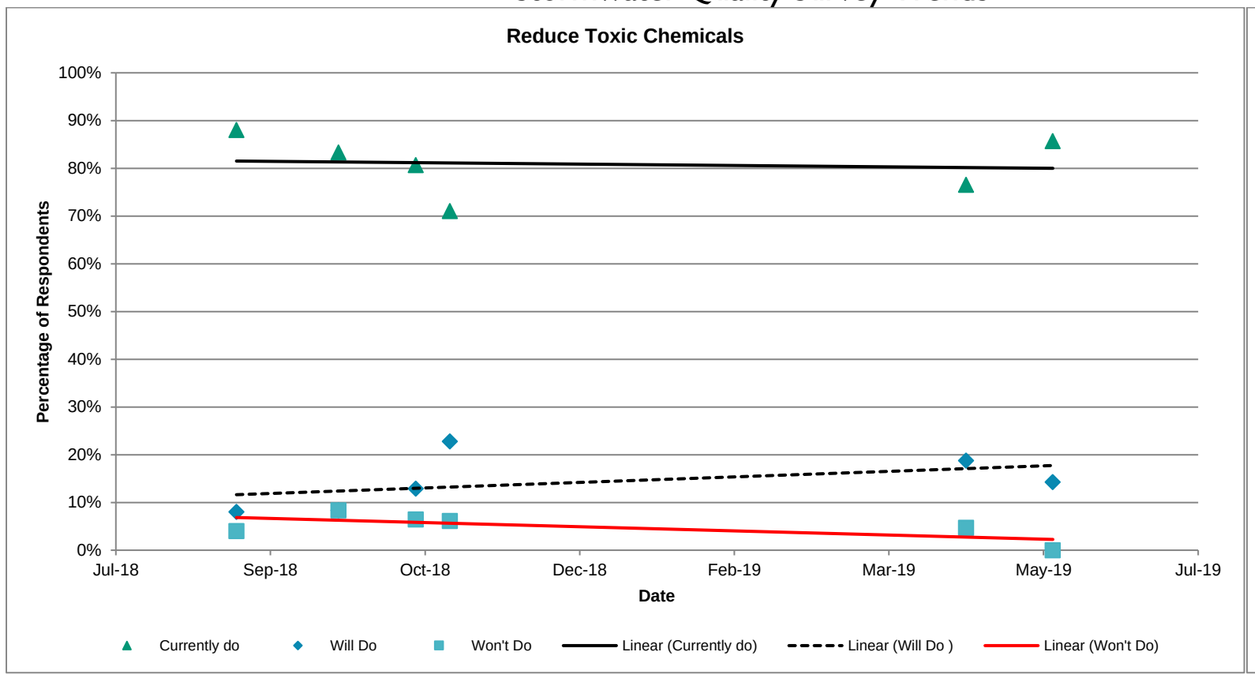


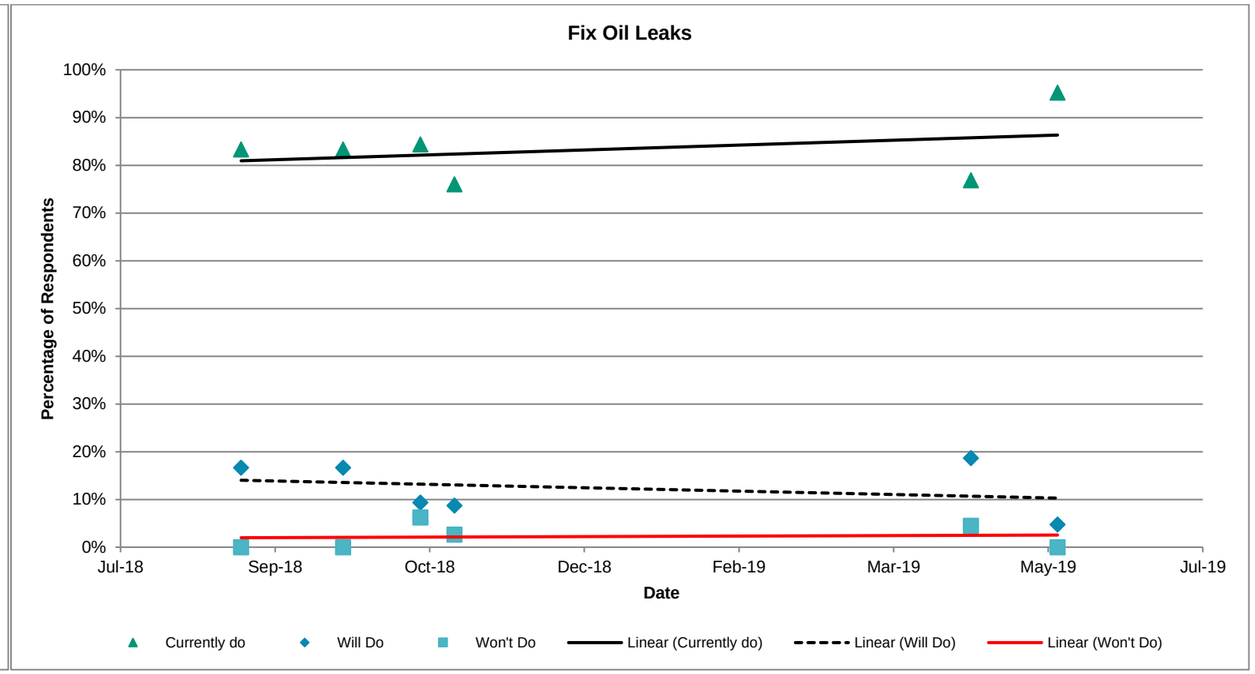


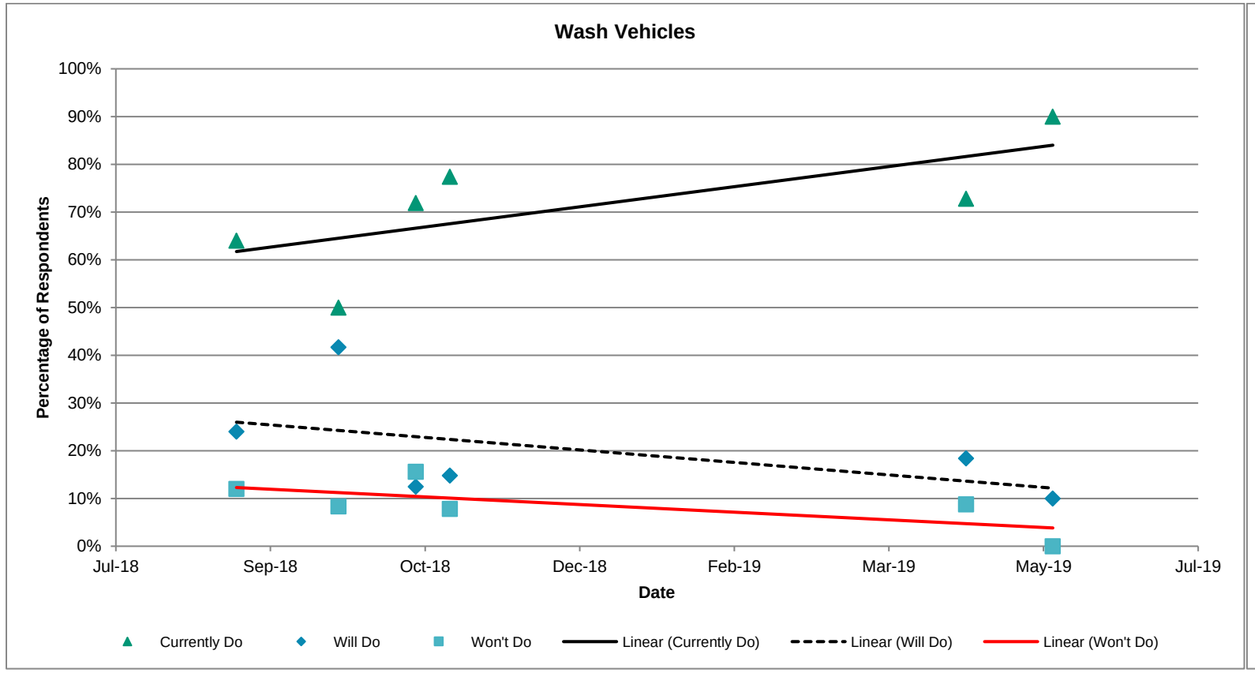


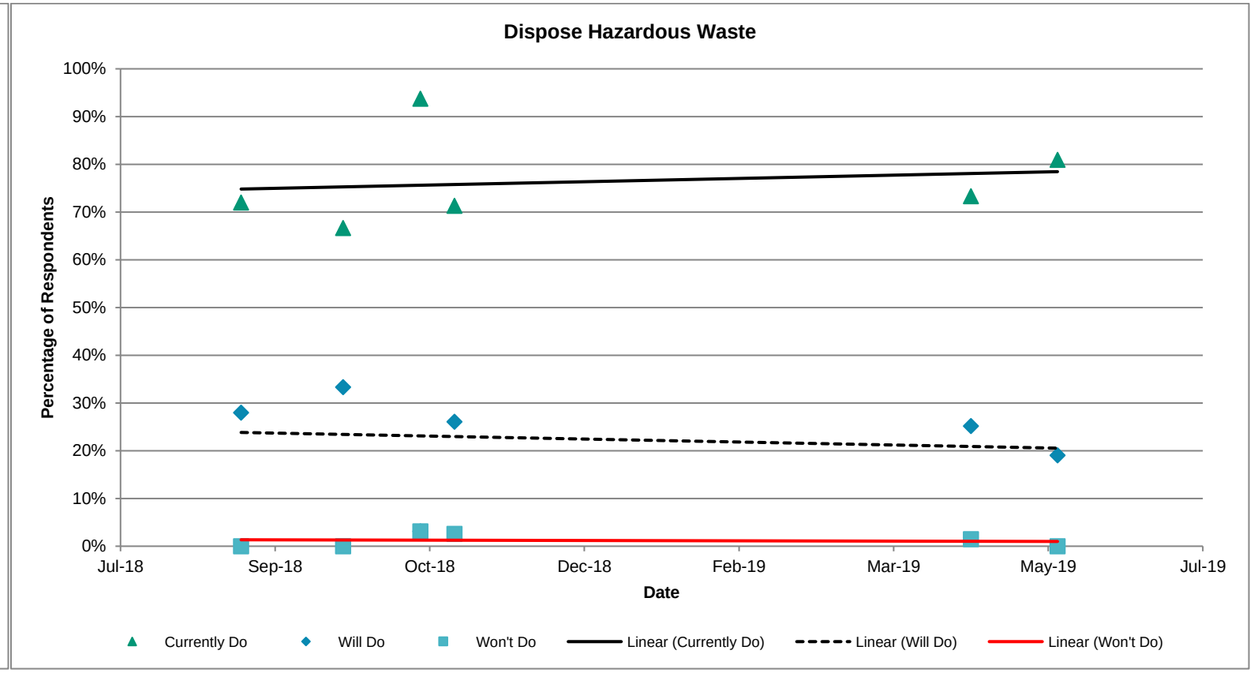


Stormwater Quality Survey Trends

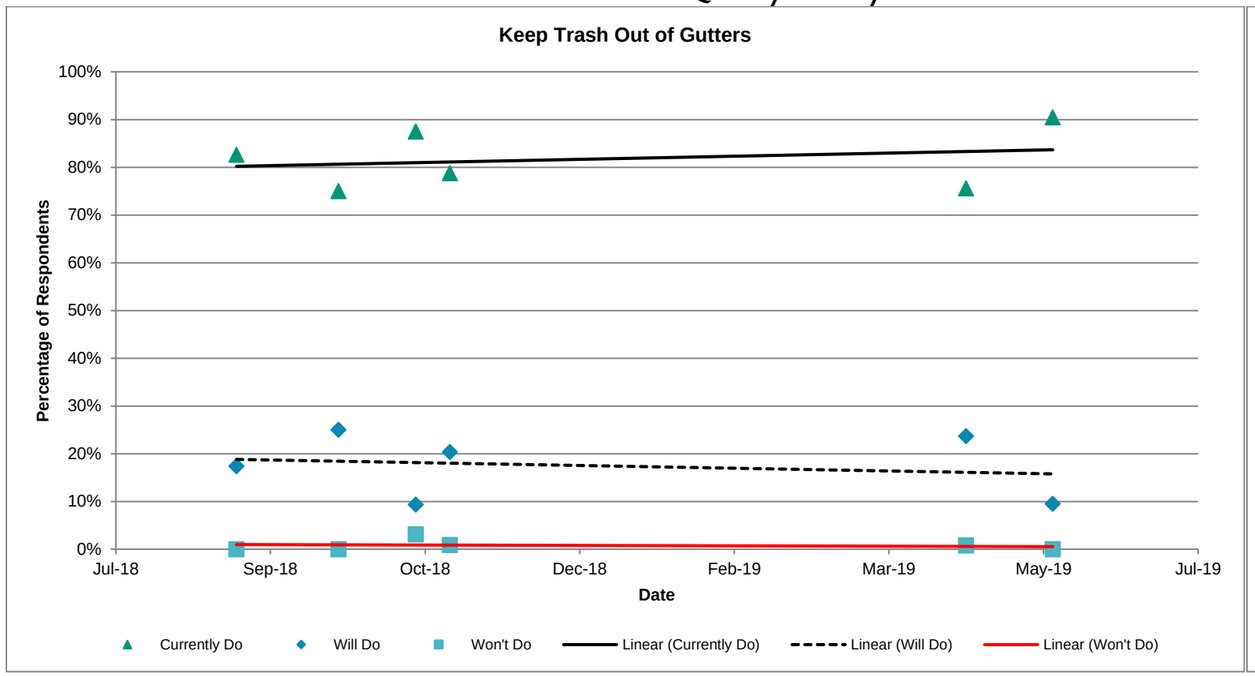


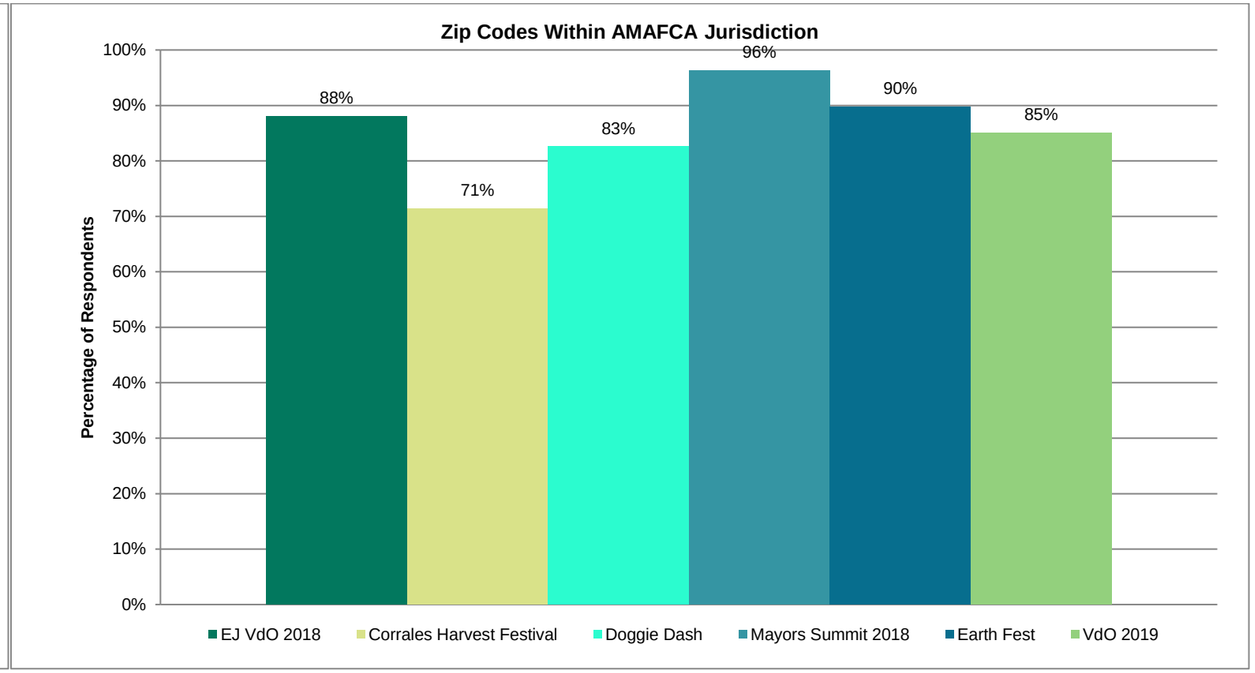




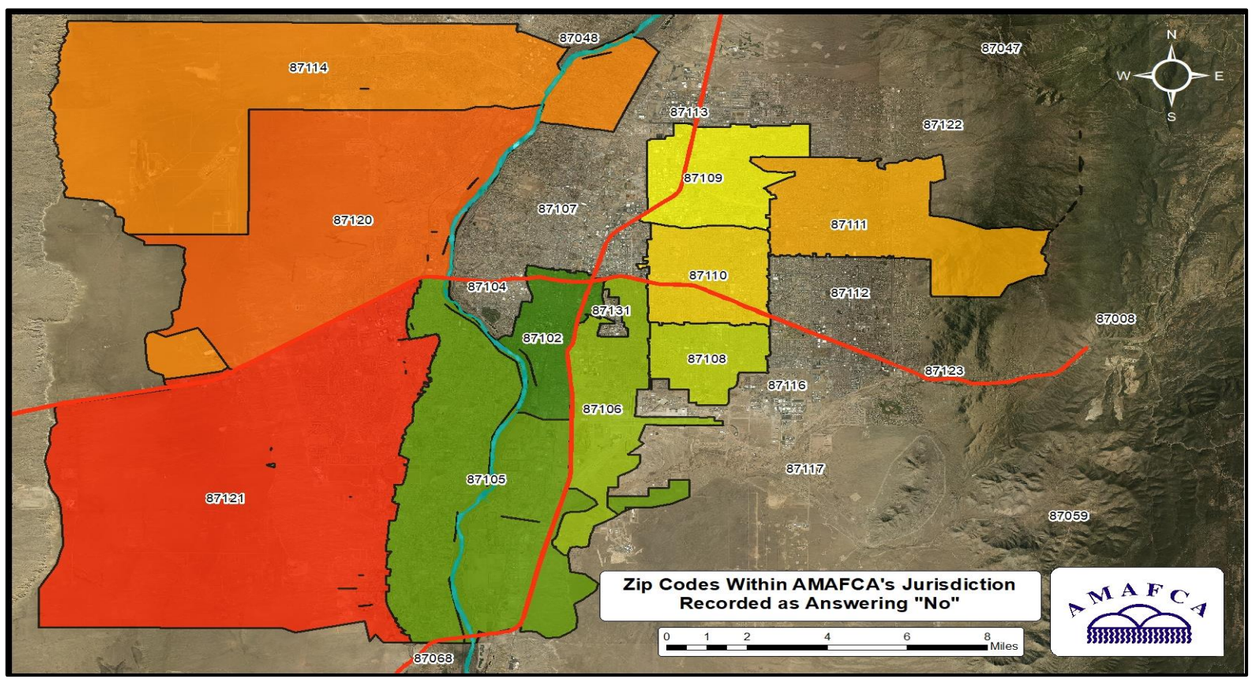


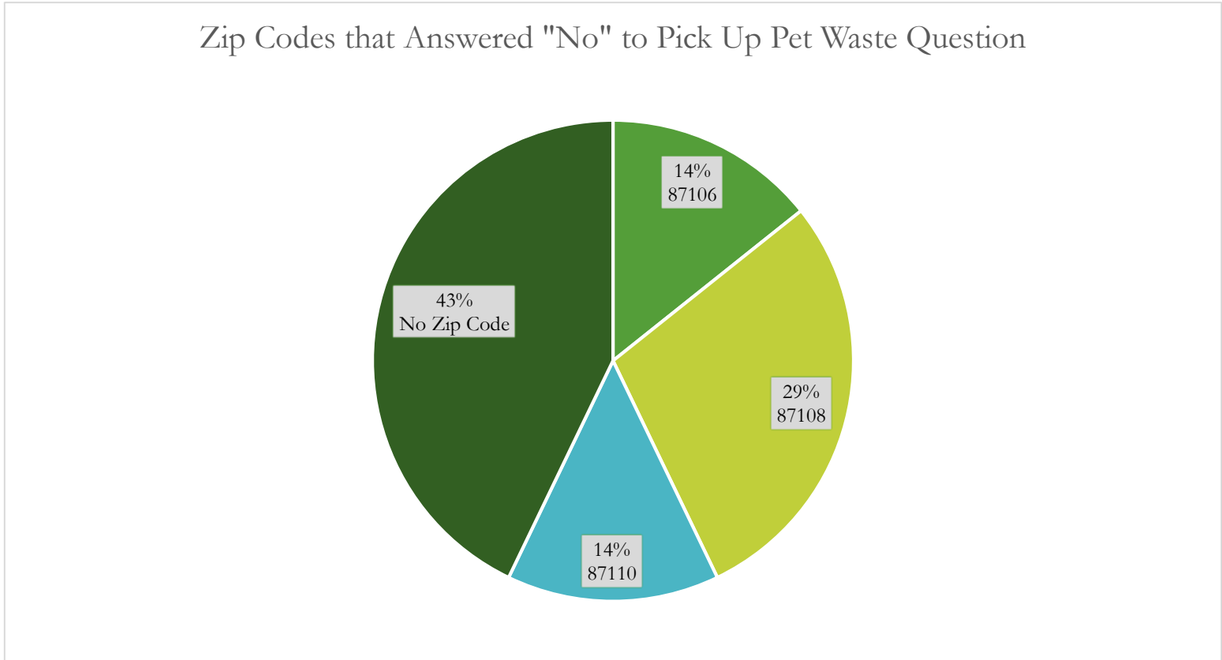
Stormwater Quality Survey Trends





The following graphic describes the tallied results for respondents who answered "No" to the question concerning picking up after pet





Stormwater Quality Survey Trends

Statistics for Pet Waste Question

Answered No to Pick up Pet Waste	Number of Votes	% of Votes
79109		0%
79782		0%
87008		0%
87043		0%
87044		0%
87047		0%
87048		0%
87059		0%
87068		0%
87102		0%
87104		0%
87105		0%
87106	1	14%
87107		0%
87108	2	29%
87109		0%
87110	1	14%
87111		0%
87112		0%
87113		0%
87114		0%
87116		0%
87117		0%
87120		0%
87121		0%
87122		0%
87123		0%
87124		0%
87131		0%
87144		0%
87528		0%
87557		0%
88310		0%
No Zip Code	3	43%

Item	*# of Respondents*	*% of Respondents*
Total Number Who Answered No	7	
Total % w/in AMAFCA Jurisdiction		57%
Total Who Answered "Pet" Question	292	
% of Total "Pet" Votes		2.11%
Total "Already Do"	292	88.22%
Total "Will Do"	32	9.67%
Total "Won't Do"	7	2.11%
Total Question (Summation)	331	100.00%
Error		0%

Stormwater Quality Survey Trends

The following describes the thought process for determining a more statistically relevant analysis of the survey results. A normal distribution was assumed because the average number of survey respondents is n=159 (n>30 generally accepted to assume normal distribution). By using the following equations, we can statistically derive a Margin of Error (MoE) for each question. The following describes the results of the analysis:

- Decided on 80% confidence interval (w/in 1.28 Standard Deviations)
- The following describe the equations used to calculate margin of error:

$$Standard\ Error = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Where $\hat{p}$ is the estimated population proportion (# of respondents), and n is the sample size (total # of people who responded to the survey)

$$Margin\ of\ Error = (1.28 * Standard\ Error) \pm 0.5n$$

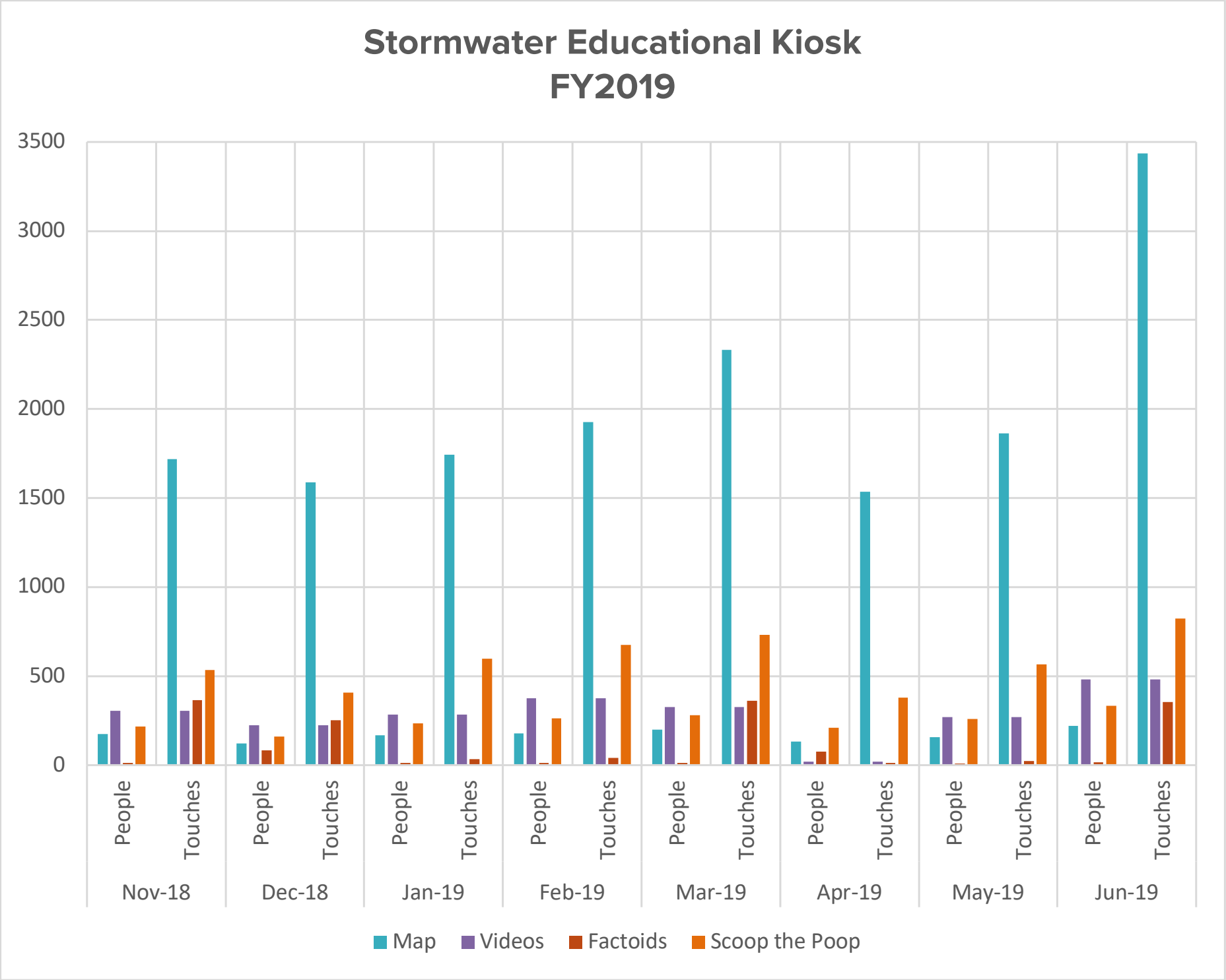
Where 1.28 is the critical value for an 80% confidence interval (z=1.28)

- 19/26 Q's have Standard Error < 5%
- Only 7/26 have Margin of Error < 5%
- Same 7/26 have total Margin of Error < 10%

The third column is read as "81 % sure next event will fall within ± Margin of Error% of the mean"

Survey Question	Answer	Mean ± MoE	Individual (±)		Mean
Stormwater Runoff	Yes	81%±10%	10.1%	BAD	81.1%
	No	05%±7%	7.1%	GOOD	5.5%
	Unsure	13%±9%	8.5%	BAD	13.4%
Pick up after pet	Currently do	88%±8%	8.4%	BAD	87.5%
	Will do	12%±8%	8.2%	BAD	11.5%
	Won't do	01%±2%	2.4%	GOOD	0.9%
Reduce, Recycle, and Recycle Trash	Currently do	89%±9%	8.7%	BAD	88.9%
	Will do	10%±8%	8.3%	BAD	10.3%
	Won't do	01%±3%	2.7%	GOOD	0.8%
Pay Minor Fee	Would Do	78%±8%	8.2%	BAD	78.0%
	Won't Do	22%±8%	8.2%	BAD	22.0%
Reduce Use of Toxic Chemicals	Currently do	81%±10%	9.8%	BAD	80.9%
	Will Do	14%±8%	8.4%	BAD	14.2%
	Won't Do	05%±7%	6.8%	GOOD	4.9%
Fix Oil Leaks on Vehicle(s)	Currently do	83%±10%	9.8%	BAD	83.2%
	Will Do	12%±9%	9.1%	BAD	12.5%
	Won't Do	02%±4%	3.6%	GOOD	2.2%
Wash Vehicles at Full or Self Service Car wash	Currently Do	71%±12%	11.7%	BAD	71.0%
	Will Do	20%±11%	10.6%	BAD	20.2%
	Won't Do	09%±8%	8.2%	BAD	8.8%
Dispose Household Hazardous Waste	Currently Do	76%±11%	10.5%	BAD	76.3%
	Will Do	22%±10%	10.2%	BAD	22.5%
	Won't Do	01%±3%	3.1%	GOOD	1.2%
Keep Chemicals/Trash Out of Street Gutters	Currently Do	82%±10%	10.1%	BAD	81.7%
	Will Do	18%±10%	9.9%	BAD	17.6%
	Won't Do	01%±3%	2.8%	GOOD	0.8%

Exhibit 3
Kiosk Statistics
2018-2019


Stormwater Educational Kiosk
FY2019
3500
3000
2500
2000
1500
1000
500
0
People
Touches
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Map
Videos
Factoids
Scoop the Poop

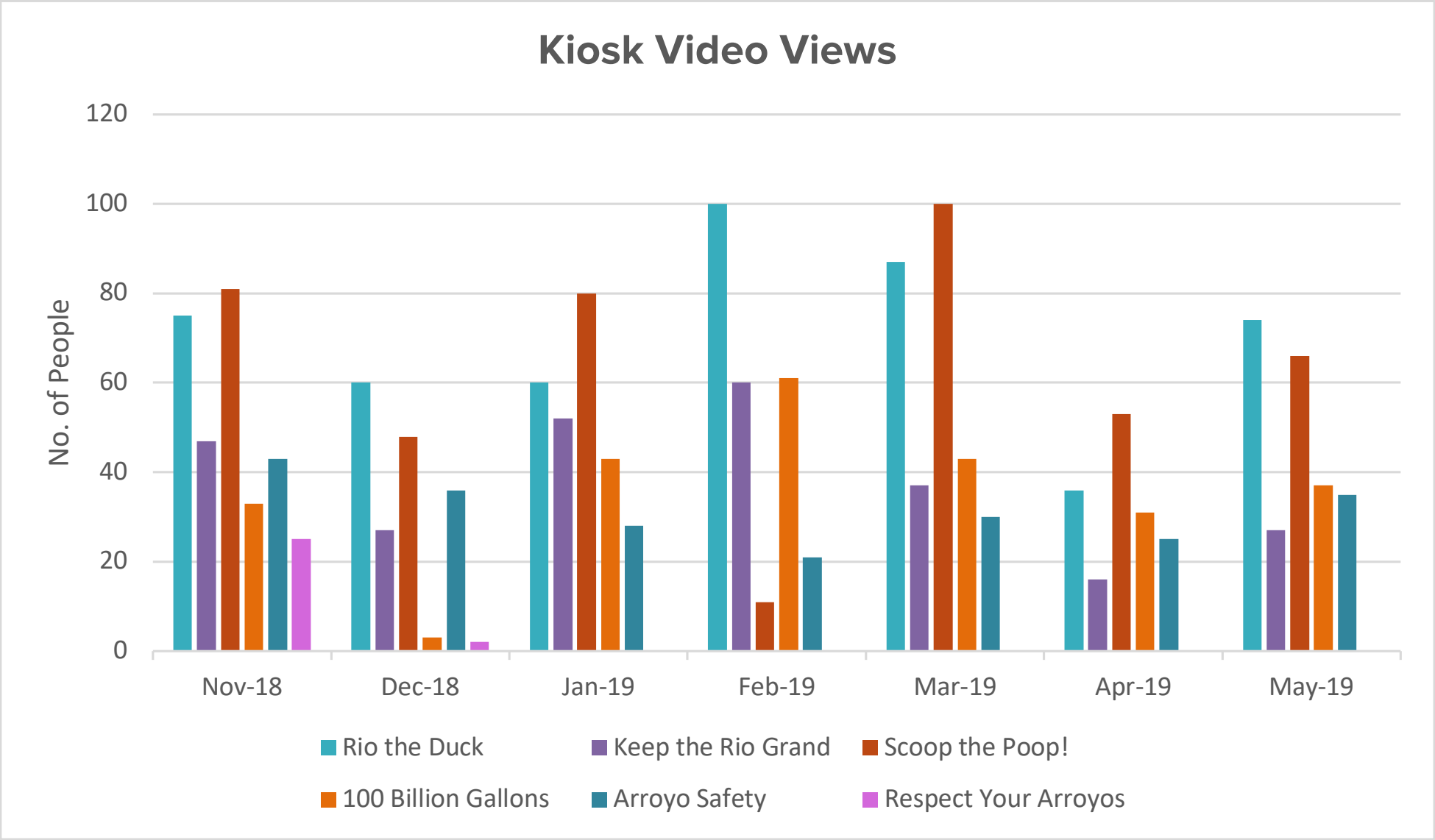

Kiosk Video Views
No. of People
120
100
80
60
40
20
0
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Rio the Duck
Keep the Rio Grand
Scoop the Poop!
100 Billion Gallons
Arroyo Safety
Respect Your Arroyos

Exhibit 4
Arroyo Classroom 2018-2019

Arroyo Classroom

2018 - 2019 final report

submitted by
Melissa McLamb, CSWCD
June 2019

The Arroyo Classroom program utilizes our natural arroyos as outdoor classrooms and brings local animals into the classroom to motivate 3rd graders to respect the arroyos as important wildlife habitat. Orilla Consulting, LLC developed the program in 2012 and initially implemented the program for 7 classes at Maggie Cordova Elementary in Rio Rancho. In 2013, the program grew to serve 20 classes. On July 1st, 2015, Orilla Consulting, LLC transferred the program to Ciudad Soil and Water Conservation District as part of the larger education and outreach efforts we are involved in throughout Bernalillo and Sandoval Counties. In the 2018-2019 school year, we served 34 classes within Rio Rancho Public Schools, reaching approximately 34 teachers and 790 students.

Participating Schools

SCHOOL	Number of classes	Number of Students
Enchanted Hills Elem.	5	140
Martin Luther King Elem. *	6	158
Sandia Vista Elem.	4	84
Maggie Cordova Elem. *	7	162
Cielo Azul Elem. *	6	124
Puesta del Sol Elem. *	6	120
TOTALS	**34**	**790**

* Title 1 school

Deliverables to date:
All complete

- Watershed Presentations: 34:34
- Arroyo Walk: 34:34
- Bat Presentations: 34:34
- Owl Presentations: 34:34

Task 1: Recruit and select classes.
Complete by September 2018. **Status: completed.**

All classes are returning classes and the program has a waiting list.

Task 2: Review and revise evaluation and curriculum.
Complete by May 2019. **Status: completed.**

The pre and post survey was revised by classroom teachers and AC staff to better suit 3rd graders. We received positive feedback from teachers on new and updated presentations offered to their classrooms this year.

Task 3: Coordinate classroom guest speakers.
Begin September 2018. On-going through May 2019. **Status: completed.**

Guest speakers have been confirmed with up to date Professional Services Agreements. All presentations have been conducted.

Task 4: Collect and analyze teacher feedback.
Complete by May 2019. **Status: completed.**

Staff has developed a feedback form for teachers to issue out to teachers in April.

Task 5: Reporting to sponsors. **Status: completed.**

Midyear report by January 31, 2019. - *submitted Jan 2019*
Final report by June 14, 2019.

Project Summary

The program consists of a four-part series of lessons, based on grade-level science standards and addressing areas of interest to SSCAFCA, such as bats, burrowing owls, ATV use, pet waste, and arroyo safety. Educators Melissa McLamb and Erin Blaz delivered two of the lessons – an introductory lesson about watersheds, and a walking field trip to nearby arroyo habitat. Justin Stevenson of RD Wildlife Management, LLC delivered a lesson using live microbats. Tavo Cruz of Envirological Services, Inc. delivered presentations with a live Burrowing Owl.

The watershed lesson expounds on the water cycle, already integral in 3rd grade curriculum. This year, we developed a hands on lesson where students were able to build a model of a watershed. This lesson introduces the concept of a watershed to students, demonstrates how surface water becomes polluted through a variety of waste, and discusses the importance of keeping our arroyos clean.

The arroyo walk is a highlight for students and teachers, as the majority of participating classes only receive one other field trip during the school year, and students always come away learning something new and interesting about the uniqueness of arroyo habitat. This lesson is about the unique adaptations of arroyo animals and plants, incorporates a walk out to a nearby arroyo (when available) and extensive discussion about arroyo safety *(see lesson plan in Appendix A.)* Melissa first talked to students about the difference between concrete-lined channels and sandy-bottomed arroyos, and emphasized that it is never safe to go into concrete-lined channels, while sandy-bottomed arroyos can be visited when there are no clouds in the sky. Students searched for evidence of animals living in the arroyo banks, learned about how lizards, and other cold-blooded animals, are adapted to the desert environment by moving about to regulate their temperature, and looked for certain adaptations of desert plants to minimize water loss in the desert.

In the lesson about bats, Justin discussed common myths about bats while pointing out how these myths can pose issues for bat populations as he addressed each one. He taught students about species common in their area, including what habitat they prefer, what they eat, the challenges they face, and what to do if one sees an injured bat. He talked about how important bats are in keeping insect populations under control, shared ways to encourage and protect bats and emphasized that kids should not be frightened of them, but also should never touch a bat if they find one. Students were able to view two different species of live microbats.

In the owl presentation, Octavio talked with students about what time of year burrowing owls are in our arroyos, what habitat they need, and what we can do to support and protect them. Tavo emphasized the impact of riding ATVs up the sides of arroyos and encouraged ways to care for burrowing owl habitat. He taught students that burrowing owls are protected by federal law, and that 3rd graders could be ambassadors and protectors for the owls. Each student was able to observe the burrowing owl up close, one at a time. We worked in coordination with Wildlife Rescue to bring in the live burrowing owl for each presentation.

Evaluation

All 34 participating classes, participated in previous years and each teacher expressed interest in returning next year. Teacher feedback from this year also showed that teachers find that each presentation helped increase students understanding of local ecology while educating them about what they can do to protect wildlife habitats and/or water quality. Some teachers have requested extension activities to help them expand on content presented to their class. We plan to integrate additional lesson plans that teachers can easily use next year. We are also working on correlating our presentations to the newly adopted science standards, NM STEM Ready! This correlation will be complete by the start of next school year.

We were unable to confirm with Cielo Azul Elementary to plan for another Arroyo Clean Up event. We hope to work with the City of Rio Rancho next year by promoting their Campus Clean Up Contest and encouraging our participating classes and schools to organize such events.

Highlights from teacher feedback:

"Every year this program adds so much to our classroom and student engagement. The excitement of the owls and bat is amazing for our kiddos. The Arroyo walk is also exciting. I thought the changes to the watershed presentation was a great improvement to capture 3rd graders attention." - Evans, Sandia Vista Elementary

"They were able to identify how they fit into the habitat surrounding them and how they can help preserve different aspects of it. They were able to apply different ideas taught (water conservation, animal identification, ect.)" - Eisenberg, Martin Luther King, Elementary

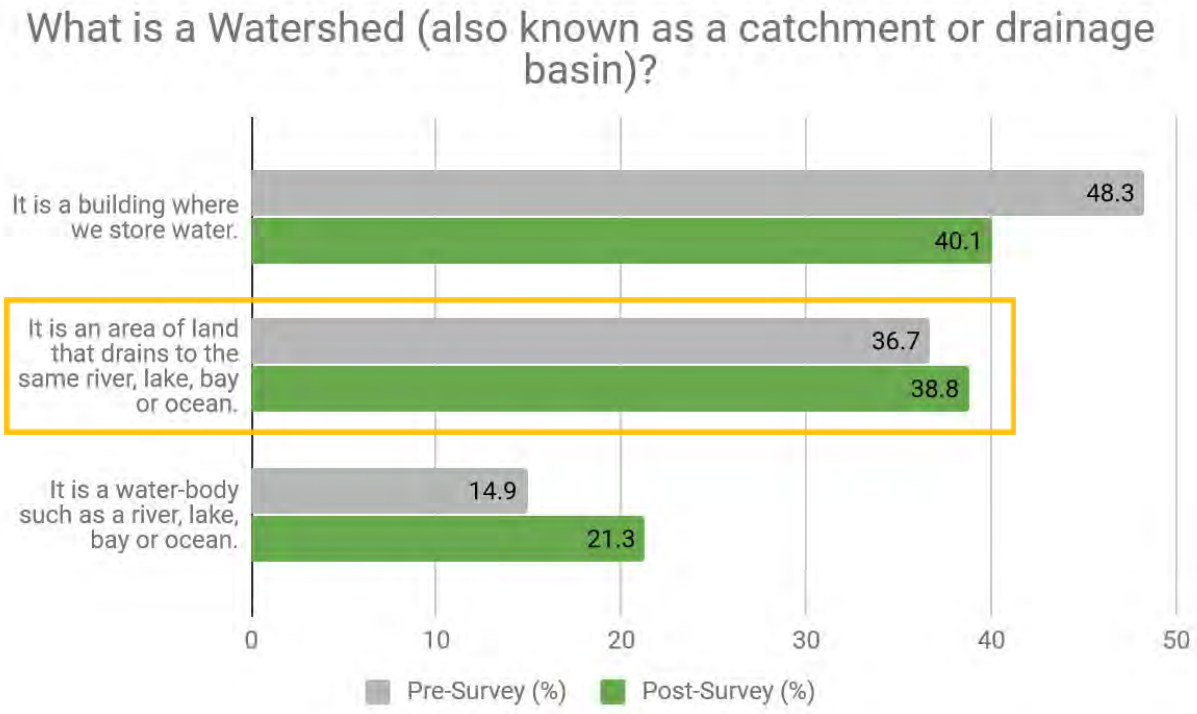
"My kids always love the animals and what they learn about them. I love that the kids get a better understanding of arroyos and how the water shed works."- Florez, Maggie Cordova Elementary

Survey

We developed the survey this year in collaboration with select 3rd grade teachers to make it as relevant and age-appropriate for students. This is the first year we have had a single pre and post survey to distribute to students.

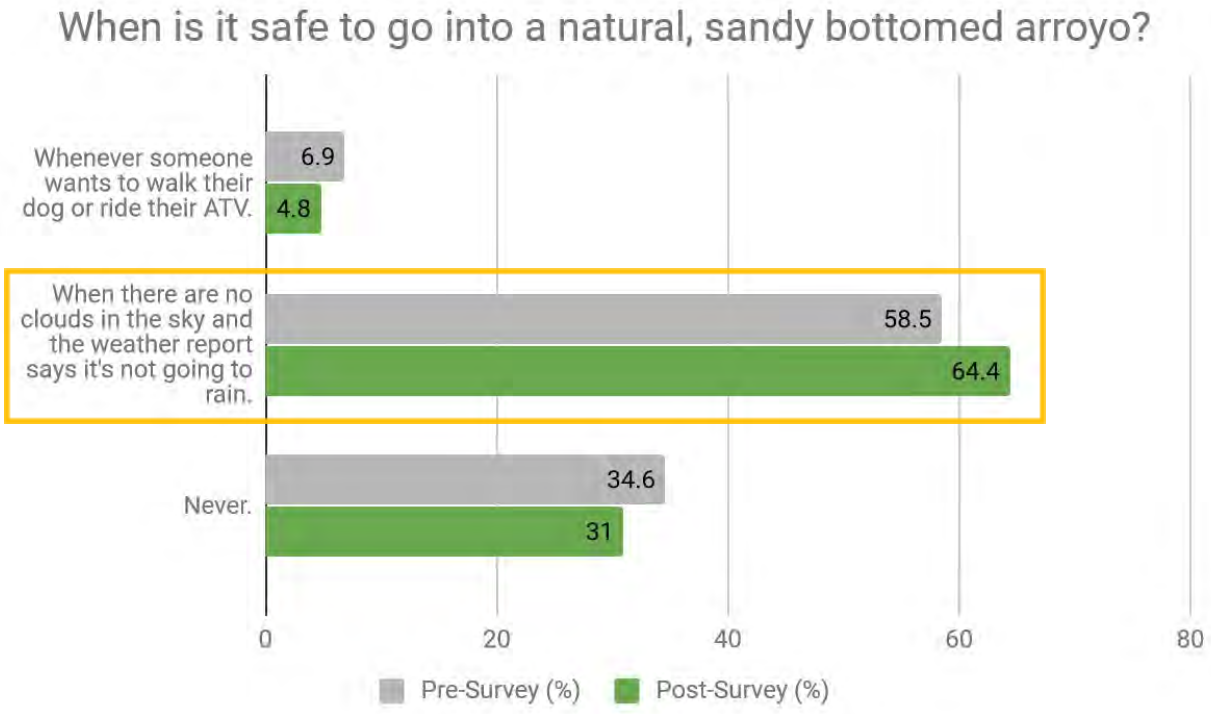
Survey Metrics:

Item 1



This age group of students are often very literal and may find the concept of a "watershed" confusing. We will find ways of making this more age appropriate for 3rd graders. It may require an adjustment to our incorrect answer options. We plan to implement extension activities next year as well, which will offer teachers the opportunity to review and expand on presentation content with students afterwards.

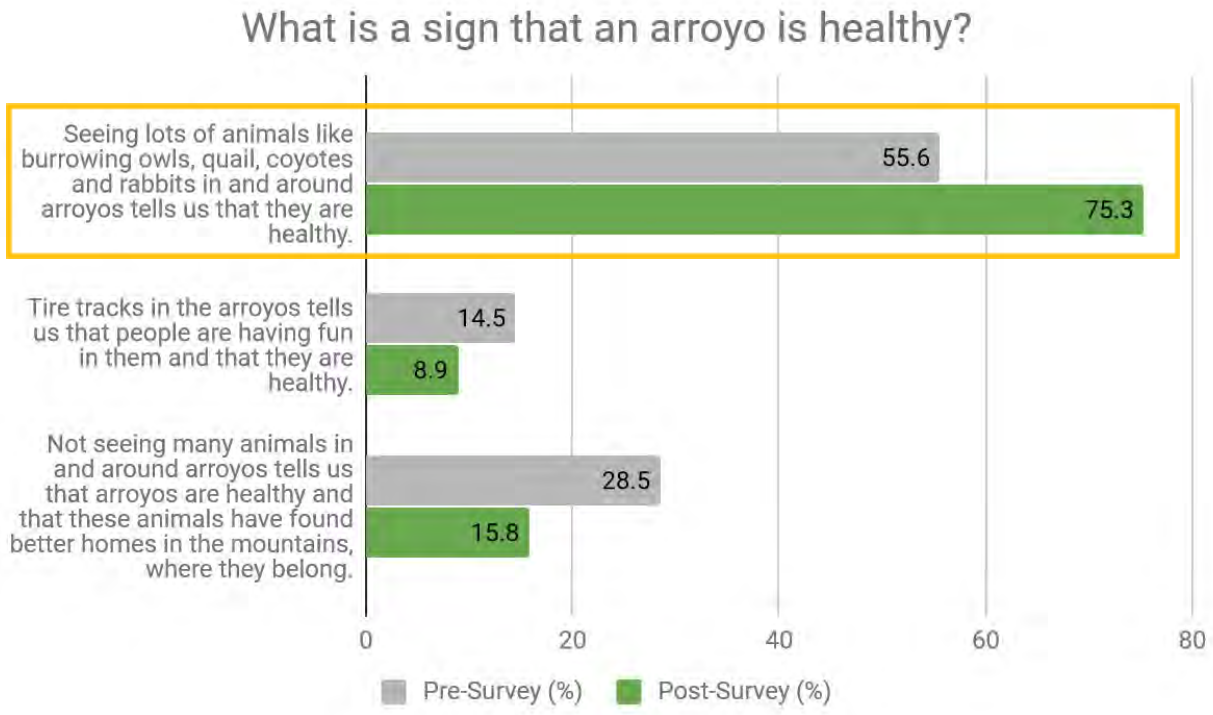
Item 2



When

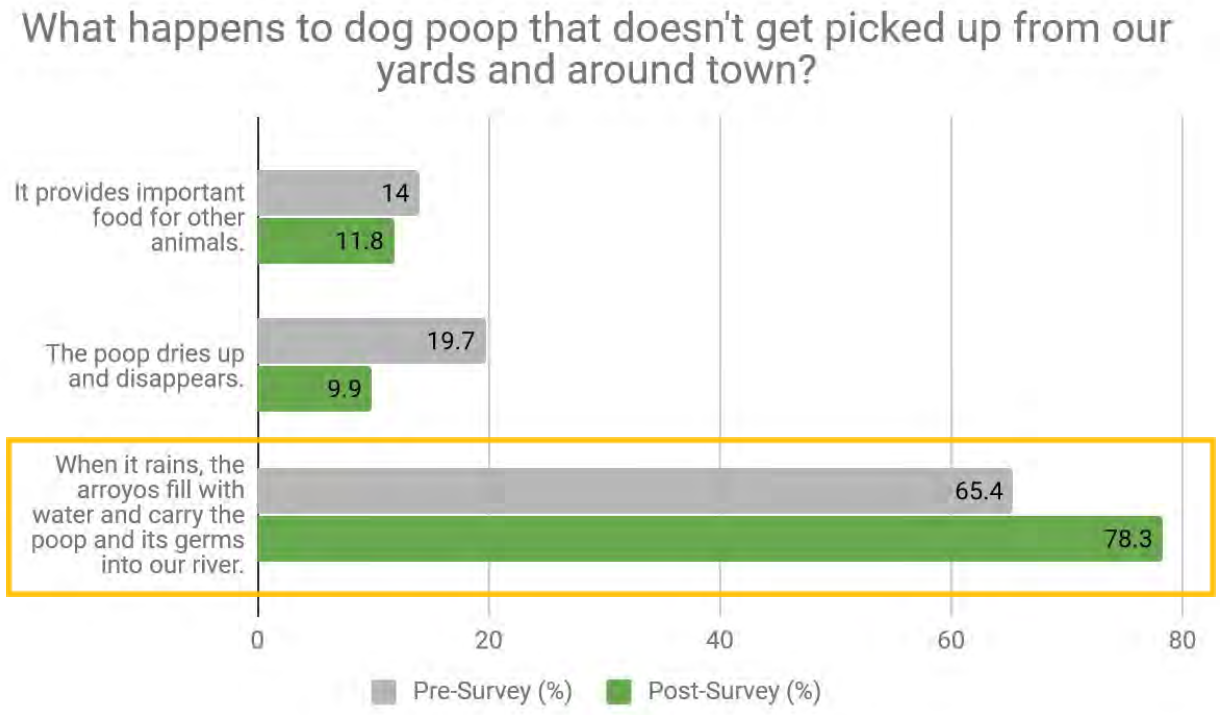
The majority of students seem to understand when it is safe from the beginning of the program, perhaps in contrast to the other answer options. It is interesting to see that 30% of students still consider it is "never" safe to into a natural arroyo. This could be an idea that students are receiving from parents or guardians understanding of arroyo safety.

Item 3



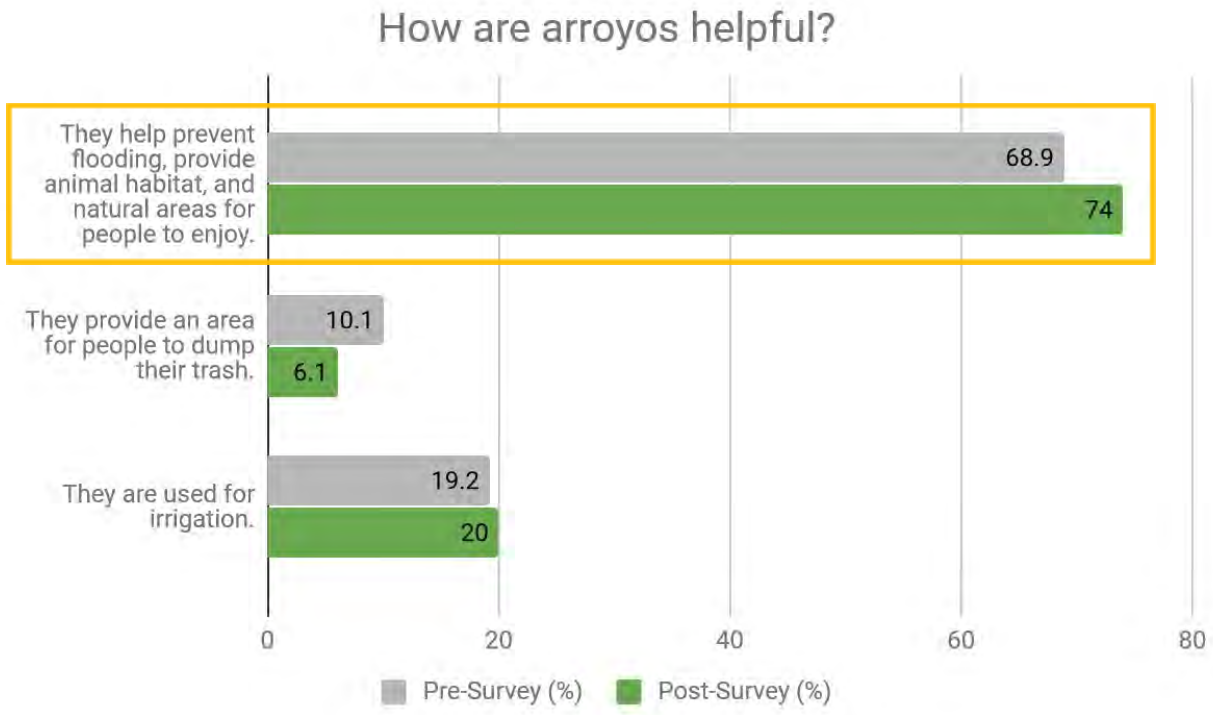
We see a 20% increase in student knowledge of species diversity being an indicator of arroyo health.

Item 4



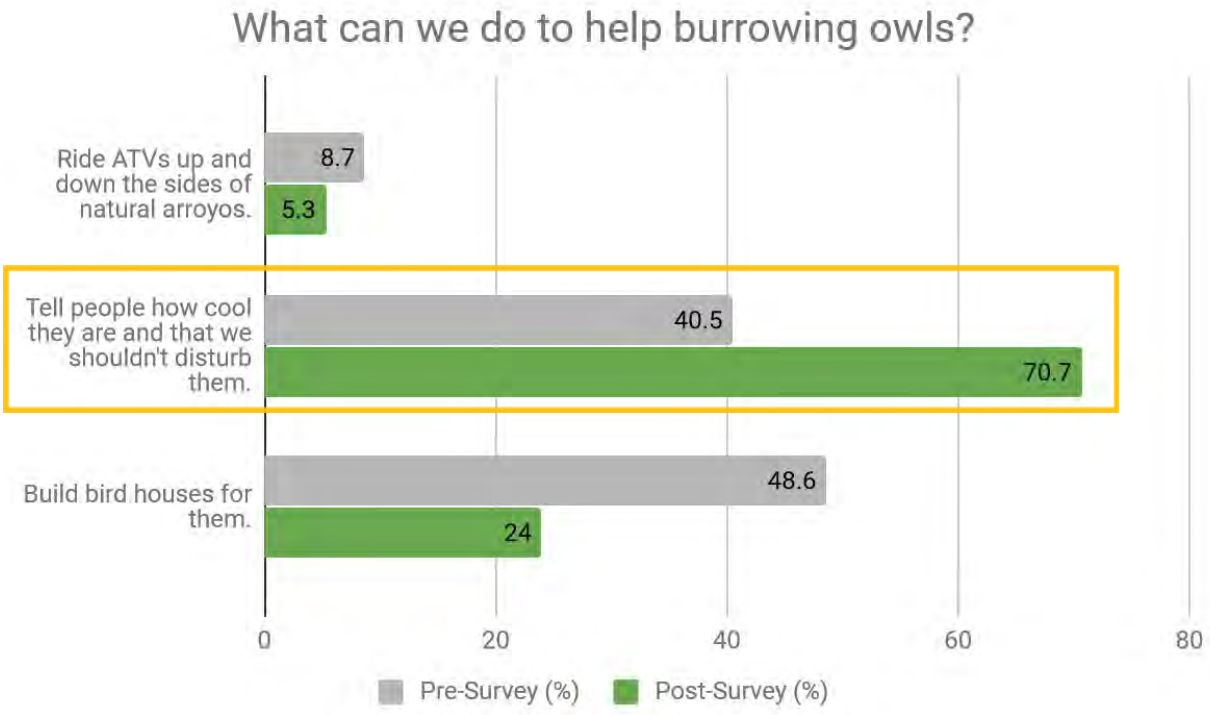
We see a decrease in the incorrect answers from the pre to post survey as well as a 13% increase in students understanding of how dog poop can impact the water quality of the river.

Item 5



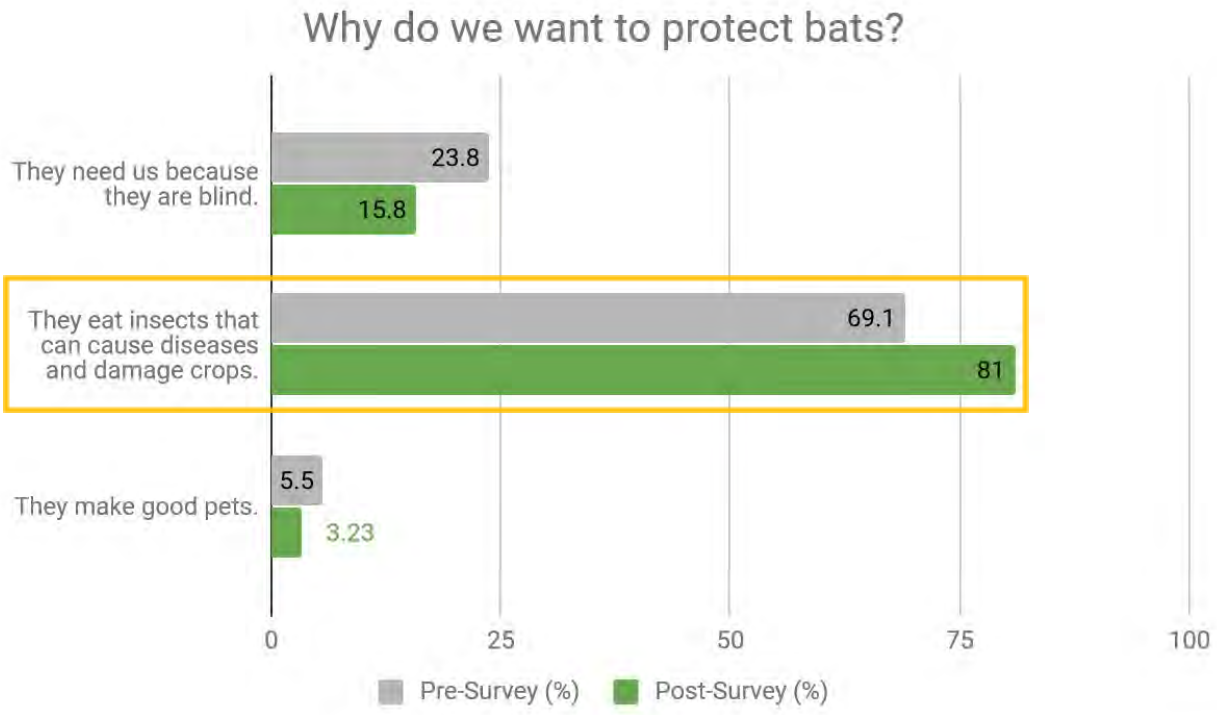
Students either already knew this or is was an easy assumption based on the answers. We will make one of the answers seem more probable next year and replace “They are used for irrigation” with “They help farmers water their crops”.

Item 6



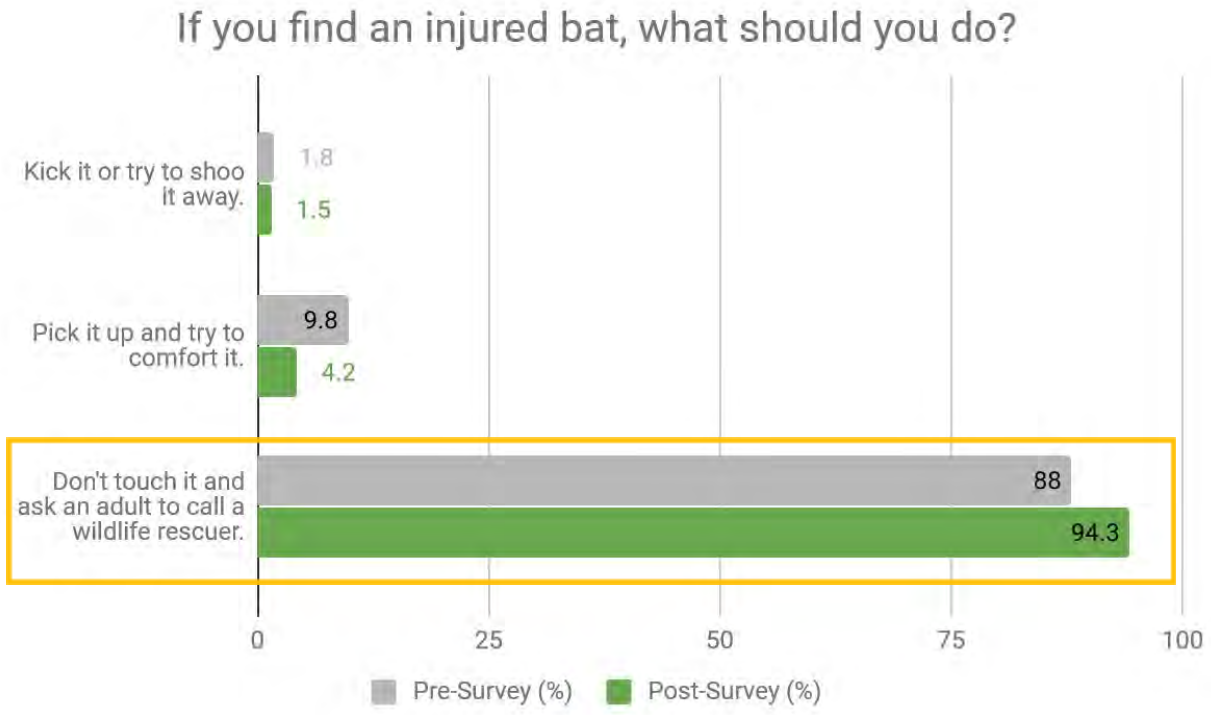
This shows how the live animal presentations introduce students to the importance of not disturbing wildlife and that burrowing owls wouldn't utilize bird houses.

Item 7



It seems that most students either already know this or they can figure it out based on the answer choices. Next year we will make the other choices more probable.

Item 8



Survey Summary

Overall, the survey findings are positive. This was a pilot year with using a single pre and post survey and we will continue to refine our questions with feedback from teachers. It is important that students understand the concept of a watershed. Next year we intend to support our classes with pre and post activities that will help teachers review and explore concepts from the presentations, which will strengthen learning outcomes for students.

Appendix A contains lesson plans; Appendix B contains supplemental materials; Appendix C contains photos.

Appendix A
Lesson Plans

Activity Guide for 3rd Grade – Animal and Plant Adaptations

1. What are we trying to teach the students in this activity?
Arroyos are cool places where animals live, animals and plants are adapted to live in the desert.

2. How can we tie this activity to our teaching goals:

Our Goals	Where we can relate our goals to this activity
Animals live in arroyos	Look for evidence of animals.
We should visit arroyos carefully	Talk about when it is safe.
Picking up dog poop keeps germs out of our river	We'll probably see poop, talk about how it can make animals sick.

Supplies:
- Thermometers
- Clipboards
- Poster of leaf adaptations
- Wax paper
- Paper towels
- Tape

3. How can we tie this activity to standards?
- Measure energy (temperature change)
- Posing a question, using numerical data, various methods to display results
- Animals and plants have adaptations that improve chances of survival
- Classifying animals and plants
- Living things cause changes to their environment, some detrimental, some beneficial

5. How should this activity be organized?

I. Pre-activity (10 minutes)
- Do you ever visit/play in arroyos? What do you do?
- What are arroyos for? Managing stormwater to keep our town from flooding when we get a heavy rain. **Show first flush video.**
- Talk about arroyo safety – don't go into arroyos when you see clouds in the sky.
- Because our arroyos are natural, with sandy sides and bottom, they are safer.
- In Albuquerque, the arroyos have concrete sides and water travels so fast, it is really dangerous to ever go in arroyos. Some arroyos come from the canyon where it might be raining but you can't see.
- Our arroyos are home to all kinds of animals and plants, so they are a wonderful place to enjoy nature. What kinds of animals do you think might live in the arroyo?
- Walk out to arroyo

II. Lizard activity (15 min)
- 5min Look for evidence of animals. What kind of evidence? Scat, tracks, holes.

- What kind of animals live in holes (besides snakes)?
- What do you think makes it difficult to live out here? Heat, sunburn, not much water, cold at night. Animals and plants have special **adaptations** (special things about their bodies) that make it easier for them to live in this habitat.
- How do they get water? From plants, from condensation under rocks.
- How could they avoid heat? Stay in burrows or shade during the day, active at night.
- Some animals love the heat, though! Lizards are cold-blooded, which doesn't mean they are actually cold. It means their body temperature is determined by the environment. They need to absorb heat from their surroundings to function.
- Each student take a thermometer. This is a lizard, and it needs to maintain its body temperature at a certain level: fence lizard 35C (95F), whiptail 38.6C (101F). How can it keep from getting too hot? How can it keep from getting too cold? Lizards regulate their body temperature through behavior.
- Plants do kind of the same thing – hold one palm out flat, one sideways. Which feels hotter? Prickly pear cactus pads grow sideways instead of flat to keep themselves cool!

IV. Plant activity (15 min)

- What do plants need in order to survive? Water, sunlight, air, soil
- What makes it difficult for plants in the desert? It's so hot and there's so little rain.
- How do plants get water? **Show evapotranspiration diagram.** It's kind of like when we're hot, we sweat. But if we lose too much water from sweating we get dehydrated.
- How do they keep cool? Remember prickly pear? **Show pictures of hedgehog and prickly pear cacti.** Desert plants can **s**hade themselves! Hedgehog cactus has lots of spines that shade the surface and also blocks the wind.
- The leaves of many desert plants are **adapted** so that they don't lose too much water.
- Show leaf adaptations poster (fuzzy, small, curled, waxy, green stems but no leaves)

If weather is ok:

- Out in arroyo, we'll do an investigation.
- How many of the plants we see will have these adaptations? Hypothesize.
- To be fair, we can't just pick the plants we like. Standing in one spot, collect the first 6 *different* leaves you see.
- Draw each one, and describe what adaptation it has.
- How many of your 6 leaves have one of the adaptations listed?
- Why don't all have it? Some plants avoid the heat by just growing and producing seed really fast before the weather gets hot, and then they just die off and leave their seeds to grow next year!
- Search for seeds.

If windy, inside activity:

- Let's investigate one way they keep water. **Dab water on board, cover one spot with paper towel, one spot with wax paper.** Which do you think will evaporate faster?
- **Show prickly pear picture.** Make model of prickly pear pad: paper towels with wax paper taped around the outside. **Show cut prickly pear pad.**
- Maybe do an experiment: soak wax-covered and non wax-covered leaves in water and time how long they take to dry.

V. Conclusion (10 min)

- Arroyos are for flood control, and we shouldn't play in them when clouds are in the sky.
- But they are cool places where animals and plants live, and we can visit when it's clear weather.
- Animals and plants are adapted to live in the desert climate.
- What we do in arroyos affects the plants, and animals' habitats. Should we ride ATVs up the sides? That's something humans do to change our environment for the worse.
- Picking up dog poop is important because it can make animals sick. Where does the water go when it flows down the arroyo? The Rio Grande! Keeping dog poop out of the river is one way humans can change our environment for the better.
- Walk back to classroom

Leaf Adaptations

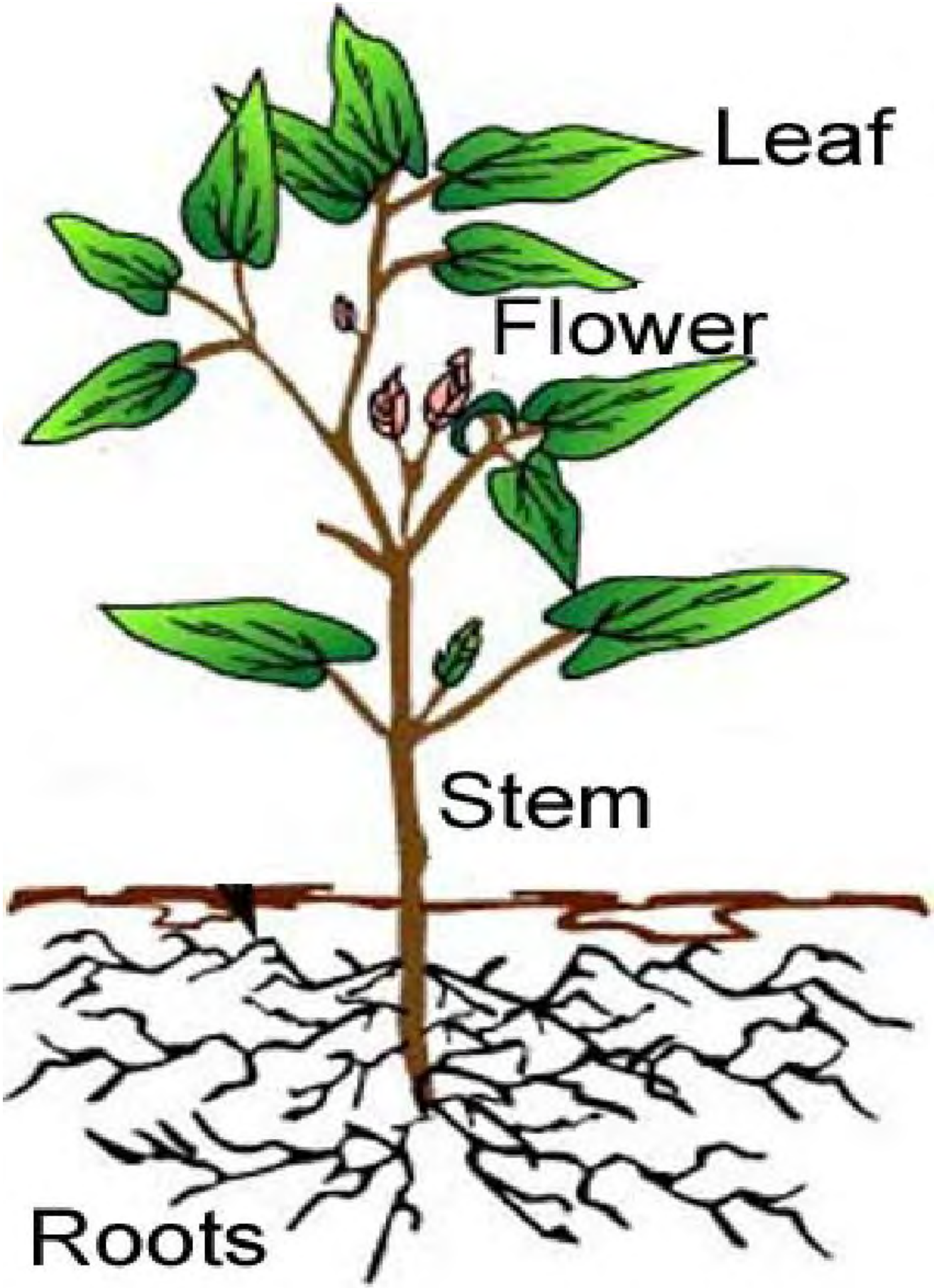
1. **Fuzzy leaves or lots of spines**

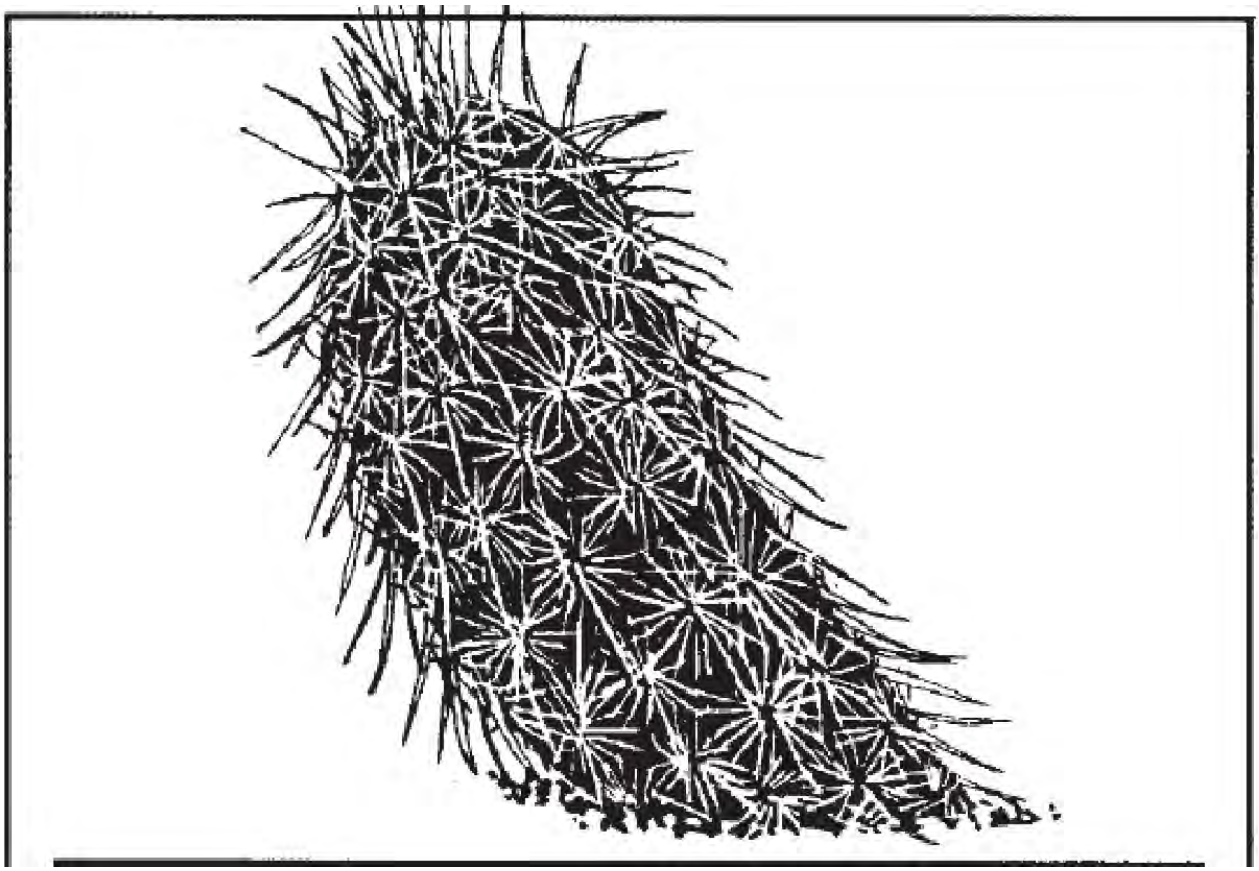
2. **Small leaves**

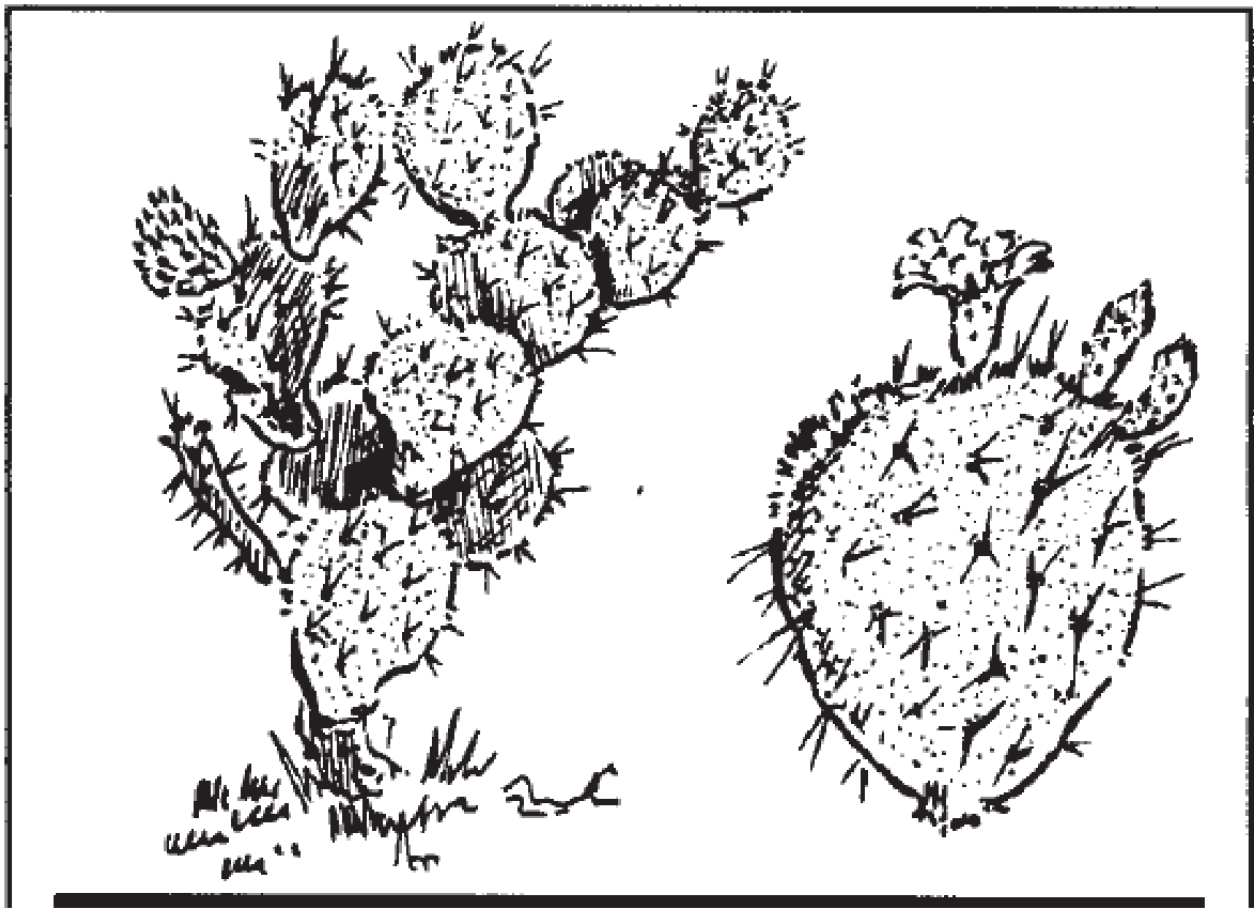
3. **Curled leaves**

4. **Waxy leaves**

5. **Green stems but no leaves!**


Leaf
Flower
Stem
Roots





Build a Watershed Activity Guide for Arroyo Classroom

1. What are we trying to teach the students in this activity?
What is a watershed? How does the water cycle work? What are different forms of pollution and how does it impact our river? Arroyos lead to the river and carries different types of pollution with it.

NM State Science Standards:

3rd Grade
Water cycles through the atmosphere, plants, soil, and bodies of water in various forms.
Describe pollution and identify different types (can be naturally occurring or human made materials). Pollutants can get into our water and harm living things.
Some animals can survive better in certain environments, some will not survive at all.
Describe how roots take up water and soil nutrients, and leaves make food from sunlight.

2. How can we tie this activity to our teaching goals:

Our Goals	**Where we can relate our goals to this activity**
How does the water cycle work?	Describe the processes of the water cycle: evaporation, condensation, precipitation, collection, run-off and infiltration.
What is a watershed?	A watershed is all the land that drains into a river or other body of water, from mountain forests to riparian zone.
What makes water dirty?	Pollution comes from all over the watershed, and erosion is one form of pollution.
Why are arroyos important?	Arroyos provide important drainage in a storm event and provide unique and critical habitat for wildlife and plants.
How does vegetation help our river?	Forests, wetlands and healthy arroyos help keep the river clean and prevent flash floods. Plants in these areas slow the runoff of water into the river, reducing erosion and flooding. They can also remove nasty chemicals from the water by taking them up through their roots.

3. What is effective in this activity? Being in small groups, students enjoy creating the model and discussing what they are observing.

4. What makes this activity difficult to teach? Students get excited and want to play with materials while you are talking.

Activity Materials

- Blank paper, markers, aluminum pans to capture water
- markers (ex: black for oil, brown for dog poop, red for trash)

- a watershed map (ex: SSCAFCA watershed map, It's All Connected in a Watershed poster)
- NM relief map

<u>Preparation</u>

- Post watershed map
- Draw sketch of the water cycle
- Have materials laid out and desks arranged (papers, trays, sets of markers)
- Optional: write out key for marker colors (keep hidden until time to show students)

I. Intro – 5 minutes

1. Introduce yourself and the Arroyo Classroom program: Respect and Know your Arroyos
2. Cover guidelines/expectations in order to be able to have a good time and learn together
3. Introduce what we will be learning: What is a watershed? Where does it go when it rains? We are going to find out how water moves across land, and through our arroyos, when it rains or snows. And learn about how it carries things with it as it flows.

II. Warm Up – 10-15 minutes

1. How many of you used water before you came to school today? How did you use it?
2. How else do people use water on a daily basis?
3. Where do you think all this water comes from? (Discuss the aquifer and it's connection to precipitation). Point out groundwater shown on the "It's All Connected in a Watershed" poster.
4. Pull out the NM relief map. Discuss the purpose of a map. Walk through so each student can view. Introduce the concept of a "key". Have them help you find ABQ on the map and the Rio Grande. Point out the area of Rio Rancho. Explore the map together.

Ask: (Really engage with students and listen to their ideas)

- Has anyone heard of the term "watershed" before? You can highlight that it is a compound word. Have students share what they think of when they hear this word usually, "a shed full of water." It's kind of like that! Except the shed (or container) is an area of land. *Everyone lives, plays and works on land that draws to a body of water, like a river, lake, bay or ocean.*
- Point out the Rio Grande Watershed through the middle of the NM relief map.
- Where are there mountains and hills? Where do you see rivers and lakes?
- What would happen if we sprayed water on the mountain peaks, what will happen to it? *It will flow downhill.*
- Where does the water come from in nature? *Rain or snow*

III. Activity – 25 minutes

Where does the water go? Let's find out by making our own model/map, similar to the relief map.
Part A: 10 min
While students are still sitting, demonstrate activity → crumpling paper to drawing on the ridges. Identify the ridges. Ridge as high point of range of hills or mountains. Point out that it is where the

paper has a peak pointing up not down. Maybe identify the difference between a peak and a valley using the paper.

1. With your imagination, imagine that this piece of paper is a piece of land.
2. Crumple up the piece of paper and then smooth it back out most of the way. Leave it a bit crumpled, showing small ridges (high points) and valleys (low points).
3. Find the ridgelines (tops of the fold lines). Use the blue marker to color along the ridgelines on your "land".

Model this for students briefly. Be sure everyone understands the activity. Ask students to crumple their paper and draw their ridgelines. Once they are complete - Hands on their hand so we know they are ready for the next step.

Pair students (groups of 2 or 3), with teachers help. Assign roles 1-2, or 1-3.

Give Roles***: We're all observers, everyone will have a turn.

Have groups gather around their tray. Drawers can begin drawing their ridgelines. Announce that students have 30 more seconds when it seems that each group has enough ridgelines.

Next, demonstrate a "rain event". Model for students the distance we want them to aim from as they spray (i.e. the length of your elbow to hand, vertically placed on the tray). And 4 sprays. (idea: Students can be drill sergeants about the three sprays, acknowledge that sometimes the spray bottles act funny but that we are trusting our classmates to count for themselves to do only four full sprays...).

Ask:

- What do you think will happen to your land when it "rains"?
- What will happen to the blue ridge lines? / Where will the "rainwater" travel?

1. Altogether, sprayers squirt your model a few times to create a "rainstorm" over your land.
2. Observe what happens.
3. As your rainfall accumulates, watch the pathways where the excess "rainfall" travels.

With teachers, walk around to ask each pair to explain what the water is doing and show you rivers and streams in their model.

Have teachers help pick up all the spray bottles, and ask everyone to place their hands on their head and have a small group discussion about their observations.

Part B: 15 min

Have pairs switch roles, “disposers” can throw out previous model. Tell students they will keep the same number assigned earlier and tell them what role they will be playing. You could write these on a whiteboard.

What’s In the Water?
Experiment with how “pollutants” might travel through their watersheds.

With a new piece of “land”, imagine this represents the City of Rio Rancho or the Rio Grande Watershed. Show one of the Watershed posters and point out all the human activity that happens in a watershed (driving cars, making things (manufacturing), farming, walking our dogs, etc.)

Ask:
- What might be on this land that we wouldn’t want in our water?
- What is pollution?
    - Have you ever seen it? What does it look like?

As students share, note the types of pollution on a poster or white board and create a key for groups to use. (Roads/Cars - black, Trash - Green, Dog poop-brown (and/or orange if you have more groups than markers)) Depending on the group, you could also identify Factories - Red

Before crumpling, have drawers (with their support drawers) mark their papers with the brown, red and black marker to represent farms, factories, houses, streets, dog poop and trash.
Announce that students have 30 more seconds when it seems that each group has drawn enough. Then ask all students to put their hands on their head.

Then have crumplers -crumple paper and then partially smooth it out.

Altogether, have sprayers spray the piece of paper.

Ask:
- What happened to the pollution when it rained?
- Describe what happened at the highest and lowest point in your watershed.
- How quickly did it spread? Are there any places on the land where it didn’t go?

WRAP UP: -5-10min
What do you think this means for our watershed - the Middle Rio Grande?
The water we drink comes from our watershed. Animals and plants also depend on this water. That’s why it’s important that we try not to pollute either the water or the land. Anything that pollutes the land will eventually wind up in the water.

What might be ways we could reduce pollution in our watershed?

*By picking up trash and picking up dog poop if we have dogs. (*I like to emphasize to this age group that **being responsible is powerful** and they can make a difference by caring and picking up their own trash. I also tell them that last year a whole grade level of 3rd graders at Cielo Azul Elementary helped pick up 1.8 tons of trash!)

Thank the class for their attention and participation. Tell them we look forward to seeing them again and expect that they show the wildlife biologists the same respect they have shown us.

*****Groups of 3: Each person gets to spray 3x. Model this for them.**
For groups of 3, you'll need two blue markers for Part A.

May be helpful to tell students each turn has a Lead Role and a Supporting role (Supporting role noted in parentheses).

Part A Roles:
1 - Drawers (+ spray)
2 - Crumplers (+ drawing / spray)
3 - 1st Spray (+ disposers) -- Spray 3, 2, 1

Part B Roles:
1 - 1st Spray (+ disposers)
2 - Drawers (+ spray) --Spray 2, 1, 3
3 - Crumpler (+ draw)

Groups of 2:

Part A Roles:
1 - Crumpler / Drawer
2 - Sprayer / Disposer

Part B Roles:
1 - Sprayer / Disposer
2 - Crumpler / Drawer

Appendix B
Supplemental Materials

-SSCAFCA Activity Book and Educational Videos:

KNOW YOUR ARROYOS
ENJOY • RESPECT • PROTECT

-SSCAFCA handouts:

Did you know?

SSCAFCA protects our community from flooding and erosion caused by big rain storms, and works to keep stormwater clean. Stormwater flows down arroyos into the Rio Grande.

Bugs like to live in stagnant water that collects in ponds and low places in the arroyos. Insects like mosquitoes can carry diseases that make us sick.

Almost all U.S. bats feed exclusively on bugs, and 1 bat can eat between 600 and 1,000 mosquitoes and other insect pests in just one hour. One bat can eat its own weight in insects in a single night!

SSCAFCA provides bat houses to encourage bats to make their homes near our arroyos, and especially near detention ponds where stormwater runoff is captured and allowed to slowly drain.

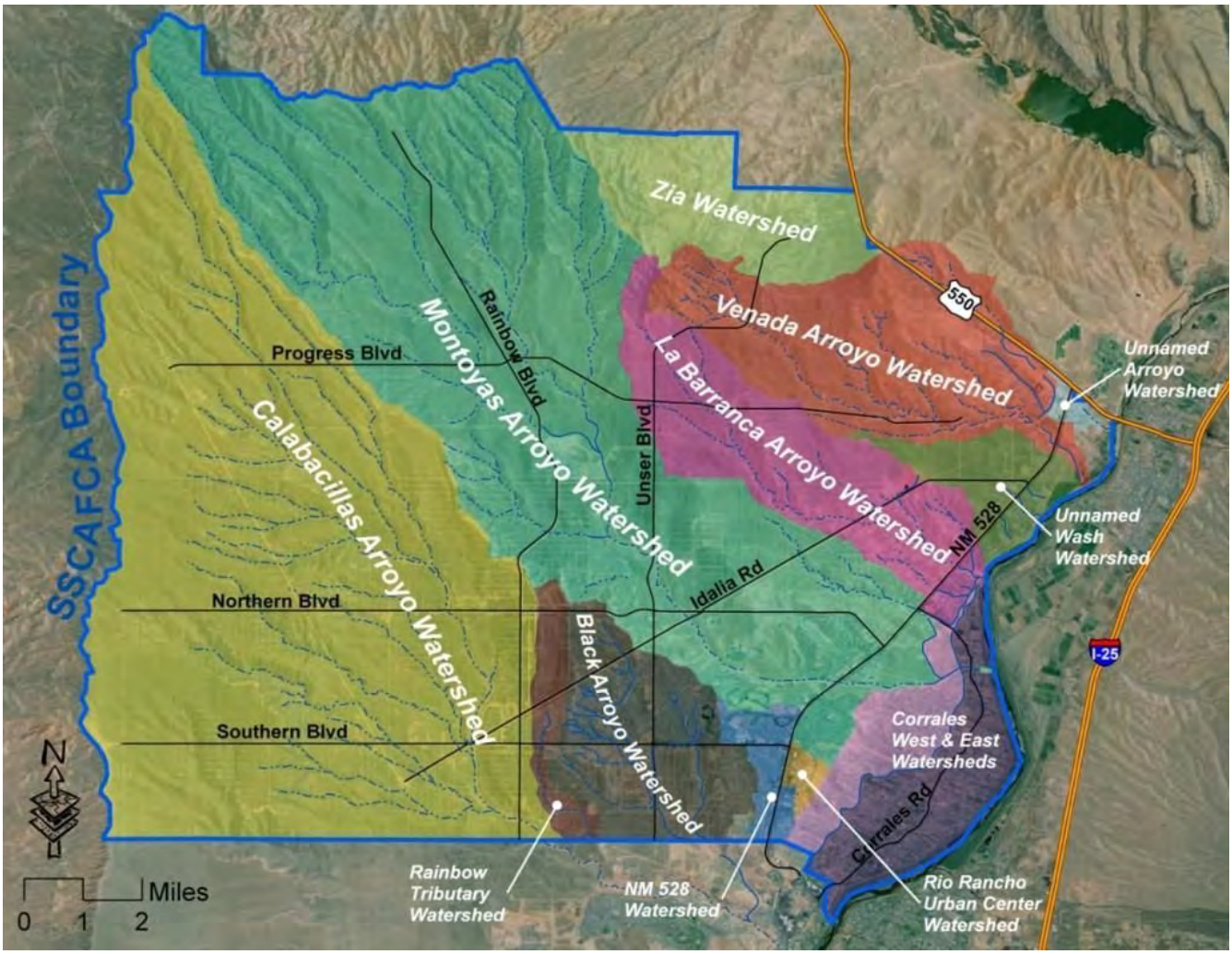
The more we help bats, the more pests they eat, so we don't have to spray pesticide that could wash down to the Rio Grande and pollute it.

Brought to you by:

SSCAFCA

SOUTHERN SANDOVAL COUNTY ARROYO FLOOD CONTROL AUTHORITY

SSCAFCA watershed map:



Appendix C
Program Photos

LEFT - Melissa McLamb discussing desert animal and plant adaptations by Maggie Cordova Arroyo.

RIGHT - Students observing and discussing the watershed model.

LEFT - Students having fun during the arroyo walk on school property. Students gather in between activities to discuss findings such as looking for evidence of wildlife (scat, tracks, burrows, etc.).

Exhibit 5
RiverXchange 2018-2019

Making Meaningful Connections by Integrating Water Resources Topics with Language Arts & Science

2019 Report

Presented by
Ciudad Soil & Water Conservation District

June 2019

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SUMMARY

This year, funding enabled 36 NM classes (954 students and 39 teachers) to participate. The majority of participating classes were from Title I schools. Each NM class was partnered with another NM class and when possible another class outside the state for a total of over 1,338 participants. All program costs and coordination are provided free of charge to NM teachers. Training, technical support, and curriculum materials are provided free of charge to partner teachers. The program required $51,881.62 in cash and generated total match valued at $90,344.90 in the form of in-kind contributions including workshop space, classroom resources, presenters' time in the classroom, field trip docents, donated trees and shrubs, as well as teachers' and students' time.

With the support of two contract hires this year, we were able to focus more on strengthening our program in ways we haven't been able to in the previous three years with unanticipated personnel changes. Our primary accomplishments include: strengthening partnerships with teachers and volunteers who support us with in-class presentations, developing an effective place based lesson on acequias and agriculture, and offering consistent blog support and encouragement in order to increase the efficacy of the technology component. Also, we refined our extension activities this year and are on target to have all RiverXchange presentations correlated with the recently adopted New Mexico science standards, NM STEM Ready! by the end of the summer. Teachers commended us throughout the year on the value of the presentations and curriculum in their class experience.

Strengthening Partnerships

Understanding how RiverXchange meets the needs of participating teachers, students, in-kind donors, as well as how RiverXchange fits into the larger efforts of watershed education in our community, is critical for keeping RiverXchange relevant and impactful. This year, we met with a wide variety of educators and stakeholders in our field. We met with organizations including: Albuquerque Water Utility Authority (ABCWUA), Sandia Labs, Bosque Ecosystem Monitoring Project (BEMP), RiverSource, Sandia Mountain Natural History Center (SMNHC) and Center for Social Sustainable Systems (CESOSS). These meetings, as well as shadowing a few presentations offered by others, gave us and our collaborators an opportunity to establish or reconfirm program expectations, help us evaluate our educational offerings and find ways we can better support common learning objectives in watershed education. Strong partnerships are critical in informing us as we work to strengthen the program, remain relevant, and navigate unexpected changes.

For example, one long term collaborating agency, Bernalillo County Extension, was unable to participate with us this year. In the past, they have offered the agriculture related presentation to all APS schools. Consequently, our staff designed and delivered a similar presentation that engaged students in a regional history of agriculture and irrigation techniques that highlighted acequia culture and the effects of human settlement on the Rio Grande. In our search for resources in the community, we discovered CESSOS, a possible future in-kind partner, who could offer a presentation more culturally relevant and significant for students.

Blog Support

We noticed an increase in blog postings, including postings of class projects this year. We held a contest for excellent and creative blogging with specific criteria and saw more class engagement due to this. Though a few teachers continue to report they face challenges with access to computer labs, many of our classrooms this year are already using technology such as Google Classroom or many have individual tablets for students. With technology being integrated into more classrooms worldwide, the blogging component of RiverXchange continues to be a unique, important offering of our program. The blog offers a protected, educational platform for teachers to guide and review student work, as well as an opportunity for the class to learn about digital citizenship. Using the blog, allows classes to experience the importance of meaningful communication to a broad, digital audience, while practicing creative collaboration and self-responsibility in the submission of work.

Teacher Workshop

Noticing a need for professional development for our teachers with the newly adopted science standards, we took the opportunity to educate teachers about NM STEM Ready! at our teacher workshop and show how the RiverXchange program and curriculum can help their students meet these in their classroom experience. With support from the Environmental Education Association of New Mexico (EEANM) and Seleana Connealy of NM EPSCoR (Established Program to Stimulate Competitive Research), we offered an introduction to the standards, offered practical tools to plan and demonstrate lesson correlation, using RiverXchange activities, and shared resources for learning more throughout the school year.

Teacher Feedback

Every year, we receive invaluable feedback from our teachers. Feedback this year continues to be positive. All participating teachers want to return and a few have asked to add other teachers from their fifth grade team. We are finding that the majority of our teachers choose our program to teach more about water resource issues and to incorporate more science into the classroom. This shows a major shift since the program's conception, at that time teachers were more drawn to the program as a way to incorporate more language arts curriculum. While the program still focuses on reflective and creative writing, we are also responding to current needs by emphasizing how RiverXchange can help teachers include more experiential learning and science in their classroom. Nearly 50% of teachers are also attracted to the program because the blog enables them to connect with other teachers and students in a thematic learning environment. Here are a few highlighted responses from our teachers on the greatest learning outcomes for their class:

> "I was able to add experiential learning in science into my classroom lessons and truly engage the students." - Anonymous
>
> "Students were able to fully understand where our water comes from, what a watershed is, how humans have impacted the environment and ecosystems. And maybe, more importantly, what we can do to help." - John Turrietta, MLK Elementary
>
> "Awareness of their role in conserving and protecting water resources."- Dwayne Norris, Bandalier Elementary
>
> "Working as a team and real life connection to science topics through our local watershed." - Tris Carty, Seven Bar Elementary

"What a wonderful way to have students directly involved in their own watershed while learning hydrosphere concepts. The teamwork and concrete lessons were a great enhancement to our classroom." - Anonymous

"This group in particular, has learned so much from the experience. Many of them have never been to the bosque, or reflected upon the components and how/why they might have come to be there." -Anonymous

"The presentations were engaging and interactive. The demonstrations helped the students to understand more of our environment. I really enjoyed the speakers. The pole planting field trip was amazing! The kids felt very accomplished!"- Randi Sevigny, Seven Bar Elementary

Presentations

Program presentations were completed as follows:

Agriculture: 36/36
Stormwater: 36/36
Wastewater: 36/36
Drinking Water: 36/36
Planting Field Trips: 34/36
Landfill Field Trips: 5

PROGRAM DESCRIPTION

Mission

The mission of RiverXchange is to deepen students' and teachers' understanding and appreciation for their local river ecosystem, motivate participants to protect local water resources by conserving water and keeping their source water clean, and to provide a high quality, high impact outreach opportunity for funders and in-kind contributors.

The Big Water Questions

The optional curriculum frames program outcomes as "guiding questions," known as *Big Water Questions*. A long term goal of RiverXchange is that students understand these questions and can formulate logical, fact-based answers by the time they finish elementary school. We believe that students who can synthesize water facts to understand larger water issues will have the proper critical thinking skills and foundation for further discussion in middle and high school so that they will become informed citizens and voters on water issues.

Understanding a Watershed

- Is every place in the world part of a watershed?
- Where does your community's stormwater go?
- How can surface water become polluted?
- How does the water cycle relate to weather?
- How are groundwater and surface water connected?
- How can groundwater become polluted?
- What actions can all of us take to keep water clean?

Water in Our Society

- In what ways does our society use water?
- Where does your community's drinking water come from?
- Does everyone have the right to use as much water as they want?
- Where does your community's wastewater go?
- What actions can all of us take to conserve water?

River Ecosystem

- How does water affect living things in an ecosystem?
- What role do forests play in a watershed?
- What role do wetlands play in a watershed?
- What are some of the ways scientists can determine the health of a river, lake, bay or ocean?
- What actions can all of us take to improve the health of our ecosystem?

Background

As producers of children's water festivals and other grade K12 water resources outreach in NM since 2007, we observed early on that NM elementary teachers rarely incorporated water concepts in the classroom beyond what is required by the state (e.g., water cycle), and that most elementary teachers considered "water" strictly as a science topic. While teachers personally acknowledged the importance of conserving water and keeping source water clean, we continued to find that upper elementary students had little or no understanding of major water resources topics unless the teacher specifically integrates a wide range of water topics into the curriculum. For this reason, as well as our successful festival work with upper elementary students, this age level was selected as the focus for the RiverXchange program.

We created RiverXchange to provide a free program that is fun, interesting, and easy to integrate into the normal curriculum. Our hope was to motivate participants to explore water resources topics in depth. The program is carried out over eight months so that students spend more time developing a sense of pride and personal connection to their own river ecosystem, as well as a personal connection to a distant river ecosystem and the students who live near it.

RiverXchange began in 2007 as a pilot project of Experiential EE, LLC (under a services agreement with the New Mexico Water Conservation Alliance) and the National Great Rivers Research and Education Center, featuring partnerships between two fourth grade classes in Albuquerque, NM, and two fifth grade classes in Godfrey, IL. A curriculum was developed, a field trip to the river was coordinated, and partner classes "met" three times during the year via video tele-conferencing to present what they had learned. The upper elementary level was chosen because of our successful festival work with this age group.

After the pilot project, we transitioned to a web-based technology called a wiki. This enabled us to overcome limitations such as the high cost, availability, and time zone logistical issues associated with video teleconferencing – and easily involve more classes. The curriculum was updated to incorporate the writing component and we introduced classroom guest speakers to reduce teacher workload and bring up-to-date technical information into the classroom.

In 2012, ownership of RiverXchange transferred to Amy White of Orilla Consulting, LLC, who managed the program through July 2015. In August 2015, RiverXchange became part of the Ciudad Soil & Water Conservation District. Since 2007, we have served over 18,000 students!

This year, the program featured the following components:

- Optional standards-based curriculum including hands on science and social studies lessons, as well as writing assignments
- Coordination of class partnerships
- KidBlog online posting and communication
- Teacher training on curriculum implementation and use of KidBlog
- Ongoing technical and motivational support
- Online class postings
- End of year teacher survey
- Pre and post student surveys (NM only)
- Payment for teacher workshop substitute teachers (NM only)

- Coordination of at least four guest speakers into the classroom (NM only)
- Coordination of a field trip to the local river or important watershed feature (NM only)
- Field trip bus transportation payment (NM only)
- Field trip leadership and activity planning (NM only)

Program Management and Financial Support

The program timeframe was July 1, 2018 through June 14, 2019. All components including fundraising, design, planning, implementation, and analysis were carried out by employees and contractors of Ciudad Soil & Water Conservation District, including:

Melissa McLamb
Jessica Garduño
Erin Blaz
Jenny Lloyd-Strovas

Sponsors

- Southern Sandoval County Arroyo and Flood Control Authority (SSCAFCA)
- Middle Rio Grande Stormwater Quality Team (MRGSQT)

Sponsors provided a total of $51,881.62 in cash.
MRGSQT - $31.768.40 | SSCAFCA - $20,113.22

Program expenses included:

- Substitute teachers for NM teacher workshops
- Teacher workshop space rental and meals
- Field trip bus transportation for NM classes
- Field trip portable toilet rentals for NM classes
- Technology services
- Office and educational supplies
- Coordination services (planning, implementing and assessing all program components)

New Mexico In-Kind Partners

- Albuquerque Water Utility Authority
- Bernalillo County - Public Works Division
- CDM Smith, Inc.
- City of Albuquerque – Open Space Division
- City of Rio Rancho – Environmental Programs Office
- City of Rio Rancho — Parks, Recreation and Community Services Department
- Daniel B. Stephens and Associates
- New Mexico Acequia Association
- Sandia Labs
- Sandoval County Cooperative Extension
- Southern Sandoval County Arroyo and Flood Control Authority

- UNM Maxwell Museum of Anthropology

In-Kind contributions totaled $90,345. For NM classes, in-kind contributions included classroom guest speakers, field trip docents, planting materials, workshop space and computer lab use, and teachers' and students' time attending the presentations and field trips. For partner classes, in-kind contributions were not calculated this year. Sponsors and in-kind partners were recognized on our website and in presentations.

Participant Selection

All 36 participating NM classes were fifth grade classes, distributed as follows:

Bernalillo County	**Sandoval County**
Bandelier Elementary (4)	Colinas del Norte Elementary (5)*
Cochiti Elementary (3) *	Martin Luther King, Jr. Elementary (7)*
Duranes Elementary (1) *	Sandia Vista Elementary (1)
Georgia O'Keeffe Elementary (2)	Santo Domingo Elementary (1)
John Baker Elementary (1)	
Monte Vista Elementary (3)	
Seven Bar Elementary (5)	
Zia Elementary (4) *	
22 classes, 558 students	**14 classes, 396 students**
* Title 1 school	**TOTAL - 36 classes, 954 students**

Curriculum

A component of RiverXchange is the hands-on optional curriculum, which is offered to all participating teachers. It was developed to help students reach for deeper meaning through hands-on learning and reinforce what they have learned through the process of writing to their pen pals. Over the years, we have developed a curated list of activities from the curriculum, along with reflection prompts

specific to each presentation. Organizers strive to incorporate emerging water resources issues into the curriculum, increase networking opportunities for teachers, reduce teacher workload, and align the curriculum with public school curriculum priorities.

Each class learns about its own local water resources issues through hands-on activities, classroom guest speakers, and a field trip. Students write about what they are learning via a private educational website that can be viewed by their partner classes. The computer technology and writing components provide a unique opportunity to reinforce what was learned, increase student motivation to learn, and collect valuable metrics about student performance.

Through RiverXchange, students take pride in sharing their knowledge of the local ecosystem and learning from their peers about another river ecosystem. Comparing the two geographical areas gives students a broader understanding of the importance of a river ecosystem to human and other life. Students gain the unique opportunity to share personal experiences and ask questions about a distant place. Teachers feel this kind of personal connection is a big deal for kids – many of whom have never traveled beyond their city limits.

All activities are correlated to NM state standards and benchmarks for Social Studies. All activities (because they require that students communicate information on the KidBlog) address Common Core Language Arts standards for writing. Some activities also address Common Core Mathematics and Science standards. For a summary of the RiverXchange Curriculum, see Appendix 1. For a summary of the extension activities, see Appendix 2.

Guest Speakers

We coordinated at least three guest presentations to visit each NM classroom. In all cases, guest speakers were water resources professionals from local agencies. Topics included:

- watershed/nonpoint source pollution
- drinking water
- wastewater
- water and agriculture (Our staff had to provide the majority of these presentations as we were unable to find an in-kind partner to do so, after we received notice that our previous provider, Bernalillo County Extension, would be unable to in the foreseeable future. We expended more coordination hours than usual due to this. We anticipate having an in-kind partner to offer this come next school year.)

Field Trips

The program requires that all classes attend at least one field trip to their local river or important watershed feature, which should incorporate a service learning component if possible. We coordinated all NM field trips. Throughout the winter and spring, students planted 518 native trees and 128 shrubs and helped restore critical riparian habitat along the Rio Grande in Albuquerque. In-kind funding from Rio Rancho Public Schools (RRPS) and Waste Management allowed us to offer an additional field trip to our RRPS classes which included a visit to the Sandoval County Landfill and Willow Creek Bosque.

<u>Field Trip Locations</u>

Alamo Farm
Candelaria Farms Open Space Preserve
Sandoval County Landfill / Willow Creek Bosque

EVALUATION

Blog Evaluation

Engagement

Of our total number of classes, Kidblog was used by 77% of RiverXchange teachers this year. Blog posts ranged from 1 to 41 per class over the year. We helped teachers who reached out with any need for technical support. As we did not hear of any issues from most of the teachers who did not blog, we can not be sure why they did not participate in this area. It is likely however, since many of these teachers have blogged in the past, that unpredictable circumstances made it challenging to integrate KidBlog into the classroom. One class did not blog because they did not have sufficient internet access (Santo Domingo ES). In general, we are satisfied that the majority of teachers utilize KidBlog in the specific method we train them on for RiverXchange. In addition, classes continued to use reflection groups for posting and this seemed to work smoothly for teachers.

We ran a contest this year for creative and excellent blogging. We used a rubric to score posts for each class to determine the winner. The results from this rubric demonstrated that about half of classes posts met a satisfactory level of blogging. 32% of classes demonstrated above satisfactory posting and 13% of classes were exceptional. Four winners were chosen, two 1st place and two 2nd place winners, who won gift certificates to Acorn Naturalists and a River of Change model from the Bosque Education Guide (1st place only). In observing the quality of postings from the majority of classes, we determined the use of the KidBlog platform is an effective means to meet our education and outreach objectives.

Student Voices

The blog is not only a platform for student voices to be heard, it also provides a rare opportunity to informally assess student learning from RiverXchange. Even with a range of quantity and quality of postings, across the board, students voices resounded messages of water conservation and protection. While they might not always have a perfect grasp on the technicalities of water distribution and use in our community, we can see they are building knowledge about their watershed and water as a local resource.

This year we continued to encourage group collaboration by setting up reflection groups at the start of the year with the hope that blog posts are a product of that collaboration. We also have tried to encourage teachers to get creative with posts - to do videos, pictures, or even voice recordings. We still see a majority of written-only posts, though some teachers integrated powerpoint projects, drawings and videos to posts. This is encouraging as the blog has the potential to truly catalyze project-based, hands-on, experiential learning by being a multimedia platform.

Blog Images

No Trash

By Gallegos Watery cycles on Oct 31, 2018

Keep our Environment Clean

Hello fellow water users. We have an issue with our trash. The plastic bag is one of the worst threats to our environment. It can destroy our watershed and we can lose all of the water and die. Trash can pollute the sea and can kill the animals. For example a plastic bag can look like a jellyfish and it can trick the turtle into eating it, and then the turtle will suffocate.

If we don't litter than our lakes and seas will not be so DIRTY! Some other ways to save our drinking water is to pick up dog poop, don't take long showers, turn off the water when you're done with it, fix leaky faucets, don't use pesticides, and only use a little fertilizer.

Fifty years ago people in Albuquerque believed that there was a lake under us. But no, we have a small portion of it and must use it carefully. If we don't take care of it we will not have enough of it to drink, water plants, and bathe.

Some facts are:

- The earth is made up of 70% salt water (not usable).
- There are people all over the world who litter in our water.
- The Pacific garbage patch is twice the size of Texas.
- Everyday the Rio Grande goes straight through New Mexico to the Gulf of Mexico.

Thanks for helping us save the environment!

"Learning about the Water Cycle" (image and quote below by Whitlock McGonagal)

"We made diagrams of our local water cycle, the Sandias to the Gulf Of Mexico as our main body of water."

Kidblog Quotes

"On the 13th of December we went to the Rio Grande bosque. When we went on our field trip we felt like this field trip was about friendship. We had fun with people we did not usually hang out with. We made some stronger friendships. It felt really good. We planted three trees and named them Skittles, RIP Mickey Mouse and Paw. We had to use shovels, an auger, and trees. The trees were cottonwoods. We did this so we can help our bosque. We also saved a live mouse. We were happy because our teacher got to help and she was in our group. Unfortunately, we also found a dead mouse and our chaperone got to take a picture. A lot of the tree starters varied from deep to like not even deep at all! Cottonwood trees are special because they can grow from a branch cut from another tree. They can live up to about 80 years old! Beavers like to eat young cottonwoods so the Open Space people use a metal fence around the trunk. This field trip was the best! It meant a lot to give back. We would love to come back!" (Gonzalez Contagious Intelligence)

"I will never forget that if you have a leaky faucet and do not know about it or just don't want to pay money to fix it, in a year over 86,000 gallons of water will be wasted." (Gomez Water Rush)

"A permeable surface means that water can soak into the top, such as grass or dirt. A impermeable surface means that water cannot soak into the top, such as a road or sidewalk. The problem with impermeable surfaces is that there is a lot more runoff from rain or water flowing down the streets." (Gomez River)

"When we learned about storm water we were surprised that just one storm can wash away all of our pollution into our watershed." (Rodriquez Africa)

"Wastewater comes from toilets, sinks, baths, showers, and drains. In Rio Rancho, this wastewater goes to a wastewater recycling plant where it is cleaned and put back into the aquifer. In order to be cleaned, people help the reclaimed water go through the plant." (Turrietta Galilei)

"When we went on the field trip we learned that the Rio Grande used to overflow. When it stoped, other plants took over like salt weed and tumble weeds. So when we planted the trees it helped. Our favorite part was planting them and feeling the accomplishment. Our whole group planted 10 TREES! We also learned that when a cottonwood tree branch falls in the mud it will sprout roots." (Yu Wonderwoman)

"The dust bowl impacted the people because it destroyed peoples farm and crops it was a time of depression and drought." (Shafer Storm)

Kidblog Partners

Due to staff transitioning at the start of the school year and other outside factors, we closed out the year with only two partner teachers who were actually set up on KidBlog and posting. One partner teacher was returning from the previous year and was able to post frequently without support. Two new partners were successfully trained over the phone in February, one of which did end up posting in late April. Detailed instructions for KidBlog were sent to all partner teachers who registered, however since none of them followed through it seems that over- the-phone training is the most effective way to ensure initial partner

success on the blog. We also plan to record a video training for partner teachers for next year to better assist them with integrated the blog in their classrooms.

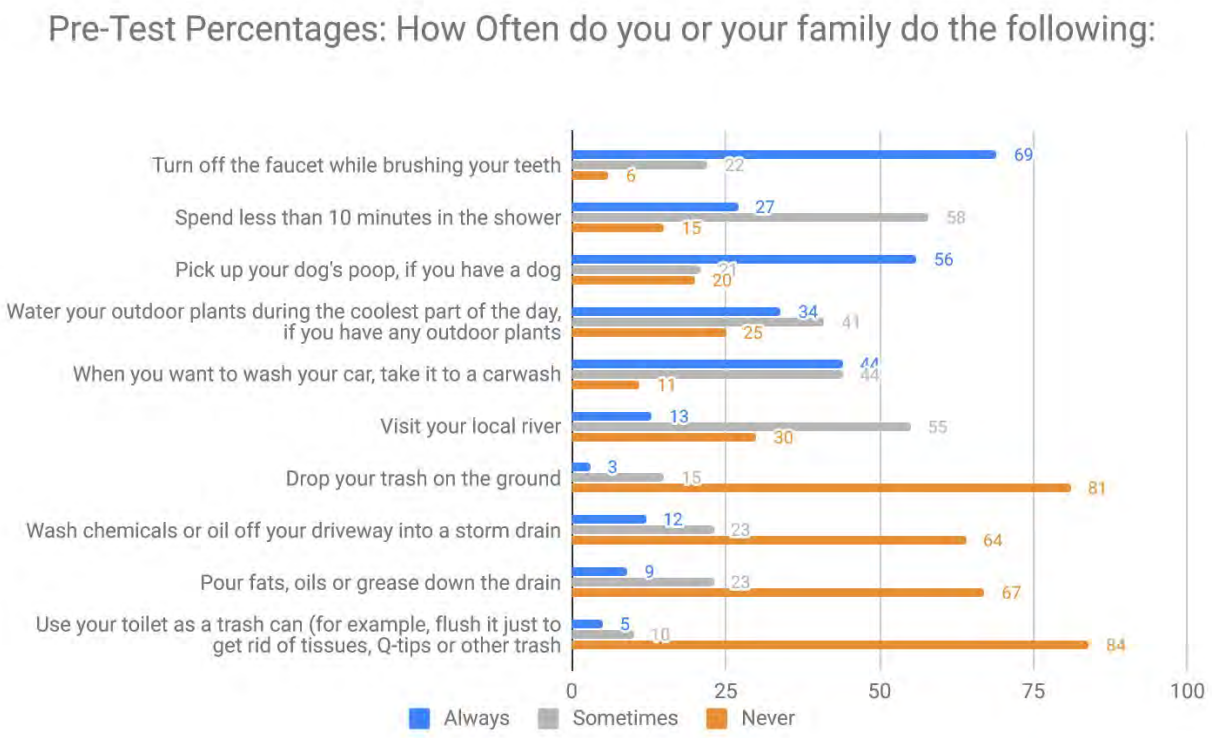
Student Surveys

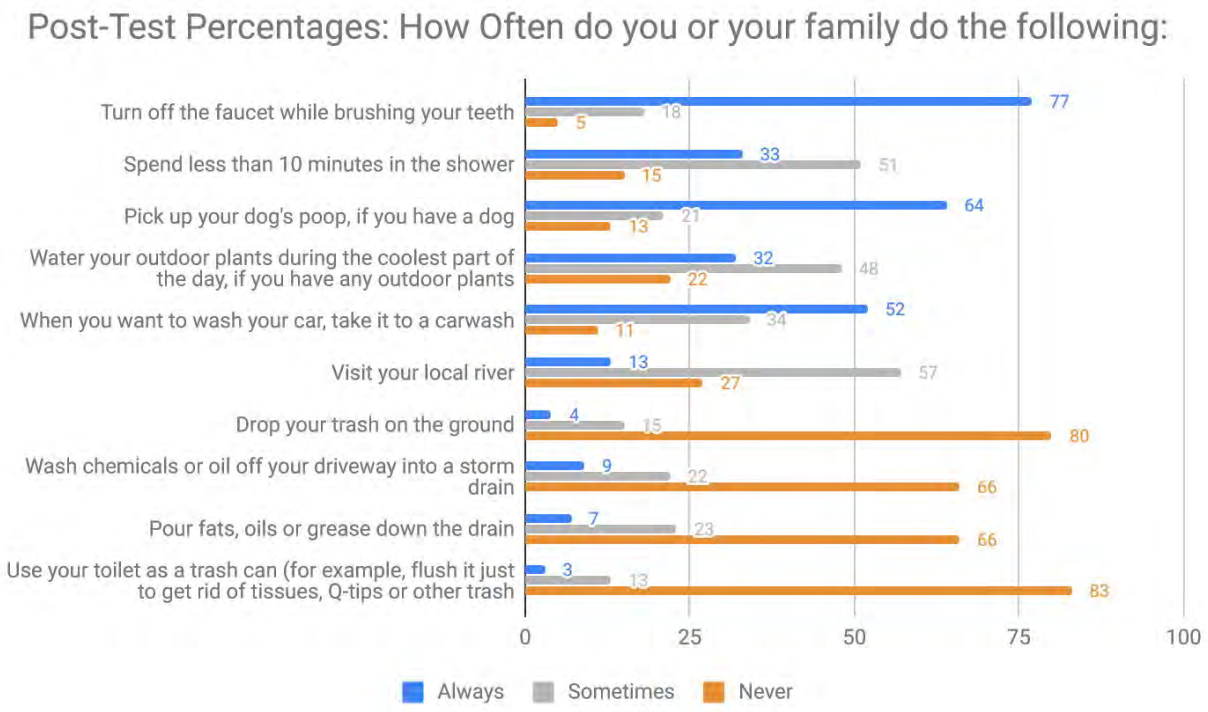
A key component of RiverXchange is it's measurable goals relating to student performance. We collected quantitative data on student performance by way of a pre and post survey and qualitative data by reading what students submitted on KidBlog. We also surveyed students about their actions before and after participating in RiverXchange.

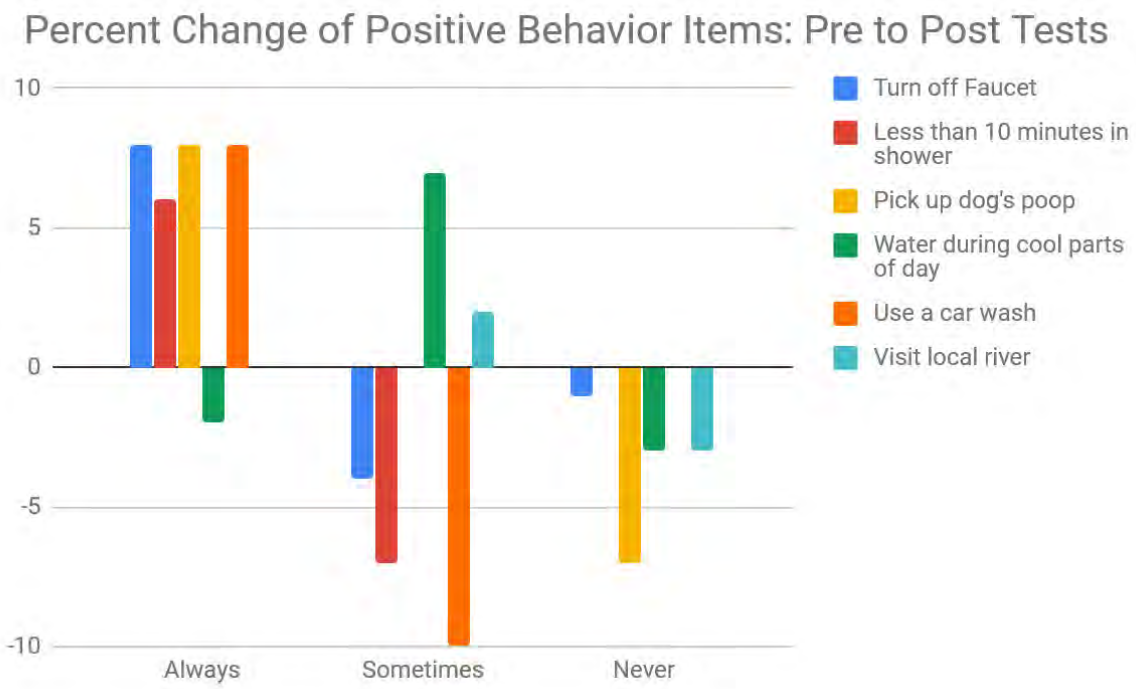
Pre/Post Behavior Survey

In order to quantify the learning outcomes achieved through RiverXchange, we ask our teachers to have their students fill out a survey prior to, and upon completion of the program. Below, you will find a series of graphs used to illustrate the change in responses between the pre and post surveys. This year, 721 students completed the pre-survey, while 718 completed the post-survey. In order to account for this small discrepancy in participation, the number of each given answer has been calculated as a percent of the total number of responses received for each given survey. We continue to refine the survey and our programming year after year based on teacher feedback and metrics gathered from these surveys. We are also evaluating our metrics over the past six years to see how and if the results have been changing year to year. We have included a graph showing the changes for the behavior survey, at the end of Item 1. We expect to have more questions assessed by August 2019.

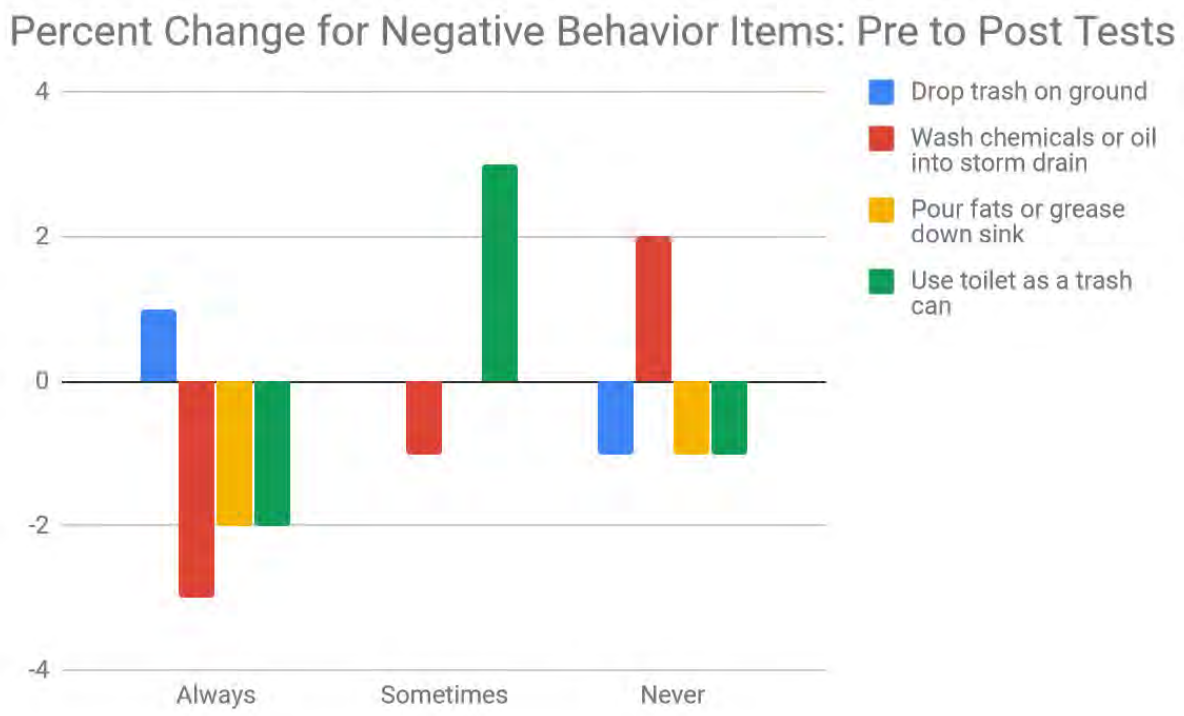
Item 1





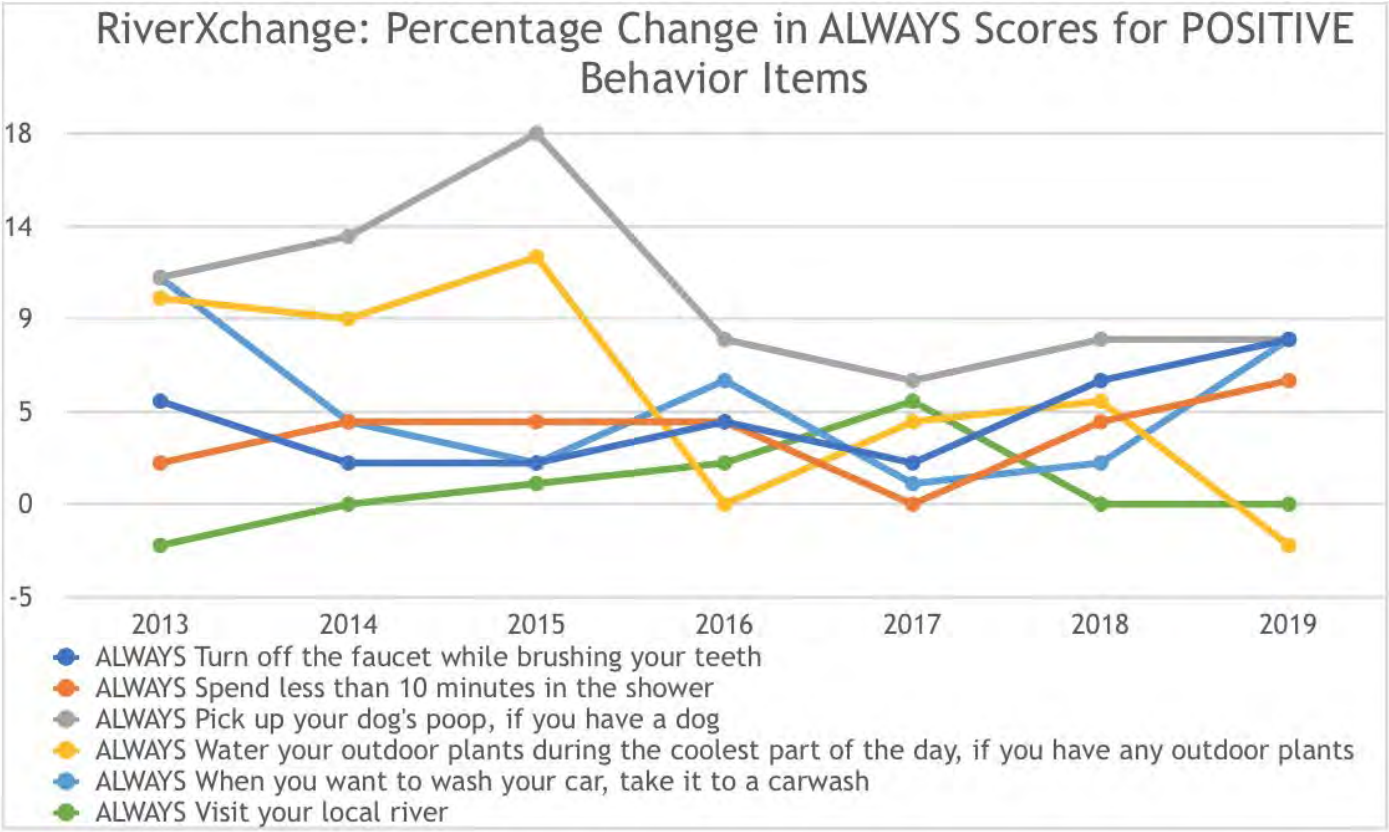


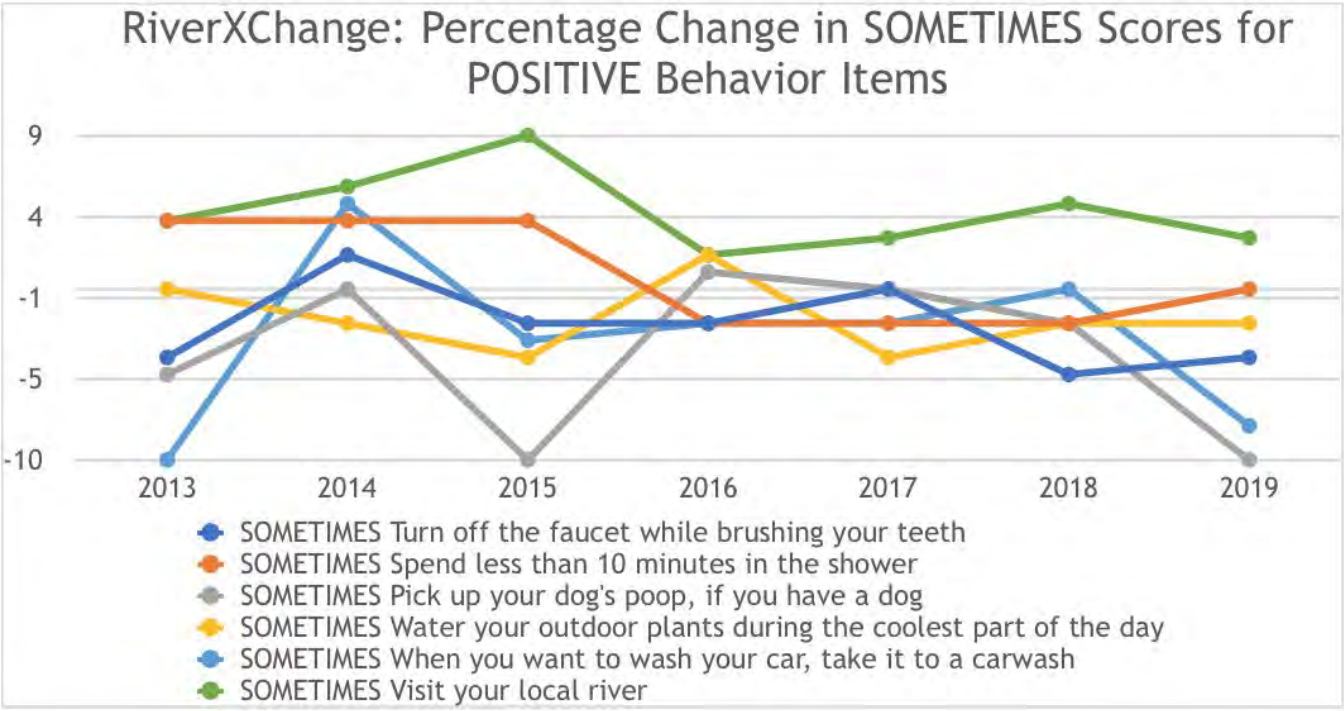
This graph illustrates an increase in positive behaviors after having received the RiverXchange presentations for the following behaviors: turning off the faucet when they brush their teeth, picking up their dog's poop, using a carwash service and spending less than 10 minutes in the shower. For many items we see an increase in positive behavior while also seeing a decrease in negative behaviors. For example, the question "How often do you pick up your dog's poop?", there is an increase in the response "Always or Very Often" while there is a decrease in the response "Never or Not Very Often." While these metrics are positive, we aim to have more significant positive findings in behavior metrics in future years.



This graph illustrates a decrease in negative behaviors after having received the RiverXchange presentations for all of the above listed behaviors except "Drop trash on the ground." It is likely that our students are unsure how to answer for the behaviors listed that may not feel applicable to them, for example, "How often do you wash chemicals or oil off your driveway into a gutter or storm drain?" For behaviors that are more specific to adults, it is more important to us that we capture students' understanding of the actions that are harmful to the watershed. As we revise our survey for next year, we will aim to make this behavior assessment more age appropriate for 5th grade students.

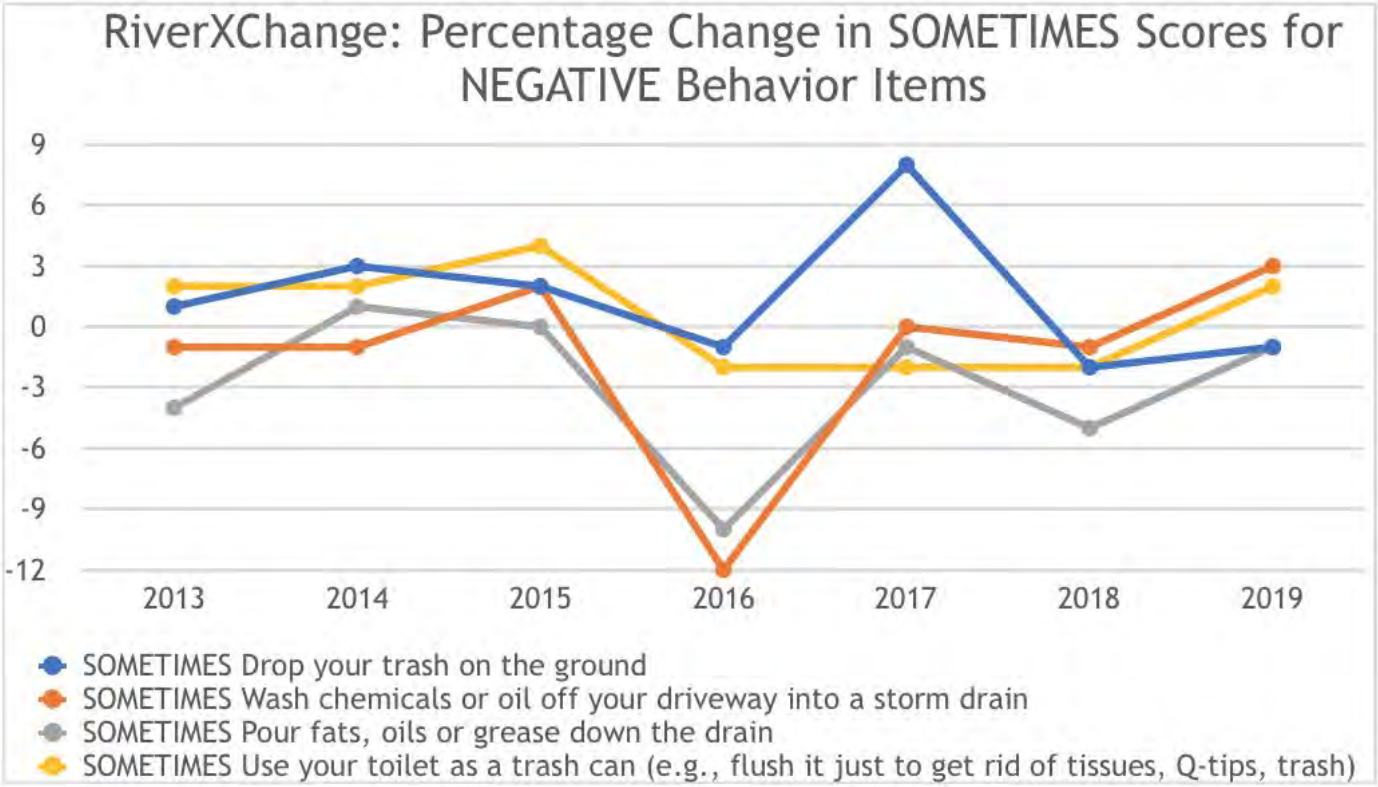
The following graphs show the percentage change between pre and post surveys on the behavior survey items since 2013. The graphs distinguish data for negative and positive behaviors. These graphs will be critical in our ongoing evaluation of the program.

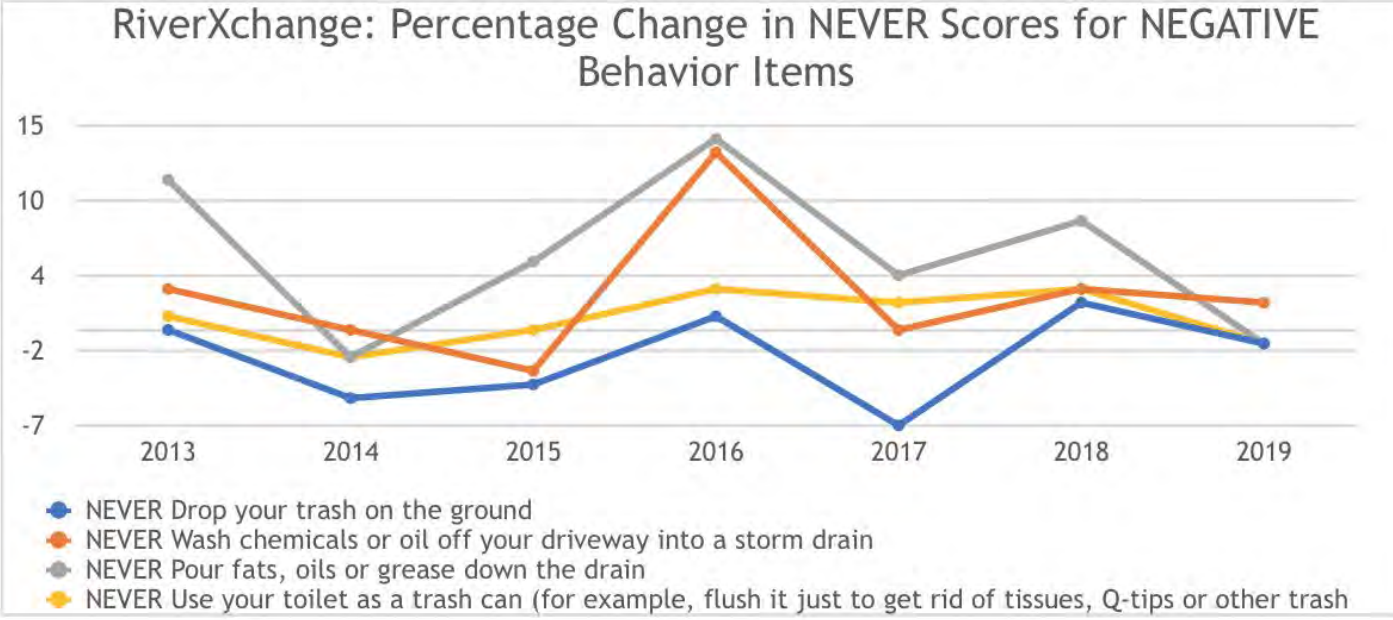




We see an overall trend of positive change in many of the listed behaviors since 2013. The most notable and consistent change showing in students learning the importance of picking up their dog's poop. Inconsistencies can be due to a variety of reasons, including changes in presenters and personnel operating the program, and students may gauge their behavior differently at the end of the year, with what they've learned throughout the program. Seeing how we compare year to year in our metrics, allows us to identify

where we need to improve the learning outcomes for students. In 2015, we had an additional presentation for our participating classes which emphasized all positive behaviors. These graphs also emphasize for us the importance of training our presenters at the start of the program and emphasizing our teaching objectives with them throughout the school year.

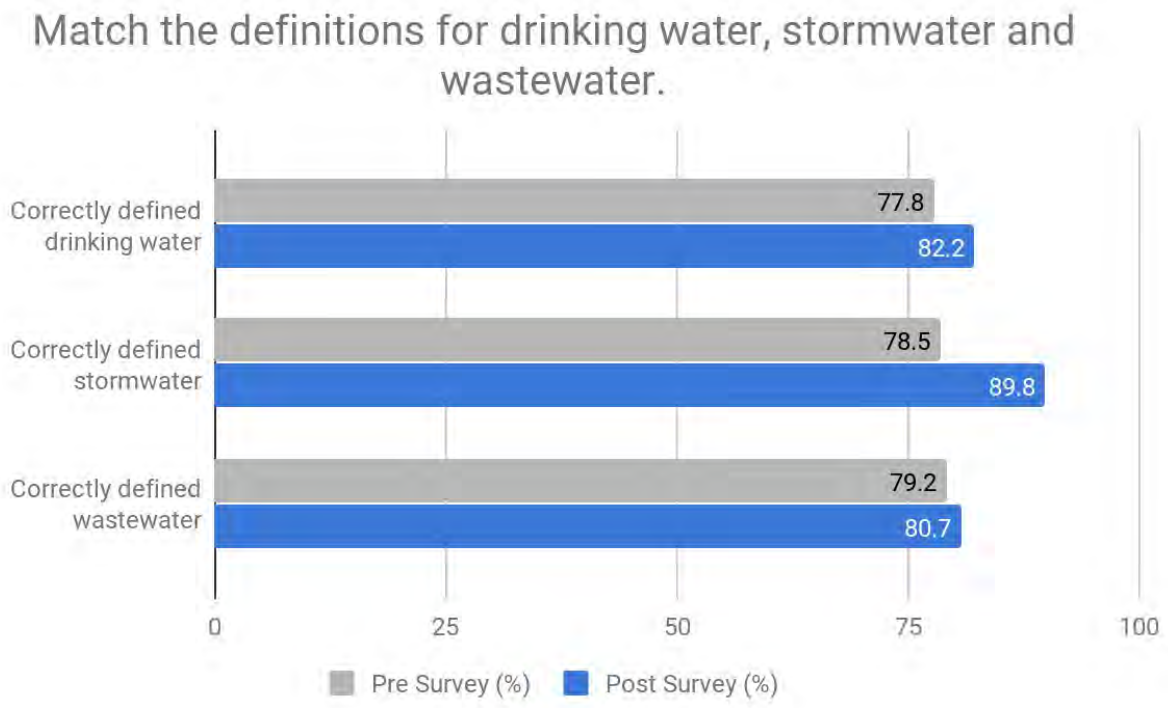




The change in negative behaviors is not consistent over the years, though we do see the majority of items showing a positive change year to year.

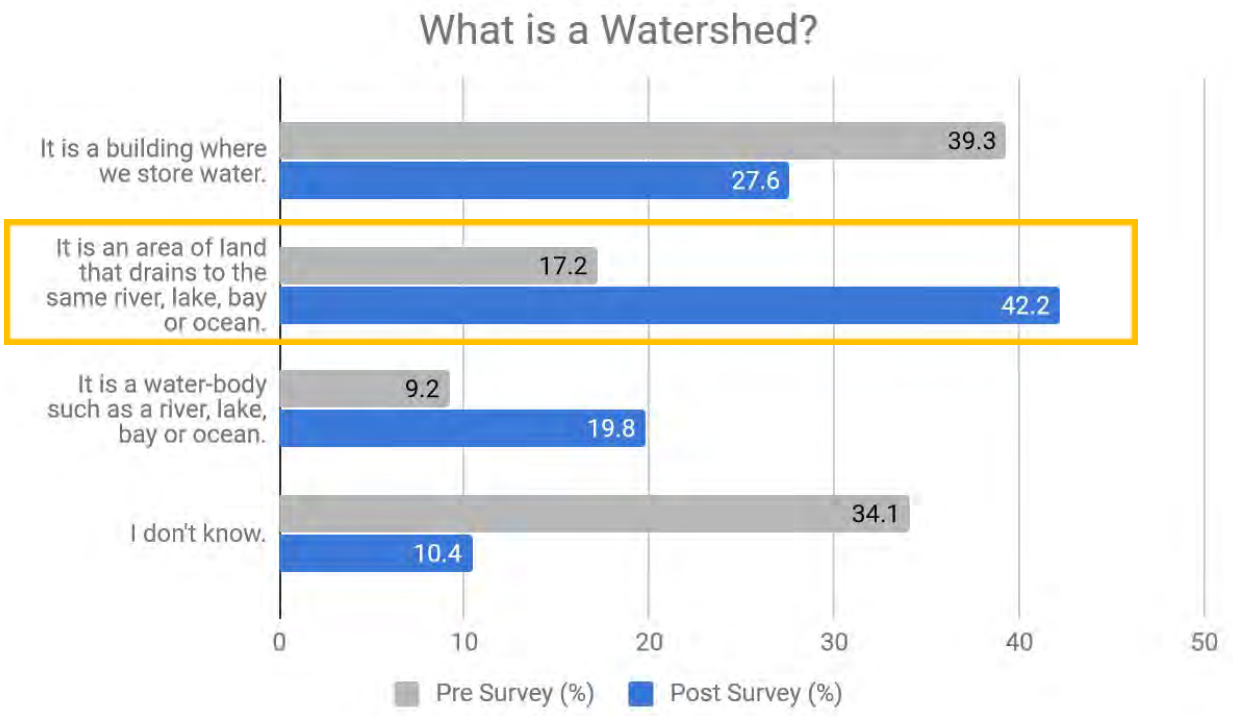
Correct answers, where applicable have been noted with a yellow outline. Stars have been used to indicate where we are seeing large differences with positive outcomes.

Item 2



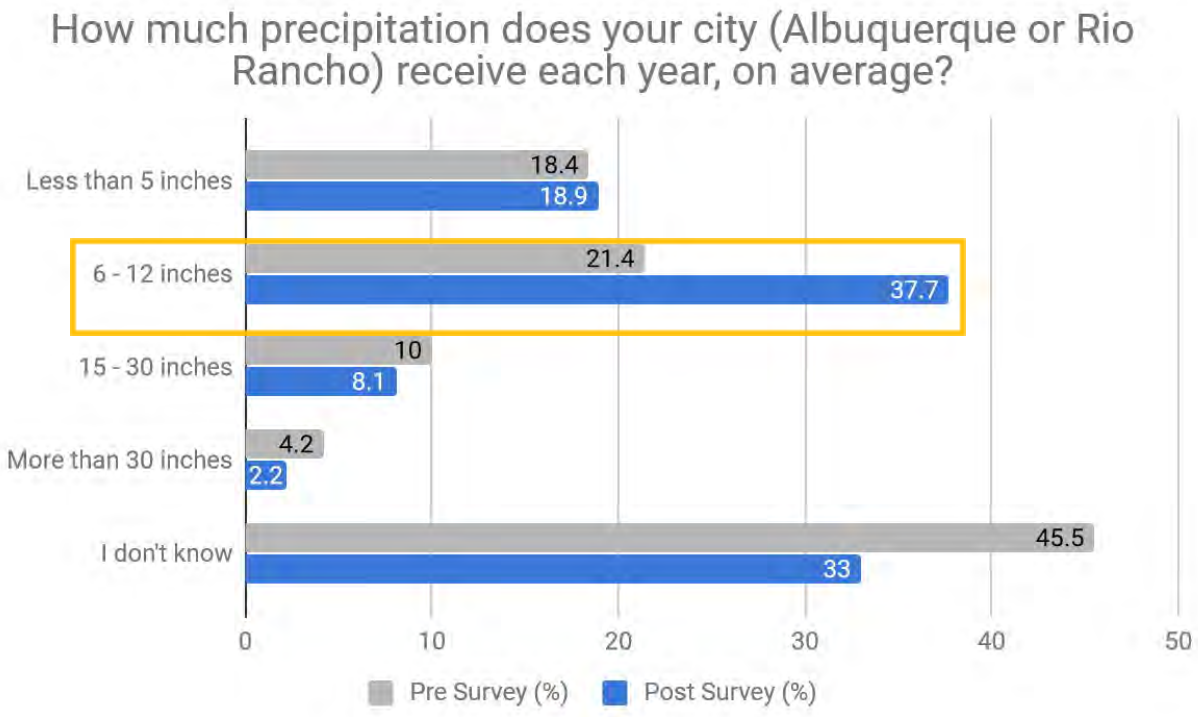
This graph does not demonstrate a significant change from pre to post. One possibility is that students are making educated guesses on the pre-survey and then are confident in their answer on the post-survey.

Item 3



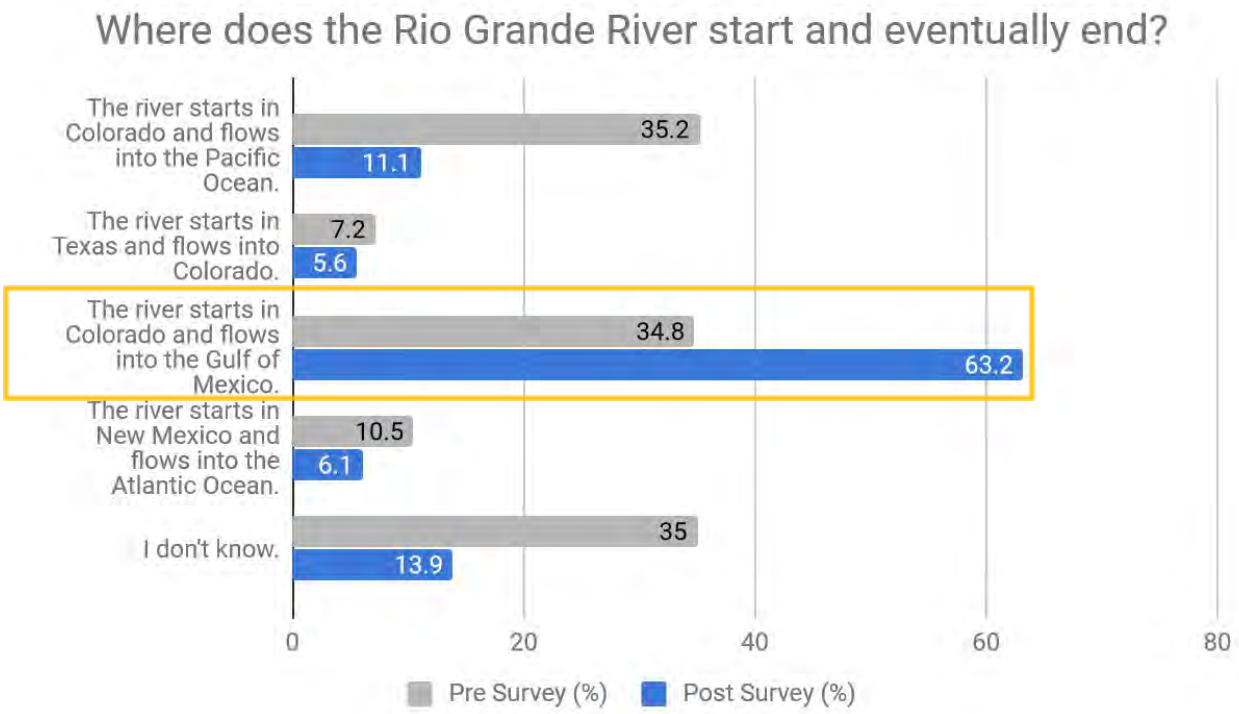
This graph demonstrates a 25% increase in correctly defining a watershed from the pre to post survey. Next year we intend to remove the option to answer “I don’t know” in all survey questions as we have determined that we could better assess student knowledge without it. Students may choose “I don’t know” in cases where they aren’t confident of the answer though could guess the correct answer with a challenge to consider the question more thoroughly.

Item 4



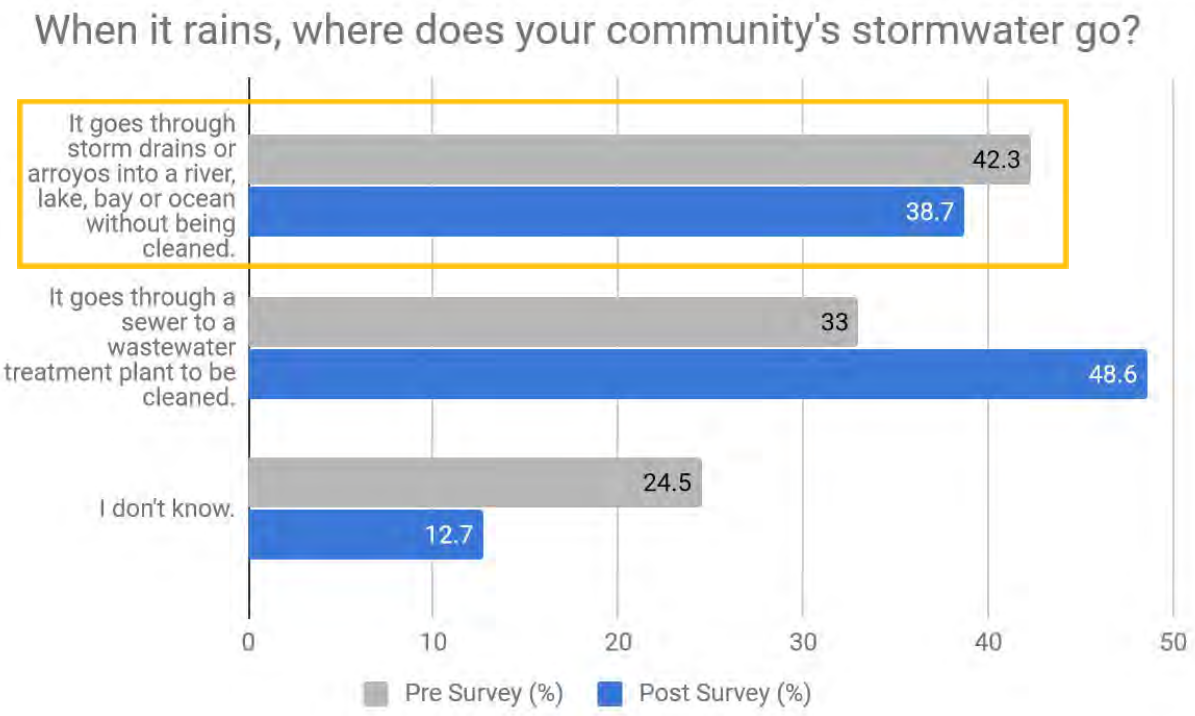
While we see a 16% increase in the correct answer here, we would like to see this metric improve next year. We adjusted the increments of the choices this year as well and added “less than 5 inches”. It’s likely that students who chose “less than 5 inches” thought the lesser precipitation reflected their home desert environment. We will plan to emphasize annual precipitation in the program next year. Also, we see again students opting for the “I don’t know” choice rather than perhaps choosing their best guess.

Item 5



Nearly 30% more students could answer this correctly at the end of the program.

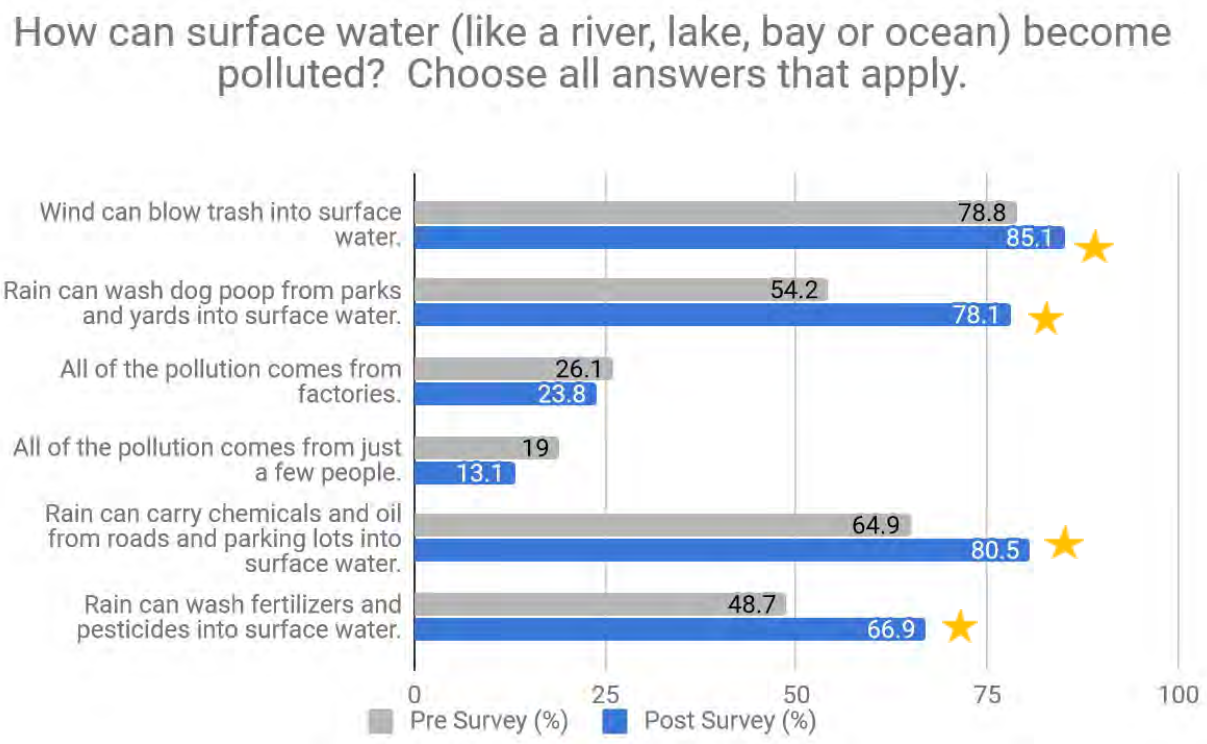
Item 6



This graph demonstrates a small decrease in correctly defining the stormwater pathway. We are not exactly sure where the misunderstanding is stemming from, but it may be rooted in misinformation about a sewer

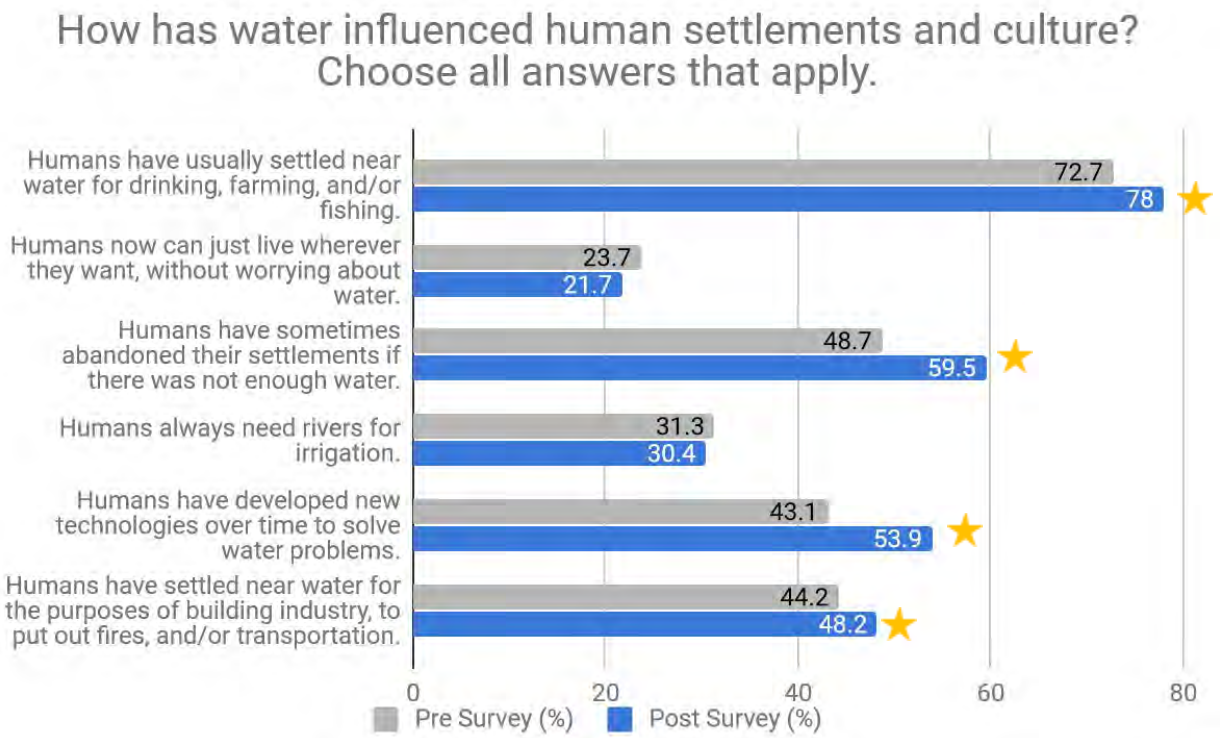
drain versus a stormwater drain. Next year we will ensure that teachers and presenters are clear about the difference between these drains and educate students on the distinctions. These results also support the need for a presenter workshop where we communicate with presenters the overall goal of RiverXchange in order to reinforce the collective goals and desired outcomes of our funders and in-kind sponsors.

Item 7



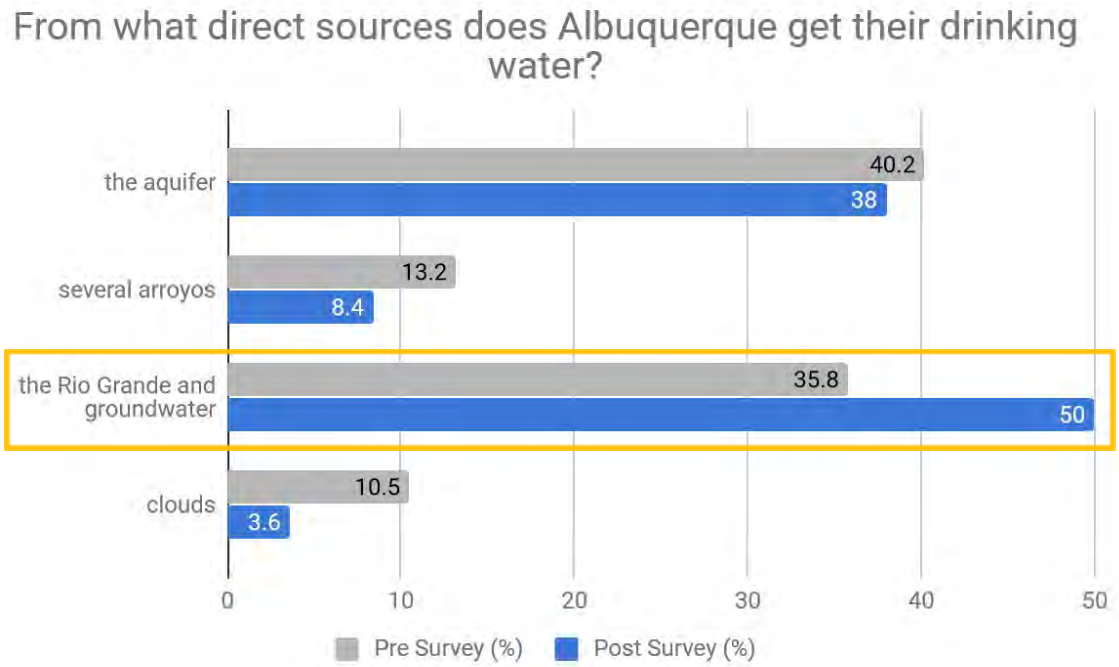
We see a significant increase (15-23%) in the understanding that stormwater can carry chemicals, fertilizers and dog poop into the river.

Item 8

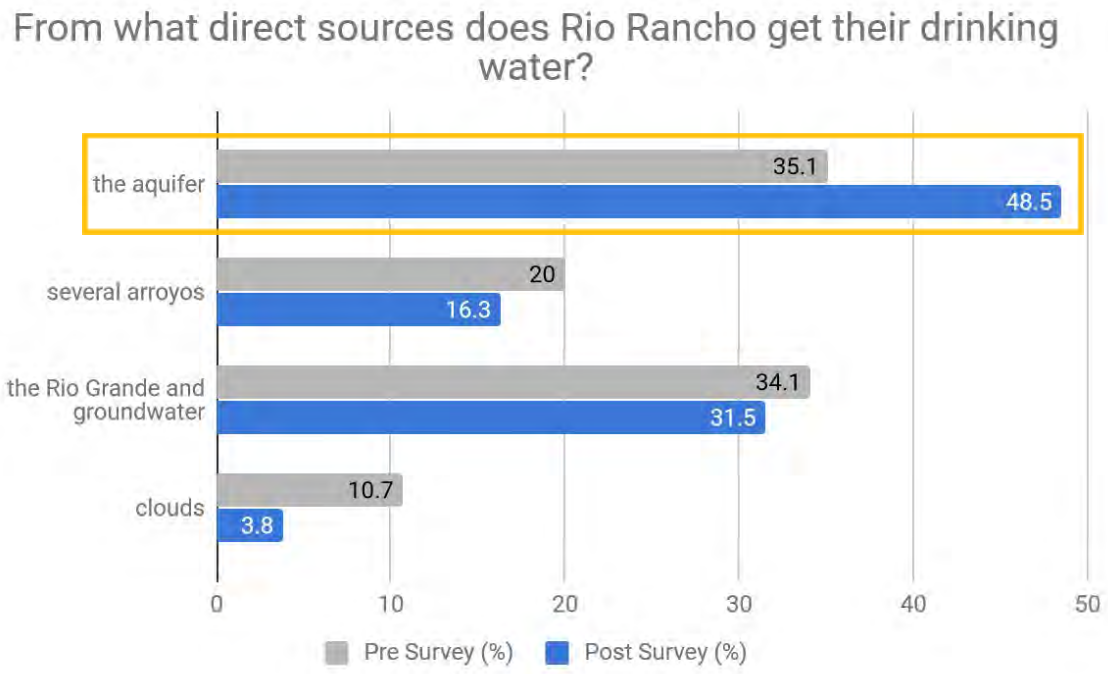


While students show a basic understanding of how water has influenced human settlements and culture at the time of the pre-survey, the post-survey shows an increase in overall understanding after students have been through the RiverXchange program.

Item 9

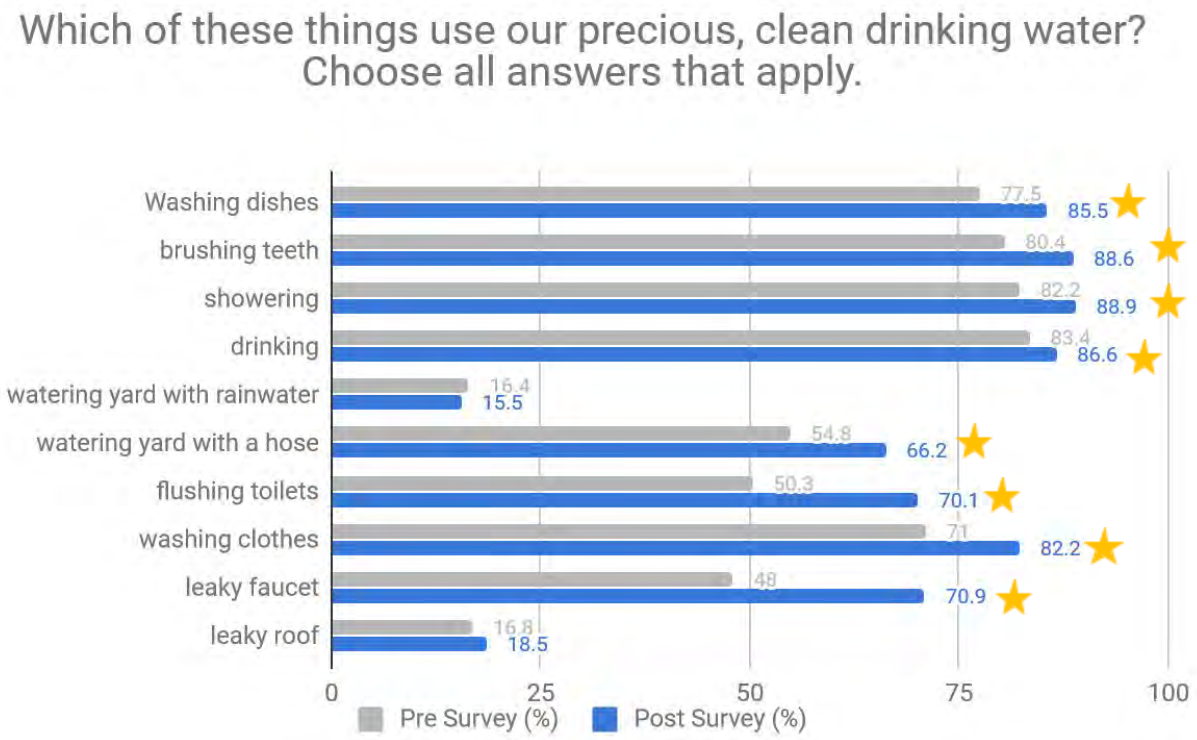


Item 10

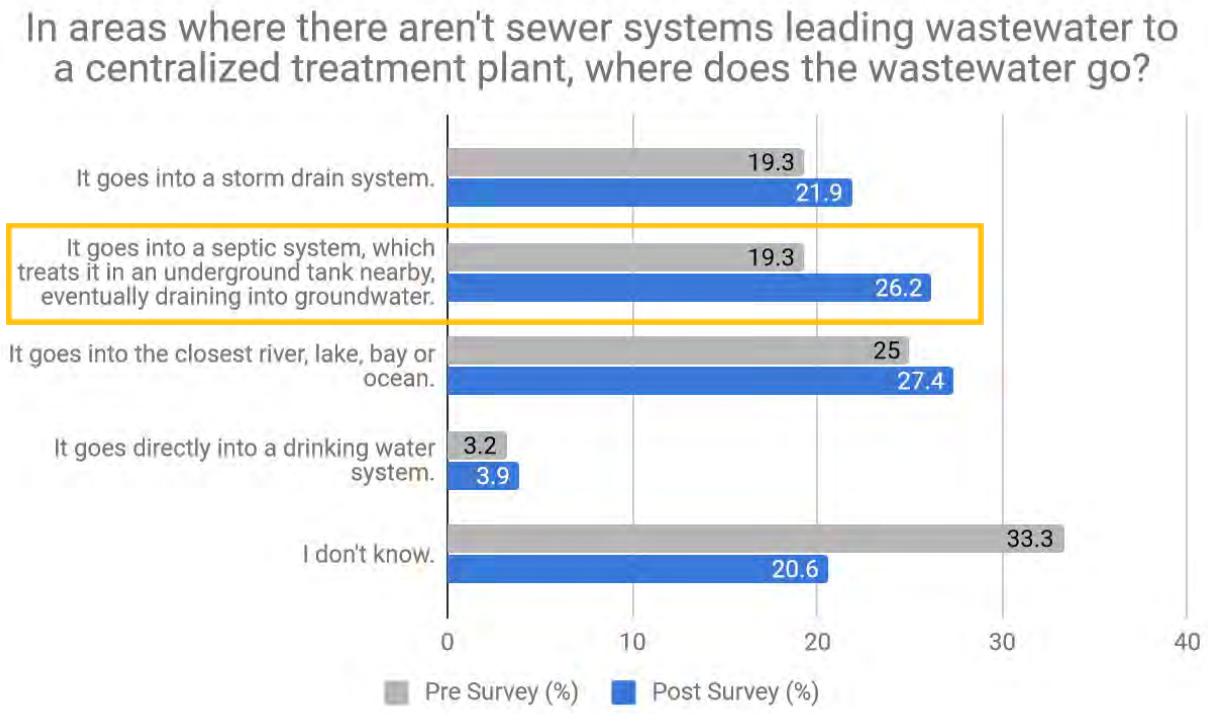


In previous years, all students, whether from APS or RRPS, could select the "river" or "groundwater/aquifer (wells)" as the correct answer to this question. To be more accurate this year, we offered students a similar question for both cities (Albuquerque and Rio Rancho). We also included an option reflecting that Albuquerque receives its drinking water from a combination of the river (surface water) and the aquifer. We also think it's important for students to understand where each city gets their drinking water. And we do see a significant increase in the correct answer for both questions. Next year, we will use the same terminology to signify the aquifer, instead of using "groundwater" and "aquifer."

Item 11



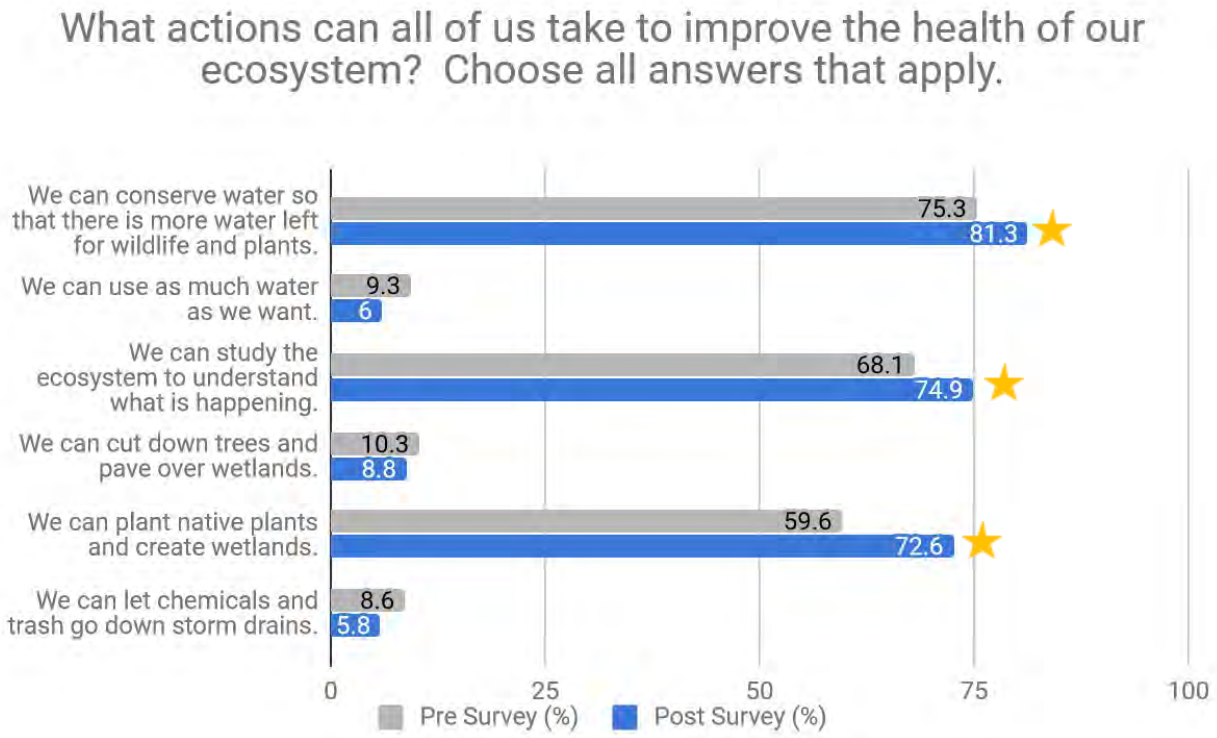
Item 12



It appears that this question is either confusing to read or the students aren't understanding the information from the program. It is likely that our APS students do not get exposed to septic systems as is covered in the

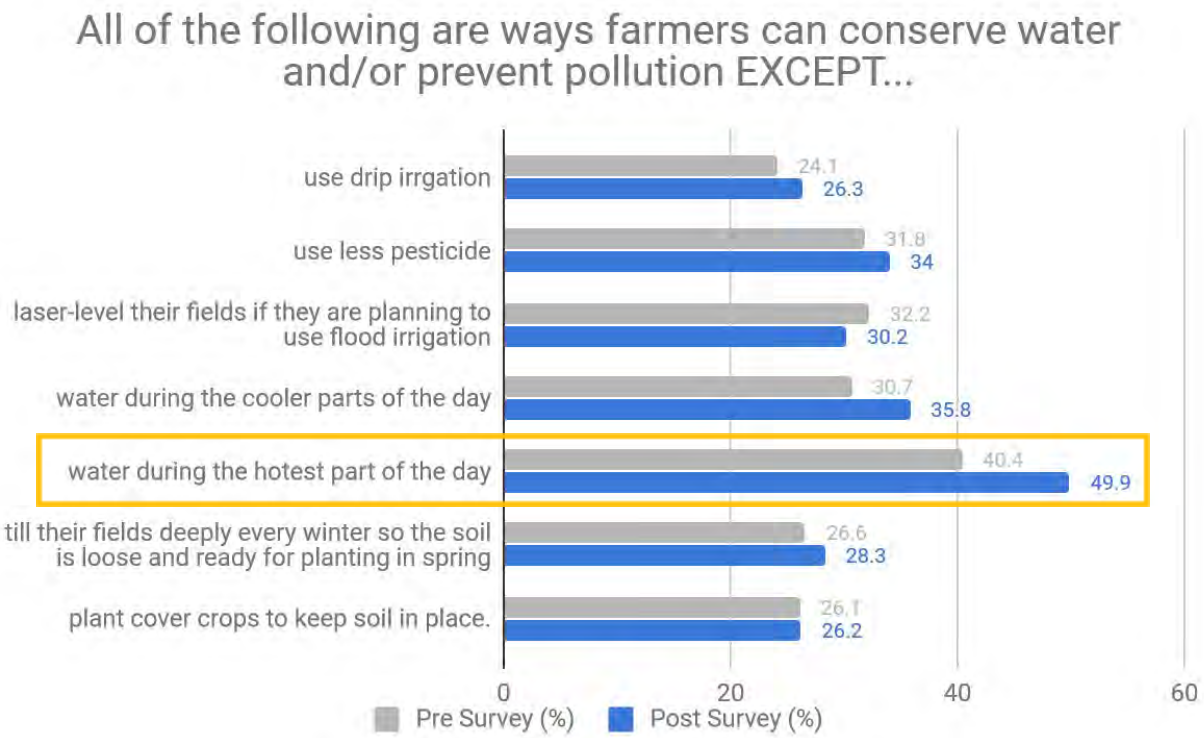
wastewater presentation for our RRPS students. While there is an increase in the correct answer in the post survey, the results also show a misunderstanding of wastewater through a similar percentage of students choosing several incorrect answers. We intend to address this more in the curriculum next year.

Item 13



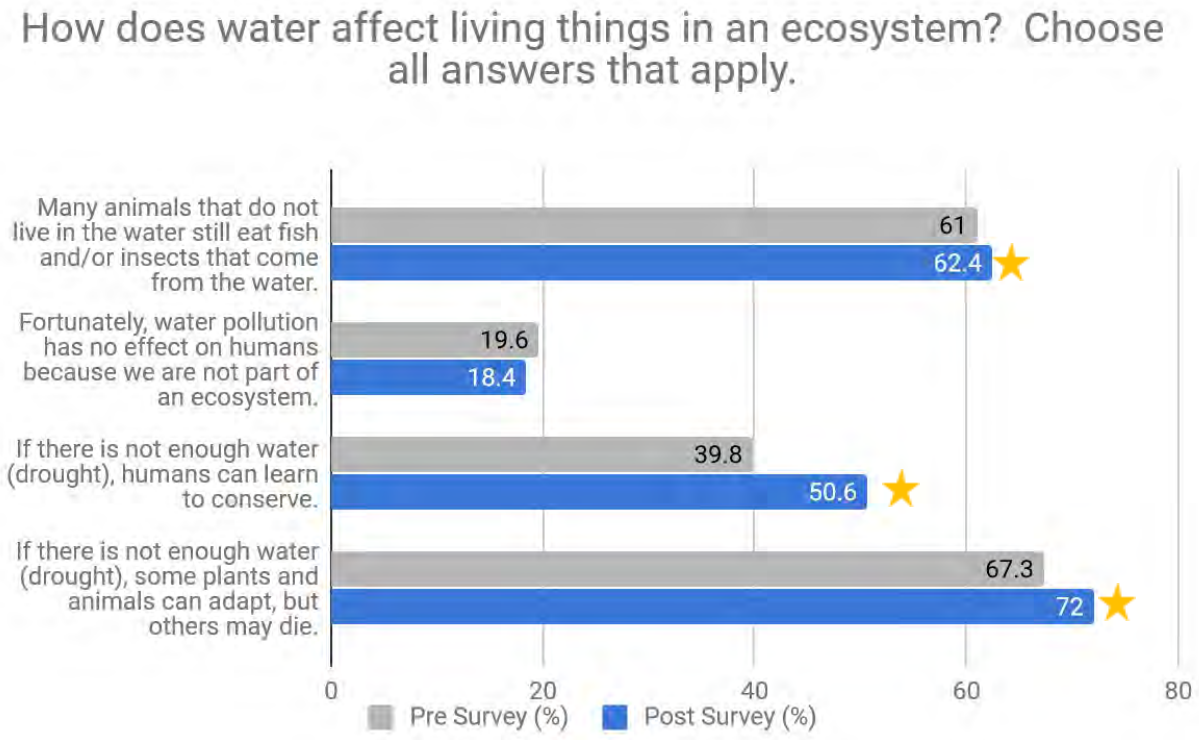
We see a 13% increase in the understanding that planting native plants can improve the health of our ecosystem. This may show learning of the significance of permeability in a landscape and how it can contribute to water conservation and support the health of the local environment.

Item 14



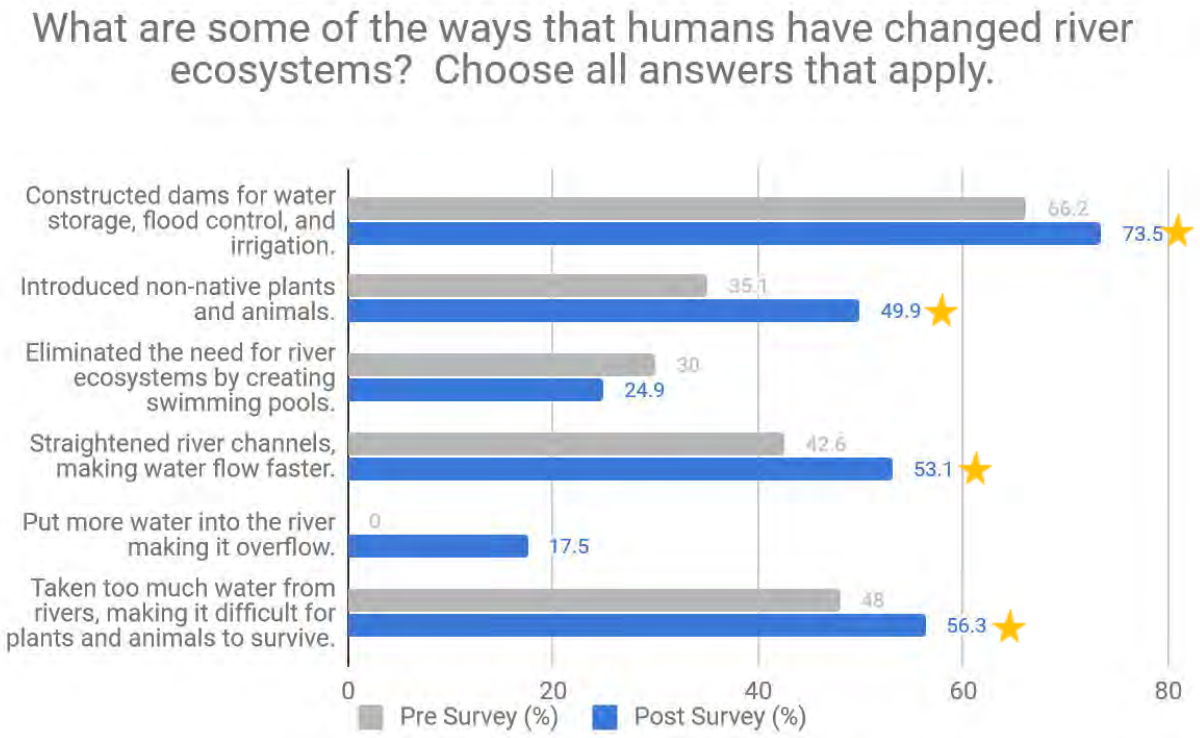
Our new presentation this year focused on acequia culture and history and water conservation did not address all of these items. With similar prompts, "All of the following EXCEPT…" we are noticing students may be choosing ALL the actions that apply rather than the one action that DOES NOT apply. Next year we will switch the question to picking all of the actions that apply to see if that yields better results.

Item 15



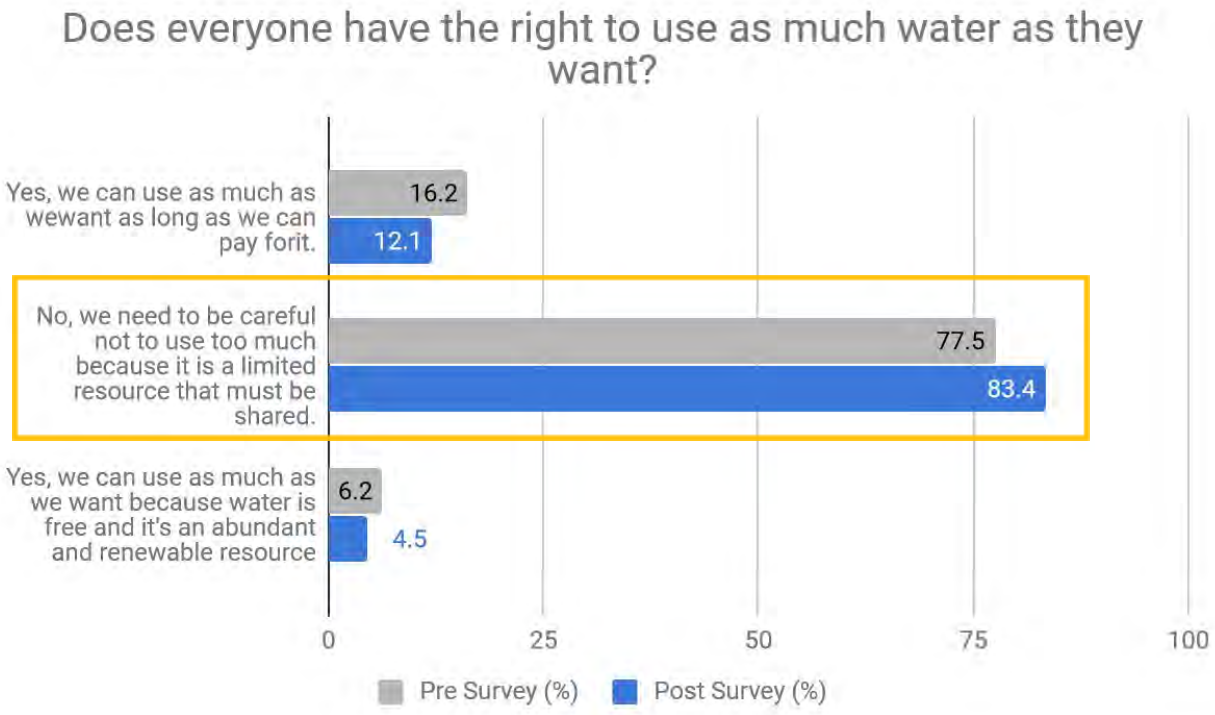
It appears that the answers to this prompt are intuitive for the majority of students from the beginning of the year. Though we do notice a greater increase in the understanding that humans can change their behavior and learn to conserve water.

Item 16



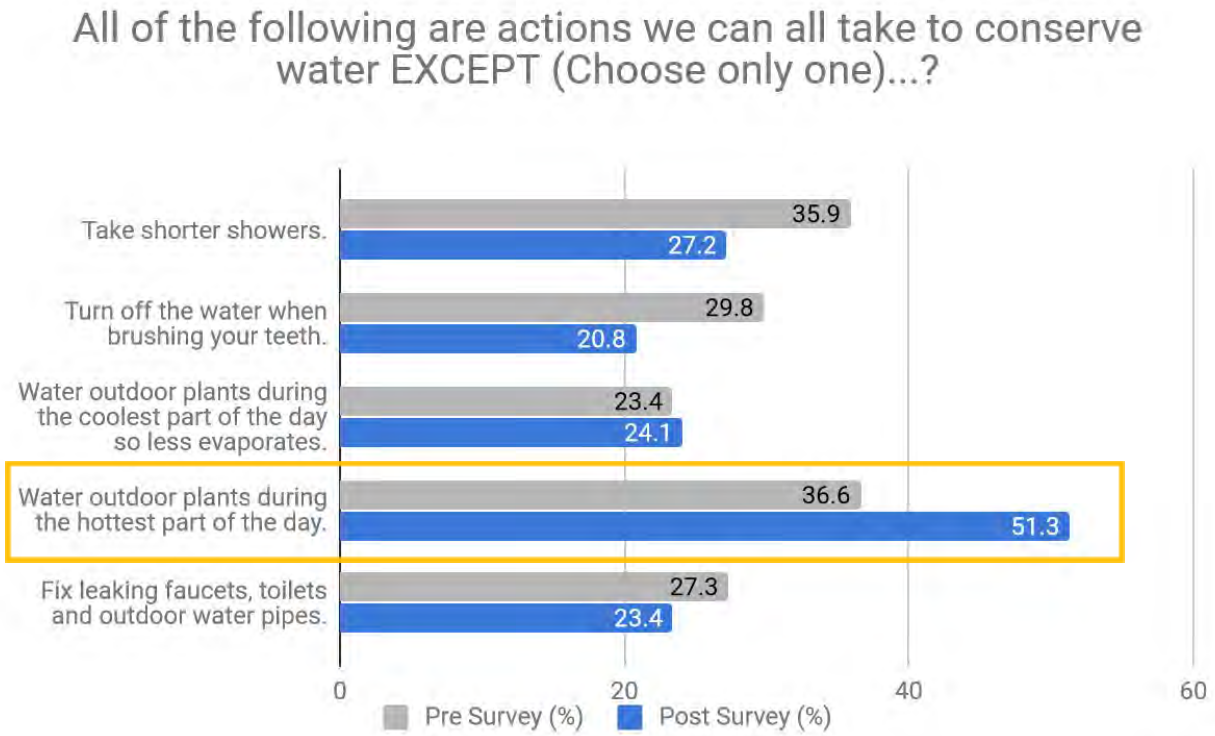
Through learning local water issues, including the history of the Middle Rio Grande, and planting native trees in the Bosque, students gained a significant understanding of the main ways humans have changed river ecosystems.

Item 17



While this answer is obvious to the majority of students, it shows a strong interest in and care for water conservation from future stewards of our watershed.

Item 18



The results in this graph are likely due to students misreading the question and picking ALL the actions we can take to conserve water instead of only choosing one action that DOES NOT conserve water. Next year we will switch the question to picking all of the actions that conserve water to see if that yields better results.

Appendix 1 includes the extension activities from the RiverXchange curriculum, Appendix 2 includes photos.

Appendix 1
Extension Questions and Activities

Understanding Our Watershed:

River Geography

- **Suggested Reading:**
  - **Books:**
    - *Follow the Water from Brook to Ocean* by Arthur Dorros
    - *Paddle-to-the-Sea* by Holling C. Holling
    - *One Well: The Story of Water on Earth (CitizenKid)* Strauss, Rochelle
  - **Articles:**
    - *Albuquerque Journal:* "As Bad as it Gets: Drought Returns to New Mexico."
    - *Albuquerque Journal:* "Drought Affecting 99% of New Mexico."

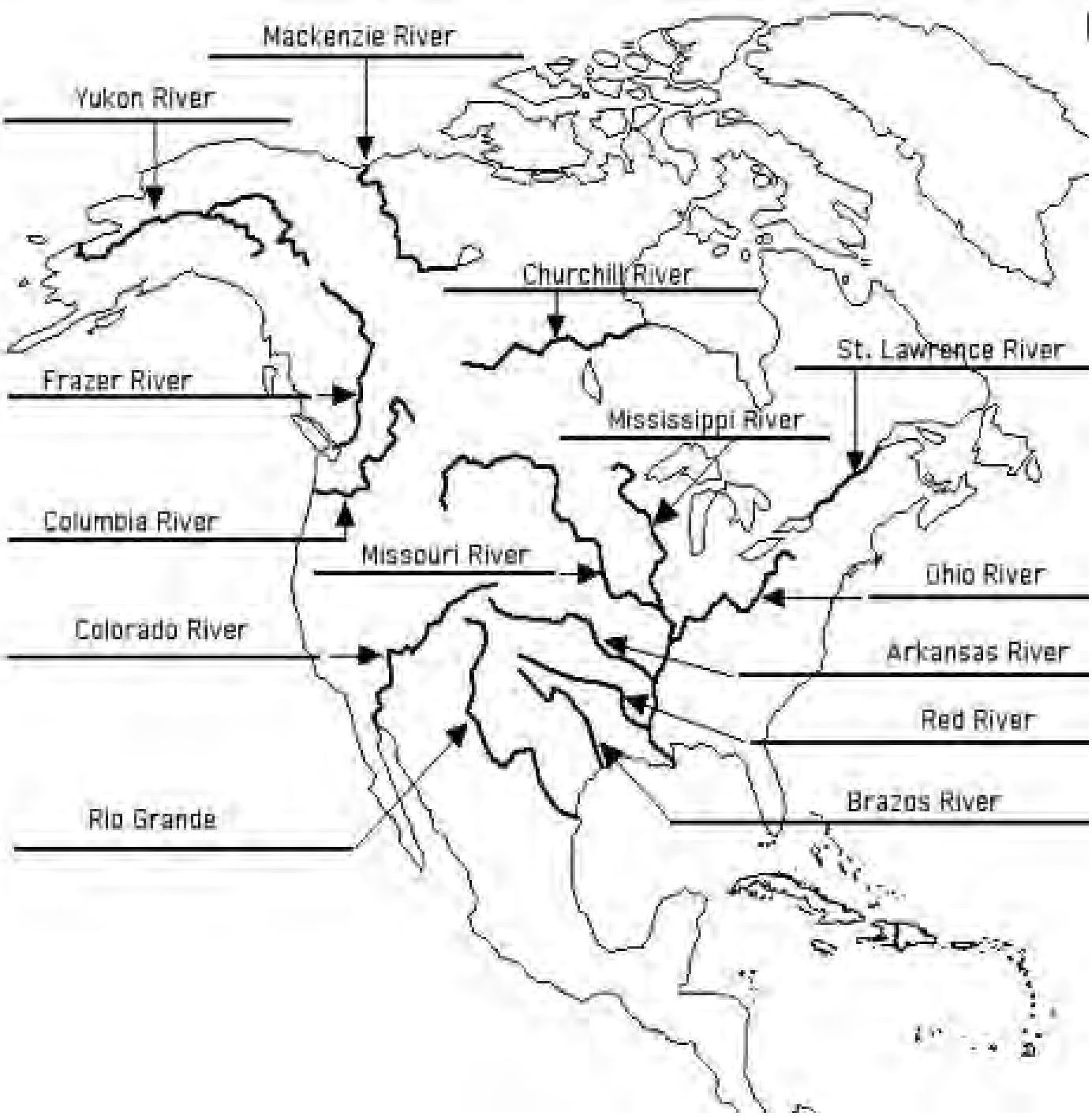
- **Watch:**
  - Watch Save Water - Save Our Rio!, a 17 minute video created by local summer camp students, sponsored by Albuquerque Water Utility Authority. Follow up with *When is the Drought Out?* http://www.abcwua.org/education/pdfs/Drought_GraphingOption.pdf

- **Write a letter to your partners or create a project, explaining:**
  - what a watershed is
  - the name of your river - this is also the name of your watershed!
  - the journey of your river from its headwaters to the ocean

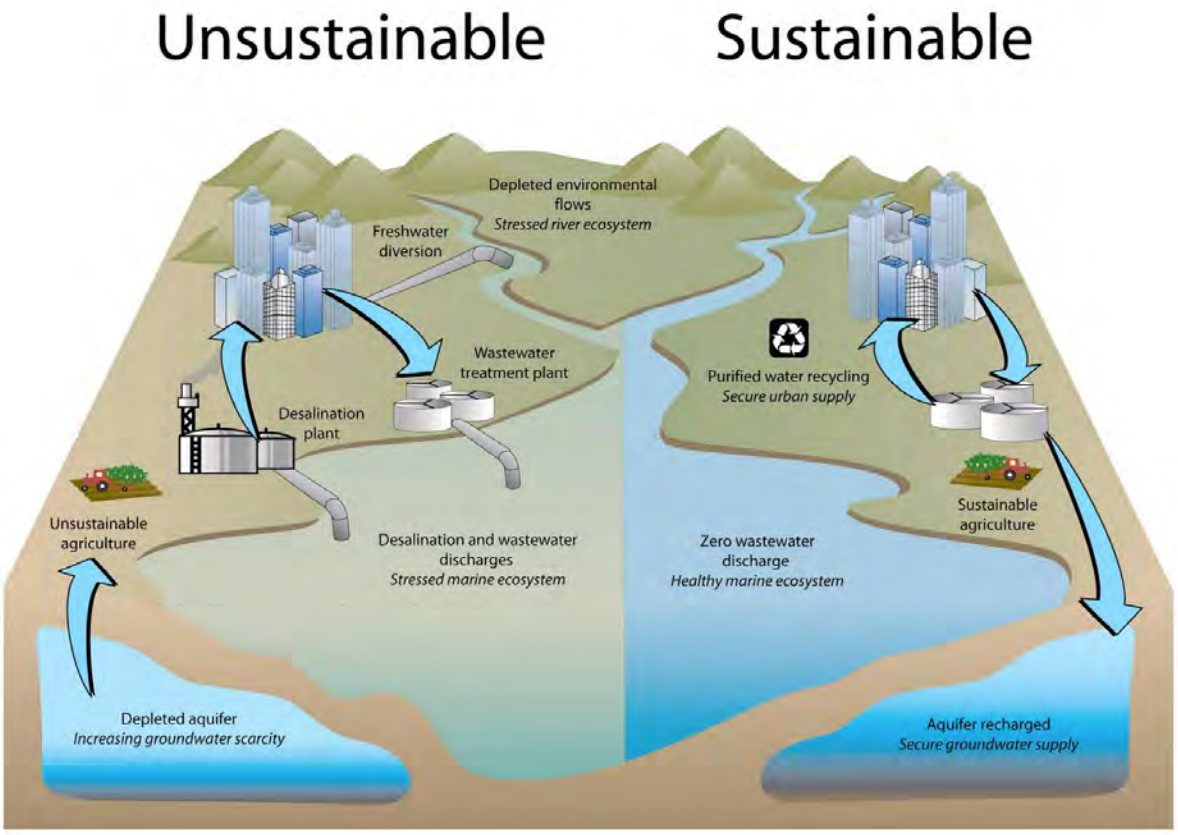
- what the river is like in your area - big/small, clear/muddy, fast/slow?
- how much precipitation your area receives each year, and what season gets the most precipitation

- **Want to explore further?** Refer to Project 1 in the RiverXchange Curriculum "Understanding a Watershed".
  - You can access the curriculum on your Kidblog homepage or by following this link: https://riverxchange.com/teachers2/curriculumpage/

North American River Map



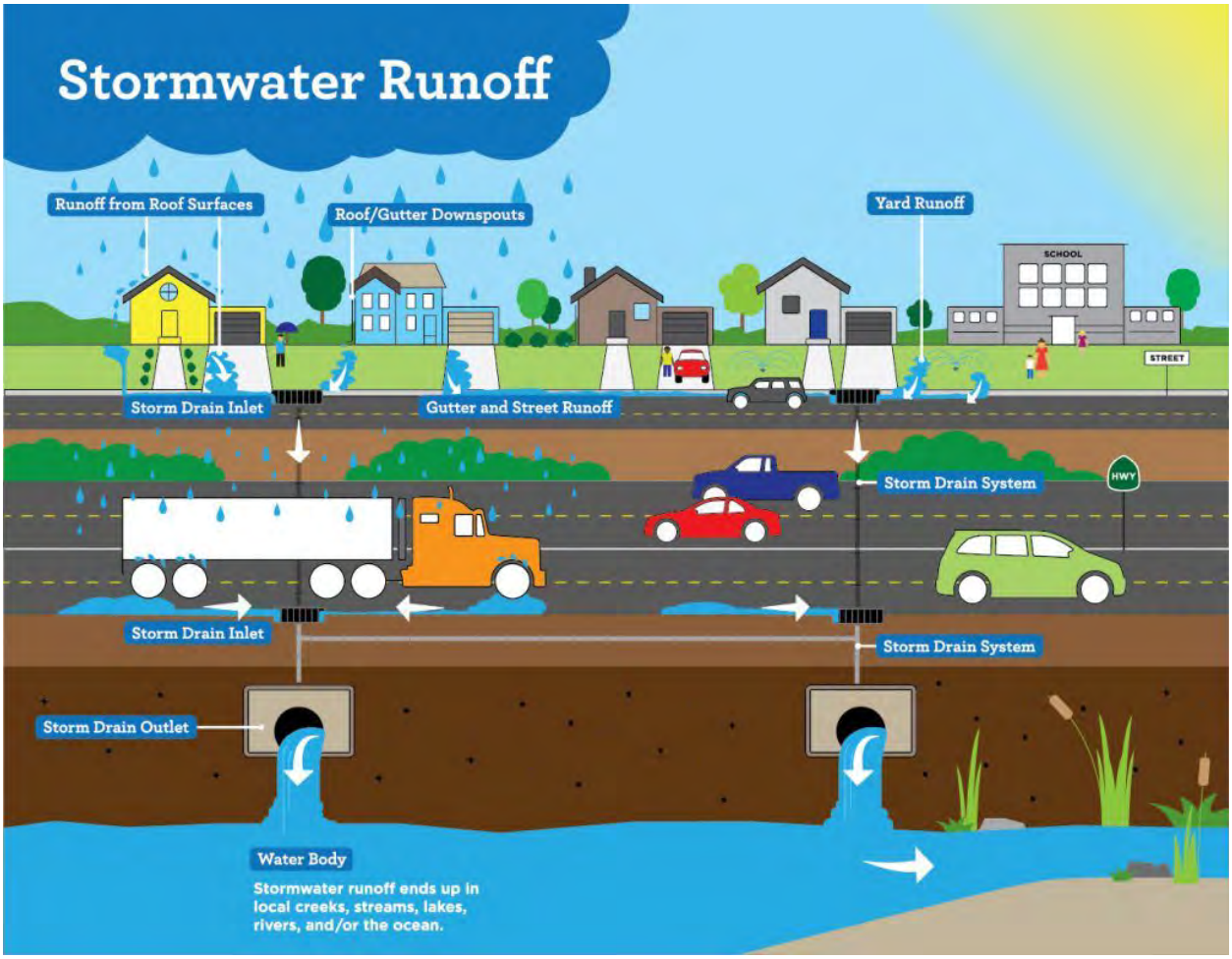
The urban water cycle



Clean Ocean Foundation 2009 - www.cleanocean.org

Understanding a Watershed:

Watershed Model / Infiltration and Runoff



Graphic credit: City of Columbia, MO

Enhance your student's blog posting and extend their learning beyond the Stormwater presentation with the following activities:

- **Suggested Reading:**
  - **Articles:**
    - *CNN* article. 2013. "Garbage Man of the River" http://www.cnn.com/2013/04/18/us/cnnheroes-pregracke-rivers-garbage
    - *Science News for Kids* article. 2012. "Suffocating Waters" https://www.sciencenewsforstudents.org/article/suffocating-waters
- **Watch:**
  - *The Human Solution to Water Pollution* video (to right of screen): http://sscafca.org/teacher-resources/
  - *The Majestic Plastic Bag* video (mockumentary): https://vimeo.com/14221747
    - For a 60 minute class activity, include this lesson to explore the Great Pacific Garbage Patch and what students can do to respond.

- Explore The Ocean Cleanup project and how an 18 year old started with a simple idea which is now making a difference in the effort to clean up the world's oceans.

❖ **Explore your watershed**

➢ Follow the link below to zoom in and explore your watershed and the watershed that family and friends live in, perhaps even your RiverXchange partners who live outside of New Mexico! Interactive Topographic Watershed Map of Earth

❖ **Lesson plan**

➢ *Don't Trash Our Rio Activity Guide* - A math based extension where students learn how much trash is pulled from Albuquerque's storm drain system yearly, and calculate how many trash bags or classrooms it would fill. (Follow links for additional handouts)

- **Reflection Questions**
  - Discuss how the gutters in our streets lead to **storm drains**, which often lead directly to the nearest body of water. Discuss the difference between **stormwater** and **wastewater** (from household drains and toilets).
  - What is stormwater and where does your community's stormwater go?
  - What did you learn about stormwater that was surprising to you?
  - How do things that happen in your yard or your neighbor's yard impact the watershed?
  - What have you noticed about stormwater in your own neighborhood?
  - What are some things you can do to clean up stormwater?
  - How can surface water become polluted?
  - What's happens when rain falls on a pervious surface compared to an impervious surface? Give examples of impervious surfaces.
  - How are groundwater and surface water connected?
  - What are ways you can minimize stormwater pollution?

❖ **Want to explore further?** Refer to Project 2 in the RiverXchange Curriculum "The Watershed".

➢ You can access the curriculum on your Kidblog homepage or by following the link below: https://riverxchange.files.wordpress.com/2018/09/riverxchange-curriculum-20181.pdf

Water in Our Society:

Drinking Water

Enhance your student's blog posting and extend their learning beyond the Drinking Water presentation with the following activities:

- **Suggested Reading:**
  - **Book:** *A Long Walk to Water*, by Linda Sue Park (2010: Clarion Books)
  - **Articles:**
    - **Albuquerque drinking water info**
      - from ABQ Water Utility Authority http://www.abcwua.org/education/pdfs/WaterUse_Text.pdf
      - About the San Juan Chama Project, ABQ Journal 2008: https://riverxchange.files.wordpress.com/2015/08/san-juan-chama-project.pdf
    - **Santa Fe drinking water info**
      - Buckman Diversion, ABQ Journal 2010: https://riverxchange.files.wordpress.com/2015/08/buckman-diversion.pdf
    - **Santa Fe drinking water info**
      - Buckman Diversion, ABQ Journal 2010: https://riverxchange.files.wordpress.com/2015/08/buckman-diversion.pdf

- **Lesson Plan: The Water Project**
  https://thewaterproject.org/resources/WaterLogs_5to8.pdf
  - Five simple activities and lessons to assist students in exploring how water scarcity may impact their lives and how they can contribute by conserving water.
  - Suggested activity: Students log their personal use and observation of other forms of water use over two days, then discuss their findings and explore what would happen if water scarcity were an issue. Another lesson also includes a TRUE/FALSE game to learn about water and how it impacts the human body and communities.

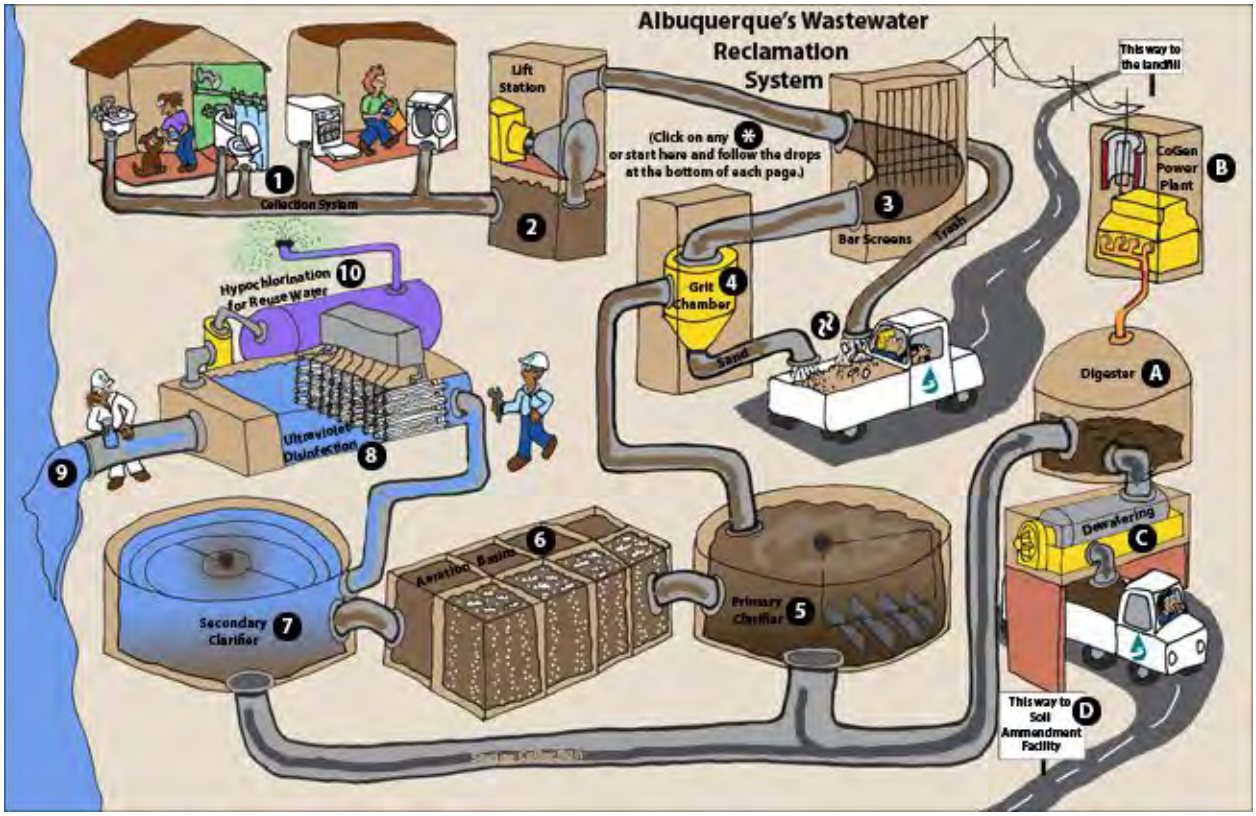
- **Lesson Plan: Cleaning Water**
  http://seplessons.ucsf.edu/node/1754
  - Create a filter in class to clean contaminated water and investigate your findings with the lesson linked below. This activity can be done over the course of a few days in class, or you can demonstrate how a filter works with your class in a shorter lesson.

- **Reflection Questions**
  - Where does your drinking water come from and what communities rely on it?
  - Drinking water is used for much more than bathing, flushing toilets and drinking. What are other ways you and your community use drinking water?
  - Did you learn anything surprising about how we use drinking water, if so what?
  - What percentage of the Earth is covered in water? Out of that amount, how much is accessible fresh water? How much is available as drinking water and why is it important to conserve it?
  - One third of the world's population does not have access to clean drinking water. How would your life be different if you had to walk miles to bring back water to your family?

- **Want to explore further?** Refer to Project 6 in the RiverXchange Curriculum "Drinking Water".
  - You can access the curriculum on your Kidblog homepage or by following this link: https://riverxchange.files.wordpress.com/2018/09/riverxchange-curriculum-20181.pdf

Water in Our Society:

Wastewater / Groundwater



Enhance your student's blog posting and extend their learning beyond the Wastewater presentation with the following activities:

- **Suggested Reading:**
  - *KOAT* news. 2015. "Aging Pipes Mean Higher Water Bills" http://www.koat.com/news/aging-pipes-could-mean-water-bill-hike/34284754
  - Combined sewer overflows article, by Anne Jefferson, a geology professor from Kent State. http://all-geo.org/highlyallochthonous/2013/03/combined-sewer-overflows-solving-a-19th-century-problem-in-the-21st-century/

- **Activities:**
  - Follow this link to the ABQ Water Utility Authority's website to navigate virtually through Albuquerque's wastewater system: http://www.abcwua.org/Education/SWRP_home.html
    - Want to add a project-based learning component to this exercise? Use these questions and activities to go along with your tour: http://www.abcwua.org/education/educators_WSDcur2_quest.html

- ➢ Show students the *Septic System* poster (the poster can be shown on a smartboard and explain the difference between a **sewer system** and a **septic system** – they both treat wastewater essentially the same way, but a septic tank is right by the house and uses a drainfield in rural areas.

- ➢ Create a Public Service Announcement with your class inspired about what you've learned. Take a video and post it on the blog to share with your partner class!

❖ **Watch:**

- ➢ Watch one of these videos in class to review the process of wastewater and what students can do to take care of wastewater: https://www.youtube.com/watch?v=Ldz29NqwK78 (An animation narrated by a young student)
- ➢ https://www.youtube.com/watch?v=tuYB8nMFxQA (A video of the water treatment process created by New Jersey American Water)
- ➢ Learn about recharging the aquifer in the City of Rio Rancho https://rrnm.gov/4024/Rio-Rancho-Pure

- **Reflection & Discussion:**
  - What is wastewater and how does it impact your community?
  - What is the difference between wastewater, stormwater and drinking water?
  - How can you use what you've learned to make a difference at home and at school?
  - What is the process of treating wastewater in your community? (For RRPS students, generally you are on a septic system). What is the difference between a sewer and septic system?
  - What surprised you about the process of treating wastewater from the presentation?
  - Why is it important to do what we can to keep certain things out of our wastewater, whether it goes to septic system or a wastewater treatment plant?

❖ **Want to explore further?** Refer to Project 8 in the RiverXchange Curriculum "Wastewater".

- ➢ You can access the curriculum on your Kidblog homepage or by following this link: https://riverxchange.files.wordpress.com/2018/09/riverxchange-curriculum-20181.pdf

Water in Our Society:

Commercial Uses of Our Waterways: Agriculture

Photo credit: Erich Schlegel

Enhance your student's blog posting and extend their learning beyond the Agriculture presentation with the following activities:

- **Suggested Reading:**
  - **Book:** *Out of the Dust* by Karen Hesse (1997: Scholastic Press)
    Written from the poetic perspective of 14 year old Billie Jo as she narrates her family's struggle in Oklahoma during the years of the Depression and the Dust Bowl.
  - **Articles:**
    - *ABQ Journal* article, 2013. "Deal Allows Farmers to Sell Irrigation Water" http://www.abqjournal.com/221194/news/deal-allows-farmers-to-sell-irrigation-water.htm
    - *National Geographic* article, 2014. "Parched: A New Dust Bowl Forms in the Heartland" http://news.nationalgeographic.com/news/2014/05/140516-dust-bowl-drought-oklahoma-panhandle-food/

- **Explore more about the Dust Bowl:** Check out the link below for an informative, interactive website developed by PBS. http://www.pbs.org/kenburns/dustbowl/educators/overview/

- **Lesson Plan: Soil is Not Trivial**
  - Using facts about the Dust Bowl, students write questions and play a trivia activity focused around the establishment of a national soil conservation program and the importance of soil. Students then explore and/or develop a plan to address a local soil conservation issue.
  - http://www.ncagr.gov/SWC/educational/documents/FLP_soil_is_not_trivial.pdf

- **Write a short story**
  - Write a short story from the perspective of someone who is living during, and affected by the Dust Bowl. Explore the PBS website link, or the suggested reading.

- **Lesson plan: Growing Plants**
  - Students will use the story of *The Empty Pot* to explore literature and science, practicing story mapping and learning about the needs of plants and the importance of soil and water. Like the characters in the story, students will plant and observe the growth of seeds. https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=484&author_state=0&grade=3&search_term_lp=growing%20plants

- **Reflection Questions**
  - What was the Dust Bowl and how did it impact people?
  - What do you think are the major agricultural lessons for us from the Dust Bowl?
  - How may we be able to prevent a dust bowl from occurring again?
  - What is important for farmers to consider when planning how to irrigate their farm and why?
  - How does agriculture relate to water and to our daily lives?
  - What did you discover in your planting activity about the different types of irrigation?

- **Want to explore further?** Refer to Project 5 in the RiverXchange Curriculum "Commercial Uses of Our Waterways".
  - You can access the curriculum on your Kidblog homepage or by following this link: https://riverxchange.files.wordpress.com/2018/09/riverxchange-curriculum-20181.pdf

Water in Our Society:

Commercial Uses of Our Waterways: Acequias

Enhance your student's blog posting and extend their learning beyond the Agriculture presentation with the following activities:

- **Suggested Reading:**
  - **Articles:**
    - *ABQ Journal* article, 2013. "Deal Allows Farmers to Sell Irrigation Water" http://www.abqjournal.com/221194/news/deal-allows-farmers-to-sell-irrigation-water.htm
    - *National Geographic* article, 2014. "Parched: A New Dust Bowl Forms in the Heartland" http://news.nationalgeographic.com/news/2014/05/140516-dust-bowl-drought-oklahoma-panhandle-food/

- **Watch:**
  - *Nuestras Acequias* (20 minutes) and/or *South Valley Acequias* (4 minutes). Discuss the **acequia** system which was put in place by the Pueblo people and early Spanish settlers, how is it organized amongst the community and maintained? What is its cultural and ecological significance?

- Explore the acequia tradition further with *El Agua Es Vida* lessons.

❖ **Lesson Plan: Prior Appropriation**

➢ Using the *Prior Appropriation* activity guide, act out the two different methods of assigning water rights to all the water users. Discuss the difference between the Riparian Rights and Prior Appropriation doctrines. Research the history of water rights in your community and compare the differences in water rights issues with your partners' area. Prior Appropriation is used in the western states, which receive far less precipitation.

❖ **Discuss**

➢ How people have developed technological solutions to solve water problems. For example, many ancient settlements in the West were abandoned because of lack of water, but irrigation technology has made it easier to survive. Dams have made it easier to control the flow of rivers, reservoirs store water, and fish ladders are built so that dams don't prevent their migration. High-efficiency toilets and other appliances help conserve water.

- **Reflection Questions**
  - What did you learn about acequias that you didn't know before this presentation?
  - How are acequias important to life and culture in New Mexico?
  - What would happen to the land if people didn't maintain acequias?
  - What is important for farmers to consider when planning how to irrigate their farm and why?
  - How does agriculture relate to water and to our daily lives?

❖ **Want to explore further?** Refer to Project 5 in the RiverXchange Curriculum "Commercial Uses of Our Waterways".

➢ You can access the curriculum on your Kidblog homepage or by following this link: https://riverxchange.files.wordpress.com/2018/09/riverxchange-curriculum-20181.pdf

River Ecosystems:

Pole Planting Field Trip

Enhance your student's blog posting and extend their learning beyond the Field Trip with the following activities:

- **Suggested Reading:**
  - **For teacher:** Read or review the 1st part of Chapter 4 of the Bosque Education Guide: A River of Change and discuss with your class the history of the Rio Grande River, the changes made to it's flow and channel, and the impact on the Bosque ecosystem.
- **Make a food web**
  - Make a food web for our local ecosystem, identifying producers, consumers and decomposers, native species and invasive species, as well as local endangered species. Discuss how wildlife are "water users" too. Like humans, wildlife needs clean water to live, so as a community we must consider their needs when making choices about water. Use Bosque plant and animal cards to do *The Web* activity, discussing how all living things depend on each other.
- **Learn about the STRAW Project**
  - An ongoing watershed restoration project first inspired by 4th graders in 1992, based in Marin Co. California! Add it to your school's library and show the documentary in class.

http://www.pointblue.org/our-science-and-services/conservation-science/conservation-training/straw-program or read about the project in this article and discuss how youth can make an impact: http://www.marinij.com/article/NO/20150325/NEWS/150329872

- **Reflection & Discussion:**
  - What did you learn about the history of the Rio Grande River and the floodplain we planted in? How does this history impact the future of cottonwoods in the area?
  - Identify some common invasive species. Where did they come from and how are they impacting the Bosque?
  - What is the process of planting cottonwoods and willows and why do we do it in the wintertime?
  - After this field trip, how may you see and understand the Bosque differently?
  - What did you most enjoy while being down in the Bosque?
  - How can you apply what you learned or enjoyed on your field trip in your everyday life?

❖ **Want to explore further?** Refer to Project 9 in the RiverXchange Curriculum "Field Trip".

➢ You can access the curriculum on your Kidblog homepage or by following the link below: https://riverxchange.files.wordpress.com/2018/09/riverxchange-curriculum-20181.pdf

Appendix 2
Photos

Field trips

Students from Colinas del Norte at the Sandoval County Landfill. (Left) Receiving a presentation on the green waste composting operation with Robert Sanchez. (Below) At the top of the landfill, getting a tour of how the landfill works and question and answer with Chris Perea.

Below is a selection of images from our planting field trips at Alamo Farm and Candelaria Open Space Preserve.

Exhibit 6
BEMP 2018-2019

Bosque Ecosystem Monitoring Program (BEMP)
Report to the Storm Team of the
2018-2019 Stormwater Science Education Program

The main objective of the *Stormwater Science* outreach education program is to teach students how the health of the Rio Grande is directly related to the health of the surrounding watershed and what their responsibility and opportunities are to help keep the "Rio Grand." BEMP educators have developed a Stormwater Science program that includes a 90-minute classroom activity, a four-to-five-hour study trip to the Rio Grande, and optional curriculum extensions incorporating hands-on data analysis, graphing, and system modeling. **During the 2018-2019 school-year 2,017 students participated in Stormwater Science** activities in their classrooms, in the field, both, or in outreach events. The classroom program was delivered to **599 students** in **33 classrooms** at **13 different schools** in **Rio Rancho, Albuquerque, and Belen.** In addition to the Stormwater Science outreach, BEMP actively involves students in water quality monitoring through the *E. coli* monitoring contract with the Mid Rio Grande Stormwater Quality Team. **29 students from La Academia de Esperanza (LADE)** and **5 University of New Mexico (UNM) undergraduates** were directly involved in water quality monitoring of the Rio Grande in support of this contract. Students are taught the proper protocols for collecting field parameters and *E. coli* data, but, consistent with our quality assurance plan, are only allowed to collect field parameter data. Students then graph and analyze the data and are supported in presenting their findings at BEMP-supported conferences, professional conferences, and to policy makers. In 2018, the student-collected data (field parameters) and *E. coli* data were presented by a UNM undergraduate in August at the EPA Region 6 conference. BEMP also spent much of 2018-19 updating and enhancing its Stormwater Science education and outreach components.

The BEMP Stormwater Science program targets middle and high school students using two main formats: an indoor classroom lesson and an outdoor field experience or *Stormwater Study Trip*. This year, a new high school classroom lesson was designed and implemented to teach more complex and nuanced stormwater science concepts, including analyzing data to see how different water quality parameters are affected by storm events. High school curriculum extensions were also created for groups who either request multiple classroom visits or have enough class time for a longer, more intensive lesson.

1. Classroom curriculum*: Preparation and delivery of Stormwater Science activities in the classroom for middle and high school students* **(599 students)**

The principal objective for the middle school classroom curriculum is to demonstrate how some of our daily, individual actions impact the health of the Rio Grande. To reach that goal, students construct a model of the Rio Grande Watershed (pages 5 and 18). The watershed model has five different communities along the river: a cattle ranch, upstream and downstream eco-friendly towns, an urban city, and agricultural fields. Students add different 'runoff cards' to the river downstream of the communities where the runoff constituents originate. Some of the runoff is naturally occurring (e.g. turbidity) while some is human-caused (e.g. pesticides or oil). The model runs through two different scenarios: (1) *before-the-storm* and (2) *after-the-storm*. While working through different variations of the model, students record the number of runoff cards introduced into the river before and after a storm event (handout table; page 6). This helps them to conceptualize/quantify and further discuss the impacts of these changes to overall river health. Exploring these two scenarios demonstrates the harmful effects that stormwater contamination can have on aquatic organisms and downstream communities.

The high school classroom lesson builds upon these core concepts. After discussing the aforementioned watershed model, students learn about some key water quality parameters: temperature, conductivity, dissolved oxygen, turbidity, and dissolved organic matter. Students divide into groups assigned one parameter each. They must then predict how their parameter might be affected by a storm event along with providing justification for their prediction. Students are given graphed data of their parameter before and after actual storm events and must analyze the graphs to determine if the data supports their previous supposition. When classes have more time available, this activity is supplemented by two different curriculum extensions. The first curriculum extension uses the same key water quality parameters introduced in the regular classroom activity but the students analyze provided data and create their own graphs. We provide (1) a blank graphing sheet with the axis labeled and with the river flow data (used as a reference to talk about the time gap between the increase in cfs and parameter peaking; see page 13) and (2) a table with measurements for each parameter (see page 14). This activity helps students learn how to analyze and graph data and then interpret the results, using skills aligned with Next Generation Science Standards (NGSS). The second curriculum extension is a soil porosity and permeability experiment that deepens students' understanding of how different surfaces (natural vs. anthropogenic, permeable vs. impermeable) impact the overall water budget and water quality (page 15 and 16).

The Stormwater Science classroom program encourages students to be reflective about their daily behaviors and to think about ways they can help keep their watershed clean. Students are asked to brainstorm about how they can help improve watershed health before educators lead a discussion on watershed stewardship that aligns with MRGSQT educational messaging. In order to reach students that identify Spanish as their first language and better serve New Mexico's diverse communities, the handouts for these activities are now available to students in both English and Spanish (pages 7 and 8).

In 2018-19, the Stormwater Science curriculum was used in BEMP's pilot after-school program, BASS (BEMP After School Science). BASS engaged K-12 students from five Title 1 schools

through STEAM-based, hands-on learning, as well as self-directed, place-based exploration and data collection. As part of the curriculum, BEMP included two Stormwater Science sessions: a live macroinvertebrate lab (page 19), and leaf pack macroinvertebrate collection. BEMP used these opportunities to introduce stormwater science concepts to a new cohort of middle school students from communities underserved and underrepresented in the sciences.

Please note that classroom curriculum numbers no longer include tabling and other outreach events.

2. Stormwater Study Trip: *Delivery and coordination of place-based Stormwater Science experiences* **(113 students)**

The centerpiece of BEMP's stormwater outreach is the Stormwater Study Trip. This activity builds upon classroom activities and facilitates hands-on student experiences including performing water quality testing at the Rio Grande. The Stormwater Study Trip is a four to five-hour trip to the river during which students investigate how stormwater moves through the city and sweeps pollutants and debris into the river. Students also collect and interpret water quality data. The middle school version of the program begins with an explanation of the arroyo system in Albuquerque (map on page 9) followed by an arroyo pollution survey where students examine and categorize the amount of visible pollutants (e.g. plastics, paper, dog poop, animal scat, etc.) in Albuquerque's San Antonio arroyo which drains into the bosque. In the arroyo, students test water quality using a LaMotte water quality monitoring kit (pages 10, 11, and 18). When the students hike to the Rio Grande, they do additional water quality testing and collect leaf packs from two locations. Students then share their results with each other, compare Rio Grande and arroyo water quality data, and discuss what their results could mean in terms of the river's health. This section of the curriculum allows students to have a more hands-on learning experience involving different type of data collection and scientific tools. The high school Stormwater Study Trip uses the same format with an emphasis on the water quality indices (percent EPT and biotic index) through analyzing collected macroinvertebrates. The goal for high school students is to connect and understand the two collected data sets and develop a deeper sense of how the system functions on a broader scale.

During the 2018-2019 scholar year, BEMP added leaf packs placed along the Rio Grande and in a backwater pond as a method to collect macroinvertebrate data. Students collect four leaf packs, one week after they are placed in these two locations. Leaf packs are brought back to the classroom where hand-held lenses and dissecting scopes are used to identify macroinvertebrates. A handout is then used to calculate EPT (pages 9 and 12). This new methodology provides valuable biological information about water quality that can be compared to student-performed chemical water quality tests. Macroinvertebrate collection is also used as a tool to introduce concepts like using percent EPT as a water quality index. Student-generated datasets are compared, sparking a discussion about the short and long-term effects of a storm event.

As an alternative to the field-based Stormwater Study Trip, BEMP offers a curriculum extension that brings hands-on macroinvertebrate and water chemistry exercises to the classroom (page 17). A thorough revamp of the water chemistry lab offered in previous years, this extension uses BEMP's macroinvertebrate tank to bring live aquatic organisms to the classroom. After

magnifying lenses and dissecting scopes are used in conjunction with field guides to identify macroinvertebrates, students explore how these organisms can be used as bioindicators of water quality. Students then chemically determine the water quality of a local sample and hypothesize whether or not the organisms they observed came from the sampled system.

3. Elementary school outreach: *Continued delivery and coordination of Stormwater Science experiences for elementary school students* **(277 students)**

Although the BEMP Stormwater Science program primarily targets middle and high school students, BEMP also reaches hundreds of elementary school students through outreach events. BEMP participated in the 2018 Children's Water Festival at the Santa Ana Star Center (277 students and 23 teachers) where BEMP educators used macroinvertebrates to teach fourth grade students about their watershed, how humans impact the health of this system, how aquatic organisms are affected by pollution, and what everyone can do to improve the health of the Middle Rio Grande.

4. Monthly Monitoring: *Continued development and delivery of Stormwater Science outreach during Monthly Monitoring*

BEMP's Monthly Monitoring data collection is often able to include a discussion with students about the bosque's health and how it is intrinsically tied to Rio Grande hydrology and water quality. The impacts of storm events can be related to different type of pollutants students find and identify in the bosque and BEMP educators then engage students in a conversation about what they can do to help minimize these impacts. For example, students from Cien Aguas International School collect litter during and/or after data collection nearly every time they are at a BEMP site. Monthly Monitoring is often a space where educational concepts are introduced based upon what students encounter in the bosque or what they are currently studying in class. Because of this, Stormwater Science is only taught intermittently during Monthly Monitoring and has not yet been granularly tracked.

5. Summer programming: *Preparation and delivery of Stormwater Science presentations during summer programming* **(20 students)**

During June and July each year, BEMP partners with Horizons Albuquerque, a tuition-free academic enrichment program that intends to fill the summer learning gap that students from low-income families often encounter. This year, 20 middle school students learned about different methods scientists use to collect environmental data through hands-on, place-based experiences. Students collected water samples, analyzed water chemistry, and discovered how their results provide insight into the overall health of their local ecosystems.

6. Stormwater Science curriculum development: *Continued development of Stormwater Science curriculum*

Much of the 2018-19 school year was spent thoroughly updating the Stormwater Science curriculum, making it more hands-on, engaging, and appropriate for a wider range of students. While some Stormwater Science activities are already closely aligned with Next Generation

Science Standard principles, part of the 2019-20 school year will be spent applying specific standards to this program and making changes to the curriculum as needed. While this year's overall outreach numbers are lower than last year's, it is important to note that festivals and outreach events are no longer considered classroom outreach, but are reflected in the outreach total. The intensive Stormwater Science curriculum work completed this year is now ready to be rolled out to a broader audience in 2019-20 and beyond.

7. BEMP educational outreach events: *Funding covers partial costs for classrooms to participate in Otter Day and BEMP Student Congress* **(492 students)**

Hundreds of students took part in Stormwater Science-related activities at two BEMP events this year: two days of BEMP Student Congress (220 students and 31 adults), where BEMP students shared their research and experiences in the bosque, including watershed health observations; and BEMP's two Otter Days festivals(262 students and 45 adults), where first graders, hosted by high school students, are taught how they are individually responsible for keeping the Rio Grande and its watershed free of pollutants for the benefit of both wildlife and humans.

8. Additional BEMP educational outreach and events: *Funding covers partial costs for classrooms to participate in Luquillo-Sevilleta Virtual Symposium and Crawford Symposium* **(535 students)**

BEMP organizes and delivers two annual educational events where stormwater science concepts are presented in various forms: The Luquillo-Sevilleta Virtual Symposium (LSVS) and the BEMP Crawford Symposium. BEMP's Luquillo-Sevilleta Virtual Symposium (16 students and 13 adults) brings together students involved with the Luquillo Long Term Ecological Research Site in Puerto Rico and students from Albuquerque to share their watershed research with each other via Skype in Spanish. The BEMP Crawford Symposium (54 students and 250 adults) is an annual conference honoring BEMP's co-founder Dr. Clifford Crawford which celebrates community science along the Middle Rio Grande and showcases environmental research by both students and professionals (page 19).

As part of our outreach, BEMP also participates in events where we bring a variety of materials and activities directly related to BEMP's curriculum and data collection. Students and community members learn about different important aspects of the bosque ecosystem, including how it is impacted by storm events. These events now allow participants to observe and identify live freshwater macroinvertebrates, and learn how these organisms can be used as Rio Grande bioindicators. This year we participated in two major tabling events: Sandia High School Earth Day Festival (400 students and 30 adults) and Albuquerque Sign and Language Academy (ASLA) Fishing Day at Sandia Lakes (65 students and 45 adults).

APPENDICES

A CLASSROOM HANDOUTS …….7
B STUDY TRIP HANDOUTS ……11
C CURRICULUM EXTENSIONS ……..15
D PHOTOS……....20
E 2018-2019 OUTREACH NUMBERS……...……22

APPENDIX A: CLASSROOM HANDOUTS

English Classroom Handout – Middle School

BEMP
Bosque Ecosystem Monitoring Program
www.bemp.org 2018

Hydrologist: _____ Date: _____

Stormwater Science

What 2 sources can New Mexicans get their drinking water from?

1. _____

2. _____

Where does water go after we use it?

_____

A ***watershed*** is an area of land where all of the water that falls on it, or that is under it, drains to the lowest point.

Draw a line from the word to its definition

Turbidity	♦ A stream or arroyo that brings water to the main channel of the river
Nonpoint source pollution	♦ Types of nutrients found in fertilizers that can lead to excess algae growth
Ecoli	♦ A single location where pollution is being leaked into the environment
Point source pollution	♦ A type of *bacteria* found in warm blooded animal's intestines that can make people sick
Nitrates and phosphates	♦ Tiny 'water bugs' whose species are an indication of water quality
Tributary	♦ *Any* type of pollution that comes from *many different* sources
Macro-invertebrates	♦ A measure of water clarity based on the amount of suspended solids

Page 1

Is the river healthier before or after an storm event?

Before: Amount + High / Medium / Low

After: Amount + ↑ / ↓ / = ✓ ✗

	Up-stream Ecofriendly Town		Cattle Ranch		Agricultural Field		Urban city		Down-stream Ecofriendly Town	
	Before	After	Before	After	Before	After	Before	After	Before	After
Oxygen										
Nutrients (Nitrates and phosphates)										
Turbidity										
Macroinvertebrates (healthy – unhealthy)										
Fish biodiversity (green – red – blue – yellow)										
Pesticides, Herbicides and Fungicides										
Trash										
Oil and gasoline										
Chemicals and medicine										
Escherichia coli										

Water quality AFTER an storm event: 👍 👎

Which community has the most polluted water AFTER an storm event? _____

How can YOU help to keep the watershed clean?

1. _____
2. _____
3. _____
4. _____

Page 2

English Classroom Handout – High School

BEMP

Name: _____ Date: _____

Stormwater Science

What is a **watershed**?

1. River composition during a storm event: A hypothetical watershed example
(Natural and anthropogenic inputs)

Which community has the most polluted water AFTER a storm event? _____ *Why?* _____

2. Data Analysis: A real example of a storm event in a city

Parameters analyzed:
- Temperature:
- Conductivity:
- Dissolved Oxygen (DO):
- Turbidity:
- Dissolved Organic Matter (DOM):

Example

Parameter: Conductivity

Prediction: *Water conductivity will drop right after an storm event due to the new input of rain water with no salts.*

Justification:

Your data

Parameter:

Group prediction:

Justification:

- Was your prediction supported based on your data analysis? Explain why or why not.

Page 1

Data Analysis: General discussion

1. In which order did the parameters react to the storm event?
2. In which season did this storm event occur?
3. Do you think these storm event peaks would be higher or lower in a different season? Why?
4. Would you expect the same parameter behavior in a non-urban area? Why?
5. Does the overall water quality after a storm event increase or decrease?

Take-home vocabulary

Match the following words with their descriptions: **Conductivity**; **Turbidity**; **Nonpoint source pollution**; ***Escherichia coli***; **Point source pollution**; **Dissolved Organic Matter**; **Temperature**; **Dissolved Oxygen** and **Tributary**.

- Drinking contaminated water with _____ may cause diarrhea.
- _____ is directly related to the concentrations of ions in the water which an oil spill can decrease.
- Acid water from acid rain is an example of _____.
- Rio Grande water often appears murky because of high _____ .
- High water _____ can increase the solubility and thus the toxicity of certain compounds.
- _____ is the mixture of living and dead materials at various stages of decomposition.
- Chemical drainage into a stream from a nearby factory is an example of _____
- A lack of _____ in the river water can cause fish die-off's.
- The Chama river is a _____ of the Rio Grande.

3. How can YOU help improve the health of the river after an storm event?

1. _____
2. _____
3. _____
4. _____

Page 2

Spanish Classroom Handout – Middle School

Hidrólogo/a: _____ Fecha: _____

Ciencia detras una tormenta

Cuales son las dos fuentes de agua de donde los Nuevo Mexicanos sacan el agua para beber?

1. _____

2. _____

A donde va el agua despues de usarla?

_____

Una *cuenca hidrografica* es el territorio drenado por un unico rio, delimitado por montanas.

Conecta las palabras con su definicion

Turbidez	• Corriente de agua que desemboca en un río mayor o directamente al mar.
Contaminacion difusa	• Tipologia de nutrientes que se encuentran en los fertilizantes y que pueden causar crecimiento algal excesivo.
E.coli	• Contaminacion de un solo origen.
Contaminacion focal	• Tipologia de bacteria que se encuentra en el aparato digestivo de animales de sangre caliente. Cuando se ingiere, puede causar/traer enfermedad.
Nitratos y fosfatos	• Pequenos insectos aquaticos que pueden ser usados como indicadores de la calidad del agua.
Tributario o afluente	• Contaminacion de origen diverso.
Macro-invertebrados	• Medida del grado de transparencia del agua que depende de la cantidad de particulas en suspension.

Page 1

En que momento el agua del rio es más saludable, antes o después de una tormenta?

Antes: Cantidad + Alta / Media / Baja

Después: Cantidad + ↑ / ↓ / = ✓ ✗

	Comunidad Ecológica rio arriba		Hacienda de ganado		Campo agrícola		Ciudad		Comunidad Ecológica rio abajo	
	Antes	Después	Antes	Después	Antes	Después	Antes	Después	Antes	Después
Oxígeno										
Nutrientes (Nitratos y fosfatos)										
Turbidez										
Macro invertebrados (saludables – no saludables)										
Biodiversidad peces (verde – rojo – azul – amarillo)										
Pesticidas, Herbicidas y Fungicidas										
Basura										
Aceite y gasolina										
Productos químicos y medicina										
Escherichia coli										

Calidad del agua después de una tormenta: 👍 👎

Cual de las comunidades sufre los mayores niveles de contaminación después de una tormenta? _____

Cómo TU puedes ayudar a mantener la cuenca limpia?

1._____

2._____

3._____

4._____

Page 2

Spanish Classroom Handout – High School

Nombre: _____ Fecha: _____

Ciencia detrás una tormenta

Qué es una **cuenca hidrográfica**?

1. Composición del rio durante una tormenta: Un ejemplo hipotético de una cuenca hidrográfica
(Elementos naturales y antropogénicos)

Cual de las comunidades sufre los mayores niveles de contaminación después de una tormenta? _____ *Por qué?* _____

2. Análisis de datos: Un ejemplo real de una tormenta en la ciudad

Parámetros analizados:
- Temperatura:
- Conductividad:
- Oxigeno Disuelto (OD):
- Turbidez:
- Materia Orgánica Disuelta (MOD):

Ejemplo:

Parámetro: Conductividad

Predicción: *La conductividad del agua disminuirá justo después de la tormenta debido a la incorporación de agua de lluvia (sin sales).*

Justificación:

Tus datos

Parámetro:

Predicción en grupo:

Justificación:

- Aceptas tu predicción según el análisis de datos? Explica por qué o por qué no.

Page 1

Análisis de datos: Discusión general

1. En qué orden respondieron los parámetros analizados durante la tormenta?
2. En qué estación del año ocurrió la tormenta?
3. Crees que el patrón de la grafica (puntos máximos y mínimos) seria el mismo en otra estación del año? Por qué?
4. Crees que los parámetros se comportarán de la misma manera en una área no urbanizada? Por qué?
5. Crees que la calidad del agua en general mejora o empeora después de una tormenta?

Vocabulario para llevarte a casa

Empareja las siguientes palabras con sus definiciones: **Conductividad**, **Turbidez**, **Contaminación focal**, ***Escherichia coli***, **Contaminación difusa**, **Materia Orgánica Disuelta**, **Temperatura**, **Oxigeno Disuelto** y **Tributario**.

- Beber agua contaminada con _____ puede causar diarrea.
- La _____ esta directamente relacionada con las concentraciones de iones en el agua. Un derrame de petróleo puede provocar el incremento de este parámetro.
- El agua acida procedente de la lluvia acida es un ejemplo de _____.
- El agua del Rio Grande es marrón porque la _____ es elevada .
- Un incremento en la _____ del agua del rio puede incrementar la solubilidad y por lo tanto la toxicidad de ciertos compuestos.
- _____ es la mezcla de materiales (vivos y muertos) en diversos estados de descomposición.
- Cuando una fabrica drena productos químicos al rio se le llama _____
- La ausencia de _____ en el agua puede causar la muerte masiva de peces en el rio.
- El rio Chama es un _____ del Rio Grande.

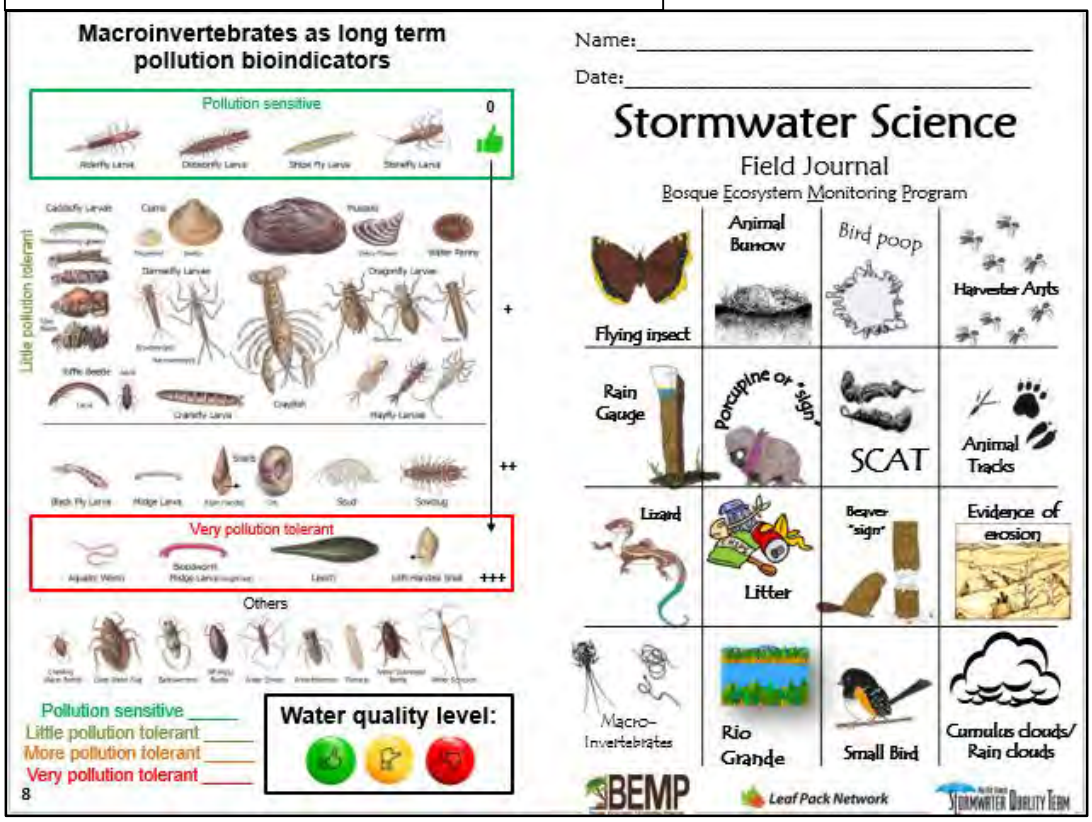
3. Cómo TU puedes ayudar a mantener la cuenca limpia?

1. _____
2. _____
3. _____
4. _____

Page 2

APPENDIX B: STUDY TRIP HANDOUTS

Field Journal for study trips – Middle School



Macroinvertebrates as long term pollution bioindicators

Pollution sensitive 0

Little pollution tolerant +

++

Very pollution tolerant +++

Others

Pollution sensitive _____
Little pollution tolerant _____
More pollution tolerant _____
Very pollution tolerant _____

Water quality level:

8

Name: _____

Date: _____

Stormwater Science

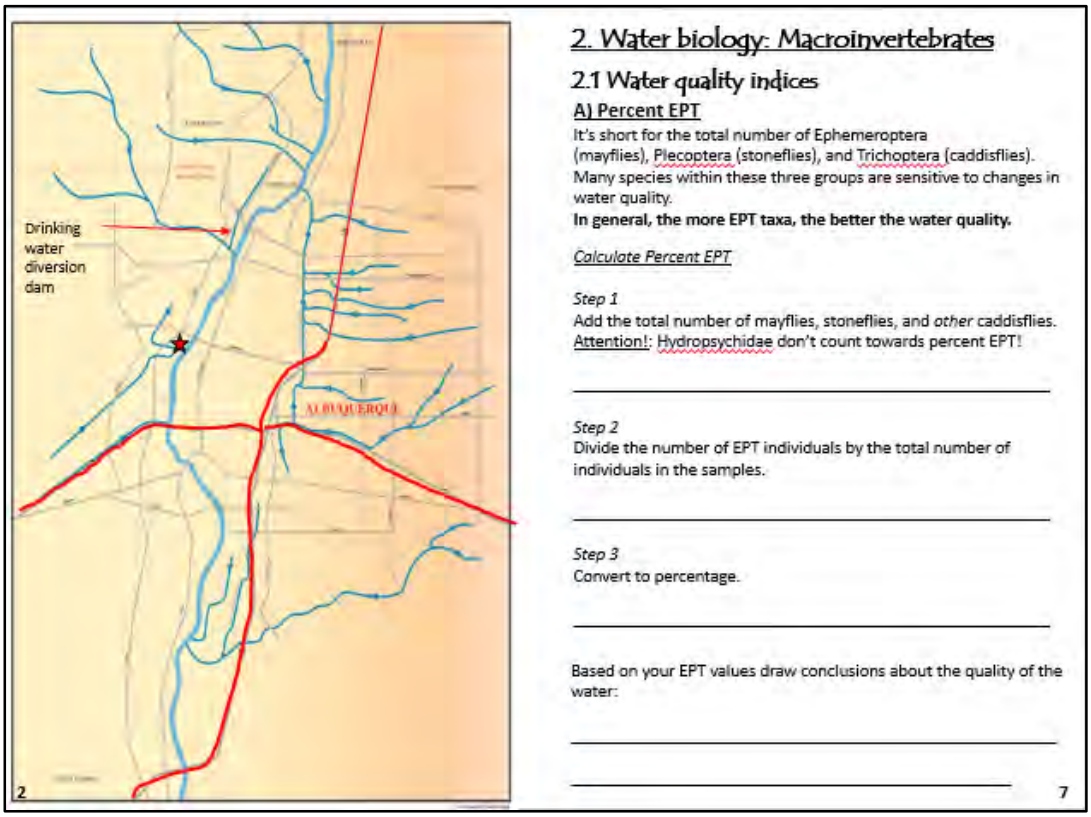
Field Journal

Bosque Ecosystem Monitoring Program

Flying insect | Animal Burrow | Bird poop | Harvester Ants
Rain Gauge | Porcupine or "sign" | SCAT | Animal Tracks
Lizard | Litter | Beaver "sign" | Evidence of erosion
Macro-Invertebrates | Rio Grande | Small Bird | Cumulus clouds/ Rain clouds

BEMP Leaf Pack Network Stormwater Quality Team

Page 1&8



Drinking water diversion dam

ALBUQUERQUE

2

2. Water biology: Macroinvertebrates

2.1 Water quality indices

A) Percent EPT

It's short for the total number of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). Many species within these three groups are sensitive to changes in water quality.

In general, the more EPT taxa, the better the water quality.

Calculate Percent EPT

Step 1
Add the total number of mayflies, stoneflies, and *other* caddisflies.
Attention!: Hydropsychidae don't count towards percent EPT!

_____

Step 2
Divide the number of EPT individuals by the total number of individuals in the samples.

_____

Step 3
Convert to percentage.

_____

Based on your EPT values draw conclusions about the quality of the water:

_____

_____

7

Page 2&7

Field Journal for outdoor study trips (cont.) - MS

Weather Report

1. Time: _____ am or pm
2. Today's Weather:
3. Cloud Cover: _____ %
4. Wind: Speed: _____ Direction: km/h OR mph
5. Humidity: _____ %
6. Temp: It feels like: _____°F It actually is.... _____°F

Reflection/Conclusions

1. How do you think the weather can effect the water chemistry results of the river that we got today?
2. If the overall river health is fair or poor, who do you think is responsible? Do you think is a point source pollution or a non-point source pollution scenario?

6

Litter Survey

The San Antonio Arroyo collects runoff from all over the west side of Albuquerque, anything on the streets can end up in the arroyo. Tally the litter you find throughout the day here. Also, think who might be responsible for this. Is it a point source pollution or a non-point source pollution?

Litter type	Arroyo	Bosque
Plastic		
Paper		
Glass		
Metal		
Cigarette butts		
Dog poop		
Animal scat		
Evidence of chemicals		
Other trash		

Reminder:

- Point source pollution - comes from a specific place
- Non-point source pollution - comes from many places and people

3

Page 6&3

How long will it take?

Every piece of trash has a face... where and WHO did it come from? It takes just a moment for an item to be carelessly discarded where it can be washed into a river or blown in by wind, but it can take many, many years for it to completely decompose. Test your knowledge about decomposition times below by drawing a line from the item to its decomposition time.

Banana peel	1–2 million years
Cigarette butt	600 years
Fishing line	450 years
Styrofoam cup	20–1000 years
Milk carton	200–500 years
Plastic bottle	+1 million years
Aluminum can	1.5–10 years
Glass bottle	5 years
Plastic bag	3–4 weeks

Which of these things can be reused or recycled?

_____

_____

_____

4

1. Water Chemistry

	Arroyo	River
Temperature	°F / °C	°F / °C
Turbidity	/TU	/TU
Nitrate	ppm	ppm
Phosphate	ppm	ppm
pH		
Dissolved oxygen	ppm %	ppm %
E. coli	Present / Absent	Present / Absent

Temperature
8-12 °C- good
13-15 °C- fair
>15 °C- poor

Turbidity
Sources: erosion, fire
1-99 /TU- good
4–100 /TU- fair
>100 /TU- poor

Nitrates
Sources: plants, soil, fertilizer
1-4 ppm- good
5-20 ppm- fair
>20 ppm- poor

Phosphates
Sources: plants, fertilizer, plastic
1 ppm- good
2 ppm- fair
4ppm- poor

pH
1-strong acid- poor
6-weak acid- fair
7-neutral- good
8-weak base-fair
14-strong base-poor

Dissolved Oxygen
1 ppm or 60-100% -good
4 ppm or 40-60%- fair
8 ppm or 0-40%- poor

E. coli
Sources: animal waste
E. coli are always be present in small amounts. Large amounts are harmful to humans and animals

Overall river health: (circle one)

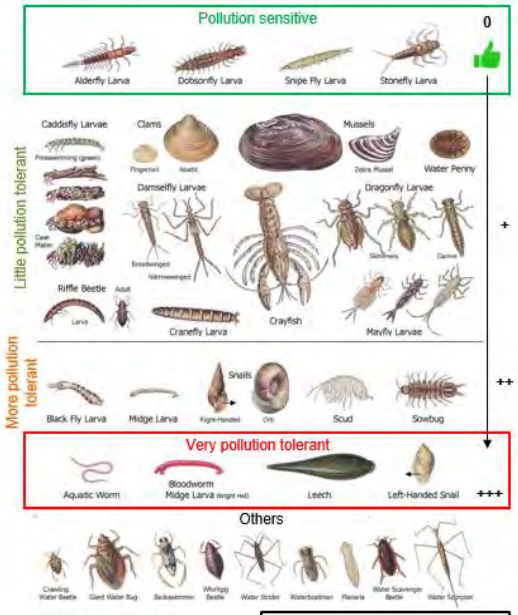
Good Fair Poor

5

Page 4&5

Field Journal for study trips – High School

Macroinvertebrates as long term pollution bioindicators



Pollution sensitive _____
Little pollution tolerant _____
More pollution tolerant _____
Very pollution tolerant _____

Water quality level:

8

Name:_____

Date:_____

Stormwater Science

Field Journal

Bosque Ecosystem Monitoring Program

BEMP Leaf Pack Network Stormwater Quality Team

Page 1&8

1. Water Chemistry

	Arroyo	River
Temperature	°F / °C	°F / °C
Turbidity	JTU	JTU
Nitrate	ppm	ppm
Phosphate	ppm	ppm
pH		
Dissolved oxygen	ppm %	ppm %
E. coli	Present / Absent	Present / Absent

Temperature
8-12 °C- good
13-15 °C- fair
>15 °C- poor

Turbidity
Sources: erosion, fire
1-39 JTU- good
4--100 JTU- fair
>100 JTU- poor

Nitrates
Sources: plants, soil, fertilizer
1-4 ppm- good
5- 20 ppm- fair
>20 ppm- poor

Phosphates
Sources: plants, fertilizer, plastic
1 ppm- good
2 ppm- fair
4ppm- poor

pH
1-strong acid- poor
6-weak acid- fair
7-neutral- good
8-weak base-fair
14-strong base-poor

Dissolved Oxygen
1 ppm or 60-100% -good
4 ppm or 40-60%- fair
8 ppm or 0-40%- poor

E. coli
Sources: animal waste
E.coli will always be present in small amounts. Large amounts are harmful to humans and animals

River health: (circle one)

Good Fair Poor

2

Biotic Index	Water Quality	Degree of Organic Pollution
<3.75	Excellent	Organic pollution unlikely
3.75-5.0	Good	Some organic pollution
5.1-6.5	Fair	Substantial pollution likely
6.6-10.0	Poor	Severe pollution likely

Overall Conclusions

1. Why is important to compare the water chemistry of the river to the macroinvertebrate data?
2. Does these two measurements show the same overall results?
3. Are the water chemistry results for the arroyo different form the river? Why?
4. Are the macroinvertebrate indices different between the pond and the river? Why?

7

Page 2&7

Field Journal for outdoor study trips (cont.) - HS

B) Biotic Index

Biotic Index is a comparison of the abundance of taxa and their tolerance to environmental stress. This widely used index can indicate organic and nutrient pollution. Organisms are assigned tolerance values which range from 0 to 10, depending on the organism's sensitivity to changes in water quality and habitat (tolerance values increase as water quality decreases).

In contrast to the percent EPT index, the lower the biotic index, the better the water quality.

Calculate Biotic Index

Step 1
To calculate the Total Tolerance Value (D), multiply each taxa (B) by the Pollution Tolerance Value (C) and record in column D.

Step 2
Add all Total Tolerance Value values (D): _____

Step 3
Add all Average # from all packs (B): _____
This is the *total number of individuals*.

Step 4
Divide all Total Tolerance Value (step 2) by total number of Individuals (step 3).

_____

Step 5
Look up the Biotic Index Value in the table to know the degree of organic pollution:

6 _____

Weather Report

1. Time: _____ am or pm
2. Today's Weather:
3. Cloud Cover: _____ %
4. Wind: Speed: _____ Direction: km/h OR mph
5. Humidity: _____ %
6. Temp: It feels like: _____°F It actually is.... _____°F

Reflection/Conclusions

1. How do you think the weather can effect the water chemistry results of the river that we got today?

2. If the overall river health is fair or poor, who do you think is responsible? Do you think is a point source pollution or a non-point source pollution scenario?

3

Page 6&3

2. Water biology: Macroinvertebrates (Pond or River)

Taxa	A Total # in your pack	B Average # from all packs	C Pollution Tolerance Value	D Total Tolerance Value
EPHEMEROPTERA (Mayflies)			3.6	
PLECOPTERA (Stoneflies)			1	
TRICHOPTERA (Caddisflies)				
Hydropsychidae (Common Netspinners)			3	
Other caddisflies			2.9	
ANISOPTERA (Dragonflies)			6	
ZYGOPTERA (Damselflies)			7	
MEGALOPTERA				
Corydalidae (Hellgrammites)			1	
Sialidae (Alderflies)			4	
COLEOPTERA (Beetles)			4.6	
DIPTERA (True Flies)				
Athericidae (Watersnipe flies)			2	
Chironomidae (Midges)			6	
Simuliidae (Black flies)			6	
Tipulidae (Crane flies)			3	
Other Diptera			6	
AMPHIPODA (Scud)			6	
ISOPODA (Aquatic sowbugs)			8	
DECAPODA (Crayfish)			6	
TURBELLARIA (Aquatic Worms)			8	
HIRUDINEA (Leeches)			8	
TURBELLARIA (Planarians)			8	
GASTEROPODA (Snails)			7	
SPHAERIIDAE (Fingernail Clams)			8	

4

2.1 Water quality indices

A) Percent EPT

It's short for the total number of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). Many species within these three groups are sensitive to changes in water quality.

In general, the more EPT taxa, the better the water quality.

Calculate Percent EPT

Step 1
Add the total number of mayflies, stoneflies, and *other* caddisflies.
Attention!: Hydropsychidae don't count towards percent EPT!

_____

Step 2
Divide the number of EPT individuals by the total number of individuals in the samples.

_____

Step 3
Convert to percentage.

_____

Based on your EPT values draw conclusions about the quality of the water:

_____

_____

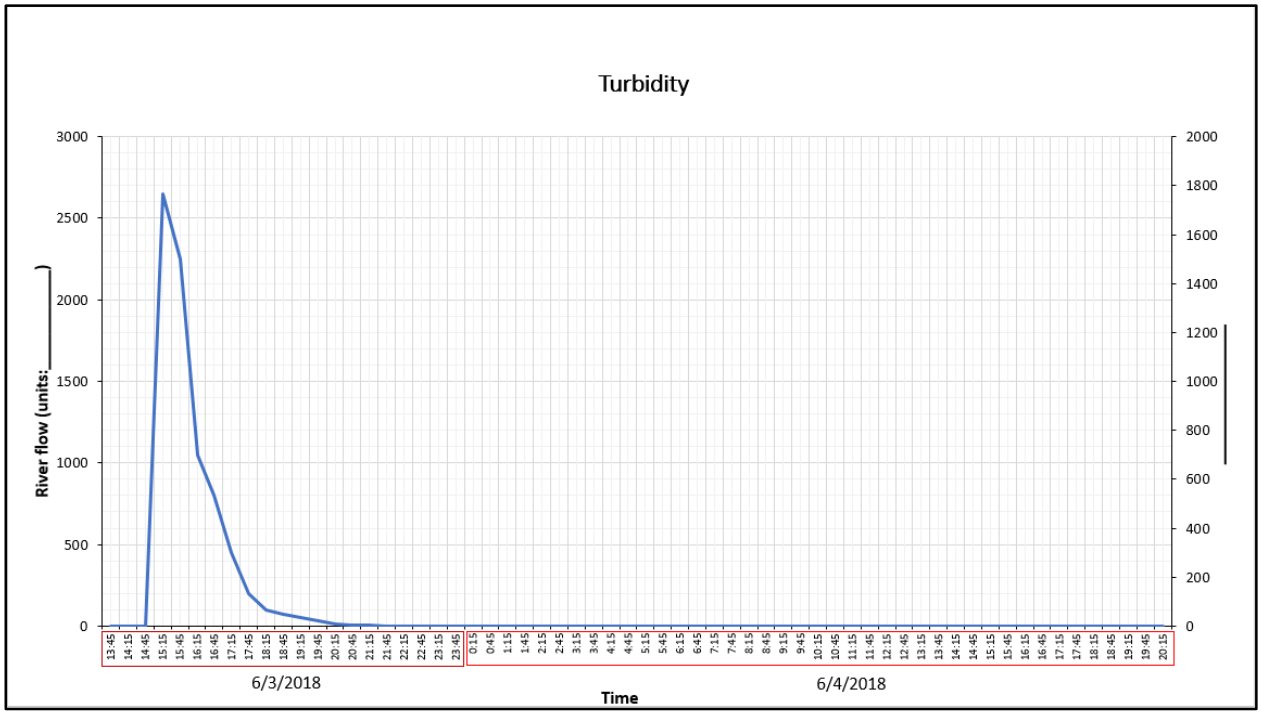
5

Page 4&5

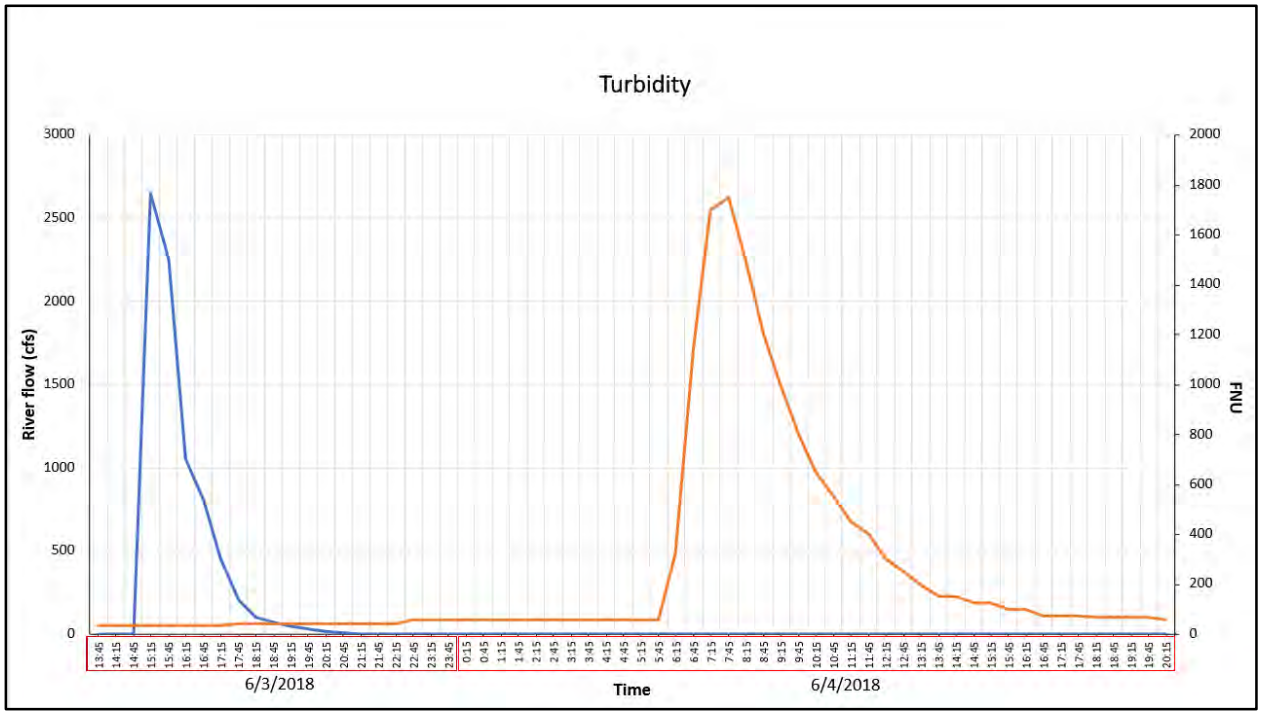
APPENDIX C: CURRICULUM EXTENSIONS

Curriculum extension 1 – HS graphing

Handout



Result expected

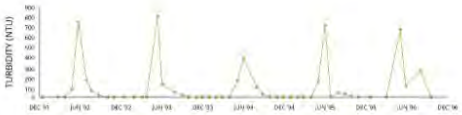


Curriculum Extension 1 – HS graphing (cont.)

Handout Information

What is Turbidity?

- Turbidity is an optical determination of water clarity based on the amount of light scattered by particles in the water column.
- Suspended particles can come from soil erosion, runoff, discharges, stirred bottom sediments or algal blooms.
- Some streams have naturally high levels of suspended solids (parts of the Rio Grande).
- High levels of total suspended solids will increase water temperatures and decrease dissolved oxygen (DO) levels.
- Turbidity can also inhibit photosynthesis by blocking sunlight
- The higher the turbidity levels, the less light that can reach the lower levels of water.
- Weather, water flow or contamination are some of the factors that can affect turbidity levels.



Turbidity will often spike annually due to spring rains and snow melt.

FONDRIEST

Table

Date	Time	Precipitation (mm)	River flow (cfs)	Turbidity (FNU)
6/3/18	13:45	0	0	35
6/3/18	14:15	1.6	1	35
6/3/18	14:45	0.1	1	35
6/3/18	15:15	0	2650	35
6/3/18	15:45	0	2250	35
6/3/18	16:15	0	1050	35
6/3/18	16:45	0	800	35
6/3/18	17:15	0	450	35
6/3/18	17:45	0	200	45
6/3/18	18:15	0	100	45
6/3/18	18:45	0	70	45
6/3/18	19:15	0	50	45
6/3/18	19:45	0	30	45
6/3/18	20:15	0	15	45
6/3/18	20:45	0	7	45
6/3/18	21:15	0	3	45
6/3/18	21:45	0	1	45
6/3/18	22:15	0	1	45
6/3/18	22:45	0	1	60
6/3/18	23:15	0	1	60
6/3/18	23:45	0	1	60
6/4/18	0:15	0	1	60
6/4/18	0:45	0	1	60
6/4/18	1:15	0	1	60
6/4/18	1:45	0	1	60
6/4/18	2:15	0	1	60
6/4/18	2:45	0	1	60
6/4/18	3:15	0	1	60
6/4/18	3:45	0	1	60
6/4/18	4:15	0	1	60
6/4/18	4:45	0	1	60
6/4/18	5:15	0	1	60
6/4/18	5:45	0	1	60
6/4/18	6:15	0	1	325
6/4/18	6:45	0	1	1150
6/4/18	7:15	0	1	1700
6/4/18	7:45	0	1	1750
6/4/18	8:15	0	1	1500

Curriculum Extension 2 – HS Soil Porosity and Permeability Experiment

Cary Institute of Ecosystem Studies

BEMP

Name _____ Date _____

Stormwater Science: Soil Porosity and Permeability Experiment

Background: Layers of rock, sand or gravel that are good ground water reservoirs are called aquifers, from the Latin words for "water" and "to bring". This water reservoirs are key to transfer nutrients from the soil to growing plants. The properties that make a good aquifer are those that increase the storage of water (porosity) and increase the flow of water (permeability) within that layer. ***Porosity*** is the proportion of empty space in a substrate. ***Permeability*** is a measure of the ease with which liquids and gases can pass through a substrate. Some soil types let water flow in quickly (infiltrate), others may let the water completely through at a fast paste and some others may keep the water from getting in at all. None of these soil types is better than the other. Today you will complete an investigation to determine which soil substrate holds the most water.

Hypothesis:

_____

_____

Materials:

- Funnel
- Substrates: (1) sand, (2) soil, (3) gravel and (4) clay
- Plastic wrap
- Water
- Plastic cups - optional
- Beakers
- Graduated cylinder
- Coffee filter
- Stopwatch
- Dropper

Procedure:

1. Make observations about the substrates you will test. Write down your observations
2. Get a funnel, and place the coffee filter inside the funnel.
3. Measure 200 mL of the first substrate you will test into the funnel.
4. Place the funnel over a beaker. One person should hold the funnel and block the tip with a finger.
5. Measure out 100 mL of water with the graduated cylinder and record the amount in the table (A).
6. Pour the water SLOWLY into the funnel, making sure not to let the water overflow the funnel. Allow the water to soak in all the way. Use the dropper to remove any excess water on top of the gravel. Be sure to put any water removed from the cup back into the graduated cylinder.
7. Record how many ml of water are now in the graduated cylinder, then discard.
8. Complete the table to determine how many ml of water you poured into the cup.
9. SLOWLY remove your finger from the tip of the funnel.
10. Time for 1 minute as the water drips from the funnel into the beaker.
11. Record the final volume of water in the beaker in the table.
12. Empty the sediment in the funnel into the appropriate container.
13. Repeat the above steps for all substrates.
14. Complete the trial again with only the coffee filter. This is your control.
15. Finally, cover the last substrate you tested (clay) with plastic wrap. Do not pull it tight, but lay it on top of the soil sample inside of the funnel. Pour the same amount of water onto the sample, and wait five minutes to see what will happen.
16. Write down all of your results and compare with your classmates.

Substrate	A. Water beginning (ml)	B. Water end (ml)	C. Water used (A-B) **Porosity**	D. Water cylinder	E. Water dripped **Permeability**
Sand					
Soil					
Gravel					
Clay					
Control					

Results:

_____

_____

_____

_____

Discussion:

1. What happens to the porosity when the particle size gets smaller?

2. Through which material did the water move the fastest? The slowest? Why?

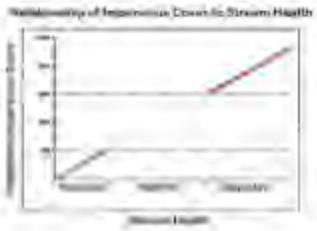
3. Why is the permeability of the substrates different?

4. What happen to the permeability of the plastic wrap?

5. What type of surface does plastic wrap mimic in real life?

6. Which substrate would cause the least flooding for a community? Why?

7. What does this graph tell you about the relationship between permeability and stream health? How does this graph relate to the activity you just completed?



Curriculum Extension 3 – MS & HS

BEMP
Bosque Ecosystem Monitoring Program

Hydrologist: _____ Date: _____

Stormwater Science

What 2 sources can New Mexicans get their drinking water from?

1. _____

2. _____

Where does water go after we use it?

_____

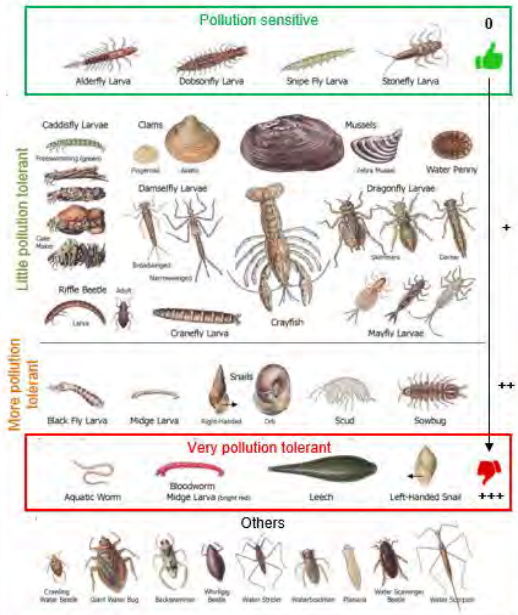
A ***watershed*** is an area of land where all of the water that falls on it, or that is under it, drains to the lowest point.

Draw a line from the word to its definition

Turbidity	A stream or arroyo that brings water to the main channel of the river
Nonpoint source pollution	Types of nutrients found in fertilizers that can lead to excess algae growth
E.coli	A single location where pollution is being leaked into the environment
Point source pollution	A type of *bacteria* found in warm blooded animal's intestines that can make people sick
Nitrates and phosphates	Tiny 'water bugs' whose species are an indication of water quality
Tributary	*Any* type of pollution that comes from *many different* sources
Macro-invertebrates	A measure of water clarity based on the amount of suspended solids

Page 1

1. Water Biology: Macroinvertebrates as long term pollution bioindicators



Pollution sensitive _____
Little pollution tolerant _____
More pollution tolerant _____
Very pollution tolerant _____

Water quality level:

2. Water Chemistry: Dissolved materials as short term pollution indicators

Water origin:	_____
Turbidity	JTU
Nitrate	ppm
Phosphate	ppm
pH	
Dissolved oxygen	ppm %
E. coli	Present / Absent

Water quality level:

Turbidity
Sources: erosion, fire
1-39 JTU- good
4--100 JTU- fair
>100 JTU- poor

pH
1-strong acid- poor
6-weak acid- fair
7-neutral- good
8-weak base-fair
14-strong base-poor

Nitrates
Sources: plants, soil, fertilizer
1-4 ppm- good
5- 20 ppm- fair
0 ppm- poor

Dissolved Oxygen
1 ppm or 60-100% -good
4 ppm or 40-60%- fair
8 ppm or 0-40%- poor

Phosphates
Sources: plants, fertilizer, plastic
1 ppm- good
2 ppm- fair
4ppm- poor

E. coli
Sources: animal waste
E.coli will always be present in small amounts. Large amounts are harmful to humans and animals

How can YOU help to keep the watershed clean?

1. _____
2. _____
3. _____
4. _____

Page 2

APPENDIX D: PHOTOS

Watershed model at Jefferson Middle School

Study Trip Water Quality analysis at the arroyo system

Study Trip with el Camino Real Academy – Water Quality analysis at the river

Study Trip macroinvertebrate lab observation

Otter Day 2019

BEMP Student Congress 2019

Luquillo-Sevilleta Virtual Symposium (LSVS)

Tabling event at Sandia High School

BASS students at Harrison Middle School observing macroinvertebrates

APPENDIX E: 2018-2019 STORMWATER SCIENCE EDUCATION OUTREACH NUMBERS

Date	School/Event name	City	Students	Adults	Grade	Activity	Presentations	School Level
11/27/18	Harrison MS	Albuquerque	2	1	6, 7, 8	BASS	1	MS
3/5/19	Harrison MS	Albuquerque	5	1	6, 7	BASS	1	MS
4/12/19	Ace Leadership HS	Albuquerque	12	1	11, 12	Classroom	1	HS
1/31/19	Albuquerque Institute for Mathematics and Science	Albuquerque	50	2	7	Classroom	2	MS
1/29/19	El Camino Real Academy	Albuquerque	24	2	6	Classroom	1	MS
12/5/18	Jefferson MS	Albuquerque	116	2	6,7,8	Classroom	6	MS
12/4/18	La Academia De Esperanza	Albuquerque	50	1	9, 10, 11	Classroom	5	HS
2/13/19	School of Dreams Academy	Los Lunas	15	1	11,12	Classroom	1	HS
3/8/19	School of Dreams Academy	Los Lunas	12	1	11,12	Classroom	1	HS
11/8/18	Taft MS	Albuquerque	14	1	6,7,8	Classroom	1	MS
9/25/18	The International School	Albuquerque	40	2	4	Classroom	2	MS
2/12/19	The International School	Albuquerque	14	1	9, 10	Classroom	2	HS
3/25/19	Volcano Vista HS	Albuquerque	168	2	11, 12	Classroom	5	HS
11/28/18	Wilson MS	Albuquerque	36	1	6,7,8	Classroom	2	MS
8/22/18	2018 EPA Region 6 Conference	Albuquerque	1	70	NA	Conference	1	NA
2/15/19	BEMP Crawford symposium	Albuquerque	54	250	all	Event	1	all
4/15/19	BEMP Otter Day	Albuquerque	130	21	K, 1	Event	1	ES
4/25/19	BEMP Otter Day	Albuquerque	142	24	1	Event	1	ES
4/24/19	BEMP Student Congress	Albuquerque	140	20	6, 7, 8	Event	1	MS
4/26/19	BEMP Student Congress	Albuquerque	80	11	6, 7, 8	Event	1	MS
4/25/19	Luquillo-Sevilleta Virutal Symposium	Albuquerque/Puerto Rico	16	13	6, 11	Event	1	MS/HS
10/22/18	Rio Rancho schools/Children's Water Festival	Rio Rancho	130	4	4	Event	6	ES
10/23/18	Rio Rancho schools/Children's Water Festival	Rio Rancho	147	19	4	Event	6	ES
9/14/18	Amy Bielh HS	Albuquerque	21	2	9	Other*	1	HS
7/1/19	Horizons Albuquerque	Albuquerque	20	5	6	Other*	1	MS
2/14/19	El Camino Real Academy	Albuquerque	20	5	6	Study trip	1	MS
11/2/18	Holy Ghost Catholic Church	Albuquerque	20	2	7	Study Trip	1	MS
4/23/19	Holy Ghost Catholic Church	Albuquerque	24	3	6	Study trip	1	MS
11/13/18	Taft MS	Albuquerque	15	1	6, 7	Study trip	1	MS
2/26/19	The International School	Albuquerque	14	1	9,10	Study Trip	1	HS
3/29/19	Volcano Vista HS	Albuquerque	20	2	10	Study trip	1	HS
4/10/19	Albuquerque Sign Language Academy	Albuquerque	65	45	4, 5, 6, 7, 8	Tabling	1	ES/MS
4/17/19	Sandia HS	Albuquerque	400	30	9, 10, 11, 12	Tabling	1	HS
TOTAL			2017	547				

*Other activities included condensed study trips (~2 hours) and classroom lessons (~30 min)

and Bernalillo Counties. This will include age-appropriate, substantive education about point and non-point source pollution that impacts the Rio Grande locally and at large. To closely align this work with BEMP's mission, students will also have the opportunity to work with real water quality data collected along the Rio Grande in Albuquerque to better understand the impacts of storm events on their local watershed. These students will have additional opportunities to learn about stormwater science concepts when participating in BEMP's Monthly Monitoring data collection. Elementary school students will primarily receive Stormwater Science education through community events, festivals, and BEMP Monthly Monitoring.

To best accommodate a variety of school models and incorporate feedback from participating classroom teachers, BEMP will offer two Stormwater Science curriculum components during the 2019-2020 school year: a classroom lesson and a Rio Grande Study Trip. Both experiences include the explicit message that students can and should act to protect the health of the Rio Grande and its watershed.

1. Classroom curriculum*: Preparation and delivery of Stormwater Science activities in the classroom for middle and high school students*

During the classroom lesson, middle school students build a watershed model with runoff cards representing pollutants relating to MS4 permit requirements and educational priorities as detailed in the matrix provided by the Storm Team. The high school classroom lesson builds upon these core concepts and includes new data analysis and data visualization components that align with NGSS principles.

2. Stormwater Study Trip: *Delivery and coordination of place-based Stormwater Science experiences*

The Study Trip is a place-based educational experience which, for middle school students, includes walking through an arroyo, surveying for litter, and testing water quality at the Rio Grande. At the high school level, the Study Trip uses a similar format with an emphasis on water quality indices and other related ecological concepts. In order to build a more holistic understanding of the Rio Grande watershed and provide students the opportunity to work with real data, student-collected water quality data gathered during these Study Trips will be shared internally with other participants. BEMP will continue to build this dataset, share student-collected data with other science organizations (ex. GLOBE – Global Learning and Observations to Benefit the Environment), and make this data available for student research projects.

Whether students only receive classroom activities or also participate in a Study Trip, Stormwater Science outreach will address all four areas of Science, Technology, Engineering and Math (STEM) education through exploring the ecological and chemical effects of water pollution, scientific technology used to test and record water chemistry data, and the engineering and design of storm drains and arroyos. During the 2018-19 school year, BEMP created lesson extensions that can be used as either homework assignments or as classwork. For the 2019-2020 school year, BEMP will to continue to align Stormwater Science activities with Next Generation Science Standards.

To implement this program, BEMP education staff will contact middle and high school teachers in Albuquerque public, charter and private schools with a focus on Title I schools. First priority will be given to public schools and then to charter, private, and home schools in Sandoval and Bernalillo Counties.

3. Elementary school outreach: *Continued delivery and coordination of Stormwater Science experiences for elementary school students*

While the Stormwater Science curriculum is primarily focused upon middle and high school students, BEMP educators will continue to attend to a variety of outreach events such as the Children's Water Festival and BEMP's Otter Days where younger students will learn about stormwater science concepts and actionable ways to help keep the Rio Grande healthy.

4. Monthly Monitoring: *Continued development and delivery of Stormwater Science presentations during Monthly Monitoring*

In addition to the core Stormwater Science curriculum, BEMP will, when possible, continue to educate all of its K-12 student and community partners about stormwater science concepts during Monthly Monitoring data collection. Students will also learn how to care for and conserve the Rio Grande and its watershed in ways that amplify key Storm Team messaging and takeaways.

Schools in Bernalillo and Sandoval Counties that participated in BEMP monthly monitoring during 2018-2019 school year and are anticipated to participate in 2019-2020:

Location	**Name**
Bernalillo	Bernalillo Middle School Santo Domingo Elementary School
Rio Rancho	Rio Rancho Cyber Academy
Albuquerque	Albuquerque Institute of Math and Science Bandelier Elementary School Bosque School Cien Aguas International School Harrison Middle School Highland High School Jefferson Middle School La Academia De Esperanza La Cueva High School Rio Grande Elementary School Rio Rancho Cyber Academy South Valley Academy The International School at Mesa del Sol Wilson Middle School Volcano Vista High School

5. Summer programming*: Preparation and delivery of Stormwater Science presentations during summer programming*

During summer months, BEMP partners with Horizons Albuquerque, a tuition-free academic enrichment program that intends to fill the summer learning gap that students from low-income families often encounter. BEMP plans on offering a program for high school students where they will learn to collect and analyze water quality-related datasets as part of their summer enrichment experience.

6. Stormwater Science curriculum development: *Continued development of Stormwater Science curriculum*

BEMP educators will continue to develop new hands'-on, engaging and age-appropriate curriculum activities for a wider range of students. Educators will continue to develop data-intensive stormwater science activities to better align with Next Generation Science Standards.

7. BEMP educational outreach events: *Funding covers partial costs for classrooms to participate in Otter Day and BEMP Student Congress*

Two of the main Stormwater Science-related field activities that BEMP organizes every year are BEMP Student Congress and Otter Day. The main goal of BEMP Student Congress is to gather middle school students from different areas in Albuquerque and help them share their research and experiences in the

bosque, including watershed health observations. BEMP's Otter Day is an event where first graders, hosted by high school students, are taught how they are individually responsible for keeping the Rio Grande and its watershed free of pollutants for the benefit of both wildlife and humans. We plan to continue offering this type of events for the next school year.

8. Additional BEMP educational outreach and events: *Funding covers partial costs for classrooms to participate in Luquillo-Sevilleta Virtual Symposium and Crawford Symposium*

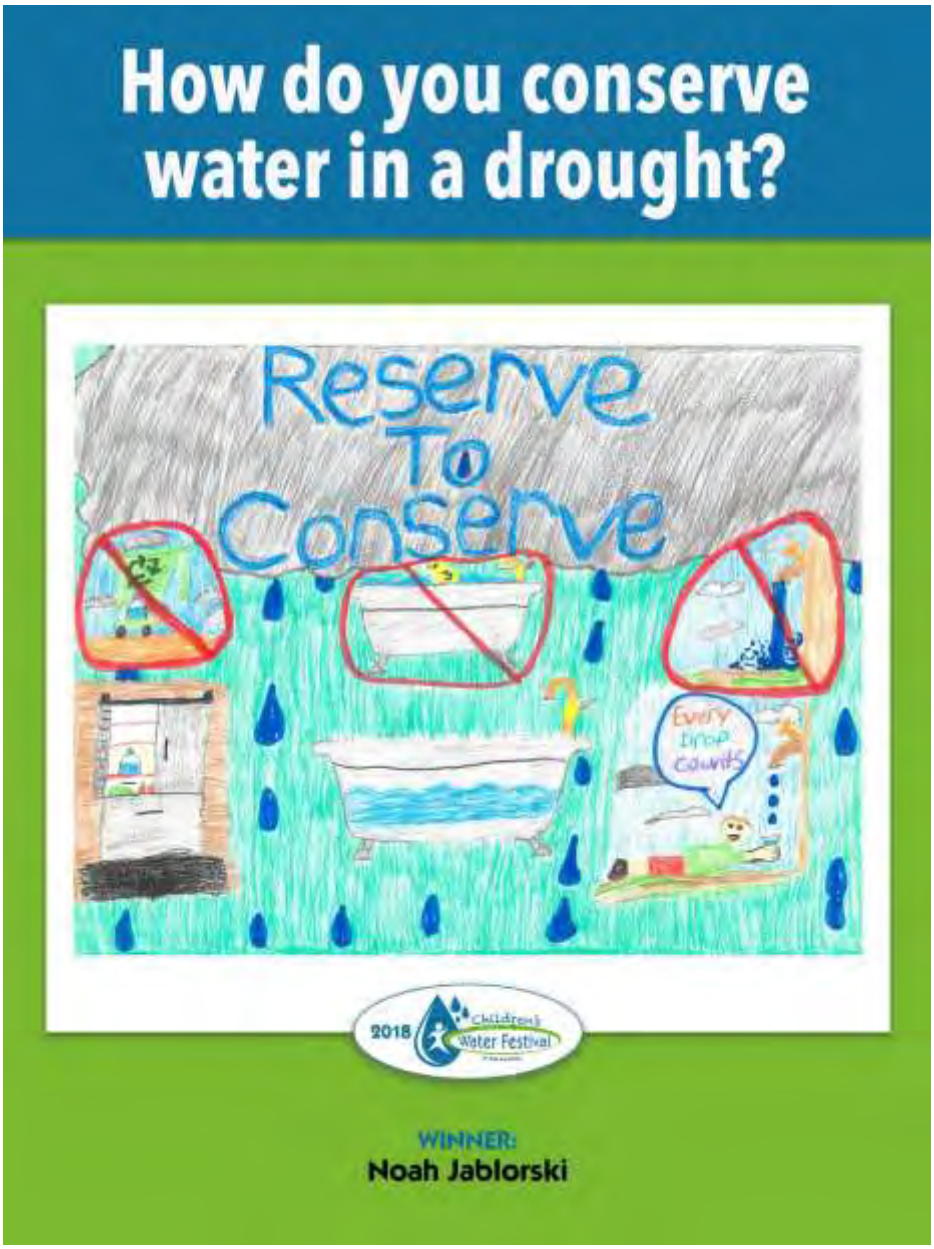
BEMP also participates in other outreach events throughout the school year where stormwater science concepts are taught to a broad audience. BEMP organizes two of these events every year - the Luquillo-Sevilleta Virtual Symposium (LSVS) and the Crawford Symposium. The LSVS is an online event where students from Albuquerque and Puerto Rico share their watershed research in Spanish via Skype. BEMP's Crawford Symposium is a community science event honoring Dr. Clifford Crawford (BEMP's co-founder) where students and professionals present their Middle Rio Grande environmental research. In both of these events, BEMP teaches students why it is their responsibility to help maintain a clean river and watershed and what steps they can take to help. In the next school year, BEMP educators will continue to participate in Stormwater Science-related research projects that will be presented to the scientific community and the public at large..

All deliverables will be non-proprietary and consist of: education materials, online posting of lesson plans and associated documents, and a report summarizing the program's accomplishments, findings, documented learner outcomes, and participant numbers.

Exhibit 7
Rio Rancho Children's Water Festival 2018-2019

Children's Water Festival

Rio Rancho, 2018



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Executive Summary

The 2018 Children's Water Festival (Festival) was held Monday, October 22nd and Tuesday, October 23rd at the Santa Ana Star Center in Rio Rancho. An estimated 1,500 fourth-grade students attended from 64 classrooms and one small group of home-schoolers; Bernalillo Elementary School, St. Thomas Aquinas, and all of the elementary schools in Rio Rancho Public Schools. The students attend three 30 minute presentations in a half-day format. Up to seventeen classes from three to four schools were on-site at one time. Schools attended a morning or afternoon program.

The seventeen presentations represented twenty-two professional organizations that ranged from federal, state, regional governments, and private industry. The organizations all have water interests and focused on subjects such as the water cycle, water quantity and conservation, water distribution, and water quality and pollution.

Students were evaluated on basic water knowledge before and after the Festival. On average, for all testing returned, **the students showed an increase in knowledge of 9 percentage points on the post testing**.

A teacher from Sandia Vista Elementary wrote, "I thought this was the best year out of the years I've attended with my class. All of our water activities were hands-on and informative."

The Festival costs an estimated $23,000. The City of Rio Rancho contributed $10,000 to the Festival and additional funding was raised through the New Mexico Water Conservation Alliance 501(c)(3). Festival sponsors include: Jacobs, Waste Management, NM Gas Company, Southern Sandoval County Arroyo Flood Control Authority, RMCI Inc., All Type, Alpha Southwest, and CWA Strategic Communications.

Introduction

The Children's Water Festival (Festival) has occurred in Rio Rancho since 2007. The 2010 Festival was the first event hosted by the City of Rio Rancho's Water Conservation Office. This report is for the 2018 Festival; the ninth event hosted by the Water Conservation Office. As in years past, the Festival was held at the Santa Ana Star Center. There were an estimated 1,500 students attending from 64 classrooms and one small group of home-schoolers; Bernalillo Elementary School, St. Thomas Aquinas, and all of the elementary schools in Rio Rancho Public Schools. The event was held on October 22nd and Tuesday, October 23rd.

Purpose and Intent

The principal focus of the Festival is to educate fourth-grade school children about water and its relationship to humans, animals and other natural resources in a fun and interactive atmosphere. The Festival's vision is to:

- Introduce students and teachers to new ideas, options, and solutions so they will conserve and protect water for the future,
- Lay the foundation for further learning, and
- Reach as many students and teachers as possible.

Public participation is essential to successful water conservation, and educating the public promotes better water conservation planning and implementation. Early education influences the future acceptance of water conservation concepts. This early education experience also has shown that training efforts affected behavioral changes and improved water use practices. Water conservation goals are only as effective as water users' willingness to adopt and implement appropriate water conservation measures. Through special training activities, water users are taught proper water use practices and techniques. Efficient use of water supplies decreases waste and prevents degradation of water quality leading to healthier ecosystems for fish and wildlife, including locally listed endangered species, such as, the Rio Grande Silvery Minnow (*Hybognathus amarus)* and the Southwestern Willow Flycatcher (*Empidonax traillii extimus*).

The Festival was designed specifically to introduce and explain new and unfamiliar water management tools to present and future water users and managers. Research concerning water conservation education indicates the targeted group of the Festival, fourth-grade students, is ideal for achieving long-term goals. Through sharing water conservation and water quality tools at home and with extended family, the estimated 1,600 participants (students, teachers, and chaperones) represent a potential audience of 10,000 to 15,000 people for the Festival program.

A series of activities that cover a wide range of core curriculum areas were presented at the Festival. These activities included language arts, mathematics, science, social studies, visual arts, and health/wellness; all of which are tied to water conservation, water quality, and water quantity in the arid Southwest desert.

The updated Water Resources Management Plan (Plan), adopted by the City of Rio Rancho Governing Body in 2014, details water efficiencies and water conservation measures to be taken by the City to better manage the existing water supplies. Policy E.4 of the Plan sets forth this initiative: "Continue consulting with and improving the partnership with Rio Rancho Public Schools to implement a robust water resources educational curriculum."

Additionally, the City of Rio Rancho Strategic Plan was formally adopted by the City of Rio Rancho Governing Body on March 25, 2009 and updated August 2017. One important element of the Infrastructure Strategies section of the Strategic Plan pertains to water sustainability and conservation to support growth and development of the City.

"My class enjoyed all 3 events. They learned the most from the watershed activity, where the students stood on blue tape that represented the water that flows into the river. They still talk about it." said one Sandia Vista Elementary teacher.

Funds

Festival Cost

The Festival costs are listed in the table below. Please note that the cost for the Santa Ana Star Center is only for the personnel time. Any monies raised from sponsors that exceed the Festival costs will be used for the 2019 Festival. The cost per student for the Festival was $14.96, and includes the Festival T-shirt and transportation.

Cost Description	Amount
Santa Ana Star Center	$2,271.96
Pipe and Drape rental	$2,801.92
Catering for volunteers & presenters	$4,401.72
Buses	$3,560.70
T-shirts with art/logos (1,629 shirts)	$7,866.10
Shadow box (for T-shirt winner)	$23.18
Banner for Display Stand	$96.00
Posters	$216.00
Copy paper (pre & post-tests)	$44.00
White paper for T-shirt artwork	$37.29
Thank you cards	$130.42
Fiscal Sponsor	$1,000.00
Thank you gifts for steering committee	$168.00
Stamps for VIP invitations/thank you cards	$62.32
Total	**$22,679.61**

Sponsorships

Through its fiscal partner, the New Mexico Water Conservation Alliance, a 501(c)3 non-profit organization, the City of Rio Rancho was able to secure several sponsors to fund the Festival. Additionally, the City sponsored $10,000 for the Festival.

A heartfelt thank you goes to these valuable partners for the Festival!

Steering Committee

The Festival was directed by a diverse steering committee. The core group contained members from:

- City of Rio Rancho's Water Conservation Office
- City of Rio Rancho's Keep Rio Rancho Beautiful Office
- Jacobs
- Sandoval County Master Gardeners
- Sandoval County Master Composters
- New Mexico Environment Department – Surface Water Quality Bureau
- Citizen volunteers

Design of Festival

Students attended the Festival for a half day program that included three presentations. This ensures participation by all Rio Rancho fourth graders. There is a transition period in the middle of the day where the morning classes are leaving and the afternoon classes are arriving.

Teachers and students experienced the Festival in three parts: pre-Festival activities, the Festival itself, and post-Festival activities.

Pre-Festival Activities

- Each school provides a lead fourth grade teacher who confirms their commitment to participate, provides the number and names of the teacher/classes and the number of anticipated students for each.
- Elementary schools are provided the information on how to participate in the student T-shirt artwork project; student art work is submitted to the Water Conservation Office and a winner is selected.
- The pre-Festival tests are provided to the schools and the teachers administered the test to the students. The post-Festival tests, printed on colored paper, were dropped off at the same time.
- Teachers received resource kit materials that included the T-shirts and miscellaneous items donated by our sponsors (e.g., pens, rulers.).

Rio Rancho Children's Water Festival Event

Students at the "Rio Grande Bosque Water Cycle" activity.

- The Water Festival ran from 9:40 a.m. through 1:30 p.m.
- Students attending the Festival in the morning boarded buses at 9:15 a.m. at their school. Students attending the afternoon program boarded the buses at 11:30 a.m.
- Each class was met by a guide/timekeeper who escorted them to each of their three assigned presentations.
- Teachers turned in completed pre-Festival student tests and photo releases.
- Presentations lasted 30 minutes and topics included: water quality, water conservation, water cycle, wastewater, ecosystems, and built water infrastructure.
- All students received a Festival T-shirt. Noah Jablorski, Puesta del Sol Elementary, was the winner of the T-shirt student artwork contest. His design was displayed on the front of the T-shirt and Festival sponsor logos were on the back.

Noah Jablorski – T-shirt artwork winner from Ms. Armendariz's Puesta del Sol Elementary class

Post-Festival Activities

- Post-Festival tests were completed by students.
- Tests and teacher evaluation forms were picked up by steering committee members.
- Teachers will receive a copy of this report with specific information on how their students did on the tests.

All aspects of the Festival planning and implementation were created with the *Big Water Questions* in mind. Each activity was categorized into one of three water themes, and each class attended one 30-minute activity in each of those themes. In addition, each presentation addressed at least one of the *Big Water Questions*, as well as the Festival's mission and objectives. The long-term outcome goal is that all elementary school students will be able to provide reasonable answers to these questions by the time they reach middle school.

Big Water Questions

- Why is water so important to life?
- How do all living things depend on each other?
- What is the water cycle?
- What is a watershed?
- Where does my drinking water come from?
- What makes water dirty?
- How much water does my family use?
- Who are the other water users in our society?
- How can *I* protect our water?
- Where does my wastewater go?

Schools Attending the Festival

The following table outlines which schools attended.

Elementary School	**Number of Teachers**	**Number of Students**
Bernalillo Elementary	6	133
Cielo Azul Elementary	5	113
Colinas del Norte Elementary	5	124
Enchanted Hills Elementary	6	158
Ernest Stapleton Elementary	6	144
Maggie Cordova Elementary	6	150
Martin Luther King Elementary	6	147
Puesta del Sol Elementary	6	135
Rio Rancho Elementary	4	103
Sandia Vista Elementary	6	132
St. Thomas Aquinas Elementary	2	40
Vista Grande Elementary	5	132
Home School Group	1	5
Totals	**64**	**1,516**

Festival Presentations

One teacher wrote, “Each of the activities were “hands-on”. They were informative and fun!”

“Let’s Settle This Outside” activity. Students learn about wastewater treatment while becoming a wastewater operator.

Each year the Festival relies on numerous professionals who volunteer their expertise and presentation time. These professionals represent federal, state and regional government entities, local engineering firms, and the school district. They choose presentations that represent their missions or specialties. There were seventeen presentations running simultaneously on both Day 1 and on Day 2. A description of all the presentations, the presenters and their contact information has been provided in Appendix A.

Volunteer Hours

The Festival could not be held without the assistance of a number of volunteers, presenters, and steering committee members. New last year, was a requirement that the volunteers use the City's on-line application process to have a background check conducted. It was hopeful that this year process would be smoother and it was not. The City's human resources staff added an additional requirement where the volunteer applicants had to fill out a form with their social security number and driver's license number. At least one volunteer was worried that her social security number may fall in the wrong hands and she would not complete the process. Several other volunteers expressed concern about this new step.

The table below lists an estimate of the in-kind volunteer hours.

Presenters	382.5 hours
Volunteers	166.5 hours
Steering Committee Meetings	37 hours
Total Hours	**586 hours**

Lessons Learned

Steering Committee Comments from the Festival

There were only a few comments from the steering committee including:

- Bus issues with Rio Rancho Elementary– there was still a problem with one school not being picked up on time even though we verified with the bus coordinator to make sure all schools were on the bus schedule. We did not get a good response from the bus coordinator when asked why the bus did not arrive; we were told both "rain delay" and "the bus was there but the classes did not get on it when they were supposed to". On the teacher evaluation forms, though, the teachers said that bus 481 was not there on time. They missed the entire first rotation.
- Chaperones from Bernalillo Elementary did not have badges showing that they were supposed to chaperone the classes.
- One female parent and boyfriend show up the first day and wanted to be let in. They were not background checked and were denied entry. The teacher said that the parent was not supposed to be there. The parent and boyfriend walked the outside of the Star Center trying each door to get in.
- A comment from the Festival Director to the Star Center security team was overheard by one of the Bernalillo Elementary teachers. When talking about the chaperone badges, the Director told security that "Bernalillo is different" and the teacher took offense.
- A male parent of a Bernalillo student wanted to be let in to visit with the class. He did not know the name of the teacher his child was with so he was denied entry.
- A comment from last year was that it needed to be more hands on – maybe let presenters know that "lecture time" should be no more than 10 minutes and use the last 15 minutes for hands-on. Still need to get better with this. Several of the presenters lectured most of the time.
- Many teachers want more activities, but that is impossible – can't get enough volunteers and presenters to do more than two days.
- From last year, we did put TURN OVER on front of test page so kids answer all of the questions and had more students do both pages.
- One class from M. Cordova (Alderson) had a lot of the students circled in between the numbers on the post-test causing the post-test scores to be significantly lower than the pre-test scores (12% decrease).
- DeCristoforo's class from ML King all received scores of 100% on the post-tests. This gave a 24% increase in the score.
- We barely managed with less volunteers due to the inconvenience of the background check.
- The Festival began at 9:40 this year and some of the classes could not make it in time. Suggestion is to go back to 9:45 for next year. Need to have the students on the bus by 1:30 next year, just like this year.
- Food for the vegetarian presenters and volunteers was very poor. Even though the caterer told us what would be served, the Star Center staff did not have anything the first day and

it was cold the next day. Next year, need to have vegetarian as one of the options especially since the meals were enchiladas one day and lasagna the other.

- There needs to be ice packs, or something quick, when a child either pinches a finger or trips. We had a student trip and bump his knee and we had to scramble to find ice and something to put the ice in.
- Question #3 from the test has "False" then "True" as the selection for the students. It was mentioned that this might be misleading for the students so it will be rewritten for next year to have "True" then "False" as the answers.
- One of the teacher comments from 2017 was that it would be nice to have each school's t-shirts be a different color. We checked on this when we ordered the shirts for this year. Colored shirts would be an additional $1 per shirt. This would put the cost of shirts from $4.95 per shirt to $5.95 per shirt. The t-shirts are the second most expensive cost of the Festival besides the venue and food for presenters and volunteers.

Comments from Teacher Evaluation Forms

Buses

- Comment from St. Thomas Aquinas: "Our office registrar received a call stating that we had not confirmed via RRPS Trip Tracker. We never had to do this in the past. We also do not have access to this system. It was Liz Aldaz who called from RRPS transportation."
- Comments from Rio Rancho Elementary:
    - "Our buses were late picking us up at Rio Rancho Elem so we missed the first rotation."
    - "Bus 481 from Rio Rancho was late causing us to miss 1 activity."
- Comment from Vista Grande: "Well, the only thing was we only got 2 buses for 5 classes and we had to do 3 to a seat."
- No problems. The bus driver was great!
- Buses were fine. We were a bit crammed in.
- "Left fast and arrived fast" Commented a teacher from M. Cordova.

2017 Festival layout.

Santa Ana Star Center

- Wonderful place.
- Facility was clean/spacious.
- Great; was good. All set up, good temp., no noise.
- Thought layout was good and having a volunteer guide kept us right on time.
- While acoustics are poor, the lessons reach the students just fine. I love the venue for this.
- Not decorated fun or with kid-friendly posters.
- It would be nice if chairs were available for the teachers & parents volunteers.
- The "rooms" were too small for tables and my 25 students.
- Well organized & a lot of room for the students @ each station.

Activities

- Each of the activities were "hands-on". They were informative and fun!
- Yes, the activities were fabulous! I believe making the activities shorter in time (± 15 mins.) would allow students to see more.
- Some were hands on but still not very engaging for students.
- Students enjoyed the content. A content guide to be used ahead of time (to introduce vocab/concepts would be great).
- Improved by…Small tables for 27 children to huddle around, my group did a lot of listening in all 3 stations.
- At our first station, it was impossible for 24 kids to gather around a small table & be able to see. I understand there is a specific vocabulary to be uses with the water content & activities but not all students know what they mean. Many of the presenters seemed very annoyed that my class didn't instantly understand a term. The only rotation my class was engaged in was the Jeopardy station. More than half of my class was disengaged during the other two. They were unsure of what to do & shy they were doing the activity, & learned nothing from them. The students might be more engaged & learn <u>something</u> if they were able to choose what station they visited.
- Many were hands on but many of the rotations finished early (up to 15 minutes) and struggled to keep kids engaged.
- Thank you for more hands on activities this year. It is hard for 4th graders to sit and listen to lectures.
- I thought this was the best year out of the years I've attended with my class. All of our water activities: "Leaky Faucet", "water cycle in Action", and "flood Plain" were <u>hands-on</u> and <u>informative</u>.

- The presentation from the Museum of Natural History was the most memorable for my students. Although they did have to figure out a connection from ancient New Mexico to water resources.
- I like that you posted the information students should know before leaving in every booth. My students and I noticed.
- My students enjoyed all 3 events. They learned the most form the watershed activity, where the students stood on blue tape that represented the water that flows into the river. They still talk about it.
- I like how everything is separated. It helps the students focus on the presenter. I also like how the person escorting the group has sign with my name on it. It made it easy to find.
- My students really enjoyed the activities. One activity was having trash and the water & poo squish toys & the kids acted as a river. Great hands-on.

Overall

- Make it interesting and kid friendly. Presenters seemed as if they did not want to be there. Presentations were boring and dull. It was nice to take home goodies, kids love that.
- For a larger class of 26+, more models may help for all to see.
- Great! A lot of volunteers that were well prepared & very knowledgeable.
- More hands on, at least 1 group out of the 3.
- Make sure EVERYONE receives the same info about the process of the festival. We got different info than our guide got.
- Shorten time slots to allow us to see more rotations.
- Provide chairs for the adults to sit in. This has always been done before. Two out of three presentations did not have them available. (Festival staff note: the chairs were there but not placed out where the teachers could access them; need to do better on this next year.)
- I think the key is to have little bit of explanation and mostly hands-on activities. The presenters should be patient and kind to the students.
- Possibly have the first rotation set up differently since buses can't get there as early as expected.
- My students loved it. Things they learned included, ½ of New Mexico was ocean, we have ocean fossils, illegal dump sites, waste and toxins pollute river and aquifer and that there many layers to a landfill.
- It was my first time and we had a great time.
- This is such important information. We should have curriculum for at least 2 weeks prior and the time we are at the event should be longer.
- Test question #2 and #3 are poorly written.
- I just feel like it needs to be more kid friendly, like a fun rally, or water rally before we go in?

- The organization can make sure each teacher gets a mix of different topics through the stations. For example, my class went to two rotations that explained the water cycle (very similar discussions). The organization can also make sure each teacher gets their fair share of hands-on activities. (Festival staff note: we use a activity matrix and do try to make sure that teachers don't go the same activity year after year and have a mix of activities each year.)

Festival Event

The two days of the Festival ran very smooth with two exceptions:

- There was an issue with the buses for Rio Rancho Elementary and the students missed the first rotation. The Festival Director spoke to the Rio Rancho teachers to let them know that activities could be brought to them.
- The comment from the Festival Director to the Star Center security team that was overheard by one of the Bernalillo Elementary teachers. When talking about the chaperone badges, the Director told security that "Bernalillo is different" and the teacher took offense. The Festival Director apologized to one of the Bernalillo teachers who contacted her after the event and tried to explain the context of the comment.

Appendix A

Working Timeline

The following was used to ensure that steps of the Festival preparation were completed in a timely manner.

- July 15 – PO for RR Sponsorship
- July 15 – PO for Buses
- August 1 – update VIP list and mail invitations
- August 14 – RR schools starts
- August 24 – Email teachers about CWF date and artwork delivery
- August 30 – Drop off artwork paperwork, poster, photo release forms
- September 1 – email volunteers
- September 7 – email reminder to teachers including schedule
- September 7 – Start scheduling/meeting with teacher/schools
- September 11 – Pick up artwork, photo release forms
- September 17 – Meeting to select the winner
- September 17 – Artwork to Wayne at Rio Rancho T Shirts
- September 28 – meet with SASC about food, etc.
- October 15 – Pick up T Shirts
- October 15 – email layout to SASC
- October 16 – Meeting to pack bags
- October 16 – Drop off bags this week
- October 22nd and 23rd – Water Festival
- November 1 – Pick up post tests
- December 31 – Festival report completed

Appendix B

Teacher/Class Rotation Schedule

Booth	MON Oct 22 morning		9:40 – 10:10	10:15 – 10:45	10:50 – 11:20
#	**Presentation**	**Category**			
1	Incredible Journey – NMED	Water Cycle	Lambson Cielo Azul	McCann Cielo Azul	Langdon/Romero Puesta del Sol
2	No Dumping – KRRB	Recycling/Water Quality	McCann Cielo Azul	Smith Puesta del Sol	Torres Colinas del Norte
3	Vacant				
4	Let's Settle this Outside – Jacobs	Wastewater	Armendariz Puesta del Sol	Lambson Cielo Azul	Wiberg Colinas del Norte
5	Basic Surface Water Treatment – Carollo	Water Quality	Langdon/Romero Puesta del Sol	Armendariz Puesta del Sol	Herrera Puesta del Sol
6	Water Jeopardy – Bohannan Huston	General Water	Vargas Colinas del Norte	Ulibarri Puesta del Sol	Smith Puesta del Sol
7	Watersheds & Aquifers – UNM	Source Water	Romero Cielo Azul	Torres Colinas del Norte	Armendariz Puesta del Sol
8	Rolling River – Ciudad SWCD	Watersheds	Ulibarri Puesta del Sol	Wiberg Colinas del Norte	McCann Cielo Azul
9	RG Bosque Water Cycle - RGNC	Water Cycle	Torres Colinas del Norte	Romero Cielo Azul	Vargas Colinas del Norte
10	Weather or Not - NOAA	Weather	Infantino Cielo Azul	Farfan Colinas del Norte	Lambson Cielo Azul
11	Watersheds & Stormwater – SNL	Watersheds	Messenger Cielo Azul	Vargas Colinas del Norte	Romero Cielo Azul
12	Leaky Faucet – RRPS	Conservation	Smith Puesta del Sol	Parker/Straley Puesta del Sol	Randall Colinas del Norte
13	NM Past and Present – NM Cultural Services	Historical Perspective	Farfan Colinas del Norte	Randall Colinas del Norte	Messenger Cielo Azul
14	Water Cycle – Ask Academy	Water Cycle	Randall Colinas del Norte	Messenger Cielo Azul	Ulibarri Puesta del Sol
15	BEMPing it Up – BEMP	Ecosystems	Herrera Puesta del Sol	Langdon/Romero Puesta del Sol	Farfan Colinas del Norte
16	Keep the Rio Grande – Stormwater Team	Watersheds	Parker/Straley Puesta del Sol	Herrera Puesta del Sol	Infantino Cielo Azul
17	Virtual Water – OSE	General Water	Wiberg Colinas del Norte	Infantino Cielo Azul	Parker/Straley Puesta del Sol
	16 Presenters		**16 Classes**		

Booth	MON Oct 22 afternoon		11:50 – 12:20	12:25 – 12:55	1:00 – 1:30
#	**Presentation**	**Category**			
1	Incredible Journey – NMED	Water Cycle	DeCristoforo ML King	Pearson ML King	Marsh Enchanted Hills
2	No Dumping – KRRB	Recycling/Water Quality	Mandich Enchanted Hills	Lawton St.Thomas	Wallace ML King
3	Vacant				
4	Let's Settle this Outside – Jacobs	Wastewater	Wallace ML King	Zukowski Enchanted Hills	Salaz ML King
5	Basic Surface Water Treatment – Carollo	Water Quality	Filkins ML King	Salaz ML King	Wiebelhaus Enchanted Hills
6	Water Jeopardy – Bohannan Huston	General Water	Sierz Enchanted Hills	Hunt Enchanted Hills	Dannenberg Enchanted Hills
7	Watersheds & Aquifers – UNM	Source Water	Marsh Enchanted Hills	Wallace ML King	Hunt Enchanted Hills
8	Rolling River – Ciudad SWCD	Watersheds	Zukowski Enchanted Hills		Sierz Enchanted Hills
9	RG Bosque Water Cycle - RGNC	Water Cycle	Dannenberg Enchanted Hills	Sierz Enchanted Hills	Lawton St.Thomas
10	Weather or Not - NOAA	Weather	Summerbell ML King	Dannenberg Enchanted Hills	Pearson ML King
11	Watersheds & Stormwater – SNL	Watersheds	Griego St. Thomas	Wiebelhaus Enchanted Hills	
12	Leaky Faucet – RRPS	Conservation	Salaz ML King	Mandich Enchanted Hills	Filkins ML King
13	NM Past and Present – NM Cultural Services	Historical Perspective	Lawton St.Thomas	Marsh Enchanted Hills	DeCristoforo ML King
14	Water Cycle – Ask Academy	Water Cycle		Griego St. Thomas	Zukowski Enchanted Hills
15	BEMPing it Up – BEMP	Ecosystems	Hunt Enchanted Hills	Filkins ML King	Summerbell ML King
16	Keep the Rio Grande – Stormwater Team	Watersheds	Pearson ML King	DeCristoforo ML King	Mandich Enchanted Hills
17	Virtual Water – OSE	General Water	Wiebelhaus Enchanted Hills	Summerbell ML King	Griego St. Thomas
	16 Presenters		**15 Classes**		

Booth	TUE Oct 23 morning		9:40 – 10:10	10:15 – 10:45	10:50 – 11:20
#	**Presentation**	**Category**			
1	Incredible Journey – NMED	Water Cycle	Sidor M Cordova	Hurlock M Cordova	Malan Bernalillo
2	No Dumping – KRRB	Recycling/Water Quality			
3	DW Model – Santa Fe	Water Quality	Sosa Bernalillo	Gabaldon M Cordova	Martinez Bernalillo
4	Let's Settle this Outside – Jacobs	Wastewater	Galvez-Romero Bernalillo	Alderson M Cordova	Paiz Rio Rancho
5	Basic Surface Water Treatment – Carollo	Water Quality	Hurlock M Cordova	Chavez Bernalillo	Steiner M Cordova
6	Water Jeopardy – Bohannan Huston	General Water	Malan Bernalillo	Sidor M Cordova	Bailey/Mashour Rio Rancho
7	Watersheds & Aquifers – UNM	Source Water	Lujan Bernalillo	Steiner M Cordova	Chavez Bernalillo
8	Rolling River – Ciudad SWCD	Watersheds	Paiz Rio Rancho	Galvez-Romero Bernalillo	Boldt Rio Rancho
9	RG Bosque Water Cycle - RGNC	Water Cycle	Aldaz Rio Rancho	Boldt Rio Rancho	Galvez-Romero Bernalillo
10	Weather or Not - NOAA	Weather	Martinez Bernalillo	Lujan Bernalillo	Sidor M Cordova
11	Watersheds & Stormwater – SNL	Watersheds	Alderson M Cordova	Sosa Bernalillo	Hurlock M Cordova
12	Leaky Faucet – RRPS	Conservation	Chavez Bernalillo	Zirpel M Cordova	Gabaldon M Cordova
13	NM Past and Present – NM Cultural Services	Historical Perspective	Boldt Rio Rancho	Malan Bernalillo	Sosa Bernalillo
14	Water Cycle – Ask Academy	Water Cycle	Bailey/Mashour Rio Rancho	Paiz Rio Rancho	Alderson M Cordova
15	BEMPing it Up – BEMP	Ecosystems	Gabaldon M Cordova	Aldaz Rio Rancho	Zirpel M Cordova
16	Keep the Rio Grande – Stormwater Team	Watersheds	Zirpel M Cordova	Bailey/Mashour Rio Rancho	Aldaz Rio Rancho
17	Virtual Water – OSE	General Water	Steiner M Cordova	Martinez Bernalillo	Lujan Bernalillo
	16 Presenters		**16 Classes**		

Booth	TUE Oct 23 afternoon		11:50 – 12:20	12:25 – 12:55	1:00 – 1:30
#	**Presentation**	**Category**			
1	Incredible Journey – NMED	Water Cycle	Pichette Sandia Vista	Wadsworth Sandia Vista	Reichbach E Stapleton
2	No dumping – KRRB	Recycling/Water Quality	Pasternaki/Hernandez Vista Grande	Bird Vista Grande	Fox - Sandia Vista Salido - Home School
3	DW Model – Santa Fe	Water Quality	Rojas/Sanchez E Stapleton	Gonzales Vista Grande	Lautt E Stapleton
4	Let's Settle this Outside – Jacobs	Wastewater	Zungia E Stapleton	Lowe E Stapleton	Walker Vista Grande
5	Basic Surface Water Treatment – Carollo	Water Quality	Wadsworth Sandia Vista	Pichette Sandia Vista	Marcotte E Stapleton
6	Water Jeopardy – Bohannan Huston	General Water	Grant Vista Grande	Pasternaki/Hernandez Vista Grande	Valdez Sandia Vista
7	Watersheds & Aquifers – UNM	Source Water	Valdez Sandia Vista	Rojas/Sanchez E Stapleton	Glauvitz/Cook Sandia Vista
8	Rolling River – Ciudad SWCD	Watersheds	Rambaldi Sandia Vista	Walker Vista Grande	Wadsworth Sandia Vista
9	RG Bosque Water Cycle - RGNC	Water Cycle	Lowe E Stapleton	Glauvitz/Cook Sandia Vista	Rambaldi Sandia Vista
10	Weather or Not - NOAA	Weather	Lautt E Stapleton	Reichbach E Stapleton	Gonzales Vista Grande
11	Watersheds & Stormwater – SNL	Watersheds	Reichbach E Stapleton	Grant Vista Grande	Pichette Sandia Vista
12	Leaky Faucet – RRPS	Conservation	Glauvitz/Cook Sandia Vista	Valdez Sandia Vista	Rojas/Sanchez E Stapleton
13	NM Past and Present – NM Cultural Services	Historical Perspective	Walker Vista Grande	Lautt E Stapleton	Grant Vista Grande
14	Water Cycle – Ask Academy	Water Cycle	Marcotte E Stapleton	Fox - Sandia Vista Salido - Home School	Zungia E Stapleton
15	BEMPing it Up – BEMP	Ecosystems	Gonzales Vista Grande	Marcotte E Stapleton	Pasternaki/Hernandez Vista Grande
16	Keep the Rio Grande – Stormwater Team	Watersheds	Fox - Sandia Vista Salido - Home School	Zungia E Stapleton	Bird Vista Grande
17	Virtual Water – OSE	General Water	Bird Vista Grande	Rambaldi Sandia Vista	Lowe E Stapleton
	17 Presenters		**17 Classes**		

Appendix C

Festival Presentations

This appendix lists all of the Festival presentations and contacts. For each section, there is the name of the presentation, a brief description of the activity, the correlation of the presentation with the Next Generation Science Standards (NGSS), the contact information of the presenter and if available, where the teacher can locate a similar presentation if they would like to teach it in the classroom.

****

Basic Surface Water Treatment
Students learn about processes used to clean water in a contemporary water treatment facility through an interactive process. This activity teaches children about the importance of water quality for drinking water.

Next Generation Science Standards, Grades 3-5:
Practice 2, Practice 3

Carollo Engineers
Rob Buss rbuss@carollo.com

****

BEMPin' It Up
Students learn about the plants, mammals, arthropods, and water table along the Bosque and how it is all supported by water in the Rio Grande.

Next Generation Science Standards, Grades 3-5:
Practice 6, Practice 7

Bosque Ecosystem Monitoring Program, UNM Dept. Biology & Bosque School
Kelly Steinberg (505) 898-6388 x 151 kelly.steiner@bosqueschool.org

Similar activity found on web: Habitats of the World, Discovery Education
http://www.discoveryeducation.com/teachers/free-lesson-plans/habitats-of-the-world.cfm

****

Drinking Water Model
The 3D EnviroScape® Drinking Water/Wastewater model traces the path of the water we use in our communities. Real water is drawn from the aquifer and enters the water treatment plant processes -- clean water is delivered for residential and commercial uses -- wastewater is sent for treatment -- treated water returned to the river.

Next Generation Science Standards, Grades 3-5:
Practice 1, Practice 2

City of Santa Fe – Water Conservation Office
Christine Chavez cychavez@ci.santa-fe.nm.us

****

Incredible Journey
During this activity, students become water molecules and move through the water cycle. They learn about the movement and distribution of water – as well as pollution – on the earth.

Next Generation Science Standards, Grades 3-5:

Practice 6, Practice 7

NM Environment Department, Surface Water Quality Bureau
Heidi Henderson heidi.henderson@state.nm.us

A similar activity found on web: Incredible Journey, Project WET
http://files.dnr.state.mn.us/education_safety/education/project_wet/sample_activity.pdf

****

Keep the Rio Grande

Keep the Rio Grande Activity is an interactive game where the students become an arroyo supplying stormwater to the Rio Grande. The stormwater picks up a variety of items as the flow increases creating a flood or raindrops, trash, pet waste, bacteria, plastics as the students pass the items down to the river. The students learn about stormwater quality and the impact we have on water in our neighborhoods and town. After the rain has stopped, students discuss the water and debris on the ground around them and at the end of the line the river. Then they are tasked with sorting all of the items to bins labeled: trash, compost, recycle and rain.

Next Generation Science Standards, Grades 3-5:
Practice 1, Practice 2

Middle Rio Grande Stormwater Quality Team
Xavier Pettes (505) 891-5045 xpettes@rrnm.gov

****

Leaky Faucet

Students create a water leak and scientifically measure the leak using graduated cylinders over three tests. The students then compute the average milliliters of water leaked over one minute to the amount of gallons of water leaked and wasted over one year.

Next Generation Science Standards, Grades 3-5:
Practice 4, Practice 5

Rio Rancho Public Schools
Lou Cusimano (505) 975-0326
lou.cusimano@rrps.net

A similar activity found on web: Leaky Faucet, Utah Education Network
http://www.uen.org/Lessonplan/preview.cgi?LPid=27247

****

Let's Settle This Outside

Students become wastewater operators and learn how the wastewater treatment plant cleans dirty water. They then create wastewater using everyday materials and clean the wastewater by sorting it into three stations: water, sludge, and trash.

Next Generation Science Standards, Grades 3-5:
Practice 1,

Jacobs
Billy Jaquez (505) 891-5024 billy.jaquez@jacobs.com
Rita Armijo (505) 891-5024

A similar activity found on web: Wastewater: We Treat it Right, City of Boise
http://bee.cityofboise.org/media/216580/43385_Wastewater.pdf

****

New Mexico Past and Present
Students learn where water comes from (the water cycle), where water is today in New Mexico, and what they can do to protect and conserve water. The students then become detectives to discover where water occurred in the past in New Mexico.

Next Generation Science Standards, Grades 3-5:
Practice 3, Practice 6

New Mexico Museum of Natural History and Science
Mike Sanchez (505) 841-2583 michael.sanchez1@state.nm.us

****

No Dumping

The 3D EnviroScape® Landfill Model was utilized to teach students the importance of landfills. The students demonstrated how both landfills and illegal dumpsites affect the environment. Students participated by adding mock hazardous items that can be found in both landfills and illegal dumpsites. This allowed the students to see how hazardous items affected the environment and how landfills can protect the environment from these hazards.

Next Generation Science Standards, Grades 3-5:
Practice 2

City of Rio Rancho, Keep Rio Rancho Beautiful
Zac Keintz (505) 896-8729 zkeintz@rrnm.gov

****

Rio Grande Bosque Water Cycle

In the semi-arid climate of New Mexico, our scarce precipitation limits the quantity of water available for use by plants, animals and humans. Students become water molecules traveling through a water cycle. The presentation emphases, with evidence and cause and effect, why we need to consider all water users when making water-use decisions.

Next Generation Science Standards, Grades 3-5:
Practice 6, Practice 7

Rio Grande Nature Center
Tanja George (505) 344-7240 Tanja.George@state.nm.us

A similar activity found on web: Incredible Journey, Project WET
http://files.dnr.state.mn.us/education_safety/education/project_wet/sample_activity.pdf

****

Rolling River

How does a river work? Students interact with a model watershed and watch the cause and effects of precipitation as it flows down-gradient from urban and rural environments. Students learn about "pervious" and "impervious" surfaces and their relationship with the water cycle, including pollutant transport and increased erosion. Students learn that their personal actions can protect their watershed.

Next Generation Science Standards, Grades 3-5:
Practice 2, Practice 7

Ciudad Soil and Water Conservation District
Steve Glass
ciudadswcd1944@gmail.com

A similar activity found on web: Protecting Our Water Resources, Midwest Research Institute (See Level 2)
http://www.stormwater.ucf.edu/toolkit/vol3/Contents/pdfs/Student%20Activities/student_activities.pdf

****

Virtual Water

The activity teaches students the importance of water and introduces /explains the terms "direct" and "indirect" water use and challenge students to think of how all water use is connected.

Students create a "water web" that illustrates their dependence on water and their interdependence among other water users. Students learn how water users depend upon the goods and services provided by other water users.

Next Generation Science Standards, Grades 3-5:
Practice 1, Practice 2

New Mexico Office of the State Engineer, Water Conservation Bureau
Julie Valdez
julie.valdez@state.nm.us

****

Water Cycle

The students made bracelets with different colored beads that represented phases of the water cycle. Additionally, the students participated in an interactive matching game, where the students had to match the steps of the water cycle to the correct pictures, as well as guess how much clean water is readily available to us.

Next Generation Science Standards, Grades 3-5:
Practice 1, Practice 2

The ASK Academy
Barbara McCann (505) 366-3437
bmccann@theaskacademy.org

****

Water Jeopardy

Students learn basic concepts and differences about groundwater vs. surface water supply for potable drinking water. The concepts are reinforced by participation in a Jeopardy game where students compete to determine the correct water "question" for a series of given "answers" (like the TV show).

Next Generation Science Standards, Grades 3-5:
Practice 1

Bohannon Huston, Inc.
Nathan Roberts (505) 823-1000
nroberts@bhinc.com

A similar activity found on web: The Water Cycle Jeopardy, Super Teacher Tools (online Flash game for up to 5 teams)
http://www.superteachertools.com/jeopardy/usergames/Jan201205/game1327973751.php

****

Watersheds and Aquifers

Students learn about watersheds by examining and manipulating both types of models. They learn that a watershed is the land area that drains to a water body such as a river or lake. The

students also learn how drinking water comes from aquifers and how pollution can influence water quality.

Next Generation Science Standards, Grades 3-5:
Practice 1, Practice 2

University of New Mexico, Civil Engineering
Blade Allen blallen3196@unm.edu

A similar activity found on web: Protecting Our Water Resources, Midwest Research Institute (See Level 2)
http://www.stormwater.ucf.edu/toolkit/vol3/Contents/pdfs/Student%20Activities/student_activities.pdf

****

Watersheds and Stormwater
Students learn about watersheds by examining and manipulating watershed models. They learn that a watershed is the land area that drains to a water body such as a river or lake. They see for themselves how watersheds can influence water quality.
Next Generation Science Standards, Grades 3-5:
Practice 1, Practice 2

Sandia National Laboratories
John Kay (505) 344-7240
jtkay@sandia.gov

A similar activity found on web: Protecting Our Water Resources, Midwest Research Institute (See Level 2)

http://www.stormwater.ucf.edu/toolkit/vol3/Contents/pdfs/Student%20Activities/student_activities.pdf

****

Weather or Not
Students analyze meteorological and hydrological data to determine if a flash flood might occur, issue warnings, and monitor the flood event.

Next Generation Science Standards, Grades 3-5:
Practice 1, Practice 2, Practice 3,

National Oceanic & Atmospheric Administration, National Weather Service
Kerry Jones (505) 243-0702 kerry.jones@noaa.gov

A similar activity found on web: Create Your Own Water Cycle, The Water Project
http://thewaterproject.org/resources/lesson-plans/create-a-mini-water-cycle.php

Appendix D

Information to Teachers

The following information was included in the teacher packets with the student's pre- and post-tests.

2018 Children's Water Festival

Monday, October 22nd
Tuesday October 23rd

Santa Ana Star Center

3001 Civic Center Circle NE
Rio Rancho, NM 87144

Theme: "***How do You Conserve Water in a Drought?***"

The Children's Water Festival has been arranged so **ALL** fourth-grade students in Rio Rancho and Bernalillo Elementary can attend the event. This is a ***FREE*** event for the students and teachers using monies donated from local businesses who care about water-related education.

The water festival is organized with three activities in the morning and three activities in the afternoon. Each school will attend on one day at either the morning or afternoon session. Each class will attend three activities during their session.

Morning Session	Afternoon Session
9:40-10:10	11:50-12:20
10:15-10:45	12:25-12:55
10:50-11:20	1:00-1:30

Chaperones

It is recommend at least one adult be present for every ten students. Chaperones are responsible for their own transportation to the Star Center. They have not been included in the bus count. Please ask all chaperones and any volunteers from the school to wear their school badges. **We ask that only the approved chaperones attend from your school. Please no "extra" parents/grandparents that show up to watch; they will be turned away!** If you do have any of these "extras", have them contact me prior to the event and I can assign them to be volunteers at the event.

Transportation

Buses are provided and paid by the Children's Water Festival. There will be no place or time for students to eat lunch at the Star Center, so plan on your students' lunch period to be at your school either before or after the water festival.

RRPS TEACHERS ARE RESPONSIBLE FOR FILLING OUT THE TRIP TRACKER.

- **Morning Sessions - Schedule for 9:15 pick up and 11:25 pick up**
- **Afternoon Sessions – Schedule for 11:25 pick up and 1:30 pick up**
- **Bernalillo and St. Thomas will be scheduled by City Staff**

These are the schools that will be attending with dates and arrival times.

Elementary School	Lead Teacher	Email	Number Classes	Day	Time
Puesta del Sol	Sarah Parker	sarah.parker@rrps.net	6	10/22	9:40
Colinas Del Norte	Ashley Randall	ashley.randall@rrps.net	5	10/22	9:40
Cielo Azul	Karin McCann	karin.mccann@rrps.net	5	10/22	9:40
St. Thomas	Pat Lawton	pat.lawton@stasnm.net	2	10/22	11:50
M.L. King	Allison Salaz	allison.salaz@rrps.net	7	10/22	11:50
Enchanted Hills	Christina Mandich	christina.mandich@rrps.net	7	10/22	11:50
M. Cordova	Cheyenne Zirpel	Cheyenne.zirpel@rrps.net	6	10/23	9:40
Rio Rancho	Joy Christopherson	joy.christopherson@rrps.net	4	10/23	9:40
Bernalillo	Samantha Lujan	slujan@bps.k12.nm.us	6	10/23	9:40
Vista Grande	Bethany Grant	bethany.grant@rrps.net	5	10/23	11:50
E. Stapleton	Carey Rojas	carey.rojas@rrps.net	6	10/23	11:50
Sandia Vista	Merry Wadsworth Veronica Valdez (Mont.)	merry.wadsworth@rrps.net veronica.valdez@rrps.net	6	10/23	11:50
Total (as of 9/12/18)			65		

Water Conservation staff would love to meet with all your 4th grade teachers to go over the festival and the logistics. The meeting should take about 15 minutes or so.

Please contact Marian Wrage, Rio Rancho Environmental Programs Manager and Festival Director, if there are any questions and to schedule the meeting with your 4th grade team. Marian's telephone number is (505) 896-8737, her cell is (505) 681-7325, and her email is mwrage@rrnm.gov.

The Rio Rancho Children's Water Festival funding has been provided by:

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ALL TYPE

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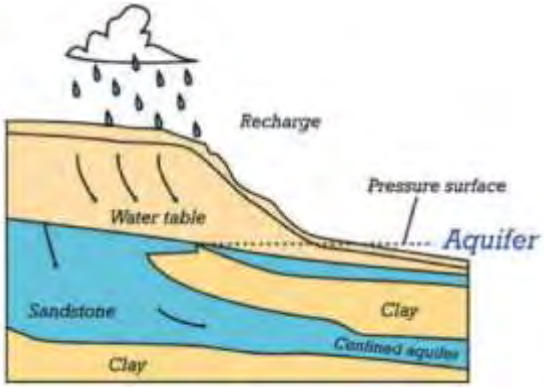
Pre and Post Test

The Festival steering committee rewrote the student test in 2017; diagrams and pictures were added to help the students visualize the concepts. Note that references to "Rio Rancho" on the tests was changed to "Bernalillo" for the students attending from Bernalillo Elementary.

1. Many substances and objects can make river water dirty. Which of the following items can make the Rio Grande dirty?
   a) Trash
   b) Dog poop
   c) Leaky cars
   d) All the above

2. An **aquifer** is a layer of water-saturated porous rock. It lies below the water table. Most people who live in New Mexico get drinking water from a well drilled into an aquifer. If you live in Rio Rancho, is the water coming from your faucet from an aquifer?
   a) True
   b) False



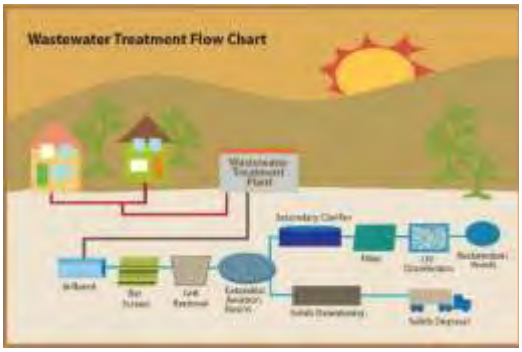
3. A **watershed** is an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel. Is the following statement true or false: We all live in a watershed?
   a) False
   b) True

4. Everyone in Rio Rancho/Bernalillo uses, on average, about 65 gallons of water per person per day. If you have four people in your home, what is your family's daily average water use?
   a) 260 gallons of water per day
   b) 200 gallons of water per day
   c) 2,600 gallons of water per day

5. Water users in our state include plants, animals, and people. Why is water so important to life?
   a) People need it to survive
   b) Plants need it to survive
   c) The river needs it to support nature
   d) All the above

6. The **water cycle** happens as the earth is warmed by the sun and water circulates between the earth's oceans, atmosphere, and land. Which of the following are terms associated with the water cycle?
   a) Pumping, Treatment, Delivery
   b) Evaporation, Condensation, Precipitation
   c) River, stream, aquifer

7. How can we protect our water?
   a) Litter
   b) Tell your parents when you see a leak
   c) Pour chemicals on the ground



8. **Wastewater** (or sewer water) is the used water from toilets, showers, and clothes washers and it is too dirty to go straight into the river or into the ground. Septic tanks and wastewater treatment plants clean the water before it goes to the river or into the ground.
   a) True
   b) False

Appendix E

Statistical Outcomes from Students' Tests by School, Teacher, and Question

The following table shows the percentage of students that got the question correct on both the pre and post-test. The improvement is shown by the increase/decrease in percentage points. Not every teacher from every school provided pre and post-tests. ***There was a 9 percentage point increase from pre- to post-tests for all the participating students.***

Table 1 shows the increase/decrease by question for the entire testing group.
Table 2 shows the test increase/decrease average by school and teacher.
Table 3 shows pre- and post-test by each teacher (school) for each question.

Table 1 **Test Question**	**Increase from Pre to Post-Test**
1 Makes river dirty	19%
2 DW come from	8%
3 Watershed	29%
4 How much Water	7%
5 H2O important to life	7%
6 Water Cycle	7%
7 Protect water	3%
8 Wastewater	2%

Table 2 **School**	**Average %**	**Average % by School**
Bernalillo		
Galvez-Romero (BES)	5%	
		5%
Cielo Azul		
Romero	21%	
Infantino/Lynch	8%	
Lambson	8%	
McCann	26%	
Messenger	16%	
		16%

Colinas del Norte		
Randall	13%	
Farfan	15%	
Vargas	14%	
Torres	11%	
Wiberg	1%	
		11%
Enchanted Hills		
Zukowski	-2%	
Dannenberg	-4%	
Sierz	7%	
Mandich	15%	
Marsh	5%	
Wiebelhaus	17%	
		6%
Ernest Stapleton		
Lowe	16%	
Lautt	11%	
Reichbach	14%	
Rojas/Sanchez	13%	
Marcotte	8%	
Zuniga	5%	
		11%
Maggie Cordova		
Alderson	-12%	
Gabaldon	4%	
Hurlock	7%	
Sidor	1%	
Steiner	15%	
Zirpel	15%	
		5%
Martin Luther King		
DeChristoforo	24%	
Pearson	16%	
Salaz	3%	
		14%
Puesta del Sol		
Langdon/Romero	13%	
Ulibarri	26%	
Straley/Parker	-2%	
Smith	15%	
		13%

Rio Rancho		
Aldaz	17%	
Boldt	3%	
Bailey/Mashour	8%	
Paiz	2%	
		8%
Sandia Vista		
Pichette	9%	
Fox	13%	
Glauvitz/Cook	17%	
Rambaldi	14%	
Valdez	4%	
Wadsworth	12%	
		11%
St. Thomas Aquinas		
Lawton	3%	
Griego	10%	
		6%
Vista Grande		
Grant	15%	
Paternaki/Hernandez	6%	
Gonzales	13%	
Bird	2%	
Walker	25%	
		12%
Increase/Decrease		9%

Table 3

Teacher (School) Question#		**AS PERCENTAGE**	
Galvez-Romero (BES)	Pre %	Post %	Improvement
1 Makes river dirty	38%	46%	8%
2 DW come from	31%	69%	38%
3 Watershed	62%	85%	23%
4 How much Water	69%	62%	-7%
5 H2O important to life	54%	54%	0%
6 Water Cycle	38%	46%	8%
7 Protect water	54%	46%	-8%
8 Wastewater	85%	62%	-23%
Average %	54%	59%	
	Average increase =		5%

Romero (CA)	Pre %	Post %	Improvement
1 Makes river dirty	42%	91%	49%
2 DW come from	68%	100%	32%
3 Watershed	11%	55%	44%
4 How much Water	58%	64%	6%
5 H2O important to life	53%	73%	20%
6 Water Cycle	32%	45%	13%
7 Protect water	74%	91%	17%
8 Wastewater	74%	64%	-10%
Average %	52%	73%	
	Average increase =		21%

Infantino/Lynch (CA)	Pre %	Post %	Improvement
1 Makes river dirty	84%	88%	4%
2 DW come from	60%	76%	16%
3 Watershed	48%	68%	20%
4 How much Water	56%	80%	24%
5 H2O important to life	80%	84%	4%
6 Water Cycle	64%	80%	16%
7 Protect water	88%	88%	0%
8 Wastewater	80%	60%	-20%
Average %	70%	78%	
	Average increase =		8%

Lambson (CA)	Pre %	Post %	Improvement
1 Makes river dirty	80%	96%	16%
2 DW come from	80%	92%	12%
3 Watershed	20%	25%	5%
4 How much Water	64%	75%	11%
5 H2O important to life	88%	88%	0%
6 Water Cycle	88%	79%	-9%
7 Protect water	100%	92%	-8%
8 Wastewater	60%	95%	35%
Average %	73%	80%	
	Average increase =		8%

McCann (CA)	Pre %	Post %	Improvement
1 Makes river dirty	35%	69%	34%
2 DW come from	47%	88%	41%
3 Watershed	41%	75%	34%
4 How much Water	53%	63%	10%
5 H2O important to life	35%	63%	28%
6 Water Cycle	35%	69%	34%
7 Protect water	59%	88%	29%
8 Wastewater	71%	69%	-2%
Average %	47%	73%	
	Average increase =		26%

Messenger (CA)	Pre %	Post %	Improvement
1 Makes river dirty	33%	61%	28%
2 DW come from	83%	83%	0%
3 Watershed	22%	72%	50%
4 How much Water	50%	67%	17%
5 H2O important to life	44%	78%	34%
6 Water Cycle	44%	61%	17%
7 Protect water	89%	89%	0%
8 Wastewater	83%	61%	-22%
Average %	56%	72%	
	Average increase =		16%

Randall (CDN)	Pre %	Post %	Improvement
1 Makes river dirty	74%	82%	8%
2 DW come from	70%	73%	3%
3 Watershed	30%	64%	34%
4 How much Water	83%	100%	17%
5 H2O important to life	74%	82%	8%
6 Water Cycle	30%	59%	29%
7 Protect water	87%	91%	4%
8 Wastewater	70%	68%	-2%
Average %	65%	77%	
	Average increase =		13%

Farfan (CDN)	Pre %	Post %	Improvement
1 Makes river dirty	38%	96%	58%
2 DW come from	75%	71%	-4%
3 Watershed	50%	50%	0%
4 How much Water	54%	63%	9%
5 H2O important to life	63%	83%	20%
6 Water Cycle	33%	50%	17%
7 Protect water	58%	88%	30%
8 Wastewater	79%	67%	-12%
Average %	56%	71%	
	Average increase =		15%

Vargas (CDN)	Pre %	Post %	Improvement
1 Makes river dirty	67%	95%	28%
2 DW come from	62%	89%	27%
3 Watershed	48%	53%	5%
4 How much Water	76%	100%	24%
5 H2O important to life	90%	100%	10%
6 Water Cycle	52%	74%	22%
7 Protect water	100%	100%	0%
8 Wastewater	86%	79%	-7%
Average %	73%	86%	
	Average increase =		14%

Torres (CDN)	Pre %	Post %	Improvement
1 Makes river dirty	27%	73%	46%
2 DW come from	82%	82%	0%
3 Watershed	64%	82%	18%
4 How much Water	64%	68%	4%
5 H2O important to life	36%	64%	28%
6 Water Cycle	32%	27%	-5%
7 Protect water	86%	86%	0%
8 Wastewater	82%	82%	0%
Average %	59%	71%	
	Average increase =		11%

Wiberg (CDN)	Pre %	Post %	Improvement
1 Makes river dirty	45%	50%	5%
2 DW come from	86%	78%	-8%
3 Watershed	59%	72%	13%
4 How much Water	59%	67%	8%
5 H2O important to life	73%	56%	-17%
6 Water Cycle	55%	56%	1%
7 Protect water	77%	78%	1%
8 Wastewater	68%	70%	2%
Average %	65%	66%	
	Average increase =		1%

Zukowski (EH)	Pre %	Post %	Improvement
1 Makes river dirty	89%	78%	-11%
2 DW come from	89%	94%	5%
3 Watershed	39%	72%	33%
4 How much Water	56%	50%	-6%
5 H2O important to life	78%	67%	-11%
6 Water Cycle	89%	67%	-22%
7 Protect water	89%	83%	-6%
8 Wastewater	72%	72%	0%
Average %	75%	73%	
	Average increase =		-2%

Dannenberg (EH)	Pre %	Post %	Improvement
1 Makes river dirty	83%	86%	3%
2 DW come from	91%	86%	-5%
3 Watershed	57%	52%	-5%
4 How much Water	65%	67%	2%
5 H2O important to life	91%	95%	4%
6 Water Cycle	74%	52%	-22%
7 Protect water	96%	95%	-1%
8 Wastewater	96%	86%	-10%
Average %	82%	77%	
	Average increase =		-4%

Sierz (EH)	Pre %	Post %	Improvement
1 Makes river dirty	85%	88%	3%
2 DW come from	81%	88%	7%
3 Watershed	31%	84%	53%
4 How much Water	92%	88%	-4%
5 H2O important to life	92%	96%	4%
6 Water Cycle	85%	96%	11%
7 Protect water	100%	92%	-8%
8 Wastewater	96%	84%	-12%
Average %	83%	90%	
	Average increase =		7%

Mandich (EH)	Pre %	Post %	Improvement
1 Makes river dirty	61%	78%	17%
2 DW come from	65%	78%	13%
3 Watershed	22%	61%	39%
4 How much Water	61%	65%	4%
5 H2O important to life	78%	87%	9%
6 Water Cycle	61%	83%	22%
7 Protect water	91%	96%	5%
8 Wastewater	74%	87%	13%
Average %	64%	79%	
	Average increase =		15%

Marsh (EH)	Pre %	Post %	Improvement
1 Makes river dirty	50%	67%	17%
2 DW come from	78%	90%	12%
3 Watershed	17%	19%	2%
4 How much Water	61%	57%	-4%
5 H2O important to life	44%	62%	18%
6 Water Cycle	56%	52%	-4%
7 Protect water	56%	67%	11%
8 Wastewater	67%	57%	-10%
Average %	54%	59%	
	Average increase =		5%

Wiebelhaus (EH)	Pre %	Post %	Improvement
1 Makes river dirty	82%	95%	13%
2 DW come from	59%	91%	32%
3 Watershed	18%	91%	73%
4 How much Water	82%	100%	18%
5 H2O important to life	82%	82%	0%
6 Water Cycle	77%	82%	5%
7 Protect water	95%	100%	5%
8 Wastewater	91%	77%	-14%
Average %	73%	90%	
	Average increase =		17%

Lowe (ES)	Pre %	Post %	Improvement
1 Makes river dirty	55%	68%	13%
2 DW come from	80%	84%	4%
3 Watershed	40%	53%	13%
4 How much Water	60%	79%	19%
5 H2O important to life	60%	79%	19%
6 Water Cycle	60%	84%	24%
7 Protect water	90%	89%	-1%
8 Wastewater	55%	89%	34%
Average %	63%	78%	
	Average increase =		16%

Lautt (ES)	Pre %	Post %	Improvement
1 Makes river dirty	59%	89%	30%
2 DW come from	82%	94%	12%
3 Watershed	47%	61%	14%
4 How much Water	76%	67%	-9%
5 H2O important to life	41%	39%	-2%
6 Water Cycle	53%	50%	-3%
7 Protect water	59%	83%	24%
8 Wastewater	47%	67%	20%
Average %	58%	69%	
	Average increase =		11%

Reichbach (ES)	Pre %	Post %	Improvement
1 Makes river dirty	65%	91%	26%
2 DW come from	78%	86%	8%
3 Watershed	30%	82%	52%
4 How much Water	74%	73%	-1%
5 H2O important to life	61%	82%	21%
6 Water Cycle	96%	95%	-1%
7 Protect water	96%	95%	-1%
8 Wastewater	78%	86%	8%
Average %	72%	86%	
	Average increase =		14%

Rojas / Sanchez (ES)	Pre %	Post %	Improvement
1 Makes river dirty	26%	80%	54%
2 DW come from	68%	85%	17%
3 Watershed	53%	70%	17%
4 How much Water	79%	60%	-19%
5 H2O important to life	58%	65%	7%
6 Water Cycle	68%	60%	-8%
7 Protect water	74%	100%	26%
8 Wastewater	68%	75%	7%
Average %	62%	74%	
	Average increase =		13%

Marcotte (ES)	Pre %	Post %	Improvement
1 Makes river dirty	48%	68%	20%
2 DW come from	65%	60%	-5%
3 Watershed	48%	52%	4%
4 How much Water	74%	64%	-10%
5 H2O important to life	61%	72%	11%
6 Water Cycle	48%	84%	36%
7 Protect water	91%	96%	5%
8 Wastewater	61%	64%	3%
Average %	62%	70%	
	Average increase =		8%

Zuniga (ES)	Pre %	Post %	Improvement
1 Makes river dirty	57%	63%	6%
2 DW come from	74%	84%	10%
3 Watershed	30%	68%	38%
4 How much Water	78%	74%	-4%
5 H2O important to life	70%	68%	-2%
6 Water Cycle	61%	74%	13%
7 Protect water	96%	89%	-7%
8 Wastewater	87%	74%	-13%
Average %	69%	74%	
	Average increase =		5%

Alderson (MC)	Pre %	Post %	Improvement
1 Makes river dirty	45%	88%	43%
2 DW come from	85%	25%	-60%
3 Watershed	30%	50%	20%
4 How much Water	50%	13%	-37%
5 H2O important to life	75%	94%	19%
6 Water Cycle	65%	44%	-21%
7 Protect water	95%	56%	-39%
8 Wastewater	65%	44%	-21%
Average %	64%	52%	
	Average increase =		-12%

Gabaldon (MC)	Pre %	Post %	Improvement
1 Makes river dirty	72%	75%	3%
2 DW come from	64%	63%	-1%
3 Watershed	36%	42%	6%
4 How much Water	80%	42%	-38%
5 H2O important to life	52%	71%	19%
6 Water Cycle	20%	17%	-3%
7 Protect water	80%	92%	12%
8 Wastewater	60%	92%	32%
Average %	58%	62%	
	Average increase =		4%

Hurlock (MC)	Pre %	Post %	Improvement
1 Makes river dirty	57%	67%	10%
2 DW come from	67%	71%	4%
3 Watershed	29%	52%	23%
4 How much Water	57%	67%	10%
5 H2O important to life	57%	67%	10%
6 Water Cycle	57%	38%	-19%
7 Protect water	67%	86%	19%
8 Wastewater	57%	57%	0%
Average %	56%	63%	
	Average increase =		7%

Sidor (MC)	Pre %	Post %	Improvement
1 Makes river dirty	52%	65%	13%
2 DW come from	65%	75%	10%
3 Watershed	48%	70%	22%
4 How much Water	74%	55%	-19%
5 H2O important to life	61%	70%	9%
6 Water Cycle	52%	45%	-7%
7 Protect water	100%	80%	-20%
8 Wastewater	74%	75%	1%
Average %	66%	67%	
	Average increase =		1%

Steiner (MC)	Pre %	Post %	Improvement
1 Makes river dirty	58%	56%	-2%
2 DW come from	74%	94%	20%
3 Watershed	42%	72%	30%
4 How much Water	53%	89%	36%
5 H2O important to life	63%	67%	4%
6 Water Cycle	53%	72%	19%
7 Protect water	100%	100%	0%
8 Wastewater	58%	72%	14%
Average %	63%	78%	
	Average increase =		15%

Zirpel (MC)	Pre %	Post %	Improvement
1 Makes river dirty	32%	48%	16%
2 DW come from	63%	71%	8%
3 Watershed	42%	71%	29%
4 How much Water	53%	81%	28%
5 H2O important to life	47%	62%	15%
6 Water Cycle	47%	62%	15%
7 Protect water	79%	81%	2%
8 Wastewater	58%	67%	9%
Average %	53%		
	Average increase =		15%

DeCristoforo (MLK)	Pre %	Post %	Improvement
1 Makes river dirty	100%	100%	0%
2 DW come from	75%	100%	25%
3 Watershed	31%	100%	69%
4 How much Water	31%	100%	69%
5 H2O important to life	94%	100%	6%
6 Water Cycle	100%	100%	0%
7 Protect water	94%	100%	6%
8 Wastewater	81%	100%	19%
Average %	76%	100%	
	Average increase =		24%

Pearson (MLK)	Pre %	Post %	Improvement
1 Makes river dirty	44%	80%	36%
2 DW come from	76%	72%	-4%
3 Watershed	12%	56%	44%
4 How much Water	72%	80%	8%
5 H2O important to life	72%	84%	12%
6 Water Cycle	76%	96%	20%
7 Protect water	96%	96%	0%
8 Wastewater	76%	84%	8%
Average %	66%	81%	
	Average increase =		16%

Salaz (MLK)	Pre %	Post %	Improvement
1 Makes river dirty	83%	88%	5%
2 DW come from	91%	92%	1%
3 Watershed	35%	28%	-7%
4 How much Water	91%	84%	-7%
5 H2O important to life	74%	92%	18%
6 Water Cycle	57%	80%	23%
7 Protect water	91%	88%	-3%
8 Wastewater	78%	72%	-6%
Average %	75%	78%	
	Average increase =		3%

Langdon/Romero (PDS)	Pre %	Post %	Improvement
1 Makes river dirty	35%	76%	41%
2 DW come from	57%	80%	23%
3 Watershed	43%	68%	25%
4 How much Water	48%	48%	0%
5 H2O important to life	74%	68%	-6%
6 Water Cycle	74%	80%	6%
7 Protect water	91%	96%	5%
8 Wastewater	70%	80%	10%
Average %	62%	75%	
	Average increase =		13%

Ulibarri (PDS)	Pre %	Post %	Improvement
1 Makes river dirty	32%	73%	41%
2 DW come from	77%	82%	5%
3 Watershed	23%	64%	41%
4 How much Water	68%	82%	14%
5 H2O important to life	32%	82%	50%
6 Water Cycle	59%	82%	23%
7 Protect water	77%	100%	23%
8 Wastewater	64%	77%	13%
Average %	54%	80%	
	Average increase =		26%

Straley/Parker (PDS)	Pre %	Post %	Improvement
1 Makes river dirty	89%	88%	-1%
2 DW come from	89%	71%	-18%
3 Watershed	16%	35%	19%
4 How much Water	74%	82%	8%
5 H2O important to life	89%	76%	-13%
6 Water Cycle	63%	59%	-4%
7 Protect water	100%	94%	-6%
8 Wastewater	95%	94%	-1%
Average %	77%	75%	
	Average increase =		-2%

Smith (PDS)	Pre %	Post %	Improvement
1 Makes river dirty	60%	84%	24%
2 DW come from	55%	84%	29%
3 Watershed	40%	53%	13%
4 How much Water	45%	42%	-3%
5 H2O important to life	70%	84%	14%
6 Water Cycle	45%	47%	2%
7 Protect water	80%	89%	9%
8 Wastewater	55%	84%	29%
Average %	56%	71%	
	Average increase =		15%

Aldaz (RR)	Pre %	Post %	Improvement
1 Makes river dirty	40%	88%	48%
2 DW come from	64%	80%	16%
3 Watershed	32%	80%	48%
4 How much Water	56%	52%	-4%
5 H2O important to life	60%	80%	20%
6 Water Cycle	52%	32%	-20%
7 Protect water	92%	100%	8%
8 Wastewater	40%	60%	20%
Average %	55%	72%	
	Average increase =		17%

Boldt (RR)	Pre %	Post %	Improvement
1 Makes river dirty	65%	78%	13%
2 DW come from	55%	67%	12%
3 Watershed	20%	61%	41%
4 How much Water	45%	33%	-12%
5 H2O important to life	75%	72%	-3%
6 Water Cycle	45%	50%	5%
7 Protect water	85%	78%	-7%
8 Wastewater	90%	61%	-29%
Average %	60%	63%	
	Average increase =		3%

Bailey/Mashour (RR)	Pre %	Post %	Improvement
1 Makes river dirty	56%	59%	3%
2 DW come from	84%	82%	-2%
3 Watershed	24%	68%	44%
4 How much Water	38%	59%	21%
5 H2O important to life	68%	59%	-9%
6 Water Cycle	40%	59%	19%
7 Protect water	76%	86%	10%
8 Wastewater	84%	64%	-20%
Average %	59%	67%	
	Average increase =		8%

Paiz (RR)	Pre %	Post %	Improvement
1 Makes river dirty	53%	61%	8%
2 DW come from	74%	83%	9%
3 Watershed	16%	26%	10%
4 How much Water	63%	57%	-6%
5 H2O important to life	79%	78%	-1%
6 Water Cycle	68%	57%	-11%
7 Protect water	84%	91%	7%
8 Wastewater	89%	91%	2%
Average %	66%	68%	
	Average increase =		2%

Pichette (SV)	Pre %	Post %	Improvement
1 Makes river dirty	61%	81%	20%
2 DW come from	52%	71%	19%
3 Watershed	57%	57%	0%
4 How much Water	91%	81%	-10%
5 H2O important to life	43%	71%	28%
6 Water Cycle	61%	57%	-4%
7 Protect water	83%	95%	12%
8 Wastewater	78%	81%	3%
Average %	66%	74%	
	Average increase =		9%

Fox (SV)	Pre %	Post %	Improvement
1 Makes river dirty	75%	100%	25%
2 DW come from	90%	84%	-6%
3 Watershed	50%	95%	45%
4 How much Water	65%	95%	30%
5 H2O important to life	95%	95%	0%
6 Water Cycle	95%	95%	0%
7 Protect water	95%	100%	5%
8 Wastewater	85%	89%	4%
Average %	81%	94%	
	Average increase =		13%

Glauvitz/Cook (SV)	Pre %	Post %	Improvement
1 Makes river dirty	68%	89%	21%
2 DW come from	95%	95%	0%
3 Watershed	37%	89%	52%
4 How much Water	47%	95%	48%
5 H2O important to life	84%	89%	5%
6 Water Cycle	68%	79%	11%
7 Protect water	95%	95%	0%
8 Wastewater	84%	84%	0%
Average %	72%	89%	
	Average increase =		17%

Rambaldi (SV)	Pre %	Post %	Improvement
1 Makes river dirty	61%	75%	14%
2 DW come from	78%	75%	-3%
3 Watershed	39%	60%	21%
4 How much Water	48%	55%	7%
5 H2O important to life	70%	75%	5%
6 Water Cycle	39%	60%	21%
7 Protect water	61%	80%	19%
8 Wastewater	70%	100%	30%
Average %	58%	73%	
	Average increase =		14%

Valdez (SV)	Pre %	Post %	Improvement
1 Makes river dirty	90%	100%	10%
2 DW come from	76%	90%	14%
3 Watershed	57%	67%	10%
4 How much Water	81%	76%	-5%
5 H2O important to life	100%	95%	-5%
6 Water Cycle	90%	90%	0%
7 Protect water	100%	100%	0%
8 Wastewater	62%	67%	5%
Average %	82%		
	Average increase =		4%

Wadsworth (SV)	Pre %	Post %	Improvement
1 Makes river dirty	61%	87%	26%
2 DW come from	52%	78%	26%
3 Watershed	43%	65%	22%
4 How much Water	70%	83%	13%
5 H2O important to life	96%	91%	-5%
6 Water Cycle	70%	87%	17%
7 Protect water	87%	96%	9%
8 Wastewater	83%	74%	-9%
Average %	70%	83%	
	Average increase =		12%

Lawton (ST)	Pre %	Post %	Improvement
1 Makes river dirty	75%	100%	25%
2 DW come from	85%	95%	10%
3 Watershed	25%	40%	15%
4 How much Water	65%	70%	5%
5 H2O important to life	90%	85%	-5%
6 Water Cycle	80%	85%	5%
7 Protect water	100%	85%	-15%
8 Wastewater	90%	70%	-20%
Average %	76%	79%	
	Average increase =		3%

Griego (ST)	Pre %	Post %	Improvement
1 Makes river dirty	58%	89%	31%
2 DW come from	63%	78%	15%
3 Watershed	32%	83%	51%
4 How much Water	84%	94%	10%
5 H2O important to life	79%	72%	-7%
6 Water Cycle	95%	100%	5%
7 Protect water	100%	94%	-6%
8 Wastewater	74%	56%	-18%
Average %	73%	83%	
	Average increase =		10%

Grant (VG)	Pre %	Post %	Improvement
1 Makes river dirty	35%	56%	21%
2 DW come from	77%	56%	-21%
3 Watershed	19%	64%	45%
4 How much Water	58%	72%	14%
5 H2O important to life	58%	52%	-6%
6 Water Cycle	19%	56%	37%
7 Protect water	69%	80%	11%
8 Wastewater	46%	68%	22%
Average %	48%	63%	
	Average increase =		15%

Paternaki/Hernandez (VG)	Pre %	Post %	Improvement
1 Makes river dirty	52%	87%	35%
2 DW come from	62%	70%	8%
3 Watershed	33%	61%	28%
4 How much Water	43%	61%	18%
5 H2O important to life	71%	70%	-1%
6 Water Cycle	71%	39%	-32%
7 Protect water	95%	83%	-12%
8 Wastewater	71%	78%	7%
Average %	62%	69%	
	Average increase =		6%

Gonzales (VG)	Pre %	Post %	Improvement
1 Makes river dirty	68%	89%	21%
2 DW come from	73%	78%	5%
3 Watershed	27%	89%	62%
4 How much Water	86%	96%	10%
5 H2O important to life	91%	81%	-10%
6 Water Cycle	55%	56%	1%
7 Protect water	91%	81%	-10%
8 Wastewater	64%	89%	25%
Average %	69%	82%	
	Average increase =		13%

Bird (VG)	Pre %	Post %	Improvement
1 Makes river dirty	60%	44%	-16%
2 DW come from	64%	78%	14%
3 Watershed	24%	56%	32%
4 How much Water	72%	78%	6%
5 H2O important to life	72%	50%	-22%
6 Water Cycle	44%	50%	6%
7 Protect water	80%	72%	-8%
8 Wastewater	60%	67%	7%
Average %	60%	62%	
	Average increase =		2%

Walker (VG)	Pre %	Post %	Improvement
1 Makes river dirty	59%	59%	0%
2 DW come from	74%	81%	7%
3 Watershed	11%	85%	74%
4 How much Water	63%	85%	22%
5 H2O important to life	56%	70%	14%
6 Water Cycle	41%	81%	40%
7 Protect water	78%	96%	18%
8 Wastewater	63%	85%	22%
Average %	56%	80%	
	Average increase =		25%

Exhibit 8
Diverted Waste and Material Reuse

City of Albuquerque

FY19 Total HHW (lbs) Diverted from Landfill

Calandar Year	Month	Recycled Waste														Sent for Destruction						
		Reuse Center	RC0014 Waste Oil	RC5056 Motor Fluids	RC0016 Lead Acid Batteries	RC6006 Mercury	ACT15687 Household Paint, xylene, tolulene etc	RC0011 Aerosols	RC7485 Alkaline Batteries	RC7486 Lithium Batteries	RC6254 NiCad Batteries	ACT46232 Compact Bulbs, CFL	ACT46233 HID Lamps	ACT46235 4 Foot Lamps	RC7658 8 Foot Lamps	RC0012 Acids	RC0013 Bases	RC0015 Flamables Toxics Incenerated	RC6002 Toxic-Solid (Poisons)	RC7182 Oxidizers	Misc*	TOTAL
2018	Jul	3,390	13,934	13,468	0	0	0	3,412	1,795	0	305	514	0	291	0	339	181	875	869	0	0	39,373
	Aug	3,906	15,751	13,259	0	26	790	2,446	1,774	193	0	135	0	1,197	0	525	194	1,004	854	0	0	42,054
	Sep	2,814	10,688	17,241	3,276	0	0	2,440	425	0	468	335	0	306	0	665	190	481	399	0	0	39,728
	Oct	2,706	7,689	10,341	3,366	0	0	1,629	767	0	0	192	0	594	0	204	255	1,711	364	0	0	29,818
	Nov	1,956	14,016	14,900	1,200	0	0	1,651	840	176	244	216	0	313	465	355	110	449	140	0	301	37,332
	Dec	1,506	4,149	6,393	0	0	0	848	422	0	0	232	0	0	138	391	0	353	291	0	0	14,723
MID YEAR		16,278	66,227	75,602	7,842	26	790	12,426	6,023	369	1,017	1,624	0	2,701	603	2,479	930	4,873	2,917	0	301	203,028
2019	Jan	786	7,360	9,600	0	30	1,111	1,703	0	0	0	216	0	700	133	268	337	1,142	189	446	0	24,021
	Feb	1,866	11,740	15,460	0	0	904	1,404	451	0	0	341	0	372	88	458	0	488	411	139	755	34,877
	Mar	444	6,959	10,279	0	0	0	1,577	780	231	0	669	0	793	131	186	0	909	162	0	0	23,120
	Apr	1,782	12,623	11,288	1,187	0	1,800	1,761	889	30	0	605	0	472	160	445	499	681	448	0		34,670
	May	3,120	12,664	12,294	1,442	0	2,363	2,666	886	222	304	242	0	532	148	732	182	952	614	0	301	39,664
	Jun	8,340	16,410	12,384	0	0	1,074	1,633	861	151	0	241	0	554	169	479	195	1,243	655	0		44,389
TOTAL (lbs)		32,616	133,983	146,907	10,471	56	8,042	23,170	9,890	1,003	1,321	3,938	0	6,124	1,432	5,047	2,143	10,288	5,396	585	1,357	403,769

* Misc = Compact Bulbs, 4 ft lamps, Ballast, PCB Capacitors, Carbides, Phosphides, Fertilizers, CO2 Cylinders, etc...

TOTAL	403,769
TOTAL Recycled Waste	332,075
% Recycled	82.2%

PO Amount:	$1,000,500.00
Paid Amount:	$841,434.25
Amount left on PO:	$159,065.75

PO# DSW0016901

* Information on this report is gathered from the Reuse forms sent by mail from ACT and the breakdown of items processed list sent by email monthly by Nicole Gwash (NGwash@ACTEnviro.com). These weights are all in pounds and will be totaled and converted to tons as you enter the information. Use the tons recycled number on the Diversion report on the Recycled HHW line.

City of Albuquerque

MATERIAL REUSE CENTER				
Month	Partcipants	Containers	Pounds	Savings
Jul-18	102	565	3,390	$3,390
Aug-18	111	651	3,906	$3,906
Sep-18	74	469	2,814	$2,814
Oct-18	76	451	2,706	$2,706
Nov-18	61	326	1,956	$1,956
Dec-18	24	251	1,506	$1,506
Mid-year Subtotal	448	2,713	16,278	$16,278
Jan-19	24	131	786	$786
Feb-19	59	311	1,866	$1,866
Mar-19	10	74	444	$444
Apr-19	104	297	1,782	$1,782
May-19	235	520	3,120	$3,120
Jun-19	110	1390	8,340	$8,340
Total FY18	990	5,436	32,616	$32,616

Pounds = number of containers x 6 lbs/container

*count out the participation forms that are mailed to us by ACT and enter that number under participants and then all up all items taken from the program. Enter that number under the containers section. The pounds and savings will auto-populate based on a formula of each item being on average 6 lbs. If ACT requests more forms, talk to Mila Romero at the Edith Yards.

Bernalillo County

Household Hazardous Waste Collection Participation

July 2018- June 2019

Month	Participants w/Unknown Location or Not Enough Info to Geocode	Total	Orphaned waste at facility	City Participants (City + No Match or Not Enough Info)	County Participants	Out of County	Out of County Breakdown	County Percentage	Monthly Cost	Light Bulbs (included in monthly cost)	HW/ER Included in Monthly cost	Total Cummulative Cost
Jul-18	108	1352	1	1155	188	9	Sandoval- 9	13.9%	$88,830.25	$950.25	$0.00	$88,830.25
Aug-18	79	1256	0	1070	175	11	Sandoval-11	13.9%	$82,541.50	$901.50	$0.00	$82,541.50
Sep-18	37	977	0	794	179	4	Cibola-1 Sandoval-2 Santa Fe-1	18.3%	$64,386.25	$881.25	$0.00	$64,386.25
Oct-18	41	1020	4	836	183	1	Sandoval - 1	17.9%	$67,248.25	$947.75	$0.00	$67,248.25
Nov-18	60	858	6	730	126	2	Sandoval-2	14.7%	$56,926.50	$1,156.50	$0.00	$56,926.50
Dec-18	41	531	4	463	67	1	Sandoval-11	12.6%	$35,311.75	$796.75	$0.00	$35,311.75
Jul-Dec 2018	**366**	5994	**15**	**5,048**	**918**	**28**		15.3%	**$ 395,244.50**	**$5,634.00**	$0.00	$395,244.50
Jan-19	45	768	2	655	113	0		14.7%	$50,977.00	$1,057	$0.00	$50,977.00
Feb-19	27	749	0	630	115	4	Sandoval-2 SantaFe-1 Taos-1	15.4%	$49,599.00	$914	$0.00	$49,599.00
Mar-19	53	1180	2	989	185	6	Sandoval-5 Valencia-1	15.7%	$77,614.50	$915	$0.00	$77,614.50
Apr-19	50	1088	0	903	180	5	Sandoval- 5	16.5%	$71,719.25	$999	$0.00	$71,719.25
May-19	109	1452	0	1250	195	7	Sandoval - 5 Soccorro-1 valencia-1	13.4%	$96,012.75	$1,633	$0.00	$96,012.75
Jun-19	94	1522	0	1,324	189	9	Sandoval- 9	12.4%	$100,267.25	$1,337	$0.00	$100,267.25
Jan-Jun 2019	**378**	**6,759**	**4**	**5,751**	**977**	**31**		14.5%	**$446,189.75**	**$6,855**	**0.00**	**$446,189.75**
FY19 Total	**744**	**12,753**	**19**	**10,799**	**1,895**	**59**		**14.9%**	**$841,434.25**	**$12,489**	**0.00**	**$841,434.25**
				Participant Total (other than orphaned)			**12,753**			**$12,489**		

Monthly Average	**1062.75**

Participant Fee	$ 65.00

FY19 Budget	**$ 540,000.00**
Remaining Balance	**$ (301,434.25)**

	Participants	Percentage	Cost
BERNCO Participation to date	1,895	14.9%	$123,175
Unknown or Not Enough Info to Geocode (costs absorbed by COA)	744	5.83%	$48,360

Email Daniele Berardelli, Jake Daugherty, Debra Kelley and Steve Falk if we need to adjust POR amount before the end of the fiscal year.

* All information in this report comes from ACT - Nichole Gwash (NGwash@ACTEnviro.com) by email. She will send an invoice, a list of residents (which must then be sent to Ben Sanborn for geocoding), a list of items processed, and any logs for drums and light bulbs & tubes.

Use the invoice from ACT emailed by Nicole Gwash to fill in the Monthly Costs and Lught Bulbs section. Use the geocoded (by Ben Sanborn) resident list to fill in the participant information. Ben will add a sheet with totals, but go back and search for the :abandoned" items to add to the report. add the number of resients that did not have enough information to the COA total but also list them separate so we can track them.

Exhibit 9
Nature Conservancy 2018-2019

New Mexico
212 East Marcy, Suite 200
Santa Fe, New Mexico 87501

Tel (505) 988-3867 nature.org/new mexico
Fax (505) 988-4095

The Nature Conservancy in New Mexico
Urban Conservation Educational Programs
Final Report to the City of Albuquerque: June 2019

In 2019, The Nature Conservancy engaged communities throughout the Albuquerque area, including several under-resourced neighborhoods, with education/awareness programs focused on stormwater pollution that highlight nature-based solutions. Our education programs reached both adults and youth with hands-on, outdoor learning activities about stormwater impacts on the Rio Grande, how Albuquerque residents can reduce stormwater pollution, and the role of infiltration and the use of trees and other vegetation to clean our air and water. We reached approximately 625 youth and 1,225 adults directly with our water messages and additional community members through earned media from articles featured in the Albuquerque Journal and other tv and radio news outlets.

Youth Education Programs:
Throughout the year we engaged kids and young adults ranging from elementary aged children to age 24. Activities included installing rain barrels, building rain gardens, making native seed bombs, tree planting and participating in other conservation educational events. In partnership with a local elementary school we installed 750 gallons of rainwater storage at Eugene Fields Elementary to support their existing garden space and expand the gardening space to accommodate greater student participation. Additionally, we worked with a girl scout troop to install a rain garden to accompany rain barrels at a local community center. Finally, we engaged a high school class over several lectures, site visits and build day activities to install a large rain garden on campus where flooding in a central plaza was a problem turned into a resource.

For the second year in a row, we participated in the environmental day at Sandia Lakes where 138 special-needs students and their families (30 adults) built seed bombs, learned about how stormwater impacts our waterways and enjoyed catching fish. Students were primarily from Albuquerque Sign Language Academy, and special-education students from various schools throughout Albuquerque Public Schools (APS) system. Participants, both youth and adults, participated in similar hands-on activities and watershed based educational curriculum. Topics included stormwater management, water quality, watershed connections, the importance of forests and mountains as water towers, drinking water sources, impacts of drought, and ecological consequences of river management.

The Nature Conservancy
Protecting nature. Preserving life.™

New Mexico
212 East Marcy, Suite 200
Santa Fe, New Mexico 87501

Tel (505) 988-3867 nature.org/new mexico
Fax (505) 988-4095

We have also engaged eight Rocky Mountain Youth Corp members, ages 17-25, in activities to learn about trees and how stormwater could serve as an asset to building a more robust tree canopy in Albuquerque. Crew members assisted with taking an inventory of and assessing the health of trees in city parks and street trees to help us understand where the gaps in tree canopy are, which trees do the best in our urban setting and identifying locations where stormwater could benefit street trees. Additionally, we participated in UNM Geography Day, guest lectured at UNM transportation engineering class, the Cibola Youth Advisory Council, the City of Albuquerque's Bosque crew, a fall Garden Party at Coronado Elementary school, and Build your Refuge Day at Valle de Oro National Wildlife Refuge. These activities help us reach new audiences and engage students of all ages in stormwater management learning events.

Adult Education Programs:
Over the course of the engagement with the City of Albuquerque, we installed more than 4,000 gallons of rainwater storage at various locations including schools, community centers, community gardens and other public spaces. We also provided talks and presentations to community groups such as the Civitan Group, Kiwanis Club, South San Pedro Neighborhood Association, International District Healthy Communities Coalition, and the Los Jardines Community Garden. Additionally, we tabled at larger event such as South Valley Pride day, Environmental Justice Day and sponsored the City Nature Challenge, including hosting an event and reaching our members with partner events.

To reach a more professional audience we also presented at the UNM Paving Conference, the Land and Water Summit, and the EPA region 6 stormwater conference. Collectively participating in these community-based and professional events allowed us to reach more than 1,225 people with the message of water conservation and stormwater management approaches that will benefit the Rio Grande and help people understand what role they play in helping to keep the river clean.

Tijeras Creek is an important tributary of the Rio Grande and with its recent TMDL limits, it is an area of active restoration. The Conservancy has continued to participate in this Watershed Collaborative, which is addressing all parts of the watershed from high in the Sandias to the river. Projects such as the Cedro Restoration Project at the Cedro Creek headwaters and the Rocky Mountain Youth Corp project, funded by the Rio Grande Water Fund, which is restoring 3-4 miles of Cedro Creek, will improve conditions to reduce erosion, improve water infiltration and potentially reduce the flow of contaminants into the City's

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jurisdiction.

Finally, we have engaged with two local experts to develop a plant list of trees and shrubs that are suitable for five elevational transects crossing the city. These selected species account for drought tolerance, water requirements, temperature limits, invasiveness, wildlife habitat and other attributes that make them good selections for our arid City.

Marketing and Communications:
During the time of the Conservancy's contract with the city, we disseminated press releases and media advisories about urban conservation outreach activities. We also produced a "benefits of trees and rainwater harvesting" postcards, an urban program annual report and a conservation handout that highlights our work with the City of Albuquerque. These collateral pieces are utilized at tabling events and distributed to residents during educational activities and identify the City of Albuquerque as a funder of this work.

During the time of our contract with the City, the program received 22 mentions reaching 16.8 million online and another 231,000 via video broadcast. The coverage is valued at $32,000.

We also featured the urban conservation activities via Facebook, our Great Places E-newsletter (reaching 3,000 individuals), and via Nature.Org/Newmexico as highlighted below.

Facebook: July 2018 – June 2019

- 35 posts
- 9,288 people reached
- 9,741 impressions
- 654 people engaged

Great Places E-Newlsetter: July 2018 – June 2019

- 5 GPN stories
- 61 clickthroughs
- Average reach: 2,600 recipients

Nature.org July 2019 – June 2019

- Two web pages
  - Page 1
    - https://www.nature.org/en-us/about-us/where-we-work/united-states/new-mexico/stories-in-new-mexico/creative-conservation-in-albuquerque/
    - Views: 948
  - Page 2
    - https://www.nature.org/en-us/about-us/where-we-work/united-states/new-mexico/stories-in-new-mexico/new-mexico-nature-in-the-city/
    - Views: 245

This attachment is available in digital format on the Bernalillo County Public Works website:

https://www.bernco.gov/public-works/epa-regulation-of-stormwater-in-bernalillo-county.aspx

Attachment 5

CMC Discharge Monitoring Reports (DMRs)

CMC FY 2019 Certified netDMR

Permit ID	Facility	Permitted Feature	Discharge #	Discharge Description	Monitoring Period End Date	Scheduled / Unscheduled	DMR Due Date	Status	COR Received Date
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	001	001-D	RIO GRANDE (NORTH) - DRY SEASON	06/30/20	Scheduled	12/01/20	Ready for Data Entry	
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-D	RIO GRANDE (SOUTH) - DRY SEASON	06/30/20	Scheduled	12/01/20	Ready for Data Entry	
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	001	001-D	RIO GRANDE (NORTH) - DRY SEASON	06/30/19	Scheduled	12/01/19	Completed	11/07/19
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-D	RIO GRANDE (SOUTH) - DRY SEASON	06/30/19	Scheduled	12/01/19	Completed	11/07/19
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	001	001-D	RIO GRANDE (NORTH) - DRY SEASON	06/30/18	Scheduled	12/01/18	Completed	12/17/18 12/01/18
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-D	RIO GRANDE (SOUTH) - DRY SEASON	06/30/18	Scheduled	12/01/18	Completed	12/17/18 12/01/18
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	001	001-W	RIO GRANDE (NORTH) - WET SEASON	10/31/17	Scheduled	12/01/18	Completed	10/05/18
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	001	001-WA	RIO GRANDE (NORTH) - WET SEASON	10/31/17	Scheduled	12/01/18	Completed	10/05/18
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	001	001-WB	RIO GRANDE (NORTH) - WET SEASON	10/31/17	Scheduled	12/01/18	Completed - Cannot Be Corrected	12/01/18
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-W	RIO GRANDE (SOUTH) - WET SEASON	10/31/17	Scheduled	12/01/18	Completed	10/05/18
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-WA	RIO GRANDE (SOUTH) - WET SEASON	10/31/17	Scheduled	12/01/18	Completed	10/05/18
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-WB	RIO GRANDE (SOUTH) - WET SEASON	10/31/17	Scheduled	12/01/18	Completed - Cannot Be Corrected	12/01/18
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	001	001-D	RIO GRANDE (NORTH) - DRY SEASON	06/30/17	Scheduled	12/01/17	Completed	11/29/17
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	001	001-DA	RIO GRANDE (NORTH) - DRY SEASON	06/30/17	Scheduled	12/01/17	Completed	11/29/17
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	001	001-DB	RIO GRANDE (NORTH) - DRY SEASON	06/30/17	Scheduled	12/01/17	Completed	11/29/17
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-D	RIO GRANDE (SOUTH) - DRY SEASON	06/30/17	Scheduled	12/01/17	Completed	11/29/17
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-DA	RIO GRANDE (SOUTH) - DRY SEASON	06/30/17	Scheduled	12/01/17	Completed	11/29/17
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-DB	RIO GRANDE (SOUTH) - DRY SEASON	06/30/17	Scheduled	12/01/17	Completed	11/29/17
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	001	001-W	RIO GRANDE (NORTH) - WET SEASON	10/31/16	Scheduled	12/01/17	Completed	11/29/17
NMR04A016		001	001-WA		10/31/16	Scheduled	12/01/17	Completed	11/29/17

Permit ID	Facility	Permitted Feature	Discharge #	Discharge Description	Monitoring Period End Date	Scheduled / Unscheduled	DMR Due Date	Status	COR Received Date
	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)			RIO GRANDE (NORTH) - WET SEASON					
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	001	001-WB	RIO GRANDE (NORTH) - WET SEASON	10/31/16	Scheduled	12/01/17	Completed	11/29/17
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-W	RIO GRANDE (SOUTH) - WET SEASON	10/31/16	Scheduled	12/01/17	Completed	11/29/17
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-WA	RIO GRANDE (SOUTH) - WET SEASON	10/31/16	Scheduled	12/01/17	Completed	11/29/17
NMR04A016	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)	002	002-WB	RIO GRANDE (SOUTH) - WET SEASON	10/31/16	Scheduled	12/01/17	Completed	11/29/17

©2008 NetDMR

DMR Copy of Record

Permit

Permit #:	**NMR04A016**	**Permittee:**	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY (AMAFCA)	**Facility:**	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)
Major:	No	**Permittee Address:**	2600 PROSPECT AVENUE NE ALBUQUERQUE, NM 87107	**Facility Location:**	2600 PROSPECT AVENUE NE ALBUQUERQUE, NM 87107
Permitted Feature:	001 External Outfall	**Discharge:**	**001-D** RIO GRANDE (NORTH) - DRY SEASON		

Report Dates & Status

Monitoring Period:	**From 11/01/18 to 06/30/19**	**DMR Due Date:**	**12/01/19**	**Status:**	**NetDMR Validated**

Considerations for Form Completion

SEASONAL MONITORING PERIODS ARE: WET SEASON = JULY 1-OCT. 31 & DRY SEASON = NOV. 1-JUNE 30. SEPARATE DMRS REQUIRED FOR EACH SEASON. DMRS TO BE SUBMITTED DUE DEC. 1ST, FOLLOWING END OF MONIT. PERIOD. PERMIT REQUIRES A MIN. OF 7 EVENTS PER LOC. PER PERMIT TERM (3 WET SEASON, 2 DRY SEASON & 2 PERMITTEE'S CHOICE).

Principal Executive Officer

First Name:	Jerry	**Title:**	Executive Engineer	**Telephone:**	505-884-2215
Last Name:	Lovato				

No Data Indicator (NODI)

Form NODI: --

Parameter		Monitoring Location	Season #	Param. NODI		Quantity or Loading					Quality or Concentration							# of Ex.	Frequency of Analysis	Sample Type
Code	Name					Qualifier 1	Value 1	Qualifier 2	Value 2	Units	Qualifier 1	Value 1	Qualifier 2	Value 2	Qualifier 3	Value 3	Units			
00010	Temperature, water deg. centigrade	1 - Effluent Gross	0	--	Sample						=	6.83	=	6.83	=	6.83	04 - deg C		02/PT - Twice Per Permit Term	GR - GRAB
					Permit Req.							Req Mon DAILY MN		Req Mon DAILY AV		Req Mon DAILY MX	04 - deg C		02/PT - Twice Per Permit Term	GR - GRAB
					Value NODI															
00094	Conductivity	1 - Effluent Gross	0	--	Sample								=	325	=	325	11 - umho/cm		02/PT - Twice Per Permit Term	GR - GRAB
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	11 - umho/cm		02/PT - Twice Per Permit Term	GR - GRAB
					Value NODI															
00300	Oxygen, dissolved [DO]	1 - Effluent Gross	0	--	Sample						=	10.78	=	10.78			19 - mg/L		02/PT - Twice Per Permit Term	GR - GRAB
					Permit Req.							Req Mon DAILY MN		Req Mon DAILY AV			19 - mg/L		02/PT - Twice Per Permit Term	GR - GRAB
					Value NODI															
00310	BOD, 5-day, 20 deg. C	1 - Effluent Gross	0	--	Sample								=	6	=	6	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
00340	Oxygen demand, chem. [high level] [COD]	1 - Effluent Gross	0	--	Sample								=	9.75	=	9.75	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
00400	pH	1 - Effluent Gross	0	--	Sample						=	6.87			=	6.87	12 - SU		02/PT - Twice Per Permit Term	GR - GRAB
					Permit Req.							Req Mon MINIMUM				Req Mon MAXIMUM	12 - SU		02/PT - Twice Per Permit Term	GR - GRAB
					Value NODI															
00530	Solids, total suspended	1 - Effluent Gross	0	--	Sample								=	44	=	44	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
00556	Oil & Grease	1 - Effluent Gross	0	--	Sample															
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
00625	Nitrogen, Kjeldahl, total [as N]	1 - Effluent Gross	0	--	Sample								=	0.7	=	0.7	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
00630	Nitrite + Nitrate total [as N]	1 - Effluent Gross	0	--	Sample															
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
00665	Phosphorus, total [as P]	1 - Effluent Gross	0	--	Sample								=	0.058	=	0.058	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
00666	Phosphorus, dissolved	1 - Effluent Gross	0	--	Sample								=	0.015	=	0.015	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
01032	Chromium, hexavalent [as Cr]	1 - Effluent Gross	0	--	Sample															
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
01040	Copper, dissolved [as Cu]	1 - Effluent Gross	0	--	Sample								=	5.5	=	5.5	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
01049	Lead, dissolved [as Pb]	1 - Effluent Gross	0	--	Sample								=	0.11	=	0.11	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
34230	Benzo[b]fluoranthene	1 - Effluent Gross	0	--	Sample															
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS

					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample															
34242	Benzo[k]fluoranthene	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample															
34247	Benzo[a]pyrene	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample															
34320	Chrysene	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY MN		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample															
34403	Indeno[1,2,3-cd]pyrene	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample															
34526	Benzo[a]anthracene	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample															
34556	Dibenz[a,h]anthracene	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample															
39032	Pentachlorophenol	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample															
39100	Di[2-ethylhexyl] phthalate [DEHP]	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample															
39120	Benzidine	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample															
39380	Dieldrin	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample								=	0.0000002	=	0.0000002	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
39516	Polychlorinated biphenyls [PCBs]	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
					Sample								=	31.8	=	31.8	3Z - CFU/100mL		02/PT - Twice Per Permit Term	GR - GRAB
51040	E. coli	1 - Effluent Gross	0	--	Permit Req.									Req Mon DA GEOAV		Req Mon DAILY MX	3Z - CFU/100mL		02/PT - Twice Per Permit Term	GR - GRAB
					Value NODI															
					Sample								=	228	=	228	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
70295	Solids, total dissolved	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
					Sample								=	1.94	=	1.94	17 - pCi/L		02/PT - Twice Per Permit Term	CP - COMPOS
80029	Alpha gross radioactivity	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	17 - pCi/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
					Sample															
81302	Dibenzofuran	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
					Sample															
81607	Tetrahydrofuran	1 - Effluent Gross	0	--	Permit Req.									Req Mon DAILY MN		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				

Submission Note

If a parameter row does not contain any values for the Sample nor Effluent Trading, then none of the following fields will be submitted for that row: Units, Number of Excursions, Frequency of Analysis, and Sample Type.

Edit Check Errors

No errors.

Comments

Dry Season Sample Date: 03/11/2019. This data applies to the CMC. EPA has approved this process for CMC members that delegate authority to AMAFCA. DMR data applies to following permits: NMR04A001; NMR04A002; NMR04A003; NMR04A004; NMR04A006; NMR04A007; NMR04A008; NMR04A010; NMR04A013; NMR04A015 and NMR04A016. BOD5 result had lab "R" flag, refer to CMC monitoring memo and QAPP for additional information. See Hall Chain of Custody 1903661

Attachments

No attachments.

Report Last Saved By

ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY (AMAFCA)

User:	JLOVATO22
Name:	Jerry Lovato
E-Mail:	jlovato@amafca.org
Date/Time:	2019-11-07 11:09 (Time Zone: -06:00)

Report Last Signed By

User:	JLOVATO22
Name:	Jerry Lovato
E-Mail:	jlovato@amafca.org

Date/Time: 2019-11-07 11:10 (Time Zone: -06:00)

DMR Copy of Record

Permit

Permit #:	**NMR04A016**	**Permittee:**	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY (AMAFCA)	**Facility:**	ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL (AMAFCA)
Major:	No	**Permittee Address:**	2600 PROSPECT AVENUE NE ALBUQUERQUE, NM 87107	**Facility Location:**	2600 PROSPECT AVENUE NE ALBUQUERQUE, NM 87107
Permitted Feature:	002 External Outfall	**Discharge:**	**002-D** RIO GRANDE (SOUTH) - DRY SEASON		

Report Dates & Status

Monitoring Period:	**From 11/01/18 to 06/30/19**	**DMR Due Date:**	**12/01/19**	**Status:**	**NetDMR Validated**

Considerations for Form Completion

SEASONAL MONITORING PERIODS ARE: WET SEASON = JULY 1-OCT. 31 & DRY SEASON = NOV. 1-JUNE 30. SEPARATE DMRS REQUIRED FOR EACH SEASON. DMRS TO BE SUBMITTED DUE DEC. 1ST, FOLLOWING END OF MONIT. PERIOD. PERMIT REQUIRES A MIN. OF 7 EVENTS PER LOC. PER PERMIT TERM (3 WET SEASON, 2 DRY SEASON & 2 PERMITTEE'S CHOICE).

Principal Executive Officer

First Name:	Jerry	**Title:**	Executive Engineer	**Telephone:**	505-884-2215
Last Name:	Lovato				

No Data Indicator (NODI)

Form NODI: --

Parameter		Monitoring Location	Season #	Param. NODI		Quantity or Loading					Quality or Concentration							# of Ex.	Frequency of Analysis	Sample Type
Code	Name					Qualifier 1	Value 1	Qualifier 2	Value 2	Units	Qualifier 1	Value 1	Qualifier 2	Value 2	Qualifier 3	Value 3	Units			
00010	Temperature, water deg. centigrade	1 - Effluent Gross	0	--	Sample						=	7.41	=	7.41	=	7.41	04 - deg C		02/PT - Twice Per Permit Term	GR - GRAB
					Permit Req.							Req Mon DAILY MN		Req Mon DAILY AV		Req Mon DAILY MX	04 - deg C		02/PT - Twice Per Permit Term	GR - GRAB
					Value NODI															
00094	Conductivity	1 - Effluent Gross	0	--	Sample								=	358	=	358	11 - umho/cm		02/PT - Twice Per Permit Term	GR - GRAB
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	11 - umho/cm		02/PT - Twice Per Permit Term	GR - GRAB
					Value NODI															
00300	Oxygen, dissolved [DO]	1 - Effluent Gross	0	--	Sample						=	10.86	=	10.86			19 - mg/L		02/PT - Twice Per Permit Term	GR - GRAB
					Permit Req.							Req Mon DAILY MN		Req Mon DAILY AV			19 - mg/L		02/PT - Twice Per Permit Term	GR - GRAB
					Value NODI															
00310	BOD, 5-day, 20 deg. C	1 - Effluent Gross	0	--	Sample								=	5	=	5	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
00340	Oxygen demand, chem. [high level] [COD]	1 - Effluent Gross	0	--	Sample								=	24.8	=	24.8	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
00400	pH	1 - Effluent Gross	0	--	Sample						=	6.95			=	6.95	12 - SU		02/PT - Twice Per Permit Term	GR - GRAB
					Permit Req.							Req Mon MINIMUM				Req Mon MAXIMUM	12 - SU		02/PT - Twice Per Permit Term	GR - GRAB
					Value NODI															
00530	Solids, total suspended	1 - Effluent Gross	0	--	Sample								=	460	=	460	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
00556	Oil & Grease	1 - Effluent Gross	0	--	Sample															
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
00625	Nitrogen, Kjeldahl, total [as N]	1 - Effluent Gross	0	--	Sample								=	1.1	=	1.1	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
00630	Nitrite + Nitrate total [as N]	1 - Effluent Gross	0	--	Sample								=	0.43	=	0.43	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
00665	Phosphorus, total [as P]	1 - Effluent Gross	0	--	Sample								=	0.45	=	0.45	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
00666	Phosphorus, dissolved	1 - Effluent Gross	0	--	Sample								=	0.054	=	0.054	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
01032	Chromium, hexavalent [as Cr]	1 - Effluent Gross	0	--	Sample															
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI									B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection				
01040	Copper, dissolved [as Cu]	1 - Effluent Gross	0	--	Sample								=	0.74	=	0.74	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
01049	Lead, dissolved [as Pb]	1 - Effluent Gross	0	--	Sample								=	0.4	=	0.4	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
34230	Benzo[b]fluoranthene	1 - Effluent Gross	0	--	Sample															
					Permit Req.									Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS

					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample															
34242	Benzo[k]fluoranthene	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample															
34247	Benzo[a]pyrene	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample															
34320	Chrysene	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY MN		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample															
34403	Indeno[1,2,3-cd]pyrene	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample															
34526	Benzo[a]anthracene	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample															
34556	Dibenz[a,h]anthracene	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample															
39032	Pentachlorophenol	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample															
39100	Di[2-ethylhexyl] phthalate [DEHP]	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample															
39120	Benzidine	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample															
39380	Dieldrin	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample							=	0.0000026	=	0.0000026	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
39516	Polychlorinated biphenyls [PCBs]	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
					Sample							=	594	=	594	3Z - CFU/100mL		02/PT - Twice Per Permit Term	GR - GRAB
51040	E. coli	1 - Effluent Gross	0	--	Permit Req.								Req Mon DA GEOAV		Req Mon DAILY MX	3Z - CFU/100mL		02/PT - Twice Per Permit Term	GR - GRAB
					Value NODI															
					Sample							=	325	=	325	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
70295	Solids, total dissolved	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	19 - mg/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
					Sample							=	7.86	=	7.86	17 - pCi/L		02/PT - Twice Per Permit Term	CP - COMPOS
80029	Alpha gross radioactivity	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	17 - pCi/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI															
					Sample															
81302	Dibenzofuran	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY AV		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					
					Sample															
81607	Tetrahydrofuran	1 - Effluent Gross	0	--	Permit Req.								Req Mon DAILY MN		Req Mon DAILY MX	28 - ug/L		02/PT - Twice Per Permit Term	CP - COMPOS
					Value NODI								B - Below Detection Limit/No Detection		B - Below Detection Limit/No Detection					

Submission Note

If a parameter row does not contain any values for the Sample nor Effluent Trading, then none of the following fields will be submitted for that row: Units, Number of Excursions, Frequency of Analysis, and Sample Type.

Edit Check Errors

No errors.

Comments

Dry Season Sample Date: 03/13/2019. This data applies to the CMC. EPA has approved this process for CMC members that delegate authority to AMAFCA. DMR data applies to the following permits: NMR04A001; NMR04A002; NMR04A003; NMR04A004; NMR04A006; NMR04A007; NMR04A008; NMR04A010; NMR04A013; NMR04A015 and NMR04A016. BOD5 result had lab "R" flag, refer to CMC monitoring memo and QAPP for additional information. See Hall Chain of Custody 1903661

Attachments

No attachments.

Report Last Saved By

ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY (AMAFCA)

User:	JLOVATO22
Name:	Jerry Lovato
E-Mail:	jlovato@amafca.org
Date/Time:	2019-11-07 11:13 (Time Zone: -06:00)

Report Last Signed By

User:	JLOVATO22
Name:	Jerry Lovato
E-Mail:	jlovato@amafca.org

Date/Time: 2019-11-07 11:13 (Time Zone: -06:00)

Attachment 6

Stormwater Management Program (SWMP)

Stormwater Management Program Plan
in Compliance with
Watershed Based Permit NMR04A000

County of Bernalillo

State of New Mexico

Natural Resource Services

December 1, 2019

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D Joint Agreements

SWMP Revisions

SWMP Plan Version and Date	Date Submitted to EPA	Reason for Revision (e.g., Modification, Annual Report Review and Update, etc.)	Notes
Revision 0 December 2016	Dec. 1, 2016	N/A – Initial Version	Initial SWMP under Permit NMR04A000
Revision 1 December 2019	Dec. 1, 2019	Annual Report and Update	First Revision of SWMP under Permit NMR04A000

1. Introduction

Stormwater discharges from Bernalillo County are regulated under the Clean Water Act. New Mexico is one of four states that does not have primacy under the Clean Water Act. This means that U.S. Environmental Protection Agency (EPA) issues permits directly to local governments and to New Mexico businesses and construction sites. The Watershed-Based Permit for the Middle Rio Grande requires that the permittee develop, implement, and enforce a Stormwater Management Program (SWMP), with the purpose to reduce the discharge of pollutants in stormwater.

1.1 Purpose of the Stormwater Management Program (SWMP)

The Stormwater Management Program (SWMP) Plan was developed in support of the requirements of the EPA's National Pollutant Discharge Elimination System (NPDES) Middle Rio Grande Watershed Based Municipal Separate Storm Sewer System (MS4) Permit NMR04A000 (MS4 Permit). The MS4 Permit was issued and became effective on December 22, 2014, and was subsequently modified by EPA on April 9, 2015. The SWMP, according to Part I.D.1 of the MS4 Permit, shall satisfy all requirements of this Permit, and be implemented in accordance with Section 402(p)(3)(B) of the Clean Water Act (CWA), and the Stormwater Regulations (40 CFR § 122.26 and § 122.34). The MS4 Permit is included as Appendix A of this SWMP Plan.

The SWMP that follows describes the actions that Bernalillo County (County) will take to protect water quality and satisfy applicable requirements of the MS4 Permit. According to Part I.D.1 of the MS4 Permit, the SWMP will be designed to reduce the discharge of pollutants from a MS4 to the maximum extent practicable, to protect water quality (including that of downstream state or tribal waters), and to satisfy applicable surface water quality standards.

The SWMP serves to document the County's proposed plans and goals, implementation schedules, and assessments associated with meeting the MS4 Permit requirements. The SWMP will be revised and modified as necessary over the course of the 5-year MS4 Permit term. The initial SWMP (Revision 0) summarizes the applicable MS4 Permit requirements and describes the County's plans and strategies to comply with the MS4 Permit requirements. The SWMP clearly defines, as applicable to the County and as required in Part I.D.4 of the MS4 Permit, the County's measurable goals and implementation schedule for each control measure.

1.2 Notice of Intent (NOI) to Obtain Permit Coverage

For coverage under the MS4 Permit, the County submitted a notice of intent (NOI) as required in Part I.A.6.a to EPA Region 6 on May 11, 2015. Bernalillo County is classified as a Class B Permittee, as defined in Table 1 (Part I.B.1.a) of the MS4 Permit. The NOI and related correspondence is provided as Appendix B of this SWMP.

1.3 Background

The Clean Water Act (CWA) was passed in 1972 and required factories to have National Pollutant Discharge Elimination System (NPDES) permits. In 1987 the CWA required municipal separate storm sewer systems (MS4s) to have NPDES permits. The first permit was issued in 1991 to the Phase 1 MS4s (populations over 100,000). In the Middle Rio Grande, the Phase I entities included the City of Albuquerque (COA), Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), the University of New Mexico (UNM), and the New Mexico Department of Transportation (NMDOT), District 3. The Phase II small MS4 NPDES permits were issued by the EPA in 1999 and included Bernalillo County. A renewal NPDES permit came into effect in March of 2012, MS4 NPDES General Permit NM000101. The Watershed-Based Permit for the Middle Rio Grande NMR04A000 became effective on December 22, 2014.

Stormwater discharges from Bernalillo County are regulated under the Clean Water Act. New Mexico is one of four states that does not have primacy under the Clean Water Act. This means that U.S. Environmental Protection Agency (EPA) issues permits directly to local governments and to New Mexico businesses and construction sites.

The purpose of the stormwater control system operated by the County is to prevent injury or loss of life and to eliminate or minimize property damage. AMAFCA operates the primary stormwater control system in the Albuquerque metropolitan area. The AMAFCA system is used by Bernalillo County, COA, UNM, NMDOT, and the Village of Los Ranchos as a final conveyance of stormwater collected by their respective systems to the Rio Grande. Bernalillo County also has 4 additional outfalls that discharge directly to the Rio Grande. A stormwater facilities map for Bernalillo County is presented in Appendix C.

This Permit was developed for MS4s within the Middle Rio Grande (MRG) Watershed that discharge stormwater to the Rio Grande. The MRG Watershed MS4 Permit provides coverage to MS4 operators located fully or partially within the Albuquerque Urbanized Area (UA) (based

on the 2000 and 2010 Decennial Census). The Permit encourages cooperation and partnerships between all permitted MS4s in the MRG Watershed by providing incentives for collaboration and legally-binding cooperation among the various MS4s.

1.3.1 Bernalillo County Stormwater Facilities

Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes. Maintenance activities for these facilities occurs both on a routine basis and following rain events and includes sediment, floatables, trash, and debris removal, mowing and vegetation control (tree trimming, debris removal), fence and gate repair, and erosion repair. The County maintains and updates a list and maps of the County storm sewer systems and all stormwater quality facilities as needed.

1.3.4 Water Quality

Bernalillo County is also concerned with protecting water quality for Albuquerque and its surrounding areas. Bernalillo County has designed and installed structures that catch debris, sediment, and trash in order to improve stormwater quality. These structural Best Management Practices (BMPs) help to protect the Rio Grande from pollution.

1.4 Compliance with Other Laws and Regulatory Requirements

Part I.D.1 of the MS4 Permit states that if a Permittee is already in compliance with one or more requirements of the MS4 Permit – because it is already subject to and complying with a related local, state, or federal requirement that is at least as stringent as the MS4 Permit requirement – the Permittee may reference the relevant requirement as part of the SWMP and document why the MS4 Permit requirement has been satisfied.

The NM Office of the State Engineer (OSE) and Interstate Stream Commission (ISC) regulates the water delivery to the Rio Grande in order to meet water delivery requirements to Texas and downstream water rights; therefore, the County's objective is to design its facilities to drain within 96 hours per the OSE requirements.

1.5 Legal Authority

Bernalillo County has the legal authority to convey discharges entering its flood control system to the Rio Grande. The County flood control system collects stormwater generated by the other permittees as well, including: the COA, UNM, NMDOT, AMAFCA and the Village of Los

Ranchos. The County facilities protect area residents from flood flows. These flows are conveyed the receiving waters of the Rio Grande.

Bernalillo County has the legal authority to pass ordinances, require permits for specific activities (i.e. septic system ownership, development and construction activities, etc.) and can use contractual agreements with other entities for activities conducted within its jurisdiction as a means to provide legal authority related to MS4 Permit requirements.

2. SWMP General Components and Requirements

As described in Section 1.1, the County will develop, implement, and enforce a SWMP that is designed to reduce the discharge of pollutants to the maximum extent practicable, to protect water quality, and to satisfy applicable surface water quality standards. The SWMP addresses the MS4 Permit Special Conditions (Part I.C), contains the eight (8) Control Measures required in Part I.D.5 of the MS4 Permit, and addresses the applicable Monitoring and Assessment requirements in Part III of the MS4 Permit. The SWMP addresses each applicable MS4 Permit activity with a proposed plan to meet the required Permit activity, measurable goal(s) for the proposed plan, implementation schedule, and identification of responsible County personnel. Program development and full implementation of this SWMP is proposed over five (5) years from the effective date of the MS4 Permit (December 22, 2014). The general SWMP components, organization, review process, and modification\process are described in the sections below.

2.1 Special Conditions Requirements in the Permit

Part I.C of the MS4 Permit defines the Special Conditions requirements. These elements are outlined below, and program details are provided in the SWMP tables in Section 3.

- Compliance with Water Quality Standards (Part I.C.1) – This section of the Permit includes provisions to ensure that MS4 discharges do not cause or contribute to exceedances of applicable surface water quality standards. Under this section, there is a Dissolved Oxygen (DO) Program (Part I.C.1.d), a Polychlorinated biphenyl (PCBs) Program (Part I.C.1.e), and a Temperature Program (Part 1.C.1.f). The DO and Temperature Programs to not apply to Bernalillo County.
- Discharges to Impaired Waters With and Without Approved TMDLs – This section of the Permit (Part I.C.2.b.(i) and Tables 1.a - TMDL Bacteria Program and 1.b – TMDL Nutrient Program - Part I.C.2.b.(iii)) requires that the SWMP have controls that target the pollutants of concern identified for the impaired waters. There are specific Permit requirements if the impaired water body has a Total Maximum Daily Load (TMDL) approved by EPA and NMED.
    - For the Rio Grande, E.coli has been identified as an impairment and has an established TMDL. This TMDL applies to the MS4 area for the Rio Grande from Alameda to US 550 (Waterbody ID NM-2105.1_00) and the Rio Grande from Isleta Pueblo boundary to Alameda (Waterbody ID NM-2105_50).

- The section of the Permit also has requirements for waters with impairments that do not yet have TMDLs. The Rio Grande has the following impairments in the MS4 area, without TMDLs:
  - Rio Grande (Isleta Pueblo to US 550 – waterbody IDs NM-2105.1_00 and NM-2105_50) - DO and PCBs in Fish Tissue;
  - Rio Grande (Alameda to US 550 – waterbody ID NM-2105.100) - PCBs in water column and Gross Alpha adjusted;
  - Rio Grande (Isleta Pueblo to Alameda – waterbody ID NM-2105_50) - water temperature.
- For the Rio Grande, there are currently no impairments for nutrients. The 2014-2016 State of New Mexico CWA 303(d)/305(d) Integrated List and Report identifies the Tijeras Arroyo Assessment Unit – Four Hills Bridge to headwaters as impaired for nutrients based on exceedance of Nutrient Level 2 assessment criteria. The permittees who discharge to this waterbody, including Bernalillo County, COA, and NMDOT, must address the activities and schedules related to Impairment for Nutrients in Table 1.b in Part I.C.2.b.(iii).
- Impairments were determined using the *2014-2016 State of New Mexico Clean Water Act 303(d)/305(b) Integrated Report, Appendix A – Final List of Assessed Surface Waters*, November 18, 2014, State of New Mexico Water Quality Control Commission (https://www.env.nm.gov/swqb/303d-305b/2014-2016/2014-2016NMList.pdf).

- Compliance with Endangered Species Act Requirements (Part I.C.3) – This section of the Permit includes provisions consistent with the USFWS Biological Opinion (BO) related to the MRG Watershed MS4 Permit dated August 21, 2014 - Cons. #22420-2011-F-0024-R001. This section has two requirements: Dissolved Oxygen Strategy and Sediment Pollutant Load Reduction Strategy.
  - The Dissolved Oxygen Strategy in this section is required for all permittees. A summary of findings must be submitted with each annual report and a description of controls implemented must be included in the SWMP submitted with the 1st and 4th annual reports, Part 1.C.3.(a).(i).
  - For the Sediment Pollutant Load Reduction Strategy, County stormwater facilities function as regional flood control facilities as well as BMPs to remove sediment from stormwater before the stormwater reaches the Rio Grande. The County has

several stormwater facilities, including about 60 ponds and other stormwater quality features that function as BMPs for sediment removal. The County's O&M activities also include sediment removal from ponds and other stormwater facilities.

2.2 Control Measures

Each applicable control measure program required in Part I.D.5 of the MS4 Permit is addressed in this SWMP. There are eight (8) control measures which are described in general terms below and with program details in the SWMP tables in Section 3.

- Construction Site Runoff Control Program (Part I.D.5.a and Table 2) – This program has controls related to the discharge of stormwater and pollutants from construction activities that result in a land disturbance of greater than or equal to one acre, including sites which disturb less than one acre but are part of a larger common plan of development.
- Post-Construction Stormwater Management Program for New Development and Redevelopment (Part I.D.5.b and Table 3) – This program addresses stormwater runoff from new development and redevelopment projects after construction site stabilization has been achieved to minimize water quality impacts.
- Pollution Prevention / Good Housekeeping Program (Part I.D.5.c and Table 4) – The goal of this program is to prevent or reduce pollutant runoff from County operations through training, maintenance, and waste management.
- Industrial and High Risk Runoff (Part I.D.5.d and Table 5) – This is a program to minimize the contribution of pollutants to the MS4 associated with industrial activity in the MS4. This section is only applicable to Class A permittees; as a Class B permittee, this section is not applicable to Bernalillo County.
- Illicit Discharges and Improper Disposal (Part I.D.5.e and Table 6) – The goal of this program is to detect and eliminate illicit discharges. The program elements also prohibit illicit dumping or disposal of materials, other than stormwater, into the MS4. The program includes a notification process and hotline, incident investigation and reporting process, procedures for testing, if necessary, an educational component, and a County spill prevention and response plan.
- Control of Floatables Discharges Program (Part I.D.5.f and Table 7) – This program is intended to address and control floatables in discharges to the MS4 through implementation of source controls and structural controls (BMPs).

- Public Education and Outreach on Stormwater Impacts (Part I.D.5.g and Table 8) – The program provides education and outreach programs to the community related to the impact human activities have on the water quality of the Rio Grande. The County provides public education and outreach on stormwater impacts through different media and methods, reaching wide spread target audiences, and focusing on target pollutants including pet waste, illicit discharges, and trash/debris.
- Public Involvement and Participation (Part I.D.5.h and Table 9) – This control measure encourages public involvement and provides opportunities for participation in public outreach activities as well as in the review, modification, and implementation of the SWMP.

2.3 Water Quality Monitoring

Part III.A of the MS4 Permit defines the monitoring and assessment program requirements and objectives. As applicable, three Permit elements are included in the SWMP: Wet Weather Monitoring (Part III.A.1 and Table 10), Dry Weather Discharge Screening (Part III.A.2), and Floatables Monitoring (Part II.A.3). Industrial and High Risk Runoff Monitoring (Part III.A.4) does not apply to the County.

2.4 SWMP Organization

The County's SWMP is organized in a tabular format in an Excel Database. The detailed SWMP tables are provided in Section 3. Cooperative programs are encouraged with this MS4 Permit Part I.B.4). Section 3, Table A, provides a list of the current County cooperative programs. The SWMP tables are organized following the MS4 Permit organization. The SWMP includes:

- Permit Activity Description – This contains the Permit requirements, Permit language, and Permit references.
- Measurable Goal (Rev. 0, 2016) – This contains specific actions that the County proposed in the original SWMP to complete to meet its Permit requirements.
- Summary of Measurable Goals Met - from Rev. 0, 2016 – This summarizes the County's progress and accomplishments related to the meeting the Measurable Goal from the original SWMP (Rev. 0, 2016).
- Updated Measurable Goal (Rev. 1, 2019) – This contains specific, updated actions that the County proposes to complete to meet its Permit requirements. An assessment of

each program's progress and successes was completed during the Annual Report development and was utilized to update the measurable goals.

- Permit Required Implementation Schedule – This contains the implementation schedules listed in the Permit for the specific Permit activity, as applicable. The Permit implementation schedules for Bernalillo County are either the Permittee Class B or the Cooperative, depending on the Permit activity and if the County has a cooperative program for that activity.

In addition, the County will add columns annually for Status of Implementation and Performance Assessment.

2.5 SWMP Review Process

According to the requirements in Part I.D.6.a, the SWMP will undergo an annual review in conjunction with preparation of the Annual Report (required in Part III.B). The review will include the following components:

- A discussion of progress made in SWMP implementation, including achievement of measurable goals and compliance with program elements and other MS4 Permit conditions.
- An evaluation of the effectiveness of the SWMP in complying with the MS4 Permit with respect to controlling pollutant discharges and complying with water quality standards and TMDLs. This evaluation will include identifying any necessary modifications needed for the SWMP, if applicable.
- The adequacy of staff (man hours needed and projected), funding levels, equipment, and support capabilities to fully implement the SWMP and comply with the MS4 Permit conditions.

As required in Part III.B, the first and fourth Annual Reports will include submittal of a complete SWMP revision.

2.6 SWMP Modification Process

The SWMP may be modified under the conditions described below.

2.6.1 Permittee-Initiated Modifications

The County may modify this SWMP with prior notification or request to the EPA and NMED in accordance with Part I.D.6.b of the MS4 Permit. Modification requests or notifications shall be made in writing and signed in accordance with Part IV.H of the Permit.

- Modifications adding, but not eliminating, replacing, or jeopardizing fulfillment of any component, control, or requirements of the SWMP can be made by the Permittee at any time upon written notification to the EPA.
- Modifications replacing or eliminating an ineffective or infeasible component, control, or requirement of the SWMP (including monitoring and analysis requirements) may be requested of EPA in writing at any time. When requesting a modification, the Permittee shall include the following information:
    - A description of why the SWMP component is ineffective, unfeasible (including cost prohibitions), or unnecessary to support compliance with the permit;
    - Expectations on the effectiveness of the proposed replacement component; and
    - An analysis of how the proposed replacement component is expected to achieve the goals of the component to be replaced.

2.6.2 EPA-Required Modifications

Modifications may be requested by EPA (Part I.D.6.c) to address impacts to receiving water quality, include requirements to comply with new or revised regulations, add measures needed to comply with the Clean Water Act, or add measures needed to comply with the MS4 Permit. If modifications are requested by EPA, the Permittee will be provided with an opportunity to propose alternative program modifications to meet the objective of the requested modification.

2.6.3 Due to Modification of the MS4 Permit

The MS4 Permit may be reopened and modified (Part V), in accordance with 40 CFR §122.62, §122.63, and §124.5. Only those portions of the SWMP specifically required as Permit conditions shall be subject to the modification requirements of 40 CFR §124.5.

3. SWMP Tables

Bernalillo County has several cooperative elements related to this permit. Table 1 summarizes the County's current cooperative programs which have joint agreements. Copies of the joint agreements are provided in Appendix D.

TABLE 1: MS4 Permit-Based Joint Agreements

Cooperative Program Name	SWMP Element	Cooperative Partners	Joint Agreement
MS4 Technical Advisory Group (TAG)	Various	Bernalillo County AMAFCA City of Albuquerque NMDOT-District 3 UNM Sandoval County Village of Corrales City of Rio Rancho Village of Los Ranchos Kirtland Air Force Base (KAFB) Town of Bernalillo SSCAFCA ESCAFCA Sandia National Laboratory (DOE)	Intergovernmental Agreement
MS4 Compliance Monitoring Cooperative (CMC)	Wet Weather Monitoring	Bernalillo County AMAFCA City of Albuquerque NMDOT-District 3 UNM Sandoval County Village of Corrales City of Rio Rancho Village of Los Ranchos Town of Bernalillo SSCAFCA ESCAFCA	Intergovernmental Agreement and Memorandum of Understanding for Delegation of Authority to AMAFCA for Data Entry into netDMR System
Mid-Rio Grande Stormwater Quality Team (MRGSQT)	Public Education and Outreach, Public Involvement and Participation	Bernalillo County AMAFCA COA NMDOT-District 3	Intergovernmental Agreement

Cooperative Program Name	SWMP Element	Cooperative Partners	Joint Agreement
Mid-Rio Grande Stormwater Quality Team (MRGSQT)	Public Education and Outreach, Public Involvement and Participation	Sandoval County Village of Corrales City of Rio Rancho Village of Los Ranchos Town of Bernalillo SSCAFCA ESCAFCA Ciudad Soil and Water Conservation District	Intergovernmental Agreement
Development Review	Construction and Post-Construction Stormwater Management	Bernalillo County Village of Los Ranchos City of Albuquerque NMDOT-District 3 AMAFCA	Intergovernmental Agreement
Capacity, Management, Operations and Maintenance (CMOM) Plan	IDDE, Spill Response, emphasis on Fats, Oils and Grease (FOG)	Bernalillo County ABCWUA City of Albuquerque AMAFCA NMDOT-District 3 Village of Los Ranchos	Intergovernmental Agreement
Investigation and resolution of illicit discharges	IDDE	Bernalillo County City of Albuquerque AMAFCA NMDOT-District 3 Village of Los Ranchos ABCWUA MRGCD	Shared without cost allocation
Household Hazardous Waste Collection Program	IDDE	Bernalillo County City of Albuquerque	Cost share for fixed collection facility
GSI/LID Impediments Assessment and Report	Post-Construction Stormwater Management	Bernalillo County AMAFCA	Shared without cost allocation
Gross Debris Study	Control of Floatables	Bernalillo County AMAFCA	Shared without cost allocation
Preliminary Assessment of PCB Loads into the Rio Grande from Selected Stormwater-Collection Basins in Bernalillo County, Albuquerque Metropolitan Area, Albuquerque, NM	Compliance with Water Quality Standards - PCBs	Bernalillo County USGS	Cooperative agreement with cost agreement

Cooperative Program Name	SWMP Element	Cooperative Partners	Joint Agreement
Ecohydrologic and Water Quality Investigations of Valle de Oro National Wildlife Refuge and Albuquerque South Valley Commons	Impaired Water Bodies with an Approved TMDL	Bernalillo County AMAFCA USACE US Bureau of Reclamation USEPA USFWS	Cooperative agreement with cost agreement
Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy	Endangered Species Act Requirements, Sediment Pollutant Load Reduction Strategy	Bernalillo County COA AMAFCA SSCAFCA	Shared without cost allocation
Tijeras Creek Watershed Collaborative (TCWC)	Impaired Water Bodies without an Approved TMDL	Bernalillo County The Nature Conservancy Canon de Carnuel Land Grant UNM Ciudad Soil and Water Conservation District Adaptive Terrain Systems COA NMDOT-District 3 USGS USFWS Cibola National Forest Rocky Mountain Youth Corps. Talking Talons Youth Leadership	Shared without cost allocation

As described in Section 2.4 above, Bernalillo County's SWMP is organized in a tabular format in an Excel Database. The SWMP tables are provided in Table 2.

Table 2

Stormwater Management Program Plan

Part I.C: Special Conditions
Compliance with Water Quality Standards - Part I.C.1.a, .b, and .c

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Compliance with Water Quality Standards – Part I.C.1.a, .b, and .c				
Part I.C.1 - Compliance with Water Quality Standards - Pursuant to Clean Water Act §402(p)(3)(B)(iii) and 40 CFR § 122.44(d)(1), this permit includes provisions to ensure that discharges from the permittee's MS4 do not cause or contribute to exceedances of applicable surface water quality standards, in addition to requirements to control discharges to the maximum extent practicable (MEP) set forth in Part I.D. Permittees shall address storm water management through development of the SWMP that shall include the following elements and specific requirements included in Part VI (sections below).	Not included in Rev. 0 of SWMP	No measurable goals identified in Rev. 0 of SWMP	Bernalillo County's measurable goals for compliance with related Permit activities are described in the applicable sections of the SWMP.	
Part I.C.1.a - Permittee's discharges shall not cause or contribute to an exceedance of surface water quality standards (including numeric and narrative water quality criteria) applicable to the receiving waters. In determining whether the SWMP is effective in meeting this requirement or if enhancements to the plan are needed, the permittee shall consider available monitoring data, visual assessment, and site inspection reports.	Not included in Rev. 0 of SWMP	No measurable goals identified in Rev. 0 of SWMP	Bernalillo County's measurable goals for compliance with related Permit activities are described in the applicable sections of the SWMP.	
Part I.C.1.b - Applicable surface water quality standards for discharges from the permittees' MS4 are those that are approved by EPA and any other subsequent modifications approved by EPA upon the effective date of this permit found at New Mexico Administrative Code §20.6.4. Discharges from various portions of the MS4 also flow downstream into waters with Pueblo of Isleta and Pueblo of Sandia Water Quality Standards.	Not included in Rev. 0 of SWMP	No measurable goals identified in Rev. 0 of SWMP	Through the CMC, monitoring data results are compared to the applicable New Mexico Administrative Code §20.6.4, Pueblo of Isleta Water Quality Standards (amended on 3/18/2002, effective 7/22/2005 per EPA website), and Pueblo of Sandia Water Quality Standards (effective 3/9/2010). The Pueblo of Sandia is located upstream of the Bernalillo County boundary; therefore, the Pueblo of Sandia Water Quality Standards (effective 3/9/2010) do not apply directly to Bernalillo County.	
Part I.C.1.c - The permittee shall notify EPA and the Pueblo of Isleta in writing as soon as practical but not later than 30 calendar days following each Pueblo of Isleta water quality standard exceedance at an in-stream sampling location. In the event that EPA determines that a discharge from the MS4 causes or contributes to an exceedance of applicable surface water quality standards and notifies the permittee of such an exceedance, the permittee shall, within sixty (60) days of notification, submit to EPA, NMED, Pueblo of Isleta (upon request) and Pueblo of Sandia (upon request), a report that describes controls that are currently being implemented and additional controls that will be implemented to prevent pollutants sufficient to ensure that the discharge will no longer cause or contribute to an exceedance of applicable surface water quality standards. The permittee shall implement such additional controls upon notification by EPA and shall incorporate such measures into their SWMP as described in Part I.D of this permit. NMED or the affected Tribe may provide information documenting exceedances of applicable water quality standards caused or contributed to by the discharges authorized by this permit to EPA Region 6 and request EPA take action under this paragraph.	Not included in Rev. 0 of SWMP	No measurable goals identified in Rev. 0 of SWMP	Bernalillo County, as part of the CMC, will notify EPA and the Pueblo of Isleta of a Pueblo of Isleta of water quality standard exceedances at an in-stream sampling location (within the Rio Grande). Notification will be in writing as soon as practical. Lab reports are typically received within 45 days of a sampling event. Preliminary review of the results typically requires 5 days. The CMC will notify EPA and the Pueblo of Isleta within 30 days of the data review if it is determined that there was a Pueblo of Isleta water quality standard exceedance at an in-stream (within the Rio Grande) sampling location. The Permit is unclear if this notification is required just for MS4 Permit compliance sampling, or if this includes results from other monitoring, such as citizen science projects. Bernalillo County will provide this notification for in-stream samples, that AMAFCA is involved with sampling, that result in a Pueblo of Isleta water quality standard exceedance.	

Part I.C: Special Conditions
Compliance with Water Quality Standards – PCBs - Part I.C.1.e

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Compliance with Water Quality Standards – PCBs - Part I.C.1.e				
According to the requirements in Part I.C.1.e, the permittee shall address concerns regarding PCBs in channel drainage areas specified in Part I.C.1.e.(vi) by developing or continue updating/revising and implementing a strategy to identify and eliminate controllable sources of PCBs that cause or contribute to exceedances of applicable water quality standards in waters of the United States. Bernalillo County shall submit the proposed PCB strategy to EPA within two (2) years from the effective date of the permit and submit a progress report with the third and with subsequent Annual Reports.	Bernalillo County has begun planning a PCB strategy and will work with the USGS on development of this strategy. Once the PCB strategy has been submitted to and accepted by the EPA, the County will begin implementation.	Bernalillo County reviewed previous PCB investigations conducted in the Middle Rio Grande area as they developed the required PCB strategy. This included a PCB study that was conducted by Bernalillo County in 2010-2011 at the Sanchez Farms stormwater facility. This study showed that PCB concentrations were reduced after flow through the wetlands at the Sanchez Farm stormwater facility, likely due to sediment retention in the wetlands. Using prior knowledge from previous studies, Bernalillo County developed and submitted a PCB strategy to EPA in early 2017, meeting the MS4 Permit requirement. Bernalillo County and USGS defined a joint strategy scope-of-work to meet the MS4 Permit requirments of this section. The strategy objectives included: 1) Characterize PCB concentrations in soil and water samples. 2) Estimate stormwater discharges from the four basins. 3) Use PCB and discharge data to estimate PCB loads for the four basins. Bernalillo County's PCB strategy and reporting focuses on Adobe Acres Drain, Alameda Outfall Channel, Paseo del Norte Outfall Channel, and Sanchez Farm Drainage Area, as assigned in the MS4 Permit. Bernalillo County will share the final report, USGS Scientific Investigations Report (SIR), tentatively titled "Preliminary Assessment of Polychlorinated Biphenyl Loads into the Rio Grande from Selected stormwater Collection Basins in Bernalillo County, Albuquerque Metropolitan Area, Albuquerque, NM,", Sept. 2019, with EPA, NMED, and the community as part of the FY 2019 MS4 Annual Report. In 2017, Bernalillo County issued a new Stormwater Quality Ordinance (Bernalillo County Code, Chapter 38, Article IV) that includes development and redevelopment review process requirements specific to the sub-watersheds services by the Adobe Acres Drain, Alameda Outfall Channel, Paseo del Norte Outfall Channel and Sanchez Farms Drainage Area for PCB evaluation, sampling, and ability to require sediment retention BMPs to address PCB concerns.	Bernalillo County will share the final report, USGS Open-File Report (OFR 2019-1106), titled "Characterization and Load Estimation of Polychlorinated Biphenyls (PCBs) From Selected Rio Grande Tributary Stormwater Channels in the Albuquerque Urbanized area, New Mexico, 2017-18," Sept. 2019, with EPA, NMED, and the community as part of the FY 2019 MS4 Annual Report. In FY 2020, Bernalillo County will evaluate the report findings and determine if any additional steps are needed for the PCB strategy. Bernalillo County will continue to follow the Stormwater Quality Ordinance (Bernalillo County Code, Chapter 38, Article IV) development and redevelopment review process requirements specific to the sub-watersheds services by the Adobe Acres Drain, Alameda Outfall Channel, Paseo del Norte Outfall Channel and Sanchez Farms Drainage Area for PCB evaluation, sampling, and ability to require sediment retention BMPs to address PCB concerns.	Proposed PCB strategy within two (2) years from effective date of permit (December 22, 2016); progress reports submitted with the third and subsequent Annual Reports.
Part I.C.1.e - The progress reports shall include: (i) Summary of data. (ii) Findings regarding controllable sources of PCBs in the channel drainages area specified in Part I.C.1.e.(vi) that cause or contribute to exceedances of applicable water quality standards in waters of the US via the discharge of municipal stormwater. (iii) Conclusions drawn, including supporting information for any determinations. (iv) Activities undertaken to eliminate controllable sources of PCBs in the drainage areas specified in Part I.C.1.e. (vi) that cause or contribute to exceedances of applicable water quality standards in waters of the US via the discharge of municipal stormwater including proposed activities that extend beyond the 5 year permit term. (v) Account of stakeholder involvement in the process. (vi) Channel Drainage Areas: The PCB strategy required in Part I.C.1.e is only applicable to: COA and AMAFCA Areas: San Jose Drain and North Diversion Channel. Bernalillo County Areas: Adobe Acres Drain, Alameda Outfall Channel, Paseo del Norte Outfall Channel, and Sanchez Farm Drainage Area.	Note: Not a part of the Rev. 0, 2016 SWMP; no measurable goals defined.	As required by the MS4 Permit, Annual Reports for FY 2017 and FY 2018 included a summary of the PCB strategy. Quarterly Progress Reports and the final report are available upon request. The final report will be publicly available - USGS Open-File Report (OFR 2019-1106), titled "Characterization and Load Estimation of Polychlorinated Biphenyls (PCBs) From Selected Rio Grande Tributary Stormwater Channels in the Albuquerque Urbanized area, New Mexico, 2017-18," Sept. 2019. Bernalillo County involved stakeholders in the PCB strategy development and investigations as well as offered opportunities to make them aware of the findings. The PCB strategy was discussed multiple times at the Water Protection Advisory Board (WPAB) and the strategy findings were presented to the WPAB in May 2019.	The Annual Report will serve as Bernalillo County's Progress Report for PCBs. Additional reports and findings may be attached to each Annual Report and will be available upon request. Bernalillo County's PCB strategy and reporting will focus on Adobe Acres Drain, Alameda Outfall Channel, Paseo del Norte Outfall Channel, and Sanchez Farm Drainage Area, as assigned in the MS4 Permit. Bernalillo County will continue to involve stakeholders in the PCB investigations as well as offer opportunities to make them aware of the findings. Stakeholders typically involved include the Water Protection Advisory Board (WPAB), MS4 Technical Advisory Group (MS4 TAG), AMAFCA and COA related to their PCB studies in the watershed, USGS, and potential PCB polluters.	Proposed PCB strategy within two (2) years from effective date of permit (December 22, 2016); progress reports submitted with the third and subsequent Annual Reports (starting in FY 2017)
A cooperative strategy to address PCBs in the COA, AMAFCA and Bernalillo County's drainage areas may be developed between Bernalillo County, AMAFCA, and the COA. If a cooperative strategy is developed, the cooperative strategy shall be submitted to EPA within 3 years from the effective date of the permit and submit a progress report with the fourth and with subsequent Annual Reports.	Bernalillo County will discuss the cooperative strategy option with COA and AMAFCA through the cooperative MS4 Technical Advisory Group (MS4 TAG).	A formal cooperative strategy was not developed following the MS4 Permit timeline (3 years from the Dec. 2014 effective date of the MS4 Permit). However, the COA, AMAFCA and Bernalillo County through the cooperative MS4 Technical Advisory Group (MS4 TAG) shared strategy plans, sampling results, and reports.	The COA, AMAFCA and Bernalillo County through the cooperative MS4 Technical Advisory Group (MS4 TAG) will continue to share PCB strategy plans, sampling results, and reports. If a future cooperative strategy is agreed to, work will begin to develop an agreement and develop a cooperative strategy to submit to EPA.	A cooperative strategy within 3 years from effective date of permit (December 22, 2017); progress reports submitted with the fourth and subsequent Annual Reports.

Part I.C: Special Conditions Discharges to Impaired Waters With Approved TMDLs - Part I.C.2.b.(i) and TABLE 1.a - TMDL Bacteria Program- Part I.C.2.b.(iii)

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Discharges to Impaired Waters With Approved TMDLs - Part I.C.2.b.(i) and TABLE 1.a - TMDL Bacteria Program- Part I.C.2.b.(iii)				
Per Part I.C.2.b.(i), if the permittee discharges to an impaired water body with an approved TMDL (see MS4 Permit, Appendix B), where stormwater has the potential to cause or contribute to the impairment, the permittee shall include in the SWMP controls targeting the pollutant(s) of concern along with any additional or modified controls required in the TMDL and this section. A bacteria TMDL for the Middle Rio Grande was approved by the New Mexico Water Quality Control Commission on April 13,2010, and by EPA on June 30, 2010. The new TMDL modifies: 1) the indicator parameter for bacteria from fecal coliform to E. coli, and 2) the way the WLAs are assigned	See below	See below	See below	See below
Targeted Controls: SWMP submitted with the first annual report must include a detailed description of all targeted controls to be implemented, such as identifying areas of focused effort or implementing additional BMPs that will be implemented to reduce the pollutant(s) of concern in the impaired waters.				
A. Sanitary Sewer Systems (improve sanitary sewers; fix lift stations; identify and implement O&M procedures; improve violation reporting; and prevent overflows)	The County will continue to cooperate with ABCWUA under their Capacity, Management, Operations and Maintenance (CMOM) program to address any leaks and/or spills from the sanitary sewer system.	Sanitary Sewer Systems - sanitary sewer systems that run through the County MS4 are owned, operated, and maintained by the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). The County has cooperated with ABCWUA under their CMOM program to identify leaks and/or spills from the sanitary sewer system and respond to illicit discharge complaints associated with sanitary sewers.	Sanitary Sewer Systems - sanitary sewer systems within the County MS4 are owned, operated, and maintained by the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). The County will continue to cooperate with ABCWUA under their Capacity, Management, Operations and Maintenance (CMOM) program to identify leaks and/or spills from the sanitary sewer system. The County will continue to offer assistance through this program to respond to illicit discharges associated with sanitary sewers. The ABCWUA is responsible for the design and cost of the sanitary sewer repairs. Because the County does not own, operate, or maintain the sanitary sewer system, it does not have any specific MS4 Permit measurable goals related to this target area in this SWMP.	Address targeted controls in SWMP. Progress report submitted with each Annual Report (Due Dec. 1).
B. On-site Sewage Facilities (address failing systems and inadequate maintenance of On-Site Sewage Facilities)	Bernalillo County has an established goal of contacting a minimum of 200 unpermitted system or aging system owners per year with the intent of verifying status and educating regarding proper operation of the systems. The County will include a summary of low income septic system replacements/sewer connections and activities or planned activities for public outreach and education in each Annual Report.	The County administers the septic system permitting program in the unincorporated portions of Bernalillo County under the Bernalillo County Wastewater Ordinance, ensuring the proper disposal of septic waste and proper operation and maintenance of septic systems. The wastewater ordinance was passed in 2015. The County began a campaign in 2012 to get unpermitted systems permitted or properly abandoned, with an established goal of contacting a minimum of 300 unpermitted system or aging system owners per year. To date, 1,773 system owners have been contacted, resulting in 813 responses and 727 resolved. Resolution means either no system was present or the property was vacant; resulted in permit or connection to sewer or repair/replacement to get into compliance; or intended/listed for clerk filing or future legal action (in process and determination). Beginning in 1993, the PIPE Program has provided assistance to income qualified residents by providing contractors to connect residences to water and sewer services. Beginning in 1998, the TANK Program provides assistance to income qualified residents with the replacement and/or repair of failing septic systems in areas of the County without sewer availability.	The County will continue to enforce the Bernalillo County Wastewater Ordinance. The County will use its existing Well and Wastewater permitting process to distribute information about proper septic system maintenance to 100% of new septic-permit holders. Bernalillo County will continue it's unpermitted and aging systems campaign, targeting portions of the unincorporated county that have not yet been targeted, including the Northeast Heights, North Valley, Paradise Hills, Mesa del Sol, South Valley, and West Mesa. The program has an established goal of contacting a minimum of 300 unpermitted system or aging system owners per year with the intent of verifying status and educating regarding proper operation of the systems. Beginning in FY 2020, the focus of these efforts will be in the South Valley, which is the area of the County draining to the one reach of the Rio Grande that is currently impaired for E. coli (NM-2105_50, Isleta Pueblo Boundary to Tijeras Arroyo). The County will continue to provide financial assistance to low-income and disadvantaged residents that require inspections, repairs, and/or replacement of septic systems through its PIPE and TANK programs. Abandonment of septic systems and connection to sanitary sewer systems will be made where available. The County will include a summary of wastewater system permits issued, low income septic system replacements/sewer connections and activities or planned activities for public outreach and education focused on septic systems in each Annual Report.	Address targeted controls in SWMP. Progress report submitted with each Annual Report (Due Dec. 1).
C. Illicit Discharges and Dumping (effort to reduce waste sources of bacteria; for ex., septic systems, grease traps, and grit traps)	Bernalillo County will address the Illicit Discharge and Dumping through its IDDE Program, refer to the *SWMP - Table 6: Illicit Discharges and Improper Disposal* for additional information.	See IDDE section	Bernalillo County will address the Illicit Discharge and Dumping through its IDDE Program, refer to the SWMP - Table 6: Illicit Discharges and Improper Disposal for additional information.	Address targeted controls in SWMP. Progress report submitted with each Annual Report (Due Dec. 1).

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Discharges to Impaired Waters With Approved TMDLs - Part I.C.2.b.(i) and TABLE 1.a - TMDL Bacteria Program- Part I.C.2.b.(iii)				
D. Animal Sources (management programs to identify and target sources such as zoos, pet waste, and horse stables)	Bernalillo County will include a summary of activities or planned activities for public outreach and education in each Annual Report.	Bernalillo County addresses targeted controls for reducing pet waste through its public outreach and educational programs and events. Bernalillo County on its own, as well as in cooperation with the Stormwater Quality Team, will continue the "There is no Poop Fairy" campaign, with yard signs and other educational materials, to promote pet owners to pick up pet waste. Bernalillo County Ordinance, Chapter 6, addresses animal waste disposal. Animal waste complaints are also addressed through zoning enforcement and special use permit review. The County requires animal waste management plans for concentrated animal holding/corralling areas when applicants apply for building or other permits. As of FY19, Bernalillo County Parks and Recreation provides and manages 57 pet waste bag dispensers and bags at its open spaces, parks, and community centers.	Bernalillo County will continue to address reducing pet waste through its public outreach and educational program and events. Bernalillo County will continue to be a member of the MRG Stormwater Quality Team and cooperatively address sources of pollutants associated with animal waste. Bernalillo County will continue to enforce its Ordinance, Chapter 6 which addresses animal waste disposal. Animal waste complaints will also continue to be addressed through zoning enforcement and special use permit review. The County will continue to require animal waste management plans for concentrated animal holding/corralling areas when applicants apply for building or other permits. Bernalillo County Parks and Recreation will continue to provide and manage pet waste bag dispensers and bags at its open spaces, parks, and community centers. The County will include a summary of the number of pet waste bag dispensers managed by Bernalillo County in each Annual Report. The Bernalillo County IDDE program includes efforts that target sources of bacteria and other pollutants. Refer to the SWMP - Table 6: Illicit Discharges and Improper Disposal for additional information. Bernalillo County will include a summary of activities or planned activities for public outreach and education in each Annual Report.	Address targeted controls in SWMP. Progress report submitted with each Annual Report (Due Dec. 1).
E. Residential Education (bacteria from residential sites; fats, oils, and grease clogging sanitary sewer lines and resulting overflows; decorative ponds; and pet waste)	Bernalillo County will include a summary of activities or planned activities for public outreach and education in each Annual Report.	Bernalillo County addresses public education through its public outreach and educational program and events, through a cooperative education and outreach program with AMAFCA, and through membership in the MRGSQT. This collaborative group's public education and outreach program targets pollutants including pet waste through its "Scoop the Poop" campaign and trash/debris. The County also utilized a combination of existing and new educational materials, Mid-Rio Grande Stormwater Quality Team (MRGSQT) and County-created brochures, and/or other educational materials and promotional items including pet-waste focused materials from the previous Public Education and Outreach efforts from the prior permit term. The County also used its website and/or social media as a venue for distributing materials and posts about water quality. Many of the brochures and downloadable brochures are also available in Spanish. The County's Health Protection team is tasked with regulating approximately 500 food service establishments in the unincorporated area of Bernalillo County. The Health Protection team also provides education and outreach to these establishments. The County has provided education and collection/disposal options for household hazardous waste. These efforts help to reduce any waste that may contribute to the E. coli impairment. The ABCWUA addresses fats, oils, and grease (FOG) related to clogging of sanitary sewer lines through their Fats, Oil and Grease Policy: http://www.abcwua.org/uploads/files/20140521%20Fats,%20Oil%20and%20Grease%20Policy.pdf. ABCWUA provides the community access to printed and digital brochures for grease removal system requirements for food service establishments. The ABCWUA also addresses FOG through their Capacity, Management, Operations and Maintenance (CMOM) program, to promote proper FOG disposal. Bernalillo County cooperates with ABCWUA under this CMOM program.	collaborative group's public education and outreach program targets pollutants including pet waste through its "Scoop the Poop" campaign and trash/debris. The County will also utilize a combination of existing and new educational materials (such as the "Project W.E.T. Kids in Discovery Series" and the Enviroscape watershed model), Mid-Rio Grande Stormwater Quality Team (MRGSQT) and County-created brochures, and/or other educational materials and promotional items including pet-waste focused materials from the previous Public Education and Outreach efforts from the prior permit term. The County will also use its website and/or social media as a venue for distributing materials and posts about water quality. Many of the brochures and downloadable brochures are also available in Spanish. The County contributes stormwater quality-related material into the County's newsletter/outreach program, at least annually or more frequently as space is available, addressing one or more of the following topics on a rotating basis: illicit discharge reporting, proper disposal of household hazardous waste, animal sources/pet wastes, or public participation in the MS4 process. The MS4 program utilizes existing County processes to provide education on a neighborhood scale through on-going opportunities such as community and neighborhood association meetings and distribution of information through neighborhood newsletters. At least one educational or public participation announcement per year will be offered to the neighborhood associations for inclusion in neighborhood newsletters. The County will continue to provide education and collection/disposal options for household hazardous waste and will provide a summary of these efforts in each Annual Report. The ABCWUA addresses fats, oils, and grease (FOG) related to clogging of sanitary sewer lines through their Fats, Oil and Grease Policy: http://www.abcwua.org/uploads/files/20140521%20Fats,%20Oil%20and%20Grease%20Policy.pdf. ABCWUA provides the community access to printed and digital brochures for grease removal system requirements for food service establishments. The ABCWUA also addresses FOG through their Capacity, Management,	Address targeted controls in SWMP. Progress report submitted with each Annual Report (Due Dec. 1).

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Discharges to Impaired Waters With Approved TMDLs - Part I.C.2.b.(i) and TABLE 1.a - TMDL Bacteria Program- Part I.C.2.b.(iii)				
(b) Measurable Goals: For each targeted control, the SWMP must include a measurable goal and an implementation schedule describing BMPs to be implemented during each year of the permit term. The value of the measurable goal must be based on one of the options presented in Part I.C.2.b.(i).(c) related to the WLA. Where the impairment is for bacteria, the permittee must, at minimum comply with the activities and schedules described in Table 1.a of Part I.C.2.b.(iii).	The County will address the Illicit Discharge and Dumping through its IDDE Program, refer to the *SWMP - Table 6: Illicit Discharges and Improper Disposal* for additional information. The County will continue to provide proper pet waste disposal outreach and education. The County will continue to use new and existing educational materials, brochures, and promotional items and well as using the County website and social media as a tool for public education and outreach. • The County will summarize education and outreach activities in each Annual Report which will include activities or planned activities related to targeting pet waste sources and residential education targeting bacteria sources.	Bernalillo County's measurable goals for targeted controls for bacteria & implementation to date include: A. Sanitary Sewer Systems. Measurable goals: Not applicable for the County. Sanitary sewer systems are owned and operated by the ABCWUA. The County has worked cooperatively with the ABCWUA in areas where sanitary sewer lines are located within the unincorporated Bernalillo County to identify leaks and/or spills and to respond to illicit discharges associated with sanitary sewers. B. On-site Sewage Facilities. Measurable goals: Bernalillo County has consistently met its established goal of contacting a minimum of 300 unpermitted system or aging system owners per year with the intent of verifying the status and providing education regarding proper operation of the systems. C. Illicit Discharges and Dumping. Measurable goals: Refer to the SWMP - Table 6: Illicit Discharges and Improper Disposal for measurable goals. D. Animal Sources. Measurable goals: The County has implemented its public education and outreach program with pet waste as one of the target pollutants. The County provided proper pet waste disposal outreach and education both through County outreach programs and the through MRGSQT outreach efforts, as well as provided pet waste bag dispensers and bags at it open space and parks properties. E. Residential Education. Measurable goal: The County has used new and existing educational materials, brochures, and promotional items and well as used the County website and social media as tools for public education and outreach. The County also offered education materials in Spanish. As a member of the MRGSQT, the County collaborated with the MS4 permittees to improve upon the existing public education and outreach program. Target pollutants include pet waste, oils, household hazardous waste, fertilizers/pesticides, and trash/debris. The County has summarized education and outreach activities in each Annual Report including activities or planned activities related to targeting pet waste sources and residential education	Bernalillo County's measurable goals for targeted controls for bacteria include: A. Sanitary Sewer Systems. Measurable goals: Not applicable for the County. Sanitary sewer systems are owned and operated by the ABCWUA. The County does work cooperatively with the ABCWUA in areas where sanitary sewer lines are located within the unincorporated Bernalillo County to identify leaks and/or spills and to respond to illicit discharges associated with sanitary sewers. B. On-site Sewage Facilities. Measurable goals: Bernalillo County has an established goal of contacting a minimum of 300 unpermitted system or aging system owners per year with the intent of verifying the status and providing education regarding proper operation of the systems. C. Illicit Discharges and Dumping. Measurable goals: Refer to the SWMP - Table 6: Illicit Discharges and Improper Disposal for measurable goals. D. Animal Sources. Measurable goals: The County will continue to implement its public education and outreach program. Target pollutants addressed in this program include pet waste and trash/debris. The County will continue to provide proper pet waste disposal outreach and education both through County outreach programs and the through MRGSQT outreach efforts, as well as continue to provide pet waste bag dispensers and bags at it open space and parks properties. E. Residential Education. Measurable goal: The County will continue to use new and existing educational materials, brochures, and promotional items and well as using the County website and/or social media as tools for public education and outreach. The County will continue to offer education materials in Spanish. As a member of the Mid-Rio Grande Stormwater Quality Team (MRGSQT), the County will continue to collaborate with the MS4 permittees to improve upon the existing public education and outreach program. Program target pollutants include pet waste, oils, household hazardous waste, fertilizers/pesticides, and trash/debris. The	Address measurable goals of targeted controls in SWMP. Progress report submitted with each Annual Report (Due Dec. 1).
According to the requirements in Part I.C.2.b.(i).(f), the permittee shall monitor or assess progress in achieving measurable goals and determining the effectiveness of BMPs, and shall include documentation of this monitoring or assessment in the SWMP and annual reports. In addition, the SWMP must include methods to be used. This program element may be coordinated with the monitoring required in Part III.A. The permittee may use the following methods either individually or in conjunction to evaluate progress towards the measurable goal and improvements in water quality as follows: A. Evaluating Program Implementation Measures or B. Assessing Improvements in Water Quality Progress towards achieving the measurable goal shall be reported in the annual report. Annual reports shall report the measurable goal and the year(s) during the permit term that the MS4 conducted additional sampling or other assessment activities.	The County will include a summary of the of educational outreach opportunities conducted and list the number of people reached through the educational outreach program in the annual report. The County will conduct stormwater monitoring in accordance with Table 10, Wet Weather Monitoring Program, Part III.A.1. The goals and plan for this program are described in the Wet Weather Monitoring Program portion of this SWMP.	Bernalillo County included a summary of the of educational outreach opportunities conducted by the County and estimated the number of people reached through the educational outreach program in its prior annual reports. Educational programs and outreach activities conducted by Bernalillo County connected with County residents an estimated 420,000 times in FY16, 465,000 in FY17, and 250,700 in FY18, and 614,750 in FY19. In FY19, the County joined the MRGSQT to enhance its educational outreach in the community. Bernalillo County, in cooperation with AMAFCA, supported a graduate study, "Have You Seen the Poop Fairy?" for a UNM Community and Regional Planning graduate student. A summary of this study is included in the FY19 Annual Report. In addition, the County has conducted stormwater monitoring in accordance with Table 10, Wet Weather Monitoring Program, Part III.A.1. The goals and plan for this program are presented in the Wet Weather Monitoring Program portion of this SWMP. Working collaboratively with the watershed MS4s, Bernalillo County has worked to understand where stormwater has the potential to cause or contribute to the E. coli impairment as well as assess the impact of the watershed efforts to reduce E. coli pollution. The assessments have helped to focus and set the program measurable goals.	Bernalillo County through its involvement with the MRGSQT will assess and evaluate the program and progress in achieving the measurable goals listed above by tracking the number of educational outreach opportunities conducted and tracking the number of people reached through the educational outreach program. The County will include a summary of the of educational outreach opportunities conducted by the MRGSQT as well as by the County and list the estimated number of people reached through the educational outreach program in the annual report. Several Microbial Source Tracking (MST) studies are currently on-going within the watershed to better understand the potential significant sources of the pollutant of concern. The COA has been conducting an MST study since 2015; Bernalillo County and USGS have teamed to conduct a MST study with sampling beginning in July 2019 and will continue into FY20; AMAFCA is also conducting a MST study in tandem with the Bernalillo County/USGS study. The focus of the newer studies is on the southern portion of the Rio Grande in the MRG, where higher E. coli results, even during dry weather, have been observed. The results of these studies will be used to guide the overall program plan and goals. Findings from these studies will be summarized in each Annual Report, as applicable. In addition, the County will conduct compliance monitoring to monitor and test for E. coli. This sampling will be done in accordance with Table 10, Wet Weather Monitoring Program, Part III.A of the MS4 Permit and will assist with a water quality assessment of the overall watershed related to E. coli. Bernalillo County is part of a Cooperative Monitoring Compliance (CMC) group, established in 2016, with 12 watershed partners	Address monitoring and assessment of measurable goals of targeted controls in SWMP. Progress report submitted with each Annual Report (Due Dec. 1).
If, by the end of the 3rd year from the effective date of the permit, the permittee observes no progress toward the measurable goal either from program implementation or water quality assessments, the permittee shall identify alternative focused BMPs that address new or increased efforts towards the measurable goal. As appropriate, the MS4 may develop a new approach to identify the most significant sources of the pollutant(s) of concern and shall develop alternative focused BMPs (this may also include information that identifies issues beyond the MS4's control). These revised BMPs must be included in the SWMP and subsequent annual reports. Where the permittee originally used a measurable goal based on an aggregated WLA, the permittee may combine or share efforts with other MS4s discharging to the same impaired stream segment to determine an alternative sub-measurable goal for the pollutant(s) of concern for their respective MS4s, as described in Part I.C.2.b.(i).(c).B above. Permittees must document the proposed schedule for the development and subsequent adoption of alternative measurable goals for the pollutant(s) of concern for their respective MS4s and associated assessment of progress in meeting those individual goals.	If, by the end of the 3rd year from the effective date of the MS4 Permit, the County observes no progress toward the measurable goals, either from program implementation or water quality assessments, the County will reevaluate the program and identify alternative focused BMPs that address new or increased efforts towards the measurable goals.	The County and MS4s have seen progress toward the measurable goals listed in this section. Bernalillo County, in cooperation with the TAG, MRGSQT, and CMC has observed progress towards E. coli controls and measurable goals, as demonstrated by the fact that the impairment for E. coli has been removed from the NMED 303 (d) list for 2 of the 3 assessment segments along the river within the Middle Rio Grande corridor.	Bernalillo County will annually assess and evaluate the program and progress in achieving the measurable goals listed above. Progress will be reported in the Annual Report. The County and Middle Rio Grande MS4s have seen progress toward the measurable goals listed in this section. Bernalillo County, in cooperation with the TAG, MRGSQT, and CMC has observed progress towards E. coli controls and measurable goals, as demonstrated by the fact that the impairment for E. coli has been removed from the NMED 303 (d) list for 2 of the 3 assessment segments along the river within the Middle Rio Grande corridor. The County will continue implementing the BMPs described in this section. The focus of the E. coli studies will be on the lower reach of the Rio Grande within the Middle Rio Grande corridor, between the Isleta Pueblo boundary and the Tijeras Arroyo, where an impairment for E. coli still remains.	If required, end of the third year from the effective date of the MS4 Permit. Dec. 22, 2017

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Discharges to Impaired Waters With Approved TMDLs - Part I.C.2.b.(i) and TABLE 1.a - TMDL Bacteria Program- Part I.C.2.b.(iii)				
Table 1.a: Identify potential significant sources of the pollutant of concern entering your MS4.	Several studies related to identifying potential significant sources of the pollutant of concern have been completed for the MRG Watershed MS4 area. The results of these studies will be used to guide the overall program plan and goals.	Prior to the current MS4 Permit, a watershed-wide study for potential sources of E. coli was completed by the community. The Middle Rio Grande Microbial Source Tracking (MST) Assessment Report (Parson Water & Infrastructure Inc., October 2005) concluded that the primary fecal sources for coliform are avian (33.5%), canine (21.9%), human/sewage (15.9%), livestock (13.7%), and non-avian wildlife (12.8%, primarily rodent). Bernalillo County helped to fund this study and report. In response to the current MS4 Permit, AMAFCA contracted with a consultant to restudy the bacteria within the Middle Rio Grande in 2014-2015, specifically to evaluate the bacteria data over the recent history to report the trend analysis and the impact to the Rio Grande. The report for this study is the Middle Rio Grande Rio Grande E. coli Analysis and Research (CDM Smith, April 2015). It is included in AMAFCA's 2015 Annual Report, Attachment II.A. Several additional Microbial Source Tracking (MST) studies are currently on-going within the watershed to better understand the potential sources of the pollutant. The COA has been conducting an MST study since 2015; Bernalillo County and USGS have teamed to conduct a MST study with sampling beginning in July 2019; and AMAFCA is also conducting a MST study in tandem with the Bernalillo County/USGS study. The focus of the newer studies is on the more downstream end of the Urbanized Area, south of Rio Bravo, where higher E. coli results, even during dry weather, have been observed. Several studies related to identifying potential significant sources of the pollutant of concern have been completed or are currently active for the MRG Watershed MS4 area. The results of these studies will be used	Several Microbial Source Tracking (MST) studies are currently on-going within the watershed to better understand the potential significant sources of the pollutant of concern. The COA has been conducting an MST study since 2015; Bernalillo County and USGS have teamed to conduct a MST study with sampling beginning in July 2019 and will continue into FY20; AMAFCA is also conducting a MST study in tandem with the Bernalillo County/USGS study. The focus of the newer studies is on the southern portion of the Rio Grande in the MRG, where higher E. coli results, even during dry weather, have been observed. The results of these studies will be used to guide the overall program plan and goals. Findings from these studies will be summarized in each Annual Report, as applicable.	10 months (if alone) or 16 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or April 22, 2016
From Table 1.a, Develop and implement a public education program to reduce the discharge of bacteria in municipal stormwater contributed by (if applicable) by pets, recreational and exhibition livestock, and zoos.	Bernalillo County will continue to with the Project W.E.T. Kids in Discovery Series and the Enviroscape watershed model presentation as well as continued distribution of pet-waste focused materials. The County will send at least one mailing annually addressing various topics on a rotating basis. The County will continue to provide education through community and neighborhood association meetings and neighborhood newsletters.	Bernalillo County has included a summary of activities and planned activities for public outreach and education in each Annual Report. The County joined the Mid-Rio Grande Stormwater Quality Team (MRGSQT) in FY19. This collaborative group's public education and outreach program targeted pollutants including pet waste through its "Scoop the Poop" campaign and trash/debris. The County has utilized a combination of existing and new educational materials (such as the "Project W.E.T. Kids in Discovery Series" and the Enviroscape watershed model), Mid-Rio Grande Stormwater Quality Team (MRGSQT) and County-created brochures, and or other educational materials and promotional items including pet-waste focused materials from the previous Public Education and Outreach efforts from the prior permit term. The County has also used its website and social media as venues for distributing materials and posts about water quality. Many of the brochures and downloadable brochures are also available in Spanish. The County has done one mailing insert into the ABCWUA monthly bills, typically annually as space is available, addressing one or more of the following topics on a rotating basis: illicit discharge reporting, proper disposal of household hazardous waste, animal sources/pet wastes, or public participation in the MS4 process. The MS4 program utilized existing County processes to provide education on a neighborhood scale through on-going opportunities such as community and neighborhood association meetings and distribution of information through neighborhood newsletters. At least one educational or public participation announcement per year	Bernalillo County will include a summary of activities or planned activities for public outreach and education in each Annual Report. The County is a current member of the Mid-Rio Grande Stormwater Quality Team (MRGSQT). This collaborative group's public education and outreach program targets pollutants including pet waste through its "Scoop the Poop" campaign and trash/debris. The County will also utilize a combination of existing and new educational materials (such as the "Project W.E.T. Kids in Discovery Series" and the Enviroscape watershed model), Mid-Rio Grande Stormwater Quality Team (MRGSQT) and County-created brochures, and or other educational materials and promotional items including pet-waste focused materials from the previous Public Education and Outreach efforts from the prior permit term. The County will also use its website and/or social media as a venue for distributing materials and posts about water quality. Many of the brochures and downloadable brochures are also available in Spanish. The County contributes stormwater quality-related material into the County's newsletter/outreach program, at least annually or more frequently as space is available, addressing one or more of the following topics on a rotating basis: illicit discharge reporting, proper disposal of household hazardous waste, animal sources/pet wastes, or public participation in the MS4 process. The MS4 program utilizes existing County processes to provide education on a neighborhood scale through on-going opportunities such as community and neighborhood association meetings and distribution of information	12 months (if alone) or 16 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or April 22, 2016
From Table 1.a, Develop and implement a program to reduce the discharge of bacteria in municipal stormwater contributed by areas within your MS4 served by on-site wastewater treatment systems.	Bernalillo County will conduct educational and public outreach programs and continue to enforce the Bernalillo County Wastewater Ordinance. Bernalillo County has an established goal of contacting a minimum of 200 unpermitted system or aging system owners per year with the intent of verifying status and educating regarding proper operation of the systems. The County will include a summary of low income septic system replacements/sewer connections and activities or planned activities for public outreach and education in each Annual Report.	The County administers the septic system permitting program in the unincorporated portions of Bernalillo County under the Bernalillo County Wastewater Ordinance, ensuring the proper disposal of septic waste and proper operation and maintenance of septic systems. The wastewater ordinance was passed in 2015. The County began a campaign in 2012 to get unpermitted systems permitted or properly abandoned, with an established goal of contacting a minimum of 300 unpermitted system or aging system owners per year. To date, 1,773 system owners have been contacted, resulting in 813 responses and 727 resolved. Resolution means either no system was present or the property was vacant; resulted in permit or connection to sewer or repair/replacement to get into compliance; or intended/listed for clerk filing or future legal action (in process and determination). Beginning in 1993, the PIPE Program has provided assistance to income qualified residents by providing contractors to connect residences to water and sewer services. Beginning in 1998, the TANK Program provides assistance to income qualified residents with the replacement and/or repair of failing septic systems in areas of the County without sewer availability.	The County administers the septic system permitting program in the unincorporated portions of Bernalillo County under the Bernalillo County Wastewater Ordinance, ensuring the proper disposal of septic waste and proper operation and maintenance of septic systems. The County will use its existing Well and Wastewater permitting process to distribute information about proper septic system maintenance to 100% of new septic-permit holders. Issuance of County septic permits includes an information packet with recommended pumping/maintenance schedules and do's and don'ts of septic system care. The County will continue with its campaign to get 100% of unpermitted systems permitted. This includes the goal of contacting a minimum of 300 unpermitted system or aging system owners per year with the intent of verifying status and educating regarding proper operation of the systems. Beginning in FY 2020, the focus of these efforts will be in the South Valley, which is the area of the County draining to the one reach of the Rio Grande that is currently impaired for E. coli (NM-2105_50, Isleta Pueblo Boundary to Tijeras Arroyo). The County will continue to provide financial assistance is provided to low-income and disadvantaged residents that require inspections, repairs, and/or replacement of septic systems. Abandonment of septic systems and connection to sanitary sewer systems will be made where available.	14 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Feb. 22, 2016 or June 22, 2016
From Table 1.a, Review results to date from the Illicit Discharge Detection and Elimination program (see Part I.D.5.e) and modify as necessary to prioritize the detection and elimination of discharges contributing bacteria to the MS4.	This requirement will be addressed in conjunction with the County's IDDE Program. Refer to the *SWMP Table 6: Illicit Discharges and Improper Disposal* for additional information.	This requirement was addressed in conjunction with the County's IDDE Program. Refer to the SWMP Table 6: Illicit Discharges and Improper Disposal for additional information.	This requirement will be addressed in conjunction with the County's IDDE Program. Refer to the SWMP Table 6: Illicit Discharges and Improper Disposal for additional information.	14 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Feb. 22, 2016 or June 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Discharges to Impaired Waters With Approved TMDLs - Part I.C.2.b.(i) and TABLE 1.a - TMDL Bacteria Program- Part I.C.2.b.(iii)				
From Table 1.a, Develop and implement a program to reduce the discharge of bacteria in municipal stormwater contributed by other significant source identified in the Illicit Discharge Detection and Elimination program (see Part I.D.5.e).	The County will review its IDDE Program results annually and identify illicit discharges that contributed bacteria to the MS4. The County will develop strategies to address IDDEs found to contribute bacteria. The development and implementation of strategies will depend on the results. These strategies will be reported in subsequent Annual Reports.	This requirement was addressed in conjunction with the County's IDDE Program. Refer to the SWMP Table 6: Illicit Discharges and Improper Disposal for additional information. The County reviewed its IDDE Program results annually and looked at illicit discharges (specific as well as general types of discharges and/or locations of discharges) that contributed bacteria to the MS4.	This requirement will be addressed in conjunction with the County's IDDE Program. Refer to the SWMP Table 6: Illicit Discharges and Improper Disposal for additional information. The County will review its IDDE Program results annually and identify illicit discharges (specific as well as general types of discharges and/or locations of discharges) that contributed bacteria to the MS4. Strategies will be developed to address these specific or general IDDEs. Development and implementation of strategies will depend on the IDDE program results. The Annual Report will include a summary of relevant IDDE program results as well as strategies, if applicable, to address IDDEs found to contribute bacteria.	16 months (if alone) or 20 months (cooperative) from effective date of MS4 Permit. April 22, 2016 or August 22, 2016
Include in the Annual Reports progress on program implementation and reducing the bacteria and updates to their measurable goals as necessary. As required in Part I.C.2.b.(i).(d), the annual report must include an analysis of how the selected BMPs have been effective in contributing to achieving the measurable goal.	The County will summarize education and outreach activities in each Annual Report. Strategies developed to address IDDEs found to contribute bacteria to the MS4 will be reported in subsequent Annual Reports. The County will report annually on compliance monitoring including E. coli monitoring results.	The County has summarized the education and outreach activities in each Annual Report and included the number of educational outreach opportunities conducted and summarize activities or planned activities related to targeting pet waste sources as well as residential education targeting bacteria sources. The County has reported annually on compliance monitoring including E. coli monitoring results. This reporting will be done in accordance with Part III.A (Wet Weather Monitoring Program) of the MS4 Permit. The County, as part of the CMC, has obtained all seven (7) MS4 permit required samples for the permit term.	The County will summarize education and outreach activities in each Annual Report and will include the number of educational outreach opportunities conducted and summarize activities or planned activities related to targeting pet waste sources as well as residential education targeting bacteria sources. If strategies are developed to address IDDEs found to contribute bacteria to the MS4, these will be reported in subsequent Annual Reports. The County will report annually on compliance monitoring including E. coli monitoring results. This reporting will be done in accordance with Part III.A (Wet Weather Monitoring Program) of the MS4 Permit.	Annual Report (due Dec. 1)

Part I.C: Special Conditions Discharges to Impaired Waters Without Approved TMDLs - Part I.C.2.b.(ii) and TABLE 1.b - TMDL Nutrient Program- Part I.C.2.b.(iii)

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Discharges to Impaired Waters Without Approved TMDLs - Part I.C.2.b.(ii) and TABLE 1.b - TMDL Nutrient Program- Part I.C.2.b.(iii)				
Table 1.b: Identify potential significant sources of the pollutant of concern entering your MS4.	The 2014-2016 State of New Mexico CWA 303(d)/305(d) Integrated List and Report identifies the Tijeras Arroyo Assessment Unit – Four Hills Bridge to headwaters as impaired for nutrients. Bernalillo County staff has completed the site assessments via aerial photo reviews and site walks through the drainages from the Four Hills Bridge eastward to the Carnuel land grant property line, and has not identified any significant sources for nutrients. Bernalillo County, in cooperation with COA and NMDOT, voluntarily began the Pre-TMDL Cooperative Nutrient Study for Tijeras Arroyo in 2015.	Bernalillo County, in cooperation with COA and NMDOT, voluntarily began the Pre-TMDL Cooperative Nutrient Study for Tijeras Arroyo in 2015 to now. The nutrient study includes sample collection in wet and dry weather conditions. Annual Reports for FY16, FY17, and FY18 included a summary of the study and were submitted to NMED and EPA. The FY19 annual report will be submitted in December 2020. The County began a campaign in 2012 to get unpermitted septic systems permitted or properly abandoned, with an established goal of contacting a minimum of 300 unpermitted system or aging system owners per year. In FY19, the County targeted the East Mountain Area, including the Upper Tijeras Arroyo watershed, and closed 233 septic systems.	The County, along with COA and NMDOT, will continue with the voluntary Tijeras Arroyo nutrient study and will summarize findings in the Annual Report. The results of these studies will be used to guide the overall program plan and goals. Bernalillo County will continue to communicate with NMED and EPA, as applicable, related to the Pre-TMDL Cooperative Nutrient Study for Tijeras Arroyo study and sampling results. Bernalillo County will continue it's unpermitted and aging septic systems campaign. The program has an established goal of contacting a minimum of 300 unpermitted system or aging system owners per year with the intent of verifying status and educating regarding proper operation of the systems. The County will continue to provide financial assistance to low-income and disadvantaged residents that require inspections, repairs, and/or replacement of septic systems through its PIPE and TANK programs. Abandonment of septic systems and connection to sanitary sewer systems will be made where available.	10 months (if alone) or 16 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or April 22, 2016
From Table 1.b, Develop and implement a public education program to reduce the discharge of pollutant of concern in municipal stormwater contributed by residential and commercial use of fertilizer	The County will utilize a combination of existing and new educational materials (such as the "Project W.E.T. Kids in Discovery Series" and the Enviroscape watershed model), County-created brochures, and other educational materials and promotional items. The County will also use its website and/or social media as a venue for distributing materials. The program will utilize the Bernalillo County Parks and Recreation Department's free backyard farming series, the Master Naturalist education series, and other community events to promote proper use and disposal of garden and landscape chemicals and proper disposal of used motor oil and other household hazardous wastes. The program utilizes existing County processes to provide education on a neighborhood scale through on-going opportunities such as community and neighborhood association meetings and distribution of information through neighborhood newsletters. At least one educational or public participation announcement per year will be offered to the neighborhood associations for inclusion in neighborhood newsletters.	Bernalillo County is a member of the Tijeras Creek Watershed Collaborative. Through this collaborative, the County has supported, funded, and/or participated in several watershed restoration projects and youth engagement/outreach/education. Information on the TCWC can be found here: https://sites.google.com/site/tijerascreekwc/ Additionally, Bernalillo County, with help from its partners, created a watershed mapping tool for the Upper Tijeras Arroyo Watershed (see above website). Educational programs and outreach activities conducted by Bernalillo County connecting with County residents an estimated 420,000 times in FY16, 465,000 in FY17, and 250,700 in FY18, and 614,750 times in FY19. In FY19, the County joined the MRGSQT to enhance its educational outreach in the community. Through the backyard farming series, Bernalillo County provided training and education to county residents specific to fertilizer use. Project W.E.T. materials were provided during public education/outreach events in FY19. The County conducted 24 household hazardous waste events within the Upper Tijeras Arroyo watershed between 2015-2019, collecting a total of approximately 48,400 lbs of waste. Information on stormwater quality, such as how to properly dispose of household hazardous waste, including fertilizers, has been included at least annually in neighborhood news letters. The County provided 3 free trainings to residents in the Upper Tijeras Arroyo watershed for proper septic system maintenance, repair, and replacement in FY18.	Bernalillo County will continue membership in the Tijeras Creek Watershed Collaborative and will continue to support, fund, participate in watershed restoration projects. The County will continue to promote watershed education, including use of the Project W.E.T. Kids in Discovery Series and the Enviroscape watershed model presentation as well as continued distribution of County-created materials. The County will also use its website and/or social media as a venue for distributing materials. The program will utilize the Bernalillo County Parks and Recreation Department's free backyard farming series, the Master Naturalist education series, and other community events to promote proper use and disposal of garden and landscape chemicals and proper disposal of used motor oil and other household hazardous wastes. The program utilizes existing County processes to provide education on a neighborhood scale through on-going opportunities such as community and neighborhood association meetings and distribution of information through neighborhood newsletters. At least one educational or public participation announcement per year will be offered to the neighborhood associations for inclusion in neighborhood newsletters. The County will continue to use community events to promote proper use and disposal of garden and landscape chemicals.	10 months (if alone) or 16 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or April 22, 2016
From Table 1.b, Develop and implement a program to reduce the discharge of the pollutant of concern in municipal stormwater contributed by fertilizer use at municipal operations (e.g., parks, roadways, municipal facilities)	This requirement will be addressed in conjunction with the County's Pollution Prevention/Good Housekeeping Program. Refer to the SWMP TABLE 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations for additional information.	This requirement will be addressed in conjunction with the County's Pollution Prevention/Good Housekeeping Program. Refer to the SWMP TABLE 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations for additional information. Refer to the SWMP TABLE 8: Public Education and Outreach for additional information.	This requirement will be addressed in conjunction with the County's Pollution Prevention/Good Housekeeping Program. Refer to the SWMP TABLE 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations for additional information. Refer to the SWMP TABLE 8: Public Education and Outreach for additional information. The County will summarize education and outreach activities in each Annual Report.	12 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2016
From Table 1.b, Develop and implement a program to reduce the discharge of the pollutant of concern in municipal stormwater contributed by municipal and private golf courses within your jurisdiction	There are no municipal or private golf courses within the unincorporated Bernalillo County urbanized area jurisdiction. Bernalillo County will address nutrients though public outreach and education programs.	There are no municipal or private golf courses within the unincorporated Bernalillo County urbanized area jurisdiction. Bernalillo County has addressed nutrients though public outreach and education programs. Refer to the SWMP TABLE 8: Public Education and Outreach for additional information.	There are no municipal or private golf courses within the unincorporated Bernalillo County urbanized area jurisdiction. Bernalillo County will address nutrients though public outreach and education programs. The County will summarize education and outreach activities in each Annual Report.	12 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Discharges to Impaired Waters Without Approved TMDLs - Part I.C.2.b.(ii) and TABLE 1.b - TMDL Nutrient Program- Part I.C.2.b.(iii)				
From Table 1.b, Develop and implement a program to reduce the discharge of the pollutant of concern in municipal stormwater contributed by other significant source identified in the Illicit Discharge Detection and Elimination program (see Part I.D.5.e).	The County will review its IDDE Program results annually and identify illicit discharges that contributed bacteria to the MS4. The County will develop strategies to address IDDEs found to contribute to nutrients. The development and implementation of strategies will depend on the results. These strategies will be reported in subsequent Annual Reports.	This requirement will be addressed in conjunction with the County's IDDE Program, refer to the SWMP - Table 6: Illicit Discharges and Improper Disposal for additional information.	This requirement will be addressed in conjunction with the County's IDDE Program, refer to the SWMP - Table 6: Illicit Discharges and Improper Disposal for additional information. The County will review its IDDE Program results annually and identify illicit discharges (specific as well as general types of discharges and/or locations of discharges) that contributed nutrients to the MS4. Strategies will be developed to address these specific or general IDDEs. Development and implementation of strategies will depend on the IDDE program results.	12 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2016
Include in the Annual Reports progress on program implementation and reducing the pollutant of concern and updates their measurable goals as necessary. As required in Part I.C.2.b.(i).(d), the annual report must include an analysis of how the selected BMPs have been effective in contributing to achieving the measurable goal.	The County will summarize education and outreach activities in each Annual Report and will include the number of educational outreach opportunities conducted and summarize activities or planned activities related to targeting residential education regarding nutrient sources. In addition, if strategies are developed to address IDDEs found to contribute nutrients to the MS4, these will be reported in subsequent Annual Reports.	The County has summarized education and outreach activities in each Annual Report, has included the number of educational outreach opportunities conducted, and has summarized activities or planned activities related to targeting residential education regarding nutrient sources. Refer to the SWMP TABLE 8: Public Education and Outreach for additional information. Bernalillo County, in cooperation with COA and NMDOT, voluntarily began the Pre-TMDL Cooperative Nutrient Study for Tijeras Arroyo in 2015 to now. The nutrient study includes sample collection in wet and dry weather conditions. Annual Reports for this study for FY16, FY17, and FY18 were submitted to NMED and EPA. The FY19 Annual Report for this sampling will be submitted in December 2019.	The County will summarize education and outreach activities in each Annual Report, will include the number of educational outreach opportunities conducted, and will summarize activities or planned activities related to targeting residential education regarding nutrient sources. In addition, if strategies are developed to address IDDEs found to contribute nutrients to the MS4, these will be reported in subsequent Annual Reports. Bernalillo County will continue to communicate with NMED and EPA, as applicable, related to the Pre-TMDL Cooperative Nutrient Study for Tijeras Arroyo study and sampling results.	Annual Report (due Dec. 1)

Part I.C: Special Conditions
Endangered Species Act (ESA) Requirements
Dissolved Oxygen Strategy in the Receiving Waters of the Rio Grande - Part I.C.3.a

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Endangered Species Act (ESA) Requirements -Dissolved Oxygen Strategy in the Receiving Waters of the Rio Grande - Part I.C.3.a				
Per Part I.C.3.a.(i), the permittees must identify structural controls, natural or man-made topographical and geographical formations, MS4 operations, or oxygen demanding pollutants contributing to reduced dissolved oxygen in the receiving water of the Rio Grande. The permittees shall implement controls, and update/revise as necessary, to eliminate discharge of pollutants at levels that cause or contribute to exceedances of applicable water quality standards for dissolved oxygen in waters of the Rio Grande. The permittees shall submit a summary of findings and a summary of activities undertaken under Part I.C.3.a.(i) with each Annual Report. The SWMP submitted with the first and fourth annual reports must include a detailed description of controls implemented (and/or proposed control to be implemented) along with corresponding measurable goals.	Bernalillo County will continue to address the DO strategy through it's pollution prevention and good housekeeping program, structural BMPs, public education and outreach, the nutrient program, the sediment pollutant load reduction strategy, construction and post-construction requirements, and regulating septic systems.	No specific structural elements, topographical and/or geographical formations, or County operations have been identified as contributing to reduced DO in the receiving waters of the Rio Grande within the jurisdictional area. Structural elements constructed by Bernalillo County that address DO include a duckbill check valve stormwater outlet for the Sanchez Farms outfall and release of stormwater into the Bosque prior to outfall into the Rio Grande. Where stormwater is released into the Bosque upstream of the Rio Grande, stormwater flows rarely make it to the river and instead spread, slow and infiltrate in the Bosque. Bernalillo County addresses County activities that have the potential to affect stormwater quality (including pollutants that affect DO levels) through pollution prevention and good housekeeping, see TABLE 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations for more information. The County also addresses pollutants that affect DO through public education and outreach, the sediment pollutant load reduction strategy, construction and post-construction requirements, and the Wastewater permitting process to address septic systems. See these sections of the SWMP for additional information.	No specific structural elements, topographical and/or geographical formations, or County operations have been identified as contributing to reduced DO in the receiving waters of the Rio Grande within the jurisdictional area. The County will continue to provide information in its annual report of any new structural elements constructed by the County (or in partnerships) that address low DO issues. Bernalillo County addresses County activities that have the potential to affect stormwater quality (including pollutants that affect DO levels) through pollution prevention and good housekeeping, see TABLE 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations for more information. These activities, as applicable, will be summarized in each annual report. The County also addresses pollutants that affect DO through public education and outreach, the sediment pollutant load reduction strategy, construction and post-construction requirements, and the Wastewater permitting process to address septic systems. See these sections of the SWMP for additional information related to specific measurable goals and annual reporting elements.	Annual Report (due Dec. 1)

Part I.C: Special Conditions Endangered Species Act (ESA) Requirements - Sediment Pollutant Load Reduction Strategy - Part I.C.3.b

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Endangered Species Act (ESA) Requirements -Sediment Pollutant Load Reduction Strategy - Part I.C.3.b				
Per Part I.C.3.b, the permittee must develop, implement, and evaluate a sediment pollutant load reduction strategy to assess and reduce pollutant loads associated with sediment (e.g., metals, etc. adsorbed to or traveling with sediment, as opposed to clean sediment) into the receiving waters of the Rio Grande.	See below	See below	See below	See below
(i) Sediment Assessment: The permittee must identify and investigate areas within its jurisdiction that may be contributing excessive levels (e.g., levels that may contribute to exceedance of applicable Water Quality Standards) of pollutants in sediments to the receiving waters of the Rio Grande as a result of stormwater discharges. The permittee must identify structural elements, natural or man-made topo-graphical and geographical formations, MS4 operations activities, and areas indicated as potential sources of sediments and pollutants in the receiving waters of the Rio Grande. At the time of assessment, the permittee shall record any observed erosion of soil or sediment along ephemeral channels, arroyos, or stream banks, noting the scouring or sedimentation in streams. The assessment should be made using available data from federal, state, or local studies supplemented as necessary with collection of additional data. The permittee must describe, in the first annual report, all standard operating procedures, quality assurance plans to assure that accurate data are collected, summarized, evaluated and reported.	Bernalillo County has several stormwater facilities, including about 50 ponds and other stormwater quality features, that function as BMPs for sediment removal. The County's O&M activities, including sediment removal from ponds and other stormwater facilities, will be tracked and evaluated for the Sediment Assessment requirement for this Permit activity.	In FY16, FY17, FY18 and FY19, Bernalillo County tracked and estimated the volume of sediment removed from their stormwater facilities and reported these sediment removal estimated values in the MS4 Annual Report. In FY18, 349 tons of waste (green waste, municipal waste, and sediment) were removed from County facilities. In FY19, 351 tons of waste (green waste, municipal waste, and sediment) were removed from County facilities. Bernalillo County drainage and water quality facilities, such as ponds, earthen channels, and stormwater quality manholes, provide sediment removal from stormwater before it reaches the Rio Grande. Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes.	As part of the County's regular O&M activities, Bernalillo County will continue the sediment assessment phase by tracking and estimating the volume of sediment removed from their stormwater facilities annually. Continuation of this assessment is not required by the MS4 permit but the continued collection of this data may be valuable to the County as it applies to this program and future planning activities. This data will be reported in each Annual Report.	No Permit required schedule. Progress Report for the entire Sediment Pollutant Load Reductions Strategy to be submitted with the fifth Annual Report. Dec. 1, 2019
(ii) Estimate Baseline Loading: Based on the results of the sediment pollutants assessment required in Part I.C.3.b.(i) above, the permittee must provide estimates of baseline total sediment loading and relative potential for contamination of those sediments by urban activities for drainage areas, sub-watersheds, Impervious Areas (IAs), and/or Directly Connected Impervious Area (DCIAs) draining directly to a surface waterbody or other feature used to convey waters of the United States. Sediment loads may be provided for targeted areas in the entire Middle Rio Grande Watershed using an individual or cooperative approach. Any data available and/or preliminary numeric modeling results may be used in estimating loads.	The data collected in the Sediment Assessment will be used for estimating baseline sediment loading to its facilities.	In FY19, Bernalillo County led the effort for the watershed to complete the estimated baseline sediment loading. Sediment loads are provided for targeted areas in the entire Middle Rio Grande Watershed using a cooperative approach. The "Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy" report, June 25, 2019 summarizes the sediment loading evaluation at five main outfalls into the Rio Grande.	Bernalillo County will review the "Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy" and discuss the findings with the watershed MS4s. The results of this study will be used to guide the overall program plans and goals. Updates to the Sediment Pollutant Load Reduction Strategy and targeted controls will be implemented, as applicable. The County will summarize any progress or updates to the Sediment Pollutant Load Reduction Strategy in each Annual Report.	No Permit required schedule. Progress Report for the entire Sediment Pollutant Load Reductions Strategy to be submitted with the fifth Annual Report. Dec. 1, 2019
(iii) Targeted Controls: Include a detailed description of all proposed targeted controls and BMPs that will be implemented to reduce sediment pollutant loads, calculated in Part I.C.3.b.(ii) above, during the next ten (10) years of permit issuance. For each targeted control, the permittee must include interim measurable goals (e.g., interim sediment pollutant load reductions) and an implementation and maintenance schedule, including interim milestones, for each control measure, and as appropriate, the months and years in which the MS4 will undertake the required actions. Any data available and/or preliminary numeric modeling results may be used in establishing the targeted controls, BMPs, and interim measurable goals. The permittee must prioritize pollutant load reduction efforts and target areas (e. g. drainage areas, sub watersheds, IAs, DCIAs) that generate the highest annual average pollutant loads.	Following review of the Sediment Assessment findings, Bernalillo County will make program and system improvements as necessary to meet this Permit requirement.	An important element of the Strategy is the use of targeted controls and BMPs to reduce sediment transport by stormwater into the receiving water of the Rio Grande. As shown in the "Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy" report, a total of 155,148 cubic yards of sediment was removed by the permittees in FY18 and at least 266,453 cubic yards of sediment was removed by the permittees during the MS4 permit period.	Bernalillo County will review the "Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy" and discuss the findings with the watershed MS4s. The results of this study will be used to guide the overall program plans and goals. Updates to the Sediment Pollutant Load Reduction Strategy and targeted controls will be implemented, as applicable. The County will summarize any progress or updates to the Sediment Pollutant Load Reduction Strategy in each Annual Report.	No Permit required schedule. Progress Report for the entire Sediment Pollutant Load Reductions Strategy to be submitted with the fifth Annual Report. Dec. 1, 2019
(iv) Monitoring and Interim Reporting: The permittee shall monitor or assess progress in achieving interim measurable goals and determining the effectiveness of BMPs, and shall include documentation of this monitoring or assessment in the SWMP and annual reports. In addition, the SWMP must include methods to be used. This program element may be coordinated with the monitoring required in Part III.A.	Bernalillo County will include a progress update for this program in each Annual Report.	In FY19, Bernalillo County led the effort for the watershed regarding monitoring to assess progress with this program. The sampling and monitoring methods are described in the "Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy," June 25, 2019. This report will be included with the FY19 Annual Report.	As mentioned, Bernalillo County will use of the "Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy" to guide the overall program plans and goals. Monitoring and assessment will be considered during the development of the program plans and goals. The County will summarize any progress or updates to the Sediment Pollutant Load Reduction Strategy in each Annual Report.	Update SWMP as necessary and include progress report in each Annual Report.

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.C: Special Conditions				
Endangered Species Act (ESA) Requirements -Sediment Pollutant Load Reduction Strategy - Part I.C.3.b				
(v) Progress Evaluation and Reporting: The permittee must assess the overall success of the Sediment Pollutant Load Reduction Strategy and document both direct and indirect measurements of program effectiveness in a Progress Report to be submitted with the fifth Annual Report. Data must be analyzed, interpreted, and reported so that results can be applied to such purposes as documenting effectiveness of the BMPs and compliance with the ESA requirements specified in Part I.C.3.b. The Progress Report must include: (a) A list of species likely to be within the action area; (b) Type and number of structural BMPs installed; (e) Evaluation of pollutant source reduction effects; (d) Any recommendation based on program evaluation; (e) Description of how the interim sediment load reduction goals established in Part I.C.3.b.(iii) were achieved; and (f) Future planning activities needed to achieve increase of sediment load reduction required in Part I.C.3.d.(iii).	A Progress Report on the Sediment Pollutant Load Reduction Strategy will be included with the fifth Annual Report.	In FY19, Bernalillo County led the effort for the watershed to complete the estimated baseline sediment loading. The "Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy" report, June 25, 2019 summarizes the sediment loading evaluation at five main outfalls into the Rio Grande. This report will be included with the FY19 Annual Report.	The submission of the "Progress Evaluation Report for the Sediment Pollutant Load Reduction Strategy" report, June 25, 2019 with the FY19 Annual Report completes and meets this MS4 permit requirement. Moving forward, future activities (planned, as well as implemented) determined to be needed to achieve improved sediment load reduction will be summarized in the Annual Reports.	Progress Report to be submitted with the fifth Annual Report. Dec. 1, 2019
(vi) Critical Habitat: Verify that the installation of stormwater BMPs will not occur in or adversely affect currently listed endangered or threatened species critical habitat by reviewing the activities and locations of stormwater BMP installation within the location of critical habitat of currently listed endangered or threatened species at the FWS website http://criticalhabitat.fws.gov/crithab/.	Bernalillo County will continue working with USFWS and USACE, as required, related to any BMPs installed for the purpose of sediment capture and removal.	Bernalillo County has continued working with USFWS and USACE, as required, related to any BMPs installed for the purpose of sediment capture and removal.	Bernalillo County will continue working with USFWS and USACE, as required, related to any BMPs installed for the purpose of sediment capture and removal.	No Permit required schedule. Ongoing requirement of the MS4 Permit.

Part I.D.5 - SWMP Control Measures
Table 2: Construction Site Stormwater Runoff Control - Part I.D.5.a

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 2: Construction Site Stormwater Runoff Control - Part I.D.5.a				
5.a.(i) The permittee shall develop, revise, implement, and enforce a program to reduce pollutants in any stormwater runoff to the MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of stormwater discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more.	The County requires construction projects to follow the Construction General Permit (CGP). Records of the inspections should be made available for the county engineer to review. As required by Part I.D.5.a.(iii) site inspections are carried out concurrently with building code inspections by the County. Several inspections are conducted over the construction project lifetime and include checking for compliance with the CGP, SWPPP review, and a final inspection of post-construction BMPs.	The County requires construction projects to follow the NPDES Construction General Permit (CGP). Chapter 38, Article III of the Bernalillo County Code of Ordinances requires all construction, development and redevelopment projects with land disturbances equal to or greater than one acre, including sites which disturb less than one acre but are part of a larger common plan of development, to have a SWPPP in accordance with EPA NPDES Phase II regulations for construction site stormwater runoff control. The SWPPP shall outline the BMPs to be utilized by the operator/owner of the project to protect stormwater quality during construction and will be maintained by the owner of the property. Small construction activity (1-5 acres) may qualify for a waiver in lieu of needing to obtain coverage under the CGP based on: (A) a low rainfall erosivity factor, (B) a TMDL analysis, or (C) an equivalent analysis that determines allocations for small construction sites are not needed. The Pueblo of Sandia does not allow the rainfall erosivity waivers to be granted for any small construction activities. Specific Construction Site Stormwater Runoff Control program goals are described in detail below.	The County will continue to require construction projects to follow the NPDES Construction General Permit (CGP). Chapter 38, Article III of the Bernalillo County Code of Ordinances requires all construction, development and redevelopment projects with land disturbances equal to or greater than one acre, including sites which disturb less than one acre but are part of a larger common plan of development, to have a SWPPP in accordance with EPA NPDES Phase II regulations for construction site stormwater runoff control. The SWPPP shall outline the BMPs to be utilized by the operator/owner of the project to protect stormwater quality during construction and will be maintained by the owner of the property. Small construction activity (1-5 acres) may qualify for a waiver in lieu of needing to obtain coverage under the CGP based on: (A) a low rainfall erosivity factor, (B) a TMDL analysis, or (C) an equivalent analysis that determines allocations for small construction sites are not needed. The Pueblo of Sandia does not allow the rainfall erosivity waivers to be granted for any small construction activities. Specific Construction Site Stormwater Runoff Control program goals are described in detail below.	10 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or June 22, 2016
Development of an ordinance or other regulatory mechanism as required in Part I.D.5.a.(ii)(a), an ordinance or other regulatory mechanism to require erosion and sediment controls, as wells as sanctions to ensure compliance, to the extent allowable under State, Tribal, or local law.	The County will continue enforcement of the drainage ordinance, Chapter 38, Article III of the Bernalillo County Code of Ordinances and will track the number of SWPPPs, including erosion control plans, reviewed annually.	Bernalillo County adopted the stormwater quality ordinance, Chapter 38, Article IV in 2017, as required by the MS4 Permit. Chapter 38, Article IV of the Bernalillo County Code of Ordinances requires all construction, development and redevelopment projects with land disturbances equal to or greater than one acre, including sites which disturb less than one acre but are part of a larger common plan of development, to have a SWPPP in accordance with EPA NPDES regulations for construction site stormwater runoff control. The SWPPP shall outline the BMPs to be undertaken by the operator/owner of the project to protect stormwater quality during construction and will be maintained by the owner of the property. The Chapter 38, Article III, the storm drainage ordinance, includes the following requirements (based on the nature of the development or construction project): - ponds shall provide for additional volume to accommodate sediment where undeveloped areas contribute flow or less than 40 percent of the total drainage area is impervious; - a grading and drainage plan shall include erosion control information sufficient in detail to determine project feasibility; and - all construction projects, both public and private, unless specifically excluded, require an approved erosion control plan prior to the start of construction. The erosion control plan must address stormwater quality where the land disturbance is one acre or greater, or is part of a larger common plan of development. Penalties for non-compliance with this ordinance include liens against the property for reasonable costs associated with a remedy(ies), revocation or refusal to renew or issue any permit until appropriate remedies are made, and punishable as provided in Chapter 1, Section 1-6 of the Bernalillo County Code.	Bernalillo County adopted the stormwater quality ordinance in 2017, as required by the MS4 Permit (Chapter 38, Article IV of the Bernalillo County Code of Ordinances). Bernalillo County will continue enforcement of the ordinance as well as the storm drainage ordinance (Chapter 38, Article III) and will track the number of SWPPPs, including erosion control plans, reviewed annually. Penalties for non-compliance with this ordinance include liens against the property for reasonable costs associated with a remedy(ies), revocation or refusal to renew or issue any permit until appropriate remedies are made, and punishable as provided in Chapter 1, Section 1-6 of the Bernalillo County Code.	10 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or June 22, 2016
Develop requirements and procedures as required in Part I.D.5.a(ii).(b) through Part I.D.5.a(ii).(h)	The County will continue enforcement of the drainage ordinance, Chapter 38, Article III of the Bernalillo County Code of Ordinances and will track the number of SWPPPS, including erosion control plans, reviewed annually.	Bernalillo County follows and enforces its ordinance, as required by the MS4 Permit (Chapter 38, Articles III and IV of the Bernalillo County Code of Ordinances). Specific Construction Site Stormwater Runoff Control program requirements and procedures are described in detail below.	Bernalillo County will continue to follow and enforce its ordinance, which meets the requirements of the MS4 Permit (Chapter 38, Articles III and IV of the Bernalillo County Code of Ordinances). Specific Construction Site Stormwater Runoff Control program requirements and procedures are described in detail below.	13 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Jan. 22, 2016 or June 22, 2016
(b) Requirements for construction site operators to implement appropriate erosion and sediment control best management practices (both structural and non-structural).	The County will continue enforcement of the drainage ordinance, Chapter 38, Article III of the Bernalillo County Code of Ordinances and will track the number of SWPPPS, including erosion control plans, reviewed annually.	Bernalillo County has followed and enforced its ordinance, as required by the MS4 Permit (Chapter 38, Articles III and IV of the Bernalillo County Code of Ordinances). The Bernalillo County ordinance includes the following requirement (based on the nature of the development or construction project): - all construction projects, both public and private, unless specifically excluded, require an approved erosion control plan prior to the start of construction. The erosion control plan must address stormwater quality where the land disturbance is one acre or greater, or is part of a larger common plan of development. This requirement helps ensure that construction site operators implement appropriate erosion and sediment control best management practices (both structural and non-structural).	Bernalillo County will continue to follow and enforce its ordinance, as required by the MS4 Permit (Chapter 38, Articles III and IV of the Bernalillo County Code of Ordinances). The Bernalillo County ordinance includes the following requirement (based on the nature of the development or construction project): -All construction projects, both public and private, unless specifically excluded, require an approved erosion control plan prior to the start of construction. The erosion control plan must address stormwater quality where the land disturbance is one acre or greater, or is part of a larger common plan of development. This requirement helps ensure that construction site operators implement appropriate erosion and sediment control best management practices (both structural and non-structural).	13 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Jan. 22, 2016 or June 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 2: Construction Site Stormwater Runoff Control - Part I.D.5.a				
(c) Requirements for construction site operators to control waste such as, but not limited to, discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality.	The County will continue enforcement of the drainage ordinance, Chapter 38, Article III of the Bernalillo County Code of Ordinances and will track the number of SWPPPs, including erosion control plans, reviewed annually.	Bernalillo County has followed and enforced its ordinance, as required by the MS4 Permit (Chapter 38, Articles III and IV of the Bernalillo County Code of Ordinances). Per the County ordinance, a SWPPP is required in accordance with EPA NPDES MS4 regulations for construction site stormwater runoff control and CGP requirements. The SWPPP shall outline the BMPs to be undertaken by the operator/owner of the project to protect stormwater quality during construction - this includes, as specifically required in the CGP, the requirement for construction site operators to control waste such as, but not limited to, discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality.	Bernalillo County will continue to follow and enforce its ordinance, as required by the MS4 Permit (Chapter 38, Articles III and IV of the Bernalillo County Code of Ordinances). Per the County ordinance, a SWPPP is required in accordance with EPA NPDES MS4 regulations for construction site stormwater runoff control and CGP requirements. Bernalillo County will continue to review the SWPPPs for County construction projects, using the standard EPA CGP checklist during the SWPPP reviews. The SWPPP shall outline the BMPs to be undertaken by the operator/owner of the project to protect stormwater quality during construction - this includes, as specifically required in the CGP, the requirement for construction site operators to control waste such as, but not limited to, discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality.	13 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Jan. 22, 2016 or June 22, 2016
(d) Procedures for site plan review which incorporate consideration of potential water quality impacts. The site plan review must be conducted prior to commencement of construction activities, and include a review of the site design, the planned operations at the construction site, the planned control measures during the construction phase (including the technical criteria for selection of the control measures), and the planned controls to be used to manage runoff created after the development.	The County will continue enforcement of the drainage ordinance, Chapter 38, Article III of the Bernalillo County Code of Ordinances and will track the number of site plans, including grading and drainage plans and erosion control plans, reviewed annually.	Bernalillo County has met this Permit requirement through the Grading and Drainage plan review process. This oversight is completed through the review of County permit application requests. These permits generally consist of building, zoning permits; zone changes; special use permits; and/or platting actions and are reviewed for compliance with guidance/regulatory documents such as the MS4 Permit, the drainage, floodplain, street standards, regional drainage master plans and excavation ordinances. This plan review process incorporates consideration of potential water quality impacts and ensures compliance with floodplain and stormwater issues. In a cooperative effort with the City of Albuquerque, Village of Los Ranchos, NMDOT, and AMAFCA, the Bernalillo County drainage engineer reviews development projects that have a connection to Bernalillo County facilities for projects disturbing at least one acre. Review includes stormwater conveyance, water quality, and erosion control. Bernalillo County has tracked and reported the number of site plans, including grading and drainage plans and erosion control plans, reviewed annually.	Bernalillo County will continue to meet this Permit requirement through the Grading and Drainage plan review process. This oversight is completed through the review of County permit application requests. These permits generally consist of building, zoning permits; zone changes; special use permits; and/or platting actions and are reviewed for compliance with guidance/regulatory documents such as the MS4 Permit, the drainage, floodplain, street standards, regional drainage master plans and excavation ordinances. This plan review process incorporates consideration of potential water quality impacts and ensures compliance with floodplain and stormwater issues. The County will continue its cooperative efforts with the City of Albuquerque, Village of Los Ranchos, NMDOT, and AMAFCA, for the Bernalillo County drainage engineer review of development projects that have a connection to Bernalillo County facilities for projects disturbing at least one acre. Reviews will includes stormwater conveyance, water quality, and erosion control. Bernalillo County will continue to track and report the number of site plans, including grading and drainage plans and erosion control plans, reviewed annually.	13 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Jan. 22, 2016 or June 22, 2016
(e) Procedures for receipt and consideration of information submitted by the public.	The Development Review staff will continue to receive and address public comments. When complaints are received, County inspectors will conduct a site visit to ensure that SWPPP documents and BMPs are in place and accurate. Complaints are managed and tracked through the County's permit tracking system. Inspections are recorded by the County and are also recorded in the on-site SWPPP.	Related to the Construction Site Stormwater Runoff Control program, the County Development Review (DR) staff meets with applicants, attends public meetings, public hearings, and private meetings with public employees and private citizens to present appropriate information, answer questions, and listen to concerns. The Development Review (DR) section emphasizes coordination with all applicable government agencies to expedite these services. The DR Section receives complaints and information from the public regarding stormwater quality issues as related to construction projects. When complaints are received, County inspectors conduct a site visit to ensure that SWPPP documents and BMPs are in place and accurate. Complaints have been managed and tracked through the County's permit tracking system. Inspections have been recorded by the County and are also recorded in the on-site SWPPP.	Related to the Construction Site Stormwater Runoff Control program, the County Development Review (DR) staff will continue to meet with applicants, attend public meetings, public hearings, and private meetings with public employees and private citizens to present appropriate information, answer questions, and listen to concerns. The DR group will continue to emphasize coordination with all applicable government agencies to expedite these services. The DR Section will continue to receive complaints and information from the public regarding stormwater quality issues as related to construction projects. When complaints are received, County inspectors will conduct a site visit to ensure that SWPPP documents and BMPs are in place and accurate. Complaints will be managed and tracked through the County's CGP permit tracking system. Inspections will be recorded by the County and are also recorded in the on-site SWPPP. The County will summarize any progress or updates to this Permit section in each Annual Report.	13 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Jan. 22, 2016 or June 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 2: Construction Site Stormwater Runoff Control - Part I.D.5.a				
(f) Procedures for site inspection during construction, and enforcement of control measures including provisions to ensure proper construction, operation, maintenance, and repair. The procedures must clearly define who is responsible for site inspections; who has the authority to implement enforcement procedures; and the steps utilized to identify priority sites for inspection and enforcement based on the nature of the construction activity, topography, and the characteristics of soils and the quality of the receiving water.	The County will continue enforcement of the drainage ordinance, Chapter 38, Article III of the Bernalillo County Code of Ordinances. The County will track the number of construction site inspections and inspection findings.	The County Stormwater Quality Ordinance includes provisions for inspections (Section 38-413) by the County. The ordinance also requires weekly inspection of the BMPs by the owner, records of the inspections to be kept for the County engineer to review, and periodic inspection of BMPs by the County. Any issues noted by the County inspector are reported to the contractor. Construction site inspections as required by this Permit and have been carried out concurrently with building code inspections by the County. Several inspections are conducted over the construction project lifetime and include checking for compliance with the Construction General Permit, SWPPP review, and a final inspection of post-construction BMPs. The County does not prioritize inspections because inspections are currently conducted on 100% of construction projects. Related to ordinance enforcement, penalties for non-compliance with this ordinance include liens against the property for reasonable costs associated with a remedy(ies), revocation or refusal to renew or issue any permit until appropriate remedies are made, and punishable as provided in Chapter 1, section 1-6 of the Bernalillo County Code.	The County Drainage Ordinance includes provisions for inspections (Section 38-174) by the County. The ordinance also requires weekly inspection of the BMPs by the owner, records of the inspections to be kept for the County engineer to review, and periodic inspection of BMPs by the County. Any issues noted by the County inspector are reported to the contractor. The County will continue enforcement of the County Drainage Ordinance. Construction site inspections as required by this Permit will continue to be carried out concurrently with building code inspections by the County. Several inspections are conducted over the construction project lifetime and include checking for compliance with the Construction General Permit, SWPPP review, and a final inspection of post-construction BMPs. The County does not prioritize inspections because inspections are currently conducted on 100% of construction projects. The County will track the number of construction site inspections and inspection findings and summarize these in each Annual Report. Related to ordinance enforcement, penalties for non-compliance with this ordinance include liens against the property for reasonable costs associated with a remedy(ies), revocation or refusal to renew or issue any permit until appropriate remedies are made, and punishable as provided in Chapter 1, section 1-6 of the Bernalillo County Code.	13 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Jan. 22, 2016 or June 22, 2016
(g) Procedures to educate and train permittee personnel involved in the planning, review, permitting, and/or approval of construction site plans, inspections, and enforcement. Education and training shall also be provided for developers, construction site operators, contractors and supporting personnel, including requiring a stormwater pollution prevention plan for construction sites within the permittee's jurisdiction.	The County will continue to ensure that County staff receive training for planning review, permitting, and/or approval of site plans, inspection, and enforcement. Many trainings will be conducted internally. The County will continue to require the Post-Construction Evaluation form for commercial and some residential projects. This form will be reviewed and updated as necessary. Additional education and outreach opportunities will be explored for developers, construction site operators, and contractor trainings. Bernalillo County was a primary sponsor for the February 2016 Land & Water Summit which included sessions on stormwater management, stormwater solutions, and green infrastructure and low-impact design. The summit was designed for developers, engineers, landscape architects, associated general contractors and the general public . A field trip titled Stormwater Solutions in Dynamic Arid Land Conditions was part of this conference and included tours of flood control projects and GI/LID projects for the County, COA, and SSCAFCA. SWPPPs are required by Bernalillo County and the CGP for construction sites.	Currently at least 4 Bernalillo County staff, including two site inspectors, have received certified stormwater inspector training. In FY18, the County improved its new employee training to include stormwater education to all new County employees, and annual training for select county employees. All commercial applicants must complete the Stormwater Post-Construction Evaluation form. This form provides information about the MS4 Permit and directs the applicant to the Bernalillo County LID webpage (http://www.bernco.gov/LID) for additional information as a means to provide education to applicants. Residential applicants are not required to complete the form as part of the initial application but may be required to during plan review. Bernalillo County was a primary sponsor for the 2016, 2017, 2018, ans 2019 Land & Water Summit which included sessions on stormwater management, stormwater solutions, and green infrastructure and low-impact design. The summit is designed for developers, engineers, landscape architects, associated general contractors and the general public. Field trips are typically part of this conference and include tours of flood control projects and GI/LID projects for the County, COA, and SSCAFCA. In FY18, the County supported local training seminars related to the new CGP requirements. These trainings focused on local contractors as well as MS4 personnel responsible for inspections.	The County will continue to ensure that County staff receive training for planning review, permitting, and/or approval of site plans, inspection, and enforcement. Many trainings will be conducted internally. The County will continue to require the Post-Construction Evaluation form for commercial and some residential projects. This form will be reviewed and updated as necessary. Additional education and outreach opportunities will continue to be explored for developers, construction site operators, and contractor trainings. Bernalillo County will continue to sponsor local conferences and education/outreach opportunities within the community, such as the annual Land & Water Summit, which typically includes sessions on stormwater management, stormwater solutions, and green infrastructure and low-impact design. The summit was designed for developers, engineers, landscape architects, associated general contractors and the general public. Field trips are typically included as part of this conference and include tours of flood control projects and GI/LID projects for the County, COA, and SSCAFCA.	13 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Jan. 22, 2016 or June 22, 2016
(h) Procedures for keeping records of and tracking all regulated construction activities within the MS4, i.e. site reviews, inspections, inspection reports, warning letters and other enforcement documents. A summary of the number and frequency of site reviews, inspections (including inspector's checklist for oversight of sediment and erosion controls and proper disposal of construction wastes) and enforcement activities that are conducted annually and cumulatively during the permit term shall be included in each annual report.	Bernalillo County will track regulated construction activities including site plan reviews, inspections, and enforcement documents. A summary of activities and the number and frequency of site plan reviews, inspections, and enforcement activities will be conducted annually and included in each annual report.	Regulated construction activities within the MS4 area have been tracked through Bernalillo County's building permit review process. The County maintains a database software package that tracks all reviews, inspections and enforcement documents for construction projects.	Bernalillo County will track regulated construction activities including site plan reviews, inspections, and enforcement documents. The County will maintain a database software package that tracks all reviews, inspections and enforcement documents for construction projects. A summary of activities and the number and frequency of site plan reviews, inspections, and enforcement activities will be conducted annually and included in each Annual Report.	13 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Jan. 22, 2016 or June 22, 2016
Annually conduct site inspections of 100 percent of all construction projects cumulatively disturbing one (1) or more acres as required in Part I.D.5.a.(iii)	Bernalillo County will track regulated construction activities including site plan reviews, inspections, and enforcement documents. A summary of activities and the number and frequency of site plan reviews, inspections, and enforcement activities will be conducted annually and included in each annual report.	The County inspects 100 percent of all construction projects cumulatively disturbing one (1) or more acres as required in Part I.D.a.(iii). The County requires construction projects to follow the CGP. Records of the inspections have been available for the County engineer to review. Site inspections by the County are carried out concurrently with building code inspections. Several inspections are conducted over the construction project lifetime and include checking for compliance with the CGP, SWPPP review, and a final inspection of post-construction BMPs. Any issues noted by the County inspector are reported to the contractor.	The County will continue to inspect 100 percent of all construction projects cumulatively disturbing one (1) or more acres as required in Part I.D.a.(iii). Bernalillo County will track regulated construction activities including site plan reviews, inspections, and enforcement documents. A summary of activities and the number and frequency of site plan reviews, inspections, and enforcement activities will be conducted annually and included in each annual report.	13 months (if alone) or 24 months (cooperative) from effective date of MS4 Permit. Jan. 22, 2016 or December 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 2: Construction Site Stormwater Runoff Control - Part I.D.5.a				
Coordinate with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private construction projects/activities within the permit area to ensure that the construction stormwater runoff controls eliminate erosion and maintain sediment on site. Planning documents include, but are not limited to: comprehensive or master plans, subdivision ordinances, general land use plan, zoning code, transportation master plan, specific area plans, such as sector plan, site area plans, corridor plans, or unified development ordinances.	Bernalillo County already complies with this Permit requirement. Bernalillo County will continue to review planning documents for public and private construction projects and activities within the unincorporated areas of Bernalillo County, as required by the ordinance.	Bernalillo County has met this MS4 Permit requirement through the Grading and Drainage plan review process. This oversight is completed through the review of permit application requests. These permits generally consist of building, zoning permits; zone changes; special use permits; and/or platting actions and are reviewed for compliance with guidance/regulatory documents such as the MS4 Permit, the drainage, floodplain, street standards, regional drainage master plans and excavation ordinances. This incorporates consideration of potential water quality impacts and ensures compliance with floodplain and stormwater issues. Construction permits require SWPPPs for sites that disturb greater than one acre. The County conducts on-site inspections to ensure drainage regulation compliance. The County Development Review Authority (CDRA) enforces the Bernalillo County Subdivision and Land Development Standards Ordinance and currently includes Bernalillo County Planning, Zoning, Public Works, Fire Marshal, Natural Resource Services, Parks & Open Space, the Albuquerque Bernalillo County Water Utility Authority, AMAFCA, and the Middle Rio Grande Conservancy District.	Bernalillo County will continue to review planning documents for public and private construction projects and activities within the unincorporated areas of Bernalillo County, as required by the ordinance. Bernalillo County will continue to met this MS4 Permit requirement through the Grading and Drainage plan review process. This oversight will continue to be completed through the review of permit application requests. These permits generally consist of building, zoning permits; zone changes; special use permits; and/or platting actions and are reviewed for compliance with guidance/regulatory documents such as the MS4 Permit, the drainage, floodplain, street standards, regional drainage master plans and excavation ordinances. This process incorporates consideration of potential water quality impacts and ensures compliance with floodplain and stormwater issues. Construction permits require SWPPPs for sites that disturb greater than one acre. The County will continue to conduct on-site inspections to ensure drainage regulation compliance. The County Development Review Authority (CDRA) enforces the Bernalillo County Subdivision and Land Development Standards Ordinance and currently includes Bernalillo County Planning, Zoning, Public Works, Fire Marshal, Natural Resource Services, Parks & Open Space, the Albuquerque Bernalillo County Water Utility Authority, AMAFCA, and the Middle Rio Grande Conservancy District.	10 months (if alone) or 14 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or Feb. 22, 2016
Evaluation of GI/LID/Sustainable practices in site plan reviews as required in Part I.D.5.a.(v). The site plan review must include an evaluation of opportunities for use of GI/LID/ Sustainable practices and when the opportunity exists, encourage project proponents to incorporate such practices into the site design to mimic the pre-development hydrology of the previously undeveloped site. For purposes of this permit, pre-development hydrology shall be met according to Part I.D.5.b of this permit (consistent with any limitations on that capture). Include a reporting requirement of the number of plans that had opportunities to implement these practices and how many incorporated these practices.	The County will continue to evaluate and ask the property owner/developer of construction projects to evaluate for opportunities to incorporate GI/LID/sustainable practices. The County will track the number of projects that have opportunities to implement these practices and how many of these practices are implemented. Tracking will be accomplished using the Stormwater Post-Construction Evaluation form.	As part of the development review process, construction project plans have been reviewed and evaluated for opportunities to incorporate GI/LID/sustainable practices. Developers have been encouraged to incorporate these practices where opportunities are available. As part of construction application requirements, all commercial applicants must complete the Stormwater Post-Construction Evaluation form as part of the permit application. Residential applicants are not required to complete the form as part of the initial application but may be required to during plan review to complete evaluation if the project falls under the stated disturbance definition (greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale) or if other stormwater or grading and drainage plans are required. The County has tracked the number of projects that have opportunities to implement these practices and how many of these practices are implemented. Tracking was accomplished using the Stormwater Post-Construction Evaluation form. The County has included a summary of the GI/LID/sustainable practice opportunities in each Annual Report.	The County will continue to evaluate and ask the property owner/developer of construction projects to evaluate for opportunities to incorporate GI/LID/sustainable practices. The County will track the number of projects that have opportunities to implement these practices and how many of these practices are implemented. Tracking will be accomplished using the Stormwater Post-Construction Evaluation form. The County will include a summary of the GI/LID/sustainable practice opportunities in each Annual Report.	10 months (if alone) or 14 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or Feb. 22, 2016
Update the SWMP document and annual report as required in Part I.D.5.a.(vi) and in Part I.D.5.a.(vii)	The County will include in each annual report a summary of the frequency of site reviews, inspections, and enforcement activities that are conducted annually and cumulatively during the permit term. The annual report will also include a summary of the number of projects that have opportunities to implement GI/LID/sustainable practices and how many of these practices are implemented.	The County has included in each Annual Report a summary of the frequency of site reviews, inspections, and enforcement activities that are conducted annually and cumulatively during the Permit term. The Annual Report has also included a summary of the number of projects that have opportunities to implement GI/LID/sustainable practices and how many of these practices are implemented. The Annual Report has served as an assessment and documentation of this program.	The County will update the SWMP, as needed, to include any updates to the description of the mechanisms that will be used to comply with the construction site stormwater runoff control measures for each of the elements in Part I.D.5.a.(i) through Part I.D.5.a.(v) and corresponding measurable goal. The County will include in each Annual Report a summary of the frequency of site reviews, inspections, and enforcement activities that are conducted annually and cumulatively during the Permit term. The Annual Report will also include a summary of the number of projects that have opportunities to implement GI/LID/sustainable practices and how many of these practices are implemented. The Annual Report will serve as an assessment and documentation of this program.	Update as necessary for SWMP and annually for Annual Report

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 2: Construction Site Stormwater Runoff Control - Part I.D.5.a				
Enhance the program to include the elements in Part I.D.5.a.(viii) through part I.D.5.a.(x). These include: (viii) Use of stormwater educational materials; (ix) Develop or update existing construction handbooks; and (x) construction inspections may be carried out in conjunction with other inspections and use a screening prioritization process.	The County will summarize education and outreach activities in each Annual Report. The County will work with other MS4s to evaluate the need to update the 2012 Storm Water Management Guidelines for Construction & Industrial Activities. The County will continue to conduct construction site inspections concurrently with building code inspections and inspection results will be summarized in each annual report per Part I.D.5.a.(iii).	The County has included all of the Permit Program Flexibility Elements/Enhancements for the Construction Site Stormwater Runoff Control program. The County has used stormwater educational materials, either developed locally or provided by EPA, NMED environmental, public interest, trade organizations, and/or other MS4s. Related to handbooks, the 2012 Storm Water Management Guidelines for Construction & Industrial Activities has been completed, led by NMDOT with coauthors Bernalillo County, AMAFCA, NMED, COA, UNM, City of Rio Rancho, and SSCAFCA. In conjunction with COA, the County participated in updates and revisions for the Development Process Manual (DPM) as necessary. The DPM delineates the development process from initial land use proposals, through infrastructure construction, to completion of a proposed development. Bernalillo County also requires the use of the Comparison of Regional Regulations (CORR) document, a companion document to the DPM. CORR is a step-by-step guide through the Bernalillo County Public Works design path. Construction site inspections as required by Part I.D.5.a.(iii) are carried out concurrently with building code inspections by the County. The County does not prioritize inspections because inspections are conducted on 100% of construction projects.	The County will continue to look for opportunities to enhance this program. Each Annual Report will include a summary of the Construction Site Stormwater Runoff Control initiatives taken in the reporting period, as applicable. The County will continue to include the Permit Program Flexibility Elements/Enhancements for the Construction Site Stormwater Runoff Control program. This includes the County's use of stormwater educational materials, either developed locally or provided by EPA, NMED environmental, public interest, trade organizations, and/or other MS4s. It also includes the use of the 2012 Storm Water Management Guidelines for Construction & Industrial Activities has been completed, led by NMDOT with coauthors Bernalillo County, AMAFCA, NMED, COA, UNM, City of Rio Rancho, and SSCAFCA. The County will continue use of the Development Process Manual (DPM). The DPM delineates the development process from initial land use proposals, through infrastructure construction, to completion of a proposed development. Bernalillo County will also continue the use of the Comparison of Regional Regulations (CORR) document, a companion document to the DPM. CORR is a step-by-step guide through the Bernalillo County Public Works design path. Construction site inspections as required by Part I.D.5.a.(iii) will continue to be carried out concurrently with building code inspections by the County. The County does not prioritize inspections because inspections are conducted on 100% of construction projects.	Update as necessary for SWMP and annually for Annual Report

Part I.D.5 - SWMP Control Measures Table 3: Post-Construction Stormwater Management in New Development and Redevelopment- Part I.D.5.b

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 3: Post-Construction Stormwater Management in New Development and Redevelopment- Part I.D.5.b				
Part I.D.5.b.(i) The permittee must develop, revise, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the MS4. The program must ensure that controls are in place that would prevent or minimize water quality impacts. Permittees previously covered under NMS000101 or NMR040000 must continue existing programs, updating as necessary, to comply with the requirements of this permit.	The County will continue enforcement of the drainage ordinance, Chapter 38, Article III of the Bernalillo County Code of Ordinances; the County is currently working on an update to this ordinance to include additional required elements from this permit.	Bernalillo County adopted the stormwater quality ordinance, Chapter 38, Article IV, in 2017. This ordinance meets the MS4 Permit requirements. This ordinance addresses stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the MS4. The program ensures that controls are in place that would prevent or minimize water quality impacts.	Bernalillo County has an developed an ordinance, the Stormwater Quality Ordinance, as required by the MS4 Permit. Bernalillo County will continue enforcement of the ordinance.	See specific Permit activity schedules below.
Development of strategies as required in Part I.D.5.b.(ii).(a). Strategies which include a combination of structural and/or non-structural best management practices (BMPs) to control pollutants in stormwater runoff.	The County will continue enforcement of the drainage ordinance, Chapter 38, Article III of the Bernalillo County Code of Ordinances and inspection of post-construction BMPs; the County is currently working on an update to this ordinance to include additional required elements from this permit.	Bernalillo County adopted the stormwater quality ordinance, Chapter 38, Article IV, in 2017. Per Chapter 38, Article IV of the Bernalillo County Code of Ordinances, the stormwater quality ordinance, Sec. 38-414. - Post-Construction Stormwater Quality Protection (2) Post-Construction BMP Design Requirments and Implementation. (a) For all development and redevelopment projects with land disturbances equal to or greater than one acre, including sites which disturb less than one acre but are part of a larger common plan of development, that discharge into the county's storm drainage system, post construction water quality BMPs to manage the stormwater quality design volume are required. This requirement is in addition to any other requirements that may apply. These BMPs shall be subject to the approval of the County engineer and Stormwater Compliance Manager. Prior to construction, a conceptual grading and drainage plan showing existing and proposed grading, drainage, control, flood control and erosion control information in sufficient detail to determine project feasibility is required. Grading and drainage plans are required by the County when a.) the area to be graded exceeds one acre, b.) the volume of dirt to be moved exceeds 500 cubic yards, c.) runoff from the proposed development exceeds the allowable runoff for the parcel; or d.) the drainage engineer determines that a grading and drainage plan is warranted. All applicants whose projects disturb one acre or greater must complete the Stormwater Post-Construction Evaluation form. This form provides information about the MS4 Permit and directs the applicant to the Bernalillo County LID webpage (http://www.bernco.gov/LID) for additional information. Residential applicants are not required to complete the form as part of the initial application but may be required to during plan review. Construction site inspections as required by this Permit, Part I.D.5.a.(iii), and are carried out by the County, typically concurrently with building code inspections by the County. Several inspections are conducted over the construction project lifetime and include checking for compliance with the Construction General Permit, SWPPP review, and a final inspection of post-construction BMPs. The County does not prioritize inspections because inspections are currently conducted on 100% of construction projects.	The County will continue enforcement of the stormwater quality ordinance and will continue the inspection of post-construction BMPs. A summary of this program as well as an estimate of the number of inspections will be included in each Annual Report.	10 months (if alone) or 14 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or Feb. 22, 2016
Development of an ordinance or other regulatory mechanism as required in Part I.D.5.b.(ii)(b), to address post-construction runoff from new development and redevelopment projects to the extent allowable under State, Tribal or local law. The ordinance or policy must incorporate a stormwater quality design standard that manages on-site the 90th percentile storm event discharge volume associated with new development sites and 80th percentile storm event discharge volume associated with redevelopment sites, through stormwater controls that infiltrate, evapotranspire the discharge volume, except in instances where full compliance cannot be achieved, as provided in Part I.D.5.b.(v).	The County will submit a draft ordinance revision to include requirements under this permit for management of 80th and 90th percentile storm event discharge for redevelopment and development sites, respectively, to the Bernalillo County Commission for approval.	This Permit activity is complete. The County's drainage ordinance (Chapter 38, Article III of the Bernalillo County Code of Ordinances, Sec. 38-147. - Stormwater quality protection) addressed stormwater quality protection for development and redevelopment projects. The County added Article IV, Stormwater Quality Ordinance (and moved the stormwater quality requirements from Article III to Article IV), to include requirements under this Permit for management of 80th and 90th percentile storm event discharge for redevelopment and development sites, respectively, under Sec. 38-414	The County will continue enforcement of the stormwater quality ordinance requirements.	30 months (if alone) or 36 months (cooperative) from effective date of MS4 Permit. June 22, 2017 or Dec. 22, 2017
Implementation and enforcement, via the ordinance or other regulatory mechanism, of site design standards as required in Part I.D.5.b.(ii).(b), to incorporate a stormwater quality design standard that manages on-site the 90th percentile storm event discharge volume associated with new development sites and 80th percentile storm event discharge volume associated with redevelopment sites.	The County will submit a draft ordinance revision to include requirements under this permit for management of 80th and 90th percentile storm event discharge for redevelopment and development sites, respectively, to the Bernalillo County Commission for approval.	The County's drainage ordinance (Chapter 38, Article III of the Bernalillo County Code of Ordinances, Sec. 38-147. - Stormwater quality protection) addressed stormwater quality protection for development and redevelopment projects. The County added Article IV, Stormwater Quality Ordinance (and moved the stormwater quality requirements from Article III to Article IV), to include requirements under this Permit for management of 80th and 90th percentile storm event discharge for redevelopment and development sites, respectively, under Sec. 38-414.	The County will continue enforcement of the stormwater quality ordinance requirements.	42 months (if alone) or 48 months (cooperative) from effective date of MS4 Permit. June 22, 2018 or Dec. 22, 2018

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 3: Post-Construction Stormwater Management in New Development and Redevelopment- Part I.D.5.b				
Ensure appropriate implementation of post-construction structural controls as required in Part I.D.5.b.(ii).(c) and Part I.D.5.b.(ii).(d) including consideration of some or all of the following: pre-construction review of BMP designs; inspections during construction to verify BMPs are built as designed; post-construction inspection and maintenance of BMPs; and penalty provisions for the noncompliance with preconstruction BMP design; failure to construct BMPs in accordance with the agreed upon pre-construction design; and ineffective post-construction operation and maintenance of BMPs. The permittee must ensure that the post-construction program requirements are constantly reviewed and revised as appropriate to incorporate improvements in control techniques.	The County will continue enforcement of the drainage ordinance, Chapter 38, Article III of the Bernalillo County Code of Ordinances. The County will track the number of construction site inspections and will summarize inspections and inspection findings in the annual report. The County will conduct a bi-annual review and update to the post-construction program requirements as appropriate.	As part of the development review process, construction project plans have been reviewed and evaluated for opportunities to incorporate GI/LID/sustainable practices. Developers have been encouraged to incorporate these practices where opportunities are available. All commercial applicants must complete the Stormwater Post-Construction Evaluation form. This form provides information about the MS4 Permit and directs the applicant to the Bernalillo County LID webpage (http://www.bernco.gov/LID) for additional information. Residential applicants have not been required to complete the form as part of the initial application but may be required to during plan review. Construction site inspections, as required by this Permit, have been carried out concurrently with building code inspections by the County. Several inspections are conducted over the construction project lifetime and include checking for compliance with the Construction General Permit, SWPPP review, and a final inspection of post-construction BMPs. Maintenance responsibility of stormwater quality control facilities is the responsibility of the property owner up to the point where stormwater enters public facilities. Penalties for non-compliance with this ordinance include liens against the property for reasonable costs associated with a remedy(ies), revocation or refusal to renew or issue any permit until appropriate remedies are made, and punishable as provided in Chapter 1, section 1-6 of the Bernalillo County Code. The County has reviewed and updated the post-construction program as necessary.	The County will continue enforcement of the stormwater quality ordinance requirements. The County will track the number of construction site inspections and will summarize inspections and inspection findings in each Annual Report. The County will conduct an annual review of this program and update to the post-construction program requirements as appropriate.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017
Develop procedures as required in Part I.D.5.b.(ii). (e) - for educational program for project developers; (f) - for site inspections and enforcement for long-term operation, maintenance, and repair of BMPs; (g) - for control of discharge related to pesticides, herbicides, and fertilizers; (h) - for review and update of the post-construction program.	The County will continue to require the Post-Construction Evaluation form for commercial and some residential projects. This form will be reviewed and updated as necessary. The County will continue to improve the education program for project developers by coordinating internally with the County Public Information Officer and coordinating with other MS4s. The County is currently working with Los Ranchos de Albuquerque on a cooperative element to address education for permittee personnel and for project developers. The County will conduct reviews of post-construction program procedures annually and update as necessary.	All applicants whose project disturb one acre or greater must complete the Stormwater Post-Construction Evaluation form. This form provides information about the MS4 Permit and directs the applicant to the Bernalillo County LID webpage (http://www.bernco.gov/LID) for additional information. Residential applicants are not required to complete the form as part of the initial application but may be required to during plan review. Bernalillo County uses checklists for building code and construction site inspections. The County has updated these checklists to address requirements from this permit. Per the County stormwater quality ordinance for post-construction stormwater quality protection, all development and redevelopment projects with land disturbances equal to or greater than one acre, including sites which disturb less than one acre but are part of a larger common plan of development, require post construction water quality BMPs. BMPs must be inspected by the Stormwater Compliance Manager or other County-designated qualified person and found to be in compliance with all approved plans and specifications prior to the release of certificate of occupancy or other County-required approval for the site. Maintenance responsibility of stormwater quality control facilities is the responsibility of the property owner up to the point where stormwater enters public facilities. Periodic inspection and certification of private facilities by a New Mexico Professional Engineer or otherwise qualified stormwater person (as determined by the County Engineer) are required of the facility/property owner and shall occur no less frequently than once every three (3) years from the date of final construction inspection. The responsibility and cost for the inspection is the responsibility of the private facility owner and/or property owner. Commercial application of pesticides is regulated by the New Mexico Department of Agriculture (NMDA). NMDA has authority over the distribution and use of all pesticides in the state. NMDA establishes certification requirements for pesticide applicators including a requirement for continuing education. Additionally, under the Clean Water Act, pesticide applications to, over, or near water generally require a NPDES permit issued by the EPA.	The County will continue to require the Post-Construction Evaluation form for commercial and some residential projects. This form will be reviewed and updated as necessary. The County will continue to improve the education program for project developers by coordinating internally with other County Departments and coordinating with other MS4s. The County will conduct reviews of post-construction program procedures annually and update as necessary.	10 months (alone) or 18 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or June 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 3: Post-Construction Stormwater Management in New Development and Redevelopment- Part I.D.5.b				
Coordinate internally with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private construction projects/activities within the permit area as required in Part I.D.5.b.(iii) related to developed hydrology mimicking pre-development hydrology.	The County Development Review Section will continue to coordinate internally with all departments for review of public and private construction projects/activities within its jurisdiction and will continue to work the NM OSE to meet State water rights requirements. The County will track site plan and grading and drainage plan reviews and include a summary in the annual report.	The Development Review (DR) section reviews permit applications and grading and drainage plans for construction projects. The permits generally consist of building, zoning permits; zone changes; special use permits; and/or platting actions and are reviewed for compliance with guidance/regulatory documents such as the MS4 Permit, the drainage, flood plain, street standards, regional drainage master plans and excavation ordinances. This incorporates consideration of potential water quality impacts and ensures compliance with floodplain and stormwater requirements. Standard comments to the application and plans provided by DR include the requirement to retain 80th and 90th percentile storm runoff. Construction permits require SWPPPs for sites that disturb greater than one acre. The County conducts on-site inspections to ensure drainage regulation compliance. The County Planning Commission (CPC) and the County Development Review Authority (CDRA) enforce the Bernalillo County Subdivision and Land Development Standards Ordinance. Review for these boards includes staff from Bernalillo County Planning, Zoning, Public Works, Fire Marshal, Natural Resource Services, Parks & Open Space; the Albuquerque Bernalillo County Water Utility Authority; AMAFCA; COA; NMDOT; and the MRGCD. In conjunction with COA, the County participates in updates and revisions for the Development Process Manual (DPM) as necessary. The DPM delineates the development process from initial land use proposals, through infrastructure construction, to completion of a proposed development. Bernalillo County also requires the use of the Comparison of Regional Regulations (CORR) document, a companion document to the DPM. The NM OSE and ISC oversee interstate water compact delivery obligations for New Mexico including delivery of water in the Rio Grande to Texas. For all projects requiring a grading and drainage plan, the County requires stormwater facilities that manage the 80th and 90th percentile rain events to drain within 96 hours per the OSE requirements.	The County Development Review Section will continue to coordinate internally with all departments for review of public and private construction projects/activities within its jurisdiction and will continue to work the NM OSE to meet State water rights requirements. The County will track site plan and grading and drainage plan reviews and include a summary in the Annual Report.	10 months (if alone) or 12 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or Dec. 22, 2015
As required in Part I.D.5.b.(iv), the permittee must assess all existing codes, ordinances, planning documents and other applicable regulations, for impediments to the use of GI/LID/Sustainable practices.	The County is currently in the process of reviewing all existing codes, ordinances, planning documents and other regulations for impediments to the use of GI/LID/Sustainable practices.	This Permit activity is complete. The County has completed the process of reviewing all existing codes, ordinances, planning documents and other regulations for impediments to the use of GI/LID/Sustainable practices with the 2017 Impediments to Low Impact Development in Bernalillo County study and report.	This Permit activity is complete. The County has completed the process of reviewing all existing codes, ordinances, planning documents and other regulations for impediments to the use of GI/LID/Sustainable practices with the 2017 Impediments to Low Impact Development in Bernalillo County study and report.	12 months (if alone) or 24 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or Dec. 22, 2016
As required in Part I.D.5.b.(iv), develop and submit a report of the assessment findings on GI/LID/Sustainable practices.	The County will develop a report regarding the assessment of findings and will use this assessment to provide information to the County for the regulation changes necessary to remove impediments to these practices.	This Permit activity is complete. The County has developed the 2017 Impediments to Low Impact Development in Bernalillo County report regarding the assessment of findings and will use this assessment to provide information to the County for the regulation changes necessary to remove impediments to these GI/LID Sustainable practices.	The County has developed the 2017 Impediments to Low Impact Development in Bernalillo County report regarding the assessment of findings and will use this assessment to provide information to the County for the regulation changes necessary to remove impediments to these GI/LID Sustainable practices.	18 months (if alone) or 27 months (cooperative) from effective date of MS4 Permit. June 22, 2016 or Mar. 22, 2017
Estimation of the number of acres of IA and DCIA as required in Part I.D.5.b.(vi).	The County is in the process of estimating the number of acres of IA and DCIA within unincorporated Bernalillo County. Bernalillo County will coordinate with other MS4s in the MRG to complete this assessment.	A GIS study was completed by Bernalillo County to estimate the impervious area (IA) in Bernalillo County and within the Middle Rio Grande MS4 Area/Albuquerque Urbanized Area (UA). Bernalillo County has worked cooperatively on this Permit activity by sharing GIS information with other MS4s, as requested. The GIS study used land use codes, land use categories, and percent impervious fields. In FY19, the impervious area(IA) for unincorporated Bernalillo County within the UA is approximately 10,393 acres. The directly connected impervious area (DCIA) is 0 acres.	Bernalillo County will continue annual updates to the estimate of the impervious area (IA) in Bernalillo County and within the Middle Rio Grande MS4 Area/Albuquerque Urbanized Area (UA). Bernalillo County will continue to work cooperatively on this Permit activity by sharing GIS information with other MS4s, as requested. The updated IA and DCIA values will be summarized in each Annual Report.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 3: Post-Construction Stormwater Management in New Development and Redevelopment- Part I.D.5.b				
Inventory and priority ranking as required in Part I.D.5.b.(vii) for MS4-owned property and infrastructure (including public right-of-way) that may have the potential to be retrofitted with control measures designed to control the frequency, volume, and peak intensity of stormwater discharges to and from its MS4.	The County will continue to meet with MS4s to discuss areas requiring drainage and water quality retrofits, project priorities, and multi-agency funding. The County will summarize proposed and completed retrofit projects in the annual report. The County will continue membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) which will facilitate cooperation and coordination with other MS4s in the Middle Rio Grande.	The County will continue to keep an inventory and develop a priority ranking of County-owned properties and facilities that may have the potential for retrofitted control measures and stormwater quality facilities and BMPs. The County will continue to meet with area MS4s to discuss areas requiring drainage and water quality retrofits, project priorities, and multi-agency funding. The County works cooperatively with AMAFCA, the COA, NMDOT, and other entities on a project schedule that updates stormwater projects in the MRG on an annual basis. This schedule also identifies stormwater quality projects and retrofit projects. During this permit term, the County has installed an inlet retrofit for the Adobe Acres stormwater facility to improve water quality. The County has also included drainage improvements and retrofits with other construction work, such as road improvement projects. The Vista del Rio Road improvement project included drainage improvements along the public right of way as well as a new detention pond to accommodate additional stormwater runoff volume. In FY18, Bernalillo County completed two projects that included GI/LID retrofits – Alameda Drain Trial Project and Second Street Southwest improvements. In addition, Bridge Blvd, which was in designed in FY18, includes GI/LID elements. Other improvement projects (IP) currently in planning or construction phases and include drainage improvements are the Sunset Road IP, Tower Road SW Roadway and Utility Improvement, Goff Boulevard Improvements, Sunset Gardens Road, Woodward Road IP, Barcelona Storm Drain Phase 1, intersection of Coors Blvd. and Blake, as well as many others.	The County will continue to meet with MS4s to discuss areas requiring drainage and water quality retrofits, project priorities, and multi-agency funding. The County will summarize proposed and completed retrofit projects in each Annual Report. The County will continue membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) which will facilitate cooperation and coordination with other MS4s in the Middle Rio Grande.	24 months (if alone) or 42 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2016 or June 22, 2018
Incorporate watershed protection elements into regular planning or policy documents as required in Part I.D.5.b.(viii). As applicable to each permittee's MS4 jurisdiction, policy and/or planning documents must include the following:	See below.	See below.	See below.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017
(a) A description of master planning and project planning procedures to control the discharge of pollutants to and from the MS4.	Bernalillo County will continue to review master planning documents as they pertain to drainage and stormwater quality infrastructure and incorporate MS4 requirements as needed.	The County currently reviews master planning documents as they pertain to drainage and stormwater quality infrastructure. MS4 requirements are incorporated into the master plans during this review process. Master plans include the regional drainage master plan, subdivision master plans, and sector development plans, among others.	Bernalillo County will continue to review master planning documents as they pertain to drainage and stormwater quality infrastructure and incorporate MS4 requirements as needed.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017
(b) Minimize the amount of impervious surfaces (roads, parking lots, roofs, etc.) within each watershed, by controlling the unnecessary creation, extension and widening of impervious parking lots, roads and associated development.	Bernalillo County will continue to incorporate GI/LID practices that reduce the amount of impervious surface areas while also considering stormwater quality improvement features where applicable. The County Natural Resource Services will work with the zoning department to adjust their policy and allow pervious parking lots to be installed.	Bernalillo County has been a community leader in the promotion and adoption of GI/LID practices, which help to reduce impervious area within the County. Bernalillo County has incorporated GI/LID practices into new and retrofit projects, such as the Alameda Drain Trail Master Plan, 2nd Street Corridor projects, the Bridge Blvd Corridor Redevelopment Plan, and the Pedestrian Bicyclist Safety Action Plan. These projects increased areas with pervious surfaces as part of GI/LID practices as well as incorporated of stormwater quality improvement features. The County's plans are inline with the MRCOG's Long Range Transportation System guide, which calls for GI/LID to be incorporated into regional roadway projects.	Bernalillo County will continue to incorporate GI/LID practices that reduce the amount of impervious surface areas while also considering stormwater quality improvement features where applicable. The County Natural Resource Services will work with the zoning department to adjust their policy and allow pervious parking lots to be installed. Each Annual Report will include a summary of any advancements related to this Permit requirement.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017
(c) Identify environmentally and ecologically sensitive areas that provide water quality benefits and serve critical watershed functions within the MS4 and ensure requirements to preserve, protect, create and/or restore these areas are developed and implemented during the plan and design phases of projects in these identified areas.	Bernalillo County will continue to manage and/or participate in the management of the refuge and the open space facilities. The County will continue to be involved in these kinds of projects as opportunities become available.	During the planning of Bernalillo projects, environmentally and ecologically sensitive areas that provide water quality benefits are considered. Valle de Oro National Wildlife Refuge (NWR) is an urban national wildlife refuge that also serves as a stormwater management facility. A storm drainage outfall through Valle de Oro NWR provides flood relief for the surrounding community and improves water quality prior to stormwater discharge to the Rio Grande. This project has been a cooperative effort with Bernalillo County, AMAFCA, U.S. Fish and Wildlife Service, Trust for Public Land, and the Bureau of Reclamation. The Bernalillo County Sanchez Farm open space property is a 14-acre property located in the Albuquerque South Valley. The property was purchased by the County's Public Works division for a storm drainage facility and has been developed to provide important ecological functions with an established wetlands and bioswales to mitigate stormwater pollution. Additionally, the site is community farmed with extensive educational programming for all ages led by the La Plazita Institute (LPI). The goal is for Sanchez Farm is to serve as a safe community space for recreational, educational, wildlife habitat, and farming activities while not interfering with its primary function as a storm drainage facility.	Bernalillo County will continue to manage and/or participate in the management of the refuge and the open space facilities. The County will continue to be involved in these kinds of projects as opportunities become available.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 3: Post-Construction Stormwater Management in New Development and Redevelopment- Part I.D.5.b				
(d) Implement stormwater management practices that minimize water quality impacts to streams, including disconnecting direct discharges to surface waters from impervious surfaces such as parking lots.	Bernalillo County will use stormwater management practices that minimize water quality impacts to streams, including disconnecting direct discharges to surface waters from impervious surfaces if and as necessary.	The County requires post-construction water quality BMPs for all development and redevelopment projects with land disturbances equal to or greater than one acre, including sites which disturb less than one acre but are part of a larger common plan of development, that discharge into the County's storm drainage system. These BMPs are subject to the approval of the County engineer. Maintenance responsibility of stormwater quality control facilities falls to the property owner up to the point where stormwater enters public facilities. The County has developed water conservation standards and guidelines to provide direction to homeowners, builders, and developers and includes BMPs for grading and stormwater management and water-conserving landscape design. The water-conserving site design attempts to imitate pre-development hydrology, allowing rainwater to collect and infiltrate at or close to where it falls. It also encourages the retention of natural arroyos and drainage ways. For large developments, the County requires that the master drainage plan meets the MS4 Permit requirements.	Bernalillo County will use stormwater management practices that minimize water quality impacts to streams, including disconnecting direct discharges to surface waters from impervious surfaces if and as necessary.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017
(e) Implement stormwater management practices that protect and enhance groundwater recharge as allowed under the applicable water rights laws.	For all projects requiring a grading and drainage plan, the County will continue to require onsite stormwater facilities that retain the 80th and 90th percentile rain events to drain within 96 hours per the OSE requirements. Bernalillo County will continue to require GI/LID evaluation for all sites disturbing greater than 1 acre.	The NM OSE and ISC oversees interstate water compact delivery obligations for New Mexico, including delivery of water in the Rio Grande to Texas. For all projects requiring a grading and drainage plan, the County requires onsite stormwater facilities that retain the 80th and 90th percentile rain events to drain within 96 hours per the OSE requirements. Bernalillo County also requires GI/LID evaluation for all sites disturbing greater than one acre. The County has developed water conservation standards and guidelines to provide direction to homeowners, builders, and developers and includes BMPs for grading and stormwater management and water-conserving landscape design. The water-conserving site design attempts to imitate pre-development hydrology, allowing rainwater to collect and infiltrate at or close to where it falls. It also encourages the retention of natural arroyos and drainage ways. Within Bernalillo County, the natural arroyos function as natural recharge zones. The County, in cooperation with AMAFCA, is encouraging the use of soft bottom structural controls (i.e. arroyos) to mimic pre-development hydrology to encourage naturally occurring recharge windows in dealing with realignments and drainage through major arroyos.	For all projects requiring a grading and drainage plan, the County will continue to require onsite stormwater facilities that retain the 80th and 90th percentile rain events to drain within 96 hours per the OSE requirements. Bernalillo County will continue to require GI/LID evaluation for all sites disturbing greater than 1 acre. The County will continue to encourage the use of soft bottom structural controls (i.e. arroyos) to mimic pre-development hydrology to encourage naturally occurring recharge windows in dealing with realignments and drainage through major arroyos.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017
(f) Seek to avoid or prevent hydromodification of streams and other water bodies caused by development, including roads, highways, and bridges.	Bernalillo County will continue to review master planning documents as they pertain to drainage and stormwater quality infrastructure and incorporate MS4 requirements as needed. The County will continue to evaluate opportunities to prevent hydromodification in its own projects, as well as during review of master planning documents.	Prior to construction, a conceptual grading and drainage plan showing existing and proposed grading, drainage, control, flood control and erosion control information in sufficient detail to determine project feasibility is required by the County. Grading and drainage plans are required by the County when a.) the area to be graded exceeds one acre, b.) the volume of dirt to be moved exceeds 500 cubic yards, c.) runoff from the proposed development exceeds the allowable runoff for the parcel; or d.) the drainage engineer determines that a grading and drainage plan is warranted. The Development Review Section of Bernalillo County reviews grading and drainage plans for construction projects and provides comments to those plans. Standard comments include the requirement to retain 80th and 90th percentile storm runoff. Per the County drainage ordinance for post-construction stormwater quality protection, all development and redevelopment projects with land disturbances equal to or greater than one acre require post-construction water quality BMPs. The County has developed water conservation standards and guidelines to provide direction to homeowners, builders, and developers and includes BMPs for stormwater management and water-conserving landscape design. The water-conserving site design attempts to imitate pre-development hydrology, allowing rainwater to collect and infiltrate at or close to where it falls. It also encourages the retention of natural arroyos and drainage ways. Bernalillo County incorporates GI/LID practices into new and retrofit projects, including road and trail projects such as the Alameda Drain Trail Master Plan, the Bridge Blvd Corridor Redevelopment Plan, and the Pedestrian Bicyclist Safety Action Plan. These GI/LID practices help to mimic predevelopment hydrology by slowing the flow of water. Although straightening of waterways is allowed for flood control, its designs are constrained by mimicking predevelopment hydrology.	Bernalillo County will continue to review master planning documents as they pertain to drainage and stormwater quality infrastructure and incorporate MS4 requirements as needed. The County will continue to evaluate opportunities to prevent hydromodification in its own projects, as well as during review of master planning documents.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 3: Post-Construction Stormwater Management in New Development and Redevelopment- Part I.D.5.b				
(g) Develop and implement policies to protect native soils, prevent topsoil stripping, and prevent compaction of soils.	Bernalillo County will continue to review master planning documents as they pertain to drainage and stormwater quality infrastructure and incorporate MS4 requirements as needed. The County will continue to require terrain management plans for subdivision developments. The County will continue to evaluate opportunities to protect soils in its own projects, as well as during review of master planning documents.	The County requires terrain management plans for subdivision plat approval. The terrain management plan must include the sub divider's proposal for the control of floods, drainage and erosion, and measures required for adapting proposed development to existing soil characteristics and topography to include but not limited to a grading and drainage plan, a drainage report, a surface hydrology study, and a stormwater pollution prevention plan as required by the Bernalillo County Stormwater Quality Ordinance. A recent project example that was successful in protecting native soils was the Vista del Rio Phase 4 project, which included the addition of a new stormwater management pond. The topsoil for the pond site was removed and stockpiled and then replaced on the bottom on the bottom of the pond for future use in farming and landscaping. Other policies that related to this Permit requirement: the Development Review Section of Bernalillo County reviews grading and drainage plans for construction projects and provides comments to those plans. Standard comments include the requirement to retain 80th and 90th percentile storm runoff. Per the County Stormwater Quality Ordinance for post-construction stormwater quality protection, all development and redevelopment projects with land disturbances equal to or greater than one acre require post construction water quality BMPs.	Bernalillo County will continue to review master planning documents as they pertain to drainage and stormwater quality infrastructure and incorporate MS4 requirements as needed. The County will continue to require terrain management plans for subdivision developments. The County will continue to evaluate opportunities to protect soils in its own projects, as well as during review of master planning documents.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017
(h) The program must be specifically tailored to address local community needs (e.g. protection to drinking water sources, reduction of water quality impacts) and must be designed to attempt to maintain pre-development runoff conditions.	Bernalillo County will continue to support projects like Valle de Oro NWR and Sanchez Farm open space where flood control, stormwater quality improvement, and local community needs are all addressed in ways that benefit the entire community.	Below are two examples of how the County's MS4 program elements have been specifically tailored to address local community needs: Valle de Oro National Wildlife Refuge (NWR) is an urban national wildlife refuge that also serves as a stormwater management facility. A storm drainage outfall through Valle de Oro NWR provides flood relief for the surrounding community and improves water quality prior to stormwater discharge to the Rio Grande. This project has been a cooperative effort with Bernalillo County, AMAFCA, U.S. Fish and Wildlife Service, Trust for Public Land, and the Bureau of Reclamation. The Bernalillo County Sanchez Farm open space property is a 14-acre property located in the Albuquerque South Valley. The property was purchased by the County's Public Works division for a storm drainage facility and has been developed to provide important ecological functions with an established wetlands and bioswales to mitigate stormwater pollution. Additionally, the site is community farmed with extensive educational programming for all ages led by the La Plazita Institute (LPI). The goal is for Sanchez Farm is to serve as a safe community space for recreational, educational, wildlife habitat, and farming activities while not interfering with its primary function as a storm drainage facility.	Bernalillo County will continue to support projects like Valle de Oro NWR and Sanchez Farm open space where flood control, stormwater quality improvement, and local community needs are all addressed in ways that benefit the entire community. As appropriate, a summary of County efforts related to this Permit requirement will be included in each Annual Report.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017
Update the SWMP document and annual report as required in Part I.D.5.b.(ix) and Part I.D.5.b.(x). The following information must be included in each annual report: (a) Include a summary and analysis of all maintenance, inspections and enforcement, and the number and frequency of inspections performed annually. (b) A cumulative listing of the annual modifications made to the Post-Construction Stormwater Management Program, and (c) According to the schedule presented in Table 3, the permittee must: A. Report the number of MS4-owned properties and infrastructure that have been retrofitted with control measures designed to control the frequency, volume, and peak intensity of stormwater discharges. B. As required in Part I.D.5.b.(vi), report the tabulated results for IA and DCIA and its estimation methodology.	The County will update the SWMP as necessary to include a description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.b.(i) through I.D.5.b.(viii).	Bernalillo County has reviewed the program requirements for these program elements during the Annual Report process. The County has included a summary in each Annual Report that addresses the requirments in this section of the Permit. The Annual Reports have included a summary of maintenance, inspections and enforcement, and the number and frequency of inspections performed annually; a cumulative listing of the annual modifications made to the Post-Construction Stormwater Management Program; the number of MS4-owned properties and infrastructure that have been retrofitted with control measures designed to control the frequency, volume, and peak intensity of stormwater discharges; and the t results for IA and DCIA and its estimation methodology.	Bernalillo County will annually review the program requirements for these program elements during the Annual Report process. The County will include a summary in each Annual Report that addresses the requirments in this section of the Permit. The Annual Reports will include a summary of maintenance, inspections and enforcement, and the number and frequency of inspections performed annually; a cumulative listing of the annual modifications made to the Post-Construction Stormwater Management Program; the number of MS4-owned properties and infrastructure that have been retrofitted with control measures designed to control the frequency, volume, and peak intensity of stormwater discharges; and the t results for IA and DCIA and its estimation methodology. The County will update the SWMP as necessary to include a description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.b.(i) through I.D.5.b.(viii).	Update as necessary for SWMP and annually for Annual Report

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 3: Post-Construction Stormwater Management in New Development and Redevelopment- Part I.D.5.b				
Enhance the program to include the elements in Part I.D.5.b.(xi) and Part I.D.5.a.(xii). These include: (xi) Use of stormwater educational materials; (xii) Develop or update existing construction handbooks; and (x) participate in watershed planning efforts to aid with BMP selection and planning.	The County will summarize education and outreach activities in each Annual Report. The County will work with other MS4s to evaluate the need to update the 2012 Storm Water Management Guidelines for Construction & Industrial Activities. The County will continue membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) which will facilitate cooperation and coordination with other MS4s in the Middle Rio Grande.	Stormwater Management program. The County has used stormwater educational materials, either developed by Bernalillo County, in conjunction with or by other local entities, or provided by EPA, NMED, public interest groups, trade organizations, and/or other MS4s. It also includes the use of the 2012 Storm Water Management Guidelines for Construction & Industrial Activities has been completed, led by NMDOT with coauthors Bernalillo County, AMAFCA, NMED, COA, UNM, City of Rio Rancho, and SSCAFCA. This manual is designed to provide guidance for the NPDES application and permitting process, assist regulated entities in understanding the importance of stormwater management, provide planning and design for stormwater management, and provides guidance for development of SWPPPs and BMPs. In conjunction with COA, the County has participated in updates and revisions for the Development Process Manual (DPM) as necessary. The DPM delineates the development process from initial land use proposals, through infrastructure construction, to completion of a proposed development. Bernalillo County also requires the use of the Comparison of Regional Regulations (CORR) document, a companion document to the DPM. CORR is a step-by-step through guide the Bernalillo County Public Works design path. Bernalillo County developed the Bernalillo County Green Stormwater Infrastructure: Low Impact Design Strategies for Desert Communities. The intent of this document is to provide GSI/LID interventions to stormwater management that mimic predevelopment hydrology. This guide provides standard details for GSI/LID practices as well as background information and implementation and maintenance information for construction, while maintaining accessibility to varied audiences. The County has developed water conservation standards and guidelines to provide direction to homeowners, builders, and developers and includes BMPs for grading and stormwater management and water-conserving landscape design. The water-conserving site design attempts to imitate pre-development hydrology, allowing rainwater to collect and infiltrate at or close to where it falls. It also encourages the retention of natural arroyos and drainage ways.	The County will continue to look for opportunities to enhance this program. Each Annual Report will include a summary of the Post-Construction Stormwater Management initiatives taken in the reporting period, as applicable. The County will continue to include the Permit Program Flexibility Elements/Enhancements for the Construction Site Stormwater Runoff Control program. This includes the County's use of stormwater educational materials either developed by Bernalillo County, in conjunction with or by other local entities, provided by EPA, NMED, public interest groups, trade organizations, and/or other MS4s. It also includes the use of the 2012 Storm Water Management Guidelines for Construction & Industrial Activities has been completed, led by NMDOT with coauthors Bernalillo County, AMAFCA, NMED, COA, UNM, City of Rio Rancho, and SSCAFCA. The County will continue use of the Development Process Manual (DPM). The DPM delineates the development process from initial land use proposals, through infrastructure construction, to completion of a proposed development. Bernalillo County will also continue the use of the Comparison of Regional Regulations (CORR) document, a companion document to the DPM. CORR is a step-by-step guide through the Bernalillo County Public Works design path. The County will continue use of the *Bernalillo County Green Stormwater Infrastructure: Low Impact Design Strategies for Desert Communities* . Bernalillo County will continue membership and involvement in the cooperative MS4 TAG which will facilitate cooperation and coordination for watershed planning efforts with other MS4s in the MRG.	Update as necessary for SWMP and annually for Annual Report

Part I.D.5 - SWMP Control Measures
Table 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations - Part I.D.5.c

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations - Part I.D.5.c				
Develop or update the Pollution Prevention/Good House Keeping program to include the elements in Part I.D.5.c.(i).	See Below	See Below	See Below	See Below
(a) Development and implementation of an employee training program for O&M activities including a tracking procedure.	Bernalillo County will adhere to the Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs.	Bernalillo County has a Pollution Prevention and Good Housekeeping Program Plan. The Plan includes employee training and BMPs for O&M activities. The training program addresses maintenance procedure implementation and inspection as well as pollution prevention and spill awareness. Training is completed on an annual basis and in conjunction with other regularly scheduled trainings provided by Bernalillo County Risk Services. This program also includes record keeping requirements. Stormwater training has also been incorporated into new employee training. A summary of the County's Pollution Prevention and Good Housekeeping program has been provided in each Annual Report.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. The Plan includes employee training and BMPs for O&M activities. The training program addresses maintenance procedure implementation and inspection as well as pollution prevention and spill awareness. Training will continue to be completed on an annual basis and in conjunction with other regularly scheduled trainings provided by Bernalillo County Risk Services. This program also includes record keeping requirements. Stormwater training will continue to be incorporated into new employee training. A summary of the County's Pollution Prevention and Good Housekeeping program will be provided in each Annual Report.	12 months (alone) or 18 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2016
(b) O&M activities, schedules, and long term inspections procedures for structural and nonstructural stormwater controls to reduce floatable, trash, and other pollutants discharged from the MS4	Bernalillo County will adhere to the Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs.	Bernalillo County has a Pollution Prevention and Good Housekeeping Program Plan. This Plan includes O&M activities, schedules, and long term inspection procedures. Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes Maintenance activities for these facilities occurs on a routine basis and following rain events and includes sediment, floatables, trash, and debris removal, mowing and vegetation control (tree trimming, debris removal), fence and gate repair, and erosion repair. A summary of the County's Pollution Prevention and Good Housekeeping program has been provided in each Annual Report.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. This Plan includes O&M activities, schedules, and long term inspection procedures. Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes. Maintenance activities for these facilities occurs on a routine basis and following rain events and includes sediment, floatables, trash, and debris removal, mowing and vegetation control (tree trimming, debris removal), fence and gate repair, and erosion repair. A summary of the County's Pollution Prevention and Good Housekeeping program will be provided in each Annual Report.	12 months (alone) or 18 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2016
(c) Controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, fleet or maintenance shops, outdoor storage areas, salt/sand storage locations, snow disposal areas, and waste transfer stations.	Bernalillo County will adhere to the Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs.	Bernalillo County has a Pollution Prevention and Good Housekeeping Program Plan. This Plan includes controls for reducing the discharge of pollutants from County streets, parking lots, and facilities. County parking lots and yards have been designed to contain the majority of stormwater runoff using stormwater channeling and detention ponds. Materials stored at maintenance and storage yards (including salt/sand) are kept indoors, under covered areas, and/or in bermed areas. In areas where some materials are not covered, BMPs such as berms are used to ensure that stormwater runoff that could come in contact with these materials does not leave the site. Bernalillo County has one waste transfer station in the unincorporated county. The waste transfer station facility is permitted and regulated by the NMED Solid Waste Bureau. Regulatory requirements include environmental controls that protect stormwater quality.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. This Plan includes controls for reducing the discharge of pollutants from County streets, parking lots, and facilities. County parking lots and yards have been designed to contain the majority of stormwater runoff using stormwater channeling and detention ponds. Materials stored at maintenance and storage yards (including salt/sand) are kept indoors, under covered areas, and/or in bermed areas. In areas where some materials are not covered, BMPs such as berms are used to ensure that stormwater runoff that could come in contact with these materials does not leave the site. Bernalillo County has one waste transfer station in the unincorporated county. The waste transfer station facility is permitted and regulated by the NMED Solid Waste Bureau. Regulatory requirements include environmental controls that protect stormwater quality.	12 months (alone) or 18 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2016
(d) Procedures for properly disposing of waste removed from storm sewers facilities (dredge spoil, sediment, floatables, and other debris).	Bernalillo County will adhere to the Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs.	Bernalillo County has a Pollution Prevention and Good Housekeeping Program Plan. This Plan includes procedures for properly disposing of waste removed from County drainage facilities. Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes. Maintenance activities for these facilities occurs on a routine basis and following rain events and includes sediment, floatables, trash, and debris removal, mowing and vegetation control (tree trimming, debris removal), fence and gate repair, and erosion repair. The County maintains one drying station- a location where floatable material, sediment, and debris removed from the storm sewer system is hauled, separated, and disposed of properly. These materials are typically taken to the landfill for proper disposal. A summary of the County's Pollution Prevention and Good Housekeeping program has been provided in each Annual Report.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. This Plan includes procedures for properly disposing of waste removed from County drainage facilities. Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes. Maintenance activities for these facilities occurs on a routine basis and following rain events and includes sediment, floatables, trash, and debris removal, mowing and vegetation control (tree trimming, debris removal), fence and gate repair, and erosion repair. The County maintains one drying station- a location where floatable material, sediment, and debris removed from the storm sewer system is hauled, separated, and disposed of properly. These materials are typically taken to the landfill for proper disposal. A summary of the County's Pollution Prevention and Good Housekeeping program will be provided in each Annual Report.	12 months (alone) or 18 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2016
(e) Procedures to ensure that new flood management projects assess the impacts on water quality and examine existing projects for incorporating additional water quality protection devices or practices.	Bernalillo County will continue to review flood control projects through the County Grading and Drainage review process, which include MS4 Permit requirements.	Flood control projects are planned and designed through Bernalillo County Public Works Technical Services Department and are reviewed through the Development (Grading and Drainage) Review process. Major flood control projects are coordinated through cooperative efforts with AMAFCA and other co-permittees as needed. The Development Review procedures have been updated to include the MS4 Permit requirements for stormwater management.	Bernalillo County will continue to review flood control projects through the County Grading and Drainage review process, which include MS4 Permit requirements.	12 months (alone) or 18 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations - Part I.D.5.c				
Enhance the program to include the elements in Part I.D.5.c.(ii).	See Below	See Below	See Below	See Below
(a) Develop or update the existing list of all stormwater quality facilities by drainage basin, including location and description.	Bernalillo County will continue to maintain and update a list and maps of all stormwater quality facilities as needed.	This Permit activity has been completed. Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes. The County has maintained and updated, as needed, a list and map of all stormwater quality facilities. An updated map is typically included in each Annual Report.	Bernalillo County will continue to maintain and update, as needed, a list and map of all stormwater quality facilities. An updated map will be included in each Annual Report.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017
(b) Develop or modify existing operational manual for de-icing activities addressing alternate materials and methods to control impacts to stormwater quality.	Bernalillo County will continue to follow BMPs in place for minimizing impacts to stormwater quality for de-icing activities and storage of de-icing materials. The county will evaluate its winter maintenance program and will look at the feasibility of using alternative materials where not cost-prohibitive. The County will assess and modify the current practices as necessary.	Bernalillo County has a Pollution Prevention and Good Housekeeping Program Plan. Bernalillo County follows BMPs in its Pollution Prevention/Good Housekeeping program to help minimize impacts to stormwater quality from de-icing activities and storage of de-icing materials. The county has evaluated its winter maintenance program and looked at the feasibility of using alternative materials. Alternative materials and methods currently available to the County are cost-prohibitive.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. Bernalillo County will continue to follow BMPs in its Pollution Prevention/Good Housekeeping program to help minimize impacts to stormwater quality from de-icing activities and storage of de-icing materials. In FY20, the County will begin using a new mix of cinders and salt. Cinders are more effective at stabilizing than sand and will reduce the amount of salts needed for de-icing.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017
(c) Develop or modify existing program to control pollution in stormwater runoff from County equipment and vehicle maintenance yard.	Bernalillo County will continue to follow BMPs in place for minimizing impacts to stormwater quality from the County equipment and vehicle maintenance yard. The County will assess and modify the current practices as necessary.	Bernalillo County has a Pollution Prevention and Good Housekeeping Program Plan. Bernalillo County follows BMPs to minimize impacts to stormwater quality from the County Public Works Yard. Fleet maintenance recycles or properly disposes of oils and other automotive and potentially hazardous fluids and uses good housekeeping practices for shop maintenance. Fluids such as oils, chemicals, and paints used by fleet maintenance, facilities management, parks and recreation, and other departments are stored in sealed containers and kept indoors or under covered areas. The County Public Works yards have been designed to contain the majority of stormwater runoff using stormwater channeling and detention ponds. In areas where some materials are not covered, BMPs such as berms are used to ensure that stormwater runoff that could come in contact with these materials does not leave the site. Bernalillo County is currently constructing a new salt storage area to minimize and eliminate contact with stormwater. A summary of the County's Pollution Prevention and Good Housekeeping program has been provided in each Annual Report.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. Bernalillo County will continue to follow BMPs in place for minimizing impacts to stormwater quality from the County equipment and vehicle maintenance yard. A summary of the County's Pollution Prevention and Good Housekeeping program will be provided in each Annual Report.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017
(d) Develop or modify existing street sweeping program. Assess possible benefits from changing frequency or timing of sweeping activities or utilizing different equipment for sweeping activities.	Bernalillo County will continue to follow its BMPs for street sweeping to minimize impacts to stormwater quality within its jurisdiction. The County will assess and modify the current practices as necessary.	Bernalillo County has a Pollution Prevention and Good Housekeeping Program Plan. Bernalillo County conducts street sweeping activities within its jurisdiction to minimize impacts to stormwater quality. The County operates a total of 3 street sweepers in the urbanized area. Targeted sweeping operations are based on citizen calls, routine supervisor visual inspections, following Clean Team activities, and on higher trafficked roads. Residential streets within the urbanized area of unincorporated Bernalillo County are swept on an as-needed basis. Streets that are more heavily used and acquire more trash and other debris or are affected by other environmental factors (undeveloped areas with unconsolidated sand and sparse vegetation) require additional sweeping and are swept more frequently. During the rainy season, sweeping activities increase to address the additional volume of materials such as litter, vegetation, and sediment. The street sweeping activities occur in unincorporated Bernalillo County, inside and outside of the urbanized area.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. Bernalillo County will continue to follow its BMPs for street sweeping to minimize impacts to stormwater quality within its jurisdiction. A summary of the County's Pollution Prevention and Good Housekeeping program will be provided in each Annual Report.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations - Part I.D.5.c				
(e) A description of procedures used by permittees to target roadway areas most likely to contribute pollutants to and from the MS4 (i.e., runoff discharges directly to sensitive receiving water, roadway receives majority of de-icing material, roadway receives excess litter, roadway receives greater loads of oil and grease).	Bernalillo County will continue its trash and debris removal, vegetation control, and street sweeping activities. The County will continue to prioritize these activities in heavily utilized areas. The County has an Objectives and Performance Measures goal of $10,000 for sweeping operations, which was met in FY15 and is a goal for FY16.	Bernalillo County has a Pollution Prevention and Good Housekeeping Program Plan. Bernalillo County targets heavily utilized roadways with trash and debris removal, vegetation control, and street sweeping activities within its jurisdiction to minimize impacts to stormwater quality. The Bernalillo County Community Custody Program (CCP) operates on a daily basis and collects debris along roadsides, drainage areas, and some open space areas and is also utilized to control vegetation. Bernalillo County Operations and Maintenance removes trash and debris and handles vegetation control (vegetation is mowed or cut, never graded) in public right of ways, drainage areas, and some open space areas. Heavily used roads are maintained on a more frequent basis. Bernalillo County conducts street sweeping activities within its jurisdiction to minimize impacts to stormwater quality, as described above.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. Bernalillo County will continue its trash and debris removal, vegetation control, and street sweeping activities targeting heavily utilized roadways within its jurisdiction. The County will continue to prioritize these activities in heavily utilized areas. The County will continue to set and strive to meet Objectives and Performance Measures goals for sweeping operations. A summary of the County's Pollution Prevention and Good Housekeeping program will be provided in each Annual Report.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017
(f) Develop or revise existing standard operating procedures for collection of used motor vehicle fluids (at a minimum oil and antifreeze) and toxics (including paint, solvents, fertilizers, pesticides, herbicides...) used by the County.	Bernalillo County will continue to follow BMPs in place for minimizing impacts to stormwater quality from the County equipment and vehicle maintenance yard s well as BMPs that address other County facilities/activities, including maintenance and parks and recreation. Bernalillo County will continue to work cooperatively with the COA to maintain the Household Hazardous Waste Collection Center and will continue to conduct public household hazardous waste collection events. The County will summarize annual waste collection activities in the Annual Report.	Bernalillo County has a Pollution Prevention and Good Housekeeping Program Plan. Bernalillo County follows BMPs to minimize impacts to stormwater quality from the County Public Works Yard. Fleet maintenance recycles or properly disposes of oils and other automotive and potentially hazardous fluids and uses good housekeeping practices for shop maintenance. Fluids such as oils, chemicals, and paints used by fleet maintenance, facilities management, parks and recreation, and other departments are stored in sealed containers and generally kept indoors, under covered areas, or within a secondary containment structure. Additionally, Bernalillo County and the COA have cooperatively maintained a contract with the Household Hazardous Waste Collection Center, operated by Advanced Chemical Transport. The County also addresses household hazardous waste through education and outreach to the public at clean-up and waste collection events occurring throughout the year within the County's jurisdiction, both in- and outside of the Urbanized Area. Bernalillo County operations utilize this resource as well. The New Mexico Department of Agriculture (NMDA) hosts free pesticide collection events annually to promote the proper and safe disposal. The Bernalillo County Extension Office has helped promote this effort.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. Bernalillo County will continue to follow BMPs to minimize impacts to stormwater quality from the County Public Works Yard as well as BMPs that address other County facilities/activities, including maintenance and parks and recreation. Related to proper disposal of household hazardous waste, the County will have at least six household waste collection events during each year of the permit term. The County will maintain its existing contracts for a Household Hazardous Waste Collection Center in cooperation with the COA. The County will continue to provide education and collection/disposal options for household hazardous waste and will provide a summary of these efforts in each Annual Report.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017
(g) Standard operating procedure for disposal of accumulated sediments, floatables, and debris.	Bernalillo County will continue to maintain its stormwater facilities on a routine basis and following rain events.	Bernalillo County has a Pollution Prevention and Good Housekeeping Program Plan. This Plan includes procedures for properly disposing of waste and sediment removed from County drainage facilities. Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes. Maintenance activities for these facilities occurs on a routine basis and following rain events and includes sediment, floatables, trash, and debris removal, mowing and vegetation control (tree trimming, debris removal), fence and gate repair, and erosion repair. The County maintains one drying station- a location where floatable material, sediment, and debris removed from the storm sewer system is hauled, separated, and disposed of properly. These materials are typically taken to the landfill for proper disposal. A summary of the County's Pollution Prevention and Good Housekeeping program has been provided in each Annual Report.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. This Plan includes procedures for properly disposing of waste and sediment removed from County drainage facilities. Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes. Maintenance activities for these facilities occurs on a routine basis and following rain events and includes sediment, floatables, trash, and debris removal, mowing and vegetation control (tree trimming, debris removal), fence and gate repair, and erosion repair. The County maintains one drying station- a location where floatable material, sediment, and debris removed from the storm sewer system is hauled, separated, and disposed of properly. These materials are typically taken to the landfill for proper disposal. A summary of the County's Pollution Prevention and Good Housekeeping program will be provided in each Annual Report.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations - Part I.D.5.c				
(h) litter source control program, include targeted public awareness campaign.	The County will continue its public outreach and education efforts, including mailers. The County will summarize education and outreach activities in each Annual Report. Bernalillo County will continue its trash and debris removal, vegetation control, and street sweeping activities. The County will continue to prioritize these activities in heavily utilized areas.	Public awareness for litter source control is also handled in the County's Public Education and Outreach program, refer to TABLE 8: Public Education and Outreach on Stormwater Impacts for additional information. The County utilizes a combination of existing and new educational materials (such as the "Project W.E.T. Kids in Discovery Series" and the Enviroscape watershed model), County-created brochures, and or other educational materials and promotional items. The County also uses its website and/or social media as a venue for distributing materials and posts about water quality. The County has typically generated a minimum of one mailing annually to residents of unincorporated Bernalillo County addressing one or more of the following topics on a rotating basis: illicit discharge reporting, proper disposal of household hazardous waste including lawn and garden chemicals and used motor oil, FOG, animal sources/pet wastes, litter control, and/or public participation in the MS4 process. The County zoning enforcement department hosts approximately residential waste collection events annually. As part of the collection event, County solid waste provides dumpsters for weekend events in targeted neighborhoods. Neighborhoods are targeted based on field observations and records of complaints for excessive trash and illegal dumping. Additionally, the household hazardous waste events are held in conjunction with a minimum of 6 of these waste collection events. Related to the Bernalillo County has a Pollution Prevention and Good Housekeeping Program, litter pickup has been addressed through the Bernalillo County Community Custody Program (CCP), which operates on a daily basis and collects debris along roadsides, drainage areas, and some open space areas and is also utilized to control vegetation. Bernalillo County Operations and Maintenance also has removed trash and debris and handles vegetation control (vegetation is mowed or cut, never graded) in public right of ways, drainage areas, and some open space areas. Bernalillo County has conducted street sweeping activities within its jurisdiction to minimize impacts to stormwater quality (details for street sweeping are included above). A summary of the County's Pollution Prevention and Good Housekeeping program and litter public outreach activities have been provided in each Annual Report.	Public awareness for litter source control will continue to be handled in the County's Public Education and Outreach program, refer to TABLE 8: Public Education and Outreach on Stormwater Impacts for additional information. The County will summarize education and outreach activities in each Annual Report. As summarized above, Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. Bernalillo County will continue its trash and debris removal, vegetation control, and street sweeping activities. The County will continue to prioritize these activities in heavily utilized areas. A summary of the County's Pollution Prevention and Good Housekeeping program and litter outreach activities will be provided in each Annual Report.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017
(i) Develop or review and revise, as necessary, the criteria, procedures and schedule to evaluate existing flood control devices, structures and drainage ways to assess the potential of retrofitting to provide additional pollutant removal from stormwater. Implement routine review to ensure new and/or innovative practices are implemented where applicable.	The County will continue to meet with agencies and private developers within its jurisdiction to discuss the areas requiring drainage and water quality retrofitting within the Middle Rio Grande Watershed, project priorities, and multi-agency funding contributions.	Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes. Maintenance activities for these facilities occurs on a routine basis and following rain events and includes sediment, floatables, trash, and debris removal, mowing and vegetation control (tree trimming, debris removal), fence and gate repair, and erosion repair. The County has met typically annually, with area MS4s, agencies, and private developers to discuss areas requiring drainage and water quality retrofits, project priorities, and multi-agency funding. The County's membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) facilitates this cooperation and coordination with other MS4s in the Middle Rio Grande. The County works cooperatively with AMAFCA, the COA, NMDOT, and other entities on a project schedule that updates stormwater projects in the MRG on an annual basis. This schedule identifies stormwater quality projects and retrofit projects. Internally, water quality projects and water quality retrofit projects will be prioritized. Operation and Maintenance procedures, inspections, repairs, and retrofits have been evaluated through the cooperative Agency and Area Wide Agreement.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes. Maintenance activities for these facilities occurs on a routine basis and following rain events and includes sediment, floatables, trash, and debris removal, mowing and vegetation control (tree trimming, debris removal), fence and gate repair, and erosion repair. The County will continue to meet with area MS4s, agencies, and private developers within its jurisdiction to discuss the areas requiring drainage and water quality retrofitting within the Middle Rio Grande Watershed, project priorities, and multi-agency funding contributions. The County's continued membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) will facilitate this cooperation and coordination with other MS4s in the Middle Rio Grande. The County works cooperatively with AMAFCA, the COA, NMDOT, and other entities on a project schedule that updates stormwater projects in the MRG on an annual basis. This schedule identifies stormwater quality projects and retrofit projects. Internally, water quality projects and water quality retrofit projects will continue to be prioritized. Operation and Maintenance procedures, inspections, repairs, and retrofits will continue to be evaluated through the cooperative Agency and Area Wide Agreement.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017
j) Enhance inspection and maintenance programs by coordinating with maintenance personnel to ensure that a target number of structures per basin are inspected and maintained per quarter.	The County will continue coordination between maintenance personnel and staff to ensure that a target number of structures per basin are inspected and maintained per quarter.	The County drainage maintenance department inspects and maintains all of the stormwater facilities in the county. The county has a drainage maintenance plan that targets specific facilities and structures for inspection and maintenance at various intervals. The county inspects all lift stations twice monthly and inspect 50% of the inlets and manholes annually. Additionally, they maintain and inspect facilities when maintenance issues arise or receive complaints. A summary of the County's Pollution Prevention and Good Housekeeping program will be provided in each Annual Report.	Bernalillo County will continue to adhere to its Pollution Prevention and Good Housekeeping Program Plan which includes procedures, instructions, and record keeping requirements for Bernalillo County facilities and BMPs. The County will continue coordination between maintenance personnel and staff to ensure that a target number of structures per basin are inspected and maintained. A summary of the County's Pollution Prevention and Good Housekeeping program will be provided in each Annual Report.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations - Part I.D.5.c				
(k) Enhance the existing program to control the discharge of floatables and trash from the MS4 by implementing source control of floatables in industrial and commercial areas.	Bernalillo County will continue to implement a program to address and control floatables in discharges into the MS4. The County will continue to install and maintain stormwater quality features to control floatables. Bernalillo County will continue to implement its public education and outreach program. The County will begin a targeted outreach and education campaign addressing industrial and commercial areas within unincorporated Bernalillo County. The existing program will be updated, as necessary, to comply with the requirements of this Permit.	Bernalillo County has implemented a program to address and control floatables in discharges into the MS4. The County has continued to install and maintain stormwater quality features to control floatables, such as ported risers, trash racks, automatic bar screens, screened inlets, and water quality manholes. The County has continued manual trash removal on a regular basis. The Bernalillo County Community Custody Program (CCP) operates on a daily basis and collects debris along roadsides, drainage areas, and some open space areas and is also utilized to control vegetation. The County zoning enforcement department hosts approximately residential waste collection events annually. As part of the collection event, County solid waste provides dumpsters for weekend events in targeted neighborhoods. Neighborhoods are targeted based on field observations and records of complaints for excessive trash and illegal dumping. Additionally, the household hazardous waste events are held in conjunction with a minimum of 6 of these waste collection events. Bernalillo County has continued to implement its public education and outreach program. Refer to TABLE 8: Public Education and Outreach on Stormwater Impacts for additional information. Target pollutants addressed in this program include pet waste and trash/debris. Currently, the County utilizes both existing and new educational materials, targeted stormwater education printed materials including brochures, public presentations/events, giveaways, signage at select locations, and a County-based stormwater education website and social media. A summary of the County's Pollution Prevention and Good Housekeeping program and Public Education and Outreach activities have been provided in each Annual Report.	Bernalillo County will continue to implement a program to address and control floatables in discharges into the MS4. The County will continue to install and maintain stormwater quality features to control floatables, such as ported risers, trash racks, automatic bar screens, screened inlets, and water quality manholes. The County will continue manual trash removal on a regular basis. Bernalillo County will continue to implement its public education and outreach program. Refer to TABLE 8: Public Education and Outreach on Stormwater Impacts for additional information. Target pollutants addressed in this program include pet waste and trash/debris. Currently, the County utilizes both existing and new educational materials, targeted stormwater education printed materials including brochures, public presentations/events, giveaways, signage at select locations, and a County-based stormwater education website and social media. A summary of the County's Pollution Prevention and Good Housekeeping program and Public Education and Outreach activities have been provided in each Annual Report.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017
(l) Include in each annual report, a cumulative summary of retrofit evaluations conducted during the permit term on existing flood control devices, structures and drainage ways to benefit water quality. Update the SWMP to include a schedule (with priorities) for identified retrofit projects.	A list of retrofit evaluations and any retrofitted facilities will be included in each annual report. The County will continue to evaluate projects for retrofitting and will implement retrofits as needed and as funding is available, on a priority basis. The County will update the SWMP as necessary to include a prioritized retrofit project schedule as this is developed.	The County has an inventory of County-owned properties and facilities that may have the potential for retrofitted control measures and stormwater quality facilities and BMPs. During this permit term, the County has installed an inlet retrofit for the Adobe Acres stormwater facility to improve water quality. The County has also included drainage improvements and retrofits with other construction work, such as road improvement projects. The Vista del Rio Road improvement project included drainage improvements along the public right of way as well as a new detention pond to accommodate additional stormwater runoff volume. In FY18, Bernalillo County completed two projects that included GI/LID retrofits – Alameda Drain Trial Project and Second Street Southwest improvements. In addition, Bridge Blvd, which was in designed in FY18, includes GI/LID elements. Other improvement projects (IP) currently in planning or construction phases and include drainage improvements are the Sunset Road IP, Tower Road SW Roadway and Utility Improvement, Goff Boulevard Improvements, Sunset Gardens Road, Woodward Road IP, Barcelona Storm Drain Phase 1, intersection of Coors Blvd. and Blake, as well as many others. The County will continue to meet with area MS4s to discuss areas requiring drainage and water quality retrofits, project priorities, and multi-agency funding. The County's membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) facilitates this cooperation and coordination with other MS4s in the Middle Rio Grande. The County works cooperatively with AMAFCA, the COA, NMDOT, and other entities on a project schedule that updates stormwater projects in the MRG on an annual basis. This schedule identifies stormwater quality and retrofit projects. Internally, water quality projects and water quality retrofit projects will be prioritized when possible.	A list of retrofit evaluations and any retrofitted facilities will be included in each Annual Report. The County will continue to evaluate projects for retrofitting and will implement retrofits as needed and as funding is available, on a priority basis. The County's continued membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) facilitates this cooperation and coordination with other MS4s in the Middle Rio Grande. The County will continue to work cooperatively with AMAFCA, the COA, NMDOT, and other entities on a project schedule that updates stormwater projects in the MRG on an annual basis. This schedule identifies stormwater quality and retrofit projects. The County will update the SWMP as necessary to include a prioritized retrofit project schedule as this is developed.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 4: Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations - Part I.D.5.c				
(m) Flood management projects: review and revise, as necessary, technical criteria guidance documents and program for the assessment of water quality impacts and incorporation of water quality controls into future flood control projects. The criteria guidance document must include the following elements: A. Describe how new flood control projects are assessed for water quality impacts. B. Provide citations and descriptions of design standards that ensure water quality controls are incorporated in future flood control projects. C. Include method for permittees to update standards with new and/or innovative practices. D. Describe master planning and project planning procedures and design review procedures.	The County will continue to incorporate stormwater quality BMPs into all new flood control projects when feasible.	Flood control projects have been reviewed through the County Grading and Drainage review procedures. These procedures have been updated to include the MS4 Permit requirements for stormwater management. The County uses the City of Albuquerque Development Process Manual (DPM) and Bernalillo County Development Review Grading and Drainage (G&D) Checklist to ensure water quality controls are incorporated in flood control projects. This process also follow state regulations. As part of these procedures, all storm water control facilities must have water quality outlets designed to minimize the contribution of floatables and sediments to Waters of the US. Facilities must be designed to retain runoff form the 90th percentile rainfall event and treat the remaining stormwater discharge to the best extent practicable. As part of the development review process, construction project plans are reviewed and evaluated for opportunities to incorporate GI/LID/sustainable practices. All commercial applicants must complete the Stormwater Post-Construction GI/LID Evaluation form. Where new and/or innovative technologies become available, the County will incorporate these practices where applicable. Additionally, the County uses the City of Albuquerque DPM as mentioned above; as the DPM is updated with new/innovative practices, the County will also incorporate these into its projects as applicable.	The County will continue to incorporate stormwater quality BMPs into all new flood control projects when feasible. This will be done following the County's established Grading and Drainage review procedures and development review process.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017
(n) Develop procedures to control the discharge of pollutants related to the storage and application of pesticides, herbicides, and fertilizers applied, by the permittee's employees or contractors, to public right of-ways, parks, and other municipal property. The permittee must provide an updated description of the data monitoring system for all permittee departments utilizing pesticides, herbicides and fertilizers.	Commercial application of pesticides is regulated by the NMDA. Bernalillo County will continue to ensure that all staff and contractors are trained and licensed for the application of pesticides by NMDA. The County will continue to use educational materials on the proper use and application of pesticides, herbicides, and fertilizers to educate the public. The County will also continue with the existing Household Hazardous Waste Collection Program, where used pesticides, herbicides, and fertilizers can be brought to be disposed of properly.	Commercial application of pesticides is regulated by the New Mexico Department of Agriculture (NMDA). NMDA has authority over the distribution and use of all pesticides in the state. NMDA establishes certification requirements for pesticide applicators including a requirement for continuing education. Additionally, under the Clean Water Act, pesticide applications to, over, or near water generally require a NPDES permit issued by the EPA. During inspections, the County will verify that all permits and certifications are in place. Bernalillo County will only allow certified staff or professionally licensed contractors to apply herbicides within unincorporated Bernalillo County. The Parks and Recreation Department uses non-restricted pesticides and herbicides in limited quantities for pest and vegetation control. In FY19, the County placed a moratorium of use of Glyphosate herbicide (main ingredient in the weed killer "Roundup". All Bernalillo County staff who apply herbicides are trained and licensed by NMDA. NMDA conducts annual inspections of the Bernalillo County facilities to ensure that training is current and all chemical are stored properly. The County follows all label instructions for application and storage of herbicides and fertilizers. Pesticide application is provided by a contractor to the County. The contractor is required to have all appropriate trainings and licenses for pesticide application.	Commercial application of pesticides is regulated by the NMDA. Bernalillo County will continue to ensure that all staff and contractors are trained and licensed for the application of herbicides and pesticides by NMDA. The Parks and Recreation Department will continue to only use non-restricted pesticides and herbicides in limited quantities for pest and vegetation control. The County will continue to use educational materials on the proper use and application of pesticides, herbicides, and fertilizers to educate the public. The County will also continue with the existing Household Hazardous Waste Collection Program (described above), where used pesticides, herbicides, and fertilizers can be brought to be disposed of properly.	12 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Dec. 22, 2015 or June 22, 2017
Develop or update a list and a map of industrial facilities owned or operated by the permittee as required in Part I.D.5.c.(iii).	NA	This Permit requirements is not applicable to Bernalillo County. Bernalillo County does not own any industrial facilities. The Bernalillo County Sherriff's Department operates its air unit from the Double Eagle II Airport, which is owned and managed by the City of Albuquerque. Operations at the facility are covered under the MSGP for Sector S Air Transportation. A SWPPP has been developed for the Double Eagle II Airport "...as a single comprehensive document for all Aviation operations (i.e. Airfield Maintenance, etc.) and all air transportation related operators including fixed-base operators, aircraft service providers, etc. All operators who fall under the MSGP must sign and certify this document" (http://www.abqsunport.com/wp-content/uploads/2015/08/Final-DEII-2015-SWPPP-Text-only.pdf). The 2015 MSGP NPDES Tracking Number for the Sherriff's Department Air Unit is NMR053253. Because these operations occur at a facility not owned by the County and all operations are covered under the SWPPP for the Double Eagle II Airport, Bernalillo County does not manage NPDES compliance for this activity.	This Permit requirements is not applicable to Bernalillo County. Bernalillo County does not own any industrial facilities. The Bernalillo County Sherriff's Department operates its air unit from the Double Eagle II Airport, which is owned and managed by the City of Albuquerque. Operations at the facility are covered under the MSGP for Sector S Air Transportation. A SWPPP has been developed for the Double Eagle II Airport "...as a single comprehensive document for all Aviation operations (i.e. Airfield Maintenance, etc.) and all air transportation related operators including fixed-base operators, aircraft service providers, etc. All operators who fall under the MSGP must sign and certify this document" (http://www.abqsunport.com/wp-content/uploads/2015/08/Final-DEII-2015-SWPPP-Text-only.pdf). The 2015 MSGP NPDES Tracking Number for the Sherriff's Department Air Unit is NMR053253. Because these operations occur at a facility not owned by the County and all operations are covered under the SWPPP for the Double Eagle II Airport, Bernalillo County does not manage NPDES compliance for this activity.	NA
Update the SWMP document and annual report as required in I.D.5.c.(iv) and Part I.D.5.c.(v). The permittee must include in the SWMP a description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.c.(i) throughout Part I.D.5.c.(iii) and its corresponding measurable goal. The permittee shall assess the overall success of the program, and document the program effectiveness in the annual report.	As part of the Annual Report process, Bernalillo County will review the program requirements listed in Part I.D.5.c, for the above-mentioned SWMP elements, and develop a strategy to implement any new program requirements as needed. Currently there are no industrial facilities owned by the County.	Bernalillo County does not own any industrial facilities. Bernalillo County has reviewed the program requirements listed in Part I.D.5.c, for the above-mentioned SWMP elements, during each Annual Report process.	As part of the Annual Report process, Bernalillo County will continue to review the program requirements listed in Part I.D.5.c, for the above-mentioned SWMP elements, and develop a strategy to implement any new program requirements as needed. Currently there are no industrial facilities owned by the County.	Update as necessary for SWMP and annually for Annual Report

Part I.D.5 - SWMP Control Measures
Table 6: Illicit Discharges and Improper Disposal - Part I.D.5.e

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 6: Illicit Discharges and Improper Disposal - Part I.D.5.e				
As described in Part I.D.5.e.(i), the permittee shall develop, revise, implement, and enforce a program to detect and eliminate illicit discharges (as defined at 40 CFR 122.26(b)(2)) entering the MS4. Permittees previously covered under NMS000101 or NMR040000 must continue existing programs while updating those programs, as necessary, to comply with the requirements of this permit. The permittee must (see required items listed below):	The County Stormwater Program Compliance Manager will continue to review, revise, and implement the Illicit Discharge Detection and Elimination Program requirements. The County will update its current written procedure for this program element. The County is pursuing developing cooperative program elements for this program.	The County has developed a program to detect and eliminate illicit discharges. The program elements, as they relate to the Permit requirements, are described in detail below. The County has continued to pursue developing cooperative program elements for this program. The County's membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) has facilitated this cooperation and coordination with other MS4s in the Middle Rio Grande.	The County Stormwater Program Compliance Manager will continue to review, revise, and implement the Illicit Discharge Detection and Elimination Program requirements, as described in detail below. The County will update its current written procedure for this program element, as needed. The County will continue pursuing developing cooperative program elements for this program. The County's continued membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) will facilitate this cooperation and coordination with other MS4s in the Middle Rio Grande.	See specific Permit activity schedules below.
Mapping as required in Part I.D.5.e.(i).(a). Develop, if not already completed, a storm sewer system map, showing the names and locations of all outfalls as well as the names and locations of all waters of the United States that receive discharge from those outfalls. Identify all discharges points into major drainage channels draining more than twenty (20) percent of the MS4 area;	The County will continue to keep this map updated as necessary, including County facilities as well as other MS4 permittee facilities in cooperation with other MS4s.	This Permit activity has been completed. Bernalillo County maintains approximately 60 storm drainage ponds, 64 miles of storm sewer lines, 20 miles of culverts, 8 miles of open channel, 1,820 linear feet of infiltrators, and 1,066 manholes. The County does not have any major drainage channels that drain more than 20% of the MS4 area. The County has maintained an updated map of all stormwater quality facilities. An updated map is typically included in each Annual Report.	Bernalillo County will continue to maintain and update, as needed, a map of all stormwater quality facilities. This may include coordination with other MS4s related to their area stormwater quality facilities. An updated map will be included in each Annual Report.	10 months (alone) or 14 months (cooperative) from effective date of MS4 Permit Oct. 22, 2015 or Feb. 22, 2016
Ordinance (or other control method) as required in Part I.D.5 .e.(i)(b).	The County will submit a draft ordinance revision to include requirements under this permit for illicit discharge management to the Bernalillo County Commission for approval.	This Permit activity has been completed. Bernalillo County adopted the Stormwater Quality Ordinance, Chapter 38, Article IV, in 2017. Section 38-451 of this ordinance addresses illicit discharge detection and elimination per the MS4 Permit requirements. This ordinance prohibits non-stormwater discharges and implements appropriate enforcement procedures. The Bernalillo County Solid Waste Ordinance also addresses illegal dumping and disposal, including illicit discharges, and provides an additional regulatory mechanism for addressing and enforcing IDDE requirements.	This Permit activity has been completed. Bernalillo County will continue to follow and enforce its ordinance, as required by the MS4 Permit (Chapter 38, Article IV and the Solid waste Ordinance of the Bernalillo County Code of Ordinances).	10 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Oct. 22, 2015 or June 22, 2017
permittee must include the following elements in the plan: A. Procedures for locating priority areas likely to have illicit discharges including field test for selected pollutant indicators (ammonia, boron, chlorine, color, conductivity, detergents, E. coli, enterococci, total coliform, fluoride, hardness, pH, potassium, conductivity, surfactants), and visually screening outfalls during dry weather; B. Procedures for enforcement, including enforcement escalation procedures for recalcitrant or repeat offenders; C. Procedures for removing the source of the discharge; D. Procedures for program evaluation and assessment; and E. Procedures for coordination with adjacent municipalities and/or state,	The County will continue to implement the existing IDDE program. The County will continue membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) which will facilitate cooperation and coordination with other MS4s in the Middle Rio Grande related to the IDDE program. The County will also continue to contact other MS4s directly to address illicit discharges that may involve their jurisdictional areas. The County is in the process of developing a written procedure for this program.	The County has completed an IDDE plan and successfully implemented its IDDE program. The County has improved it's program by including procedures: to locate priority areas (A), for enforcement (B), for removal of the source of the discharge (C), for program evaluation and assessment (D), and for coordination with adjacent municipalities/agencies (E). The County cooperates with other MS4s by coordinating efforts to address illicit discharges where the discharges may cross jurisdictional boundaries. The County's membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) has facilitated this cooperation and coordination with other MS4s in the Middle Rio Grande.	The County will continue to implement the existing IDDE plan and program. The County will continue membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) which will facilitate cooperation and coordination with other MS4s in the Middle Rio Grande related to the IDDE program. The County will also continue to contact other MS4s directly to address illicit discharges that may involve their jurisdictional areas.	10 months (alone) or 30 months (cooperative) from effective date of MS4 Permit Oct. 22, 2015 or June 22, 2017
Develop an education program as required in Part I.D.5.e.(i).(d). Develop an education program to promote, publicize, and facilitate public reporting of illicit connections or discharges, and distribution of outreach materials. The permittee shall inform public employees, businesses and the general public of hazards associated with illegal discharges and improper disposal of waste.	The County will continue its education and outreach program and internal training program for inspection, field, and staff regarding illicit discharges and improper waste disposal. The County will summarize education and outreach activities in each Annual Report.	Education related to hazards associated with illegal discharges and improper disposal of waste is also handled in the County's Public Education and Outreach program, refer to TABLE 8: Public Education and Outreach on Stormwater Impacts for additional information. Bernalillo County has an internal training program for inspection, field, and staff regarding illicit discharges and improper waste disposal. A summary of the County's IDDE education and outreach activities, as well as internal trainings, have been provided in each Annual Report. The County has utilized a combination of existing and new educational materials (such as the "Project W.E.T. Kids in Discovery Series" and the Enviroscape watershed model), County-created brochures, and or other educational materials and promotional items. The County uses its website and/or social media as a venue for distributing materials and posts about water quality. The County has typically generated a minimum of one mailing annually to residents and/or businesses of unincorporated Bernalillo County addressing one or more of the following topics on a rotating basis: illicit discharge reporting, proper disposal of household hazardous waste including lawn and garden chemicals and used motor oil, FOG, animal sources/pet wastes, litter control, and/or public participation in the MS4 process. The Valle de Oro National Wildlife Refuge represents a significant opportunity for the County for stormwater education and outreach. The County has sponsored and supported at least one event to educate and involve members of the community about local riparian restoration and clean-up opportunities at the refuge each year of the permit term. Bernalillo County also has an illegal dumping website (http://www.bernco.gov/illegal-dumping), environmental complaint website (http://www.bernco.gov/public-works/report-water-waste.aspx), and a hotline (505-224-2100) that includes illicit discharge reporting.	Education related to hazards associated with illegal discharges and improper disposal of waste will continue to also be handled in the County's Public Education and Outreach program, refer to TABLE 8: Public Education and Outreach on Stormwater Impacts for additional information. Bernalillo County will continue its internal training program for inspection, field, and staff regarding illicit discharges and improper waste disposal. A summary of the County's IDDE education and outreach activities, as well as internal trainings, will be provided in each Annual Report. The County will continue to utilize a combination of existing and new educational materials (such as the "Project W.E.T. Kids in Discovery Series" and the Enviroscape watershed model), County-created brochures, and or other educational materials and promotional items. The County will also continue to use its website and/or social media as a venue for distributing materials and posts about water quality. The County will continue to aim for one mailing annually to residents of unincorporated Bernalillo County addressing one or more of the following topics on a rotating basis: illicit discharge reporting, proper disposal of household hazardous waste including lawn and garden chemicals and used motor oil, FOG, animal sources/pet wastes, litter control, and/or public participation in the MS4 process. The Valle de Oro National Wildlife Refuge represents a significant opportunity for the County for stormwater education and outreach. The County will continue to sponsor and support at least one event to educate and involve members of the community about local riparian restoration and clean-up opportunities at the refuge each year of the permit term. Bernalillo County has an illegal dumping website (http://www.bernco.gov/illegal-dumping), environmental complaint website (http://www.bernco.gov/public-works/report-water-waste.aspx), and a hotline (505-224-2100) that includes illicit discharge reporting.	10 months (alone) or 18 months (cooperative) from effective date of MS4 Permit Oct. 22, 2015 or June 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 6: Illicit Discharges and Improper Disposal - Part I.D.5.e				
Establish a hotline as required in Part I.D.5.e.(i).(e).	Bernalillo County will continue to receive illicit discharge complaints and will continue to cooperate with other MS4s for this program element.	The Bernalillo County Solid Waste Department has an illegal dumping program and Solid Waste Ordinance. Bernalillo County has an illegal dumping website (http://www.bernco.gov/illegal-dumping), environmental complaint website (http://www.bernco.gov/public-works/report-water-waste.aspx), email (water@bernco.gov), and a hotline (505-224-2100) that includes illicit discharge reporting. The County works with other MS4s, including AMAFCA, COA, NMDOT, and the Village of Los Ranchos on illicit discharge reporting. The County cooperates with other MS4s and area agencies on IDDE by coordinating efforts to address illicit discharges where the discharges may cross jurisdictional boundaries. The County's membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) has facilitated this cooperation and coordination with other MS4s in the Middle Rio Grande.	The Bernalillo County Solid Waste Department has an illegal dumping program and Solid Waste Ordinance. Bernalillo County has an illegal dumping website (http://www.bernco.gov/illegal-dumping), environmental complaint website (http://www.bernco.gov/public-works/report-water-waste.aspx), email (water@bernco.gov), and a hotline (505-224-2100) that includes illicit discharge reporting. Bernalillo County will continue to receive illicit discharge complaints and will continue to cooperate with other MS4s and area agencies on IDDE by coordinating efforts to address illicit discharges where the discharges may cross jurisdictional boundaries. The County's continued membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) will facilitate this cooperation and coordination with other MS4s in the Middle Rio Grande.	10 months (alone) or 18 months (cooperative) from effective date of MS4 Permit Oct. 22, 2015 or June 22, 2016
Investigate suspected significant/severe illicit discharges as required in Part I.D.5.e.(i).(f). Investigate suspected significant/severe illicit discharges within forty-eight (48) hours of detection and all other discharges as soon as practicable; elimination of such discharges as expeditiously as possible; and, requirement of immediate cessation of illicit discharges upon confirmation of responsible parties.	Bernalillo County will continue its policy of investigation of suspected significant/severe illicit discharges within forty-eight (48) hours of detection and all other discharges as soon as practicable. Bernalillo County will continue investigation and documentation of illicit discharge complaints and follow-up actions taken by the County. Bernalillo County will continue membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) which will facilitate cooperation and coordination with other MS4s in the Middle Rio Grande related to investigation of illicit discharges.	Bernalillo County has investigated suspected significant/severe illicit discharges within forty-eight (48) hours of detection and all other discharges as soon as practicable. The County has followed its procedures for illicit discharge investigation and use of its IDDE database reporting procedure. Bernalillo County uses the Emergency Support Function (ESF) 10 to provide a coordinated response to an actual or potential discharge and/or uncontrolled release of hazardous materials. If the actual or potential discharge occurs on private property, the County will contact the owner/operator to address the issue. If the owner/operator does not address the issue and there is an imminent threat, the County will take necessary actions to manage the situation. The County has worked cooperatively with AMAFCA, COA, MRGCD, NMDOT, Village of Los Ranchos, Rio Rancho, and the ABCWUA (through CMOM) for spill response and notification of illicit discharges. The County's membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) has facilitated this cooperation and coordination with other MS4s in the Middle Rio Grande.	Bernalillo County will continue to investigate suspected significant/severe illicit discharges within forty-eight (48) hours of detection and all other discharges as soon as practicable. The County will continue its procedures for illicit discharge investigation and use of its IDDE database reporting procedure. Bernalillo County uses the Emergency Support Function (ESF) 10 to provide a coordinated response to an actual or potential discharge and/or uncontrolled release of hazardous materials. If the actual or potential discharge occurs on private property, the County will contact the owner/operator to address the issue. If the owner/operator does not address the issue and there is an imminent threat, the County will take necessary actions to manage the situation. The County will continue to work cooperatively with AMAFCA, COA, MRGCD, NMDOT, Village of Los Ranchos, Rio Rancho, and the ABCWUA (through CMOM) for spill response and notification of illicit discharges. The County's continued membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) will facilitate this cooperation and coordination with other MS4s in the Middle Rio Grande.	10 months (alone) or 18 months (cooperative) from effective date of MS4 Permit Oct. 22, 2015 or June 22, 2016
Review complaint records and develop a targeted source reduction program as required in Part I.D.5.e.(i).(g). Review complaint records for the last permit term and develop a targeted source reduction program for those illicit discharge /improper disposal incidents that have occurred more than twice in two (2) or more years from different locations.	Bernalillo County will continue to review complaint records, including a focus on illicit discharges that contribute bacteria to the MS4. The County will reevaluate the targeted source reduction program annually. The County will continue to develop cooperative elements for this program.	Bernalillo County has annually reviewed IDDE complaint records. Complaint records that are determined to be illicit discharges have been added to the illicit discharge tracking database. The location, date, type of illicit discharge, and source (if known) is documented. To meet the Permit requirements in Table 1.a (Part I.C.2), regarding discharges to impaired waters with a TMDL (E. coli), the County's review of complaint records has included a focus on illicit discharges contributing bacteria to the MS4. The County has developed a targeted source reduction program for those illicit discharge/improper disposal incidents that have occurred more than twice in 2 or more years from different locations. The County has worked cooperatively with AMAFCA, COA, MRGCD, NMDOT, village of Los Ranchos, Rio Rancho, and the ABCWUA (through CMOM) for notification of illicit discharges.	Bernalillo County will continue to review complaint records annually, including a focus on illicit discharges that contribute bacteria to the MS4. The County will reevaluate the targeted source reduction program annually. The County will continue to develop additional cooperative elements for this program, as needed. The County will continue working cooperatively with AMAFCA, COA, MRGCD, NMDOT, village of Los Ranchos, Rio Rancho, and the ABCWUA (through CMOM) for notification of illicit discharges. The County's continued membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) will facilitate this cooperation and coordination with other MS4s in the Middle Rio Grande.	10 months (alone) or 12 months (cooperative) from effective date of MS4 Permit Oct. 22, 2015 or Dec. 22, 2015
As required in Part I.D.5.e.(ii), the permittee shall address the following categories of non-stormwater discharges or flows (e.g., illicit discharges) only if they are identified as significant contributors of pollutants to the MS4: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(90)), uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water. (Note: Discharges or flows from fire fighting activities are excluded from the effective prohibitions against non-stormwater and need only be addressed where they are identified a significant sources of pollutants to water of the United States).	Bernalillo County will review this list of authorized non-stormwater discharges annually to assess whether any of these discharges have become a significant contributor of pollutants to the MS4.	Any such discharge that is identified as a significant contributor of pollutants to the Bernalillo County MS4, or is causing or contributing to a water quality standards violation, has been addressed as an illicit discharge pursuant to Part I.D.5.e of the MS4 Permit. When applicable, the County will require the discharger to analyze the non-stormwater discharge for pollutants of concern. Pollutants of concern will be determined based on source of discharge, surrounding land use, and nearby utilities (i.e. sanitary sewer). The Permit lists authorized non-stormwater discharges in Part I.D.5.e.(ii). Bernalillo County has reviewed this list of authorized non-stormwater discharges annually to assess whether any of these discharges have become a significant contributor of pollutants to the MS4. Many of these authorized non stormwater discharges are not applicable to the County and none of these discharges are expected to be significant contributors of pollutants to the MS4, particularly bacteria.	Any such discharge that is identified as a significant contributor of pollutants to the Bernalillo County MS4, or is causing or contributing to a water quality standards violation, will continue to be addressed as an illicit discharge pursuant to Part I.D.5.e of the MS4 Permit. When applicable, the County will require the discharger to analyze the non-stormwater discharge for pollutants of concern. Pollutants of concern will be determined based on source of discharge, surrounding land use, and nearby utilities (i.e. sanitary sewer). The Permit lists authorized non-stormwater discharges in Part I.D.5.e.(ii). Bernalillo County will review this list of authorized non-stormwater discharges annually to assess whether any of these discharges have become a significant contributor of pollutants to the MS4. Many of these authorized non stormwater discharges are not applicable to the County and none of these discharges are expected to be significant contributors of pollutants to the MS4, particularly bacteria.	No specific implementation schedule, Bernalillo County will review annually.

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 6: Illicit Discharges and Improper Disposal - Part I.D.5.e				
As required in Part I.D.5.e.(ii), the permittee must screen the entire jurisdiction at least once every five (5) years and high priority areas at least once every year. High priority areas include any area where there is ongoing evidence of illicit discharges or dumping, or where there are citizen complaints on more than five (5) separate events within twelve (12) months. The permittee must: (a) Include in its SWMP document a description of the means, methods, quality assurance and controls protocols, and schedule for successfully implementing the required screening, field monitoring, laboratory analysis, investigations, and analysis evaluation of data collected. (b) Comply with the dry weather screening program established in Table 6 and the monitoring requirements specified in Part III.A.2. (c) If applicable, implement the priority ranking system developed in previous permit term.	Bernalillo County will develop screening procedures, protocols and plan in years 1-3 for the Permit (Dec. 22, 2014 through Dec. 22, 2017). This may be done as a cooperative program. Bernalillo County will implement the IDDE required screening activities for a minimum of 30% of the Bernalillo County MS4 by the end of year 4 for this Permit (Dec. 22, 2018). Bernalillo County will complete the IDDE required screening activities for 70% the of the Bernalillo County MS4 system by the end of year 5 for this Permit (Dec. 22, 2019). Bernalillo County will continue membership and involvement in the cooperative TAG which will facilitate cooperation and coordination with other MS4s in the Middle Rio Grande related to screening for illicit discharges. Bernalillo County is pursuing developing a cooperative approach for this program element, including implementing the priority ranking system.	Bernalillo County has continued with its IDDE program, working toward the Permit deadlines described for this Permit activity. Much of this effort has included coordination with MS4 permittees COA, AMAFCA, and NMDOT, as well as other co-permittees. The County's membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) facilitates this cooperation and coordination with other MS4s in the Middle Rio Grande. Part I.D.5.e.(ii).(a) - The County's IDDE Program Plan includes procedures for outfall screening. The timing of outfall screening is important to consider when scheduling field days. Given the arid climate of this region, outfall inspections can be conducted during the wet or dry seasons and should have an antecedent dry period of at least 72 hours after a rain event greater than 0.1 inch in magnitude. Outfall and outlet locations are screened annually in November and December. During annual screening, field personnel record observations on an outfall monitoring form and collect photographs. If discharges from outfall locations are observed during screening, samples will be collected as described in the IDDE Program Plan. The County also has a routine inspection and O&M program in place. These O&M inspections are coordinated with the IDDE screening program. Part I.D.5.e.(ii).(b) - There is a not a Table 6 in Part III.A.2 as referred to in the Permit text in this section. Development of the screening procedures and protocols complies with the dry weather screening program monitoring requirements specified in Part III.A.2.	Bernalillo County will continue with its IDDE program, working toward the Permit deadlines described for this Permit activity. Much of this effort will include coordination with MS4 permittees COA, AMAFCA, and NMDOT, as well as other co-permittees. The County's continued membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) will facilitate this cooperation and coordination with other MS4s in the Middle Rio Grande. Part I.D.5.e.(ii).(a) - The County's IDDE Program Plan will continue to follow the procedures for outfall screening. The timing of outfall screening is important to consider when scheduling field days. Given the arid climate of this region, outfall inspections can be conducted during the wet or dry seasons and should have an antecedent dry period of at least 72 hours after a rain event greater than 0.1 inch in magnitude. Outfall and outlet locations will be screened at least annually in November and December or more frequently. During annual screening, field personnel record observations on an outfall monitoring form and collect photographs. If discharges from outfall locations are observed during screening, samples will be collected as described in the IDDE Program Plan. The County also has a routine inspection and O&M program in place. These O&M inspections will continue to be coordinated with the IDDE screening program. Part I.D.5.e.(ii).(b) - There is a not a Table 6 in Part III.A.2 as referred to in the Permit text in this section. Development of the screening procedures and protocols will continue to comply with the dry weather screening program monitoring requirements specified in Part III.A.2.	Cooperative program: High Priority: screen 1x per year. Years 1 -3: develop procedures as required in Part I.D.5.e.(i).(c). Year 4: screen 30% of the MS4 area. Year 5: screen 70% of the MS4 area.
Develop, update, and implement a Waste Collection Program as required in Part I.D.5.e.(iv).	Bernalillo County will continue to cooperatively maintain the Household Hazardous Waste Collection Center and continue to conduct a minimum of 6 outreach and household hazardous waste collection events annually in unincorporated Bernalillo County.	Bernalillo County and the COA have cooperatively maintained a contract with the Household Hazardous Waste Collection Center, operated by Advanced Chemical Transport. The County also addresses household hazardous waste through education and outreach to the public at clean-up and waste collection events occurring at least 6 times per year within the County's jurisdiction, both in- and outside of the Urbanized Area.	The County will maintain its existing contracts for a Household Hazardous Waste Collection Center in cooperation with the COA. The County will continue to provide education and collection/disposal options for household hazardous waste. The County will have at least six household hazardous waste collection events during each year of the Permit term. The County will provide a summary of these efforts in each Annual Report.	18 months (alone) or 30 months (cooperative) from effective date of MS4 Permit June 22, 2016 or June 22, 2017
Develop, update and implement a Spill Prevention and Response program to prevent, contain, and respond to spills that may discharge into the MS4 as required in Part I.D.5.e.(v). The Spill Prevention and Response program shall include: (a) Where discharge of material resulting from a spill is necessary to prevent loss of life, personal injury, or severe property damage, the permittee(s) shall take, or ensure the party responsible for the spill takes, all reasonable steps to control or prevent any adverse effects to human health or the environment; and (b) The spill response program may include a combination of spill response actions by the permittee (and/or another public or private entity), and legal requirements for private entities within the permittee's municipal jurisdiction.	Bernalillo County will continue to address spill response functions through ESF 10. Bernalillo County will continue to develop a cooperative Spill Response Program with agency partners and will continue to cooperate with COA, MRGCD, ABCWUA, and AMAFCA for spill response. Bernalillo County will continue membership and involvement in the cooperative MS4 TAG which will facilitate cooperation and coordination with other MS4s in the MRG related to spill prevention and response.	Bernalillo County uses the Emergency Support Function (ESF) 10 to provide a coordinated response to an actual or potential discharge and/or uncontrolled release of hazardous materials. If the actual or potential discharge occurs on private property, the County will contact the owner/operator to address the issue. If the owner/operator does not address the issue and there is an imminent threat, the County will take necessary actions to manage the situation. The County has worked cooperatively with AMAFCA, COA, MRGCD, NMDOT, Village of Los Ranchos, Rio Rancho, and the ABCWUA (through CMOM) for spill response and notification of illicit discharges. Bernalillo County has continued membership and involvement in the cooperative MS4 TAG which has facilitated cooperation and coordination with other MS4s in the MRG related to spill prevention and response.	Bernalillo County will continue to address spill response functions through ESF 10. Bernalillo County will continue to develop a cooperative Spill Response Program with agency partners and will continue to cooperate with AMAFCA, COA, MRGCD, NMDOT, Village of Los Ranchos, and the ABCWUA (through CMOM) for spill response and notification of illicit discharges. . Bernalillo County will continue membership and involvement in the cooperative MS4 TAG which will facilitate cooperation and coordination with other MS4s in the MRG related to spill prevention and response.	10 months (alone) or 18 months (cooperative) from effective date of MS4 Permit October 22, 2015 or June 22, 2016
Update the SWMP document and annual report as required in Part I.D.5.e.(iii), Part I.D.5.e.(vi), and Part I.D.5.e.(vii). A description of the means, methods, quality assurance and controls protocols, and schedule for successfully implementing the required screening, field monitoring, laboratory analysis, investigations, and analysis evaluation of data collected.	Bernalillo County will review the program requirements listed in Part I.D.5.e for these program elements during the Annual Report process. A review of the screening completed and the data collected will be included in the Annual Report. A strategy to implement any new program requirements will be developed as needed. The County will include a review of the screening completed as well as a summary of findings for any data collected in the Annual Report.	Bernalillo County has reviewed the program requirements listed in Part I.D.5.e for these program elements during the Annual Report process. A review of the screening completed and the data collected has been included in the Annual Report.	Bernalillo County will review the program requirements listed in Part I.D.5.e for these program elements during the Annual Report process. A review of the screening completed and the data collected will be included in the Annual Report. A strategy to implement any new program requirements will be developed as needed. The County will include a review of the screening completed as well as a summary of findings for any data collected in the Annual Report.	Update as necessary for SWMP and annually for Annual Report

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 6: Illicit Discharges and Improper Disposal - Part I.D.5.e				
Enhance the program to include requirements in Part I.D.5.e.(ix). The permittee may: (a) Divide the jurisdiction into assessment areas where monitoring at fewer locations still provides sufficient information; (b) Downgrade high priority areas after the area has been screened at least once and there are citizen complaints on no more than 5 separate events within a 12 month period; (c) Rely on a cooperative program with other MS4s for detection and elimination of illicit discharges and illegal dumping; (d) If cooperative program, required detection program frequencies may be based on the combined jurisdictional area rather than individual jurisdictional areas to reduce total number of screening locations; (e) After screening a non-high priority area once, adopt an "in response to complaints only" IDDE for that area (no more than 2 separate events within a 12 month period); (f) Enhance the program to utilize methodologies consistent with those described in "Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments."	The County will document any program enhancements incorporated into the program annually.	The County has included or considered all of the Permit Program Flexibility Elements/Enhancements for the Illicit Discharges and Improper Disposal program. Part I.D.5.e.(ix).(a) - The County has installed several rainfall gauges to better understand runoff and evaluate monitoring locations and needs, in cooperation with AMAFCA, SSCAFCA, and COA Part I.D.5.e.(ix).(b) - This enhancement has and will continue to be considered and included when writing the screening procedures, protocols and plan. Part I.D.5.e.(ix).(c) - The County has worked cooperatively with AMAFCA, COA, NMDOT, and the ABCWUA (through CMOM) for notification of illicit discharges. The County will continue to pursue developing similar agreements with other agencies. Part I.D.5.e.(ix).(d) and (e) - This enhancement has and will continue to be and included when writing the screening procedures, protocols and plan. Part I.D.5.e.(ix).(f) - The County has and will continue to evaluate it's IDDE program and will incorporate methodologies consistent with "Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments" as appropriate.	The County will document any program enhancements incorporated into the program annually.	Update as necessary for SWMP and annually for Annual Report

Part I.D.5 - SWMP Control Measures
Table 7: Control of Floatables Discharges - Part I.D.5.f

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 7: Control of Floatables Discharges - Part I.D.5.f				
As required in Part I.D.5.f.(i), the permittee must develop, update, and implement a program to address and control floatables in discharges into the MS4. The floatables control program shall include source controls and, where necessary, structural controls. Permittees previously covered under NMS000101 or NMR040000 must continue existing programs while updating those programs, as necessary, to comply with the requirements of this permit. The permittee shall develop or update a schedule to implement as required in Part I.D.5.f.(i).(a). Note: AMAFCA and the City of Albuquerque should update the schedule according to the findings of the 2005 AMAFCA/COA Floatable and Gross Pollutant Study and other studies.	The County will continue to review, revise, and implement a program to address and control floatables in discharges into the MS4. The County will develop a written procedure for this program element. The County will continue membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) which will facilitate cooperation and coordination with other MS4s in the Middle Rio Grande related control of floatables discharges.	The County has continued to implement a program to address and control floatables in discharges into the MS4. In FY18, the County removed and disposed of 569 CY of trash and debris from County drainage facilities. In FY19, the County removed and disposed of 535 CY of trash and debris from County drainage facilities. The County has installed stormwater quality features to control floatables, such as ported risers, trash racks, automatic bar screens, screened inlets, and water quality manholes in both new construction and retrofits, where appropriate. The County has also continued manual trash removal on a regular basis. The County has continued it membership (including taking on a leadership role) and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) which has facilitated cooperation and coordination with other MS4s in the Middle Rio Grande related control of floatables discharges.	The County will continue to review, revise, and implement a program to address and control floatables in discharges into the MS4. The County will continue to install stormwater quality features to control floatables, such as ported risers, trash racks, automatic bar screens, screened inlets, and water quality manholes in both new construction and retrofits, where appropriate. The County will continue manual trash removal on a regular basis. The County will develop a written procedure for this program element. The County will summarize relevant program elements in each Annual Report. The County will continue membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) which will facilitate cooperation and coordination with other MS4s in the Middle Rio Grande related control of floatables discharges.	10 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or June 22, 2016
Estimate the annual volume of floatables and trash removed from each control facility and characterize the floatable type as required in Part I.D.5.f.(i).(b).	The County will include an estimate of the annual volume of floatables and trash removed from the control facilities and characterization of the floatable type in each annual report. The County will continue to improve crew activity tracking to better determine the volume of floatables and sediment removed from each Bernalillo County facility.	The County has continued to implement a program to address and control floatables in discharges into the MS4. In FY18, the County removed and disposed of 569 CY of trash and debris from County drainage facilities. In FY19, the County removed and disposed of 535 CY of trash and debris from County drainage facilities. The County has included an estimate of the annual volume of floatables and trash removed from the control facilities and characterization of the floatable type in each Annual Report. The County has also continued to improve crew activity tracking to better determine the volume of floatables and sediment removed from each Bernalillo County facility.	The County will include an estimate of the annual volume of floatables and trash removed from the control facilities and characterization of the floatable type in each annual report. The County will consider improvements to crew activity tracking to better determine the volume of floatables and sediment removed from each Bernalillo County drainage facility.	12 months (if alone) or 30 months (cooperative) from effective date of MS4 Permit. Dec. 22, 2015 or June 22, 2017
Update the SWMP document and annual report as required in Part I.D.5.f.(ii) and Part I.D.5.f.(iii).	As part of the Annual Report process, the County will review the program requirements listed in Part I.D.5.f, for the above-mentioned SWMP elements, and assess and document the program effectiveness in the Annual Report.	As part of the Annual Report process, the County annually has reviewed the program requirements listed in Part I.D.5.f, for the above-mentioned SWMP elements, and assessed and documented the program effectiveness in the Annual Report.	As part of the Annual Report process, the County will review the program requirements listed in Part I.D.5.f, for the above-mentioned SWMP elements, and assess and document the program effectiveness in the Annual Report. A strategy to implement any new program requirements or improve the compliance with program requirements will be developed as needed and summarized in each Annual Report, as applicable.	Update as necessary for SWMP and annually for Annual Report

Part I.D.5 - SWMP Control Measures
Table 8: Public Education and Outreach on Stormwater Impacts - Part I.D.5.g

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 8: Public Education and Outreach on Stormwater Impacts - Part I.D.5.g				
Develop, revise, implement, and maintain an education and outreach program as required in Part I.D.5.g.(i) and Part I.D.5.g.(ii). This comprehensive stormwater program should educate the community, employees, businesses, and the general public of hazards associated with the illegal discharges and improper disposal of waste and about the impact that stormwater discharges on local waterways, as well as the steps that the public can take to reduce pollutants in stormwater.	Bernalillo County will continue to implement its public education and outreach program. The existing program will be updated, as necessary, to comply with the requirements of this Permit.	Bernalillo County has successfully implemented its public education and outreach program. Target pollutants addressed in this program include pet waste, trash/debris, household hazardous waste, and nutrient laden pollutants. The County has utilized both existing and new educational materials including "Project W.E.T. Kids in Discovery Series", the Enviroscape watershed model, targeted stormwater education printed materials including brochures, public presentations/events, giveaways, signage at select locations, and a County-based stormwater education website and social media. Educational programs and outreach activities conducted by Bernalillo County connecting with County residents an estimated 420,000 times in FY16, 465,000 in FY17, and 250,700 in FY18, and 617,450 times in FY19. In FY19, the County joined the MRGSQT to enhance its educational outreach in the community. The educational and outreach activities have been summarized in each Annual Report.	Bernalillo County will continue to implement its public education and outreach program. Target pollutants addressed in this program include pet waste, trash/debris, household hazardous waste, and nutrient laden pollutants. The County will continue to utilize both existing and new educational materials including "Project W.E.T. Kids in Discovery Series", the Enviroscape watershed model, targeted stormwater education printed materials including brochures, public presentations/events, giveaways, signage at select locations, and a County-based stormwater education website and social media. The County will summarize education and outreach activities in each Annual Report.	11 months (if alone) or 14 months (cooperative) from effective date of MS4 Permit. Sept. 22, 2015 or Feb. 22, 2016
Part I.D.5.g.(ii)(a) Define goals and objectives of the program based on high priority community-wide issues.	Bernalillo County will continue to review and revise the goals and objectives of this program as additional data and information is collected as it pertains to this program.	High priority, community-wide issues include water conservation, increased urban waters interactions, Permit-required evaluation and implementation of GI/LID practices, and improving water quality (i.e. elimination of illicit discharge/illegal disposal into the County's MS4). The Water Protection Advisory Board (WPAB) was established by joint ordinance of the County, ABCWUA, and COA. It's purpose is to advise these agencies on surface and groundwater protection concerns and to advocate for effective protection of surface and groundwater quality. The WPAB consists of nine citizen members, appointed by the Water Authority, the City, and the County. Members represent public interest and all meetings are open to the general public. This advisory board functions to assist with defining the community-wide issues and goals.	Bernalillo County will continue to review and revise the goals and objectives of this program as additional data and information is collected as it pertains to this program. The County will continue to work with the Water Protection Advisory Board (WPAB) and consider the high priority, community-wide issues as they pertain to the MS4 program elements.	11 months (if alone) or 14 months (cooperative) from effective date of MS4 Permit. Sept. 22, 2015 or Feb. 22, 2016
Part I.D.5.g.(ii)(b) Develop or utilize appropriate educational materials, such as printed materials, billboard and mass transit advertisements, signage at select locations, radio advertisements, television advertisements, and websites.	The County will continue to use new and existing educational materials, brochures, and promotional items and well as using the County website and social media as a tool for public education and outreach. The County will generate a minimum of one mailing annually to residents of unincorporated Bernalillo County which will address one or more of the following topics on a rotating basis: illicit discharge reporting, proper disposal of household hazardous waste including lawn and garden chemicals and used motor oil, FOG, animal sources/pet wastes, and/or public participation in the MS4 process. Existing County processes will be used to provide education on a neighborhood scale through on-going opportunities such as community and neighborhood association meetings and distribution of information through neighborhood newsletters. At least one educational or public participation announcement per year will be offered to the neighborhood associations for inclusion in neighborhood newsletters.	The County joined the Mid-Rio Grande Stormwater Quality Team (MRGSQT) in FY19. This collaborative group's public education and outreach program targets pollutants including pet waste through its "Scoop the Poop" campaign and trash/debris. The County uses a combination of existing and new educational materials (such as the "Project W.E.T. Kids in Discovery Series" and the Enviroscape watershed model), Mid-Rio Grande Stormwater Quality Team (MRGSQT) and County-created brochures, and/or other educational materials and promotional items including pet-waste focused materials from the previous Public Education and Outreach efforts from the prior permit term. The County uses its website and/or social media as a venue for distributing materials and posts about water quality. Many of the brochures and downloadable brochures are also available in Spanish. The County has utilized both existing and new educational materials including "Project W.E.T. Kids in Discovery Series", the Enviroscape watershed model, targeted stormwater education printed materials including brochures, public presentations/events, giveaways, signage at select locations, and a County-based stormwater education website and social media. The educational and outreach activities have been summarized in each Annual Report.	The County is a current member of the Mid-Rio Grande Stormwater Quality Team (MRGSQT). This collaborative group's public education and outreach program targets pollutants including pet waste through its "Scoop the Poop" campaign and trash/debris. The County will also utilize a combination of existing and new educational materials (such as the "Project W.E.T. Kids in Discovery Series" and the Enviroscape watershed model), Mid-Rio Grande Stormwater Quality Team (MRGSQT) and County-created brochures, and/or other educational materials and promotional items including pet-waste focused materials from the previous Public Education and Outreach efforts from the prior permit term. The County will also use its website and/or social media as a venue for distributing materials and posts about water quality. Many of the brochures and downloadable brochures are also available in Spanish. The County will typically generate one mailing (possibly electronic format) annually to residents and businesses of unincorporated Bernalillo County which will address one or more of the following topics on a rotating basis: illicit discharge reporting, proper disposal of household hazardous waste including lawn and garden chemicals and used motor oil, FOG, animal sources/pet wastes, and/or public participation in the MS4 process. Existing County processes will continue to be used to provide education on a neighborhood scale through on-going opportunities such as community and neighborhood association meetings and distribution of information through neighborhood newsletters. At least one educational or public participation announcement per year will be offered to the neighborhood associations for inclusion in neighborhood newsletters.	11 months (if alone) or 14 months (cooperative) from effective date of MS4 Permit. Sept. 22, 2015 or Feb. 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 8: Public Education and Outreach on Stormwater Impacts - Part I.D.5.g				
Part I.D.5.g.(ii) (c) Inform individuals and households about ensuring proper septic system maintenance, ensuring the proper use and disposal of landscape and garden chemicals including fertilizers and pesticides, protecting and restoring riparian vegetation, and properly disposing of used motor oil or household hazardous wastes.	Bernalillo County has an established goal of contacting a minimum of 200 unpermitted system or aging system owners per year with the intent of verifying status and educating regarding proper operation of the systems. The County will include a summary of low income septic system replacements/sewer connections and activities or planned activities for public outreach and education in each Annual Report. At least six household waste collection events will be conducted during each year of the permit term. The County will maintain its existing contracts for a Household Hazardous Waste Collection Center in cooperation with the COA.	The County has used its existing Well and Wastewater permitting process to distribute information about proper septic system maintenance to 100% of new septic-permit holders. Issuance of County septic permits includes an information packet with recommended pumping/maintenance schedules and do's and don'ts of septic system care. The County's goal for this campaign to get 100% of unpermitted systems permitted. This includes the goal of contacting a minimum of 300 unpermitted system or aging system owners per year with the intent of verifying status and educating regarding proper operation of the systems. Financial assistance has been provided to low-income and disadvantaged residents that require inspections, repairs, and/or replacement of septic systems. Abandonment of septic systems and connection to sanitary sewer systems will be made where available. The County began a campaign in 2012 to get unpermitted septic systems permitted or properly abandoned, with an established goal of contacting a minimum of 300 unpermitted system or aging system owners per year. In FY19, the County targeted the East Mountain Area, including the Upper Tijeras Arroyo watershed, and closed 233 septic systems. Bernalillo County and the COA have cooperatively maintained a contract with the Household Hazardous Waste Collection Center, operated by Advanced Chemical Transport. The County also addresses household hazardous waste through education and outreach to the public at clean-up and waste collection events occurring throughout the year within the County's jurisdiction, both in- and outside of the Urbanized Area. In addition, the New Mexico Department of Agriculture (NMDA) has hosted free pesticide collection events annually to promote the proper and safe disposal. The Bernalillo County Extension Office has helped promote this effort..	Bernalillo County will continue it's unpermitted and aging septic systems campaign. The program has an established goal of contacting a minimum of 300 unpermitted system or aging system owners per year with the intent of verifying status and educating regarding proper operation of the systems. The County will continue to provide financial assistance to low-income and disadvantaged residents that require inspections, repairs, and/or replacement of septic systems through its PIPE and TANK programs. Abandonment of septic systems and connection to sanitary sewer systems will be made where available. The County will include a summary of low income septic system replacements/sewer connections and activities or planned activities for public outreach and education in each Annual Report. Related to proper disposal of household hazardous waste, the County will have at least six household waste collection events during each year of the Permit term. The County will maintain its existing contracts for a Household Hazardous Waste Collection Center in cooperation with the COA. The County will continue to provide education and collection/disposal options for household hazardous waste and will provide a summary of these efforts in each Annual Report.	11 months (if alone) or 14 months (cooperative) from effective date of MS4 Permit. Sept. 22, 2015 or Feb. 22, 2016
Part I.D.5.g.(ii)(d) Inform individuals and groups how to become involved in local stream and beach restoration activities as well as activities that are coordinated by youth service and conservation corps or other citizen groups.	The County will continue in its collaborative efforts with other agencies to inform the pubic about opportunities to participate in local steam and Bosque restoration activities. The County collaborates with Valle de Oro NWR and other supporting groups, such as the youth service and conservation corps, to educate and involve members of the community about local riparian restoration and clean-up opportunities for the Rio Grande Bosque. The County will sponsor, co-sponsor, or otherwise support at least one such event each year of the permit term.	The County has successfully used websites, social media, county-created brochures, and distribution of materials created by other affiliated groups to inform the public about how to become involved in local stream and Bosque restoration activities. The County has collaborated with other agencies and/or groups within the County to inform the public of activities coordinated by youth service and conservation corps. The County is a member of the Tijeras Creek Watershed Collaborative (TCWC), which focuses its activities in the Upper Tijeras Watershed. The TCWC engages in and recruits volunteers for several watershed restoration activities. The COA, 3 youth conservation corps, Ciudad SWCD, the USGS, The Nature Conservancy, the Carnue Land Grant, and several other groups, individuals, and residents are members of this active collaborative. The Valle de Oro NWR is an urban wildlife refuge in an economically disadvantaged area of Albuquerque and Bernalillo County. There has been significant County and community involvement in its creation and it is a focal point for Urban Waters program activities. The refuge is a significant opportunity for the County for stormwater public education, outreach and involvement. The County has distributed stormwater-related materials during public outreach and education events held at Valle de Oro NWR. The targeted audience for these outreach and participation activities include the culturally diverse and economically disadvantaged community surrounding the refuge, as well as the general population of Bernalillo County that visit the refuge. Residents who attend these kinds of events are generally community-minded and frequently participate in volunteer initiatives. Additionally, support of refuge activities by the youth corps and similar groups targets involvement opportunities for children and teens. Many of these efforts are also described in TABLE 9 of the SWMP: Public Involvement and Participation - Part I.D.5.h. The County has included a summary of education and outreach activities in each Annual Report.	The County will continue in its collaborative efforts with other agencies to inform the pubic about opportunities to participate in local steam and Bosque restoration activities. The County will continue to use websites, social media, county-created brochures, and distribution of materials created by other affiliated groups to inform the public about how to become involved in local stream and Bosque restoration activities. The County will continue to collaborate with other agencies and/or groups within the County to inform the public of activities coordinated by youth service and conservation corps. The County will continue its membership and participation in the TCWC. The County will continue to collaborate with Valle de Oro NWR and other supporting groups, such as the youth service and conservation corps, to educate and involve members of the community about local riparian restoration and clean-up opportunities for the Rio Grande Bosque. The Valle de Oro NWR is an urban wildlife refuge in an economically disadvantaged area of Albuquerque and Bernalillo County. There has been significant County and community involvement in its creation and it is a focal point for Urban Waters program activities. The refuge is a significant opportunity for the County for stormwater public education, outreach and involvement. The County will continue to distribute stormwater-related materials during public outreach and education events held at Valle de Oro NWR. The targeted audience for these outreach and participation activities include the culturally diverse and economically disadvantaged community surrounding the refuge, as well as the general population of Bernalillo County that visit the refuge. Residents who attend these kinds of events are generally community-minded and frequently participate in volunteer initiatives. Additionally, support of refuge activities by the youth corps and similar groups targets involvement opportunities for children and teens. The County will continue its membership in the Mid-Rio Grande Stormwater Quality Team (MRGSQT). Many of these efforts are also described in TABLE 9 of the SWMP: Public Involvement and Participation - Part I.D.5.h. The County will summarize education and outreach activities in each Annual Report.	11 months (if alone) or 14 months (cooperative) from effective date of MS4 Permit. Sept. 22, 2015 or Feb. 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 8: Public Education and Outreach on Stormwater Impacts - Part I.D.5.g				
Part I.D.5.g.(ii)(e) Use tailored public education program, using a mix of locally appropriate strategies, to target specific audiences and communities. Examples of strategies include distributing brochures or fact sheets, sponsoring speaking engagements before community groups, providing public service announcements, implementing educational programs targeted at school age children, and conducting community-based projects such as storm drain stenciling, and watershed cleanups.	The County will continue to distribute materials during public outreach and education events held at Valle de Oro NWR. The County will utilize GI/LID design elements on County projects leading to the refuge, and will support other stormwater-related outreach events and materials at the refuge.	The County has successfully used a mix of locally appropriate strategies, to target specific audiences and communities with its public education and outreach message. The County has distributed stormwater-related materials during public outreach and education events held at Valle de Oro NWR. The targeted audience for these outreach activities include the culturally diverse and economically disadvantaged community surrounding the refuge, as well as the general population of Bernalillo County that visit the refuge. Residents who attend these kinds of events are generally community-minded and frequently participate in volunteer initiatives. Additionally, support of refuge activities by the youth corps and similar groups targets children and teens has been a focus of the County. In addition, Bernalillo County Open Space has conducted numerous public outreach and education events which correspond well with the intent of public outreach and education for this Permit. These events include the free Backyard Farming series workshops, the Naturalist series, the Family Fun series, and the Master Naturalist Program. The County has also used the Watershed Protection Advisory Board (WPAB) and the County website as the primary mechanism to reach out to the community for volunteers. Materials and solicitation for volunteers and/or participants has also been made available through neighborhood newsletters and postings at community centers in the unincorporated urbanized area areas of the County's jurisdiction and, as appropriate, in English and Spanish in order to reach all economic and ethnic groups.	The County and the Mid-Rio Grande Stormwater Quality Team (MRGSQT) will continue to use a mix of locally appropriate strategies, to target specific audiences and communities with its public education and outreach message. The County will continue to distribute stormwater-related materials during public outreach and education events held at Valle de Oro NWR. The targeted audience for these outreach activities include the culturally diverse and economically disadvantaged community surrounding the refuge, as well as the general population of Bernalillo County that visit the refuge. Residents who attend these kinds of events are generally community-minded and frequently participate in volunteer initiatives. Additionally, support of refuge activities by the youth corps and similar groups targets children and teens will continue. In addition, Bernalillo County Open Space has conducted numerous public outreach and education events which correspond well with the intent of public outreach and education for this Permit. These events include the free Backyard Farming series workshops, the Naturalist series, the Family Fun series, and the Master Naturalist Program. The County has also used the Watershed Protection Advisory Board (WPAB) and the County website as the primary mechanism to reach out to the community for volunteers. Materials and solicitation for volunteers and/or participants has also been made available through neighborhood newsletters and postings at community centers in the unincorporated urbanized area areas of the County's jurisdiction and, as appropriate, in English and Spanish in order to reach all economic and ethnic groups.	11 months (if alone) or 14 months (cooperative) from effective date of MS4 Permit. Sept. 22, 2015 or Feb. 22, 2016
Part I.D.5.g.(ii)(f) Use materials or outreach programs directed toward targeted groups of commercial, industrial, and institutional entities likely to have significant stormwater impacts. For example, providing information to restaurants on the impact of grease clogging storm drains and to garages on the impact of oil discharges. The permittee may tailor the outreach program to address the viewpoints and concerns of all communities, particularly minority and disadvantaged communities, as well as any special concerns relating to children. The permittee must make information available for non-English speaking residents, where appropriate.	The County will continue it's program to provide information on the effect of FOG disposal. An informational sheet about the effects of FOG disposal to septic systems will be developed and included in each septic tank permit issued by the county starting the second year of the permit term. Through the Well and Wastewater Program, the County will work with local septic companies to promote proper disposal of septage waste at authorized wastewater facilities. The County will also work with the local sewer utility (ABCWUA), under their Capacity, Management, Operations and Maintenance (CMOM) program, to promote proper FOG disposal. The ABCWUA also addresses FOG related to clogging of sanitary sewer lines through their Fats, Oil and Grease Policy: http://www.abcwua.org/uploads/files/20140521%20Fats,%20Oil%20and%20Grease%20Policy.pdf. During the permit term, the County will identify other target sectors for educational opportunities based on the constituents and concentration of those constituents found in waters from impaired stream segments. Bilingual information and/or resources will be provided as appropriate and as needed.	whose operations have the potential to impact stormwater quality in unincorporated Bernalillo County. The purpose of the mailing was to educate and promote best management practices to protect stormwater quality. Business types identified for the mailing include automotive repair, printing, carpet cleaning, fueling stations, landscaping, and contractors yards. These materials were provided in both English and Spanish. The County has worked through its Well and Wastewater Program and Health Protection's restaurant inspection program to provide information on the effects of fats, oils and grease (FOG) disposal into sanitary sewer and septic systems. The County has also worked with the local sewer utility (ABCWUA), under their Capacity, Management, Operations and Maintenance (CMOM) program, to promote proper FOG disposal. The ABCWUA also addresses FOG related to clogging of sanitary sewer lines through their Fats, Oil and Grease Policy: http://www.abcwua.org/uploads/files/20140521%20Fats,%20Oil%20and%20Grease%20Policy.pdf. The County has provided information on the effect of FOG disposal. An informational sheet about the effects of FOG disposal to septic systems has been included in each septic tank permit issued by the County. The County has distributed stormwater-related materials during public outreach and education events held at Valle de Oro NWR. The targeted audience for these outreach activities include the culturally diverse and economically disadvantaged community surrounding the refuge, as well as the general population of Bernalillo County that visit the refuge. Residents who attend these kinds of events are generally community-minded and frequently participate in volunteer initiatives. Additionally, support of refuge activities by the youth corps and similar groups targets children and teens has been a focus of the County. During the Permit term, the County identified other target sectors for educational opportunities based on the constituents and concentration of those constituents found in waters from impaired stream segments. Bilingual information and/or resources were created and provided, as appropriate and as needed. Target sectors included: Vehicle and Equipment Repair, Contractor Yards, Food Preparation and Service, Fueling Stations, Landscaping, Carpet and Upholstery Cleaning, and Scrap Metal Recycling.	The County will continue with education/outreach directed to local businesses such as automotive repair, printing, carpet cleaning, fueling stations, landscaping, and contractors yards. The County will continue to work through its Well and Wastewater Program and Health Protection's restaurant inspection program to provide information on the effects of fats, oils and grease (FOG) disposal into sanitary sewer and septic systems. The County will also continue to work with the local sewer utility (ABCWUA), under their Capacity, Management, Operations and Maintenance (CMOM) program, to promote proper FOG disposal. The ABCWUA also addresses FOG related to clogging of sanitary sewer lines through their Fats, Oil and Grease Policy: http://www.abcwua.org/uploads/files/20140521%20Fats,%20Oil%20and%20Grease%20Policy.pdf. The County and the Mid-Rio Grande Stormwater Quality Team (MRGSQT) will continue to provide information on the effect of FOG disposal. An informational sheet about the effects of FOG disposal to septic systems will continue to be included in each septic tank permit issued by the County. The County will continue to distribute stormwater-related materials during public outreach and education events held at Valle de Oro NWR. The targeted audience for these outreach activities include the culturally diverse and economically disadvantaged community surrounding the refuge, as well as the general population of Bernalillo County that visit the refuge. Residents who attend these kinds of events are generally community-minded and frequently participate in volunteer initiatives. Additionally, support of refuge activities by the youth corps and similar groups targets children and teens will continue. The County will continue to distribute targeted commercial/industrial information and resources (Bilingual is available) , as appropriate and as needed. Target sectors include: Vehicle and Equipment Repair, Contractor Yards, Food Preparation and Service, Fueling Stations, Landscaping, Carpet and Upholstery Cleaning, and Scrap Metal Recycling. The County will continue its membership in the Mid-Rio Grande Stormwater Quality Team (MRGSQT). Many of these efforts are also described in TABLE 9 of the SWMP: Public Involvement and Participation - Part I.D.5.h. The County will summarize education and outreach activities in each Annual Report.	11 months (if alone) or 14 months (cooperative) from effective date of MS4 Permit. Sept. 22, 2015 or Feb. 22, 2016
Update the SWMP document and annual report as required in Part I.D.5.g.(iii) and Part I.D.5.g.(iv). (iii) The permittee must include the following information in the SWMP document: (a) A description of a program to promote, publicize, facilitate public reporting of the presence of illicit discharges or water quality associated with discharges from MS4s; (b) A description of the education activities, public information activities, and other appropriate activities to facilitate the proper management and disposal of used oil and toxic materials; & (c) A description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.g.(i) and Part I.D.5.g.(ii) and its corresponding measurable goal. (iv) The permittee must assess the overall success of the program, and	Bernalillo County will review the program requirements in Part I.D.5.g and assess the overall success of the program, including documentation of direct and indirect measurements of program effectiveness in the annual report.	Bernalillo County has reviewed the program requirements listed in Part I.D.5.g and assessed the overall success of the program, including documentation of direct and indirect measurements of program effectiveness in the Annual Report. The Annual Report has included a summary of the program findings for each reporting period. Part I.D.5.g.(III)(a) has been described in the IDDE section of the SWMP and Annual Report; (b) and (c) have been described in the Public Outreach and Education section of the SWMP and Annual Report; (iv) has been described in the Annual Report.	Bernalillo County will continue to review the program requirements listed in Part I.D.5.g and assess the overall success of the program, including documentation of direct and indirect measurements of program effectiveness in the Annual Report. The Annual Report will include a summary of the program findings for each reporting period. Part I.D.5.g.(III)(a) is described in the IDDE section of the SWMP and Annual Report; (b) and (c) are described in the Public Outreach and Education section of the SWMP and Annual Report; (iv) is described in the Annual Report. A strategy to implement any new program requirements or improve compliance with the program requirements will be developed as needed.	Update as necessary for SWMP and annually for Annual Report

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 8: Public Education and Outreach on Stormwater Impacts - Part I.D.5.g				
Enhance the program to include requirements in Part I.D.5.g.(v) through Part I.D.5.g.(viii). (v) Where necessary to comply with the MS4 Permit, the permittee should develop a program or modify/revise an existing education and outreach program to: (a) Promote, publicize, and facilitate the use of GI/LID/Sustainability practices; and (b) Include an integrated public education program regarding litter reduction, reduction in pesticide/herbicide use, recycling, and disposal (including yard waste, hazardous waste materials, and used motor vehicle fluids), and GI/ LID/ Sustainable practices (as allowed by the NM OSE). (vi) The permittee may collaborate or partner with other MS4 operators to maximize the program and cost effectiveness of the required outreach. (vii) The education and outreach program may use citizen hotlines as a low-cost strategy to engage the public in illicit discharge surveillance. (viii) The permittee may use stormwater educational materials provided by the State, Tribe, EPA, environmental, public interest or trade organizations, or other MS4s. The permittee may also integrate the education and outreach program with existing education and outreach programs in the MRG area.	Any progress made with these program enhancement activities will be documented in the SWMP as necessary and annually in the annual report.	Bernalillo County has included the following in the public education and outreach elements into their program: GI/LID/sustainability, litter reduction, pesticide/herbicide proper use and reduction, recycling and proper disposal, public hotline for illicit discharge reporting, classroom education on stormwater, sponsorship of professional conferences, participation in regional events, and pet waste disposal education. The County has summarized program enhancement activities related to education and outreach activities in each Annual Report.	Bernalillo County and the Mid-Rio Grande Stormwater Quality Team (MRGSQT) will continue to include the following in the public education and outreach program: GI/LID/sustainability, litter reduction, pesticide/herbicide proper use and reduction, recycling and proper disposal, public hotline for illicit discharge reporting, classroom education on stormwater, sponsorship of professional conferences, participation in regional events, and pet waste disposal education. The County will summarize program enhancement activities related to education and outreach activities in each Annual Report.	Update as necessary for SWMP and annually for Annual Report

Part I.D.5 - SWMP Control Measures
Table 9: Public Involvement and Participation - Part I.D.5.h

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 9: Public Involvement and Participation - Part I.D.5.h				
Develop (or update), implement, and maintain a public involvement and participation plan as required in Part I.D.5.h.(ii). This plan should provide opportunities for participation in the review, modification and implementation of the SWMP; develop and implement a process by which public comments to the plan are received and reviewed by the person(s) responsible for the SWMP; and make the SWMP available to the public and to the operator of any MS4 or Tribal authority receiving discharges from the MS4.	Post the draft SWMP, any SWMP amendments or modifications, and draft Annual Reports to the Bernalillo County website with an explanation of the public comment period and instruction on how to submit comments. The posted documents will show redline and strikethrough of text additions and deletions and/or provide explanations for substantial changes. A hard copy of the SWMP will be made available for the review, and provided to the MS4 operators. The Pueblo of Isleta will be notified in writing of the SWMP availability. A 30-day comment period will be allotted for SWMP document public review. A 45-day comment period will be allotted for Annual Report document public review as required in Part III.B of the MS4 Permit.	Related to this MS4 Permit requirement, the County has posted the draft SWMP and draft Annual Reports to the Bernalillo County website with an explanation of the public comment period and instruction on how to submit comments. The County has also had printed copies of the draft SWMP and draft Annual Reports available at public libraries throughout the County to allow for public review. A hard copy of the SWMP will be made available for the review, and provided to the MS4 operators. The Pueblo of Isleta will be notified of the SWMP availability. A 45-day comment period has been allotted for SWMP document public review. A 45-day comment period has been allotted for Annual Report document public review, as required in Part III.B of the MS4 Permit.	The County will continue its Public Involvement and Participation program to encourage public involvement in the review, modification and implementation of the Bernalillo County SWMP, as required in Part I.D.5.h.(ii). Related to this MS4 Permit requirement, the County will continue to post any draft SWMP and draft Annual Reports to the Bernalillo County website with an explanation of the public comment period and instruction on how to submit comments. Keep the printed copies at libraries here? or is that too specific? A 45-day comment period has been allotted for SWMP document public review. A 45-day comment period has been allotted for Annual Report document public review, as required in Part III.B of the MS4 Permit.	10 months (alone) or 12 months (cooperative) from effective date of MS4 Permit Oct. 22, 2015 or Dec. 22, 2015
As required in Part I.D.5.h.(iii), the Public Involvement and Participation Plan shall include a comprehensive planning process which involves public participation and where necessary intergovernmental coordination. The permittee must include the following elements in the plan: (a) A detailed description of the general plan for informing the public of involvement and participation opportunities, including types of activities; target audiences; how interested parties may access the SWMP; and how the public was involved in development of the SWMP; (b) The development and implementation of at least one (1) assessment of public behavioral change following a public education and/or participation event; (c) A process to solicit involvement by environmental groups, environmental justice communities, civic organizations or other neighborhoods /organizations interested in water quality-related issues; and (d) An evaluation of opportunities to utilize volunteers for stormwater pollution prevention activities and awareness throughout the area.	Bernalillo County will continue to implement it's Public Education and Outreach initiatives and solicit public comment, feedback, and participation. The County will continue to distribute stormwater quality-related materials. The Bernalillo County Public Involvement and Participation Plan includes methods for informing the public of involvement and participation opportunities, measurements of program effectiveness, solicitation of involvement by interested groups/organizations, and evaluation of opportunities to utilize volunteers for stormwater quality related activities, as described in the Public Education and Outreach sections of the SWMP and annual report. The County will utilize one or more of the following opportunities: Master Naturalist program through County Open Space, volunteers to create and post signage relating to stormwater pollution prevention at county open spaces, sponsorship/participation of at least one river Clean-up Day per year, continued support of Urban Waters program, sponsorship/promotion of at least one annual watershed-related conference lead by community volunteers educating the public on stormwater issues.	Bernalillo County has in place Public Involvement and Participation initiatives that solicit public comment, feedback, and participation. The County has provided opportunities for public comment through postings on the website, in newspapers and availability of a hard copy of public documents at the Public Works office as well as local libraries throughout the County. The County has provided notification, including the mechanism for involvement, to the Watershed Protection Advisory Board (WPAB), Pueblo of Isleta, registered neighborhood associations in the unincorporated urbanized area within the County's jurisdiction and the Stormwater Quality Team after development of draft Annual Reports and SWMP modifications. The Bernalillo County Public Involvement and Participation Plan includes methods for informing the public of involvement and participation opportunities, measurements of program effectiveness, solicitation of involvement by interested groups/organizations, and evaluation of opportunities to utilize volunteers for stormwater quality related activities, as described in the Public Education and Outreach sections of the SWMP and Annual Report. The County has utilized the following opportunities for public involvement and participation: Master Naturalist program through the County Open Space, BEMP participation through the MRGSQT, sponsorship/participation in clean-up days, continued support of EPA's Urban Waters program, membership and participation in the Tijeras Creek Watershed Collaborative, sponsorship/promotion of watershed-related conferences lead by community volunteers educating the public on stormwater issues. In addition, public involvement has been solicited through the WPAB, which was established by joint ordinance of the County, ABCWUA, and City of Albuquerque (COA). It's purpose is to advise these agencies on surface and groundwater protection concerns and to advocate for effective protection of surface and groundwater quality. The WPAB consists of nine citizen members, appointed by the ABCWUA, the COA, and the County. Members represent public interest and all meetings are open to the general public.	Bernalillo County will continue its Public Involvement and Participation initiatives that solicit public comment, feedback, and participation. The County will provide opportunities for public comment through postings on the website, in newspapers and/or availability of a hard copy of public documents at the Public Works office as well as local libraries throughout the County. The County will continue to provide notification, including the mechanism for involvement, to the Watershed Protection Advisory Board (WPAB), Pueblo of Isleta, registered neighborhood associations in the unincorporated urbanized area within the County's jurisdiction and the Stormwater Quality Team after development of draft Annual Reports and SWMP modifications. The Bernalillo County Public Involvement and Participation Plan includes methods for informing the public of involvement and participation opportunities, measurements of program effectiveness, solicitation of involvement by interested groups/organizations, and evaluation of opportunities to utilize volunteers for stormwater quality related activities, as described in the Public Education and Outreach sections of the SWMP and Annual Report. The County will utilize one or more of the following opportunities: Master Naturalist program through the County Open Space, sponsorship/participation of at least one clean-up day per year, continued support of EPA Urban Waters program, BEMP participation through the MRGSQT, membership and participation in the Tijeras Creek Watershed Collaborative, sponsorship/promotion of at least one annual watershed-related conference lead by community volunteers educating the public on stormwater issues. In addition, public involvement will continue to be solicited through the WPAB, which was established by joint ordinance of the County, ABCWUA, and City of Albuquerque (COA). It's purpose is to advise these agencies on surface and groundwater protection concerns and to advocate for effective protection of surface and groundwater quality. The WPAB consists of nine citizen members, appointed by the ABCWUA, the COA, and the County. Members represent public interest and all meetings are open to the general public. Each Annual Report will include a summary of the Public Involvement and Participation initiatives taken in the reporting period.	10 months (if alone) or 12 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or Dec. 22, 2015
Comply with State, Tribal, and local notice requirements when implementing a Public Involvement and Participation Program as required in Part I.D.5.h.(iv). Reporting notification requirements also in Part III.D.4.	Bernalillo County will provide copies of all MS4 compliance reporting documents to the NMED, Pueblos of Sandia and Isleta as required here and in Part III.D.4 of the MS4 Permit.	Bernalillo County has provided digital copies or links of all MS4 compliance reporting documents to the NMED, Pueblos of Sandia and Isleta as required here and in Part III.D.4 of the MS4 Permit.	Bernalillo County will continue to provide digital copies or links of all MS4 compliance reporting documents to the NMED, Pueblos of Sandia and Isleta as required here and in Part III.D.4 of the MS4 Permit.	11 months (if alone) or 14 months (cooperative) from effective date of MS4 Permit. Nov. 22, 2015 or Feb. 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part I.D.5 - Stormwater Management Plan (SWMP) Control Measures				
TABLE 9: Public Involvement and Participation - Part I.D.5.h				
Include elements as required in Part I.D.5.h.(v). The public participation process must reach out to all economic and ethnic groups. Opportunities for members of the public to participate in program development and implementation include serving as citizen representatives on a local stormwater management panel, attending public hearings, working as citizen volunteers to educate other individuals about the program, assisting in program coordination with other preexisting programs, or participating in volunteer monitoring efforts.	The County will continue in its collaborative efforts with other agencies to inform the pubic about opportunities to participate in local stream and Bosque restoration activities. The County collaborates with Valle de Oro NWR and other supporting groups, such as the youth service and conservation corps, to educate and involve members of the community about local riparian restoration and clean-up opportunities for the Rio Grande Bosque. The County will sponsor, co-sponsor, or otherwise support at least one such event each year of the permit term.	Bernalillo County has participated in multiple cooperative efforts with other area agencies. These collaborative efforts allow for a wider, more diverse reach for public involvement opportunities. These efforts include informing the pubic about opportunities to participate in local stream and Bosque restoration activities. Specific examples of the County's collaborative efforts include the Valle de Oro National Wildlife Refuge (NWR) and other supporting groups, such as the youth service and conservation corps, to educate and involve members of the community about local riparian restoration and clean-up opportunities for the Rio Grande Bosque. The Valle de Oro NWR is an urban wildlife refuge in an economically disadvantaged area of Albuquerque and Bernalillo County. There has been significant County and community involvement in its creation and it is a focal point for Urban Waters program activities. The refuge is a significant opportunity for the County for stormwater public education, outreach and involvement. The County has distributed stormwater-related materials during public outreach and education events held at Valle de Oro NWR. The targeted audience for these outreach and participation activities include the culturally diverse and economically disadvantaged community surrounding the refuge, as well as the general population of Bernalillo County that visit the refuge. Residents who attend these kinds of events are generally community-minded and frequently participate in volunteer initiatives. Additionally, support of refuge activities by the youth corps and similar groups targets involvement opportunities for children and teens. The County has also used the Watershed Protection Advisory Board (WPAB) and the County website as the primary mechanism to reach out to the community for volunteers and to solicit input through public meetings and discussions. Materials and solicitation for volunteers and/or participants has also been made available through neighborhood newsletters and postings at community centers in the unincorporated urbanized area areas of the County's jurisdiction and, as appropriate, in English and Spanish in order to reach all economic and ethnic groups. The WPAB was established by joint ordinance of the County, ABCWUA, and COA. It's purpose is to advise these agencies on surface and groundwater protection concerns and to advocate for effective protection of surface and groundwater quality. The WPAB consists of nine citizen members, appointed by the Water Authority, the City, and the County. Members represent public interest and all meetings are open to the general public.	Bernalillo County will continue to participate in multiple cooperative efforts with other area agencies. These collaborative efforts allow for a wider, more diverse reach for public involvement opportunities. These efforts include informing the pubic about opportunities to participate in local stream and Bosque restoration activities. Specific examples of the County's collaborative efforts include the Valle de Oro National Wildlife Refuge (NWR) and other supporting groups, such as the youth service and conservation corps, to educate and involve members of the community about local riparian restoration and clean-up opportunities for the Rio Grande Bosque. The Valle de Oro NWR is an urban wildlife refuge in an economically disadvantaged area of Albuquerque and Bernalillo County. There has been significant County and community involvement in its creation and it is a focal point for Urban Waters program activities. The refuge is a significant opportunity for the County for stormwater public education, outreach and involvement. The County distributes stormwater-related materials during public outreach and education events held at Valle de Oro NWR. The targeted audience for these outreach and participation activities include the culturally diverse and economically disadvantaged community surrounding the refuge, as well as the general population of Bernalillo County that visit the refuge. Residents who attend these kinds of events are generally community-minded and frequently participate in volunteer initiatives. Additionally, support of refuge activities by the youth corps and similar groups targets involvement opportunities for children and teens. The County will also continue to use the Watershed Protection Advisory Board (WPAB) and the County website as the primary mechanism to reach out to the community for volunteers and to solicit input through public meetings and discussions. Materials and solicitation for volunteers and/or participants will also be made available through neighborhood newsletters and postings at community centers in the unincorporated urbanized area areas of the County's jurisdiction and, as appropriate, in English and Spanish in order to reach all economic and ethnic groups. The WPAB was established by joint ordinance of the County, ABCWUA, and COA. It's purpose is to advise these agencies on surface and groundwater protection concerns and to advocate for effective protection of surface and groundwater quality. The WPAB consists of nine citizen members, appointed by the Water Authority, the City, and the County. Members represent public interest and all meetings are open to the general public.	11 months (if alone) or 18 months (cooperative) from effective date of MS4 Permit. Nov. 22, 2015 or June 22, 2016
Update the SWMP document and annual report as required in Part I.D.5.h.(vi), Part I.D.5.h.(vii), and Part I.D.5.h.(viii). The permittee must provide public accessibility of the SWMP and Annual Reports online via the Internet and during normal business hours at the MS4 operator's main office for public inspection and copying consistent with any applicable federal, state, tribal, or local open records requirements. Upon a showing of significant public interest, the MS4 operator is encouraged to hold a public meeting (or include in the agenda of in a regularly scheduled city council meeting, etc.) on the NOI, SWMP, and Annual Reports.	As part of the Annual Report process each year, the Stormwater Program Manager will review the program requirements listed in Part I.D.5.h, for the abovementioned SWMP elements, and assess the overall success of the program and document the program effectiveness in the Annual Report. The County will provide public accessibility to the SWMP document and most recent Annual Report online via the Bernalillo County website and during normal business hours at the Bernalillo County Public Works Building located at 2400 Broadway Blvd SE, Albuquerque, NM 87102.	As part of the Annual Report process each year, the Stormwater Program Manager has reviewed the program requirements listed in Part I.D.5.h, for the abovementioned SWMP elements, and assessed the overall success of the program and document the program effectiveness in each Annual Report. The County has provided public accessibility to the SWMP document and most recent Annual Report online via the Bernalillo County website and during normal business hours at the Bernalillo County Public Works Building located at 2400 Broadway Blvd SE, Albuquerque, NM 87102.	As part of the Annual Report process each year, the Stormwater Program Manager will review the program requirements listed in Part I.D.5.h, for the abovementioned SWMP elements, and assess the overall success of the program and document the program effectiveness in the Annual Report. The County will provide public accessibility to the SWMP document and most recent Annual Report online via the Bernalillo County website and during normal business hours at the Bernalillo County Public Works Building located at 2400 Broadway Blvd SE, Albuquerque, NM 87102.	Update as necessary for SWMP and annually for Annual Report
Enhance the program to include requirements in Part I.D.5.h.(ix).	The County will continue to review, update, and enhance public involvement and participation programs.	The County has continued to review, update, and enhance its MS4 related Public Involvement and Participation programs. Bernalillo County has included its public involvement and participation program elements into the following programs: funding groups that include public participation, such as Valle de Oro NWR, Bernalillo County Master Naturalist program, youth corps programs, and the Bosque Ecosystem Monitoring Program (BEMP). The County has also continued to provide an illegal dumping/IDDE hotline reporting phone number and website - allowing public participation in reporting stormwater issues that the public sees in the community.	The County will continue to review, update, and enhance its MS4 related Public Involvement and Participation programs. Bernalillo County will continue to include its public involvement and participation program elements into the following programs: funding groups that include public participation, such as Valle de Oro NWR, Bernalillo County Master Naturalist program, youth corps programs, and the Bosque Ecosystem Monitoring Program (BEMP). The County will also continue to provide an illegal dumping/IDDE hotline reporting phone number and website - allowing public participation in reporting stormwater issues that the public sees in the community. Each Annual Report will include a summary of the Public Involvement and Participation initiatives taken in the reporting period, as applicable.	Update as necessary for SWMP and annually for Annual Report

Part I.D.5 - SWMP Control Measures
Table 10: Wet Weather Monitoring Program - Part III.A.1

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part III - Monitoring, Assessment and Reporting Requirements				
TABLE 10: Wet Weather Monitoring Program - Part III.A.1				
According to the requirements in Part III.A.1., The permittee must develop, in consultation with NMED and EPA (and affected Tribes if monitoring locations would be located on Tribal lands), and implement a comprehensive monitoring and assessment program. The permittees shall conduct wet weather monitoring to gather information on the response of receiving waters to wet weather discharges from the MS4 during both wet season (July 1 through October 31) and dry Season (November 1 through June 30). Wet Weather Monitoring shall be conducted at outfalls, internal sampling stations, and/or in-stream monitoring locations at each water of the US that runs in each entity or entities' jurisdiction(s).	The program details and measurable goals are described below. The final Sampling Plan for Compliance Monitoring was submitted to EPA May 5, 2016. The sampling plan was accepted by the EPA and NMED.	The program details and measurable goals met are described below. The final Sampling Plan for Compliance Monitoring was submitted to EPA May 5, 2016. The sampling plan was accepted by the EPA and NMED. As identified in the Compliance Monitoring Cooperative (CMC) Monitoring Plan, the MS4 Permit requires a minimum of seven (7) storm events be sampled at both the Rio Grande North and Rio Grande South locations for cooperative monitoring programs. For these seven (7) samples, at least three (3) events are required in the wet season and two (2) events are required in the dry season. The wet season is defined in the permit as July 1 through October 31 and the dry season as November 1 through June 30. All required CMC samples have been collected and reported; four (4) samples were collected in FY17, two (2) samples were collected in FY18, and one (1) sample was collected in FY19.	channels, storm drains and pump stations. The Rio Grande, the only perennial river in the watershed, enters the MRG Watershed in one location (North of Albuquerque) and leaves the MRG Watershed south of Albuquerque. Details for this program are provided in the SWMP sections below. The final Sampling Plan for Compliance Monitoring was submitted to EPA May 5, 2016. The sampling plan was accepted by the EPA and NMED. As identified in the Compliance Monitoring Cooperative (CMC) Monitoring Plan, the MS4 Permit requires a minimum of seven (7) storm events be sampled at both the Rio Grande North and Rio Grande South locations for cooperative monitoring programs. For these seven (7) samples, at least three (3) events are required in the wet season and two (2) events are required in the dry season. The wet season is defined in the permit as July 1 through October 31 and the dry season as November 1 through June 30. All Permit required CMC samples have been collected and reported. The current 2014 Middle Rio Grande Watershed Based Municipal Separate Storm Sewer System (MS4) Permit, NPDES Permit No. NMR04A000, expires in December 2019. On July 27, 2019 the EPA (Brent Larson/Maria	See specific Permit activity schedules below.
Part III.A.3.1.b. Option B: Cooperative Monitoring Program: Develop a cooperative wet weather monitoring program with other permittees in the Middle Rio Grande Watershed. The program will monitor waters coming into the watershed (upstream) and leaving the watershed (downstream). The program must include sampling for TSS, TDS, COD, BOD5, DO, oil and grease, E. coli, pH, total kjeldahl nitrogen, nitrate plus nitrite, dissolved phosphorus, total ammonia plus organic nitrogen, total phosphorus, PCBs and Gross alpha. Monitoring of temperature shall be also conducted at outfalls and/or Rio Grande monitoring locations. Permittees must include additional parameters from monitoring conducted under permits NMS000101, NMR040000 or/and NMR040001 whose mean values are at or above a WQS. The monitoring program must sample the pollutants for a minimum of 7 storm events per location during the permit term with at least 3 events in the wet season and 2 events in the dry season.	The monitoring program will follow the permit requirements for parameters tested (TSS, TDS, COD, BOD5, DO, oil and grease, E. coli, pH, total kjeldahl nitrogen, nitrate plus nitrite, dissolved phosphorus, total ammonia plus organic nitrogen, phosphorus, PCBs, gross alpha, tetrahydrofuran, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,3,4-cd)pyrene, dieldrin, pentachlorophenol, benzidine, benzo(a)anthracene, dibenzofuran, dibenzo(a,h)anthracene, 3,4-benzofluoranthene, chromium IV, copper-dissolved, lead-dissolved, bis(2ethylhexyl)phthalate). In addition, dissolved oxygen, pH, conductivity, and temperature will be analyzed in the field within 15 minutes of sample collection. The monitoring program will be conducted according to the approved Sampling Plan for Compliance Monitoring.	The monitoring program was conducted according to the approved Sampling Plan for Compliance Monitoring. The monitoring program followed the Permit requirements for parameters tested (TSS, TDS, COD, BOD5, DO, oil and grease, E. coli, pH, total kjeldahl nitrogen, nitrate plus nitrite, dissolved phosphorus, total ammonia plus organic nitrogen, phosphorus, PCBs, and gross alpha). In addition, parameters from stormwater monitoring conducted under permits NMS000101, whose mean values are at or above a WQS, will also be tested. NMED and EPA added these additional parameters based on results from prior stormwater monitoring in the watershed (tetrahydrofuran, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,3,4-cd)pyrene, dieldrin, pentachlorophenol, benzidine, benzo(a)anthracene, dibenzofuran, dibenzo(a,h)anthracene, 3,4-benzofluoranthene, chromium IV, copper-dissolved, lead-dissolved, bis(2ethylhexyl)phthalate). In addition, dissolved oxygen, pH, conductivity, and temperature were analyzed in the field within 15 minutes of sample collection, as required by the Permit.	The current 2014 Middle Rio Grande Watershed Based MS4 Permit, NPDES Permit No. NMR04A000, expires in December 2019. On July 27, 2019 the EPA (Brent Larson/Maria Martinez, EPA Region 6) indicated to the MS4 permittees at a meeting at Bernalillo County Public Works, Albuquerque, NM that this Permit will most likely be administratively continued. Administrative continuance of this Permit would mean that since the CMC members have met all requirement in Part III. A.1.b ("The monitoring program must sample the pollutants for a minimum of 7 storm events per location during the permit term which at least 3 events in the wet season and 2 events in the dry season"), no additional monitoring would be required until a new permit is issued. However, the CMC members may choose to continue sampling to support their MS4 program needs, demonstrate program progress, or gather additional data in support of the future Permit compliance. If the CMC does continue wet weather monitoring during administrative continuance of this Permit, the parameter list may be modified based on a review of the results obtained within the watershed and the program assessment needs for the permittees. The County will summarize, as applicable, any wet weather monitoring activity and results in each Annual Report, with additional information available upon request.	Monitoring program will sample the pollutants for a minimum of 7 storm events per location during the permit term with at least 3 events in the wet season and 2 events in the dry season.
As required in Part III.A.1. and Table 10, the permittees shall submit wet weather monitoring preference Option A or Option B to EPA (i.e., individual monitoring program vs. cooperative monitoring program) with NOI submittals.	N/A - this permit activity is complete.	Bernalillo County submitted its NOI in compliance with the permit requirements and schedule. Bernalillo County indicated it will participate in Option B - cooperative monitoring program.	Bernalillo County submitted its NOI in compliance with the Permit requirements and schedule. Bernalillo County indicated it will participate in Option B - cooperative monitoring program. This Permit requirement is complete; there are no additional measurable goal associated with this item.	N/A
Submit a detailed description of the monitoring scheme to EPA and NMED for approval. The monitoring scheme should include: a list of pollutants; a description of monitoring sites with an explanation of why those sites were selected; and a detailed map of all proposed monitoring sites. In addition, as required in Part III.A.1.h, the monitoring program must include a contingency plan for collecting additional monitoring data within the MS4 or at additional appropriate instream locations should monitoring results indicate that MS4 discharges may be contributing to instream exceedances of WQS. The purpose of this additional monitoring effort would be to identify sources of elevated pollutant loadings so they could be addressed by the SWMP.	The monitoring program will be conducted according to the approved Sampling Plan for Compliance Monitoring.	Bernalillo County has developed, with its cooperative partners, a Sampling Plan for Compliance Monitoring. The final Sampling Plan for Compliance Monitoring was submitted to the EPA on May 5, 2016 and has been accepted by the EPA and NMED. No official modifications to this sampling plan were made during the Permit term.	Bernalillo County has developed, with its cooperative partners, a Sampling Plan for Compliance Monitoring. The final Sampling Plan for Compliance Monitoring was submitted to the EPA on May 5, 2016 and has been accepted by the EPA and NMED. Modifications to this sampling may be submitted to the EPA in future, as needed, for approval. If the CMC choses to continue wet weather monitoring during administrative continuance of this Permit, the parameter list may be modified based on a review of the results obtained within the watershed and the program assessment needs for the permittees. The County will summarize, as applicable, any wet weather monitoring activity and results in each Annual Report, with additional information available upon request.	10 months (if alone) or 12 months (cooperative) from effective date of MS4 Permit. Oct. 22, 2015 or Dec. 22, 2015
Submit certification that all wet weather monitoring sites are operational and begin sampling.	Bernalillo County, with its cooperative partners, has submitted certification to EPA that all wet weather compliance monitoring sites are operational and has begun sampling, according to the Permit requirements.	Bernalillo County submitted its sampling certification to the EPA June 2016. Bernalillo County, with its cooperative partners, submitted certification to EPA that all wet weather compliance monitoring sites are operational and have begun sampling, according to the Permit requirements.	Bernalillo County submitted its sampling certification to the EPA June 2016. Bernalillo County, with its cooperative partners, submitted certification to EPA that all wet weather compliance monitoring sites are operational and have begun sampling, according to the Permit requirements. This Permit requirement is complete; there are no additional measurable goal associated with this item.	June 22, 2016

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part III - Monitoring, Assessment and Reporting Requirements				
TABLE 10: Wet Weather Monitoring Program - Part III.A.1				
As required in Part III.A.1.e, update SWMP document and submit annual reports. The results of the Wet Weather Monitoring must be provided in each annual report.	As part of the Annual Report process each year, Bernalillo County will review the program requirements listed in Part III.A.1, for the above-mentioned SWMP elements, and assess the overall success of the program and document the program effectiveness in the Annual Report. The Wet Weather Monitoring results obtained from July 1st to June 30th will be submitted in each Annual Report on Discharge Monitoring Report (DMR) forms as required in Part III.D.1, or as otherwise approved by the EPA as part of the cooperative sampling program.	Bernalillo County had reviewed the program requirements listed in Part II.A.1, for the above-mentioned program elements, during each Annual Report process. The wet weather monitoring results obtained from July 1st to June 30th of each year have been submitted in each Annual Report and on electronic Discharge Monitoring Report (DMR) forms as required in Part III.D.1 as part of the cooperative sampling program. As of FY19, all required CMC samples have been collected and reported. With the FY19 Annual Report, Bernalillo County, with its cooperative partners, has submitted to NMED and EPA documentation that all of the Permit monitoring requirements for wet weather monitoring have been completed. All electronic Discharge Monitoring Reports (DMRs) have been entered and certified for the CMC samples.	The current 2014 Middle Rio Grande Watershed Based MS4 Permit, NPDES Permit No. NMR04A000, expires on December 2019. On July 27, 2019 the EPA (Brent Larson/Maria Martinez, EPA Region 6) indicated to the MS4 permittees at a meeting at Bernalillo County Public Works, Albuquerque, NM that this Permit will most likely be administratively continued. Administrative continuance of this Permit would mean that since the CMC members have met all requirement in Part III. A.1.b ("The monitoring program must sample the pollutants for a minimum of 7 storm events per location during the permit term which at least 3 events in the wet season and 2 events in the dry season"), no additional monitoring would be required until a new MS4 Permit is issued. However, the CMC members may choose to continue sampling to support their MS4 program needs, demonstrate program progress, or gather additional data in support of the future Permit compliance. The County will summarize, as applicable, any wet weather monitoring activity and results in each Annual Report, with additional information available upon request. Bernalillo County will review the program requirements listed in Part II.A.1, for the above-mentioned program elements, during the Annual Report process. A strategy to implement any new program requirements or improve compliance with the program requirements will be developed as needed. The wet weather monitoring results obtained from July 1st to June 30th of each year will be submitted in each Annual Report on electronic Discharge Monitoring Report (DMR) forms as required in Part III.D.1, or as otherwise approved by the EPA as part of the cooperative sampling program.	Update as necessary for SWMP and annually for Annual Report

Part I.D.5 - SWMP Control Measures
Dry Weather Discharge Screening - Part III.A.2

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part III - Monitoring, Assessment and Reporting Requirements				
Dry Weather Monitoring Program - Part III.A.2				
According to the requirements in Part III.A.2., Each permittee shall identify, investigate, and address areas within its jurisdiction that may be contributing excessive levels of pollutants to the Municipal Separate Storm Sewer System as a result of dry weather discharges (i.e., discharges from separate storm sewers that occur without the direct influence of runoff from storm events, e.g. illicit discharges, allowable non-stormwater, groundwater infiltration, etc.). Due to the arid and semi-arid conditions of the area, the dry weather discharges screening program may be carried out during both wet season (July I through October 31) and dry season (November 1 through June 30). Results of the assessment shall be provided in each annual report.	The program details and measurable goals are described below and In Table 6 - Illicit Discharge and Improper Disposal.	The program details and measurable goals are described below and In Table 6 - Illicit Discharge and Improper Disposal.	The program details and measurable goals are described below and In Table 6 - Illicit Discharge and Improper Disposal.	See specific Permit activity schedules below.
This program may be coordinated with the illicit discharge detection and elimination program required in Part I.D.5.e. The dry weather screening program shall be described in the SWMP and comply with the schedules contained in Part I.D.5.e.(iii). The permittee shall: a) Include sufficient screening points to adequately assess pollutant levels from all areas of the MS4. b) Screen for, at a minimum, BOD5, sediment or a parameter addressing sediment (e.g., TSS or turbidity), E. coli, Oil and Grease, nutrients, any pollutant that has been identified as cause of impairment of a waterbody receiving discharges from that portion of the MS4, including temperature. c) Specify the sampling and non-sampling techniques to be issued for initial screening and follow-up purposes. d) Perform monitoring only when an antecedent dry period of at least 72 hours after a rain event greater than 0.1 inch in magnitude is satisfied. Monitoring methodology shall consist of collecting a minimum of 4 grab samples spaced at a minimum interval of 15 minutes each.	Bernalillo County will work cooperatively with nearby entities in developing its dry weather screening program. Any screening results attained will be including the annual report. The County will continue membership and involvement in the cooperative MS4 Technical Advisory Group (MS4 TAG) which will facilitate cooperation and coordination with other MS4s in the Middle Rio Grande related to screening for illicit discharges.	There are no perennial streams in the Albuquerque area that contribute to the Rio Grande. As such, the dry weather screening program serves a dual purpose as an illicit discharge screening analysis. Bernalillo County has worked cooperatively to develop an illicit discharge program and screening procedures, as required in I.D.5.e.(iii). The dry weather screening program includes screening locations within Bernalillo County's jurisdiction. The majority of Bernalillo County's storm sewer system either drains into another entity's system (AMAFCA, COA, MRGCD) or another entities storm sewer system (AMAFCA, COA, MRGCD) drains into Bernalillo County's system. The County has worked cooperatively with these entities in developing and implementing this program. The County has summarized any dry weather/illicit discharge incidents in each Annual Report.	There are no perennial streams in the Albuquerque area that contribute to the Rio Grande. As such, the dry weather screening program serves a dual purpose as an illicit discharge screening analysis. Bernalillo County will continue working cooperatively to develop an illicit discharge program and screening procedures, as required in I.D.5.e.(iii). The dry weather screening program will include screening locations within Bernalillo County's jurisdiction. The majority of Bernalillo County's storm sewer system either drains into another entity's system (AMAFCA, COA, MRGCD) or another entities storm sewer system (AMAFCA, COA, MRGCD) drains into Bernalillo County's system. The County will continue to work cooperatively with these entities in developing and implementing this program. Should any discharge be present in a quantity sufficient for analysis, it will be screened for appropriate analytes based on suspected source; if the source is not known, sample may be analyzed for BOD5, sediment (e.g., TSS or turbidity), E. coli, oil and grease, and nutrients. Any discharge collected will be a grab sample according to the Permit monitoring methodology. The County will summarize any dry weather/illicit discharge incidents in each Annual Report, with additional information available upon request.	Cooperative Program -as required in part I.D.5.e.(iii) Years 1 -3: develop procedures as required in Part I.D.5.e.(i).(c) Year 4: screen 30% of the MS4 area Year 5: screen 70% of the MS4 area

Part I.D.5 - SWMP Control Measures
Floatables Monitoring - Part III.A.3

Table 2. Stormwater Management Program Plan

for NPDES Permit No. NMR04A000

Permit Activity Description	Measurable Goal (Rev. 0, 2016)	Summary of Measurable Goals Met - from Rev. 0, 2016	Updated Measurable Goal (Rev. 1, 2019)	Permit Required Implementation Schedule
Part III - Monitoring, Assessment and Reporting Requirements				
Floatables Monitoring - Part III.A.3				
According to the requirements in Part III.A.3., The permittees shall establish locations for monitoring/assessing floatable material in discharges to and/or from their MS4. A cooperative monitoring program may be established in partnership with other MS4s to monitor and assess floatable material in discharges to and/or from a joint jurisdictional area or watershed basis.	Bernalillo County will continue to monitor floatable material and estimate the amount collected.	Bernalillo County has continued to monitor floatable material and estimate the amount collected. In FY18, the County removed and disposed of 569 CY of trash and debris from County drainage facilities. In FY19, the County removed and disposed of 535 CY of trash and debris from County drainage facilities. The County has included an estimate of the annual volume of floatables and trash removed from the control facilities and characterization of the floatable type in each Annual Report.		
Floatable material shall be monitored at least twice per year at priority locations and at minimum of two (2) stations. The amount of collected material shall be estimated in cubic yards.	The County will maintain one drying station- a location where floatable material, sediment, and debris removed from the storm sewer system is hauled, separated, and properly disposed of. This station helps the County meet the requirements for this activity.	The County has maintained one drying station- a location where floatable material, sediment, and debris removed from the storm sewer system is hauled, separated, and properly disposed of. This station helps the County meet the requirements for this activity.		Update as necessary for SWMP and annually for Annual Report

Appendix A

NPDES Middle Rio Grande Watershed Based MS4 Permit NMR04A000

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202 - 2733

APR 0 9 2015

CERTIFIED MAIL: RETURN RECEIPT REQUESTED (See Attachment 1)

Addressees: Middle Rio Grande Watershed Municipal Separate Storm Sewer Systems Operators
(See Attachment 1)

Re: NPDES Permit No. NMR04A000
Notice of Minor Permit Modification

Dear (See Attachment 1):

Following regulations listed at 40 CFR 122.63(a) and CFR 122.63 (c), the following minor permit modifications are made to the NPDES Permit No. NMR04A000:

- To allow more time to review and approve NOIs, and remove schedule conflicts, certain interim compliance dates in the compliance schedules included in Activity Tables 1.a through 10, except Table 1.c entitled "Measurable Goals of Anoxic and Hypoxia Levels Measured by Permit Year" have been extended. The corrected pages are enclosed in Attachment 2. The new compliance schedules dates are in bold and underlined text.

- The point of contact and address for the Pueblo of Isleta in Part III, Part IV, and Appendix C has been updated. The updated page(s) are enclosed in Attachment 3.

The version of the permit on the EPA R6 website is also being updated. See http://epa.gov/region6/water/npdes/sw/ms4/index.htm

If you have any questions on any aspect of these minor permit modifications, please feel free to contact the permit writer, Nelly Smith, by telephone at:214-665-7109 or via E-mail at Nelly.smith@epa.gov.

Sincerely yours,

for Stacey B. Dwyer, P.E.
Associate Director
NPDES Permits & TMDLs Branch

Enclosures

cc w/Enclosure: New Mexico Environment Department

Attachment 1

Attachment 1

MS4	Address	City	State	Zip Code	Contact Name	Return Receipt Requested
City of Albuquerque	Dept. Municipal Development P.O. Box 1293	Albuquerque	NM	87103	Kevin Daggett	7014015000002452 6650
AMAFCA	2600 Prospect Ave NE	Albuquerque	NM	87107	Jerry Lovato	7014015000002452 6643
NMDOT District 3	7500 Pan American Blvd	Albuquerque	NM	87199	Timothy R, Trujillo	7014015000002452 6636
University of New Mexico	1801 Tucker St NE	Albuquerque	NM	87131	Chemanji (Che) Shu-Nyamboli	7014015000002452 6629
SSCAFCA	1041 Commercial Dr SE	Rio Rancho	NM	87124	Chuck Thomas	7014015000002452 6612
Town of Bernalillo	829 Camino del Pueblo	Bernalillo	NM	87004	Maria Rinaldi	7014015000002452 6605
Sandoval County	2708 Iris NE	Rio Rancho	NM	87144	Fred Marquez	7014015000002452 6599
Village of Corrales	4324 Corrales Rd	Corrales	NM	87048	Mayor Jack Torres	7014015000002452 6582
Los Ranchos de Albuquerque	6718 Rio Grande Blvd NW	Los Ranchos de Albuquerque	NM	87107	Tim McDonough	7014015000002452 6575
City of Rio Rancho	3200 Civic Center Circle NE Ste 200	Rio Rancho	NM	87144	Xavier Pettes	7014015000002452 6568
Bernalillo County	2400 Broadway SE, Bldg N	Albuquerque	NM	87102	Anita Stead	7014015000002452 6551

Attachment 1

Kirtland AFB	377 ABW/CC 200 Wyoming Blvd SE	Kirtland AFB	NM	87117	Chris Segura	7014015000002452 6544
EXPO	P.O. Box 8456	Albuquerque	NM	87198	John C. Jaramillo	7014015000002452 6537
Sandia Laboratories, DOE	P.O. Box 5400, KAFB	Albuquerque	NM		Karen Agogino	7014015000002452 6520
ESCAFCA	829 Camino del Pueblo, Bernalillo, NM	Bernalillo	NM		Jack Torres	7014015000002452 6513
						7014015000002452 6506
Pueblo of Sandia	481 Sandia Loop	Bernalillo	NM	87004	Scott Bulgrin	7014015000002452 6490
Pueblo of Isleta	PO Box 1270	Isleta	NM	87022	Ramona Montoya	7014015000002453 0657

Attachment 2

schedules described in Table 1.a of Part I.C.2.(iii). The annual report must include information on compliance with this section, including results of any sampling conducted by the permittee.

Note: Probable pollutant sources identified by permittees should be submitted to NMED on the following form: ftp://ftp.nmenv.state.nm.us/www/swqb/Surveys/PublicProbableSourceIDSurvey.pdf

(c) Impairment for Nutrients: Where the impairment is for nutrients (e.g., nitrogen or phosphorus), the permittee shall identify potential significant sources and develop and implement targeted BMPs to control nutrients from potential sources. The permittee must, at minimum comply with the activities and schedules described in Table 1.b of Part I.C,2, (iii). The annual report must include information on compliance with this section, including results of any sampling conducted by the permittee.

(d) Impairment for Dissolved Oxygen: See Endangered Species Act (ESA) Requirements in Part I.C.3. These program elements may be coordinated with the monitoring required in Part III.A.

(iii) Program Development and Implementation Schedules: Where the impairment is for nutrient constituent (e.g., nitrogen or phosphorus) or bacteria, the permittee must at minimum comply with the activities and schedules in Table 1.a and Table 1.b.

Table 1.a. Pre-TMDL Bacteria Program Development and Implementation Schedules

Activity	**Class Permittee**				
	A **Phase I MS4s**	**B** **Phase II MS4s (2000 Census)**	**C** **New Phase II MS4s (2010 Census **)**	**D** **MS4s within Indian Lands**	**Cooperative (*)** **Any Permittee with cooperative programs**
Identify potential significant sources of the pollutant of concern entering your MS4	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Sixteen (16) months from effective date of permit
Develop (or modify an existing program ***) and implement a public education program to reduce the discharge of bacteria in municipal storm water contributed by (if applicable) by pets, recreational and exhibition livestock, and zoos.	**Twelve (12)** months from effective date of permit	**Twelve (12)** months from effective date of permit	**Fourteen (14) months** from effective date of permit	**Fourteen (14) months** from effective date of permit	Sixteen (16) months from effective date of permit
Develop (or modify an existing program ***) and implement a program to reduce the discharge of bacteria in municipal storm water contributed by areas within your MS4 served by on-site wastewater treatment systems.	**Fourteen (14) months** from effective date of permit	**Fourteen (14) moths** from effective date of permit	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit
Review results to date from the Illicit Discharge Detection and Elimination program (see Part I.D.5.e) and modify as necessary to prioritize the detection and elimination of discharges contributing bacteria to the MS4	**Fourteen (14) months** from effective date of permit	**Fourteen (14) months** from effective date of permit	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit

Develop (or modify an existing program ***) and implement a program to reduce the discharge of bacteria in municipal storm water contributed by other significant source identified in the Illicit Discharge Detection and Elimination program (see Part I.D.5.e)	**Sixteen (16) months** from effective date of permit	**Sixteen (16)** months from effective date of permit	**Eighteen (18)** months from effective date of permit	**Eighteen (18)** months from effective date of permit	**Twenty (20)** months from effective date of permit
Include in the Annual Reports progress on program implementation and reducing the bacteria and updates their measurable goals as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs
(**) or MS4s designated by the Director
(***) Permittees previously covered under permit NMS000101 or NMR040000
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

Table 1.b. Pre-TMDL Nutrient Program Development and Implementation Schedules

Activity	**Class Permittee**				
	A Phase I MS4s	**B Phase II MS4s (2000 Census)**	**C New Phase II MS4s (2010 Census **)**	**D MS4s within Indian Lands**	**Cooperative (*) Any Permittee with cooperative programs**
Identify potential significant sources of the pollutant of concern entering your MS4	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Sixteen (16) months from effective date of permit
Develop (or modify an existing program ***) and implement a public education program to reduce the discharge of pollutant of concern in municipal storm water contributed by residential and commercial use of fertilizer	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Sixteen (16) months from effective date of permit
Develop (or modify an existing program ***) and implement a program to reduce the discharge of the pollutant of concern in municipal storm water contributed by fertilizer use at municipal operations (e.g., parks, roadways, municipal facilities)	One (1) year from effective date of permit	One (1) year from effective date of permit	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit

Develop (or modify an existing program ***) and implement a program to reduce the discharge of the pollutant of concern in municipal storm water contributed by municipal and private golf courses within your jurisdiction	One (1) year from effective date of permit	One (1)year from effective date of permit	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit
Develop (or modify an existing program ***) and implement a program to reduce the discharge of the pollutant of concern in municipal storm water contributed by other significant source identified in the Illicit Discharge Detection and Elimination program (see Part I.D.5.e)	One (1) year from effective date of permit	One (1) year from effective date of permit	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit
Include in the Annual Reports progress on program implementation and reducing the nutrient pollutant of concern and updates their measurable goals	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs
(**) or MS4s designated by the Director
(***) Permittees previously covered under permit NMS000101 or NMR040000
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

These program elements may be coordinated with the monitoring required in Part III.A.

3. **Endangered Species Act (ESA) Requirements**. Consistent with U.S. FWS Biological Opinion dated August 21, 2014 to ensure actions required by this permit are not likely to jeopardize the continued existence of any currently listed as endangered or threatened species or adversely affect its critical habitat, permittees shall meet the following requirements and include them in the SWMP:

   a. Dissolved Oxygen Strategy in the Receiving Waters of the Rio Grande:

      (i) The permittees must identify (or continue identifying if previously covered under permit NMS000101) structural controls, natural or man-made topographical and geographical formations, MS4 operations, or oxygen demanding pollutants contributing to reduced dissolved oxygen in the receiving waters of the Rio Grande. The permittees shall implement controls, and update/revise as necessary, to eliminate discharge of pollutants at levels that cause or contribute to exceedances of applicable water quality standards for dissolved oxygen in waters of the Rio Grande. The permittees shall submit a summary of findings and a summary of activities undertaken under Part I.C.3.a.(i) with each Annual Report. The SWMP submitted with the first and fourth annual reports must include a detailed description of controls implemented (or/and proposed control to be implemented) along with corresponding measurable goals. (Applicable to all permittees).

      (ii) As required in Part I.C.1.d, the COA and AMAFCA shall revise the May 1, 2012 Strategy for dissolved oxygen to address dissolved oxygen at the North Diversion Channel Embayment and/or other MS4 locations. The permittees shall submit the revised strategy to FWS and EPA for approval within a year of permit issuance and progress reports with the subsequent Annual Reports (see also Part I.C.1.d.(iv)). The permittees shall ensure that actions to reduce pollutants or remedial activities selected for the North Diversion Channel Embayment and its watershed are implemented such that there is a reduction in

Table 2. Construction Site Stormwater Runoff Control - Program Development and Implementation Schedules

Activity	Permittee Class				
	A **Phase I MS4s**	**B** **Phase II MS4s (2000 Census)**	**C** **New Phase II MS4s (2010 Census **)**	**D** **MS4s within Indian Lands**	**Cooperative (*)** **Any Permittee with cooperative programs**
Development of an ordinance or other regulatory mechanism as required in Part I.D.5.a.(ii)(a)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of the permit
Develop requirements and procedures as required in Part I.D.5.a.(ii)(b) through in Part I.D.5.a.(ii)(h)	**Ten (10)** months from effective date of permit	**Thirteen (13)** months from effective date of permit	**Sixteen (16) months** from effective date of permit	**Sixteen (16) months** from effective date of permit	Eighteen (18) months from effective date of permit
Annually conduct site inspections of 100 percent of all construction projects cumulatively disturbing one (1) or more acres as required in Part I.D.5.a.(iii)	**Ten (10)** months from effective date of permit	Start **Thirteen (13)** months from effective date of permit and annually thereafter	Start **Sixteen (16) months** from effective date of permit and annually thereafter	Start eighteen (18) months from effective date of permit and thereafter	Start two (2) years from effective date of permit and thereafter
Coordinate with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private construction projects/activities within the permit area as required in Part I.D.5.a.(iv)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	**Twelve (12)** months from effective date of permit	**Twelve (12)** months from effective date of permit	**Fourteen (14) months** from effective date of permit
Evaluation of GI/LID/Sustainable practices in site plan reviews as required in Part I.D.5.a.(v)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	**Twelve (12)** months from effective date of permit	**Twelve (12)** months from effective date of permit	**Fourteen (14) months** from effective date of permit
Update the SWMP document and annual report as required in Part I.D.5.a.(vi) and in Part I.D.5.a.(vii)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary
Enhance the program to include program elements in Part I.D.5.a.(viii) through Part I.D.5.a.(x)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(xiii) The permittee may incorporate the following elements in the Post-Construction Stormwater Management in New Development and Redevelopment program required in Part I.D.5.b.(ii)(b):

(a) Provide requirements and standards to direct growth to identified areas to protect environmentally and ecologically sensitive areas such as floodplains and/or other areas with endangered species and historic properties concerns;

(b) Include requirements to maintain and/or increase open space/buffers along sensitive water bodies, minimize impervious surfaces, and minimize disturbance of soils and vegetation; and

(c) Encourage infill development in higher density urban areas, and areas with existing storm sewer infrastructure.

Table 3. Post-Construction Stormwater Management in New Development and Redevelopment - Program Development and Implementation Schedules

Activity	**Permittee Class**				
	A **Phase I MS4s**	**B** **Phase II MS4s (2000 Census)**	**C** **New Phase II MS4s (2010 Census **)**	**D** **MS4s within Indian Lands**	**Cooperative (*)** **Any Permittee with cooperative programs**
Development of strategies as required in Part I.D.5.b.(ii).(a)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	**Twelve (12)** months from effective date of permit	**Twelve (12)** months from effective date of permit	**Fourteen (14) months** from effective date of permit
Development of an ordinance or other regulatory mechanism as required in Part I.D.5.b.(ii).(b)	**Twenty (24)** months from effective date of permit	**Thirty (30)** months from effective date of permit	**Thirty six (36)** months from effective date of permit	**Thirty six (36)** months from effective date of permit	**Thirty six (36)** months from effective date of permit
Implementation and enforcement, via the ordinance or other regulatory mechanism, of site design standards as required in Part I.D.5.b.(ii).(b)	Within **thirsty six (36)** months from effective date of the permit	Within **forty two (42)** months from the effective date of the permit	Within **forty eight (48)** months from effective date of the permit	Within **forty eight (48)** months from effective date of the permit	Within **forty eight (48)** months from effective date of the permit
Ensure appropriate implementation of structural controls as required in Part I.D.5.b.(ii).(c) and Part I.D.5.b.(ii).(d)	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Develop procedures as required in Part I.D.5.b.(ii).(e), Part I.D.5.b.(ii).(f), Part I.D.5.b.(ii).(g), and Part I.D.5.b.(ii).(h)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit

Coordinate internally with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private construction projects/activities within the permit area as required in Part I.D.5.b.(iii)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	**Eleven (11)** months from effective date of permit	**Eleven (11)** months from effective date of permit	One (1) year from effective date of permit
As required in Part I.D.5.b.(iv), the permittee must assess all existing codes, ordinances, planning documents and other applicable regulations, for impediments to the use of GI/LID/Sustainable practices	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit	Eighteen (18) months from effective date of permit	Two (2) years from effective date of permit
As required in Part I.D.5.b.(iv), develop and submit a report of the assessment findings on GI/LID/Sustainable practices.	**Eleven (11)** months from effective date of permit	Eighteen (18) months from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Twenty seven (27) months from effective date of permit
Estimation of the number of acres of IA and DCIA as required in Part I.D.5.b.(vi)	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Inventory and priority ranking as required in section in Part I.D.5.b.(vii)	Within fifteen (15) months from effective date of the permit	Within **twenty four** (24) months from effective date of the permit	Within **thirty six** (36) months from effective date of the permit	Within **thirty six** (36) months from effective date of the permit	Within **forty two** (42) months from effective date of the permit
Incorporate watershed protection elements as required in Part I.D.5.b.(viii)	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Update the SWMP document and annual report as required in Part I.D.5.b.(ix) and Part I.D.5.b.(x).	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary
Enhance the program to include program elements in Part I.D.5.b.(xi) and Part I.D.5.b.(xii)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs.
(**) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

(iv) The permittee must include in the SWMP a description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.c.(i) throughout Part I.D.5.c.(iii) and its corresponding measurable goal.

(v) The permittee shall assess the overall success of the program, and document the program effectiveness in the annual report.

Table 4. Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations - Program Development and Implementation Schedules

Activity	Permittee Class				
	A Phase I MS4s	**B** Phase II MS4s (2000 Census)	**C** New Phase II MS4s (2010 Census **)	**D** MS4s within Indian Lands	**Cooperative (*)** Any Permittee with cooperative programs
-Develop or update the Pollution Prevention/Good House Keeping program to include the elements in Part I.D.5.c.(i)	**Ten (10)** months from effective date of the permit	**Twelve (12)** months from effective date of the permit	**Fourteen (14) months** from effective date of the permit	**Fourteen (14) months** from effective date of the permit	Eighteen (18) months from effective date of the permit
-Enhance the program to include the elements in Part I.D.5.c.(ii)	**Ten (10)** months from effective date of the permit	One (1) year from effective date of the permit	Two (2) years from effective date of the permit	Two (2) years from effective date of the permit	Thirty (30) months from effective date of the permit
-Develop or update a list and a map of industrial facilities owned or operated by the permittee as required in Part I.D.5.c.(iii)	**Ten (10)** months from effective date of the permit	**Eleven (11)** months from effective date of the permit	One (1) year from effective date of the permit	One (1) year from effective date of the permit	Eighteen (18) months from effective date of the permit
Update the SWMP document and annual report as required in Part I.D.5.c.(iv) and Part I.D.5.c.(v)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs
(**) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

d. Industrial and High Risk Runoff (Applicable only to Class A permittees)

(i) The permittee must control through ordinance, permit, contract, order or similar means, the contribution of pollutants to the municipal storm sewer by storm water discharges associated with industrial activity and the quality of storm water discharged from sites of industrial activity as defined in 40 CFR 122.26(b)(14)(i)-(ix) and (xi). If no such industrial activities are in a permittees jurisdiction, that permittee may certify that this program element does not apply.

(ii) The permittee must continue implementation and enforcement of the Industrial and High Risk Runoff program, assess the overall success of the program, and document both direct and indirect measurements of program effectiveness in the annual report. The program shall include:

(a) A description of a program to identify, monitor, and control pollutants in stormwater discharges to the MS4 from municipal landfills; other treatment, storage, or disposal facilities for municipal waste (e.g. transfer stations, incinerators, etc.); hazardous waste treatment, storage, disposal and recovery facilities; facilities that are subject to EPCRA Title III, Section 313; and any other industrial or commercial discharge the permittee(s) determines are contributing a substantial pollutant loading to the

Table 5: Industrial and High Risk Runoff - Program Development and Implementation Schedules:

Activity	Permittee Class	
	A **Phase I MS4s**	**Cooperative (*)** **Any Permittee with cooperative programs**
Ordinance (or other control method) as required in Part I.D.5.d.(i)	**Ten (10)** months from effective date of the permit	**Twelve (12)** months from effective date of the permit
Continue implementation and enforcement of the Industrial and High Risk Runoff program, assess the overall success of the program, and document both direct and indirect measurements of program effectiveness in the annual report as required in Part I.D.5.d.(ii)	**Ten (10)** months from effective date of the permit	**Twelve (12)** months from effective date of the permit
Meet the monitoring requirements in Part I.D.5.d.(iii)	**Ten (10)** months from effective date of the permit	**Twelve (12)** months from effective date of the permit
Include requirements in Part I.D.5.d.(iv)	**Ten (10)** months from permit effective date of the permit	**Twelve (12)** months from effective date of the permit
Update the SWMP document and annual report as required in Part I.D.5.d.(v) and Part I.D.5.d.(vi)	Update as necessary	Update as necessary
Enhance the program to include requirements in Part I.D.5.d.(vii)	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs. Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

e. Illicit Discharges and Improper Disposal

(i) The permittee shall develop, revise, implement, and enforce a program to detect and eliminate illicit discharges (as defined at 40 CFR 122.26(b)(2)) entering the MS4. **Permittees previously covered under NMS000101 or NMR040000 must continue existing programs while updating those programs, as necessary, to comply with the requirements of this permit**. The permittee must:

(a) Develop, if not already completed, a storm sewer system map, showing the names and locations of all outfalls as well as the names and locations of all waters of the United States that receive discharges from those outfalls. Identify all discharges points into major drainage channels draining more than twenty (20) percent of the MS4 area;

(b) To the extent allowable under State, Tribal or local law, effectively prohibit, through ordinance or other regulatory mechanism, non-stormwater discharges into the MS4, and implement appropriate enforcement procedures and actions;

(c) Develop and implement a plan to detect and address non-stormwater discharges, including illegal dumpling, to the MS4. The permittee must include the following elements in the plan:

A. Procedures for locating priority areas likely to have illicit discharges including field test for selected pollutant indicators (ammonia, boron, chlorine, color, conductivity, detergents, *E. coli*, enterococci, total coliform, fluoride, hardness, pH, potassium, conductivity, surfactants), and visually screening outfalls during dry weather;

(d) If participating in a cooperative program with other MS4s, required detection program frequencies may be based on the combined jurisdictional area rather than individual jurisdictional areas and may use assessment areas crossing jurisdictional boundaries to reduce total number of screening locations (e.g., a shared single screening location that would provide information on more than one jurisdiction); and

(e) After screening a non-high priority area once, adopt an "in response to complaints only" IDDE for that area provided there are citizen complaints on no more than two (2) separate events within a twelve (12) month period.

(f) Enhance the program to utilize procedures and methodologies consistent with those described in "Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments."

Table 6. Illicit Discharges and Improper Disposal - Program Development and Implementation Schedules

Activity	**Permittee Class**				
	A **Phase I MS4s**	**B** **Phase II MS4s (2000 Census)**	**C** **New Phase II MS4s (2010 Census ***)**	**D** **MS4s within Indian Lands**	**Cooperative (*)** **Any Permittee with cooperative programs**
Mapping as required in Part I.D.5.e.(i)(a)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	**Eleven (11)** months from effective date of permit	**Eleven (11)** months from effective date of permit	**Fourteen (14) months** from effective date of permit
Ordinance (or other control method) as required in Part I.D.5.e.(i)(b)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Develop and implement a IDDE plan as required in Part I.D.5.e.(i)(c)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Develop an education program as required in Part I.D.5.e.(i)(d)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit
Establish a hotline as required in Part I.D.5.e.(i)(e)	Update as necessary	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit
Investigate suspected significant/severe illicit discharges as required in Part I.D.5.e.(i)(f)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit
Review complaint records and develop a targeted source reduction program as required in Part I.D.5.e.(i)(g)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	N/A	N/A	One (1) year from effective date of permit

Screening of system as required in Part I.D.5.e.(iii) as follows: a.) High priority areas**	1 / year	1 / year	1 / year	1 / year	1 / year
b.) Whole system	-Screen 20% of the MS4 per year	- Screen 20% of the MS4 per year	-Years 1 – 2: develop procedures as required in Part I.D.5.e.(i)(c) -Year 3: screen 30% of the MS4 -Year 4: screen 20% of the MS4 -Year 5: screen 50% of the MS4	-Years 1 – 2: develop procedures as required Part I.D.5.e.(i)(c) -Year 3: screen 30% of the MS4 -Year 4: screen 20% of the MS4 -Year 5: screen 50% of the MS4	-Years 1 – 3: develop procedures as require in Part I.D.5.e.(i)(c) -Year 4: screen 30% of the MS4 -Year 5: screen 70% of the MS4
Develop, update, and implement a Waste Collection Program as required in Part I.D.5.e.(iv)	**Ten (10)** months from effective date of permit	Eighteen (18) months from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Develop, update and implement a Spill Prevention and Response program to prevent, contain, and respond to spills that may discharge into the MS4 as required in Part I.D.5.e.(v)	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit
Update the SWMP document and annual report as required in Part I.D.5.e.(iii), Part I.D.5.e.(vi), and Part I.D.5.e.(vii).	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary
Enhance the program to include requirements in Part I.D.5.e.(ix)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs.
(**) High priority areas include any area where there is ongoing evidence of illicit discharges or dumpling, or where there are citizen complaints on more than five (5) separate events within twelve (12) months
(***) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

f. Control of Floatables Discharges

(i) The permittee must develop, update, and implement a program to address and control floatables in discharges into the MS4. The floatables control program shall include source controls and, where necessary, structural controls. **Permittees previously covered under NMS000101 or NMR040000 must continue existing programs while updating those programs, as necessary, to comply with the requirements of this permit.** The following elements must be included in the program:

(a) Develop a schedule for implementation of the program to control floatables in discharges into the MS4 (Note: AMAFCA and the City of Albuquerque should update the schedule according to the findings of the 2005 AMAFCA/COA Floatable and Gross Pollutant Study and other studies); and

(b) Estimate the annual volume of floatables and trash removed from each control facility and characterize the floatable type.

(ii) The permittee must include in the SWMP a description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.f.(i).

(iii) The permittee shall assess the overall success of the program, and document the program effectiveness in the annual report.

Table 7. Control of Floatables Discharges - Program Development and Implementation Schedules

Activity	**Permittee Class**				
	A **Phase I MS4s**	**B** **Phase II MS4s (2000 Census)**	**C** **New Phase II MS4s (2010 Census **)**	**D** **MS4s within Indian Lands**	**Cooperative (*)** **Any Permittee with cooperative programs**
- Develop a schedule to implement the program as required in Part I.D.5.f.(i)(a)	**Ten (10)** months from the effective date of the permit	**Ten (10)** months from the effective date of the permit	One (1) year from the effective date of the permit	One (1) year from the effective date of the permit	Eighteen (18) months from the effective date of the permit
-Estimate the annual volume of floatables and trash removed from each control facility and characterize the floatable type as required in Part I.D.5.f.(i)(b)	**Ten (10)** months from the effective date of the permit	One (1) year from the effective date of the permit	Two (2) years from the effective date of the permit	Two (2) years from the effective dae of the permit	Thirty (30) months from the effective date of the permit
Update the SWMP document and annual report as required in Part I.D.5.f.(ii) and Part I.D.5.f.(iii).	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs.
(**) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

g. Public Education and Outreach on Stormwater Impacts

(i) The permittee shall, individually or cooperatively, develop, revise, implement, and maintain a comprehensive stormwater program to educate the community, employees, businesses, and the general public of hazards associated with the illegal discharges and improper disposal of waste and about the impact that stormwater discharges on local waterways, as well as the steps that the public can take to reduce pollutants in stormwater. **Permittees previously covered under NMS000101 and NMR040000 must continue existing programs while updating those programs, as necessary, to comply with the requirements of this permit.**

(ii) The permittee must implement a public education program to distribute educational knowledge to the community or conduct equivalent outreach activities about the impacts of storm water discharges on water bodies and the steps that the public can take to reduce pollutants in storm water runoff. The permittee must:

Table 8. Public Education and Outreach on Stormwater Impacts - Program Development and Implementation Schedules

Activity	Permittee Class				
	A Phase I MS4s	**B** Phase II MS4s (2000 Census)	**C** New Phase II MS4s (2010 Census **)	**D** MS4s within Indian Lands	**Cooperative (*)** Any Permittee with cooperative programs
Develop, revise, implement, and maintain an education and outreach program as required in Part I.D.5.g.(i) and Part I.D.5.g.(ii)	**Ten (10)** months from the effective date of the permit	**Eleven (11)** months from the effective date of the permit	**Twelve (12)** months from effective date of the permit	**Twelve (12)** months from effective date of the permit	**Fourteen (14) months** from effective date of the permit
Update the SWMP document and annual report as required in Part I.D.5.g.(iii) and Part I.D.5.g.(iv)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary
Enhance the program to include requirements in Part I.D.5.g.(v) through Part I.D.5.g.(viii)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs.
(**) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

h. Public Involvement and Participation

(i) The permittee must provide local public notice of and make available for public review a copy of the complete NOI and attachments (see Part I.B.2). Local public notice may be made by newspaper notice, notice at a council meeting, posting on the internet, or other method consistent with state/tribal/local public notice requirements.

The permittee must consider all public comments received during the public notice period and modify the NOI, or include a schedule to modify the SWMP, as necessary, or as required by the Director modify the NOI or/and SWMP in response to such comments. The Permittees must include in the NOI any unresolved public comments and the MS4's response to these comments. Responses provided by the MS4 will be considered as part of EPA's decision-making process. See also Appendix E Providing Comments or Requesting a Public Hearing on an Operator's NOI.

(ii) The permittee shall develop, revise, implement and maintain a plan to encourage public involvement and provide opportunities for participation in the review, modification and implementation of the SWMP; develop and implement a process by which public comments to the plan are received and reviewed by the person(s) responsible for the SWMP; and, make the SWMP available to the public and to the operator of any MS4 or Tribal authority receiving discharges from the MS4. **Permittee previously covered under NMS000101 or NMR040000 must continue existing public involvement and participation programs while updating those programs, as necessary, to comply with the requirements of this permit.**

system, using phones and social media); Revegetation Programs; Storm Drain Stenciling Programs; Stream cleanup and Monitoring program/events.

Table 9. Public Involvement and Participation - *Program Development and Implementation Schedules*

Activity	Permittee Class				
	A Phase I MS4s	**B** Phase II MS4s (2000 Census)	**C** New Phase II MS4s (2010 Census **)	**D** MS4s within Indian Lands	**Cooperative (*)** Any Permittee with cooperative programs
Develop (or update), implement, and maintain a public involvement and participation plan as required in Part I.D.5.h.(ii) and Part I.D.5.h.(iii)	**Ten (10)** months from effective date of the permit	**Ten (10)** months from effective date of the permit	**Eleven (11)** months from effective date of the permit	**Eleven (11)** months from effective date of the permit	One (1) year from effective date of the permit
Comply with State, Tribal, and local notice requirements when implementing a Public Involvement and Participation Program as required in Part I.D.5.h.(iv)	**Ten (10)** months from effective date of the permit	**Eleven (11)** months from effective date of the permit	**Twelve (12)** months from effective date of the permit	**Twelve (12)** months from effective date of the permit	**Fourteen (14) months** from effective date of the permit
Include elements as required in Part I.D.5.h.(v)	**Ten (10)** months from effective date of the permit	**Eleven (11)** months from effective date of the permit	One (1) year from effective date of the permit	One (1) year from effective date of the permit	Eighteen (18) months from effective date of the permit
Update the SWMP document and annual report as required in Part I.D.5.h.(vi), Part I.D.5.h.(vii), and Part I.D.5.h.(viii)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary
Enhance the program to include requirements in Part I.D.5.h.(ix)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs.
(**) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

6. **Stormwater Management Program Review and Modification**.

a. Program Review. Permittee shall participate in an annual review of its SWMP in conjunction with preparation of the annual report required in Part III.B. Results of the review shall be discussed in the annual report and shall include an assessment of:

(i) SWMP implementation, progress in achieving measurable goals, and compliance with program elements and other permit conditions;

(ii) the effectiveness of its SWMP, and any necessary modifications, in complying with the permit, including requirements to control the discharge of pollutants, and comply with water quality standards and any applicable approved TMDLs; and the adequacy of staff, funding levels, equipment, and support capabilities to fully implement the SWMP and comply with permit conditions.

h. Response to monitoring results: The monitoring program must include a contingency plan for collecting additional monitoring data within the MS4 or at additional appropriate instream locations should monitoring results indicate that MS4 discharges may be contributing to instream exceedances of WQS. The purpose of this additional monitoring effort would be to identify sources of elevated pollutant loadings so they could be addressed by the SWMP.

Table 10. Wet Weather Monitoring Program Implementation Schedules:

Activity	**Permittee Class**				
	A **Phase I MS4s**	**B** **Phase II MS4s (2000 Census)**	**C** **New Phase II MS4s (2010 Census **)**	**D** **MS4s within Indian Lands**	**Cooperative (*)** **Any Permittee with cooperative programs**
Submit wet weather monitoring preference to EPA (i.e., individual monitoring program vs. cooperative monitoring program) with NOI submittals	**NOI submittal Deadline (see Table 1)**	**NOI submittal Deadline (see Table 1)**	**NOI submittal Deadline (see Table 1)**	**NOI submittal Deadline (see Table 1)**	**NOI submittal Deadline (see Table 1)**
Submit a detailed description of the monitoring scheme to EPA and NMED for approval. The monitoring scheme should include: a list of pollutants; a description of monitoring sites with an explanation of why those sites were selected; and a detailed map of all proposed monitoring sites	**Ten (10)** months from effective date of permit	**Ten (10)** months from effective date of permit	**Eleven (11)** months from effective date of permit	**Eleven (11)** months from effective date of permit	**Twelve (12)** months from effective date of permit
Submit certification that all wet weather monitoring sites are operational and begin sampling	**Eleven (11)** months from effective date of permit	**Eleven (11)** months from effective date of permit	**Thirteen (13)** months from effective date of permit	**Thirteen (13)** months from effective date of permit	**Fourteen (14)** months from effective date of permit
Update SWMP document and submit annual reports	Annually	Annually	Annually	Annually	Annually

(**) or MS4s designated by the Director

Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

2. **Dry Weather Discharge Screening of MS4**: Each permittee shall identify, investigate, and address areas within its jurisdiction that may be contributing excessive levels of pollutants to the Municipal Separate Storm Sewer System as a result of dry weather discharges (i.e., discharges from separate storm sewers that occur without the direct influence of runoff from storm events, e.g. illicit discharges, allowable non-stormwater, groundwater infiltration, etc.). Due to the arid and semi-arid conditions of the area, the dry weather discharges screening program may be carried out during both wet season (July 1 through October 31) and dry Season (November 1 through June 30). Results of the assessment

Attachment 3

Attachment 3

Page 9 of Part III.D

Pueblo of Isleta
Attn: Ramona M. Montoya, Environment Division Manager
PO Box 1270
Isleta NM 87022

Page 6 of Part IV.U

Pueblo of Isleta
Department of Cultural and Historic Preservation
Attn: Daniel Waseta, Director
PO Box 1270
Isleta NM 87022

Appendix C

Tribal Historic Preservation Officers (THPO)
Pueblo of Isleta
Department of Cultural and Historic Preservation
Attn: Dr. Henry Walt, THPO
PO Box 1270
Isleta NM 87022

New Mexico Environment Department
Attn: Bruce Yurdin, Program Manager
Surface Water Quality Bureau
Point Source Regulation Section
P.O. Box 5469
Santa Fe, New Mexico 87502

Pueblo of Sandia Environment Department
Attn: Scott Bulgrin, Water Quality Manager
481 Sandia Loop
Bernalillo, NM 87004
(Note: Only those MS4s with discharges upstream of or to waters under the jurisdictional of the Pueblo of Sandia: AMAFCA, Sandoval County, Village of Corrales, City of Rio Rancho, Town of Bernalillo, SSCAFCA, and ESCAFCA)

Pueblo of Isleta
Attn: Ramona M. Montoya, Environment Division Manager
P.O. Box 1270
Isleta NM 87022

(Notes: Only the City of Albuquerque, Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), New Mexico Department of Transportation (NMDOT) District 3, KAFB (Kirtland Air Force Base), Sandia Labs (DOE), and Bernalillo County). All parties submitting an NOI or NOT shall notify the Pueblo of Isleta in writing that a NOI or NOT has been submitted to EPA

Water Resources Division Manager
Pueblo of Santa Ana
2 Dove Road
Santa Ana Pueblo, New Mexico 87004
(Note: Only those MS4s with discharges upstream of or to waters under the jurisdictional of the Pueblo of Santa Ana)

Bataan Memorial Building
407 Galisteo Street, Ste. 236
Santa Fe, New Mexico 87501

Pueblo of Sandia Environment Department
Attn: Frank Chaves, Environment Director
481 Sandia Loop
Bernalillo, New Mexico 87004

Pueblo of Isleta
Department of Cultural and Historic Preservation
Attn: Daniel Waseta, Director
P.O. Box 1270
Isleta NM 87022

Water Resources Division Manager
Pueblo of Santa Ana
2 Dove Road
Santa Ana Pueblo, New Mexico 87004

3. If the permittee receives a request for an archeological survey or notice of adverse effects from the SHPO, the permittee shall delay such activity until:

   a. A cultural resource survey report has been submitted to the SHPO for a review and a determination of no effect or no adverse effect has been made, and

   b. If an adverse effect is anticipated, measures to minimize harm to historic properties have been agreed upon between the permittee and the SHPO.

4. If the permittee does not receive notification of adverse effects or a request for an archeological survey from the SHPO within thirty (30) days, the permittee may proceed with the activity.

5. Alternately, the permittee may obtain authorization for stormwater discharges from such sites of disturbance by applying for a modification of this permit. The permittee may apply for a permit modification by submitting the following information to the Permitting Authority 180 days prior to commencing such discharges:

   a. A letter requesting a permit modification to include discharges from activities subject to this provision, in accordance with the signatory requirements in Part IV.H.

   b. A description of the construction or land disturbing activity and the potential impact that this activity may have upon the ground; County in which the facility will be constructed; type of facility to be constructed; size area (in acres) that the facility will encompass; expected date of construction; and whether the facility is located on land owned or controlled by any political subdivision of New Mexico; and

   c. A copy of a USGS topographic map outlining the location of the project and other ancillary impact areas.

V. **CONTINUATION OF THE EXPIRED GENERAL PERMIT**. If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedures Act and remain in force and effect. Any permittee who was granted permit coverage prior to the expiration date will automatically remain covered by the continued permit until the earlier of:

II. State Historic Preservation Officers (SHPO)
SHPO List for areas covered by the permit:

NEW MEXICO
Historic Preservation Div, Office of Cultural Affairs
Bataan Memorial Building, 407 Galisteo Street, Suite 236
Santa Fe, NM 87501
505-827-6320 FAX: 505-827-6338

III. Tribal Historic Preservation Officers
(THPO)
In instances where a Tribe does not have a Tribal Historic Preservation Officer, please contact the appropriate Tribal government office when responding to this permit eligibility condition.

Tribal Historic Preservation Officers:
Mescalero Apache Tribe
P.O. Box 227
Mescalero, New Mexico 88340

Pueblo of Sandia Environment Department
Attn: Frank Chaves, Environment Director
481 Sandia Loop
Bernalillo, New Mexico 87004

Pueblo of Isleta
Department of Cultural and Historic Preservation
Attn: Dr. Henry Walt, THPO
P.O. Box 1270
Isleta NM 87022

Water Resources Division Manager
Pueblo of Santa Ana
2 Dove Road
Santa Ana Pueblo, New Mexico 87004

For more information:
National Association of Tribal Historic
Preservation Officers
P.O. Box 19189
Washington, DC 20036-9189
Phone: (202) 628-8476
Fax: (202) 628-2241

IV. Advisory Council on Historic Preservation
Advisory Council on Historic Preservation, 1100 Pennsylvania Avenue, NW., Suite 803, Washington, DC 20004 Telephone: (202) 606-8503, Fax: (202) 606-8647/8672, E-mail: achp@achp.gov

Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

NPDES General Permit No. NMR04A000

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"), except as provided in Part I.A.5 of this permit, operators of municipal separate storm sewer systems located in the area specified in Part I.A.1 are authorized to discharge pollutants to waters of the United States in accordance with the conditions and requirements set forth herein.

Only operators of municipal separate storm sewer systems in the general permit area who submit a Notice of Intent and a storm water management program document in accordance with Part I.A.6 of this permit are authorized to discharge storm water under this general permit.

This is a renewal NPDES permit issued for these portions of the small municipal separate storm sewer systems covered under the NPDES permit No NMR040000 and NMR04000I and the large municipal separate storm sewer systems covered under the NPDES permit No NMS000101.

This permit is issued on and shall become effective on the date of publication in the Federal Register. DEC 2 2 2014

This permit and the authorization to discharge shall expire at, midnight, December 19, 2019.

Signed by

William K. Honker, P.E.
Director
Water Quality Protection Division

Prepared by

Nelly Smith
Environmental Engineer
NPDES Permits and TMDLs Branch

MIDDLE RIO GRANDE WATERSHED BASED MUNICIPAL SEPARATE STORM SEWER SYSTEM PERMIT

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PART I. INDIVIDUAL PERMIT CONDITIONS

A. DISCHARGES AUTHORIZED UNDER THIS PERMIT

1. **Permit Area.** This permit is available for MS4 operators within the Middle Rio Grande Sub-Watersheds described in Appendix A. This permit may authorize stormwater discharges to waters of the United States from MS4s within the Middle Rio Grande Watershed provided the MS4:

   a. Is located fully or partially within the corporate boundary of the City of Albuquerque;

   b. Is located fully or partially within the Albuquerque urbanized area as determined by the 2000 and 2010 Decennial Census. Maps of Census 2010 urbanized areas are available at: http://water.epa.gov/polwaste/npdes/stormwater/Urbanized-Area-Maps-for-NPDES-MS4-Phase-II-Stormwater-Permits.cfm;

   c. Is designated as a regulated MS4 pursuant to 40 CFR 122.32; or

   d. This permit may also authorize an operator of a MS4 covered by this permit for discharges from areas of a regulated small MS4 located outside an Urbanized Areas or areas designated by the Director provided the permittee complies with all permit conditions in all areas covered under the permit.

2. **Potentially Eligible MS4s.** MS4s located within the following jurisdictions and other areas, including any designated by the Director, are potentially eligible for authorization under this permit:

   - City of Albuquerque
   - AMAFCA (Albuquerque Metropolitan Arroyo Flood Control Authority)
   - UNM (University of New Mexico)
   - NMDOT (New Mexico Department of Transportation District 3)
   - Bernalillo County
   - Sandoval County
   - Village of Corrales
   - City of Rio Rancho
   - Los Ranchos de Albuquerque
   - KAFB (Kirtland Air Force Base)
   - Town of Bernalillo
   - EXPO (State Fairgrounds/Expo NM)
   - SSCAFCA (Southern Sandoval County Arroyo Flood Control Authority)
   - ESCAFCA (Eastern Sandoval County Arroyo Flood Control Authority)
   - Sandia Laboratories, Department of Energy (DOE)
   - Pueblo of Sandia
   - Pueblo of Isleta
   -Pueblo of Santa Ana

3. **Eligibility**. To be eligible for this permit, the operator of the MS4 must provide:

   a. Public Participation: Prior submitting the Notice of Intent (NOI), the operator of the MS4 must follow the local notice and comment to procedures at Part I.D.5.h.(i).

   b. National Historic Preservation Act (NHPA) Eligibility Provisions

   In order to be eligible for coverage under this permit, the applicant must be in compliance with the National Historic Preservation Act. Discharges may be authorized under this permit only if:

(i) Criterion A: storm water discharges, allowable non-storm water discharges, and discharge-related activities do not affect a property that is listed or is eligible for listing on the National Register of Historic Places as maintained by the Secretary of the Interior; or

(ii) Criterion B: the applicant has obtained and is in compliance with a written agreement with the State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO) (or equivalent tribal authority) that outlines all measures the MS4 operator will undertake to mitigate or prevent adverse effect to the historic property.

Appendix C of this permit provides procedures and references to assist with determining permit eligibility concerning this provision. You must document and incorporate the results of your eligibility determination in your SWMP.

The permittee shall also comply with the requirements in Part IV.U.

4. **Authorized Non-Stormwater Discharges**. The following non-stormwater discharges need not be prohibited unless determined by the permittees, U.S. Environmental Protection Agency (EPA), or New Mexico Environment Department (NMED) to be significant contributors of pollutants to the municipal separate storm sewer system (MS4). Any such discharge that is identified as significant contributor pollutants to the MS4, or as causing or contributing to a water quality standards violation, must be addressed as an illicit discharge under the illicit discharge and improper disposal practices established pursuant to Part I.D.5.e of this permit. For all of the discharges listed below, not treated as illicit discharges, the permittee must document the reason these discharges are not expected to be significant contributors of pollutants to the MS4. This documentation may be based on either the nature of the discharge or any pollution prevention/treatment requirements placed on such discharges by the permittee.

- potable water sources, including routine water line flushing;
- lawn, landscape, and other irrigation waters provided all pesticides, herbicides and fertilizers have been applied in accordance with approved manufacturing labeling and any applicable permits for discharges associated with pesticide, herbicide and fertilizer application;
- diverted stream flows;
- rising ground waters;
- uncontaminated groundwater infiltration (as defined at 40 CFR §35.2005 (20));
- uncontaminated pumped groundwater;
- foundation and footing drains;
- air conditioning or compressor condensate;
- springs;
- water from crawl space pumps;
- individual residential car washing;
- flows from riparian habitats and wetlands;
- dechlorinated swimming pool discharges;
- street wash waters that do not contain detergents and where no un-remediated spills or leaks of toxic or hazardous materials have occurred;
- discharges or flows from fire fighting activities (does not include discharges from fire fighting training activities); and,
- other similar occasional incidental non-stormwater discharges (e.g. non-commercial or charity car washes, etc.)

5. **Limitations of Coverage**. This permit does not authorize:

a. Non-Storm Water: Discharges that are mixed with sources of non-storm water unless such non-storm water discharges are:

(i) In compliance with a separate NPDES permit; or

(ii) Exempt from permitting under the NPDES program; or

(iii) Determined not to be a substantial contributor of pollutants to waters of the United States. See Part I.A.4.

b. Industrial Storm Water: Storm water discharges associated with industrial activity as defined in 40 CFR §122.26(b)(14)(i)-(ix) and (xi).

c. Construction Storm Water: Storm water discharges associated with construction activity as defined in 40 CFR §122.26(b)(14)(x) or 40 CFR §122.26(b)(15).

d. Currently Permitted Discharges: Storm water discharges currently covered under another NPDES permit.

e. Discharges Compromising Water Quality: Discharges that EPA, prior to authorization under this permit, determines will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. Where such a determination is made prior to authorization, EPA may notify you that an individual permit application is necessary in accordance with Part IV.M. However, EPA may authorize your coverage under this permit after you have included appropriate controls and implementation procedures in your SWMP designed to bring your discharge into compliance with water quality standards.

f. Discharges Inconsistent with a TMDL: You are not eligible for coverage under this permit for discharges of pollutants of concern to waters for which there is an applicable total maximum daily load (TMDL) established or approved by EPA unless you incorporate into your SWMP measures or controls that are consistent with the assumptions and requirements of such TMDL. To be eligible for coverage under this general permit, you must incorporate documentation into your SWMP supporting a determination of permit eligibility with regard to waters that have an EPA-established or approved TMDL. If a wasteload allocation has been established that would apply to your discharge, you must comply with the requirements established in Part I.C.2.b.(i). Where an EPA-approved or established TMDL has not specified a wasteload allocation applicable to municipal storm water discharges, but has not specifically excluded these discharges, adherence to a SWMP that meets the requirements in Part I.C.2.b.(ii) of this general permit will be presumed to be consistent with the requirements of the TMDL. If the EPA-approved or established TMDL specifically precludes such discharges, the operator is not eligible for coverage under this general permit.

6. **Authorization Under This General Permit**

a. Obtaining Permit Coverage.

(i) An MS4 operator seeking authorization to discharge under this general permit must submit electronically a complete notice of intent (NOI) to the e-mail address provided in Part I.B.3 (see suggested EPA R6 MS4 NOI format located in EPA website at http://epa.gov/region6/water/npdes/sw/ms4/index.htm), in accordance with the deadlines in Part I.B.1 of this permit. The NOI must include the information and attachments required by Parts I.B.2, Part I.A.3, Part I.D.5.h.(i), and I.A.5.f of this permit. By submitting a signed NOI, the applicant certifies that all eligibility criteria for permit coverage have been met. If EPA notifies a discharger (either directly, by public notice, or by making information available on the Internet) of other NOI options that become available at a later date, such as electronic submission of forms or information, the MS4 operator may take advantage of those options to satisfy the NOI submittal requirements.

(ii) If an operator changes or a new operator is added after an NOI has been submitted, the operator must submit a new or revised NOI to EPA.

(iii) An MS4 operator who submits a complete NOI and meets the eligibility requirements in Part I of this permit is authorized to discharge storm water from the MS4 under the terms and conditions of this general permit only upon written notification by the Director. After review of the NOI and any public comments on the NOI, EPA may condition permit coverage on correcting any deficiencies or on including a schedule to respond to any public comments. (See also Parts I.A.3 and Part I.D.5.h.(i).)

(iv) If EPA notifies the MS4 operator of deficiencies or inadequacies in any portion of the NOI (including the SWMP), the MS4 operator must correct the deficient or inadequate portions and submit a written statement to EPA certifying that appropriate changes have been made. The certification must be submitted within the time-frame specified by EPA and must specify how the NOI has been amended to address the identified concerns.

(v) The NOI must be signed and certified in accordance with Parts IV.H.1 and 4. Signature for the NOI, which effectively takes the place of an individual permit application, may not be delegated to a lower level under Part IV.H.2

b. Terminating Coverage.

(i) A permittee may terminate coverage under this general permit by submitting a notice of termination (NOT). Authorization to discharge terminates at midnight on the day the NOT is post-marked for delivery to EPA.

(ii) A permittee must submit an NOT to EPA within 30 days after the permittee:

(a) Ceases discharging storm water from the MS4,

(b) Ceases operations at the MS4, or

(c) Transfers ownership of or responsibility for the facility to another operator.

(iii) The NOT will consist of a letter to EPA and must include the following information:

(a) Name, mailing address, and location of the MS4 for which the notification is submitted;

(b) The name, address and telephone number of the operator addressed by the NOT;

(c) The NPDES permit number for the MS4;

(d) An indication of whether another operator has assumed responsibility for the MS4, the discharger has ceased operations at the MS4, or the storm water discharges have been eliminated; and

(e) The following certification:

I certify under penalty of law that all storm water discharges from the identified MS4 that are authorized by an NPDES general permit have been eliminated, or that I am no longer the operator of the MS4, or that I have ceased operations at the MS4. I understand that by submitting this Notice of Termination I am no longer authorized to discharge storm water under this general permit, and that discharging pollutants in storm water to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by an NPDES permit. I also understand that the submission of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

(f) NOTs, signed in accordance with Part IV.H.1 of this permit, must be sent to the e-mail address in Part I.B.3. Electronic submittal of the NOT required in the permit using a compatible Integrated Compliance Information System (ICIS) format would be allowed if available.

B. NOTICE OF INTENT REQUIREMENTS

1. **Deadlines for Notification.**

a. Designations: Small MS4s automatically designated under 40 CFR 122.32(a)(1), large MS4s located within the corporate boundary of the COA including the COA and former co-permittees under the NPDES permit No

NMS000101, and MS4s designated under 40 CFR 122.26(a)(1)(v), 40 CFR 122.26(a)(9)(i)(C) or (D), or 40 CFR 122.32(a)(2) are required to submit individual NOIs by the dates listed in Table 1. Any MS4 designated as needing a permit after issuance of this permit will be given an individualized deadline for NOI submittal by the Director at the time of designation.

In lieu of creating duplicate program elements for each individual permittee, implementation of the SWMP, as required in Part I.D, may be achieved through participation with other permittees, public agencies, or private entities in cooperative efforts to satisfy the requirements of Part D. For these programs with cooperative elements, the permittee may submit individual NOIs as established in Table 1. See also "Permittees with Cooperative Elements in their SWMP " under Part.I.B.4 and "Shared Responsibilities and Cooperative Programs" under Part I.D.3.

Table 1 Deadlines to Submit NOI

Permittee Class Type	**NOI Deadlines**
Class A: MS4s within the Cooperate Boundary of the COA including former co-permittees under the NPDES permit No NMS000101	90 days from effective date of the permit or 180 days from effective date of the permit if participating in cooperative programs for one or more program elements.
Class B: MS4s designated under 40 CFR 122.32(a)(1). Based on 2000 Decennial Census Map	90 days from effective date of the permit or 180 days from effective date of the permit if participating in cooperative programs for one or more program elements.
Class C: MS4s designated under 40 CFR 122.26(a)(1)(v), 40 CFR 122.26(a)(9)(i)(C) or (D), or 40 CFR 122.32(a)(2) or MS4s newly designated under 122.32(a)(1) based on 2010 Decennial Census Map	180 days from effective date of the permit or notice of designation, unless the notice of designation grants a later date or; 180 days from effective date of the permit if participating in cooperative programs for one or more program elements.
Class D: MS4s within Indian Country Lands designed under 40 CFR 122.26(a)(1)(v), 122.26(a)(9)(i)(C) or (D), 122.32(a)(1), or 122.32(a)(2)	180 days from effective date of the permit or notice of designation, unless the notice of designation grants a later date or; 180 days from effective date of the permit if participating in cooperative programs for one or more program elements.

See Appendix A for list of potential permittees in the Middle Rio Grande Watershed

b. New Operators. For new operators of all or a part of an already permitted MS4 (due to change on operator or expansion of the MS4) who will take over implementation of the existing SWMP covering those areas, the NOI must be submitted 30 days prior to taking over operational control of the MS4. Existing permittees who are expanding coverage of their MS4 area (e.g., city annexes part of unincorporated county MS4) are not required to submit a new NOI, but must comply with Part I.D.6.d.

c. Submitting a Late NOI. MS4s not able to meet the NOI deadline in Table I and Part I.B.1.b due to delays in determining eligibility should notify EPA of the circumstance and progress to date at the address in Part I.B.3 and then proceed with a late NOI. MS4 operators are not prohibited from submitting an NOI after the dates provided in Table 1 and Part I.B.1.b. If a late NOI is submitted, the authorization is only for discharges that occur after permit coverage is effective. The permitting authority reserves the right to take appropriate enforcement actions for any unpermitted discharges.

d. End of Administrative Continued Coverage under Previous Permit. Administrative continuance is triggered by a timely reapplication. Discharges submitting an NOI for coverage under this permit are considered to have met

the timely reapplication requirement if NOI is submitted by the deadlines included in Table 1 of Part I.B.1. For MS4s previously covered under either NMS000101 or NMR040000, continued coverage under those permits ends: a) the day after the applicable deadline for submittal of an NOI if a complete NOI has not been submitted or b) upon notice of authorization under this permit if a complete and timely NOI is submitted.

2. **Contents of Notice of Intent**. An MS4 operator eligible for coverage under this general permit must submit an NOI to discharge under this general permit. The NOI will consist of a letter to EPA containing the following information (see suggested EPA R6 MS4 NOI Format located in EPA website at http://www.epa.gov/region6/water/npdes/sw/ms4/index.htm) and must be signed in accordance with Part IV.H of this permit:

   a. The legal name of the MS4 operator and the name of the urbanized area and core municipality (or Indian reservation/pueblo) in which the operator's MS4 is located;

   b. The full facility mailing address and telephone number;

   c. The name and phone number of the person or persons responsible for overall coordination of the SWMP;

   d. An attached location map showing the boundaries of the MS4 under the applicant's jurisdiction. The map must include streets or other demarcations so that the exact boundaries can be located;

   e. The area of land served by the applicant's MS4 (in square miles);

   f. The latitude and longitude of the approximate center of the MS4;

   g. The name(s) of the waters of the United States that receive discharges from the system.

   h. If the applicant is participating in a cooperative program element or is relying on another entity to satisfy one or more permit obligations (see Part I.D.3), identify the entity(ies) and the element(s) the entity(ies) will be implementing;

   i. Information on each of the storm water minimum control measures in Part I.D.5 of this permit and how the SWMP will reduce pollutants in discharges to the Maximum Extent Practicable. For each minimum control measure, include the following:

      (i) Description of the best management practices (BMPs) that will be implemented;

      (ii) Measurable goals for each BMP; and

      (iii) Time frames (i.e., month and year) for implementing each BMP;

   j. Based on the requirements of Part I.A.3.b describe how the eligibility criteria for historic properties have been met;

   k. Indicate whether or not the MS4 discharges to a receiving water for which EPA has approved or developed a TMDL. If so, describe how the eligibility requirements of Part I.A.5.f and Part I.C.2 have been met.

      Note: If an individual permittee or a group of permittees seeks an alternative sub-measureable goal for TMDL controls under Part I.C.2.b.(i).(c).B, the permittee or a group of permittees must submit a preliminary proposal with the NOI. This proposal shall include, but is not limited to, the elements included in Appendix B under Section B.2.

   l. Signature and certification by an appropriate official (see Part IV.H). The NOI must include the certification statement from Part IV.H.4.

3. **Where to Submit.** The MS4 operator must submit the signed NOI to EPA via e-mail at R6_MS4Permits@epa.gov (note: there is an underscore between R6 and MS4) and NMED to the address provided in Part III.D.4. See also Part III.D.4 to determine if a copy must be provided to a Tribal agency.

   The following MS4 operators: AMAFCA, Sandoval County, Village of Corrales, City of Rio Rancho, Town of Bernalillo, SSCAFCA, and ESCAFCA must submit the signed NOI to the Pueblo of Sandia to the address provided in Part III.D.4.

   Note: See suggested EPA R6 MS4 NOI Format located in EPA website at http://www.epa.gov/region6/water/npdes/sw/ms4/index.htm. A complete copy of the signed NOI should be maintained on site. Electronic submittal of the documents required in the permit using a compatible Integrated Compliance Information System (ICIS) format would be allowed if available.

4. **Permittees with Cooperative Elements in their SWMP.** Any MS4 that meets the requirements of Part I.A of this general permit may choose to partner with one or more other regulated MS4 to develop and implement a SWMP or SWMP element. The partnering MS4s must submit separate NOIs and have their own SWMP, which may incorporate jointly developed program elements. If responsibilities are being shared as provided in Part I.D.3 of this permit, the SWMP must describe which permittees are responsible for implementing which aspects of each of the minimum measures. All MS4 permittees are subject to the provisions in Part I.D.6.

   Each individual MS4 in a joint agreement implementing a permit condition will be independently assessed for compliance with the terms of the joint agreement. Compliance with that individual MS4s obligations under the joint agreement will be deemed compliance with that permit condition. Should one or more individual MS4s fail to comply with the joint agreement, causing the joint agreement program to fail to meet the requirements of the permit, the obligation of all parties to the joint agreement is to develop within 30 days and implement within 90 days an alternative program to satisfy the terms of the permit.

C. SPECIAL CONDITIONS

1. **Compliance with Water Quality Standards**. Pursuant to Clean Water Act §402(p)(3)(B)(iii) and 40 CFR §122.44(d)(1), this permit includes provisions to ensure that discharges from the permittee's MS4 do not cause or contribute to exceedances of applicable surface water quality standards, in addition to requirements to control discharges to the maximum extent practicable (MEP) set forth in Part I.D. Permittees shall address stormwater management through development of the SWMP that shall include the following elements and specific requirements included in Part VI.

   a. Permittee's discharges shall not cause or contribute to an exceedance of surface water quality standards (including numeric and narrative water quality criteria) applicable to the receiving waters. In determining whether the SWMP is effective in meeting this requirement or if enhancements to the plan are needed, the permittee shall consider available monitoring data, visual assessment, and site inspection reports.

   b. Applicable surface water quality standards for discharges from the permittees' MS4 are those that are approved by EPA and any other subsequent modifications approved by EPA upon the effective date of this permit found at New Mexico Administrative Code §20.6.4. Discharges from various portions of the MS4 also flow downstream into waters with Pueblo of Isleta and Pueblo of Sandia Water Quality Standards;

   c. The permittee shall notify EPA and the Pueblo of Isleta in writing as soon as practical but not later than thirty (30) calendar days following each Pueblo of Isleta water quality standard exceedance at an in-stream sampling location. In the event that EPA determines that a discharge from the MS4 causes or contributes to an exceedance of applicable surface water quality standards and notifies the permittee of such an exceedance, the permittee shall, within sixty (60) days of notification, submit to EPA, NMED, Pueblo of Isleta (upon request) and Pueblo of Sandia (upon request), a report that describes controls that are currently being implemented and additional controls that will be implemented to prevent pollutants sufficient to ensure that the discharge will no longer cause or contribute to an exceedance of applicable surface water quality standards. The permittee shall implement such additional controls upon notification by EPA and shall incorporate such measures into their SWMP as described in Part I.D of this permit. NMED or the affected Tribe may provide information

documenting exceedances of applicable water quality standards caused or contributed to by the discharges authorized by this permit to EPA Region 6 and request EPA take action under this paragraph.

d. Phase I Dissolved Oxygen Program (Applicable only to the COA and AMAFCA as a continuation of program in 2012 NMS000101 individual permit): Within one year from effective date of the permit , the permittees shall revise the May 1, 2012 Strategy to continue taking measures to address concerns regarding discharges to the Rio Grande by implementing controls to eliminate conditions that cause or contribute to exceedances of applicable dissolved oxygen water quality standards in waters of the United States. The permittees shall:

(i) Continue identifying structural elements, natural or man-made topographical and geographical formations, MS4 operations activities, or oxygen demanding pollutants contributing to reduced dissolved oxygen in the receiving waters of the Rio Grande. Both dry and wet weather discharges shall be addressed. Assessment may be made using available data or collecting additional data;

(ii) Continue implementing controls, and updating/revising as necessary, to eliminate structural elements or the discharge of pollutants at levels that cause or contribute to exceedances of applicable water quality standards for dissolved oxygen in waters of the United States;

(iii) To verify the remedial action in the North Diversion Channel Embayment, the COA and AMAFCA shall continue sampling for DO and temperature until the data indicate the discharge does not exceed applicable dissolved oxygen water quality standards in waters of the United States; and

(iv) Submit a revised strategy to FWS for consultation and EPA for approval from a year of effective date of the permit and progress reports with the subsequent Annual Reports. Progress reports to include:

(a) Summary of data.

(b) Activities undertaken to identify MS4 discharge contribution to exceedances of applicable dissolved oxygen water quality standards in waters of the United States. Including summary of findings of the assessment required in Part I.C.1.d.(i).

(c) Conclusions drawn, including support for any determinations.

(d) Activities undertaken to eliminate MS4 discharge contribution to exceedances of applicable dissolved oxygen water quality standards in waters of the United States.

(e) Account of stakeholder involvement.

e. PCBs (Applicable only to the COA and AMAFCA as a continuation of program in 2012 NMS000101 individual permit and Bernalillo County): The permittee shall address concerns regarding PCBs in channel drainage areas specified in Part I.C.1.e.(vi) by developing or continue updating/revising and implementing a strategy to identify and eliminate controllable sources of PCBs that cause or contribute to exceedances of applicable water quality standards in waters of the United States. Bernalillo County shall submit the proposed PCB strategy to EPA within two (2) years from the effective date of the permit and submit a progress report with the third and with subsequent Annual Reports. COA and AMAFCA shall submit a progress report with the first and with the subsequent Annual Reports. The progress reports shall include:

(i) Summary of data.

(ii) Findings regarding controllable sources of PCBs in the channel drainages area specified in Part I.C.1.e.(vi) that cause or contribute to exceedances of applicable water quality standards in waters of the United States via the discharge of municipal stormwater.

(iii) Conclusions drawn, including supporting information for any determinations.

(iv) Activities undertaken to eliminate controllable sources of PCBs in the drainage areas specified in Part I.C.1.e.(vi) that cause or contribute to exceedances of applicable water quality standards in waters of the United States via the discharge of municipal stormwater including proposed activities that extend beyond the five (5) year permit term.

(v) Account of stakeholder involvement in the process.

(vi) Channel Drainage Areas: The PCB strategy required in Part I.C.1.e is only applicable to:

<u>COA and AMAFCA Channel Drainage Areas</u>:
- San Jose Drain
- North Diversion Channel

<u>Bernalillo County Channel Drainage Areas:</u>
- Adobe Acres Drain
- Alameda Outfall Channel
- Paseo del Norte Outfall Channel
- Sanchez Farm Drainage Area

A cooperative strategy to address PCBs in the COA, AMAFCA and Bernalillo County's drainage areas may be developed between Bernalillo County, AMAFCA, and the COA. If a cooperative strategy is developed, the cooperative strategy shall be submitted to EPA within three (3) years from the effective date of the permit and submit a progress report with the fourth and with subsequent Annual Reports,

Note: COA and AMAFCA must continue implementing the existing PCB strategy until a new Cooperative PCB Strategy is submitted to EPA.

f. Temperature (Applicable only to the COA and AMAFCA as a continuation of program in 2012 NMS000101 individual permit): The permittees must continue assessing the potential effect of stormwater discharges in the Rio Grande by collecting and evaluating additional data. If the data indicates there is a potential of stormwater discharges contributing to exceedances of applicable temperature water quality standards in waters of the United States, within thirty (30) days such as findings, the permittees must develop and implement a strategy to eliminate conditions that cause or contribute to these exceedances. The strategy must include:

(i) Identify structural controls, post construction design standards, or pollutants contributing to raised temperatures in the receiving waters of the Rio Grande. Both dry and wet weather discharges shall be addressed. Assessment may be made using available data or collecting additional data;

(ii) Develop and implement controls to eliminate structural controls, post construction design standards, or the discharge of pollutants at levels that cause or contribute to exceedances of applicable water quality standards for temperature in waters of the United States; and

(iii) Provide a progress report with the first and with subsequent Annual Reports. The progress reports shall include:

(a) Summary of data.

(b) Activities undertaken to identify MS4 discharge contribution to exceedances of applicable temperature water quality standards in waters of the United States.

(c) Conclusions drawn, including supporting information for any determinations.

(d) Activities undertaken to reduce MS4 discharge contribution to exceedances of applicable temperature water quality standards in waters of the United States.

(e) Accounting of stakeholder involvement.

2. **Discharges to Impaired Waters with and without approved TMDLs**. Impaired waters are those that have been identified pursuant to Section 303(d) of the Clean Water Act as not meeting applicable surface water quality standards. This may include both waters with EPA-approved Total Maximum Daily Loads (TMDLs) and those for which a TMDL has not yet been approved. For the purposes of this permit, the conditions for discharges to impaired waters also extend to controlling pollutants in MS4 discharges to tributaries to the listed impaired waters in the Middle Rio Grande watershed boundary identified in Appendix A.

   a. Discharges of pollutant(s) of concern to impaired water bodies for which there is an EPA approved total maximum daily load (TMDL) are not eligible for this general permit unless they are consistent with the approved TMDL. A water body is considered impaired for the purposes of this permit if it has been identified, pursuant to the latest EPA approved CWA §303(d) list, as not meeting New Mexico Surface Water Quality Standards.

   b. The permittee shall control the discharges of pollutant(s) of concern to impaired waters and waters with approved TMDLs as provided in sections (i) and (ii) below, and shall assess the success in controlling those pollutants.

      (i) Discharges to Water Quality Impaired Water Bodies with an Approved TMDL
      If the permittee discharges to an impaired water body with an approved TMDL (see Appendix B), where stormwater has the potential to cause or contribute to the impairment, the permittee shall include in the SWMP controls targeting the pollutant(s) of concern along with any additional or modified controls required in the TMDL and this section. The SWMP and required annual reports must include information on implementing any focused controls required to reduce the pollutant(s) of concern as described below:

         (a) Targeted Controls: The SWMP submitted with the first annual report must include a detailed description of all targeted controls to be implemented, such as identifying areas of focused effort or implementing additional Best Management Practices (BMPs) that will be implemented to reduce the pollutant(s) of concern in the impaired waters.

         (b) Measurable Goals: For each targeted control, the SWMP must include a measurable goal and an implementation schedule describing BMPs to be implemented during each year of the permit term. Where the impairment is for bacteria, the permittee must, at minimum comply with the activites and schedules described in Table 1.a of Part I.C.2.(iii).

         (c) Identification of Measurable Goal: The SWMP must identify a measurable goal for the pollutant(s) of concern. The value of the measurable goal must be based on one of the following options:

            A. If the permittee is subject to a TMDL that identifies an aggregate Waste Load Allocation (WLA) for all or a class of permitted MS4 stormwater sources, then the SWMP may identify such WLA as the measurable goal. Where an aggregate WLA measurable goal is used, all affected MS4 operators are jointly responsible for progress in meeting the measurable goal and shall (jointly or individually) develop a monitoring/assessment plan. This program element may be coordinated with the monitoring required in Part III.A.

            B. Alternatively, if multiple permittees are discharging into the same impaired water body with an approved TMDL (which has an aggregate WLA for all permitted stormwater MS4s), the MS4s may combine or share efforts, in consultation with/and the approval of NMED, to determine an alternative sub-measurable goal derived from the WLA for the pollutant(s) of concern (e.g., bacteria) for their respective MS4. The SWMP must clearly define this alternative approach and must describe how the sub-measurable goals would cumulatively support the aggregate WLA. Where an aggregate WLA measurable goal has been broken into sub-measurable goals for individual MS4s, each permittee is only responsible for progress in meeting its WLA sub-measurable goal.

C. If the permittee is subject to an individual WLA specifically assigned to that permittee, the measurable goal must be the assigned WLA. Where WLAs have been individually assigned, or where the permittee is the only regulated MS4 within the urbanized area that is discharging into the impaired watershed with an approved TMDL, the permittee is only responsible for progress in meeting its WLA measurable goal.

(d) Annual Report: The annual report must include an analysis of how the selected BMPs have been effective in contributing to achieving the measurable goal and shallll include graphic representation of pollutant trends, along with computations of annual percent reductions achieved from the baseline loads and comparisons with the target loads.

(e) Impairment for Bacteria: If the pollutant of concern is bacteria, the permittee shall include focused BMPs addressing the five areas below, as applicable, in the SWMP and implement as appropriate. If a TMDL Implementation Plan (a plan created by the State or a Tribe) is available, the permittee may refer to the TMDL Implementation Plan for appropriate BMPs. The SWMP and annual report must include justification for not implementing a particular BMP included in the TMDL Implementation Plan. The permittee may not exclude BMPs associated with the minimum control measures required under 40 CFR §122.34 from their list of proposed BMPs. The BMPs shall, as appropriate, address the following:

A. Sanitary Sewer Systems
- Make improvements to sanitary sewers;
- Address lift station inadequacies;
- Identify and implement operation and maintenance procedures;
- Improve reporting of violations; and
- Strengthen controls designed to prevent over flows

B. On-site Sewage Facilities (for entities with appropriate jurisdiction)
- Identify and address failing systems; and
- Address inadequate maintenance of On-Site Sewage Facilities (OSSFs).

C. Illicit Discharges and Dumping
- Place additional effort to reduce waste sources of bacteria; for example, from septic systems, grease traps, and grit traps.

D. Animal Sources
- Expand existing management programs to identify and target animal sources such as zoos, pet waste, and horse stables.

E. Residential Education: Increase focus to educate residents on:
- Bacteria discharging from a residential site either during runoff events or directly;
- Fats, oils, and grease clogging sanitary sewer lines and resulting overflows;
- Decorative ponds; and
- Pet waste.

(f) Monitoring or Assessment of Progress: The permittee shall monitor or assess progress in achieving measurable goals and determining the effectiveness of BMPs, and shall include documentation of this monitoring or assessment in the SWMP and annual reports. In addition, the SWMP must include methods to be used. This program element may be coordinated with the monitoring required in Part III.A. The permittee may use the following methods either individually or in conjunction to evaluate progress towards the measurable goal and improvements in water quality as follows:

A. Evaluating Program Implementation Measures: The permittee may evaluate and report progress towards the measurable goal by describing the activities and BMPs implemented, by identifying the appropriateness of the identified BMPs, and by evaluating the success of implementing the measurable goals. The permittee may assess progress by using program implementation indicators

such as: (1) number of sources identified or eliminated; (2) decrease in number of illegal dumping; (3) increase in illegal dumping reporting; (4) number of educational opportunities conducted; (5) reductions in SSOs; or, 6) increase in illegal discharge detection through dry screening, etc.; and

B. Assessing Improvements in Water Quality: The permittee may assess improvements in water quality by using available data for segment and assessment units of water bodies from other reliable sources, or by proposing and justifying a different approach such as collecting additional instream or outfall monitoring data, etc. Data may be acquired from NMED, local river authorities, partnerships, and/or other local efforts as appropriate. Progress towards achieving the measurable goal shall be reported in the annual report. Annual reports shall report the measurable goal and the year(s) during the permit term that the MS4 conducted additional sampling or other assessment activities.

(g) Observing no Progress towards the Measurable Goal: If, by the end of the third year from the effective date of the permit, the permittee observes no progress toward the measurable goal either from program implementation or water quality assessments, the permittee shall identify alternative focused BMPs that address new or increased efforts towards the measurable goal. As appropriate, the MS4 may develop a new approach to identify the most significant sources of the pollutant(s) of concern and shall develop alternative focused BMPs (this may also include information that identifies issues beyond the MS4's control). These revised BMPs must be included in the SWMP and subsequent annual reports.

Where the permittee originally used a measurable goal based on an aggregated WLA, the permittee may combine or share efforts with other MS4s discharging to the same impaired stream segment to determine an alternative sub-measurable goal for the pollutant(s) of concern for their respective MS4s, as described in Part I.C.2.b.(i).(c).B above. Permittees must document, in their SWMP for the next permit term, the proposed schedule for the development and subsequent adoption of alternative sub-measurable goals for the pollutant(s) of concern for their respective MS4s and associated assessment of progress in meeting those individual goals.

(ii) Discharges Directly to Water Quality Impaired Water Bodies without an Approved TMDL:
The permittee shall also determine whether the permitted discharge is directly to one or more water quality impaired water bodies where a TMDL has not yet been approved by NMED and EPA. If the permittee discharges directly into an impaired water body without an approved TMDL, the permittee shall perform the following activities:

(a) Discharging a Pollutant of Concern: The permittee shall:

A. Determine whether the MS4 may be a source of the pollutant(s) of concern by referring to the CWA §303(d) list and then determining if discharges from the MS4 would be likely to contain the pollutant(s) of concern at levels of concern. The evaluation of CWA §303(d) list parameters should be carried out based on an analysis of existing data (e.g., Illicit Discharge and Improper Disposal Program) conducted within the permittee's jurisdiction.

B. Ensure that the SWMP includes focused BMPs, along with corresponding measurable goals, that the permittee will implement, to reduce, the discharge of pollutant(s) of concern that contribute to the impairment of the water body. (note: Only applicable if the permittee determines that the MS4 may discharge the pollutant(s) of concern to an impaired water body without a TMDL. The SWMP submitted with the first annual report must include a detailed description of proposed controls to be implemented along with corresponding measurable goals.

C. Amend the SWMP to include any additional BMPs to address the pollutant(s) of concern.

(b) Impairment for Bacteria: Where the impairment is for bacteria, the permittee shall identify potential significant sources and develop and implement targeted BMPs to control bacteria from those sources (see Part I.C.2.b.(i).(e).A through E.. The permittee must, at minimum comply with the activities and

schedules described in Table 1.a of Part I.C.2.(iii). The annual report must include information on compliance with this section, including results of any sampling conducted by the permittee.

Note: Probable pollutant sources identified by permittees should be submitted to NMED on the following form: ftp://ftp.nmenv.state.nm.us/www/swqb/Surveys/PublicProbableSourceIDSurvey.pdf

(c) Impairment for Nutrients: Where the impairment is for nutrients (e.g., nitrogen or phosphorus), the permittee shall identify potential significant sources and develop and implement targeted BMPs to control nutrients from potential sources. The permittee must, at minimum comply with the activities and schedules described in Table 1.b of Part I.C,2, (iii). The annual report must include information on compliance with this section, including results of any sampling conducted by the permittee.

(d) Impairment for Dissolved Oxygen: See Endangered Species Act (ESA) Requirements in Part I.C.3. These program elements may be coordinated with the monitoring required in Part III.A.

(iii) Program Development and Implementation Schedules: Where the impairment is for nutrient constituent (e.g., nitrogen or phosphorus) or bacteria, the permittee must at minimum comply with the activities and schedules in Table 1.a and Table 1.b.

Table 1.a. Pre-TMDL Bacteria Program Development and Implementation Schedules

Activity	**Class Permittee**				
	A **Phase I MS4s**	**B** **Phase II MS4s (2000 Census)**	**C** **New Phase II MS4s (2010 Census **)**	**D** **MS4s within Indian Lands**	**Cooperative (*)** **Any Permittee with cooperative programs**
Identify potential significant sources of the pollutant of concern entering your MS4	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Sixteen (16) months from effective date of permit
Develop (or modify an existing program ***) and implement a public education program to reduce the discharge of bacteria in municipal storm water contributed by (if applicable) by pets, recreational and exhibition livestock, and zoos.	Twelve (12) months from effective date of permit	Twelve (12) months from effective date of permit	Fourteen (14) months from effective date of permit	Fourteen (14) months from effective date of permit	Sixteen (16) months from effective date of permit
Develop (or modify an existing program ***) and implement a program to reduce the discharge of bacteria in municipal storm water contributed by areas within your MS4 served by on-site wastewater treatment systems.	Fourteen (14) months from effective date of permit	Fourteen (14) moths from effective date of permit	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit
Review results to date from the Illicit Discharge Detection and Elimination program (see Part I.D.5.e) and modify as necessary to prioritize the detection and elimination of discharges contributing bacteria to the MS4	Fourteen (14) months from effective date of permit	Fourteen (14) months from effective date of permit	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit

Develop (or modify an existing program ***) and implement a program to reduce the discharge of bacteria in municipal storm water contributed by other significant source identified in the Illicit Discharge Detection and Elimination program (see Part I.D.5.e)	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit	Eighteen (18) months from effective date of permit	Twenty (20) months from effective date of permit
Include in the Annual Reports progress on program implementation and reducing the bacteria and updates their measurable goals as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs
(**) or MS4s designated by the Director
(***) Permittees previously covered under permit NMS000101 or NMR040000
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

Table 1.b. Pre-TMDL Nutrient Program Development and Implementation Schedules

Activity	**Class Permittee**				
	A Phase I MS4s	**B Phase II MS4s (2000 Census)**	**C New Phase II MS4s (2010 Census **)**	**D MS4s within Indian Lands**	**Cooperative (*) Any Permittee with cooperative programs**
Identify potential significant sources of the pollutant of concern entering your MS4	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Sixteen (16) months from effective date of permit
Develop (or modify an existing program ***) and implement a public education program to reduce the discharge of pollutant of concern in municipal storm water contributed by residential and commercial use of fertilizer	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Sixteen (16) months from effective date of permit
Develop (or modify an existing program ***) and implement a program to reduce the discharge of the pollutant of concern in municipal storm water contributed by fertilizer use at municipal operations (e.g., parks, roadways, municipal facilities)	One (1) year from effective date of permit	One (1) year from effective date of permit	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit

Develop (or modify an existing program ***) and implement a program to reduce the discharge of the pollutant of concern in municipal storm water contributed by municipal and private golf courses within your jurisdiction	One (1) year from effective date of permit	One (1)year from effective date of permit	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit
Develop (or modify an existing program ***) and implement a program to reduce the discharge of the pollutant of concern in municipal storm water contributed by other significant source identified in the Illicit Discharge Detection and Elimination program (see Part I.D.5.e)	One (1) year from effective date of permit	One (1) year from effective date of permit	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit
Include in the Annual Reports progress on program implementation and reducing the nutrient pollutant of concern and updates their measurable goals	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs
(**) or MS4s designated by the Director
(***) Permittees previously covered under permit NMS000101 or NMR040000
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

These program elements may be coordinated with the monitoring required in Part III.A.

3. **Endangered Species Act (ESA) Requirements**. Consistent with U.S. FWS Biological Opinion dated August 21, 2014 to ensure actions required by this permit are not likely to jeopardize the continued existence of any currently listed as endangered or threatened species or adversely affect its critical habitat, permittees shall meet the following requirements and include them in the SWMP:

   a. Dissolved Oxygen Strategy in the Receiving Waters of the Rio Grande:

      (i) The permittees must identify (or continue identifying if previously covered under permit NMS000101) structural controls, natural or man-made topographical and geographical formations, MS4 operations, or oxygen demanding pollutants contributing to reduced dissolved oxygen in the receiving waters of the Rio Grande. The permittees shall implement controls, and update/revise as necessary, to eliminate discharge of pollutants at levels that cause or contribute to exceedances of applicable water quality standards for dissolved oxygen in waters of the Rio Grande. The permittees shall submit a summary of findings and a summary of activities undertaken under Part I.C.3.a.(i) with each Annual Report. The SWMP submitted with the first and fourth annual reports must include a detailed description of controls implemented (or/and proposed control to be implemented) along with corresponding measurable goals. (Applicable to all permittees).

      (ii) As required in Part I.C.1.d, the COA and AMAFCA shall revise the May 1, 2012 Strategy for dissolved oxygen to address dissolved oxygen at the North Diversion Channel Embayment and/or other MS4 locations. The permittees shall submit the revised strategy to FWS and EPA for approval within a year of permit issuance and progress reports with the subsequent Annual Reports (see also Part I.C.1.d.(iv)). The permittees shall ensure that actions to reduce pollutants or remedial activities selected for the North Diversion Channel Embayment and its watershed are implemented such that there is a reduction in

frequency and magnitude of all low oxygen storm water discharge events that occur in the Embayment or downstream in the MRG as indicated in Table 1.c. Actions to meet the year 3 measurable goals must be taken within 2 years from the effective date of the permit. Actions to meet the year 5 measurable goals must be taken within 4 years from the effective date of the permit.

Table 1.c Measurable Goals of Anoxic and Hypoxia Levels Measured by Permit Year

Permit Year	*Anoxic Events*, max*	*Hypoxic Events**, max*
Year 1	*18*	*36*
Year 2	*18*	*36*
Year 3	*9*	*18*
Year 4	*9*	*18*
Year 5	*4*	*9*

Notes:

- * Anoxic Events: See Appendix G, for oxygen saturation and dissolved oxygen concentrations at various water temperatures and atmospheric pressures for the North Diversion Channel area that are considered anoxic and associated with the Rio Grande Silvery minnow lethality.
- ** Hypoxic Events: See Appendix for G, for oxygen saturation and dissolved oxygen concentrations at various water temperatures and atmospheric pressures for the North Diversion Channel area that are considered hypoxic and associated with the Rio Grande silvery minnow harassment.

(a) The revised strategy shall include:

A. A Monitoring Plan describing all procedures necessary to continue conducting continuous monitoring of dissolved oxygen (DO) and temperature in the North Diversion Channel Embayment and at one (1) location in the Rio Grande downstream of the mouth of the North Diversion Channel within the action area (e.g., Central Bridge). The monitoring plan to be developed will describe the methodology used to assure its quality, and will identify the means necessary to address any gaps that occur during monitoring, in a timely manner (that is, within 24 to 48 hours).

B. A Quality Assurance and Quality Control (QA/QC) Plan describing all standard operating procedures, quality assurance and quality control plans, maintenance, and implementation schedules that will assure timely and accurate collection and reporting of water temperature, dissolved oxygen, oxygen saturation, and flow. The QA/QC plan should include all procedures for estimating oxygen data when any oxygen monitoring equipment fail. Until a monitoring plan with quality assurance and quality control is submitted by EPA, any data, including any provisional or incomplete data from the most recent measurement period (e.g. if inoperative monitoring equipment for one day, use data from previous day) shall be used as substitutes for all values in the calculations for determinations of incidental takes. Given the nature of the data collected as surrogate for incidental take, all data, even provisional data (e.g., oxygen/water temperature data, associated metadata such as flows, date, times), shall be provided to the Service in a spreadsheet or database format within two weeks after formal request.

(b) Reporting: The COA and AMAFCA shall provide

A. An Annual Incidental Take Report to EPA and the Service that includes the following information: beginning and end date of any qualifying stormwater events, dissolved oxygen values and water temperature in the North Diversion Channel Embayment, dissolved oxygen values and water temperature at a downstream monitoring station in the MRG, flow rate in the North Diversion Channel, mean daily flow rate in the MRG, evaluation of oxygen and temperature data

as either anoxic or hypoxic using Table 2 of the BO, and estimate the number of silvery minnows taken based on Appendix A of the BO. Electronic copy of The Annual Incidental Take Report should be provided with the Annual Report required under Part III.B no later than December 1 for the proceeding calendar year.

B. A summary of data and findings with each Annual Report to EPA and the Service. All data collected (including provisional oxygen and water temperature data, and associated metadata), transferred, stored, summarized, and evaluated shall be included in the Annual Report. If additional data is requested by EPA or the Service, The COA and AMAFCA shall provide such as information within two weeks upon request,

The revised strategy required under Part I.C.3.a.(ii),the Annual Incidental Take Reports required under Part I.C.3.a.(ii).(b).A, and Annual Reports required under Part III.B can be submitted to FWS via e-mail nmesfo@fws.gov and joel_lusk@fws.gov, or by mail to the New Mexico Ecological Services field office, 2105 Osuna Road NE, Albuquerque, New Mexico 87113. (Only Applicable to the COA and AMAFCA

b. Sediment Pollutant Load Reduction Strategy (Applicable to all pemittees): The permittee must develop, implement, and evaluate a sediment pollutant load reduction strategy to assess and reduce pollutant loads associated with sediment (e.g., metals, etc. adsorbed to or traveling with sediment, as opposed to clean sediment) into the receiving waters of the Rio Grande. The strategy must include the following elements:

(i) Sediment Assessment: The permittee must identify and investigate areas within its jurisdiction that may be contributing excessive levels (e.g., levels that may contribute to exceedance of applicable Water Quality Standards) of pollutants in sediments to the receiving waters of the Rio Grande as a result of stormwater discharges. The permittee must identify structural elements, natural or man-made topographical and geographical formations, MS4 operations activities, and areas indicated as potential sources of sediments pollutants in the receiving waters of the Rio Grande. At the time of assessment, the permittee shall record any observed erosion of soil or sediment along ephemeral channels, arroyos, or stream banks, noting the scouring or sedimentation in streams. The assessment should be made using available data from federal, state, or local studies supplemented as necessary with collection of additional data. The permittee must describe, in the first annual report, all standard operating procedures, quality assurance plans to assure that accurate data are collected, summarized, evaluated and reported.

(ii) Estimate Baseline Loading: Based on the results of the sediment pollutants assessment required in Part I.C.3.b.(i) above the permittee must provide estimates of baseline total sediment loading and relative potential for contamination of those sediments by urban activities for drainage areas, sub-watersheds, Impervious Areas (IAs), and/or Directly Connected Impervious Area (DCIAs) draining directly to a surface waterbody or other feature used to convey waters of the United States. Sediment loads may be provided for targeted areas in the entire Middle Rio Grande Watershed (see Appendix A) using an individual or cooperative approach. Any data available and/or preliminary numeric modeling results may be used in estimating loads.

(iii) Targeted Controls: Include a detailed description of all proposed targeted controls and BMPs that will be implemented to reduce sediment pollutant loads calculated in PartI.C.3.b.(ii) above during the next ten (10) years of permit issuance. For each targeted control, the permittee must include interim measurable goals (e.g., interim sediment pollutant load reductions) and an implementation and maintenance schedule, including interim milestones, for each control measure, and as appropriate, the months and years in which the MS4 will undertake the required actions. Any data available and/or preliminary numeric modeling results may be used in establishing the targeted controls, BMPs, and interim measurable goals. The permittee must prioritize pollutant load reduction efforts and target areas (e..g. drainage areas, sub-watersheds, IAs, DCIAs) that generate the highest annual average pollutant loads.

(iv) Monitoring and Interim Reporting: The permittee shall monitor or assess progress in achieving interim measurable goals and determining the effectiveness of BMPs, and shall include documentation of this

monitoring or assessment in the SWMP and annual reports. In addition, the SWMP must include methods to be used. This program element may be coordinated with the monitoring required in Part III.A.

(v) Progress Evaluation and Reporting: The permittee must assess the overall success of the Sediment Pollutant Load Reduction Strategy and document both direct and indirect measurements of program effectiveness in a Progress Report to be submitted with the fifth Annual Report. Data must be analyzed, interpreted, and reported so that results can be applied to such purposes as documenting effectiveness of the BMPs and compliance with the ESA requirements specified in Part I.C.3.b. The Progress Report must include:

(a) A list of species likely to be within the action area:

(b) Type and number of structural BMPs installed;

(c) Evaluation of pollutant source reduction efforts;

(d) Any recommendation based on program evaluation;

(e) Description of how the interim sediment load reduction goals established in Part I.C.3.b.(iii) were achieved; and

(f) Future planning activities needed to achieve increase of sediment load reduction required in Part I.C.3.d.(iii).

(vi) Critical Habitat (Applicable to all permittees): Verify that the installation of stormwater BMPs will not occur in or adversely affect currently listed endangered or threatened species critical habitat by reviewing the activities and locations of stormwater BMP installation within the location of critical habitat of currently listed endangered or threatened species at the U.S. Fish and Wildlife service website http://criticalhabitat.fws.gov/crithab/.

D. STORMWATER MANAGEMENT PROGRAM (SWMP)

1. **General Requirements**. The permittee must develop, implement, and enforce a SWMP designed to reduce the discharge of pollutants from a MS4 to the maximum extent practicable (MEP), to protect water quality (including that of downstream state or tribal waters), and to satisfy applicable surface water quality standards. The permittees shall continue implementation of existing SWMPs, and where necessary modify or revise existing elements and/or develop new elements to comply with all discharges from the MS4 authorized in Part I.A. The updated SWMP shall satisfy all requirements of this permit, and be implemented in accordance with Section 402(p)(3)(B) of the Clean Water Act (Act), and the Stormwater Regulations (40 CFR §122.26 and §122.34). This permit does not extend any compliance deadlines set forth in the previous permits (NMS000101 with effective date March 1, 2012 and permits No: NM NMR040000 and NMR04000I with effective date July 1, 2007).

   If a permittee is already in compliance with one or more requirements in this section because it is already subject to and complying with a related local, state, or federal requirement that is at least as stringent as this permit's requirement, the permittee may reference the relevant requirement as part of the SWMP and document why this permit's requirement has been satisfied. Where this permit has additional conditions that apply, above and beyond what is required by the related local, state, or federal requirement, the permittee is still responsible for complying with these additional conditions in this permit.

2. **Legal Authority**. Each permittee shall implement the legal authority granted by the State or Tribal Government to control discharges to and from those portions of the MS4 over which it has jurisdiction. The difference in each co-permittee's jurisdiction and legal authorities, especially with respect to third parties, may be taken into account in developing the scope of program elements and necessary agreements (i.e. Joint Powers Agreement, Memorandum of Agreement, Memorandum of Understanding, etc.). Permittees may use a combination of statute, ordinance, permit, contract, order, interagency or inter-jurisdictional agreement(s) with other permittees to:

a. Control the contribution of pollutants to the MS4 by stormwater discharges associated with industrial activity and the quality of stormwater discharged from sites of industrial activity (applicable only to MS4s located within the corporate boundary of the COA);

b. Control the discharge of stormwater and pollutants associated with land disturbance and development activities, both during the construction phase and after site stabilization has been achieved (post-construction), consistent with Part I.D.5.a and Part I.D.5.b;

c. Prohibit illicit discharges and sanitary sewer overflows to the MS4 and require removal of such discharges consistent with Part I.D.5.e;

d. Control the discharge of spills and prohibit the dumping or disposal of materials other than stormwater (e.g. industrial and commercial wastes, trash, used motor vehicle fluids, leaf litter, grass clippings, animal wastes, etc.) into the MS4;

e. Control, through interagency or inter-jurisdictional agreements among permittees, the contribution of pollutants from one (1) portion of the MS4 to another;

f. Require compliance with conditions in ordinances, permits, contracts and/or orders; and

g. Carry out all inspection, surveillance and monitoring procedures necessary to maintain compliance with permit conditions.

3. **Shared Responsibility and Cooperative Programs**.

a. The SWMP, in addition to any interagency or inter-jurisdictional agreement(s) among permittees, (e.g., the Joint Powers Agreement to be entered into by the permittees), shall clearly identify the roles and responsibilities of each permittee.

b. Implementation of the SWMP may be achieved through participation with other permittees, public agencies, or private entities in cooperative efforts to satisfy the requirements of Part I.D in lieu of creating duplicate program elements for each individual permittee.

(i) Implementation of one or more of the control measures may be shared with another entity, or the entity may fully take over the measure. A permittee may rely on another entity only if:

(a) the other entity, in fact, implements the control measure;

(b) the control measure, or component of that measure, is at least as stringent as the corresponding permit requirement; or,

(c) the other entity agrees to implement the control measure on the permittee's behalf. Written acceptance of this obligation is expected. The permittee must maintain this obligation as part of the SWMP description. If the other entity agrees to report on the minimum measure, the permittee must supply the other entity with the reporting requirements in Part III.D of this permit. The permittee remains responsible for compliance with the permit obligations if the other entity fails to implement the control measure component.

c. Each permittee shall provide adequate finance, staff, equipment, and support capabilities to fully implement its SWMP and all requirements of this permit.

4. **Measurable Goals**. The permittees shall control the discharge of pollutants from its MS4. The permittee shall implement the provisions set forth in Part I.D.5 below, and shall at a minimum incorporate into the SWMP the control measures listed in Part I.D.5 below. The SWMP shall include measurable goals, including interim milestones, for each control measure, and as appropriate, the months and years in which the MS4 will undertake the required actions and the frequency of the action.

5. **Control Measures**.

a. Construction Site Stormwater Runoff Control.

(i) The permittee shall develop, revise, implement, and enforce a program to reduce pollutants in any stormwater runoff to the MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of stormwater discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more. **Permittees previously covered under permit NMS000101 or NMR040000 must continue existing programs, updating as necessary, to comply with the requirements of this permit**. (Note: Highway Departments and Flood Control Authorities may only apply the construction site stormwater management program to the permittees's own construction projects)

(ii) The program must include the development, implementation, and enforcement of, at a minimum:

(a) An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State, Tribal or local law;

(b) Requirements for construction site operators to implement appropriate erosion and sediment control best management practices (both structural and non-structural);

(c) Requirements for construction site operators to control waste such as, but not limited to, discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality (see EPA guidance at http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=117);

(d) Procedures for site plan review which incorporate consideration of potential water quality impacts. The site plan review must be conducted prior to commencement of construction activities, and include a review of the site design, the planned operations at the construction site, the planned control measures during the construction phase (including the technical criteria for selection of the control measures), and the planned controls to be used to manage runoff created after the development;

(e) Procedures for receipt and consideration of information submitted by the public;

(f) Procedures for site inspection (during construction) and enforcement of control measures, including provisions to ensure proper construction, operation, maintenance, and repair. The procedures must clearly define who is responsible for site inspections; who has the authority to implement enforcement procedures; and the steps utilized to identify priority sites for inspection and enforcement based on the nature of the construction activity, topography, and the characteristics of soils and the quality of the receiving water. If a construction site operator fails to comply with procedures or policies established by the permittee, the permittee may request EPA enforcement assistance. The site inspection and enforcement procedures must describe sanctions and enforcement mechanism(s) for violations of permit requirements and penalties with detail regarding corrective action follow-up procedures, including enforcement escalation procedures for recalcitrant or repeat offenders. Possible sanctions include non-monetary penalties (such as stop work orders and/or permit denials for non-compliance), as well as monetary penalties such as fines and bonding requirements;

(g) Procedures to educate and train permittee personnel involved in the planning, review, permitting, and/or approval of construction site plans, inspections and enforcement. Education and training shall also be provided for developers, construction site operators, contractors and supporting personnel, including requiring a stormwater pollution prevention plan for construction sites within the permitee's jurisdiction;

(h) Procedures for keeping records of and tracking all regulated construction activities within the MS4, i.e. site reviews, inspections, inspection reports, warning letters and other enforcement documents. A

summary of the number and frequency of site reviews, inspections (including inspector's checklist for oversight of sediment and erosion controls and proper disposal of construction wastes) and enforcement activities that are conducted annually and cumulatively during the permit term shall be included in each annual report; and

(iii) Annually conduct site inspections of 100 percent of all construction projects cumulatively disturbing one (1) or more acres within the MS4 jurisdiction. Site inspections are to be followed by any necessary compliance or enforcement action. Follow-up inspections are to be conducted to ensure corrective maintenance has occurred; and, all projects must be inspected at completion for confirmation of final stabilization.

(iv) The permittee must coordinate with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private construction projects/activities within the permit area to ensure that the construction stormwater runoff controls eliminate erosion and maintain sediment on site. Planning documents include, but are not limited to: comprehensive or master plans, subdivision ordinances, general land use plan, zoning code, transportation master plan, specific area plans, such as sector plan, site area plans, corridor plans, or unified development ordinances.

(v) The site plan review required in Part I.D.5.a.(ii)(d) must include an evaluation of opportunities for use of GI/LID/Sustainable practices and when the opportunity exists, encourage project proponents to incorporate such practices into the site design to mimic the pre-development hydrology of the previously undeveloped site. For purposes of this permit, pre-development hydrology shall be met according to Part I.D.5.b of this permit. (consistent with any limitations on that capture). Include a reporting requirement of the number of plans that had opportunities to implement these practices and how many incorporated these practices.

(vi) The permittee must include in the SWMP a description of the mechanism(s) that will be utilized to comply with each of the elements required in Part I.D.5.a.(i) throughout Part I.D.5.a.(v), including description of each individual BMP (both structural or non-structural) or source control measures and its corresponding measurable goal.

(vii) The permittee shall assess the overall success of the program, and document the program effectiveness in the annual report. The permittee must include in each annual report:

(a) A summary of the frequency of site reviews, inspections and enforcement activities that are conducted annually and cumulatively during the permit term.

(b) The number of plans that had the opportunity to implement GI/LID/Sustainable practices and how many incorporated the practices.

Program Flexibility Elements

(viii) The permittee may use storm water educational materials locally developed or provided by the EPA (refer to http://water.epa.gov/polwaste/npdes/swbmp/index.cfm, http://www.epa.gov/smartgrowth/parking.htm, http://www.epa.gov/smartgrowth/stormwater.htm), the NMED, environmental, public interest or trade organizations, and/or other MS4s.

(ix) The permittee may develop or update existing construction handbooks (e.g., the COA NPDES Stormwater Management Guidelines for Construction and Industrial Activities Handbook) to be consistent with promulgated construction and development effluent limitation guidelines.

(x) The construction site inspections required in Part I.D.5.a.(iii) may be carried out in conjunction with the permittee's building code inspections using a screening prioritization process.

Table 2. Construction Site Stormwater Runoff Control - Program Development and Implementation Schedules

Activity	Permittee Class				
	A Phase I MS4s	**B** Phase II MS4s (2000 Census)	**C** New Phase II MS4s (2010 Census **)	**D** MS4s within Indian Lands	**Cooperative (*)** Any Permittee with cooperative programs
Development of an ordinance or other regulatory mechanism as required in Part I.D.5.a.(ii)(a)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of the permit
Develop requirements and procedures as required in Part I.D.5.a.(ii)(b) through in Part I.D.5.a.(ii)(h)	Ten (10) months from effective date of permit	Thirteen (13) months from effective date of permit	Sixteen (16) months from effective date of permit	Sixteen (16) months from effective date of permit	Eighteen (18) months from effective date of permit
Annually conduct site inspections of 100 percent of all construction projects cumulatively disturbing one (1) or more acres as required in Part I.D.5.a.(iii)	Ten (10) months from effective date of permit	Start Thirteen (13) months from effective date of permit and annually thereafter	Start Sixteen (16) months from effective date of permit and annually thereafter	Start eighteen (18) months from effective date of permit and thereafter	Start two (2) years from effective date of permit and thereafter
Coordinate with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private construction projects/activities within the permit area as required in Part I.D.5.a.(iv)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	Twelve (12) months from effective date of permit	Twelve (12) months from effective date of permit	Fourteen (14) months from effective date of permit
Evaluation of GI/LID/Sustainable practices in site plan reviews as required in Part I.D.5.a.(v)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	Twelve (12) months from effective date of permit	Twelve (12) months from effective date of permit	Fourteen (14) months from effective date of permit
Update the SWMP document and annual report as required in Part I.D.5.a.(vi) and in Part I.D.5.a.(vii)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary
Enhance the program to include program elements in Part I.D.5.a.(viii) through Part I.D.5.a.(x)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs.
(**) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

b. Post-Construction Stormwater Management in New Development and Redevelopment

(i) The permittee must develop, revise, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the MS4. The program must ensure that controls are in place that would prevent or minimize water quality impacts. **Permittees previously covered under NMS000101 or NMR040000 must continue existing programs, updating as necessary, to comply with the requirements of this permit.** (Note: Highway Departments and Flood Control Authorities may only apply the post-construction stormwater management program to the permittee's own construction projects)

(ii) The program must include the development, implementation, and enforcement of, at a minimum:

(a) Strategies which include a combination of structural and/or non-structural best management practices (BMPs) to control pollutants in stormwater runoff.

(b) An ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State, Tribal or local law. The ordinance or policy must:

Incorporate a stormwater quality design standard that manages on-site the 90th percentile storm event discharge volume associated with new development sites and 80th percentile storm event discharge volume associated with redevelopment sites, through stormwater controls that infiltrate, evapotranspire the discharge volume, except in instances where full compliance cannot be achieved, as provided in Part I.D.5.b.(v). The stormwater from rooftop discharge may be harvested and used on-site for non-commercial use. Any controls utilizing impoundments that are also used for flood control that are located in areas where the New Mexico Office of the State Engineer requirements at NMAC 19.26.2.15 (see also Section 72-5-32 NMSA) apply must drain within 96 hours unless the state engineer has issued a waiver to the owner of the impoundment.

Options to implement the site design standard include, but not limited to: management of the discharge volume achieved by canopy interception, soil amendments, rainfall harvesting, rain tanks and cisterns, engineered infiltration, extended filtration, dry swales, bioretention, roof top disconnections, permeable pavement, porous concrete, permeable pavers, reforestation, grass channels, green roofs and other appropriate techniques, and any combination of these practices, including implementation of other stormwater controls used to reduce pollutants in stormwater (e.g., a water quality facility).

Estimation of the 90th or 80th percentile storm event discharge volume is included in EPA Technical Report entitled "*Estimating Predevelopment Hydrology in the Middle Rio Grande Watershed, New Mexico, EPA Publication Number 832-R-14-007*". Permittees can also estimate:

Option A: a site specific 90th or 80th percentile storm event discharge volume using methodology specified in the referenced EPA Technical Report.

Option B: a site specific pre-development hydrology and associated storm event discharge volume using methodology specified in the referenced EPA technical Report.

(c) The permittee must ensure the appropriate implementation of the structural BMPs by considering some or all of the following: pre-construction review of BMP designs; inspections during construction to verify BMPs are built as designed; post-construction inspection and maintenance of BMPs; and penalty provisions for the noncompliance with preconstruction BMP design; failure to construct BMPs

in accordance with the agreed upon pre-construction design; and ineffective post-construction operation and maintenance of BMPs;

(d) The permittee must ensure that the post-construction program requirements are constantly reviewed and revised as appropriate to incorporate improvements in control techniques;

(e) Procedure to develop and implement an educational program for project developers regarding designs to control water quality effects from stormwater, and a training program for plan review staff regarding stormwater standards, site design techniques and controls, including training regarding GI/LID/Sustainability practices. Training may be developed independently or obtained from outside resources, i.e. federal, state, or local experts;

(f) Procedures for site inspection and enforcement to ensure proper long-term operation, maintenance, and repair of stormwater management practices that are put into place as part of construction projects/activities. Procedure(s) shall include the requirement that as-built plans be submitted within ninety (90) days of completion of construction projects/activities that include controls designed to manage the stormwater associated with the completed site (post-construction stormwater management). Procedure(s) may include the use of dedicated funds or escrow accounts for development projects or the adoption by the permittee of all privately owned control measures. This may also include the development of maintenance contracts between the owner of the control measure and the permittee. The maintenance contract shall include verification of maintenance practices by the owner, allows the MS4 owner/operator to inspect the maintenance practices, and perform maintenance if inspections indicate neglect by the owner;

(g) Procedures to control the discharge of pollutants related to commercial application and distribution of pesticides, herbicides, and fertilizers where permittee(s) hold jurisdiction over lands not directly owned by that entity (e.g., incorporated city). The procedures must ensure that herbicides and pesticides applicators doing business within the permittee's jurisdiction have been properly trained and certified, are encouraged to use the least toxic products, and control use and application rates according to the applicable requirements; and

(h) Procedure or system to review and update, as necessary, the existing program to ensure that stormwater controls or management practices for new development and redevelopment projects/activities continue to meet the requirements and objectives of the permit.

(iii) The permittee must coordinate with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private new development and redevelopment projects/activities within the permit area to ensure the hydrology associated with new development and redevelopment sites mimic to the extent practicable the pre-development hydrology of the previously undeveloped site, except in instances where the pre-development hydrology requirement conflicts with applicable water rights appropriation requirements. For purposes of this permit, pre-development hydrology shall be met by capturing the 90th percentile storm event runoff (consistent with any limitations on that capture) which under undeveloped natural conditions would be expected to infiltrate or evapotranspirate on-site and result in little, if any, off-site runoff. (Note: This permit does not prevent permittees from requiring additional controls for flood control purposes.) Planning documents include, but are not limited to: comprehensive or master plans, subdivision ordinances, general land use plan, zoning code, transportation master plan, specific area plans, such as sector plan, site area plans, corridor plans, or unified development ordinances.

(iv) The permittee must assess all existing codes, ordinances, planning documents and other applicable regulations, for impediments to the use of GI/LID/Sustainable practices. The assessment shall include a list of the identified impediments, necessary regulation changes, and recommendations and proposed schedules to incorporate policies and standards to relevant documents and procedures to maximize infiltration, recharge, water harvesting, habitat improvement, and hydrological management of stormwater runoff as allowed under the applicable water rights appropriation requirements. The permittee must develop a report of the assessment findings, which is to be used to provide information to the permittee, of the regulation changes necessary to remove impediments and allow implementation of these practices.

(v) Alternative Compliance for Infeasibility due to Site Constrains:

(a) Infeasibility to manage the design standard volume specified in Part I(D)(5)(b)(ii)(b), or a portion of the design standard volume, onsite may result from site constraints including the following:

A. too small a lot outside of the building footprint to create the necessary infiltrative capacity even with amended soils;

B. soil instability as documented by a thorough geotechnical analysis;

C. a site use that is inconsistent with capture and reuse of storm water;

D. other physical conditions; or,

E. to comply with applicable requirements for on-site flood control structures leaves insufficient area to meet the standard.

(b) A determination that it is infeasible to manage the design standard volume specified in Part I.D.5.b.(ii)(b), or a portion of the design standard volume, on site may not be based solely on the difficulty or cost of implementing onsite control measures, but must include multiple criteria that rule out an adequate combination of the practices set forth in Part I.D,5.b.(v).

(c) This permit does not prevent imposition of more stringent requirements related to flood control. Where both the permittee's site design standard ordinance or policy and local flood control requirements on site cannot be met due to site conditions, the standard may be met through a combination of on-site and off-site controls.

(d) Where applicable New Mexico water law limits the ability to fully manage the design standard volume on site, measures to minimize increased discharge consistent with requirements under New Mexico water law must still be implemented.

(e) In instances where an alternative to compliance with the standard on site is chosen, technical justification as to the infeasibility of on-site management of the entire design standard volume, or a portion of the design standard volume, is required to be documented by submitting to the permittee a site-specific hydrologic and/or design analysis conducted and endorsed by a registered professional engineer, geologist, architect, and/or landscape architect.

(f) When a Permittee determines a project applicant has demonstrated infeasibility due to site constraints specified in Part I.D.5.b.(v) to manage the design standard volume specified in Part I.D.5.b.(ii).(b) or a portion of the design standard volume on-site, the Permittee shall require one of the following mitigation options:

A. Off-site mitigation. The off-site mitigation option only applies to redevelopment sites and cannot be applied to new development. Management of the standard volume, or a portion of the volume, may be implemented at another location within the MS4 area, approved by the permittee. The permittee shall identify priority areas within the MS4 in which mitigation projects can be completed. The permittee shall determine who will be responsible for long-term maintenance on off-site mitigation projects.

B. Ground Water Replenishment Project: Implementation of a project that has been determined to provide an opportunity to replenish regional ground water supplies at an offsite location.

C. Payment in lieu. Payment in lieu may be made to the permittee, who will apply the funds to a public stormwater project. MS4s shall maintain a publicly accessible database of approved projects for which these payments may be used.

D. *Other.* In a situation where alternative options A through C above are not feasible and the permittee wants to establish another alternative option for projects, the permitte may submit to the EPA for approval, the alternative option that meets the standard.

(vi) The permittee must estimate the number of acres of impervious area (IA) and directly connected impervious area (DCIA). For the purpose of his part, IA includes conventional pavements, sidewalks, driveways, roadways, parking lots, and rooftops. DCIA is the portion of IA with a direct hydraulic connection to the permittee's MS4 or a waterbody via continuous paved surfaces, gutters, pipes, and other impervious features. DCIA typically does not include isolated impervious areas with an indirect hydraulic connection to the MS4 (e.g., swale or detention basin) or that otherwise drain to a pervious area.

(vii) The permittee must develop an inventory and priority ranking of MS4-owned property and infrastructure (including public right-of-way) that may have the potential to be retrofitted with control measures designed to control the frequency, volume, and peak intensity of stormwater discharges to and from its MS4. In determining the potential for retrofitting, the permittee shall consider factors such as the complexity and cost of implementation, public safety, access for maintenance purposes, subsurface geology, depth to water table, proximity to aquifers and subsurface infrastructure including sanitary sewers and septic systems, and opportunities for public use and education under the applicable water right requirements and restrictions. In determining its priority ranking, the permittee shall consider factors such as schedules for planned capital improvements to storm and sanitary sewer infrastructure and paving projects; current storm sewer level of service and control of discharges to impaired waters, streams, and critical receiving water (drinking water supply sources);

(viii) The permittee must incorporate watershed protection elements into relevant policy and/or planning documents as they come up for regular review. If a relevant planning document is not scheduled for review during the term of this permit, the permittee must identify the elements that cannot be implemented until that document is revised, and provide to EPA and NMED a schedule for incorporation and implementation not to exceed five years from the effective date of this permit. As applicable to each permittee's MS4 jurisdiction, policy and/or planning documents must include the following:

(a) A description of master planning and project planning procedures to control the discharge of pollutants to and from the MS4.

(b) Minimize the amount of impervious surfaces (roads, parking lots, roofs, etc.) within each watershed, by controlling the unnecessary creation, extension and widening of impervious parking lots, roads and associated development. The permittee may evaluate the need to add impervious surface on a case-by-case basis and seek to identify alternatives that will meet the need without creating the impervious surface.

(c) Identify environmentally and ecologically sensitive areas that provide water quality benefits and serve critical watershed functions within the MS4 and ensure requirements to preserve, protect, create and/or restore these areas are developed and implemented during the plan and design phases of projects in these identified areas. These areas may include, but are not limited to critical watersheds, floodplains, and areas with endangered species concerns and historic properties. Stakeholders shall be consulted as appropriate.

(d) Implement stormwater management practices that minimize water quality impacts to streams, including disconnecting direct discharges to surface waters from impervious surfaces such as parking lots.

(e) Implement stormwater management practices that protect and enhance groundwater recharge as allowed under the applicable water rights laws.

(f) Seek to avoid or prevent hydromodification of streams and other water bodies caused by development, including roads, highways, and bridges.

(g) Develop and implement policies to protect native soils, prevent topsoil stripping, and prevent compaction of soils.

(h) The program must be specifically tailored to address local community needs (e.g. protection to drinking water sources, reduction of water quality impacts) and must be designed to attempt to maintain pre-development runoff conditions.

(ix) The permittee must update the SWMP as necessary to include a description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.b.(i) throughout Part I.D.5.b.(viii) as well as the citations and descriptions of design standards for structural and non-structural controls to control pollutants in stormwater runoff, including discussion of the methodology used during design for estimating impacts to water quality and selecting structural and non-structural controls. Description of measurable goals for each BMP (structural or non-structural) or each stormwater control must be included in the SWMP.

(x) The permittee shall assess the overall success of the program, and document the program effectiveness in the annual report. The following information must be included in each annual report:

(a) Include a summary and analysis of all maintenance, inspections and enforcement, and the number and frequency of inspections performed annually.

(b) A cumulative listing of the annual modifications made to the Post-Construction Stormwater Management Program during the permit term, and a cumulative listing of annual revisions to administrative procedures made or ordinances enacted during the permit term.

(c) According to the schedule presented in the Program Development and Implementation Schedule in Table 3, the permittee must

A. Report the number of MS4-owned properties and infrastructure that have been retrofitted with control measures designed to control the frequency, volume, and peak intensity of stormwater discharges. The permittee may also include in its annual report non-MS4 owned property that has been retrofitted with control measures designed to control the frequency, volume, and peak intensity of stormwater discharges.

B. As required in Part I.D.5.b.(vi), report the tabulated results for IA and DCIA and its estimation methodology. In each subsequent annual report, the permittee shall estimate the number of acres of IA and DCIA that have been added or removed during the prior year. The permittee shall include in its estimates the additions and reductions resulting from development, redevelopment, or retrofit projects undertaken directly by the permittee; or by private developers and other parties in a voluntary manner on in compliance with the permittee's regulations.

Program Flexibility Elements:

(xi) The permittee may use storm water educational materials locally developed or provided by EPA (refer to http://water.epa.gov/polwaste/npdes/swbmp/index.cfm, http://www.epa.gov/smartgrowth/parking.htm, and http://www.epa.gov/smartgrowth/stormwater.htm); the NMED; environmental, public interest or trade organizations; and/or other MS4s.

(xii) When choosing appropriate BMPs, the permittee may participate in locally-based watershed planning efforts, which attempt to involve a diverse group of stakeholders including interested citizens. When developing a program that is consistent with this measure's intent, the permittee may adopt a planning process that identifies the municipality's program goals (e.g., minimize water quality impacts resulting from post-construction runoff from new development and redevelopment), implementation strategies (e.g., adopt a combination of structural and/or non-structural BMPs), operation and maintenance policies and procedures, and enforcement procedures.

(xiii) The permittee may incorporate the following elements in the Post-Construction Stormwater Management in New Development and Redevelopment program required in Part I.D.5.b.(ii)(b):

(a) Provide requirements and standards to direct growth to identified areas to protect environmentally and ecologically sensitive areas such as floodplains and/or other areas with endangered species and historic properties concerns;

(b) Include requirements to maintain and/or increase open space/buffers along sensitive water bodies, minimize impervious surfaces, and minimize disturbance of soils and vegetation; and

(c) Encourage infill development in higher density urban areas, and areas with existing storm sewer infrastructure.

Table 3. Post-Construction Stormwater Management in New Development and Redevelopment - Program Development and Implementation Schedules

Activity	**Permittee Class**				
	A **Phase I MS4s**	**B** **Phase II MS4s (2000 Census)**	**C** **New Phase II MS4s (2010 Census **)**	**D** **MS4s within Indian Lands**	**Cooperative (*)** **Any Permittee with cooperative programs**
Development of strategies as required in Part I.D.5.b.(ii).(a)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	Twelve (12) months from effective date of permit	Twelve (12) months from effective date of permit	Fourteen (14) months from effective date of permit
Development of an ordinance or other regulatory mechanism as required in Part I.D.5.b.(ii).(b)	Twenty (24) months from effective date of permit	Thirty (30) months from effective date of permit	Thirty six (36) months from effective date of permit	Thirty six (36) months from effective date of permit	Thirty six (36) months from effective date of permit
Implementation and enforcement, via the ordinance or other regulatory mechanism, of site design standards as required in Part I.D.5.b.(ii).(b)	Within thirsty six (36) months from effective date of the permit	Within forty two (42) months from the effective date of the permit	Within forty eight (48) months from effective date of the permit	Within forty eight (48) months from effective date of the permit	Within forty eight (48) months from effective date of the permit
Ensure appropriate implementation of structural controls as required in Part I.D.5.b.(ii).(c) and Part I.D.5.b.(ii).(d)	Ten (10) months from effective date of permit	One (1) year from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Develop procedures as required in Part I.D.5.b.(ii).(e), Part I.D.5.b.(ii).(f), Part I.D.5.b.(ii).(g), and Part I.D.5.b.(ii).(h)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit

Coordinate internally with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private construction projects/activities within the permit area as required in Part I.D.5.b.(iii)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	Eleven (11) months from effective date of permit	Eleven (11) months from effective date of permit	One (1) year from effective date of permit
As required in Part I.D.5.b.(iv), the permittee must assess all existing codes, ordinances, planning documents and other applicable regulations, for impediments to the use of GI/LID/Sustainable practices	Ten (10) months from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit	Eighteen (18) months from effective date of permit	Two (2) years from effective date of permit
As required in Part I.D.5.b.(iv), develop and submit a report of the assessment findings on GI/LID/Sustainable practices.	Eleven (11) months from effective date of permit	Eighteen (18) months from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Twenty seven (27) months from effective date of permit
Estimation of the number of acres of IA and DCIA as required in Part I.D.5.b.(vi)	Ten (10) months from effective date of permit	One (1) year from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Inventory and priority ranking as required in section in Part I.D.5.b.(vii)	Within fifteen (15) months from effective date of the permit	Within twenty four (24) months from effective date of the permit	Within thirty six (36) months from effective date of the permit	Within thirty six (36) months from effective date of the permit	Within forty two (42) months from effective date of the permit
Incorporate watershed protection elements as required in Part I.D.5.b.(viii)	Ten (10) months from effective date of permit	One (1) year from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Update the SWMP document and annual report as required in Part I.D.5.b.(ix) and Part I.D.5.b.(x).	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary
Enhance the program to include program elements in Part I.D.5.b.(xi) and Part I.D.5.b.(xii)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs.
(**) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

c. Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations.

(i) The permittee must develop, revise and implement an operation and maintenance program that includes a training component and the ultimate goal of preventing or reducing pollutant runoff from municipal operations. **Permittees previously covered under NMS000101 or NMR040000 must continue existing programs while updating those programs, as necessary, to comply with the requirements of this permit**. The program must include:

(a) Development and implementation of an employee training program to incorporate pollution prevention and good housekeeping techniques into everyday operations and maintenance activities. The employee training program must be designed to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance. The permittee must also develop a tracking procedure and ensure that employee turnover is considered when determining frequency of training;

(b) Maintenance activities, maintenance schedules, and long term inspections procedures for structural and non-structural storm water controls to reduce floatable, trash, and other pollutants discharged from the MS4.

(c) Controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, fleet or maintenance shops with outdoor storage areas, salt/sand storage locations, snow disposal areas operated by the permittee, and waste transfer stations;

(d) Procedures for properly disposing of waste removed from the separate storm sewers and areas listed in Part I.D.5.c.(i).(c) (such as dredge spoil, accumulated sediments, floatables, and other debris); and

(e) Procedures to ensure that new flood management projects assess the impacts on water quality and examine existing projects for incorporating additional water quality protection devices or practices.

Note: The permittee may use training materials that are available from EPA, NMED, Tribe, or other organizations.

(ii) The Pollution Prevention/Good Housekeeping program must include the following elements:

(a) Develop or update the existing list of all stormwater quality facilities by drainage basin, including location and description;

(b) Develop or modify existing operational manual for de-icing activities addressing alternate materials and methods to control impacts to stormwater quality;

(c) Develop or modify existing program to control pollution in stormwater runoff from equipment and vehicle maintenance yards and maintenance center operations located within the MS4;

(d) Develop or modify existing street sweeping program. Assess possible benefits from changing frequency or timing of sweeping activities or utilizing different equipment for sweeping activities;

(e) A description of procedures used by permittees to target roadway areas most likely to contribute pollutants to and from the MS4 (i.e., runoff discharges directly to sensitive receiving water, roadway receives majority of de-icing material, roadway receives excess litter, roadway receives greater loads of oil and grease);

(f) Develop or revise existing standard operating procedures for collection of used motor vehicle fluids (at a minimum oil and antifreeze) and toxics (including paint, solvents, fertilizers, pesticides, herbicides,

and other hazardous materials) used in permittee operations or discarded in the MS4, for recycle, reuse, or proper disposal;

(g) Develop or revised existing standard operating procedures for the disposal of accumulated sediments, floatables, and other debris collected from the MS4 and during permittee operations to ensure proper disposal;

(h) Develop or revised existing litter source control programs to include public awareness campaigns targeting the permittee audience; and

(i) Develop or review and revise, as necessary, the criteria, procedures and schedule to evaluate existing flood control devices, structures and drainage ways to assess the potential of retrofitting to provide additional pollutant removal from stormwater. Implement routine review to ensure new and/or innovative practices are implemented where applicable.

(j) Enhance inspection and maintenance programs by coordinating with maintenance personnel to ensure that a target number of structures per basin are inspected and maintained per quarter;

(k) Enhance the existing program to control the discharge of floatables and trash from the MS4 by implementing source control of floatables in industrial and commercial areas;

(l) Include in each annual report, a cumulative summary of retrofit evaluations conducted during the permit term on existing flood control devices, structures and drainage ways to benefit water quality. Update the SWMP to include a schedule (with priorities) for identified retrofit projects;

(m) Flood management projects: review and revise, as necessary, technical criteria guidance documents and program for the assessment of water quality impacts and incorporation of water quality controls into future flood control projects. The criteria guidance document must include the following elements:

A. Describe how new flood control projects are assessed for water quality impacts.

B. Provide citations and descriptions of design standards that ensure water quality controls are incorporated in future flood control projects.

C. Include method for permittees to update standards with new and/or innovative practices.

D. Describe master planning and project planning procedures and design review procedures.

(n) Develop procedures to control the discharge of pollutants related to the storage and application of pesticides, herbicides, and fertilizers applied, by the permittee's employees or contractors, to public right-of-ways, parks, and other municipal property. The permittee must provide an updated description of the data monitoring system for all permittee departments utilizing pesticides, herbicides and fertilizers.

(iii) Comply with the requirements included in the EPA Multi Sector General Permit (MSGP) to control runoff from industrial facilities (as defined in 40 CFR 122.26(b)(14)(i)-(ix) and (xi)) owned or operated by the permittees and ultimately discharge to the MS4. The permittees must develop or update:

(a) A list of municipal/permittee operations impacted by this program,

(b) A map showing the industrial facilities owned and operated by the MS4,

(c) A list of the industrial facilities (other than large construction activities defined as industrial activity) that will be included in the industrial runoff control program by category and by basin. The list must include the permit authorization number or a MSGP NOI ID for each facility as applicable.

(iv) The permittee must include in the SWMP a description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.c.(i) throughout Part I.D.5.c.(iii) and its corresponding measurable goal.

(v) The permittee shall assess the overall success of the program, and document the program effectiveness in the annual report.

Table 4. Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations - Program Development and Implementation Schedules

Activity	Permittee Class				
	A Phase I MS4s	**B** Phase II MS4s (2000 Census)	**C** New Phase II MS4s (2010 Census **)	**D** MS4s within Indian Lands	**Cooperative (*)** Any Permittee with cooperative programs
-Develop or update the Pollution Prevention/Good House Keeping program to include the elements in Part I.D.5.c.(i)	Ten (10) months from effective date of the permit	Twelve (12) months from effective date of the permit	Fourteen (14) months from effective date of the permit	Fourteen (14) months from effective date of the permit	Eighteen (18) months from effective date of the permit
-Enhance the program to include the elements in Part I.D.5.c.(ii)	Ten (10) months from effective date of the permit	One (1) year from effective date of the permit	Two (2) years from effective date of the permit	Two (2) years from effective date of the permit	Thirty (30) months from effective date of the permit
-Develop or update a list and a map of industrial facilities owned or operated by the permittee as required in Part I.D.5.c.(iii)	Ten (10) months from effective date of the permit	Eleven (11) months from effective date of the permit	One (1) year from effective date of the permit	One (1) year from effective date of the permit	Eighteen (18) months from effective date of the permit
Update the SWMP document and annual report as required in Part I.D.5.c.(iv) and Part I.D.5.c.(v)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs
(**) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

d. Industrial and High Risk Runoff (Applicable only to Class A permittees)

(i) The permittee must control through ordinance, permit, contract, order or similar means, the contribution of pollutants to the municipal storm sewer by storm water discharges associated with industrial activity and the quality of storm water discharged from sites of industrial activity as defined in 40 CFR 122.26(b)(14)(i)-(ix) and (xi). If no such industrial activities are in a permittees jurisdiction, that permittee may certify that this program element does not apply.

(ii) The permittee must continue implementation and enforcement of the Industrial and High Risk Runoff program, assess the overall success of the program, and document both direct and indirect measurements of program effectiveness in the annual report. The program shall include:

(a) A description of a program to identify, monitor, and control pollutants in stormwater discharges to the MS4 from municipal landfills; other treatment, storage, or disposal facilities for municipal waste (e.g. transfer stations, incinerators, etc.); hazardous waste treatment, storage, disposal and recovery facilities; facilities that are subject to EPCRA Title III, Section 313; and any other industrial or commercial discharge the permittee(s) determines are contributing a substantial pollutant loading to the

MS4. (Note: If no such facilities are in a permittees jurisdiction, that permittee may certify that this program element does not apply.); and

(b) Priorities and procedures for inspections and establishing and implementing control measures for such discharges.

(iii) Permittees must comply with the monitoring requirements specified in Part III.A.4;

(iv) The permittee must modify the following as necessary:

(a) The list of the facilities included in the program, by category and basin;

(b) Schedules and frequency of inspection for listed facilities. Facility inspections may be carried out in conjunction with other municipal programs (e.g. pretreatment inspections of industrial users, health inspections, fire inspections, etc.), but must include random inspections for facilities not normally visited by the municipality;

(c) The priorities for inspections and procedures used during inspections (e.g. inspection checklist, review for NPDES permit coverage; review of stormwater pollution prevention plan; etc.); and

(d) Monitoring frequency, parameters and entity performing monitoring and analyses (MS4 permittees or subject facility). The monitoring program may include a waiver of monitoring for parameters at individual facilities based on a "no-exposure" certification;

(v) The permittee must include in the SWMP a description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.d.(i) throughout Part I.D.5.d.(iv) and its corresponding measurable goal.

(vi) The permittee shall assess the overall success of the program, and document the program effectiveness in the annual report.

Program Flexibility Elements:

(vii) The permittee may:

(a) Use analytical monitoring data, on a parameter-by-parameter basis, that a facility has collected to comply with or apply for a State or NPDES discharge permit (other than this permit), so as to avoid unnecessary cost and duplication of effort;

(b) Allow the facility to test only one (1) outfall and to report that the quantitative data also apply to the substantially identical outfalls if:

A. A Type 1 or Type 2 industrial facility has two (2) or more outfalls with substantially identical effluents, and

B. Demonstration by the facility that the stormwater outfalls are substantially identical, using one (1) or all of the following methods for such demonstration. The NPDES Stormwater Sampling Guidance Document (EPA 833-B-92-001), available on EPA's website at provides detailed guidance on each of the three options: (1) submission of a narrative description and a site map; (2) submission of matrices; or (3) submission of model matrices.

(c) Accept a copy of a "no exposure" certification from a facility made to EPA under 40 CFR §122.26(g), in lieu of analytic monitoring.

Table 5: Industrial and High Risk Runoff - Program Development and Implementation Schedules:

Activity	Permittee Class	
	A **Phase I MS4s**	**Cooperative (*)** **Any Permittee with cooperative programs**
Ordinance (or other control method) as required in Part I.D.5.d.(i)	Ten (10) months from effective date of the permit	Twelve (12) months from effective date of the permit
Continue implementation and enforcement of the Industrial and High Risk Runoff program, assess the overall success of the program, and document both direct and indirect measurements of program effectiveness in the annual report as required in Part I.D.5.d.(ii)	Ten (10) months from effective date of the permit	Twelve (12) months from effective date of the permit
Meet the monitoring requirements in Part I.D.5.d.(iii)	Ten (10) months from effective date of the permit	Twelve (12) months from effective date of the permit
Include requirements in Part I.D.5.d.(iv)	Ten (10) months from permit effective date of the permit	Twelve (12) months from effective date of the permit
Update the SWMP document and annual report as required in Part I.D.5.d.(v) and Part I.D.5.d.(vi)	Update as necessary	Update as necessary
Enhance the program to include requirements in Part I.D.5.d.(vii)	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs. Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

e. Illicit Discharges and Improper Disposal

(i) The permittee shall develop, revise, implement, and enforce a program to detect and eliminate illicit discharges (as defined at 40 CFR 122.26(b)(2)) entering the MS4. **Permittees previously covered under NMS000101 or NMR040000 must continue existing programs while updating those programs, as necessary, to comply with the requirements of this permit**. The permittee must:

(a) Develop, if not already completed, a storm sewer system map, showing the names and locations of all outfalls as well as the names and locations of all waters of the United States that receive discharges from those outfalls. Identify all discharges points into major drainage channels draining more than twenty (20) percent of the MS4 area;

(b) To the extent allowable under State, Tribal or local law, effectively prohibit, through ordinance or other regulatory mechanism, non-stormwater discharges into the MS4, and implement appropriate enforcement procedures and actions;

(c) Develop and implement a plan to detect and address non-stormwater discharges, including illegal dumpling, to the MS4. The permittee must include the following elements in the plan:

A. Procedures for locating priority areas likely to have illicit discharges including field test for selected pollutant indicators (ammonia, boron, chlorine, color, conductivity, detergents, *E. coli*, enterococci, total coliform, fluoride, hardness, pH, potassium, conductivity, surfactants), and visually screening outfalls during dry weather;

B. Procedures for enforcement, including enforcement escalation procedures for recalcitrant or repeat offenders;

C. Procedures for removing the source of the discharge;

D. Procedures for program evaluation and assessment; and

E. Procedures for coordination with adjacent municipalities and/or state, tribal, or federal regulatory agencies to address situations where investigations indicate the illicit discharge originates outside the MS4 jurisdiction.

(d) Develop an education program to promote, publicize, and facilitate public reporting of illicit connections or discharges, and distribution of outreach materials. The permittee shall inform public employees, businesses and the general public of hazards associated with illegal discharges and improper disposal of waste.

(e) Establish a hotline to address complaints from the public.

(f) Investigate suspected significant/severe illicit discharges within forty-eight (48) hours of detection and all other discharges as soon as practicable; elimination of such discharges as expeditiously as possible; and, requirement of immediate cessation of illicit discharges upon confirmation of responsible parties.

(g) Review complaint records for the last permit term and develop a targeted source reduction program for those illicit discharge/improper disposal incidents that have occurred more than twice in two (2) or more years from different locations. (Applicable only to class A and B permittees)

(h) If applicable, implement the program using the priority ranking develop during last permit term

(ii) The permittee shall address the following categories of non-stormwater discharges or flows (e.g., illicit discharges) only if they are identified as significant contributors of pollutants to the MS4: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(90)), uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water.

Note: Discharges or flows from fire fighting activities are excluded from the effective prohibitions against non-stormwater and need only be addressed where they are identified a significant sources of pollutants to water of the United States).

(iii) The permittee must screen the entire jurisdiction at least once every five (5) years and high priority areas at least once every year. High priority areas include any area where there is ongoing evidence of illicit discharges or dumping, or where there are citizen complaints on more than five (5) separate events within twelve (12) months. The permittee must:

(a) Include in its SWMP document a description of the means, methods, quality assurance and controls protocols, and schedule for successfully implementing the required screening, field monitoring, laboratory analysis, investigations, and analysis evaluation of data collected.

(b) Comply with the dry weather screening program established in Table 6 and the monitoring requirements specified in Part III.A.2.

(c) If applicable, implement the priority ranking system develop in previous permit term.

(iv) Waste Collection Programs: The permittee must develop, update, and implement programs to collect used motor vehicle fluids (at a minimum, oil and antifreeze) for recycle, reuse, or proper disposal, and to collect household hazardous waste materials (including paint, solvents, fertilizers, pesticides, herbicides, and other hazardous materials) for recycle, reuse, or proper disposal. Where available, collection programs operated by third parties may be a component of the programs. Permittees shall enhance these programs by establishing the following elements as a goal in the SWMP:

A. Increasing the frequency of the collection days hosted;

B. Expanding the program to include commercial fats, oils and greases; and

C. Coordinating program efforts between applicable permittee departments.

(v) Spill Prevention and Response. The permittee must develop, update and implement a program to prevent, contain, and respond to spills that may discharge into the MS4. The permittees must continue existing programs while updating those programs, as necessary, to comply with the requirements of this permit. The Spill Prevention and Response program shall include:

(a) Where discharge of material resulting from a spill is necessary to prevent loss of life, personal injury, or severe property damage, the permittee(s) shall take, or insure the party responsible for the spill takes, all reasonable steps to control or prevent any adverse effects to human health or the environment: and

(b) The spill response program may include a combination of spill response actions by the permittee (and/or another public or private entity), and legal requirements for private entities within the permittee's municipal jurisdiction.

(vi) The permittee must include in the SWMP a description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.e.(i) throughout Part I.D.5.e.(v) and its corresponding measurable goal. A description of the means, methods, quality assurance and controls protocols, and schedule for successfully implementing the required screening, field monitoring, laboratory analysis, investigations, and analysis evaluation of data collected

(vii) The permittee shall assess the overall success of the program, and document the program effectiveness in the annual report.

(viii) The permittee must expeditiously revise as necessary, within nine (9) months from the effective date of the permit, the existing permitting/certification program to ensure that any entity applying for the use of Right of Way implements controls in their construction and maintenance procedures to control pollutants entering the MS4. (Only applicable to NMDOT)

Program Flexibility Elements

(ix) The permittee may:

(a) Divide the jurisdiction into assessment areas where monitoring at fewer locations would still provide sufficient information to determine the presence or absence of illicit discharges within the larger area;

(b) Downgrade high priority areas after the area has been screened at least once and there are citizen complaints on no more than five (5) separate events within a twelve (12) month period;

(c) Rely on a cooperative program with other MS4s for detection and elimination of illicit discharges and illegal dumping;

(d) If participating in a cooperative program with other MS4s, required detection program frequencies may be based on the combined jurisdictional area rather than individual jurisdictional areas and may use assessment areas crossing jurisdictional boundaries to reduce total number of screening locations (e.g., a shared single screening location that would provide information on more than one jurisdiction); and

(e) After screening a non-high priority area once, adopt an "in response to complaints only" IDDE for that area provided there are citizen complaints on no more than two (2) separate events within a twelve (12) month period.

(f) Enhance the program to utilize procedures and methodologies consistent with those described in "Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments."

Table 6. Illicit Discharges and Improper Disposal - Program Development and Implementation Schedules

Activity	**Permittee Class**				
	A **Phase I MS4s**	**B** **Phase II MS4s (2000 Census)**	**C** **New Phase II MS4s (2010 Census ***)**	**D** **MS4s within Indian Lands**	**Cooperative (*)** **Any Permittee with cooperative programs**
Mapping as required in Part I.D.5.e.(i)(a)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	Eleven (11) months from effective date of permit	Eleven (11) months from effective date of permit	Fourteen (14) months from effective date of permit
Ordinance (or other control method) as required in Part I.D.5.e.(i)(b)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Develop and implement a IDDE plan as required in Part I.D.5.e.(i)(c)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Develop an education program as required in Part I.D.5.e.(i)(d)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit
Establish a hotline as required in Part I.D.5.e.(i)(e)	Update as necessary	Ten (10) months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit
Investigate suspected significant/severe illicit discharges as required in Part I.D.5.e.(i)(f)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit
Review complaint records and develop a targeted source reduction program as required in Part I.D.5.e.(i)(g)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	N/A	N/A	One (1) year from effective date of permit

Screening of system as required in Part I.D.5.e.(iii) as follows: a.) High priority areas**	1 / year	1 / year	1 / year	1 / year	1 / year
b.) Whole system	-Screen 20% of the MS4 per year	- Screen 20% of the MS4 per year	-Years 1 – 2: develop procedures as required in Part I.D.5.e.(i)(c) -Year 3: screen 30% of the MS4 -Year 4: screen 20% of the MS4 -Year 5: screen 50% of the MS4	-Years 1 – 2: develop procedures as required Part I.D.5.e.(i)(c) -Year 3: screen 30% of the MS4 -Year 4: screen 20% of the MS4 -Year 5: screen 50% of the MS4	-Years 1 – 3: develop procedures as require in Part I.D.5.e.(i)(c) -Year 4: screen 30% of the MS4 -Year 5: screen 70% of the MS4
Develop, update, and implement a Waste Collection Program as required in Part I.D.5.e.(iv)	Ten (10) months from effective date of permit	Eighteen (18) months from effective date of permit	Two (2) years from effective date of permit	Two (2) years from effective date of permit	Thirty (30) months from effective date of permit
Develop, update and implement a Spill Prevention and Response program to prevent, contain, and respond to spills that may discharge into the MS4 as required in Part I.D.5.e.(v)	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	One (1) year from effective date of permit	One (1) year from effective date of permit	Eighteen (18) months from effective date of permit
Update the SWMP document and annual report as required in Part I.D.5.e.(iii), Part I.D.5.e.(vi), and Part I.D.5.e.(vii).	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary
Enhance the program to include requirements in Part I.D.5.e.(ix)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs.
(**) High priority areas include any area where there is ongoing evidence of illicit discharges or dumpling, or where there are citizen complaints on more than five (5) separate events within twelve (12) months
(***) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

f. Control of Floatables Discharges

(i) The permittee must develop, update, and implement a program to address and control floatables in discharges into the MS4. The floatables control program shall include source controls and, where necessary, structural controls. **Permittees previously covered under NMS000101 or NMR040000 must continue existing programs while updating those programs, as necessary, to comply with the requirements of this permit.** The following elements must be included in the program:

(a) Develop a schedule for implementation of the program to control floatables in discharges into the MS4 (Note: AMAFCA and the City of Albuquerque should update the schedule according to the findings of the 2005 AMAFCA/COA Floatable and Gross Pollutant Study and other studies); and

(b) Estimate the annual volume of floatables and trash removed from each control facility and characterize the floatable type.

(ii) The permittee must include in the SWMP a description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.f.(i).

(iii) The permittee shall assess the overall success of the program, and document the program effectiveness in the annual report.

Table 7. Control of Floatables Discharges - Program Development and Implementation Schedules

Activity	**Permittee Class**				
	A **Phase I MS4s**	**B** **Phase II MS4s (2000 Census)**	**C** **New Phase II MS4s (2010 Census **)**	**D** **MS4s within Indian Lands**	**Cooperative (*)** **Any Permittee with cooperative programs**
- Develop a schedule to implement the program as required in Part I.D.5.f.(i)(a)	Ten (10) months from the effective date of the permit	Ten (10) months from the effective date of the permit	One (1) year from the effective date of the permit	One (1) year from the effective date of the permit	Eighteen (18) months from the effective date of the permit
-Estimate the annual volume of floatables and trash removed from each control facility and characterize the floatable type as required in Part I.D.5.f.(i)(b)	Ten (10) months from the effective date of the permit	One (1) year from the effective date of the permit	Two (2) years from the effective date of the permit	Two (2) years from the effective dae of the permit	Thirty (30) months from the effective date of the permit
Update the SWMP document and annual report as required in Part I.D.5.f.(ii) and Part I.D.5.f.(iii).	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs.
(**) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

g. Public Education and Outreach on Stormwater Impacts

(i) The permittee shall, individually or cooperatively, develop, revise, implement, and maintain a comprehensive stormwater program to educate the community, employees, businesses, and the general public of hazards associated with the illegal discharges and improper disposal of waste and about the impact that stormwater discharges on local waterways, as well as the steps that the public can take to reduce pollutants in stormwater. **Permittees previously covered under NMS000101 and NMR040000 must continue existing programs while updating those programs, as necessary, to comply with the requirements of this permit.**

(ii) The permittee must implement a public education program to distribute educational knowledge to the community or conduct equivalent outreach activities about the impacts of storm water discharges on water bodies and the steps that the public can take to reduce pollutants in storm water runoff. The permittee must:

(a) Define the goals and objectives of the program based on high priority community-wide issues;

(b) Develop or utilize appropriate educational materials, such as printed materials, billboard and mass transit advertisements, signage at select locations, radio advertisements, television advertisements, and websites;

(c) Inform individuals and households about ensuring proper septic system maintenance, ensuring the proper use and disposal of landscape and garden chemicals including fertilizers and pesticides, protecting and restoring riparian vegetation, and properly disposing of used motor oil or household hazardous wastes;

(d) Inform individuals and groups how to become involved in local stream and beach restoration activities as well as activities that are coordinated by youth service and conservation corps or other citizen groups;

(e) Use tailored public education program, using a mix of locally appropriate strategies, to target specific audiences and communities. Examples of strategies include distributing brochures or fact sheets, sponsoring speaking engagements before community groups, providing public service announcements, implementing educational programs targeted at school age children, and conducting community-based projects such as storm drain stenciling, and watershed cleanups; and

(f) Use materials or outreach programs directed toward targeted groups of commercial, industrial, and institutional entities likely to have significant stormwater impacts. For example, providing information to restaurants on the impact of grease clogging storm drains and to garages on the impact of oil discharges. The permittee may tailor the outreach program to address the viewpoints and concerns of all communities, particularly minority and disadvantaged communities, as well as any special concerns relating to children. The permittee must make information available for non-English speaking residents, where appropriate.

(iii) The permittee must include the following information in the Stormwater Management Program (SWMP) document:

(a) A description of a program to promote, publicize, facilitate public reporting of the presence of illicit discharges or water quality associated with discharges from municipal separate storm sewers;

(b) A description of the education activities, public information activities, and other appropriate activities to facilitate the proper management and disposal of used oil and toxic materials; and

(c) A description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.g.(i) and Part I.D.5.g.(ii) and its corresponding measurable goal.

(iv) The permittee must assess the overall success of the program, and document both direct and indirect measurements of program effectiveness in the Annual Report.

Program Flexibility Elements

(v) Where necessary to comply with the Minimum Control Measures established in Part I.D.5.g.(i) and Part I.D.5.g.(ii), the permittee should develop a program or modify/revise an existing education and outreach program to:

(a) Promote, publicize, and facilitate the use of Green Infrastructure (GI)/Low Impact Development (LID)/Sustainability practices; and

(b) Include an integrated public education program (including all permittee departments and programs within the MS4) regarding litter reduction, reduction in pesticide/herbicide use, recycling and proper

disposal (including yard waste, hazardous waste materials, and used motor vehicle fluids), and GI/LID/Sustainable practices (including xeriscaping, reduced water consumption, water harvesting practices allowed by the New Mexico State Engineer Office).

(vi) The permittee may collaborate or partner with other MS4 operators to maximize the program and cost effectiveness of the required outreach.

(vii) The education and outreach program may use citizen hotlines as a low-cost strategy to engage the public in illicit discharge surveillance.

(viii) The permittee may use stormwater educational materials provided by the State, Tribe, EPA, environmental, public interest or trade organizations, or other MS4s. The permittee may also integrate the education and outreach program with existing education and outreach programs in the Middle Rio Grande area. Example of existing programs include:

(a) Classroom education on stormwater;

A. Develop watershed map to help students visualize area impacted.

B. Develop pet-specific education

(b) Establish a water committee/advisor group;

(c) Contribute and participate in Stormwater Quality Team;

(d) Education/outreach for commercial activities;

(e) Hold regular employee trainings with industry groups

(f) Education of lawn and garden activities;

(g) Education on sustainable practices;

(h) Education/outreach of pet waste management;

(i) Education on the proper disposal of household hazardous waste;

(j) Education/outreach programs aimed at minority and disadvantaged communities and children;

(k) Education/outreach of trash management;

(l) Education/outreach in public events;

A. Participate in local events—brochures, posters, etc.

B. Participate in regional events (i.e., State Fair, Balloon Fiesta).

(m) Education/outreach using the media (e.g. publish local newsletters);

(n) Education/outreach on water conservation practices designed to reduce pollutants in storm water for home residences.

Table 8. Public Education and Outreach on Stormwater Impacts - Program Development and Implementation Schedules

Activity	Permittee Class				
	A Phase I MS4s	**B** Phase II MS4s (2000 Census)	**C** New Phase II MS4s (2010 Census **)	**D** MS4s within Indian Lands	**Cooperative (*)** Any Permittee with cooperative programs
Develop, revise, implement, and maintain an education and outreach program as required in Part I.D.5.g.(i) and Part I.D.5.g.(ii)	Ten (10) months from the effective date of the permit	Eleven (11) months from the effective date of the permit	Twelve (12) months from effective date of the permit	Twelve (12) months from effective date of the permit	Fourteen (14) months from effective date of the permit
Update the SWMP document and annual report as required in Part I.D.5.g.(iii) and Part I.D.5.g.(iv)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary
Enhance the program to include requirements in Part I.D.5.g.(v) through Part I.D.5.g.(viii)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs.
(**) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

h. Public Involvement and Participation

(i) The permittee must provide local public notice of and make available for public review a copy of the complete NOI and attachments (see Part I.B.2). Local public notice may be made by newspaper notice, notice at a council meeting, posting on the internet, or other method consistent with state/tribal/local public notice requirements.

The permittee must consider all public comments received during the public notice period and modify the NOI, or include a schedule to modify the SWMP, as necessary, or as required by the Director modify the NOI or/and SWMP in response to such comments. The Permittees must include in the NOI any unresolved public comments and the MS4's response to these comments. Responses provided by the MS4 will be considered as part of EPA's decision-making process. See also Appendix E Providing Comments or Requesting a Public Hearing on an Operator's NOI.

(ii) The permittee shall develop, revise, implement and maintain a plan to encourage public involvement and provide opportunities for participation in the review, modification and implementation of the SWMP; develop and implement a process by which public comments to the plan are received and reviewed by the person(s) responsible for the SWMP; and, make the SWMP available to the public and to the operator of any MS4 or Tribal authority receiving discharges from the MS4. **Permittee previously covered under NMS000101 or NMR040000 must continue existing public involvement and participation programs while updating those programs, as necessary, to comply with the requirements of this permit.**

(iii) The plan required in Part I.D.5.h.(ii) shall include a comprehensive planning process which involves public participation and where necessary intergovernmental coordination, to reduce the discharge of pollutants to the maximum extent practicable using management practices, control techniques and system, design and engineering methods, and such other provisions which are appropriate. The permittee must include the following elements in the plan:

(a) A detailed description of the general plan for informing the public of involvement and participation opportunities, including types of activities; target audiences; how interested parties may access the SWMP; and how the public was involved in development of the SWMP;

(b) The development and implementation of at least one (1) assessment of public behavioral change following a public education and/or participation event;

(c) A process to solicit involvement by environmental groups, environmental justice communities, civic organizations or other neighborhoods/organizations interested in water quality-related issues, including but not limited to the Middle Rio Grande Water Quality Work Group, the Middle Rio Grande Bosque Initiative, the Middle Rio Grande Endangered Species Act Collaborative Program, the Middle Rio Grande-Albuquerque Reach Watershed Group, the Pueblos of Santa Ana, Sandia and Isleta, Albuquerque Bernalillo County Water Utility Authority, UNM Colleges and Schools, and Chartered Student Organizations; and

(d) An evaluation of opportunities to utilize volunteers for stormwater pollution prevention activities and awareness throughout the area.

(iv) The permittee shall comply with State, Tribal and local public notice requirements when implementing a public involvement/ participation program.

(v) The public participation process must reach out to all economic and ethnic groups. Opportunities for members of the public to participate in program development and implementation include serving as citizen representatives on a local stormwater management panel, attending public hearings, working as citizen volunteers to educate other individuals about the program, assisting in program coordination with other pre-existing programs, or participating in volunteer monitoring efforts.

(vi) The permittee must include in the SWMP a description of the mechanism(s) utilized to comply with each of the elements required in Parts I.D.5.h.(i) throughout Part I.D.5.h.(iv) and its corresponding measurable goal.

(vii) The permittee shall assess the overall success of the program, and document the program effectiveness in the annual report.

(viii) The permittee must provide public accessibility of the Storm Water Management Program (SWMP) document and Annual Reports online via the Internet and during normal business hours at the MS4 operator's main office, a local library, posting on the internet and/or other readily accessible location for public inspection and copying consistent with any applicable federal, state, tribal, or local open records requirements. Upon a showing of significant public interest, the MS4 operator is encouraged to hold a public meeting (or include in the agenda of in a regularly scheduled city council meeting, etc.) on the NOI, SWMP, and Annual Reports. (See Part III B)

Program Flexibility Elements

(ix) The permittee may integrate the public Involvement and participation program with existing education and outreach programs in the Middle Rio Grande area. Example of existing programs include: Adopt-A-Stream Programs; Attitude Surveys; Community Hotlines (e.g. establishment of a "311"-type number and system established to handle storm-water-related concerns, setting up a public tracking/reporting

system, using phones and social media); Revegetation Programs; Storm Drain Stenciling Programs; Stream cleanup and Monitoring program/events.

Table 9. Public Involvement and Participation - *Program Development and Implementation Schedules*

Activity	Permittee Class				
	A Phase I MS4s	**B** Phase II MS4s (2000 Census)	**C** New Phase II MS4s (2010 Census **)	**D** MS4s within Indian Lands	**Cooperative (*)** Any Permittee with cooperative programs
Develop (or update), implement, and maintain a public involvement and participation plan as required in Part I.D.5.h.(ii) and Part I.D.5.h.(iii)	Ten (10) months from effective date of the permit	Ten (10) months from effective date of the permit	Eleven (11) months from effective date of the permit	Eleven (11) months from effective date of the permit	One (1) year from effective date of the permit
Comply with State, Tribal, and local notice requirements when implementing a Public Involvement and Participation Program as required in Part I.D.5.h.(iv)	Ten (10) months from effective date of the permit	Eleven (11) months from effective date of the permit	Twelve (12) months from effective date of the permit	Twelve (12) months from effective date of the permit	Fourteen (14) months from effective date of the permit
Include elements as required in Part I.D.5.h.(v)	Ten (10) months from effective date of the permit	Eleven (11) months from effective date of the permit	One (1) year from effective date of the permit	One (1) year from effective date of the permit	Eighteen (18) months from effective date of the permit
Update the SWMP document and annual report as required in Part I.D.5.h.(vi), Part I.D.5.h.(vii), and Part I.D.5.h.(viii)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary
Enhance the program to include requirements in Part I.D.5.h.(ix)	Update as necessary	Update as necessary	Update as necessary	Update as necessary	Update as necessary

(*) During development of cooperative programs, the permittee must continue to implement existing programs.
(**) or MS4s designated by the Director
Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

6. **Stormwater Management Program Review and Modification**.

a. Program Review. Permittee shall participate in an annual review of its SWMP in conjunction with preparation of the annual report required in Part III.B. Results of the review shall be discussed in the annual report and shall include an assessment of:

(i) SWMP implementation, progress in achieving measurable goals, and compliance with program elements and other permit conditions;

(ii) the effectiveness of its SWMP, and any necessary modifications, in complying with the permit, including requirements to control the discharge of pollutants, and comply with water quality standards and any applicable approved TMDLs; and the adequacy of staff, funding levels, equipment, and support capabilities to fully implement the SWMP and comply with permit conditions.

(a) Project staffing requirements, in man hours, for the implementation of the MS4 program during the upcoming year.

(b) Staff man hours used during the previous year for implementing the MS4 program. Man hours may be estimated based on staff assigned, assuming a forty (40) hour work week.

b. Program Modification. The permittee(s) may modify its SWMP with prior notification or request to the EPA and NMED in accordance with this section.

(i) Modifications adding, but not eliminating, replacing, or jeopardizing fulfillment of any components, controls, or requirements of its SWMP may be made by the permittee(s) at any time upon written notification to the EPA.

(ii) Modifications replacing or eliminating an ineffective or unfeasible component, control or requirement of its SWMP, including monitoring and analysis requirements described in Parts III.A and V, may be requested in writing at any time. If request is denied, the EPA will send a written explanation of the decision. Modification requests shall include the following:

(a) a description of why the SWMP component is ineffective, unfeasible (including cost prohibitions), or unnecessary to support compliance with the permit;

(b) expectations on the effectiveness of the proposed replacement component; and

(c) an analysis of how the proposed replacement component is expected to achieve the goals of the component to be replaced.

(iii) Modifications resulting from schedules contained in Part VI may be requested following completion of an interim task or final deadline.

(iv) Modification requests or notifications shall be made in writing, signed in accordance with Part IV.H.

c. Program Modifications Required by EPA. Modifications requested by EPA shall be made in writing, set forth the time schedule for the permittee(s) to develop the modifications, and offer the permittee(s) the opportunity to propose alternative program modifications to meet the objective of the requested modification. The EPA may require changes to the SWMP as needed to:

(i) Address impacts on receiving water quality caused, or contributed to, by discharges from the MS4;

(ii) Include more stringent requirements necessary to comply with new State or Federal statutory or regulatory requirements;

(iii) Include such other conditions deemed necessary by the EPA to comply with the goals and requirements of the Clean Water Act; or

(iv) If, at any time, EPA determines that the SWMP does not meet permit requirements.

d. Transfer of Ownership, Operational Authority, or Responsibility for SWMP Implementation: The permittee(s) shall implement the SWMP:

(i) On all new areas added to their portion of the MS4 (or for which they become responsible for implementation of stormwater quality controls) as expeditiously as possible, but not later than one (1) year from addition of the new areas. Implementation may be accomplished in a phased manner to allow additional time for controls that cannot be implemented immediately;

(ii) Within ninety (90) days of a transfer of ownership, operational authority, or responsibility for SWMP implementation, the permittee(s) shall have a plan for implementing the SWMP on all affected areas. The plan may include schedules for implementation; and information on all new annexed areas and any resulting updates required to the SWMP shall be submitted in the annual report.

7. **Retention of Program Records**. The permittee shall retain SWMP records developed in accordance with Part I.D, Part IV.P, and Part VI for at least five (5) years after coverage under this permit terminates.

8. **Qualifying State, Tribal or Local Program**. The permittee may substitute the BMPs and measurable goals of an existing storm water pollution control program to qualify for compliance with one or more of the minimum control measures if the existing measure meets the requirements of the minimum control measure as established in Part I.D.5

PART II. NUMERIC DISCHARGE LIMITATIONS

A. DISCHARGE LIMITATIONS. Reserved

PART III. MONITORING, ASSESSMENT, AND REPORTING REQUIREMENTS:

A. MONITORING AND ASSESSMENT

The permittee must develop, in consultation with NMED and EPA (and affected Tribes if monitoring locations would be located on Tribal lands), and implement a comprehensive monitoring and assessment program designed to meet the following objectives:

- Assess compliance with this permit;
- Assess the effectiveness of the permittee's stormwater management program;
- Assess the impacts to receiving waters resulting from stormwater discharges;
- Characterize stormwater discharges;
- Identify sources of elevated pollutant loads and specific pollutants;
- Detect and eliminate illicit discharges and illegal connections to the MS4; and
- Assess the overall health and evaluate long-term trends in receiving water quality.

The permittee shall be select specific monitoring locations sufficient to assess effects of storm water discharges on receiving waters. The monitoring program may take advantage of monitoring stations/efforts utilized by the permittees or others in previous stormwater monitoring programs or other water quality monitoring efforts. Data collected by others at such stations may be used to satisfy part, or all, of the permit monitoring requirements provided the data collection by that party meets the requirements established in Part III.A.1 throughout Part III.A.5. The comprehensive monitoring and assessment program shall be described in the SWMP document and the results must be provided in each annual report.

Implementation of the comprehensive monitoring and assessment program may be achieved through participation with other permittees to satisfy the requirements of Part III.A.1 throughout Part III.A.5 below in lieu of creating duplicate program elements for each individual permittee.

1. **Wet Weather Monitoring**: The permittees shall conduct wet weather monitoring to gather information on the response of receiving waters to wet weather discharges from the MS4 during both wet season (July 1 through October 31) and dry Season (November 1 through June 30). Wet Weather Monitoring shall be conducted at outfalls, internal sampling stations, and/or in-stream monitoring locations at each water of the US that runs in each entity or entities' jurisdiction(s). Permittees may choose either Option A or Option B below:

   a. *Option A*: Individual monitoring

      (i) Class A: Perform wet weather monitoring at a location coming into the MS4 jurisdictional area (upstream) and leaving the MS4 jurisdictional area (downstream), see Appendix D. Monitor for TSS, TDS, COD, BOD_5, DO, oil and grease, *E.coli*, pH, total kjeldahl nitrogen, nitrate plus nitrite, dissolved phosphorus, total ammonia plus organic nitrogen, total phosphorus, PCBs and gross alpha. Monitoring of temperature shall be also conducted at outfalls and/or Rio Grande monitoring locations. Phase I permittees must include additional parameters from monitoring conducted under permit NMS000101 (from last 10 years) whose mean values are at or above a WQS. Permittee must sample these pollutants a minimum of 10 events during the permit term with at least 5 events in wet season and 4 events in dry season.

      (ii) Class B, C, and D: Perform wet weather monitoring at a location coming into the MS4 jurisdictional area (upstream) and leaving the MS4 jurisdictional area (downstream), see Appendix D. Monitor for TSS, TDS, COD, BOD_5, DO, oil and grease, *E.coli*, pH, total kjeldahl nitrogen, nitrate plus nitrite, dissolved phosphorus, total ammonia plus organic nitrogen, total phosphorus, PCBs and gross alpha. Monitoring of temperature shall be also

conducted at outfalls and/or Rio Grande monitoring locations. If applicable, include additional parameters from monitoring conducted under permits NMR040000 or/and NMR04000I whose mean values are at or above a WQS; sample these pollutants a minimum of 8 events per location during the permit term with at least 4 events in wet season and 2 events in dry season.

b. *Option B*: Cooperative Monitoring Program

Develop a cooperative wet weather monitoring program with other permittees in the Middle Rio Grande watershed (see map in Appendix A). The program will monitor waters coming into the watershed (upstream) and leaving the watershed (downstream), see suggested sampling locations in Appendix D. The program must include sampling for TSS, TDS, COD, BOD5, DO, oil and grease, *E.coli*, pH, total kjeldahl nitrogen, nitrate plus nitrite, dissolved phosphorus, total ammonia plus organic nitrogen, total phosphorus, PCBs and Gross alpha. Monitoring of temperature shall be also conducted at outfalls and/or Rio Grande monitoring locations. Permittees must include additional parameters from monitoring conducted under permits NMS000101, NMR040000 or/and NMR04000I whose mean values are at or above a WQS. The monitoring program must sample the pollutants for a minimum of 7 storm events per location during the permit term with at least 3 events wet season and 2 events in dry season.

Note: Seasonal monitoring periods are: Wet Season: July 1 through October 31; Dry Season: November 1 through June 30.

c. Wet weather monitoring shall be performed only when the predicted (or actual) rainfall magnitude of a storm event is greater than 0.25 inches and an antecedent dry period of at least forty-eight (48) hours after a rain event greater than 0.1 inch in magnitude is satisfied. Monitoring methodology will consist of collecting a minimum of four (4) grab samples spaced at a minimum interval of fifteen (15) minutes each (or a flow weighted automatic composite, see Part III.A.5.a.(i)). Individual grab samples shall be preserved and delivered to the laboratory where samples will be combined into a single composite sample from each monitoring location.

d. Monitoring methodology at each MS4 monitoring location shall be collected during any portion of the monitoring location's discharge hydrograph (i.e. first flush, rising limb, peak, and falling limb) after a discernible increase in flow at the tributary inlet.

e. The permittee must comply with the schedules contained in Table 10. The results of the Wet Weather Monitoring must be provided in each annual report.

f. DO, pH, conductivity, and temperature shall be analyzed in the field within fifteen (15) minutes of sample collection.

g. Alternate wet weather monitoring locations established in Part III.A.1.a or Part III.A.1.b may be substituted for just cause during the term of the permit. Requests for approval of alternate monitoring locations shall be made to the EPA and NMED in writing and include the rationale for the requested monitoring station relocation. Unless disapproved by the EPA, use of an alternate monitoring location (except for those with numeric effluent limitations) may commence thirty (30) days from the date of the request. For monitoring locations where numeric effluent limitations have been established, the permit must be modified prior to substitution of alternate monitoring locations. At least six (6) samples shall be collected during the first year of monitoring at substitute monitoring locations. If there are less than six sampleable events, this should be document for reporting purposes.

h. Response to monitoring results: The monitoring program must include a contingency plan for collecting additional monitoring data within the MS4 or at additional appropriate instream locations should monitoring results indicate that MS4 discharges may be contributing to instream exceedances of WQS. The purpose of this additional monitoring effort would be to identify sources of elevated pollutant loadings so they could be addressed by the SWMP.

Table 10. Wet Weather Monitoring Program Implementation Schedules:

Activity	Permittee Class				
	A Phase I MS4s	**B** Phase II MS4s (2000 Census)	**C** New Phase II MS4s (2010 Census **)	**D** MS4s within Indian Lands	**Cooperative (*)** Any Permittee with cooperative programs
Submit wet weather monitoring preference to EPA (i.e., individual monitoring program vs. cooperative monitoring program) with NOI submittals	NOI submittal Deadline (see Table 1)	NOI submittal Deadline (see Table 1)	NOI submittal Deadline (see Table 1)	NOI submittal Deadline (see Table 1)	NOI submittal Deadline (see Table 1)
Submit a detailed description of the monitoring scheme to EPA and NMED for approval. The monitoring scheme should include: a list of pollutants; a description of monitoring sites with an explanation of why those sites were selected; and a detailed map of all proposed monitoring sites	Ten (10) months from effective date of permit	Ten (10) months from effective date of permit	Eleven (11) months from effective date of permit	Eleven (11) months from effective date of permit	Twelve (12) months from effective date of permit
Submit certification that all wet weather monitoring sites are operational and begin sampling	Eleven (11) months from effective date of permit	Eleven (11) months from effective date of permit	Thirteen (13) months from effective date of permit	Thirteen (13) months from effective date of permit	Fourteen (14) months from effective date of permit
Update SWMP document and submit annual reports	Annually	Annually	Annually	Annually	Annually

(**) or MS4s designated by the Director

Note: The deadlines established in this table may be extended by the Director for any MS4 designated as needing a permit after issuance of this permit to accommodate expected date of permit coverage.

2. **Dry Weather Discharge Screening of MS4**: Each permittee shall identify, investigate, and address areas within its jurisdiction that may be contributing excessive levels of pollutants to the Municipal Separate Storm Sewer System as a result of dry weather discharges (i.e., discharges from separate storm sewers that occur without the direct influence of runoff from storm events, e.g. illicit discharges, allowable non-stormwater, groundwater infiltration, etc.). Due to the arid and semi-arid conditions of the area, the dry weather discharges screening program may be carried out during both wet season (July 1 through October 31) and dry Season (November 1 through June 30). Results of the assessment

shall be provided in each annual report. This program may be coordinated with the illicit discharge detection and elimination program required in Part I.D.5.e. The dry weather screening program shall be described in the SWMP and comply with the schedules contained in Part I.D.5.e.(iii). The permittee shall

a. Include sufficient screening points to adequately assess pollutant levels from all areas of the MS4.

b. Screen for, at a minimum, BOD_5, sediment or a parameter addressing sediment (e.g., TSS or turbidity), E. coli, Oil and Grease, nutrients, any pollutant that has been identified as cause of impairment of a waterbody receiving discharges from that portion of the MS4, including temperature.

c. Specify the sampling and non-sampling techniques to be issued for initial screening and follow-up purposes. Sample collection and analysis need not conform to the requirements of 40 CFR Part 136; and

d. Perform monitoring only when an antecedent dry period of at least seventy-two (72) hours after a rain event greater than 0.1 inch in magnitude is satisfied. Monitoring methodology shall consist of collecting a minimum of four (4) grab samples spaced at a minimum interval of fifteen (15) minutes each. Grab samples will be combined into a single composite sample from each station, preserved, and delivered to the laboratory for analysis. A flow weighted automatic composite sample may also be used.

3. **Floatable Monitoring:** The permittees shall establish locations for monitoring/assessing floatable material in discharges to and/or from their MS4. Floatable material shall be monitored at least twice per year at priority locations and at minimum of two (2) stations except as provided in Part III.A.3. below. The amount of collected material shall be estimated in cubic yards.

   a. One (1) station should be located in the North Diversion (only applicable to the COA and AMAFCA).

   b. Non-traditional MS4 as defined in Part VII shall sample/assess at one (1) station.

   c. Phase II MS4s shall sample/assess at one (1) station within their jurisdiction or participate in a cooperative floatable monitoring plan addressing impacts on perennial waters of the US on a larger watershed basis.

   A cooperative monitoring program may be established in partnership with other MS4s to monitor and assess floatable material in discharges to and/or from a joint jurisdictional area or watershed basis.

4. **Industrial and High Risk Runoff Monitoring** (Applicable only to Class A permittees): The permittees shall monitor stormwater discharges from Type 1 and 2 industrial facilities which discharge to the MS4 provided such facilities are located in their jurisdiction. (Note: if no such facilities are in the permittee's jurisdiction, the permittee must certify that this program element does not apply). The permittee shall:

   a. Conduct analytical monitoring of Type 1 facilities that discharge to the MS4. Type 1 facilities are municipal landfills; hazardous waste treatment, disposal and recovery facilities; facilities that are subject to EPCRA Title III, Section 313; and industrial facilities the permittee(s) determines are contributing a substantial pollutant loading to the MS4.

      (i) The following parameters shall be monitored:
      - any pollutants limited in an existing NPDES permit to a subject facility;

- oil and grease;
- chemical oxygen demand (COD);
- pH;
- biochemical oxygen demand, five-day (BOD_5);
- total suspended solids (TSS);
- total phosphorous;
- total Kjeldahl nitrogen (TKN);
- nitrate plus nitrite nitrogen;
- any discharge information required under 40 CFR §122.21(g)(7)(iii) and (iv);
- total cadmium;
- total chromium;
- total copper;
- total lead;
- total nickel;
- total silver;
- total zinc; and,
- PCBs.

(ii) Frequency of monitoring shall be established by the permittee(s), but may not be less than once per year;

(iii) In lieu of the above parameter list, the permittee(s) may alter the monitoring requirement for any individual Type 1 facility:

(a) To coincide with the corresponding industrial sector-specific monitoring requirements of the 2008 Multi-Sector General Stormwater Permit or any applicable general permit issued after September 2008. This exception is not contingent on whether a particular facility is actually covered by the general permit; or

(b) To coincide with the monitoring requirements of any individual permit for the stormwater discharges from that facility, and

(c) Any optional monitoring list must be supplemented by pollutants of concern identified by the permittee(s) for that facility.

b. Conduct appropriate monitoring (e.g. analytic, visual), as determined by the permittee(s), at Type 2 facilities that discharge to the MS4. Type 2 facilities are other municipal waste treatment, storage, or disposal facilities (e.g. POTWs, transfer stations, incinerators) and industrial or commercial facilities the permittee(s) believed contributing pollutants to the MS4. The permittee shall include in each annual report, a list of parameters of concern and monitoring frequencies required for each type of facility.

c. May use analytical monitoring data, on a parameter-by-parameter basis, that a facility has collected to comply with or apply for a State or NPDES discharge permit (other than this permit), so as to avoid unnecessary cost and duplication of effort;

d. May allow the facility to test only one (1) outfall and to report that the quantitative data also apply to the substantially identical outfalls if:

(i) A Type 1 or Type 2 industrial facility has two (2) or more outfalls with substantially identical effluents, and

(ii) Demonstration by the facility that the stormwater outfalls are substantially identical, using one (1) or all of the following methods for such demonstration. The NPDES Stormwater Sampling Guidance Document (EPA 833-B-92-001), available on EPA's website at provides detailed guidance on each of the three options: (1) submission of a narrative description and a site map; (2) submission of matrices; or (3) submission of model matrices.

b. May accept a copy of a "no exposure" certification from a facility made to EPA under 40 CFR §122.26(g), in lieu of analytic monitoring.

5. **Additional Sample Type, Collection and Analysis**:

a. Wet Weather (or Storm Event) Discharge Monitoring: If storm event discharges are collected to meet the objectives of the Comprehensive Monitoring and Assessment Program required in Part III.A (e.g., assess compliance with this permit; assess the effectiveness of the permittee's stormwater management program; assess the impacts to receiving waters resulting from stormwater discharges), the following requirements apply:

(i) Composite Samples: Flow-weighted composite samples shall be collected as follows:

(a) Composite Method – Flow-weighted composite samples may be collected manually or automatically. For both methods, equal volume aliquots may be collected at the time of sampling and then flow-proportioned and composited in the laboratory, or the aliquot volume may be collected based on the flow rate at the time of sample collection and composited in the field.

(b) Sampling Duration – Samples shall be collected for at least the first three (3) hours of discharge. Where the discharge lasts less than three (3) hours, the permittee should report the value. .

(c) Aliquot Collection – A minimum of three (3) aliquots per hour, separated by at least fifteen (15) minutes, shall be collected. Where more than three (3) aliquots per hour are collected, comparable intervals between aliquots shall be maintained (e.g. six aliquots per hour, at least seven (7) minute intervals).

(ii) Grab Samples: Grab samples shall be taken during the first two (2) hours of discharge.

b. Analytical Methods: Analysis and collection of samples shall be done in accordance with the methods specified at 40 CFR §136. Where an approved 40 CFR §136 method does not exist, any available method may be used unless a particular method or criteria for method selection (such as sensitivity) has been specified in the permit. The minimum quantification levels (MQLs) in Appendix F are to be used for reporting pollutant data for NPDES permit applications and/or compliance reporting.

Screening level tests may utilize less expensive "field test kits" using test methods not approved by EPA under 40 CFR 136, provided the manufacturers published detection ranges are adequate for the illicit discharge detection purposes.

EPA Method 1668 shall be utilized when PCB water column monitoring is conducted to determine compliance with permit requirements. For purposes of sediment sampling in dry weather as part of a screening program to identify area(s) where PCB control/clean-up efforts may need to be focused, either the Arochlor test (EPA Method 8082) or USGS test method (8093) may be utilized, but must use EPA Method 1668 (latest revision) for confirmation and determination of specific PCB levels at that location.

EPA Method 900.0 shall be utilized when gross alpha water column monitoring is conducted to determine compliance with permit requirements.

B. ANNUAL REPORT

The permittees shall submit an annual report to be submitted by no later than **December 1st**. See suggested form at http://epa.gov/region6/water/npdes/sw/ms4/index.htm. The report shall cover the previous year from **July 1st to June 30rd** and include the below separate sections. Additionally, the year one (1) and year four (4) annual report shall include submittal of a complete SWMP revision.

At least forty five (45) days prior to submission of each Annual Report, the permittee must provide public notice of and make available for public review and comment a draft copy of the Annual Report. All public input must be considered in preparation of the final Annual Reports and any changes to the SWMP.

Note: A complete copy of the signed Annual Report should be maintained on site.

1. **SWMP(s) status of implementation**: shall include the status of compliance with all schedules established under this permit and the status of actions required in Parts I, III, and VI.

2. **SWMP revisions**: shall include revisions, if necessary, to the assessments of controls or BMPs reported in the permit application (or NOI for coverage under this permit) under 40 CFR §122.26(d)(2)(v) and §122.34(d)(1)(i) are to be included, as well as a cumulative list of all SWMP revisions during the permit term.

   Class A permittees shall include revisions, if necessary, to the fiscal analysis reported in the permit application (or NOI for coverage under this permit) under §122.26(d)(2)(vi).

3. **Performance assessment**: shall include:

   a. an assessment of performance in terms of measurable goals, including, but not limited to, a description of the number and nature of enforcement actions and inspections, public education and public involvement efforts;

   b. a summary of the data, including monitoring data, that is accumulated throughout the monitoring year (July 1 to June 30); actual values of representative monitoring results shall be included, if results are above minimum quantification level (MQL); and

   c. an identification of water quality improvements or degradation.

4. **Annual expenditures**: for the reporting period, with a breakdown for the major elements of the stormwater management program and the budget for the year following each annual report. (Applicable only to Class A permittees)

5. **Annual Report Responsibilities for Cooperative Programs:** preparation of a system-wide report with cooperative programs may be coordinated among cooperating MS4s and then used as part of individual Annual Reports. The report of a cooperative program element shall indicate which, if any, permittee(s) have failed to provide the required information on the portions of the MS4 for which they are responsible to the cooperation permittees.

   a. Joint responsibility for reports covering cooperative programs elements shall be limited to participation in preparation of the overview for the entire system and inclusion of the identity of any permittee who failed to provide input to the annual report.

b. Individual permittees shall be individually responsible for content of the report relating to the portions of the MS4 for which they are responsible and for failure to provide information for the system-wide annual report no later than July 31st of each year.

6. **Public Review and Comment**: a brief summary of any issues raised by the public on the draft Annual Report, along with permittee's responses to the public comments.

7. **Signature on Certification of Annual Reports**: The annual report shall be signed and certified, in accordance with Part IV.H and include a statement or resolution that the permittee's governing body or agency (or delegated representative) has reviewed or been apprised of the content of the Annual Report. Annual report shall be due no later than December 1st of each year. A complete copy of the signed Annual Report should be maintained on site.

C. CERTIFICATION AND SIGNATURE OF RECORDS.

All reports required by the permit and other information requested by the EPA shall be signed and certified in accordance with Part IV.H.

D. REPORTING: WHERE AND WHEN TO SUBMIT

1. Monitoring results (Part III.A.1, Part III.A.3, Part III.A.5.a) obtained during the reporting period running from July 1st to June 30th shall be submitted on discharge monitoring report (DMR) forms along with the annual report required by Part III.B. A separate DMR form is required for each monitoring period (season) specified in Part III.A.1. If any individual analytical test result is less than the minimum quantification level (MQL) listed for that parameter, then a value of zero (0) may be used for that test result for the discharge monitoring report (DMR) calculations and reporting requirements. The annual report shall include the actual value obtained, if test result is less than the MQL (See Appendix F).

2. Signed copies of DMRs required under Part III, the Annual Report required by Part III.B, and all other reports required herein, shall be submitted in electronic form to R6_MS4Permits@epa.gov (note: there is an underscore between R6 and MS4).

   Copy of a suggested Annual Report Format is located in EPA R6 website: http://epa.gov/region6/water/npdes/sw/ms4/index.htm.

   Electronic submittal of the documents required in the permit using a compatible Integrated Compliance Information System (ICIS) format would be allowed if available.

3. Requests for SWMP updates, modifications in monitoring locations, or application for an individual permit shall, be submitted to,:

   U.S. EPA, Region 6
   Water Quality Protection Division
   Operations Support Office (6WQ-O)
   1445 Ross Avenue
   Dallas, Texas 75202-2733

4. Additional Notification. Permittee(s) shall also provide copies of NOIs, DMRs, annual reports, NOTs, requests for SWMP updates, items for compliance with permit requirements for Compliance with Water Quality Standards in Part I.C.1, TMDL's reports established in Part I.C.2, monitoring scheme, reports, and certifications required in Part III.A.1, programs or changes in monitoring locations, and all other reports required herein, to:

New Mexico Environment Department
Attn: Bruce Yurdin, Program Manager
Surface Water Quality Bureau
Point Source Regulation Section
P.O. Box 5469
Santa Fe, New Mexico 87502

Pueblo of Sandia Environment Department
Attn: Scott Bulgrin, Water Quality Manager
481 Sandia Loop
Bernalillo, NM 87004
(Note: Only those MS4s with discharges upstream of or to waters under the jurisdictional of the Pueblo of Sandia: AMAFCA, Sandoval County, Village of Corrales, City of Rio Rancho, Town of Bernalillo, SSCAFCA, and ESCAFCA)

Pueblo of Isleta
Attn: Ramona M. Montoya, Environment Division Manager
P.O. Box 1270
Isleta NM 87022

(Notes: Only the City of Albuquerque, Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), New Mexico Department of Transportation (NMDOT) District 3, KAFB (Kirtland Air Force Base), Sandia Labs (DOE), and Bernalillo County). All parties submitting an NOI or NOT shall notify the Pueblo of Isleta in writing that a NOI or NOT has been submitted to EPA

Water Resources Division Manager
Pueblo of Santa Ana
2 Dove Road
Santa Ana Pueblo, New Mexico 87004
(Note: Only those MS4s with discharges upstream of or to waters under the jurisdictional of the Pueblo of Santa Ana)

PART IV. STANDARD PERMIT CONDITIONS

A. DUTY TO COMPLY.

The permittee(s) must comply with all conditions of this permit insofar as those conditions are applicable to each permittee, either individually or jointly. Any permit noncompliance constitutes a violation of the Clean Water Act (The Act) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

B. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS.

The EPA will adjust the Civil and administrative penalties listed below in accordance with the Civil Monetary Penalty Inflation Adjustment Rule (Federal Register: Dec. 31, 1996, Volume 61, No. 252, pages 69359-69366, as corrected, March 20, 1997, Volume 62, No. 54, pages 13514-13517) as mandated by the Debt Collection Improvement Act of 1996 for inflation on a periodic basis. This rule allows EPA's penalties to keep pace with inflation. The Agency is required to review its penalties at least once every four years thereafter and to adjust them as necessary for inflation according to a specified formula. The civil and administrative penalties listed below were adjusted for inflation starting in 1996.

1. **Criminal Penalties**.
   a. Negligent Violations: The Act provides that any person who negligently violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one (1) year, or both.

   b. Knowing Violations: The Act provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than three (3) years, or both.

   c. Knowing Endangerment: The Act provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than $250,000, or by imprisonment for not more than fifteen (15) years, or both.

   d. False Statement: The Act provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than two (2) years, or by both. If a conviction is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four (4) years, or by both. (See Section 309(c)(4) of the Act).

2. **Civil Penalties**. The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed $27,500 per day for each violation.

3. **Administrative Penalties**. The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty, as follows:

   a. Class I penalty: Not to exceed $11,000 per violation nor shall the maximum amount exceed $27,500.

b. Class II penalty: Not to exceed $11,000 per day for each day during which the violation continues nor shall the maximum amount exceed $137,500.

C. **DUTY TO REAPPLY**. If the permittee wishes to continue an activity regulated by this permit after the permit expiration date, the permittee must apply for and obtain a new permit. The application shall be submitted at least 180 days prior to expiration of this permit. The EPA may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date. Continuation of expiring permits shall be governed by regulations promulgated at 40 CFR §122.6 and any subsequent amendments.

D. **NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE**. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

E. **DUTY TO MITIGATE**. The permittee(s) shall take all reasonable steps to control or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. **DUTY TO PROVIDE INFORMATION**. The permittee(s) shall furnish to the EPA, within a time specified by the EPA, any information which the EPA may request to determine compliance with this permit. The permittee(s) shall also furnish to the EPA upon request copies of records required to be kept by this permit.

G. **OTHER INFORMATION**. When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in any report to the EPA, he or she shall promptly submit such facts or information.

H. **SIGNATORY REQUIREMENTS**. For a municipality, State, or other public agency, all DMRs, SWMPs, reports, certifications or information either submitted to the EPA or that this permit requires be maintained by the permittee(s), shall be signed by either a:

1. Principal executive officer or ranking elected official; or

2. Duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the EPA.

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. A duly authorized representative may thus be either a named individual or any individual occupying a named position.

3. If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new written authorization satisfying the requirements of this paragraph must be submitted to the EPA prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification: Any person signing documents under this section shall make the following certification: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

I. **PENALTIES FOR FALSIFICATION OF MONITORING SYSTEMS.** The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by fines and imprisonment described in Section 309 of the Act.

J. **OIL AND HAZARDOUS SUBSTANCE LIABILITY.** Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under section 311 of the Act or section 106 of CERCLA.

K. **PROPERTY RIGHTS.** The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

L. **SEVERABILITY.** The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

M. **REQUIRING A SEPARATE PERMIT.**

1. The EPA may require any permittee authorized by this permit to obtain a separate NPDES permit. Any interested person may petition the EPA to take action under this paragraph. The Director may require any permittee authorized to discharge under this permit to apply for a separate NPDES permit only if the permittee has been notified in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form (as necessary), a statement setting a deadline for the permittee to file the application, and a statement that on the effective date of the separate NPDES permit, coverage under this permit shall automatically terminate. Separate permit applications shall be submitted to the address shown in Part III.D. The EPA may grant additional time to submit the application upon request of the applicant. If an owner or operator fails to submit, prior to the deadline of the time extension, a separate NPDES permit application as required by the EPA, then the applicability of this permit to the permittee is automatically terminated at the end of the day specified for application submittal.

2. Any permittee authorized by this permit may request to be excluded from the coverage of this permit by applying for a separate permit. The permittee shall submit a separate application as specified by 40 CFR §122.26(d) for Class A permittees and by 40 CFR §122.33(b)(2) for Class B, C, and D permittees, with reasons supporting the request to the Director. Separate permit applications shall be submitted to the address shown in Part III.D.3. The request may be granted by the issuance of a separate permit if the reasons cited by the permittee are adequate to support the request.

3. When an individual NPDES permit is issued to a discharger otherwise subject to this permit, or the permittee is authorized to discharge under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual NPDES permit is denied to an operator otherwise subject to this permit, or the operator is denied for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by the permitting authority.

N. **STATE / ENVIRONMENTAL LAWS.**

1. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by section 510 of the Act.

2. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

O. PROPER OPERATION AND MAINTENANCE. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of stormwater management programs. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

P. MONITORING AND RECORDS.

1. The permittee must retain records of all monitoring information, including, all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, copies of Discharge Monitoring Reports (DMRs), a copy of the NPDES permit, and records of all data used to complete the NOI for this permit, for a period of at least three years from the date of the sample, measurement, report or application, or for the term of this permit, whichever is longer. This period may be extended by request of the permitting authority at any time.

2. The permittee must submit its records to the permitting authority only when specifically asked to do so. The permittee must retain a description of the SWMP required by this permit (including a copy of the permit language) at a location accessible to the permitting authority. The permittee must make its records, including the NOI and the description of the SWMP, available to the public if requested to do so in writing.

3. Records of monitoring information shall include:
   a. The date, exact place, and time of sampling or measurements;
   b. The initials or name(s) of the individual(s) who performed the sampling or measurements;
   c. The date(s) analyses were performed;
   d. The time(s) analyses were initiated;
   e. The initials or name(s) of the individual(s) who performed the analyses;
   f. References and written procedures, when available, for the analytical techniques or methods used; and
   g. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

4. The permittee must maintain, for the term of the permit, copies of all information and determinations used to document permit eligibility under Parts I.A.5.f and Part I.A.3.b.

Q. MONITORING METHODS. Monitoring must be conducted according to test procedures approved under 40 CFR §136, unless other test procedures have been specified in this permit. The minimum quantification levels (MQLs) in Appendix F are to be used for reporting pollutant data for NPDES permit applications and/or compliance reporting.

R. INSPECTION AND ENTRY. The permittee shall allow the EPA or an authorized representative of EPA, or the State, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Act, any substance or parameters at any location.

S. **PERMIT ACTIONS.** This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

T. **ADDITIONAL MONITORING BY THE PERMITTEE(S).** If the permittee monitors more frequently than required by this permit, using test procedures approved under 40 CFR §136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report (DMR). Such increased monitoring frequency shall also be indicated on the DMR.

U. **ARCHEOLOGICAL AND HISTORIC SITES** (Applicable to areas within the corporate boundary of the City of Albuquerque and Tribal lands). This permit does not authorize any stormwater discharges nor require any controls to control stormwater runoff which are not in compliance with any historic preservation laws.

1. In accordance with the Albuquerque Archaeological Ordinance (Section 2-12-2, 14-16-5, and 14-14-3-4), an applicant for either:

   a. A preliminary plan for any subdivision that is five acres or more in size; or

   b. A site development plan or master development plan for a project that is five acres or more in size on property that is zoned SU-1 Special Use, IP Industrial Park, an SU-2 zone that requires site plan review, PC Planned Community with a site, or meets the Zoning Code definition of a Shopping Center must first obtain either a Certificate of No Effect or a Certificate of Approval from the City Archaeologist. Details of the requirements for a Certificate of No Effect or a Certificate of Approval are described in the ordinance. Failure to obtain a certificate as required by ordinance shall subject the property owner to the penalties of §1-1-99 ROA 1994.

2. If municipal excavation and/or construction projects implementing requirements of this permit will result in the disturbance of previously undisturbed land, and the project is not required to have a separate NPDES permit (e.g. general permit for discharge of stormwater associated with construction activity), then the permittee may seek authorization for stormwater discharges from such sites of disturbance by:

   a. Submitting, thirty (30) days prior to commencing land disturbance, the following to the State Historic Preservation Officer (SHPO) and to appropriate Tribes and Tribal Historic Preservation Officers for evaluation of possible effects on properties listed or eligible for listing on the National Register of Historic Places:

      (i) A description of the construction or land disturbing activity and the potential impact that this activity may have upon the ground, and

      (ii) A copy of a USGS topographic map outlining the location of the project and other ancillary impact areas.

      (iii) The addresses of the SHPO. Sandia Pueblo, and Isleta Pueblo are:

State Historic Preservation Officer
New Mexico Historic Preservation Division

Bataan Memorial Building
407 Galisteo Street, Ste. 236
Santa Fe, New Mexico 87501

Pueblo of Sandia Environment Department
Attn: Frank Chaves, Environment Director
481 Sandia Loop
Bernalillo, New Mexico 87004

Pueblo of Isleta
Department of Cultural and Historic Preservation
Attn: Daniel Waseta, Director
P.O. Box 1270
Isleta NM 87022

Water Resources Division Manager
Pueblo of Santa Ana
2 Dove Road
Santa Ana Pueblo, New Mexico 87004

3. If the permittee receives a request for an archeological survey or notice of adverse effects from the SHPO, the permittee shall delay such activity until:

   a. A cultural resource survey report has been submitted to the SHPO for a review and a determination of no effect or no adverse effect has been made, and

   b. If an adverse effect is anticipated, measures to minimize harm to historic properties have been agreed upon between the permittee and the SHPO.

4. If the permittee does not receive notification of adverse effects or a request for an archeological survey from the SHPO within thirty (30) days, the permittee may proceed with the activity.

5. Alternately, the permittee may obtain authorization for stormwater discharges from such sites of disturbance by applying for a modification of this permit. The permittee may apply for a permit modification by submitting the following information to the Permitting Authority 180 days prior to commencing such discharges:

   a. A letter requesting a permit modification to include discharges from activities subject to this provision, in accordance with the signatory requirements in Part IV.H.

   b. A description of the construction or land disturbing activity and the potential impact that this activity may have upon the ground; County in which the facility will be constructed; type of facility to be constructed; size area (in acres) that the facility will encompass; expected date of construction; and whether the facility is located on land owned or controlled by any political subdivision of New Mexico; and

   c. A copy of a USGS topographic map outlining the location of the project and other ancillary impact areas.

V. **CONTINUATION OF THE EXPIRED GENERAL PERMIT.** If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedures Act and remain in force and effect. Any permittee who was granted permit coverage prior to the expiration date will automatically remain covered by the continued permit until the earlier of:

1. Reissuance or replacement of this permit, at which time the permittee must comply with the Notice of Intent conditions of the new permit to maintain authorization to discharge; or

2. Issuance of an individual permit for your discharges; or

3. A formal permit decision by the permitting authority not to reissue this general permit, at which time the permittee must seek coverage under an alternative general permit or an individual permit.

W. **PERMIT TRANSFERS**: This permit is not transferable to any person except after notice to the permitting authority. The permitting authority may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Act.

X. **ANTICIPATED NONCOMPLIANCE**. The permittee must give advance notice to the permitting authority of any planned changes in the permitted small MS4 or activity which may result in noncompliance with this permit. (see

Y. **PROCEDURES FOR MODIFICATION OR REVOCATION**: Permit modification or revocation will be conducted according to 40 CFR 122.62, 122.63, 122.64 and 124.5.

PART V. PERMIT MODIFICATION

A. **MODIFICATION OF THE PERMIT**. The permit may be reopened and modified, in accordance with 40 CFR §122.62, §122.63, and §124.5, during the life of the permit to address:

1. Changes in the State's Water Quality Management Plan, including Water Quality Standards;
2. Changes in applicable water quality standards, statutes or regulations;
3. A new permittee who is the owner or operator of a portion of the MS4;
4. Changes in portions of the SWMP that are considered permit conditions;
5. Construction activities implementing requirements of this permit that will result in the disturbance of previously undisturbed land and not required to have a separate NPDES permit; or
6. Other modifications deemed necessary by the EPA to meet the requirements of the Act.

B. **MODIFICATION OF THE SWMP(s)**. Only those portions of the SWMPs specifically required as permit conditions shall be subject to the modification requirements of 40 CFR §124.5. Addition of components, controls, or requirements by the permittee(s); replacement of an ineffective or infeasible control implementing a required component of the SWMP with an alternate control expected to achieve the goals of the original control; and changes required as a result of schedules contained in Part VI shall be considered minor changes to the SWMP and not modifications to the permit. (See also Part I.D.6)

C. **CHANGES IN REPRESENTATIVE MONITORING SITES**. Changes in monitoring sites, other than those with specific numeric effluent limitations (as described in Part III.A.1.g), shall be considered minor modifications to the permit and shall be made in accordance with the procedures at 40 CFR §122.63.

PART VI. SCHEDULES FOR IMPLEMENTATION AND COMPLIANCE.

A. **IMPLEMENTATION AND AUGMENTATION OF THE SWMP(s).** The permittee(s) shall comply with all elements identified in Parts I and III for SWMP implementation and augmentation, and permit compliance. The EPA shall have sixty (60) days from receipt of a modification or augmentation made in compliance with Part VI to provide comments or request revisions. During the initial review period, EPA may extend the time period for review and comment. The permittee(s) shall have thirty (30) days from receipt of the EPA's comments or required revisions to submit a response. All changes to the SWMP or monitoring plans made to comply with schedules in Parts I and III must be approved by EPA prior to implementation.

B. **COMPLIANCE WITH EFFLUENT LIMITATIONS.** Reserved.

C. **REPORTING COMPLIANCE WITH SCHEDULES.** No later than fourteen (14) days following a date for a specific action (interim milestone or final deadline) identified in the Part VI schedule(s), the permittee(s) shall submit a written notice of compliance or noncompliance to the EPA in accordance with Part III.D.

D. **MODIFICATION OF THE SWMP(s).** The permittee(s) shall modify its SWMP, as appropriate, in response to modifications required in Part VI.A. Such modifications shall be made in accordance with Part V.B.

PART VII. DEFINITIONS

All definitions contained in Section 502 of the Act shall apply to this permit and are incorporated herein by reference. Unless otherwise specified, additional definitions of words or phrases used in this permit are as follows:

(1) **Baseline Load** means the load for the pollutant of concern which is present in the waterbody before BMPs or other water quality improvement efforts are implemented.

(2) **Best Management Practices (BMPs)** means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

(3) **Bioretention** means the water quality and water quantity stormwater management practice using the chemical, biological and physical properties of plants, microbes and soils for the removal of pollution from stormwater runoff.

(4) **Canopy Interception** means the interception of precipitation, by leaves and branches of trees and vegetation that does not reach the soil.

(5) **Contaminated Discharges:** The following discharges are considered contaminated:
- Has had a discharge resulting in the discharge of a reportable quantity for which notification is or was required pursuant to 40 CFR 117.21 or 40 CFR 302.6 at any time since November 16, 1987; or
- Has had a discharge resulting in the discharge of a reportable quantity for which notification is or was required pursuant to 40 CFR 110.6 at any time since November 16, 1987; or
- Contributes to a violation of an applicable water quality standard.

(6) **Controls** or **Control Measures** or **Measures** means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or control the pollution of waters of the United States. Controls also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

(7) **Controllable Sources**: Sources, private or public, which fall under the jurisdiction of the MS4.

(8) **CWA** or **The Act** means Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub.L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483 and Pub. L. 97-117, 33 U.S.C. 1251 et.seq.

(9) **Co-permittee** means a permittee to a NPDES permit that is only responsible for permit conditions relating to the discharge for which it is operator.

(10) **Composite Sample** means a sample composed of two or more discrete samples. The aggregate sample will reflect the average water quality covering the compositing or sample period.

(11) **Core Municipality** means, for the purpose of this permit, the municipality whose corporate boundary (unincorporated area for counties and parishes) defines the municipal separate storm sewer system. (ex. City of Dallas for the Dallas Municipal Separate Storm Sewer System, Harris County for unincorporated Harris County).

(12) **Direct Connected Impervious Area (DCIA)** means the portion of impervious area with a direct hydraulic connection to the permitee's municipal separate storm sewer system or a waterbody via continuous paved surfaces, gutters, pipes, and other impervious features. Direct connected impervious area typically does not include isolated impervious areas with an indirect hydraulic connection to the municipal separate storm sewer system (e.g., swale or detention basin) or that otherwise drain to a pervious area.

(13) **Director** means the Regional Administrator or an authorized representative.

(14) **Discharge** for the purpose of this permit, unless indicated otherwise, means discharges from the municipal separate storm sewer system.

(15) **Discharge-related activities"** include: activities which cause, contribute to, or result in storm water point source pollutant discharges; and measures to control storm water discharges, including the sitting, construction and operation of best management practices (BMPs) to control, reduce or prevent storm water pollution.

(16) **Engineered Infiltration** means an underground device or system designed to accept stormwater and slowly exfiltrates it into the underlying soil. This device or system is designed based on soil tests that define the exfiltration rate.

(17) **Evaporation** means rainfall that is changed or converted into a vapor.

(18) **Evapotranspiration** means the sum of evaporation and transpiration of water from the earth's surface to the atmosphere. It includes evaporation of liquid or solid water plus the transpiration of plants.

(19) **Extended Filtration** means a structural stormwater practice which filters stormwater runoff through vegetation and engineered soil media. A portion of the stormwater runoff drains into an underdrain system which slowly releases it after the storm is over.

(20) **Facility** means any NPDES "point source" or any other facility (including land or appurtenances thereto) that is subject to regulation under the NPDES program.
(21) **Flood Control Projects** mean major drainage projects developed to control water quantity rather than quality, including channelization and detention.
(22) **Flow-weighted composite sample** means a composite sample consisting of a mixture of aliquots collected at a constant time interval, where the volume of each aliquot is proportional to the flow rate of the discharge.
(23) **Grab Sample** means a sample which is taken from a wastestream on a one-time basis without consideration of the flow rate of the wastestream and without consideration of time.
(24) **Green Infrastructure** means an array of products, technologies, and practices that use natural systems – or engineered systems that mimic natural processes – to enhance overall environmental quality and provide utility services. As a general principal, Green Infrastructure techniques use soils and vegetation to infiltrate, evapotranspirate, and/or recycle stormwater runoff. When used as components of a stormwater management system, Green Infrastructure practices such as green roofs, porous pavement, rain gardens, and vegetated swales can produce a variety of environmental benefits. In addition to effectively retaining and infiltrating rainfall, these technologies can simultaneously help filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon while also providing communities with aesthetic and natural resource benefits.
(25) **Hydromodification** means the alteration of the natural flow of water through a landscape, and often takes the form of channel straightening, widening, deepening, or relocating existing, natural stream channels. It also can involve excavation of borrow pits or canals, building of levees, streambank erosion, or other conditions or practices that change the depth, width or location of waterways. Hydromodification usually results in water quality and habitat impacts.
(26) **Illicit connection** means any man-made conveyance connecting an illicit discharge directly to a municipal separate storm sewer.
(27) **Illicit discharge** means any discharge to a municipal separate storm sewer that is not composed entirely of stormwater except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities.
(28) **Impervious Area (IA)** means conventional pavements, sidewalks, driveways, roadways, parking lots, and rooftops.
(29) **Indian Country** means:
   a. All land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation;
   b. All dependent Indian communities within the borders of the United States whether within the originally or subsequently acquired territory thereof, and whether within or without the limits of a state; and
   c. All Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same. This definition includes all land held in trust for an Indian tribe.
(30) **Individual Residence** means, for the purposes of this permit, single or multi-family residences. (e.g. single family homes and duplexes, town homes, apartments, etc.)
(31) **Infiltration** means the process by which stormwater penetrates the soil.
(32) **Land application unit** means an area where wastes are applied onto or incorporated into the soil surface (excluding manure spreading operations) for treatment or disposal.
(33) **Landfill** means an area of land or an excavation in which wastes are placed for permanent disposal, and which is not a land application unit, surface impoundment, injection well, or waste pile.
(34) **Land Use** means the way in which land is used, especially in farming and municipal planning.
(35) **Large or medium municipal separate storm sewer system** means all municipal separate storm sewers that are either: (i) located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendix F of 40 CFR §122); or (ii) located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers are located in the incorporated places, townships, or towns within such counties (these counties are listed in Appendices H and I of 40 CFR §122); or (iii) owned or operated by a municipality other than those described in Paragraph (i) or (ii) and that are designated by the Regional Administrator as part of the large or medium municipal separate storm sewer system.
(36) **MEP** means maximum extent practicable, the technology-based discharge standard for municipal separate storm sewer systems to reduce pollutants in storm water discharges. A discussion of MEP as it applies to small MS4s is found at 40 CFR 122.34. CWA section 402(p)(3)(B)(iii) requires that a municipal permit "shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system design, and engineering methods, and other provisions such as the Administrator or the State determines appropriate for the control of such pollutants.
(37) **Measurable Goal** means a quantitative measure of progress in implementing a component of storm water management program.

(38) **Municipal Separate Storm Sewer (MS4)** means all separate storm sewers that are defined as "large" or "medium" or "small" municipal separate storm sewer systems pursuant to paragraphs 40 CFR §122.26(b)(4), (b)(7), and (b)(16), or designated under paragraph 40 CFR §122.26(a)(1)(v).

(39) **Non-traditional MS4** means systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings. 40 CFR 122.26(a)(16)(iii).

(40) **NOI** means Notice of Intent to be covered by this permit (see Part I.B of this permit)

(41) **NOT** means Notice of Termination.

(42) **Outfall** means a *point source* as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States.

(43) **Percent load reduction** means the difference between the baseline load and the target load divided by the baseline load.

(44) **Owner or operator** means the owner or operator of any "facility or activity" subject to regulation under the NPDES program.

(45) **Permittee** refers to any person (defined below) authorized by this NPDES permit to discharge to Waters of the United States.

(46) **Permitting Authority** means EPA, Region 6.

(47) **Person** means an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

(48) **Point Source** means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

(49) **Pollutant** is defined at 40 CFR 122.2. Pollutant means dredged spoil, solid waste, incinerator residue, filter back-wash, sewage, garbage, sewage sludge. Munitions, chemical waste, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011), heat, wrecked or discarded equipment, rock sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

(50) **Pre-development Hydrology**, Predevelopment hydrology is generally the rain volume at which runoff would be produced when a site or an area is in its natural condition, prior to development disturbances. For the Middle Rio Grande area, EPA considers predevelopment conditions to be a mix of woods and desert shrub.

(51) **Rainfall and Rainwater Harvesting** means the collection, conveyance, and storage of rainwater. The scope, method, technologies, system complexity, purpose, and end uses vary from rain barrels for garden irrigation in urban areas, to large-scale collection of rainwater for all domestic uses.

(52) **Soil amendment** means adding components to in-situ or native soils to increase the spacing between soil particles so that the soil can absorb and hold more moisture. The amendment of soils changes various other physical, chemical and biological characteristics so that the soils become more effective in maintaining water quality.

(53) **Storm drainage projects** include stormwater inlets, culverts, minor conveyances and a host of other structures or devices.

(54) **Storm sewer**, unless otherwise indicated, means a municipal separate storm sewer.

(55) **Stormwater** means stormwater runoff, snow melt runoff, and surface runoff and drainage.

(56) **Stormwater Discharge Associated with Industrial Activity** means the discharge from any conveyance which is used for collecting and conveying stormwater and which is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant (See 40 CFR §122.26(b)(14) for specifics of this definition).

(57) **Target load** means the load for the pollutant of concern which is necessary to attain water quality goals (e.g. applicable water quality standards).

(58) **Stormwater Management Program (SWMP)** means a comprehensive program to manage the quality of stormwater discharged from the municipal separate storm sewer system. For the purposes of this permit, the Stormwater Management Program is considered a single document, but may actually consist of separate programs (e.g. "chapters") for each permittee.

(59) **Targeted controls** means practices implemented to address particular pollutant of concern. For example litter program targets floatables.

(60) **Time-weighted composite** means a composite sample consisting of a mixture of equal volume aliquots collected at a constant time interval.

(61) **Total Maximum Daily Load (TMDL)** means a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. A TMDL is the sum of individual wasteload allocations for point sources (WLA), load allocations for non-point sources and natural background (LA), and must consider seasonal variation and include a margin of safety. The TMDL comes in the form of a technical document or plan.

(62) **Toxicity** means an LC50 of <100% effluent.

(63) **Waste load allocation (WLA)** means the portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality-based effluent limitation.

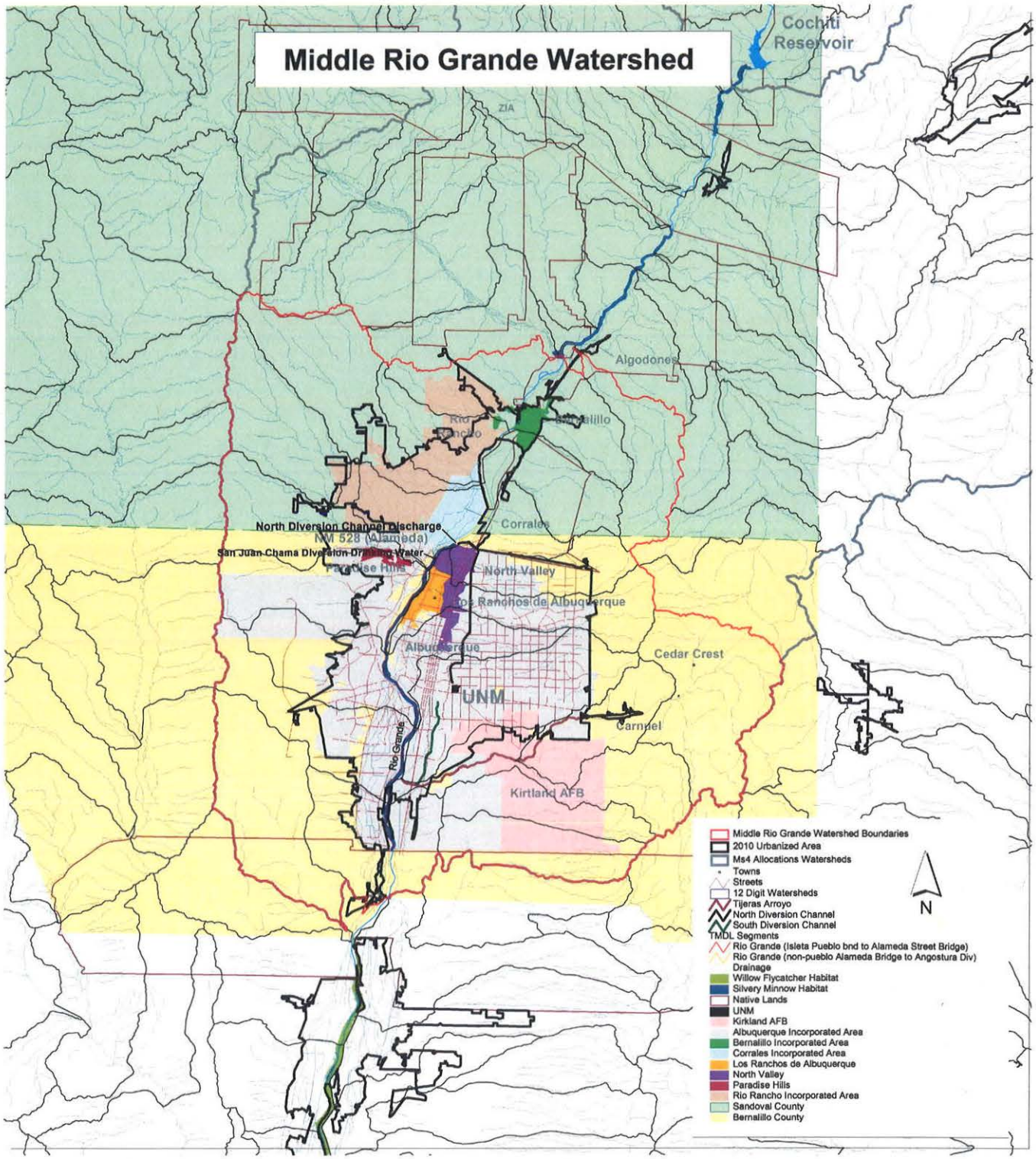
(64) **Wetlands** means those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

(65) **Whole Effluent Toxicity (WET)** means the aggregate toxic effect of an effluent measured directly by a toxicity test.

PART VIII PERMIT CONDITIONS APPLICABLE TO SPECIFIC AREAS OR INDIAN COUNTY LANDS

Reserved

Appendix A - Middle Rio Grande Watershed Jurisdictions and Potential Permittees



Middle Rio Grande Watershed Jurisdictions and Potential Permittees

Class A:
City of Albuquerque
AMAFCA (Albuquerque Metropolitan Arroyo Flood Control Authority)
UNM (University of New Mexico)
NMDOT (New Mexico Department of Transportation District 3)

Class B:
Bernalillo County
Sandoval County
Village of Corrales
City of Rio Rancho
Los Ranchos de Albuquerque
KAFB (Kirtland Air Force Base)
Town of Bernalillo
EXPO (State Fairgrounds/Expo NM)
SSCAFCA (Southern Sandoval County Arroyo Flood Control Authority)
NMDOT (New Mexico Department of Transportation District 3)

Class C:
ESCAFCA (Eastern Sandoval County Arroyo Flood Control Authority)
Sandia Labs (DOE)

Class D:
Pueblo of Sandia
Pueblo of Isleta
Pueblo of Santa Ana

Note: There could be additional potential permittees.
NMDOT Dist. 3 falls into the Class A type permittee, if an individual program is developed or/and implemented. The timelines for cooperative programs should be used, if NMDOT Dist. 3 cooperates with other permittees.

Appendix B - Total Maximum Daily Loads (TMDLs)

B.1. Approved Total Maximum Daily Loads (TMDLs) Tables

A bacteria TMDL for the Middle Rio Grande was approved by the New Mexico Water Quality Control Commission on April 13, 2010, and by EPA on June 30, 2010. The new TMDL modifies: 1) the indicator parameter for bacteria from fecal coliform to *E. coli*, and 2) the way the WLAs are assigned

Discharges to Impaired Waters – TMDL Waste Load Allocations (WLAs)[2] for *E. coli*: Rio Grande[1]

Stream Segment	Stream Name	Permittee Class	FLOW CONDITIONS & ASSOCIATED WLA (cfu/day)[3]				
			High	Moist	Mid-Range	Dray	Low
2105_50	Isleta Pueblo boundary to Alameda Street Bridge (based on flow at USGS Station NM08330000)	Class A [4]	3.36×10^{10}	8.41×10^{10}	5.66×10^{10}	2.09×10^{10}	4.67×10^{9}
		Class B[5] Class C[6]	3.73×10^{9}	9.35×10^{9}	6.29×10^{9}	2.32×10^{9}	5.19×10^{8}
2105.1_00	non-Pueblo Alameda Bridge to Angostura Diversion (based on flow at USGS Station NM08329928)	Class A	5.25×10^{10}	1.52×10^{10}	_	5.43×10^{9}	2.80×10^{9}
		Class B Class C	2.62×10^{11}	7.59×10^{10}	_	2.71×10^{10}	1.40×10^{10}

1 Total Maximum Daily Load for the Middle Rio Grande Watershed, NMED, 2010.
2 The WLAs for the stormwater MS4 permit was based on the percent jurisdiction area approach. Thus, the MS4 WLAs are a percentage of the available allocation for each hydrologic zone, where the available allocation = TMDL – WLA – MOS.
3 Flow conditions relate to percent of days the flow in the Rio Grande at a USGS Gauge exceeds a particular level: High 0-10%; Moist 10-40%; Mid-Range 40-60%; Dry 60-90%; and Low 90-100%. (Source: Figures 4.3 and 4.4 in 2010 Middle Rio Grande TMDL)
4 Phase I MS4s
5 Phase II MS4s (2000 Census)
6 New Phase II MS4s (2010 Census or MS4s designated by the Director)

Estimating Target Loadings for Particular Monitoring Location:

The Table in B.2 below provides a mechanism to calculate, based on acreage within a drainage area, a target loading value for a particular monitoring location.

B.2. Calculating Alternative Sub-measurable Goals

Individual permittees or a group of permittees seeking alternative sub-measureable goals under C.2.b.(i).(c).B should consult NMED. Preliminary proposals should be submitted with the Notice of Intent (NOI) under Part I.B.2.k according to the due dates specified in Part I.B.1.a of the permit. This proposal shall include, but is not limited to, the following items

B.2.1 **Determine base loading for subwatershed areas consistent with TMDL**

a. Using the table below, the permittee must develop a target load consistent with the TMDL for any sampling point in the watershed (even if it includes area outside the jurisdictional area of the permit).

E. coli loading on a per area basis (cfu/sq mi/day)

	high	moist	mid	dry	low
Alameda to Isleta	1.79E+09	4.48E+08	3.02E+08	1.11E+08	2.58E+07
Angostura to Alameda	3.25E+09	9.41E+08	5.19E+08	3.37E+08	1.74E+08

b. An estimation of the pertinent, subwatershed area that the permittee is responsible for and the basis for determining that area, including the means for excluding any tributary inholdings;

c. Using the total loading for the watershed (from part a) and the percentage of the watershed area that is part of the permitee(s) jurisdiction (part b) to calculate a base WLA for this subwatershed.

B.2.2 Set Alternative subwatershed targets

a. Permittee(s) may reallocate WLA within and between subwatershed based on factors including:

- Population density within the pertinent watershed area;
- Slope of the waterway;
- Percent impervious surface and how that value was determined;
- Stormwater treatment, installation of green infrastructure for the control or treatment of stormwater and stormwater pollution prevention and education programs within specific watersheds

b. A proposal for an alternative subwatershed target must include the rationale for the factor(s) used

B.2.3 Ensure overall compliance with TMDL WLA allocation

The permitee(s) will provide calculations demonstrating the total WLA under the alternative proposed in (Part II) is consistent with the baseline calculated in (Part I) based on their total jurisdictional area. Permittee(s) will not be allowed to allocate more area within the watershed than is accorded to them under their jurisdictional area. For permittees that work cooperatively, WLA calculations may be combined and used where needed within the sub-watershed amongst the cooperating parties.

WLA calculations must be sent as part of the Notice of Intent to EPA via e-mail at R6_MS4Permits@epa.gov. These calculations must also be sent to:

Sarah Holcomb
Industrial and Stormwater Team Leader
NMED Surface Water Quality Bureau
P.O. Box 5469,

Appendix C - Historic Properties Eligibility Procedures

MS4 operators must determine whether their MS4's storm water discharges, allowable non-storm water discharges, or construction of best management practices (BMPs) to control such discharges, have potential to affect a property that is either listed or eligible for listing on the National Register of Historic Places.

For existing dischargers who do not need to construct BMPs for permit coverage, a simple visual inspection may be sufficient to determine whether historic properties are affected. However, for MS4s which are new storm water dischargers and for existing MS4s which are planning to construct BMPs for permit eligibility, MS4 operators should conduct further inquiry to determine whether historic properties may be affected by the storm water discharge or BMPs to control the discharge. In such instances, MS4 operators should first determine whether there are any historic properties or places listed on the National Register or if any are eligible for listing on the register (e.g., they are "eligible for listing").

Due to the large number of entities seeking coverage under this permit and the limited number of personnel available to State and Tribal Historic Preservation Officers nationwide to respond to inquiries concerning the location of historic properties, EPA suggests that MS4 operators first access the "National Register of Historic Places" information listed on the National Park Service's web page (www.nps.gov/nr/). Addresses for State Historic Preservation Officers and Tribal Historic Preservation Officers are listed in Parts II and III of this appendix, respectively. In instances where a Tribe does not have a Tribal Historic Preservation Officer, MS4 operators should contact the appropriate Tribal government office when responding to this permit eligibility condition. MS4 operators may also contact city, county or other local historical societies for assistance, especially when determining if a place or property is eligible for listing on the register. Tribes that do not currently reside in an area may also have an interest in cultural properties in areas they formerly occupied. Tribal contact information is available at http://www.epa.gov/region06/6dra/oejta/tribalaffairs/index.html

The following three scenarios describe how MS4 operators can meet the permit eligibility criteria for protection of historic properties under this permit:

(1) If historic properties are not identified in the path of an MS4's storm water and allowable non-storm water discharges or where construction activities are planned to install BMPs to control such discharges (e.g., diversion channels or retention ponds), then the MS4 operator has met the permit eligibility criteria under Part I.A.3.b.(i).

(2) If historic properties are identified but it is determined that they will not be affected by the discharges or construction of BMPs to control the discharge, the MS4 operator has met the permit eligibility criteria under Part.I.A.3.b.(ii).

(3) If historic properties are identified in the path of an MS4's storm water and allowable non-storm water discharges or where construction activities are planned to install BMPs to control such discharges, and it is determined that there is the potential to adversely affect the property, the MS4 operator can still meet the permit eligibility criteria under Part I.A.3.b.(ii) if he/she obtains and complies with a written agreement with the appropriate State or Tribal Historic Preservation Officer which outlines measures the MS4 operator will follow to mitigate or prevent those adverse effects. The operator should notify EPA before exercising this option.

The contents of such a written agreement must be included in the MS4's Storm Water Management Program.

In situations where an agreement cannot be reached between an MS4 operator and the State or Tribal Historic Preservation Officer, MS4 operators should contact EPA for assistance.

The term "adverse effects" includes but is not limited to damage, deterioration, alteration or destruction of the historic property or place. EPA encourages MS4 operators to contact the appropriate State or Tribal Historic Preservation Officer as soon as possible in the event of a potential adverse effect to a historic property.

MS4 operators are reminded that they must comply with applicable State, Tribal and local laws concerning the protection of historic properties and places.

I. Internet Information on the National Register of Historic Places
An electronic listing of the ``National Register of Historic Places," as maintained by the National Park Service on its National Register Information System (NRIS), can be accessed on the Internet at www.nps.gov/nr/.

II. State Historic Preservation Officers (SHPO)
SHPO List for areas covered by the permit:

NEW MEXICO
Historic Preservation Div, Office of Cultural Affairs
Bataan Memorial Building, 407 Galisteo Street, Suite 236
Santa Fe, NM 87501
505-827-6320 FAX: 505-827-6338

III. Tribal Historic Preservation Officers
(THPO)
In instances where a Tribe does not have a Tribal Historic Preservation Officer, please contact the appropriate Tribal government office when responding to this permit eligibility condition.

Tribal Historic Preservation Officers:
Mescalero Apache Tribe
P.O. Box 227
Mescalero, New Mexico 88340

Pueblo of Sandia Environment Department
Attn: Frank Chaves, Environment Director
481 Sandia Loop
Bernalillo, New Mexico 87004

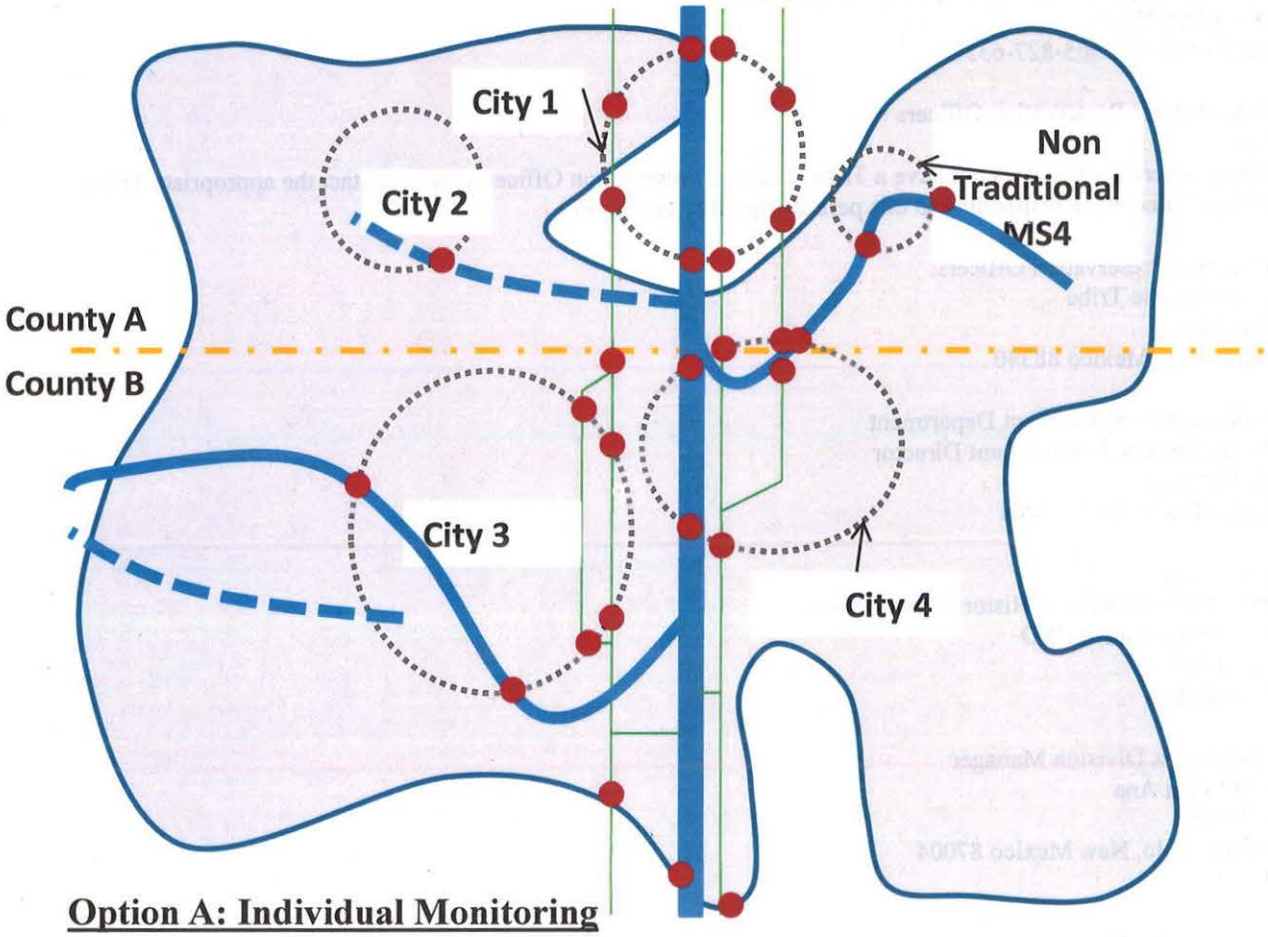
Pueblo of Isleta
Department of Cultural and Historic Preservation
Attn: Dr. Henry Walt, THPO
P.O. Box 1270
Isleta NM 87022

Water Resources Division Manager
Pueblo of Santa Ana
2 Dove Road
Santa Ana Pueblo, New Mexico 87004

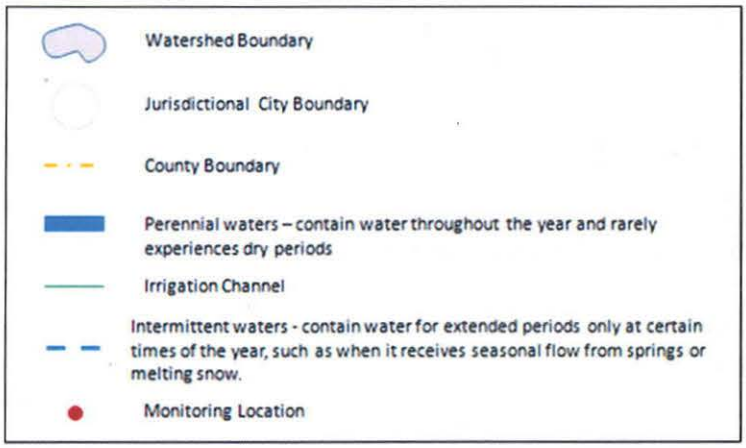
For more information:
National Association of Tribal Historic
Preservation Officers
P.O. Box 19189
Washington, DC 20036-9189
Phone: (202) 628-8476
Fax: (202) 628-2241

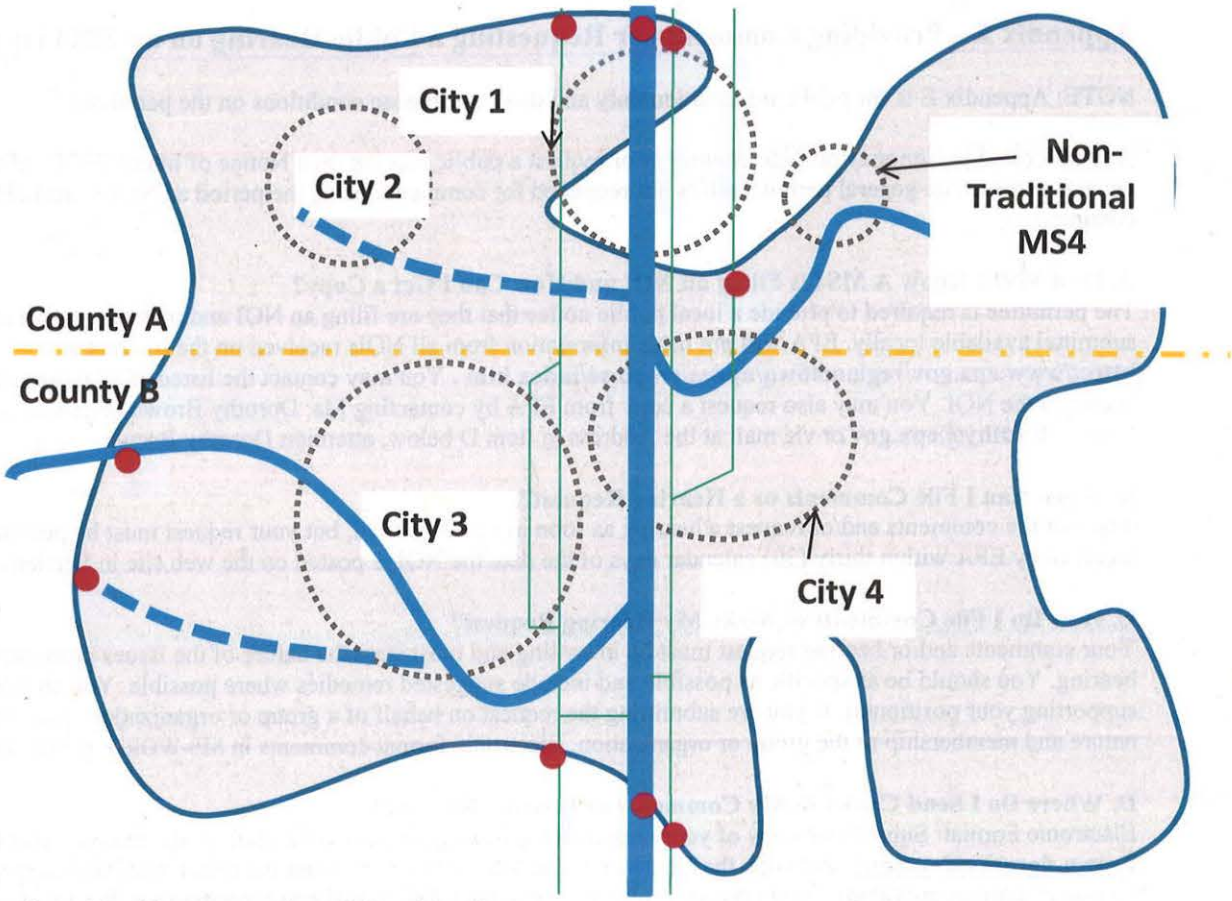
IV. Advisory Council on Historic Preservation
Advisory Council on Historic Preservation, 1100 Pennsylvania Avenue, NW., Suite 803, Washington, DC 20004 Telephone: (202) 606-8503, Fax: (202) 606-8647/8672, E-mail: achp@achp.gov

Appendix D - Suggested Initial Phase Sampling Location Concepts – Wet Weather Monitoring

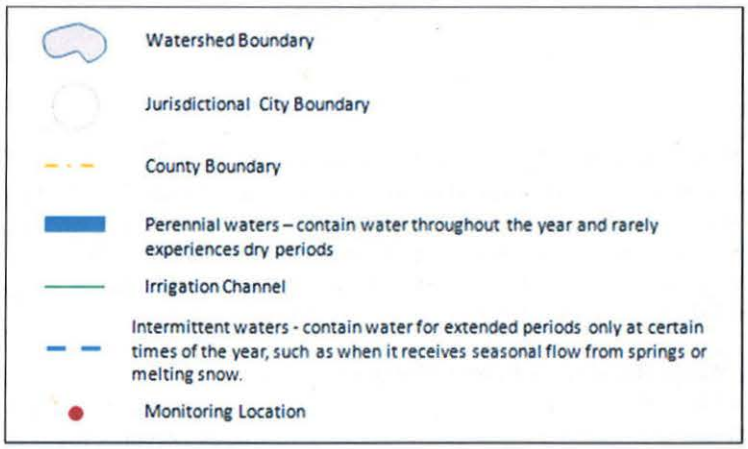


Option A: Individual Monitoring





Option B: Cooperative Monitoring



Appendix E - Providing Comments or Requesting a Public Hearing on an MS4 Operator's NOI

NOTE: Appendix E is for public information only and does not impose conditions on the permittee.

Any interested person may provide comments or request a public hearing on a Notice of Intent (NOI) submitted under this general permit. The general permit itself is not reopened for comment during the period an NOI is available for review and comment.

A. How Will I Know A MS4 is Filing an NOI and How Can I Get a Copy?
The permittee is required to provide a local public notice that they are filing an NOI and make a copy of the draft NOI submittal available locally. EPA will put basic information from all NOIs received on the Internet at: **http://www.epa.gov/region6/6wq/npdes/sw/sms4/index.htm** . You may contact the listed MS4 representative for local access to the NOI. You may also request a copy from EPA by contacting Ms. Dorothy Brown at 214-665-8141 or **brown.dorothy@epa.gov** or via mail at the Address in Item D below, attention Dorothy Brown.

B. When Can I File Comments or a Hearing Request?
You can file comments and/or request a hearing as soon as a NOI is filed, but your request must be postmarked or physically received by EPA within thirty (30) calendar days of the date the NOI is posted on the web site in Section A.

C. How Do I File Comments or Make My Hearing Request?
Your comments and/or hearing request must be in writing and must state the nature of the issues proposed to be raised in the hearing. You should be as specific as possible and include suggested remedies where possible. You should include any data supporting your position(s). If you are submitting the request on behalf of a group or organization, you should describe the nature and membership of the group or organization. Electronic format comments in MS-WORD or PDF format are preferred.

D. Where Do I Send Copies of My Comments or Hearing Request?
Electronic Format: Submit one copy of your comments or hearing request via e-mail to Ms. Dorothy Brown at **brown.dorothy@epa.gov** and copy the Operator of the MS4 at the address on the NOI (send hard copy to MS4 Operator if no e-mail address provided). You may also submit via compact disk or diskette formatted for PCs to addresses for hard copy below. (Hard Copy: You must send an original and one copy of your comments or hearing request to EPA at the address below and a copy to the Operator of the MS4 at the address provided on the NOI)

U.S. EPA Region 6
Water Quality Protection Division (6WQ-NP)
Attn: Dorothy Brown
1445 Ross Ave., Suite 1200
Dallas, TX 75202

E. How Will EPA Determine Whether or Not To Hold a Public Hearing?
EPA will evaluate all hearing requests received on an NOI to determine if a significant degree of public interest exists and whether issues raised may warrant clarification of the MS4 Operator's NOI submittal. EPA will hold a public hearing if a significant amount of public interest is evident. EPA may also, at the Agency's discretion, hold either a public hearing or an informal public meeting to clarify issues related to the NOI submittal. EPA may hold a single public hearing or public meeting covering more than one MS4 (e.g., for all MS4s in an Urbanized Area, etc.).

F. How Will EPA Announce a Pubic Hearing or Public Meeting?
EPA will provide public notice of the time and place for any public hearing or public meeting in a major newspaper with local distribution and via the Internet at **http://www.epa.gov/region6/6wq/npdes/sw/sms4/index.htm**.

G. What Will EPA Do With Comments on an NOI?
EPA will take all comments made directly or in the course of a public hearing or public meeting into consideration in determining whether or not the MS4 that submitted the NOI is appropriately covered under the general permit. The MS4 operator will have the opportunity to provide input on issues raised. The Director may require the MS4 operator to supplement or amend the NOI submittal in order to be authorized under the general permit or may direct the MS4 Operator to submit an individual permit application. A summary of issues raised and EPA's responses will be made available online at **http://www.epa.gov/region6/6wq/npdes/sw/sms4/index.htm.** A hard copy may also be requested by contacting Ms. Dorothy Brown (see paragraph D)

Appendix F - Minimum Quantification Levels (MQL's)

The following Minimum Quantification Levels (MQL's) are to be used for reporting pollutant data for NPDES permit applications and/or compliance reporting.

POLLUTANTS	MQL µg/l	POLLUTANTS	MQL µg/l
METALS, RADIOACTIVITY, CYANIDE and CHLORINE			
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thalllium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine	33
Mercury (*)	0.0005		
	0.005		
DIOXIN			
2,3,7,8-TCDD	0.00001		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Clorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10

POLLUTANTS	MQL µg/l	POLLUTANTS	MQL µg/l
		BASE/NEUTRAL	
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronapthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3'-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		
		PESTICIDES AND PCBS	
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4'-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs **	0.2
Alpha-Endosulfan	0.01	Toxaphene	0.3

(MQL's Revised November 1, 2007)

(*) Default MQL for Mercury is 0.005 unless Part I of your permit requires the more sensitive Method 1631 (Oxidation / Purge and Trap / Cold vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.

(**) EPA Method 1668 should be utilized when PCB water column monitoring is conducted to determine compliance with permit requirements. Either the Arochlor test (EPA Method 8082) or USGS test method (8093) may be utilized for purposes of sediment sampling as part of a screening program, but must use EPA Method 1668 (latest revision) for confirmation and determination of specific PCB levels at that location.

Appendix G – Oxygen Saturation and Dissolved Oxygen Concentrations North Diversion Channel Area

Concentrations of dissolved oxygen in water at various atmospheric pressures and temperatures with 100 percent oxygen saturation, 54.3 percent oxygen saturation (associated with hypoxia and harassment of silvery minnows), and 8.7 percent oxygen saturation (associated with anoxia and lethality of silvery minnows) at the North Diversion Channel (NDC) (based on USGS DO website <http://water.usgs.gov/software/DOTABLES/> for pressures between 628 to 648 millimeters of mercury (Hg)). Source: Biological Consultation Cons. #22420-2011-F-0024-R001

Water temp.	100°/o Oxygen Saturation at NDC			54.3% saturation = Harassmen			8.7% saturation= 50%Lethality		
(°C)	628mmHg	638mmHg	648mmHg	628mmHg	638mmHg	648mmHg	628mmHg	638mmHg	64BmmHg
0	12.1	12.3	12.5	66	6.7	6.8	1.1	1.1	1.1
1	11.7	11.9	12.1	64	6.5	6.6	1.0	1.0	1 1
2	11.4	11.6	11.8	6.2	6.3	8.4	1.0	1.0	1.0
▼	11.1	11.3	11.5	6.0	6.1	6.2	1.0	1.0	1.0
4	10.8	11	11.2	5.9	6.0	6.1	0.9	1.0	1.0
5	10.5	10.7	10.9	5.7	5.8	59	0.9	0.9	0.9
6	10.3	10.4	10.6	5.6	5.8	5.0	0.9	0.9	0.9
7	10	10.2	10.3	5.4	5.5	5.6	0.9	09	0.9
8	9.8	9.9	10.1	5.3	5.4	5.5	0.9	0.9	0.9
8	9.5	9.7	9.6	52	53	5.3	08	0.8	0.9
▼▼	93	9.5	96	50	5.2	5.2	0.0	0.8	0.8
11	9.1	9.2	9.4	4.9	5.0	5.1	0.8	0.8	08
12	8.9	9	9.2	4.8	4.9	5.0	0.8	0.8	08
13	8.7	8.8	9	4.7	4.8	4.9	0.8	0.8	0.8
14	8.5	8.6	8.8	4.8	4.7	4.8	0.7	0.7	0.0
15	8.3	8.4	8.8	4.5	4.6	4.7	0.7	0.7	0.7
16	0.1	83	0.4	4.4	4.5	4.6	07	0.7	0.7
17	8	8.1	8.2	4.3	4.4	4.5	0.7	0.7	0.7
16	7.8	7.9	8	4.2	43	43	07	0.7	0.7
19	76	7.8	7.9	4.1	4.2	4.3	0.7	07	0.7
20	7.5	76	7.7	4.1	4.1	42	07	07	0.7
21	7.3	7.4	7.6	4.0	4.0	4.1	0.6	0.6	0.7
22	7.2	7.3	7.4	3.9	4.0	4.0	0.6	0.6	0.6
23	7	72	7.3	3.8	3.9	4.0	0.6	0.6	0.6
24	6.9	7	7.1	3.7	3.8	3.9	0.6	0.6	0.6
25	6.8	69	7	3.7	3.7	3.6	0.6	0.6	0.6
26	6.7	68	6.9	3.6	3.7	3.7	0.6	0.6	06
27	6.5	8.6	8.8	3.5	3.6	3.7	06	0.6	0.8
26	6.4	8.5	8.6	3.5	3.5	3.6	0.6	0.8	08
29	6.3	8.4	6.5	3.4	3.5	3.5	0.5	06	0.8
20	82	83	6.4	3.4	3.4	3.5	0.5	0.5	0.8
31	6.1	6.2	6.3	3.3	3.4	3.4	0.5	0.5	OS
32	6	6.1	6.2	3.3	3.3	34	0.5	0.5	0.5
33	5.0	6	6.1	3.2	3.3	3.3	0.5	0.5	0.5
34	5.8	5.9	6	3.1	3.2	3.3	0.5	0.5	0.5
	5.7	5.6	5.9	31	3.1	3.2	0.5	0.5	0.5

Appendix B

Bernalillo County Notice of Intent (NOI)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202 - 2733

November 18, 2015

CERTIFIED MAIL: RETURNED RECEIPT REQUESTED (7014 0150 0000 2452 2492)

Ms. Anita Steed
Bernalillo County
2400 Broadway SE, Building N
Albuquerque, NM 87102

Re: Coverage under Middle Rio Grande (MRG) Watershed Based Municipal Sewer Separate Storm Sewer System General Permit (NPDES No. NMR04A000)

Permit Tracking Number: NMR04A008

Dear Ms. Steed:

The Environmental Protection Agency has reviewed your Notice of Intent (NOI) submittal and found it to be technically complete and has provided an opportunity for the public to review your NOI and other related documents prior to permit authorization becoming effective. No comments were received from the public during the public comment period. Authorization under this permit and duty to comply is effective as of the date of this letter.

Please contact Nelly Smith via email at Smith.Nelly@epa.gov or phone at (214) 665-7109 if you have questions or concerns regarding your coverage or the requirements included in the MRG MS4 General Permit.

Sincerely,

William K. Honker, P.E.
Director
Water Quality Protection Division

cc: Bruce Yurdin, Manager
Point Source Regulation Section, NMED

Sarah Holcomb, Industrial and Stormwater Team Supervisor
NMED

NOTICE OF INTENT

National Pollutant Discharge Elimination System Stormwater Program
MS4 Notice of Intent Format

Check box if you are submitting an individual NOI with one or more cooperative program elements. ☒

Check box if you are submitting an individual NOI with individual program elements only. ☐

Check box if your municipality or organization was previously covered under a MS4 permit. ☒

Please indicate the permittee class type: (Note: The definition of the permittee class type is located in Table 1 of Part I.B.1.)

☐ A (Phase I) ☒ B (Phase II) ☐ C (New Phase II) ☐ D (MS4s within Indian Lands)

I. MS4(s) Information

A. General Information

Bernalillo County (noted as BC throughout NOI)

Name of MS4

Anita | Steed | Water Resources

Name of Contact Person (First) (Last) (Title)

505-224-2122 | ASteed@BernCo.gov

Telephone (including area code) Email

2400 Broadway Blvd. SE, Building N

Mailing Address

Albuquerque | NM | 87102

City State ZIP code

What size population does your MS4(s) serve? 76,665 unincorporat

The operator is: ☐ Federal ☐ State ☐ Tribal ☒ other public (check one)

B. In what urbanized area (UA), the MS4 is located in:

Farmington UA ☐
Santa Fe UA ☐
Albuquerque UA ☒
Los Lunas UA ☐
Las Cruces UA ☐
El Paso UA ☐

C. If not located in an UA, the MS4 is located in:

Core Municipality
Indian Reservation/Pueblo
County(ies)
Cluster

D. Is this a Phase I MS4? ☐ Yes ☒ No

Is this a Non-traditional MS4? ☐ Yes ☒ No

If so, Check one: ☐ Dept. of Transportation ☐ Flood Control Authority ☐ University

Other - Specify

What is the Latitude and longitude of the approximate center of the MS4?

Latitude N 35° 5' 4.54" Longitude W -106° 38' 56.63"

II. Eligibility Determination

A. Receiving Water(s) Information

Does the MS4 discharge to any waters for which an TMDL applicable to discharges from the MS4 has been approved? (See Part I.A.5.f) ☒ Yes ☐ No ☐ NA

The receiving water(s) are:	*State or Tribal Segment ID*	*Approved TMDL*	*TMDL assigns WLA to MS4*
Rio Grande River	2105.50	☒ Yes ☐ No	☒ Yes ☐ No
BC will coordinate with other agencies in		☐ Yes ☐ No	☐ Yes ☐ No
meeting assigned WLA as specified in Part		☐ Yes ☐ No	☐ Yes ☐ No
I.C.2.b.i.c.B. See Attachment 1.		☐ Yes ☐ No	☐ Yes ☐ No
		☐ Yes ☐ No	☐ Yes ☐ No

Is the MS4 (or a group of MS4s) seeking an alternative sub-measureable goal for TMDL controls under Part I.C.2.b.(i).(c).B? ☒ Yes ☐ No ☐ NA

If so, the MS4 or a group of MS4s must submit a preliminary proposal with the NOI to EPA and NMED (see Part I.B.2.k, Section B.2 in Appendix B and Part III.D.4). This proposal should include, but is not limited to, the elements included in Appendix B under Section B.2 of the permit

If the MS4 discharges to a receiving water for which EPA has approved or developed a TMDL, describe how the eligibility requirements of Part I.A.5.f and Part I.C.2. have been met :

A bacterial TMDL for the MRG was approved by the NM Water Quality Control Commission on 4-13-10, and by EPA on 6-30-10. The new TMDL modifies: 1) the indicator parameter for bacteria from fecal coliform to E. coli, and 2) the way the WLA's are assigned.

BC SWMP will include focused BMPs, along with corresponding measurable goals, that the permittee will implement to reduce the discharge of pollutant(s) of concern that may contribute to the impairment of the water body.

B. Is the MS4 partially located on Indian Country lands? ☐ Yes ☒ No

If so, the Indian Country Lands include the following: (NOTE: MS4s straddling State and Indian Country land boundaries will be issued authorization under all applicable permits and may have additional State or Tribal-specific requirements applicable to different areas of the MS4 - see Part VIII and initial notification under Part III.D.4)

C. Is the permit in compliance with the National Historic Preservation Act (NHPA)? ☒ Yes ☐ No

In order to be eligible for coverage under this permit, the MS4 operator must meet one of the following criteria: (Please check which criterion the MS4 is eligible under)

Criterion A: storm water discharges, allowable non-storm water discharges, and discharge-related activities do not affect a property that is listed or is eligible for listing on the National Register of Historic Places as maintained by the Secretary of the Interior. ☒

Criterion B: the applicant has obtained and is in compliance with a written agreement with the State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO) (or equivalent tribal authority) that outlines all measures the MS4 operator will undertake to mitigate or prevent adverse effect to the historic property. ☐

Provide a brief summary of the basis for the criterion selected above:

Historic properties have not been identified in the path of BC's storm water and allowable non-storm water discharges.

III. Preliminary Description of the Proposed Stormwater Program

As applicable, use Sections 1 through 8 below to describe the storm water management program (SWMP), including best management practices (BMPs) or storm water controls that will be implemented and the measurable goals for each of the storm water minimum control measures specified in Part I.D.5 of this permit, the month and year in which the MS4 operator will start and fully implement each of the minimum control measures or the frequency of the action, the name of the person(s) or position(s) responsible for implementing or coordinating the SWMP.

If the MS4 operator is participating in cooperative programs with other parties (or is relying on another governmental entity) to satisfy one or more permit obligations (see Part I.D.3), use the space provided under ***Cooperative Elements*** to identify the partners and briefly describe roles and responsibilities.

NOTE:

The space provided in the fields below (255 characters) should be used to briefly describe proposed BMPs and corresponding measurable goals. Individual boxes should be used to describe individual target activities. If additional space is required to describe target activities, the MS4(s) should attach such as information with the NOI using the format provided.

Section 1. Construction Site Stormwater Runoff Control – Proposed BMPS, Stormwater Controls, and Measurable Goals

1.1. Development of an ordinance or other regulatory mechanism as required in Part I.D.5.a.(ii)(a)

BC will update existing ordinances and/ or sanctions regarding construction erosion and sediment controls, as necessary to ensure compliance with new construction measures as described in Part I.D.5.a.(ii)(a), to the extent allowable under law.

***For all sections 1-8 below: Bernalillo County (BC) intends to develop measurable goals and to meet all deadlines as detailed in the Permit and the modification issued April 09, 2015 as well as any subsequent deadline modifications issued by USEPA.

***For all sections 1-8 below: Bernalillo County (BC) Natural Resource Services will be the compliance coordinator for all Permit Elements. Point of contact will be the Water Resources Planner for Stormwater.

*** For all sections 1-8 below regarding any and all Measures referencing use of GI/LID/Sustainable practices, Bernalillo County (BC) specifies reference to and use of -Arid- GI/LID/Sustainable practices.

Cooperative Elements

Through existing and expanding partnership with the Village of Los Ranchos (VLR), BC and VLR will provide education to staff and local contractors on erosion/sediment controls, on-site pollution prevention, and understanding of stormwater quality.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the reduction of Construction Site Stormwater Runoff.

1.2. Develop requirements and procedures as required in Part I.D.5.a.(ii)(b) through in Part I.D.5.a.(ii)(h)

BC will continue to use existing procedures for the implementation of measures described in Part I.D.5.a.(ii)(b) through in Part I.D.5.a.(ii)(h) and to update or revise these procedures as necessary to improve the reduction of Construction Site Runoff.

** For any and all Construction Measures referencing use of GI/LID/Sustainable practices, BC specifies reference to and use of -Arid- GI/LID/Sustainable practices.

Cooperative Elements

Through existing and expanding partnership with the Village of Los Ranchos (VLR), BC and VLR will provide education to staff and local contractors on erosion/sediment controls, on-site pollution prevention, and understanding of stormwater quality.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the reduction of Construction Site Stormwater Runoff.

1.3. Annually conduct site inspections of 100 percent of all construction projects cumulatively disturbing one (1) or more acres as required in Part I.D.5.a.(iii)

BC will continue to conduct site inspections of 100% of all construction projects disturbing 1 or more acres within the MS4 jurisdiction. as required in Part I.D.5.a.(iii), including initial, follow-ups, progress and final stabilization inspections.

Follow-up inspections will be conducted and tracked to ensure corrective maintenance has occurred; and, all projects will be inspected at completion for confirmation of final stabilization.

Site inspections will be followed by any necessary compliance or enforcement actions. All inspections and actions will be tracked internally via existing data programs.

Cooperative Elements

Through existing and expanding partnership with VLR, BC will provide joint training with staff to perform inspections, ensuring consistency between VLR and BC relations with contractors.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the reduction of Construction Site Stormwater Runoff.

1.4. Coordinate with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private construction projects/activities within the permit area as required in Part I.D.5.a.(iv)

BC will continue to coordinate with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private construction projects/activities within the permit area to ensure compliance with PartI.D.5.a.(iv).

BC Natural Resource Services will continue to work with BC programs: Development Review, Technical Services, Planning and Development, Operations and Maintenance, Parks and Recreation, and Fleet and Facilities Management to coordinate such activities.

Cooperative Elements

Through existing and expanding partnership with VLR, BC will continue to share information on planning, review, permitting, or approval.

BC will continue to collaborate with Class A permittees, City of Albuquerque (CoA) and NM Department of Transportation (NMDOT) on the Development Process Manual and the NPDES Manual, and to update these guidance documents as appropriate and necessary.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the reduction of Construction Site Stormwater Runoff.

1.5. Evaluation of GI/LID/Sustainable practices in site plan reviews as required in Part I.D.5.a.(v)

BC construction site plan review of all construction projects 1 acre or larger will include an evaluation of opportunities for use of Arid GI/LID/Sustainable practices.

When opportunity exists for use of Arid GI/LID/Sustainable practices, in compliance with other requirements such as FEMA Flood Control and NM Office of the State Engineer, BC will encourage project proponents to incorporate these into the site design.

BC will continue to track construction site plan review of all construction projects 1 acre or larger, and will include tracking of these evaluations for use of Arid GI/LID/Sustainable practices.

** For any and all Construction Measures referencing use of GI/LID/Sustainable practices, BC specifies reference to and use of -Arid- GI/LID/Sustainable practices.

Cooperative Elements

BC will continue to sponsor the annual Xeriscape - Arid GI/LID conference (or other comparable events), and when possible, to present additional workshops targeting specific practices for development and use of these practices.

Through existing and expanding partnership with VLR, BC will continue to share information on Arid GI/LID/ Sustainable practices as part of our shared review and inspection practices.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information on Arid GI/LID/Sustainable practices

1.6. Enhance the program to include program elements in Part I.D.5.a.(viii) through Part I.D.5.a.(x)

BC will regularly evaluate educational (or technical) materials developed by EPA or others for use in local climate-restricted (Arid) construction and program elements per Program Flexibility Element, Part I.D.5.a.(viii).

BC will continue to collaborate with CoA and NMDOT on the Development Process Manual and the NPDES Manual, and to update these guidance documents as appropriate and necessary, per Program Flexibility Element, Part I.D.5.a.(ix).

BC inspections for drainage and SWPPP compliance as required in Part I.D.5.a.(iii) are currently conducted simultaneously by Development Review per existing US Federal Emergency Management Agency (FEMA) Flood Control requirements.

BC trade inspections will continue to be conducted independently of SWPPP and drainage inspection; therefore, BC will not include Flexibility Element Part I.D.5.a.(x).

Cooperative Elements

Through existing and expanding partnership with VLR, BC will review and/or develop locally appropriate technical information, mechanisms and procedures to explore the possibilities of use or modification of the Program Flexibility Elements.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop locally appropriate technical information, mechanisms and procedures to explore the possibilities of use or modification of the Program Flexibility Elements.

1.7. Describe other proposed activities to address the Construction Site Stormwater Runoff Control Measure:

BC will explore local practices and local hydrologic data for methods to reduce erosion and reduce or improve the quality of Construction Site Runoff.

BC will continue to use existing procedures for the implementation of measures described in Part I.D.5.a.(ii)(b) through in Part I.D.5.a.(ii)(h) and to update or revise these procedures as necessary or appropriate.

Section 2. Post-Construction Stormwater Management in New Development and Redevelopment – Proposed BMPs, Stormwater Controls, and Measurable Goals

2.1. Development of strategies as required in Part I.D.5.b.(ii).(a)

BC will develop or revise strategies which may include a combination of post-construction structural and/or non-structural best management practices (BMPs) to control pollutants in storm-water runoff as required in Part I.D.5.b.(ii).(a).

** For any and all Post-Construction Measures referencing use of GI/LID/Sustainable practices, BC specifies reference to and use of -Arid- GI/LID/Sustainable practices.

Cooperative Elements

Through existing and expanding partnership with VLR, BC will share training and inspection requirements necessary to implement post-construction structural and/or non-structural (BMPs) as required in Part I.D.5.b.(ii).(a).

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop locally appropriate technical information, mechanisms and procedures to implement post-construction structural and/or non-structural (BMPs) as required.

2.2. Development of an ordinance or other regulatory mechanism as required in Part I.D.5.b.(ii).(b)

BC will revise its ordinances and/or practices to incorporate a stormwater quality design standard for on-site retention of a 90th or 80th percentile storm event discharge volume as appropriate for compliance with all State and Federal standards.

BC will revise its ordinances and/or practices to incorporate a stormwater quality design standard for on-site retention of a 90th or 80th percentile storm event discharge volume as consistent with the Development Process Manual.

Cooperative Elements

Through existing and expanding partnership with VLR, BC will share training and inspection requirements necessary to implement post-construction structural and/or non-structural (BMPs) as required in Part I.D.5.b.(ii).(b).

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop locally appropriate technical information, mechanisms and procedures to implement post-construction structural and/or non-structural (BMPs) as required.

BC will continue to collaborate with Class A permittees, City of Albuquerque (CoA) and NM Department of Transportation (NMDOT) on the Development Process Manual and the NPDES Manual, and to update these guidance documents as appropriate and necessary.

2.3. Implementation and enforcement, via the ordinance or other regulatory mechanism, of site design standards as required in Part I.D.5.b.(ii).(b).

BC will revise its ordinances and/or practices to incorporate a stormwater quality design standard for on-site retention of a 90th or 80th percentile storm event discharge volume as appropriate for compliance with all State and Federal standards.

Cooperative Elements

Through existing and expanding partnership with VLR, BC will share training and inspection requirements necessary to implement post-construction structural and/or non-structural (BMPs) as required in Part I.D.5.b.(ii).(b).

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop locally appropriate technical information, mechanisms and procedures to implement post-construction structural and/or non-structural (BMPs) as required.

BC will continue to collaborate with Class A permittees, City of Albuquerque (CoA) and NM Department of Transportation (NMDOT) on the Development Process Manual and the NPDES Manual, and to update these guidance documents as appropriate and necessary.

2.4. Ensure appropriate implementation of structural controls as required in Part I.D.5.b.(ii).(c) and Part I.D.5.b.(ii).(d)

BC will review and update ordinances and/or practices for appropriate implementation of post-construction BMPs from design review, inspections, etc., through post-construction operation and maintenance of said BMPs (continued below)

(continued from above) as consistent with the Development Process Manual.

Cooperative Elements

Through existing and expanding partnership with VLR, BC will share training on inspection requirements necessary for appropriate implementation of post-construction BMPs from design review, inspections, through post-construction operation and maintenance.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop locally appropriate technical information, mechanisms and procedures to implement post-construction structural and/or non-structural (BMPs) as required.

BC will continue to collaborate with Class A permittees, City of Albuquerque (CoA) and NM Department of Transportation (NMDOT) on the Development Process Manual and the NPDES Manual, and to update these guidance documents as appropriate and necessary.

2.5. Develop procedures as required in Part I.D.5.b.(ii).(e), Part I.D.5.b.(ii).(f), Part I.D.5.b.(ii).(g), and Part I.D.5.b.(ii).(h)

BC will update or revise procedures for training and inspection as required in Part I.D.5.b.(ii).(e) through Part I.D.5.b.(ii).(h) for implementation of Arid GI/LID/Sustainable practices.

BC will continue to sponsor the annual Xeriscape - Arid GI/LID conference (or other comparable events), and when possible, to present additional workshops targeting specific practices for development and use of these practices.

Cooperative Elements

Through existing and expanding partnership with VLR, BC will share training on inspection requirements necessary for appropriate implementation of post-construction BMPs from design review, inspections, through post-construction operation and maintenance.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop locally appropriate technical information, mechanisms and procedures to implement post-construction structural and/or non-structural (BMPs) as required.

2.6. Coordinate internally with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private construction projects/activities within the permit area as required in Part I.D.5.b.(iii)

BC will continue to coordinate with all departments and boards with jurisdiction over the planning, review, permitting, or approval of public and private construction projects/activities within the permit area to ensure compliance with PartI.D.5.b.(iii).

BC Natural Resource Services will continue to work with BC programs: Development Review, Technical Services, Planning and Development, Operations and Maintenance, Parks and Recreation, and Fleet and Facilities Management to coordinate such activities.

Cooperative Elements

This element specifies internal coordination, therefore is not applicable re cooperative elements.

2.7. As required in Part I.D.5.b.(iv), the permittee must assess all existing codes, ordinances, planning documents and other applicable regulations, for impediments to the use of GI/LID/Sustainable practices

BC will assess all existing codes, ordinances, planning documents and other applicable regulations, for impediments to the use of Arid GI/LID/Sustainable practices.

BC Natural Resource Services will continue to work with BC programs: Development Review, Technical Services, Planning and Development, Operations and Maintenance, Parks and Recreation, and Fleet and Facilities Management to coordinate this assessment.

Cooperative Elements

This element specifies internal assessment, therefore is not applicable re direct cooperative efforts. As always BC will continue to share information with all other MS4s, both formally and informally.

2.8. As required in Part I.D.5.b.(iv), describe the plan to report the assessment findings on GI/LID/ Sustainable practices

Following assessment of all existing codes, ordinances, planning documents and other applicable regulations, for impediments to the use of Arid GI/LID/Sustainable practices, BC will report these findings for inclusion in the subsequent Annual Report.

Cooperative Elements

This element specifies internal assessment, therefore is not applicable re direct cooperative efforts. As always BC will continue to share information with all other MS4s, both formally and informally.

2.9. Estimation of the number of acres of IA and DCIA as required in Part I.D.5.b.(vi)

BC will estimate the number of acres of impervious area (IA) including conventional pavements, sidewalks, driveways, roadways, parking lots, and rooftops.

BC will estimate the number of acres of directly connected impervious area (DCIA), the portion of IA with a direct hydraulic connection to the permittee's MS4 or a waterbody via continuous paved surfaces*, (non-edifice/roof) gutters, [continued next]

[continued from above] pipes, and other impervious features.
* continuous paved surfaces shall not included crowned or uncurbed roadways--those draining into adjacent properties--or roadways crossing over levees or other such elevated structures.

Cooperative Elements

BC GIS and orthography data will be shared with any and all other MS4s.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to assist in developing locally appropriate standards for estimation of IA and DCIA.

2.10. Inventory and priority ranking as required in section in Part I.D.5.b.(vii)

BC will continue the process of evaluating and retrofitting County owned properties with control measures as required in section in Part I.D.5.b.(vii)
(Many County facilities have already been retrofitted with xeric landscaping and other measures.)

Cooperative Elements

BC will work with other local MS4s (particularly CoA, AMAFCA, NMDOT, and VLR) to examine potential ROW control measures.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to evaluate retrofits of existing facilities.

2.11. Incorporate watershed protection elements as required in Part I.D.5.b.(viii)

BC will incorporate watershed protection elements into relevant policy and/or planning documents as they come up for regular review, as required in Part I.D.5.b.(viii).

BC will continue to work in partnership with other local MS4s (particularly ABCWUA, CoA, AMAFCA, NMDOT, and VLR) to examine sensitive watershed areas, and implement stormwater management practices that protect or enhance these areas.

Cooperative Elements

BC will continue to work in partnership with other local MS4s (particularly ABCWUA, CoA, AMAFCA, NMDOT, and VLR) to examine sensitive watershed areas, and implement stormwater management practices that protect or enhance these areas.

BC will continue to work in partnership with state or federal agencies such as the Rio Grande Water Trust and the Urban Partnership to examine sensitive watershed areas, and implement stormwater management practices that protect or enhance these areas.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures for the protection of sensitive watershed areas.

2.12. Enhance the program to include program elements in Part I.D.5.b.(xi) and Part I.D.5.b.(xii)

BC will regularly evaluate educational (or technical) materials developed by EPA or others for use in local climate-restricted (Arid) post-construction and program elements per Program Flexibility Element, Part I.D.5.b.(xi).

BC will continue to collaborate with agencies such as CoA, AMAFCA and NMDOT on watershed planning and will continue to hold public meetings for new projects as is current practice, per Program Flexibility Element, Part I.D.5.b.(xii).

Cooperative Elements

BC will continue to collaborate with agencies such as CoA, AMAFCA and NMDOT on watershed planning, flood control and stormwater quality.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures for the protection of sensitive watershed areas.

2.13. Describe other proposed activities to address the Post-Construction Stormwater Management in New Development and Redevelopment Measure:

During planning for development or redevelopment BC will encourage infill development in per Part I.D.5.b.(xii) (c).

Note: Parts I.D.5.b.(xii) (a) and (b) refer primarily to Bosque (riverside) areas under City or State control, and therefore will not often be a part of BC Development considerations.

Section 3. Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations – Proposed BMPs, Stormwater Controls, and Measurable Goals

3.1. Develop or update the Pollution Prevention/Good House Keeping program to include the elements in Part I.D.5.c.(i)

BC will update the Pollution Prevention/Good House Keeping program to comply with the elements listed in Part I.D.5.c.(i)

BC will include in the SWMP a description of the mechanism(s) utilized to comply with each of the elements required in Part I.D.5.c.(i) throughout Part I.D.5.c.(iii).

Cooperative Elements

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, literature and procedures for compliance with Pollution Prevention/Good Housekeeping requirements.

BC Natural Resource Services will work with BC Risk Management to develop a joint program for the enhanced maintenance of County Facilities, and the mutual protection of employees and environment from polluting or hazardous materials and chemicals.

BC will open special (non-Risk Management) training events to all other MS4s as resources allow.

3.2. Enhance the program to include the elements in Part I.D.5.c.(ii)

BC will enhance the Pollution Prevention/Good House Keeping program to comply with the elements listed in Part I.D.5.c.(ii)

Cooperative Elements

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, literature and procedures for compliance with Pollution Prevention/Good Housekeeping requirements.

BC Natural Resource Services will work with BC Risk Management to develop a joint program for the enhanced maintenance of County Facilities, and the mutual protection of employees and environment from polluting or hazardous materials and chemicals.

3.3. Develop or update a list and a map of industrial facilities owned or operated by the permittee as required in Part I.D.5.c.(iii)

BC does not own or operate any industrial facilities as listed in 40 CFR 122.26(b)(14)(i)-(ix) and (xi) within the County permit area, i.e. the 2010 US Census designated Urbanized Area.

Cooperative Elements

N/A, see above.

3.4. Describe other proposed activities to address the Pollution Prevention/Good Housekeeping for Municipal/permittee Operations Measure:

BC will continue to review and incorporate appropriate practices as necessary to accommodate new facilities and/or new operations.

BC Natural Resource Services will work with BC Risk Management to develop a joint program for the enhanced maintenance of County Facilities, and the mutual protection of employees and environment from polluting or hazardous materials and chemicals.

Section 4: Industrial and High Risk Runoff – Proposed BMPs, Stormwater Controls, and Measurable Goals (APPLICABLE ONLY TO CLASS A PERMITTTEES)

4.1. Ordinance (or other control method) as required in Part I.D.5.d.(i)

N/A - BC (Bernalillo County) is a Class B Permittee.

Cooperative Elements

N/A - BC (Bernalillo County) is a Class B Permittee.

4.2. Continue implementation and enforcement of the Industrial and High Risk Runoff program, assess the overall success of the program, and document both direct and indirect measurements of program effectiveness in the annual report as required in Part I.D.5.d.(ii)

N/A - BC (Bernalillo County) is a Class B Permittee.

Cooperative Elements

N/A - BC (Bernalillo County) is a Class B Permittee.

4.3. Meet the monitoring requirements in Part I.D.5.d.(iii)

N/A - BC (Bernalillo County) is a Class B Permittee.

Cooperative Elements

N/A - BC (Bernalillo County) is a Class B Permittee.

4.4. Include requirements in Part I.D.5.d.(iv)

N/A - BC (Bernalillo County) is a Class B Permittee.

Cooperative Elements

N/A - BC (Bernalillo County) is a Class B Permittee.

4.5. Enhance the program to include requirements in Part I.D.5.d.(vii)

N/A - BC (Bernalillo County) is a Class B Permittee.

Cooperative Elements

N/A - BC (Bernalillo County) is a Class B Permittee.

4.6. Describe other proposed activities to address the Industrial and High Risk Runoff Measure:

N/A - BC (Bernalillo County) is a Class B Permittee.

Section 5. Illicit Discharges and Improper Disposal – Proposed BMPs, Stormwater Controls, and Measurable Goals

5.1. Mapping as required in Part I.D.5.e.(i)(a)

BC has already completed and submitted in 2004, updated in 2007, a storm sewer system map, showing the names and locations of all outfalls as required in Part I.D.5.e.(i)(a). Any modifications will be submitted as needed.

BC does not maintain or operate any facilities draining more than twenty (20) percent of the unincorporated County permit area, i.e. the 2010 US Census designated Urbanized Area.

Cooperative Elements

BC will continue to respond to reports of illicit discharge in cooperation with CoA, AMAFCA, NMDOT and VLR, and will continue to work such complaints to resolution or referral to appropriate state agency such as NMED.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to reduce illicit discharges and dumping.

5.2. Ordinance (or other control method) as required in Part I.D.5.e.(i)(b)

BC prohibits dumping and illicit discharges and takes enforcement action via existing waste ordinance. BC responds to dumping and illicit discharge, and pursues such incidents to resolution or referral to appropriate state agency such as NMED.

Cooperative Elements

BC will continue to respond to reports of illicit discharge in cooperation with CoA, AMAFCA, NMDOT and VLR, and will continue to work such complaints to resolution or referral to appropriate state agency such as NMED.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to reduce illicit discharges and dumping.

5.3. Develop and implement a IDDE plan as required in Part I.D.5.e.(i)(c)

BC will revise if necessary and formalize existing procedures to detect and address non-stormwater discharges, including illegal dumpling, to the MS4, which will include elements as specified in Part I.D.5.e.(i)(c) A. - E.

Cooperative Elements

BC will continue to work closely with other County-area agencies, CoA, AMAFCA, and VLR, to enhance and formalize existing unofficial agreements to create incident tracking for all agencies.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the detection of Illicit or non-stormwater discharges.

5.4. Develop an education program as required in Part I.D.5.e.(i)(d)

BC shall develop an education program to encourage public understanding and reporting of illicit discharges and dumping, as required in Part I.D.5.e.(i)(d)

Cooperative Elements

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the understanding and reporting of illicit discharges and dumping.

Through long-standing partnerships with City and County Open Space programs, BC will continue to emphasize the environmental problems associated with illegal dumping and discharges, as well as to participate in local clean-up events.

5.5. Establish a hotline as required in Part I.D.5.e.(i)(e)

BC will incorporate and publicize Illicit Discharge reporting via existing, well-utilized complaint lines and web-based complaint reporting, rather than creating a speciality line which would not be easily recalled by the public.

Cooperative Elements

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the understanding and reporting of illicit discharges and dumping.

Through long-standing partnerships with City and County Open Space programs, BC will continue to emphasize the environmental problems associated with illegal dumping and discharges, as well as to participate in local clean-up events.

5.6. Investigate suspected significant/severe illicit discharges as required in Part I.D.5.e.(i)(f)

BC will continue to investigate to resolution all reports of illegal dumping and illicit discharges, and to work such complaints to resolution or referral to appropriate local or state agency.

Cooperative Elements

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the understanding and reporting of illicit discharges and dumping.

BC will continue to respond to reports of illicit discharge in cooperation with CoA, AMAFCA, NMDOT and VLR, and will continue to work such complaints to resolution or referral to appropriate state agency such as NMED.

5.7. Review complaint records and develop a targeted source reduction program as required in Part I.D.5.e.(i)(g)

BC will review all complaint records of illegal dumping and discharges, and as needed, develop a targeted source reduction program for patterns or regions of of illegal dumping and discharges.

Cooperative Elements

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information to develop a targeted source reduction program as needed.

BC will share local information and records of illegal dumping and illicit discharges with CoA, AMAFCA, NMDOT and VLR to determine patterns or regions of abuse.

5.8. Screening of system as required in Part I.D.5.e.(iii) as follows:

BC will screen the County-operated/maintained Urban Area MS4 at least once every five (5) years and high priority areas at least once every year.

BC will continue to operate in-line flow-actuated automatic monitoring to detect any dry weather discharges.

Cooperative Elements

BC will continue to respond to reports of illegal dumping and illicit discharge in cooperation with CoA, AMAFCA, NMDOT and VLR, and will share data on any events or patterns discovered during screening.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information on the best mechanisms and procedures for system screening.

5.9. Develop, update, and implement a Waste Collection Program as required in Part I.D.5.e.(iv)

Since 2010 BC has operated a permanent Household Hazardous Waste Collection site via partnership with CoA, and will continue. It is at full implementation, currently open 4 days per week including Saturdays. Schedule may change to meet use patterns.

BC also operates neighborhood collection events annually. Schedules and locations vary according to demand.

BC will continue to respond to illegally disposed wastes in County right of ways and properties.

Cooperative Elements

Since 2010 BC has operated a permanent Household Hazardous Waste Collection site via partnership with CoA, and will continue. It is at full implementation, currently open 4 days per week including Saturdays. Schedule may change to meet use patterns.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information on waste collection.

5.10. Develop, update and implement a Spill Prevention and Response program to prevent, contain, and respond to spills that may discharge into the MS4 as required in Part I.D.5.e.(v)

BC will continue to work closely with other County-area agencies, CoA, AMAFCA, and VLR, to enhance and formalize existing Spill Prevention and Response procedures.

Cooperative Elements

BC will continue to work closely with other County-area agencies, CoA, AMAFCA, and VLR, to enhance and formalize existing Spill Prevention and Response procedures.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to enhance and formalize existing Spill Prevention and Response procedures.

5.11. Enhance the program to include requirements in Part I.D.5.e.(ix)

BC will continue to work closely with other County-area agencies, CoA, AMAFCA, and VLR, for detection and elimination of illegal dumping and illicit discharges per Part I.D.5.e.(ix)(c).

Cooperative Elements

BC will continue to work closely with other County-area agencies, CoA, AMAFCA, and VLR, for detection and elimination of illegal dumping and illicit discharges per Part I.D.5.e.(ix)(c).

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures for detection and elimination of illegal dumping and illicit discharges.

5.12. Describe other proposed activities to address the Illicit Discharges and Improper Disposal Measure:

Section 6. Control of Floatables Discharges – Proposed BMPs, Stormwater Controls, and Measurable Goals

6.1. Develop a schedule to implement the program as required in Part I.D.5.f.(i)(a)

BC will develop a schedule to implement the program as required in Part I.D.5.f.(i)(a), specifically targeting floatable elements of trash and litter.

BC will continue to implement source control reduction of floatables via anti-litter messages, and response to illegal dumping complaints.

BC will continue to implement reduction of floatables through existing structural BMPs at discharge channels and upstream in conveyances.

Cooperative Elements

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to reduce floatables (litter) discharge.

6.2. Describe the plan to estimate the annual volume of floatables and trash removed from each control facility and characterize the floatable type as required in Part I.D.5.f.(i)(b)

BC develop a plan to estimate the annual volume of floatables and trash removed from each control facility and characterize the floatable type as required in Part I.D.5.f.(i)(b).

BC will sample, characterize and estimate annual volumes of floatable debris from structural controls at each discharge facility (pump station).

Cooperative Elements

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to estimate and characterize the annual of floatables and trash.

6.3. Describe other proposed activities to address the Control of Floatables Discharges Measure:

BC conducts many activities targeting litter and trash reduction, including, but not necessarily limited to Floatables.

Section 7. Public Education and Outreach on Stormwater Impacts – proposed BMPs, Stormwater Controls, and Measurable Goals

7.1. Develop, revise, implement, and maintain an education and outreach program as required in Part I.D.5.g.(i) and Part I.D.5.g.(ii)

BC will continue to conduct public education, in particular regarding of hazards associated with the illegal discharges and improper disposal of waste and about the impact of stormwater discharges on the Middle Rio Grande.

Through long-standing partnerships with City and County Open Space programs, BC will continue to emphasize the impact of stormwater discharges, as well as to participate in local clean-up events.

Cooperative Elements

Through long-standing partnerships with City and County Open Space programs, BC will continue to emphasize the impact of stormwater discharges, as well as to participate in local clean-up events.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the reduction of Construction Site Stormwater Runoff.

7.2. Enhance the program to include requirements in Part I.D.5.g.(v) through Part I.D.5.g.(viii)

BC will continue to support classroom and adult education, including participation in local and regional events.

BC will continue to sponsor and promote the household hazardous waste collection site and will continue to operate neighborhood waste collection events.

Cooperative Elements

BC has supported and sponsored the annual Xeriscape Conference since its inception, and will continue to sponsor and promote such events for water conservation and stormwater quality.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the reduction of Construction Site Stormwater Runoff.

7.3. Describe other proposed activities to address the Public Education and Outreach on Stormwater Impacts Measure:

Since 2004 BC has conducted or sponsored specific events, and will continue to support those partnerships, and to participate as opportunities arise.

Section 8. Public Involvement and Participation – Proposed BMPs, Stormwater Controls, and Measurable Goals

8.1. Develop (or update), implement, and maintain a public involvement and participation plan as required in Part I.D.5.h.(ii) and Part I.D.5.h.(iii)

BC actively engages in a comprehensive planning process that promotes public involvement and participation at all levels of County government, from Commission meetings, zoning and planning meetings or presentations.

Currently, and for the next several years, BC is actively improving infrastructure and infill opportunities particularly in the South Valley. Public meetings are promoted and well-attended.

Public meetings (above) will be considered for opportunities to assess public attitudinal and behavioral change following the meetings

BC will continue to engage in the Water Protection Advisory Board and Urban Waters Program to encourage public involvement in water quality-related issues, activities, and awareness.

Cooperative Elements

BC will continue to work with CoA and AMAFCA in the promotion and planning of public meetings for new infrastructure and infill development.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to keep local public participation at a high level.

BC will continue to engage in the Water Protection Advisory Board and Urban Waters Program to encourage public involvement in water quality-related issues, activities, and awareness.

8.2. Describe the plan to comply with State, Tribal, and local notice requirements when implementing a Public Involvement and Participation Program as required in Part I.D.5.h.(iv)

BC will continue to promote public participation by County news release, Facebook promotion, direct mailing and legal notice as appropriate for individual events.

Cooperative Elements

BC will continue to work with CoA and AMAFCA in the promotion and planning of public meetings for new infrastructure and infill development.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the promotion of public participation.

8.3. Describe a plan to include elements as required in Part I.D.5.h.(v)

BC actively promotes public involvement and participation at all levels of County government, from Commission meetings, zoning and planning meetings or presentations.

Particularly for long-term planning, meetings are regional/neighborhood-oriented, and as such involve the entire community regardless of economic or ethnic status.

BC actively supports neighborhood-based planning organizations and participates in local events such as fairs or design charettes

Cooperative Elements

BC will continue to work with CoA, VLR and AMAFCA in the promotion and planning of public meetings for stormwater and development planning.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve the promotion of public participation.

BC will continue to support the activities of the citizen-volunteer Water Protection Advisory Board along with AMAFCA and the CoA.

BC will remain engaged with the Urban Waters Partnership.

8.4. As required in Part I.D.5.h.(viii) provide the internet site (or website) where the SWMP document, Annual Reports, and other documents will be available to the public.

https://www.bernco.gov/EPA/

8.5. Enhance the program to include requirements in Part I.D.5.h.(ix)

BC will continue to encourage public involvement as described above. BC will continue to monitor and assess public understanding and attitude via surveys at all appropriate venues.

Cooperative Elements

BC will continue to work with CoA, VLR and AMAFCA in the promotion and planning of public meetings for stormwater and development planning.

Through membership in the Technical Advisory Group (TAG), BC will work with other MS4s to develop and share locally appropriate technical information, mechanisms and procedures to improve public participation.

8.6. Describe other proposed activities to address the Public Involvement and Participation Measure:

Existing public involvement and participation is currently fully implemented.

IV. Proposed Monitoring Program

Indicate wet weather monitoring program preference:

Individual Monitoring Program ☐

Cooperative Monitoring Program ☒

Provide a general description of the propose monitoring program.

BC intends to participate in a Bernalillo County-area Cooperative Monitoring Program as currently under design by AMAFCA and CoA.

Until such time as a Bernalillo County-area Cooperative Monitoring Program is approved by NMED and USEPA BC will continue to monitor as per existing general permit requirements as required by Part I.B.1.d.

V. Public Participation

Include a Summary of issues raised in any local public comments received by the MS4 Operator on the draft NOI/SWMP and MS4 operator's responses.

ONE Comment received from The Business Water Task Force (BWTF), 5-27-15,
Brian Burnett, Chair, Business Water Task Force, stated intention "to evaluate any proposed new or revised ordinances that may affect development of new properties or --cont'd next-- +

redevelopment of existing sites within your permit jurisdiction. We request that you include us in any Notices of Public Meetings or Requests for Comments as you engage in the process of promulgating any ordinances or development of a --cont'd next-- +

Storm Water Management Plan in response to the MS4 permit."
Response: that they would be included in a list of interested parties for later contact, as appropriate.
ALSO,BWTF representative attended planning meeting June 9, 2015 +

Complete email, letter and response follow as Attachment 2

VI. Attachments

Attach a location map showing the boundaries of the MS4 under the applicant's jurisdiction. The map must include streets or other demarcations so that the exact boundaries can be located.

Are other attachments included with the NOI? If so, indicate the title of the document(s).

Attachment 1 Waste Load Allocations.pdf

Attachment 2 Comment and Response BWTF Interest in BC NOI 5-27-15.pdf

Location Map: EPA NOI Urban Area Map FINAL.pdf

VII. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature:

Printed Name: Tom Zdunek

Date: 6/15/15

ATTACHMENT 1: WASTE LOAD ALLOCATION CALCULATIONS

For Stream Segment, 2105_50, Isleta Pueblo boundary to Alameda Street Bridge, Bernalillo County seeks a WLA based on watershed jurisdictional area.

BC watershed area* 393.8 sq mi

Stream Segment	Stream Name non-Pueblo	Permittee Class	Flow Conditions & Associated WLA/Area (sq mi)				
			High	Moist	Mid-Range	Dry	Low
2105_00	Alameda Br to Isleta Pueblo	Class B/C	3.73E+09	9.35E+09	6.29E+09	2.32E+09	5.19E+07
		TOTAL	1.47E+12	3.68E+12	2.48E+12	9.14E+11	2.04E+10

*BC jurisdictional watershed area:

585.9	Total HUC/watershed within BC
187.7	City of Albuquerque
4.4	Village of Los Ranchos
393.8	BC jurisdictional watershed area:

BC will coordinate with other watershed permittees in meeting the assigned WLA for listed stream segments. As specified in Part I.C.2.b.i.c.B, BC may share efforts and request an aggregate WLA to be specified in the SWMP.

ATTACHMENT 2
COMMENT AND RESPONSE: BWTF INTEREST IN BC NOI 5-27-15

included as attachment in response to question, pg. 38,
V. Public Participation

5-27-15 Comment received from The Business Water Task Force (BWTF)
Brian Burnett, Chair, Business Water Task Force, stated intention "to evaluate any proposed new or revised ordinances that may affect development of new properties or redevelopment of existing sites within your permit jurisdiction. We request that you include us in any Notices of Public Meetings or Requests for Comments as you engage in the process of promulgating any ordinances or development of a Storm Water Management Plan in response to the MS4 permit.

Response: that they would be included in a list of interested parties for later contact, as appropriate.

Complete email, letter and response follow:
Comment and Response BWTF Interest in BC NOI 5-27-15.pdf

Note: Map showing Bernalillo County MS4 Permit Area was revised slightly after public notice to correct typos in the legend, and to improve contrast/legibility of roadways. There were no changes in boundaries or areas.
There were no comments received on the map itself.

Anita Steed

From: Brian Burnett <Bburnett@bhinc.com>
Sent: Wednesday, May 27, 2015 8:31 AM
To: Anita Steed
Cc: dsumshler@att.net
Subject: BWTF Interest in Bernalillo County Notice of Intent
Attachments: 20150526Bern County NOI letterREV.pdf

Hi Anita, Attached is a letter from the Business Water Task Force expressing our interest in your Notice of Intent to obtain a National Pollutant Discharge Elimination System Stormwater Permit under the new Regional MS4 permit. The letter also contains some information about our group. Please contact me, or Sue Umshler (dsumshler@att.net), if you have any questions. Thank you very much. Brian

May 27, 2015

Bernalillo County
Attn: Anita Steed, Water Resources
2400 Broadway Blvd. SE, Building N
Albuquerque, NM 87102

Dear Ms. Steed,

The Business Water Task Force (BWTF) appreciates the opportunity to provide comments on your Notice of Intent to obtain a National Pollutant Discharge Elimination System Stormwater Permit under the new Regional MS4 permit No. NMR04A000 from the U.S. Environmental Protection Agency. The BWTF is a group of business organizations that focuses on developing sound water planning, policies, and regulations for this region (see Attachment).

The BWTF intends to evaluate any proposed new or revised ordinances that may affect development of new properties or redevelopment of existing sites within your permit jurisdiction. We request that you include us in any Notices of Public Meetings or Requests for Comments as you engage in the process of promulgating any ordinances or development of a Storm Water Management Plan in response to the MS4 permit.

Thank you for your time and consideration of out comments. Please do not hesitate to call our consultant, Sue E. Umshler, (505-344-7204, P.O. Box 6760, Albuquerque, NM 87197) if you have any questions or require any additional information.

Sincerely,

Brian Burnett, Chair
Business Water Task Force

Attachment

Business Water Task Force

The Business Water Task Force (BWTF) is a coalition of business associations and water professionals who are committed to scientific-based water policy that also addresses cost benefits for the citizens and businesses of New Mexico. Our focus, however, is mostly on the Middle Rio Grande region.

The BWTF has been in existence for over 20 years, and has been involved in major water issues including the San Juan Chama Drinking Water Project, the development of regional water plans under the guidance of the Interstate Stream Commission and the State Engineer, and EPA initiatives such as rule-making for the Waters of the US, and MS4 Permits. We also monitor current water issues involving the major water entities such as ABCWUA, AMAFCA, MRGCD, and other governmental & environmental bodies.

Our governing structure includes a Board of Directors and a professional consultant who researches existing and proposed water legislation and policy. Our current consultant is **Sue E. Umshler,** a professional engineer and water attorney.

Our current Board of Directors are:

Brian Burnett, Chair (Bohannan Huston)
Lynne Andersen, Vice Chair (NAIOP, the Commercial Real Estate Development Association)

Directors:

Kelle Senye, Apartment Association of New Mexico
Jason Espinoza, Association of Commerce & Industry
Roxanne Rivera-Wiest, Association of Builders & Contractors
David Hill, Commercial Association of REALTORS New Mexico
Janice McCrary, Greater Albuquerque Board of REALTORS
John Garcia, Home Builders of Central New Mexico
Martin Haynes, Irrigator & Owner of SCM Partners
Michelle Henrie, Water Attorney & General Counsel for CYRQ Energy

Anita Steed

From: Anita Steed
Sent: Wednesday, May 27, 2015 9:46 AM
To: 'Brian Burnett'
Cc: dsumshler@att.net
Subject: RE: BWTF Interest in Bernalillo County Notice of Intent

Thanks very much for your comment and interest.

We are still many months away from ordinance revision, and trying to evaluate the best course to meet the Federally required modifications and deadlines. We will also now be evaluating the impact of the new Clean Water Rule which should be in effect in a few months.

I will keep your email addresses, and add them to my list of contacts re any actions related to the MS4 permit. In the past 2 years I have appreciated NAIOP's interest and willingness to participate in discussion—especially via 2014's Bernalillo County sponsored Xeriscape Roundtable Discussion on the new permit. I'm glad to expand this to a larger group of interested professionals.

I look forward to our continued dialogue as we come to grips with our new permit and new requirements.

Anita Steed

Anita Steed, Water Resources Planner
Bernalillo County Public Works
2400 Broadway SE, Building N
Albuquerque, NM 87102
Phone: 505-224-2122, Fax: 505-848-1510

From: Brian Burnett [mailto:Bburnett@bhinc.com]
Sent: Wednesday, May 27, 2015 8:31 AM
To: Anita Steed
Cc: dsumshler@att.net
Subject: BWTF Interest in Bernalillo County Notice of Intent

Hi Anita, Attached is a letter from the Business Water Task Force expressing our interest in your Notice of Intent to obtain a National Pollutant Discharge Elimination System Stormwater Permit under the new Regional MS4 permit. The letter also contains some information about our group. Please contact me, or Sue Umshler (dsumshler@att.net), if you have any questions. Thank you very much. Brian

Anita Steed

From: Brian Burnett <Bburnett@bhinc.com>
Sent: Wednesday, May 27, 2015 10:02 AM
To: Anita Steed
Cc: dsumshler@att.net
Subject: RE: BWTF Interest in Bernalillo County Notice of Intent

Anita, Thank you very much. We look forward to future dialogue. Have a good day. Brian

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From: Anita Steed [mailto:asteed@bernco.gov]
Sent: Wednesday, May 27, 2015 9:47 AM
To: Brian Burnett
Cc: dsumshler@att.net
Subject: RE: BWTF Interest in Bernalillo County Notice of Intent

Thanks very much for your comment and interest.

We are still many months away from ordinance revision, and trying to evaluate the best course to meet the Federally required modifications and deadlines. We will also now be evaluating the impact of the new Clean Water Rule which should be in effect in a few months.

I will keep your email addresses, and add them to my list of contacts re any actions related to the MS4 permit. In the past 2 years I have appreciated NAIOP's interest and willingness to participate in discussion—especially via 2014's Bernalillo County sponsored Xeriscape Roundtable Discussion on the new permit. I'm glad to expand this to a larger group of interested professionals.

I look forward to our continued dialogue as we come to grips with our new permit and new requirements.

Anita Steed

Anita Steed, Water Resources Planner
Bernalillo County Public Works
2400 Broadway SE, Building N
Albuquerque, NM 87102
Phone: 505-224-2122, Fax: 505-848-1510

From: Brian Burnett [mailto:Bburnett@bhinc.com]
Sent: Wednesday, May 27, 2015 8:31 AM
To: Anita Steed
Cc: dsumshler@att.net
Subject: BWTF Interest in Bernalillo County Notice of Intent

Hi Anita, Attached is a letter from the Business Water Task Force expressing our interest in your Notice of Intent to obtain a National Pollutant Discharge Elimination System Stormwater Permit under the new Regional MS4 permit. The letter also contains some information about our group. Please contact me, or Sue Umshler (dsumshler@att.net), if you have any questions. Thank you very much. Brian

Bernalillo County announces the availability for public review a Notice of Intent (NOI) to discharge under EPA Permit No. NMR04A000.as required by the U. S. EPA National Pollutant Discharge Elimination System (NPDES) The NOI is available for public review and written comment at Bernalillo County Public Works Division, 2400 Broadway SE, Building N, Albuquerque, NM 87102, and on the Bernalillo County website at https://www.bernco.gov/EPA/. Please provide any written comments before June 15, 2015 to: Anita Steed, Water Resources Planner, Bernalillo County Public Works Division, 2400 Broadway SE, Building N, Albuquerque, NM 87102 or to ASteed@bernco.gov

Journal: May 11, 2015

June 27, 2013

Ms. Diane Smith
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202–2733

Comments by Bernalillo County Staff on the Proposed MRG MS4 Permit (NMR04A000)

re: **Official comments from Bernalillo County, State of New Mexico, on Proposed MRG MS4 Permit (NMR04A000)**

As directed in Federal Register /Vol. 78, No. 84 /Wednesday, May 1, 2013 /Notices 25435, Bernalillo County, State of New Mexico submits the following comments to the Draft National Pollutant Discharge Elimination System (NPDES) General Permit for Municipal Separate Storm Sewer Systems in the Middle Rio Grande Watershed in New Mexico, proposed permit # NMR04A000, Environmental Protection Agency [FRL–9807–2].

Our comments include the following:

A. Comments with reference to permit section
B. Comments & Questions on Monitoring
C. Comments & Tabulation of SWMP elements for cooperation between parties

Respectfully,

Tom Zdunek,

cc: (e*mail) smith.diane@epa.gov*

Section A. General Comments on the Proposed MS4 MRG permit

PART I. B. 1. A. Designations 2

Comment 1: The Rulemaking Process is incomplete

The first and simplest concern of Bernalillo County with regard to the proposed MS4 permit targeting the Middle Rio Grande is that it precedes the action of rulemaking. Changes to stormwater regulations have been planned for years, but are still delayed; in fact none have been publicly proposed. The formal process of Federal rulemaking would involve a broader review by many more agencies and consultants with more resources and greater experience. This permit suggests a radical shift in approach to municipal stormwater regulation, and does not reflect the current distinctions of Phase I and Phase II regulations. Indeed, a wide range of villages, municipalities, flood control agencies and county governments are covered whole cloth by this permit with little or no recognition of population size, density or actual stormwater contribution to the Rio Grande River flow. This is a very small community, in a rather unique setting. It is difficult to assess the long term consequences of the permit in itself, and more troubling to consider that this permit may represent de-facto rulemaking outside the legal process. Simply renaming Phase I and Phase II as Classes A & B does not reflect the genuine differences inherent in the current legal designations.

While it may be useful to move beyond Phase I and II in that they reflect the starting stages of NPDES stormwater regulation, there should be some consideration of both population size and community resources in assigning mandatory, unfunded programs. This permit appears to apply Phase I implementation to all parties, no matter how small in population, and with no consideration of how little flow they may contribute. In fact, much of the permit is essentially the same as the permit issued in 2012 to the City of Albuquerque and its Phase I co-permittees. Many of the parties to this permit have discharges only exceptionally, ie during exceptional flood events. The smallest MS4's are in basins along the Rio Grande, fundamentally at or below water level.

We recommend that Phase I & Phase II designations be restored until stormwater rulemaking is complete, with concurrent staging or down-sizing of requirements for the Phase II permittees.

Part I B. Notice of Intent 1. Deadlines:

Comment 2: Deadlines & Implementation Dates

Throughout this section and others there is confusion as to what exactly is meant by several terms: "permit issuance," "effective date of permit," "permit effective date," etc. ***Please clarify whether a phrase refers to approval of the <u>General Permit</u> itself by EPA, or approval of a MS4 Permit, and use***

consistent terms throughout the permit. As written, there are several instances where implementation might precede approval of a MS4 permit.

PART I. B. 1. A. Designations, also refers to PART I. D. 1. General Requirements

Comment 3: The proposed permit does not reflect recommendations of EPA-led working meetings

Since early 2010 there have been monthly meetings at the direction of EPA permitting staff, yet these considerations and conclusions are not included in this permit, nor are the recommendations reached by the group as a whole. For example, the MRG working group created a ranking of SWMP elements, especially arid BMPs, with a count assigned to each sector level. That plan and several other collaborative efforts have been not been included. Also, because the SWMP mandatory elements are essentially the same as the current City of Albuquerque Phase I permit, it appears that Phase II permittees are now effectively considered Phase I. This seems beyond the intent of Phase I & Phase II regulations, again without the benefit of rulemaking review.

We suggest that the Sector based ranking of BMP's developed by the MRG working group be used to rank the SWMP elements and assign a minimum number for each sector rather than making all 145 SWMP elements mandatory for Phase II. We also recommend that the testing requirements be moderated and reduced in number and frequency.

Part I. C. Special Conditions, 2.Discharges to Impaired Waters,

Comment 4: Targeted Controls

b. (i) (a) and throughout (7 instances)"Targeted Controls" ***Please define***. Is there a separate list of specific controls or BMPs to which this refers? Or do you mean "controls intended for targeted pollutants"? ie, ***is the Pollutant the Target or is the Control the Target?***

Part I., D. 3. A. Shared Responsibility etc.

Comment 5: Joint Powers requirement

This section references a "Joint Powers Agreement to be entered into by the permittees." It was our understanding after meetings with EPA this spring (2013) that all cooperative programs were to be voluntary, but this seems to carry the weight of a command. ***Is this a mandatory separate requirement overreaching individual cooperative agreements between agencies? If so, please define the scope and the legal basis for requiring such an agreement between different sovereign governments. If not, please delete from this instance and all others.***

PART I. D. 1. General Requirements,

Comment 6: The proposed permit was intended to promote watershed cooperative efforts, but most of the 145 mandatory SWMP elements are non-cooperative by nature

Part D. Stormwater Management Program (SWMP), 5. Control Measures, includes 145 mandatory program elements. Despite EPA Permitting's openly stated intention to make the new permit too burdensome for any single entity to manage individually, there are few realistic opportunities for real collaborative efforts. In fact more than 80% of these control measures require local ordinance or procedures, or are simply best suited to management by different county divisions or departments. Thus the proposed permit is not merely burdensome, but doomed to fail as a cooperative effort.

(These are listed and categorized in Table 1 for reference.. It does not include the Industrial and High Risk Runoff, the Special Conditions with TMDL or sediment control, nor the monitoring requirements.)

Although EPA has held more than 2 years' of meetings with MRG agencies, there is no apparent understanding of the actual operations of a municipal or county government. *For example: street sweeping is a standard Part of sanitation efforts. SW measures might reasonably require a greater frequency, but to remove street sweeping to a separate "cooperative" agency or program is expensive folly. In fact, most stormwater programs rely upon the efforts of multiple groups within government: Building Permits, Facilities, Parks, and Health Services to name a few. Economically, these efforts are incorporated into the normal existing work of multiple individuals. There is not a "Stormwater Street Sweeper," only a street sweeper. To require that these things be done extra-agency as a cooperative effort, or called out as unique stormwater programs, completely ignores the economy of small scale.*

Stormwater management, as the most recent regulatory system in city or county operations, is almost always incorporated into another program, usually at substantial cost savings. The industrial business model of "economy of scale" is not applicable to small government. It might indeed create unreasonable subdivision of labor. The goal of cooperation, simply to call something a "cooperative" program, surely is not the point of a watershed approach, and may be a disservice to the greater goal of improving stormwater quality.

There must be a better way to encourage effective cooperation, such as funding a monitoring consortium to collect consistent watershed data with the assistance of Federal agencies. Since this MRG permit was begun as a pilot permit program, it seems appropriate that EPA fund implementation directly to measure the actual effectiveness of such a "watershed" approach. Such an evaluation is beyond the scope of any one agency involved directly in implementation, and would be better done by a neutral party or the regulatory agency itself, EPA.

Alternately, we request that the number of mandatory elements be reduced proportionate to Phase II status, or that the reporting requirements be modified to make cooperative efforts realistic.

Part I. D. 5. a. Construction Site Stormwater Runoff Control.
Also Part I. D. 5. b. Post-Construction Stormwater Management in New Development etc

Comment 7. New measures incorporating GI/LID are unproven, and possibly detrimental to river flow

The proposed permit includes more than 20 new measures for Green Infrastructure/LID. While these measures are currently quite popular, there has been very little demonstration of their effectiveness in the arid Southwest. Since they rely almost entirely upon reduction of flow, not reduction of pollution, they also challenge the reality of water rights (the Rio Grande Compact) and the necessity of having water in the river if endangered species are to survive. The silvery minnow will be more challenged by the absence of water than by its quality.

In fact, with our current average rainfall of 4 inches per year, the stormwater contribution of the entire Albuquerque area is estimated to be less than 0.02% of the river's flow as it leaves the area. The Rio Grande is a river originating in the mountains of Southern Colorado and Northeastern New Mexico, fed largely by snow melt. Once it leaves the Santa Fe area into the flat river bottoms and bosques of central New Mexico it loses water through evaporation (even in winter), infiltration and irrigation. As it passes through the MRG the flow is additionally diminished by the ABCWUA draw of drinking water; while much of the drinking water draw is returned via the wastewater utility, there is a substantial net loss. Further reduction of flow via Green Infrastructure and LID measures are likely to produce a greater negative impact if this permit is implemented.

We recommend that GI/LID measures be made optional elements or at least reduced in number.

Part I D. (SWMP), 5. a. Construction Site Stormwater Runoff Control, Comments 8 - 11

Comment 8. Question: Do these provisions apply only to the Urbanized Areas of Bernalillo County? We have separate policies for the East Mountains, non-urbanized areas. This calls for different policies within different areas of Bernalillo County, so would require particular study and procedures. Please clarify exact application prior to permit approval to conserve time.

Comment 9. a. Construction Site Stormwater Runoff Control, in general: Currently in our master plans and development review, we can take into account certain downstream flood and stormwater control features in calculations of allowable run-off. ***How will this be accommodated in the new permit?*** These measures reflect the unique nature of arid SW conditions, in which flood control for exceptional events has created these structures. Unlike the east coast models of stormwater, Bernalillo County has long periods (months) without any rain at all, with steep slopes and critical flood control. The flood control features provide protection for the extremes, while allowing flexibility for development in the average dry conditions.

Comment 10. (v) ***Has the State Engineer's Office been consulted specifically and given written approval or consent regarding GI/LID/Sustainable practices? If not, will EPA provide legal support for this mandated program?*** Lacking a specific consultation, all projects may be tied up in burdensome and lengthy consultation with OSE, especially as noted below in Post-Construction management alternative options. **This is a problem that should have been resolved clearly without burdening MS4 permittees with extraneous conflict in state law.**

Comment 11. (v) This is the newest element to Construction, and has the shortest time line for implementation. It also requires the greatest training/learning time. ***Please revise the implementation schedule.***

Part I D. (SWMP), 5. b. Post-Construction Stormwater Management in New Development and Redevelopment, Comments 12 - 16

Comment 12 (ii) (f) regarding Procedures for site inspection and enforcement to ensure proper long-term operation, etc. ***Can you qualify this with a minimum commercial site size or industrial category?*** As it stands now it might include small businesses and residential development, even individual homes.

Comment 13 (ii) (g) regarding the training and certification of Pesticide Applicators, ***does this conflict or overlap with the NM State Department of Agriculture's program and licensure?*** Currently the state has legal authority over this program. The county has no legal authority to enforce or countermand state statutes.

Comment 14 (c) Partial Implementation. Partial compliance may be implemented where there is a written determination from the New Mexico Office of the State Engineer that full compliance cannot be achieved consistent with water rights appropriations requirements. This has the potential to create a huge burden on the OSE and to hold up projects.

Comment 15 (v) (d) Other. In a situation where alternative options (a) through (c) above are not feasible, the permittees may submit to the EPA for approval, an alternative option that meets the 90th percentile pre-development hydrology values. ***Will EPA guarantee rapid approval, within 30 days, to meet contractor/developer schedules?*** If not, please specify approval by default, ie, if a ruling is not issued within 30 days, the option is approved.

Comment 16 Overall this section puts Bernalillo County and other MS4's in direct conflict with State and Federal Water Rights laws, specifically the Rio Grande Compact, of May 31,, 1939 (Public Act No. 96, 76) administered in part by the USGS and the Federal Rio Grande Compact Commission. ***As a Federal Agency it is the responsibility of USEPA to resolve conflicts with other Federal laws and agencies.*** This has been argued before EPA watershed meetings for more than 2 years, and should be resolved by EPA, not local agencies**.**

Part III. A. Monitoring and Assessment

Part I. D. 5. a. Construction Site Stormwater Runoff Control.
Also Part I. D. 5. b. Post-Construction Stormwater Management in New Development etc
Also Part III. A. Monitoring and Assessment

Comment 17. The economic burden imposed by this permit is disproportionate to any realistic benefit

The Monitoring program alone represents a substantial increase in simple, direct costs. The required analytical costs alone will increase from less than $100 per sample (for E. coli) to more than $3000 per sample for the list of 15 analytes—a 30-fold increase, which does not include increased sampling frequency or new sampling locations.

The new mandatory elements in construction and post-construction measures alone may triple the workload of County plan review and inspection. Many of these elements are unnecessarily repetitive and overly defined. Simply calling out more than 145 mandatory elements in the SWMP creates tedious and largely irrelevant tracking efforts.

The reporting requirement, with annual update and annual assessments of the SWMP required, virtually doubles the administrative workload. It is also unrealistic to expect accurate evaluation of new stormwater measures on an annual basis in a location currently averaging about 4 inches of rain per year. To evaluate any measure at this frequency is a waste of time and money.

We recommend that new Construction and Post-Construction SWMP elements be reduced in number, and at the least staged in over the permit term to allow time for training and expansion of duties with existing personnel.
We strongly suggest that the analytical requirements be reduced, and that the annual assessment requirements be reduced to years 3 and 5 of the permit term, or to year 5 alone.

Section B: Comment & Questions on Monitoring
Permit Part III. Monitoring, Assessment, and Reporting Requirements

Wet Weather Monitoring vs. Storm Event Discharge Monitoring

Of first concern in this document is the distinction between Wet Weather Monitoring (Sec.III.A.1) and Storm Event Discharge Monitoring (Sec.III.A.5.a). More specifically, the sampling requirements for wet weather monitoring are significantly different from the requirements for storm event monitoring. For example, wet weather sampling requires an antecedent dry period as well as minimum rainfall amounts. However, both of these requirements can be waived for storm event samples.

The Albuquerque area is a semi-arid region; drainages that outfall to the Rio Grande are dry for extended periods of time and referring to these drainages even as ephemeral would be a very generous misnomer. Any notion of a defined wet-season would have to refer to Albuquerque's monsoonal months and just beyond (July through October). Even during this "wet season" drainages in the area are typically dry and regardless of the time of the year, discharges to the Rio Grande will almost always be the result of a storm event.

Comment 18 ***What, specifically, distinguishes a wet weather sample from a storm event sample? Are the two interchangeable, ie. can storm events be used to meet the wet weather monitoring requirements given in Sec.III.1.a-b? If the two samples are interchangeable, what is the reasoning for the significant differences between sampling methodologies?***

Sampling Methodology

There also exists some confusion regarding the sampling methodology. For example, Sec.III.A.1.c, in the paragraph that begins," Wet weather monitoring shall be performed…," list antecedent dry period and rainfall requirements. However, the following section which begins, "Monitoring methodology at each MS4 monitoring location shall consist…" states that these requirements are not necessary.

Comment 19 ***Can you please clarify the differences in sampling methodology between Sec.III.A.1.c and Sec.III.A.1.d?***

In addition, there is also some confusion in the permit regarding the difference, if any, between a grab sample and an aliquot. For example, Sec.III.A.1.c suggests that the term "grab sample" refers to the individual components, or aliquots, of a composite sample. However, the language in Sec.III.A.5.i-ii suggests that grab samples are not the same as aliquots.

Comment 20 ***What specifically are the definitions of composite sample, grab sample, and aliquot as they are being used in the permit?***

Variability of Rainfall

As previously mentioned, the wet season in Albuquerque is mostly driven by monsoonal thunderstorms, and being convective in nature, these thunderstorms are also very spotty. It is not uncommon to see closely-spaced rain gages record vastly different amounts of rainfall. And for this reason, it could be difficult to determine if a sample will meet minimum rainfall requirements simply because rainfall may not be evenly distributed across the sampling watershed and as a result, a given storm may produce discharge without actually being recorded at a rain gage. Section Sec.III.A.1.d basically states that any discernible flow would constitute a valid sample, regardless of any antecedent dry period or rainfall requirement and this approach to sampling is probably most appropriate for an area like Albuquerque.

Comment 21 ***Consequently, rainfall magnitude requirements should be dropped from the permit and instead NPDES permittees in the Albuquerque area should be allowed to sample any and all significant flows to meet permit requirements.***

Analytical Requirements

The analytical requirements listed include 15 tests: TSS, TDS, COD, BOD5, DO, oil and grease, E.coli, pH, total kjeldahl nitrogen, nitrate plus nitrite, dissolved phosphorus, total ammonia plus organic nitrogen, total phosphorus, PCBs and gross alpha. (Although total ammonia plus organic nitrogen is the same as TKN, so it is unclear what exactly is required.) To perform all 15 tests as routine discharge monitoring is excessive and expensive, approximately $3000 per sample.

Comment 22 ***Please identify the critical analytes per sample: in other words if a sample cannot be tested for a specific analyte in accordance with the methods specified at 40 CFR §136 due to holding time constraints for example, WHICH of the analytes define whether a sample counts toward the minimum samples required? <u>Is E. coli the minimum mandatory analysis?</u>***

Comment 23 ***We recommend that the test list be reduced to those parameters of concern PER stream or discharge point, not required across the entire watershed for each sample event.***

Comment 24 ***DO, conductivity, and temperature are not included in the test list, but are referenced in field screening along with pH. Please clarify if and when these are required. (Part III, A, 1. F)***

(b) Analytical Methods:
Comment 25 ***Please clarify specifically.*** Is EPA Method 1668 (PCBs) to be used in discharge water? And the Arochlor test (EPA Method 8082) or USGS test method (8093) to be used only for sediment sampling as part of a screening program.

Section C: Comments & Tabulation of SWMP elements for cooperation between parties

Comment 26 Despite the published intention to create a cooperative watershed permit, this permit creates few opportunities for meaningful cooperative efforts. In the 145 listed mandatory SWMP elements, the potentially cooperative elements are less than 15% of the count. ***The number of mandatory elements in itself increases workload significantly without contributing to water quality improvement.***

Comment 27 Of the mandatory SWMP control measures listed, 58% would be Part of existing normal programs, such as building permits, zoning reviews, etc. ***These are identified as INT for Integral to existing programs.*** Particularly in pollution prevention/good housekeeping, these activities are already Part of normal, existing programs; it would be both inefficient and costly if these activities were removed from their current process to some cooperative program to do lip service to the idea of cooperative programs.. For example, it would be foolish to have street sweepers pulled out as "stormwater" sweepers when they already operate for normal county sanitation efforts. ***We recommend that EPA find other opportunities for cooperation.***

Another 7% to 10% cannot be shared between MS4s because of the need for an ordinance or local regulation. In some instances the regulation is directly required by permit, in others it will be necessary to implement the mandatory control measure. ***These are identified as RR for Requiring Regulation.*** It is difficult to determine without study and consultation with other divisions exactly which of these 3% might be implemented by policy without ordinance.

Comment 28 Of the remaining listed control measures, approximately 23% are required to be done separately by the permit itself. Many/most reporting elements, especially those for in the annual report, are required to be done individually by the MS4 permittee; it would be difficult to build a cooperative effort on these items where detailed, internal tracking is required to document how many instances had been performed by the individual permittee. ***These are identified as SEP for Separate by definition of permit (separate tabulation per agency required by EPA. To increase the opportunities for cooperation we recommend that EPA change reporting requirements. The number of mandatory elements in itself increases workload significantly without contributing to water quality improvement.***

Comment 29 Ironically, of those 21 potentially cooperative elements all but two are already in practice through the efforts of the Middle Rio Grande Stormwater Quality Team. This jointly funded education/outreach/involvement program has been funded and operated cooperatively since 2004, and has as members Bernalillo County, the City of Albuquerque, the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), the Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA), the University of New Mexico and the New Mexico Department of Transportation. **The current proposed permit offers virtually nothing new for cooperative SWMP elements.**

Comment 30 ***We recommend that many of the reporting requirements and tabulations be dropped or modified to allow more effective cooperative efforts. Also, we suggest that requiring 145 mandatory elements is excessive; the work burden of tracking and administering these elements virtually ensures that nothing new or effective will result from this permit because there will not be time or money to spend.***

TABULATION OF MANDATORY SWMP ELEMENTS WITH COOPERATIVE STATUS

Cooperative
Status SWMP Components: 5. Control Measures
CE = Cooperative with Effort only
CF = Cooperative with Funding
RR = Requires regulation or ordinance
INT = integral Part of existing county programs, such as building permits, with broader scope
SEP = Separate by definition of permit (separate reports are required by EPA)

SWMP Components: 5. Control Measures

	a. Construction Site Stormwater Runoff Control.
INT	(i) Program for Reduction of pollutants & total discharge volume from Construction
RR	(ii) development, implementation, & enforcement of, at a minimum:
RR	(a) Regulatory mechanism to require erosion & sediment controls, w sanctions for non-compliance
RR	(b) Requirements for construction site operators to implement BMPs
RR	(c) Requirements for construction site operators to control waste
INT	(d) PreConstruction site plan review for water quality impact, site design, on-site operations, planned control measures during construction & post-construction run-off controls
INT	(e) Procedures for receipt & consideration of information submitted by the public;
INT	(f) site inspection & enforcement of control measures
INT	(g) Training of personnel in planning, review, permitting, inspections & enforcement
SEP	(h) Procedures for keeping records of & tracking all regulated construction activities
RR	(iii) site inspections of 100 percent of all construction projects
INT	(iv) Internal coordination
SEP	(v) evaluation of each plan for use of GI/LID/Sustainable practices, encouragement to meet pre-development hydrology by capturing the 90th percentile storm event runoff & report # of plans w opportunities & # incorporated
SEP	(vi) description of the mechanism(s) used for above, with description of each individual BMP (both structural or non-structural) or source control measures and its corresponding measurable goal
SEP	(vii) annual report

SEP	(a) frequency of activities
SEP	(b) # plans with opportunity & implementation for GI/LID/Sustainable practices
	b. Post-Construction Stormwater Management in New Development & Redevelopment
INT	(i) revise, implement, & enforce a program, runoff
INT	(ii) development, implementation, & enforcement of, at a minimum:
INT	(a) structural and/or non-structural best management practices
INT	(b) ordinance or other regulatory mechanism to address post-construction runoff
INT	A. site design standard addressing 90th percentile pre-development hydrology
INT	B. requirements & standards to direct growth, such as sensitive areas
INT	C. requirements to maintain and/or increase open space/buffers
INT	D. infill development in higher density urban areas, with existing storm sewer infrastructure.
INT	(d) post-construction requirements are reviewed & revised as appropriate
INT	(e) educational program for project developers & plan review staff regarding standards & practices
INT	(f) procedures for site inspection & enforcement; operation, maintenance, & repair
INT	(g) discharge of pollutants for commercial application, jurisdiction over lands not directly owned by that entity (e.g., incorporated city).
INT	(h) system to review & update the existing program to ensure objectives of the permit
INT	(iii) permittee must coordinate with all departments & boards with jurisdiction
INT	(iv) permittee must assess all existing codes, ordinances, planning documents & other applicable regulations, for impediments to the use of GI/LID/Sustainable practices.
INT	(v) Apply alternatives for projects that cannot meet the pre-development runoff values requirement on site as required in Part I.D.5.b.(ii).(b).A, four (4) alternatives are available
INT	(a) Off-site mitigation. Runoff practices achieving pre-development runoff values may be implemented at another location within the MS4 area
INT	(b) Payment in lieu. Payment in lieu may be made to the permittee, applied to a public stormwater project.
INT	(c) Partial Implementation. Partial compliance may be implemented where here is a written determination from the New Mexico Office of the State Engineer that full compliance cannot be achieved consistent with water rights appropriations requirements.
INT	(d) Other. In a situation where alternative options (a) through (c) above are not feasible, the permittees may submit to the EPA for approval, an alternative option that meets the 90th percentile pre-development hydrology values.
INT	(vi) Estimation of the # of acres of impervious area (IA) & directly connected impervious area (DCIA).
INT	(vii) An inventory & priority ranking of MS4-owned property & infrastructure
INT	(viii) Incorporation of watershed protection elements into policy and/or planning documents as they come up for regular review
INT	(a) Describe master planning & project planning procedures to control the discharge of pollutants to & from the MS4.
INT	(b) Minimize the amount of impervious surfaces within each watershed
INT	(c) Identify environmentally & ecologically sensitive areas

INT	(d) Implement stormwater management practices that minimize water quality impacts to streams
INT	(e) Implement stormwater management practices that protect & enhance groundwater recharge
INT	(f) Avoid or prevent hydromodification of streams & other water bodies caused by development
INT	(g) Policies to protect native soils, prevent topsoil stripping, & prevent compaction of soils.
INT	(h) program must be tailored to address local community needs
SEP	(ix) permittee must update the SWMP as necessary
SEP	(x) assess the program & document the program effectiveness in the annual report
SEP	(a) Include a summary & analysis w number & frequency of all maintenance, inspections & enforcement
SEP	(b) list all modifications made to the Post-Construction SWMP wcumulative listing of annual revisions to administrative procedures
SEP	(c) According to the schedule the permittee must
SEP	A. Report the number of MS4-owned properties & infrastructure retrofitted w control measures for frequency, volume, & peak intensity of stormwater discharges
SEP	B. report the tabulated results for IA & DCIA & its estimation methodology
	c. Pollution Prevention/Good Housekeeping for Municipal/Co-permittee Operations.
INT	(i) permittee must develop, revise & implement an O & M program wirh training component & preventing or reducing pollutant runoff from municipal operations
INT	(a) employee training program for pollution prevention & good housekeeping
INT	(b) Maintenance to reduce floatable, trash, & other pollutants discharged from the MS4.
INT	(c) Controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance & storage yards, fleet or maintenance shops with outdoor storage areas, salt/sand storage locations, snow disposal areas operated by the permittee, & waste transfer stations;
INT	(d) Procedures for properly disposing of waste removed from the separate storm sewers & areas listed above such as dredge spoil, accumulated sediments, floatables, & other debris
INT	(e) Procedures to ensure that new flood management projects assess the impacts on water quality & examine existing projects for incorporating additional water quality protection devices or practices.
INT	(ii) The Pollution Prevention/Good Housekeeping program must include the following elements:
INT	(a) Develop or update the existing list of all stormwater quality facilities by drainage basin
INT	(b) Develop or modify existing operational manual for de-icing activities addressing alternate materials & methods to control impacts to stormwater quality;
INT	(c) Develop or modify existing program to control pollution in stormwater runoff from equipment & vehicle maintenance yards & maintenance center operations located within the MS4;
INT	(d) Develop or modify existing street sweeping program. Assess possible benefits from changing frequency or timing of sweeping activities or utilizing different equipment for sweeping activities;
INT	(e) Describe procedure to target roadway areas most likely to contribute pollutants to & from the MS4

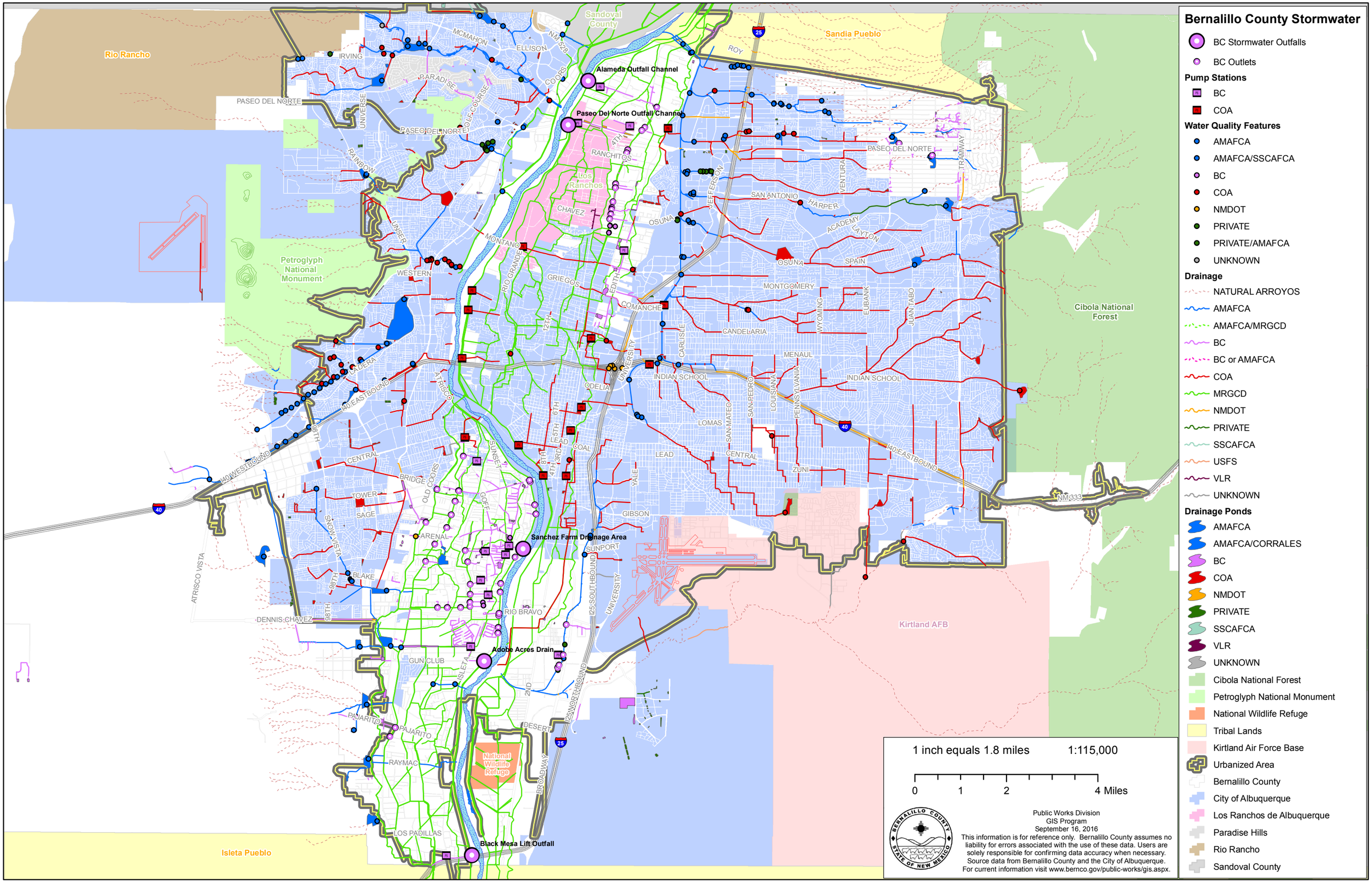
INT	(f) Develop or revise existing SOPs for collection of used motor vehicle fluids & toxics used in permittee operations or discarded in the MS4, for recycle, reuse, or proper disposal;
INT	(g) Develop or revise existing SOPs for the disposal of accumulated sediments, floatables, & other debris
INT	(h) Develop or revise existing litter source control programs to include public awareness campaigns
INT	(i) assess the potential of retrofitting existing flood control devices, structures & drainage ways to provide additional pollutant removal from stormwater.
INT	(j) Enhance inspection & maintenance programs by coordinating with maintenance personnel to ensure that a target number of structures per basin are inspected & maintained per quarter;
INT	(k) Enhance the existing program to control the discharge of floatables & trash from the MS4 by implementing source control of floatables in industrial & commercial areas;
SEP	(l) Include in each annual report, a cumulative summary of retrofit evaluations Update the SWMP to include a schedule (with priorities) for identified retrofit projects;
INT	(m) Review & revise technical criteria guidance documents & program for assessment of water quality impacts & incorporation of water quality controls into future flood control projects with elements:
INT	A. Describe how new flood control projects are assessed for water quality impacts.
INT	B. Provide citations & descriptions of design standards
INT	C. Include method to update standards with new and/or innovative practices.
INT	D. Describe master planning & project planning procedures & design review procedures.
INT	(n) Develop procedures to control the discharge of pollutants related to the storage & application of pesticides, herbicides, & fertilizers applied, by the permittee's employees or contractors, to public right-of-ways, parks, & other municipal property.
SEP	(iii) Comply with the requirements included in the EPA Multi Sector General Permit (MSGP) to control runoff
SEP	(a) A list of municipal/permittee operations impacted by this program,
SEP	(b) A map showing the industrial facilities owned & operated by the MS4,
INT	(c) A list of the industrial facilities (other than large construction activities defined as industrial activity) that will be included in the industrial runoff control program by category & by basin. The list must include the permit authorization number or a MSGP NOI ID for each facility as applicable.
SEP	(iv) description of the mechanism(s) utilized above
SEP	(v) assess the overall success of the program, & document the program effectiveness in the annual report.
	e. Illicit Discharges & Improper Disposal
INT	(i) Program to detect & eliminate illicit discharges
INT	(a) Develop a storm sewer system map, showing the names & locations of all outfalls as well as the names & locations of all waters of the United States that receive discharges from those outfalls. Identify all discharges points into major drainage channels draining more than twenty (20) percent of the MS4 area;
RR	(b) effectively prohibit, through ordinance or other regulatory mechanism, non-stormwater discharges into the MS4, & implement appropriate enforcement procedures & actions;
INT	(c) must include the following elements in the plan:

INT	A. Locate priority areas including field test for selected pollutant indicators & visually screening outfalls during dry weather;
RR	B. Procedures for enforcement, w/ escalation for recalcitrant or repeat offenders;
INT	C. Procedures for removing the source of the discharge;
INT	D. Procedures for program evaluation & assessment
CE	E. Coordinate with adjacent agencies to address situations where investigations indicate the illicit discharge originates outside the MS4 jurisdiction.
INT	(d) Develop an education program
CF	(e) Establish a hotline to address complaints from the public.
INT	(f) Investigate suspected significant/severe illicit discharges within forty-eight (48) hours
INT	(g) Review complaint records for the last permit term & develop a targeted source reduction program
INT	(h) If applicable, implement the program using the priority ranking develop during last permit term
INT	(ii) The permittee shall address the following categories of non-stormwater discharges or flows (e.g., illicit discharges) only if they are identified as significant contributors of pollutants to the MS4
INT	(iii) Screen the entire jurisdiction at least once every five (5) years & high priority areas at least once every year.
INT	(a) Develop SOP for required screening, field monitoring, laboratory analysis, investigations, & analysis evaluation of data collected.
INT	(b) Comply with the dry weather screening program established in Table 6 & the monitoring requirements specified in Part III.A.2.
INT	(c) If applicable, implement the priority ranking system develop in previous permit term.
CF	(iv) Develop programs to collect used motor vehicle fluids & household hazardous waste materials
CF	A. Increasing the frequency of the collection days hosted;
CF	B. Expanding the program to include commercial fats, oils & greases; and
CF	C. Coordinating program efforts between applicable permittee departments.
INT	(v) Spill Prevention & Response Program
INT	(a) Where discharge of material resulting from a spill is necessary to prevent loss of life, personal injury, or severe property damage, the permittee(s) shall take, or insure the party responsible for the spill takes, all reasonable steps to control or prevent any adverse effects to human health or the environment: and
INT	(b) Include a combination of spill response actions & legal requirements for private entities
SEP	(vi) Description of the mechanism(s) for above
SEP	(vii) The permittee shall assess the overall success of the program, & document the program effectiveness in the annual report.
INT	**f. Control of Floatables Discharges**
INT	(i) develop, update, & implement a program to control floatables in discharges
INT	(a) Develop a schedule for implementation of the program to control floatables
INT	(b) Estimate & characterize the annual volume of floatables & trash
SEP	(ii) describe compliance mechanism as used above
SEP	(iii) assess & document the program effectiveness in the annual report.

	g. Public Education & Outreach on Stormwater Impacts
CF	(i) comprehensive stormwater program Education program
CF	(ii) distribute educational knowledge or conduct equivalent outreach activities
CF	(a) Define the goals & objectives of the program based on high priority community-wide issues;
CF	(b) Develop or utilize appropriate educational materials
CF	(c) Inform individuals & households about proper septic system maintenance,
CF	(d) Inform individuals & groups about local stream & beach restoration activities
CF	(e) Use tailored public education program to target specific audiences & communities.
CF	(f) Target commercial, industrial, & institutional entities likely to have significant stormwater impacts.
SEP	(iii) Include the following information in the Stormwater Management Program (SWMP) document:
SEP	(a) Describe program for public reporting illicit discharges or water quality associated with MS4 discharges
SEP	(b) list activities to facilitate the proper management & disposal of used oil & toxic materials; and
SEP	(c) describe compliance mechanism as used above
SEP	(iv) assess program & document both direct & indirect measurements in the Annual Report.
	h. Public Involvement & Participation
SEP	(i) public notice of complete NOI & attachments
SEP	(ii) encourage public involvement in the review, modification & implementation of the SWMP
CF	(iii) Include a comprehensive planning process w/ public participation
CF	(a) detailed general plan for public involvement & participation opportunities
CF	(b) at least one (1) assessment of public behavioral change following an event;
CF	(c) Solicit involvement by environmental groups, etc
CF	(d) An evaluation of opportunities to utilize volunteers
CF	(iv) comply with State, Tribal & local public notice requirements
CF	(v) The public participation process must reach out to all economic & ethnic groups.
SEP	(vi) Description of the mechanism(s) for above
SEP	(vii) assess program in the annual report.
SEP	(viii) provide public accessibility of the (SWMP) document & Annual Reports

Appendix C

Bernalillo County Stormwater Facilities Map


Bernalillo County Stormwater
BC Stormwater Outfalls
BC Outlets
Pump Stations
BC
COA
Water Quality Features
AMAFCA
AMAFCA/SSCAFCA
BC
COA
NMDOT
PRIVATE
PRIVATE/AMAFCA
UNKNOWN
Drainage
NATURAL ARROYOS
AMAFCA
AMAFCA/MRGCD
BC
BC or AMAFCA
COA
MRGCD
NMDOT
PRIVATE
SSCAFCA
USFS
VLR
UNKNOWN
Drainage Ponds
AMAFCA
AMAFCA/CORRALES
BC
COA
NMDOT
PRIVATE
SSCAFCA
VLR
UNKNOWN
Cibola National Forest
Petroglyph National Monument
National Wildlife Refuge
Tribal Lands
Kirtland Air Force Base
Urbanized Area
Bernalillo County
City of Albuquerque
Los Ranchos de Albuquerque
Paradise Hills
Rio Rancho
Sandoval County
1 inch equals 1.8 miles
1:115,000
0
1
2
4 Miles
Public Works Division
GIS Program
September 16, 2016
This information is for reference only. Bernalillo County assumes no liability for errors associated with the use of these data. Users are solely responsible for confirming data accuracy when necessary. Source data from Bernalillo County and the City of Albuquerque.
For current information visit www.bernco.gov/public-works/gis.aspx.
Rio Rancho
Sandoval County
Sandia Pueblo
Petroglyph National Monument
Cibola National Forest
Kirtland AFB
Isleta Pueblo
Los Ranchos
Alameda Outfall Channel
Paseo Del Norte Outfall Channel
Sanchez Farm Drainage Area
Adobe Acres Drain
Black Mesa Lift Outfall
National Wildlife Refuge
PASEO DEL NORTE
MONTANO
I-25
I-40
NM 528
NM 333
RIO GRANDE
RIO BRAVO
I-25 SOUTHBOUND
I-25 NORTHBOUND
I-40 EASTBOUND
I-40 WESTBOUND
UNIVERSITY
COMANCHE
INDIAN SCHOOL
CENTRAL
LOMAS
LEAD
COAL
GIBSON
SUNPORT
DESERT
BROADWAY
ISLETA
2ND
GUN CLUB
DENNIS CHAVEZ
ATRISCO VISTA
98TH
SNOW VISTA
BLAKE
ARENAL
SAGE
TOWER
BRIDGE
OLD COORS
GOFF
SUNSET
LOS PADILLAS
RAYMAC
PAJARITO
CHAVEZ
GRIEGOS
RANCHITOS
OSUNA
SAN ANTONIO
HARPER
ACADEMY
LAYTON
SPAIN
MONTGOMERY
CANDELARIA
MENAUL
ZUNI
YALE
ODELIA
ATRISCO
MADERA
WESTERN
UNSER
RAINBOW
UNIVERSE
PARADISE
GOLF COURSE
IRVING
MCMAHON
ELLISON
COORS
ROY
JEFFERSON
VENTURA
TRAMWAY
WYOMING
EUBANK
JUAN TABO
CARLISLE
SAN PEDRO
LOUISIANA
PENNSYLVANIA
SAN MATEO
EDITH
4TH
6TH
8TH
2ND
1ST
3RD
5TH
7TH

Appendix D

Joint Agreements

Middle Rio Grande Stormwater MS4 Technical Advisory Group

MEMORANDUM OF AGREEMENT

A COOPERATIVE AGREEMENT, CREATING THE MIDDLE RIO GRANDE MS4 TECHNICAL ADVISORY GROUP, IN SUPPORT OF COMPLIANCE EFFORTS FOR A STORMWATER DISCHARGE PERMITTING SYSTEM FOR THE MIDDLE RIO GRANDE VALLEY IN ACCORDANCE WITH THE FEDERAL CLEAN WATER ACT.

WHEREAS, the United States Environmental Protection Agency (EPA), Region 6 regulates the discharge of stormwater from municipal separate storm sewer systems (MS4s) in New Mexico through the issuance of an MS4 permit for the Middle Rio Grande valley urbanized area under the authority of the National Pollutant Discharge Elimination System (NPDES) regulations (40CFR122); and

WHEREAS, the Middle Rio Grande area is comprised of many diverse local, state, federal and tribal entities, each with separate and distinct authority and responsibilities; and

WHEREAS, the Middle Rio Grande area entities potentially eligible for authorization under the proposed NPDES General Permit No. NMR04A000 (hereinafter "MS4 Permit"), and therefore are eligible to enter into this Memorandum of Agreement (hereinafter "Agreement") in furtherance of the requirements of the MS4 Permit, are the City of Albuquerque, Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), University of New Mexico, New Mexico Department of Transportation District 3, Bernalillo County, Sandoval County, Village of Corrales, City of Rio Rancho, Los Ranchos de Albuquerque, Kirtland Air Force Base, Town of Bernalillo, State Fairgrounds/Expo New Mexico, the Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA), the Eastern Sandoval County Arroyo Flood Control Authority (ESCAFCA), Sandia National Laboratories/Department of Energy, Pueblo of Sandia, Pueblo of Isleta, and Pueblo of Santa Ana (collectively "Stormwater Management Entities"); and

WHEREAS, the proposed MS4 Permit encourages cooperative efforts among separate local, state, federal and Tribal governments to reduce the amount of pollutants discharged with stormwater from the Middle Rio Grande urbanized area MS4s; and

WHEREAS, continued cooperation among the Stormwater Management Entities in the MS4 Permit offers an enhanced opportunity for each entity to remain aware of the requirements in the MS4 Permit and facilitate compliance with conditions of the permit;

NOW, THEREFORE, BE IT AGREED THAT:

1. The signatories to this Agreement (hereinafter collectively referred to as "Parties" and individually referred to as "Party") support and encourage a cooperative commitment to assist one another with technical issues regarding compliance with the MS4 Permit and agree to form the Middle Rio Grande MS4 Technical Advisory Group (MS4TAG).

2. The purpose of the MS4TAG will be to exchange technical information regarding compliance with the MS4 Permit, exchange ideas among Parties regarding compliance efforts, and exchange information regarding illicit discharges detected within each Party's jurisdiction. The MS4TAG shall have no binding financial authority and shall be strictly advisory in nature.

3. Nothing in this Agreement shall be construed as obligating a Party to this agreement to expend funds for any purpose, and no Party shall be required to contribute any funds in order to participate in this Agreement. In the event the Parties determine that any joint expenditure of funds among multiple Parties becomes necessary in order to comply with the requirements of the MS4 Permit, a separate agreement shall be entered into between the affected Parties regarding any and all such expenditures at that time.

4. The term of this Agreement shall run from the date the MS4 Permit is issued by the EPA until the date the MS4 Permit is terminated or expires, whichever occurs first. This Agreement may be terminated in its entirety at any time upon the mutual agreement of all of the then-existing Parties to this Agreement. In the event any Party wishes to withdraw from this Agreement without terminating the other Parties' interests in this Agreement, withdrawal shall become effective upon ninety (90) days prior written notice to the other Parties. Withdrawal shall fully and completely terminate that Party's interest in and obligations under this Agreement. Following any Party's withdrawal, this Agreement shall continue in full force and effect as to all remaining Parties to the extent possible.

5. This Agreement does not address the "Public Education and Outreach" or "Cooperative Sampling" sections of the MS4 Permit. Any MS4TAG efforts regarding either of these sections of the MS4 Permit under this Agreement shall be strictly in furtherance of the spirit of cooperation intended among the Parties. Each Party acknowledges its obligations under the "Public Education and Outreach" and "Cooperative Sampling" sections of the MS4 Permit are separate and apart from its activities under this Agreement, and a separate agreement will be required for any collaboration among the Parties with respect to those permit requirements.

6. The Parties will appoint two (2) Co-Coordinators from among the Parties, one of which must be from a Party located within the Bernalillo County geographical area and one of which must be from a Party located within the Sandoval County geographical area. Appointment of a Co-Coordinator shall be by majority vote of the voting Parties, with only those Parties located in the county of Bernalillo voting on the Co-Coordinator from that area, and only those Parties located in the county of Sandoval voting on the Co-Coordinator from that area. Co-Coordinators must be appointed annually in each subsequent permit year, or earlier if the position becomes vacant for any reason. For the New Mexico Department of Transportation District 3, which operates stormwater management facilities in both counties, for the purposes of this section, they shall select one county affiliation in year one of the agreement and alternate affiliations is subsequent years of this Agreement. The Co-Coordinators will be expected to coordinate the Parties' efforts under this Agreement, including facilitating meetings of the MS4TAG at least monthly for the first year of the MS4 Permit. In years two through five of the permit, the frequency of meetings may be reduced to quarterly with additional meetings called as necessary to discuss issues regarding MS4 Permit compliance.

7. Each Party shall be entitled to one (1) vote on any action items.

8. This Agreement creates no obligations on behalf of any Party to any other Party to this Agreement, including for any requirements imposed or determinations made by EPA. The Parties acknowledge and agree that each shall at all times remain individually liable for full compliance with the requirements of the MS4 Permit, including EPA's determination regarding the implementation schedule.

9. This Agreement may be modified in writing at any time upon the mutual agreement of the Parties.

10. Parties can be added at any time during the life of this Agreement. A potential future Party's submittal of a signature page to the Co-Coordinators and approval by the Co-Coordinators shall add the Party to the Agreement.

Approved as to Form:

Bernard P. Metzgar
SSCAFCA Attorney

Date: 10/04/13

Southern Sandoval County Arroyo
Flood Control Authority

Date: 10/18/13

Donald Rudy, Chairman

City of Rio Rancho

Approved as to Form:

City Attorney

Date: 10/4/13

Recommended By:

Dolores Wood, Director

Date: 11.4.13

Approved By:

Keith Riesberg, City Manager

Date: 11/1/13

Approved as to Form:

George Perez
Town of Bernalillo Attorney

Date: 10/15/2013

Mayor Jack Torres, Town of Bernalillo

Date: 10/14/13

Attest: Date: 10/14/13
Ida Fierro, Town Clerk

VILLAGE OF CORRALES

By: _____ 10·08·13
Philip Gasteyer, Mayor Date

Attest:

_____ 10-08-2013
Juan Reyes, Village Clerk Date

IN WITNESS WHEREOF, the undersigned have caused this Agreement to be executed.

Albuquerque Metropolitan Arroyo Flood Control Authority

Date: 10/24/2013

Tim Eichenberg
Chair of the Board of Directors

Attest:

Bruce Thomson
Secretary/Treasurer

Date: 10/24/13

VILLAGE OF LOS RANCHOS DE ALBUQUERQUE

Date: November 14, 2013

LARRY P. ABRAHAM
MAYOR

(SEAL)

STEHANIE DOMINGUEZ
VILLAGE CLERK

Accepted on behalf of:

U.S. DEPARTMENT OF ENERGY
NATIONAL NUCLEAR SECURITY ADMINISTRATION
SANDIA FIELD OFFICE

By: _____ 14 NOV 2013
Geoffrey L. Beausoleil Date
Manager

MIDDLE RIO GRANDE STORMWATER
MS4 TECHNICAL ADVISORY GROUP
FINAL

Approved as to Form:

Bernard P. Metzgar
ESCAFCA Attorney

Date: 11/14/13

Eastern Sandoval County Arroyo Flood Control Authority

Date: NOV. 19, 2013

Salvador Reyes, Chairman

UNIVERSITY OF NEW MEXICO

Approved by:

Date: 12/12/13

David Harris, Executive Vice President

Recommended by:

Carla P. Domenici Date: 12-10-13

Carla P. Domenici, Director
Safety and Risk Services Department

New Mexico Department of Transportation

Approved By:

Tim Parker

Date: 12/22/13

Timothy L. Parker, M.S., P.E.
NMDOT District Three Engineer

Approved As To Form Only:

Date: 12/18/2013

Ken Swain, Assistant General Counsel
Office of the General Counsel

BC CCN 2014-0069

BERNALILLO COUNTY

Motion to: Approve a Memorandum of Agreement (MOA) joining the County with other local entities participating in the Middle Rio Grande MS4 Technical Advisory Group (MS4TAG).

Approved this 28th day of January, 2014

BOARD OF COUNTY COMMISSIONERS

Debbie O'Malley, Chair

Art De La Cruz, Vice Chair

Maggie Hart Stebbins, Member

Lonnie C. Talbert, Member

Wayne A. Johnson, Member

APPROVED AS TO FORM:

County Attorney

Date: 1/28/14

ATTEST:

Maggie Toulouse Oliver, County Clerk

Date: 1/28/14

BERNALILLO COUNTY COUNTY CLERK SEAL STATE OF NEW MEXICO

Approved as to Form:

Patrick F.Trujillo
Sandoval County Attorney

Date: 1/27/2014

Sandoval County

Date: 2/6/2014

Phillip Rios, County Manager

MIDDLE RIO GRANDE STORMWATER
MS4 TECHNICAL ADVISORY GROUP
FINAL

10-07-13

Approved as to Form:

David Tourek
City Attorney

Date: 2/24/14

Recommended By:

Michael J. Riordan, P.E.
Director, Department of Municipal Development

Date: 2/26/14

Approved By:

Robert J. Perry
Chief Administrative Officer

Date: 3/4/14

MIDDLE RIO GRANDE STORMWATER
MS4 TECHNICAL ADVISORY GROUP
FINAL

Memorandum of Agreement accepted on behalf of:

UNITED STATES AIR FORCE
KIRTLAND AIR FORCE BASE

By _____ Date 28 Dec 15
ERIC H. FROEHLICH, COLONEL,
USAF INSTALLATION COMMANDER

Middle Rio Grande Stormwater MS4 Compliance Monitoring Cooperative

INTERGOVERNMENTAL AGREEMENT

AN INTERGOVERNMENTAL AGREEMENT, CREATING THE MIDDLE RIO GRANDE MS4 COMPLIANCE MONITORING COOPERATIVE, IN SUPPORT OF COMPLIANCE EFFORTS FOR A STORMWATER DISCHARGE PERMITTING SYSTEM FOR THE MIDDLE RIO GRANDE VALLEY IN ACCORDANCE WITH THE FEDERAL CLEAN WATER ACT.

RECITALS

WHEREAS, the United States Environmental Protection Agency (EPA), Region 6 regulates the discharge of stormwater from municipal separate storm sewer systems (MS4s) in central New Mexico through the issuance of an MS4 permit for the Middle Rio Grande valley urbanized area, under the authority of the National Pollutant Discharge Elimination System (NPDES) regulations (40CFR122); and

WHEREAS, the Middle Rio Grande valley urbanized area is comprised of many diverse local, state, federal and tribal entities, each with separate and distinct authority and responsibilities; and

WHEREAS, the Middle Rio Grande valley urbanized area entities that are eligible for authorization under NPDES General Permit No. NMR04A000 (hereinafter "MS4 Permit"), and therefore eligible to enter into this Intergovernmental Agreement (hereinafter "Agreement") in furtherance of the requirements of the MS4 Permit, are the City of Albuquerque, Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), University of New Mexico, New Mexico Department of Transportation District 3, Bernalillo County, Sandoval County, Village of Corrales, City of Rio Rancho, Village of Los Ranchos de Albuquerque, Kirtland Air Force Base, Town of Bernalillo, State Fairgrounds/Expo New Mexico, Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA), Eastern Sandoval County Arroyo Flood Control Authority (ESCAFCA), Sandia National Laboratories/Department of Energy, Pueblo of Sandia, Pueblo of Isleta, and Pueblo of Santa Ana (collectively "Co-permittees"); and

WHEREAS, the proposed MS4 Permit requires each Co-permittee to obtain and report stormwater compliance monitoring results in their MS4 Annual Report; and

WHEREAS, the proposed MS4 Permit encourages cooperative efforts among the Co-permittees, including compliance monitoring activities, to reduce the amount of pollutants discharged with stormwater into the Rio Grande; and

WHEREAS, cooperation among the Co-permittees in the MS4 Permit through the Middle Rio Grande Compliance Monitoring Cooperative ("CMC"), with regard to monitoring requirements, offers the opportunity to reduce each individual Co-permittee's monitoring costs by cooperatively developing, funding, and executing a common monitoring plan without reducing the effectiveness of the monitoring plan.

a Members cash contribution, provided however, that participation in the CMC shall not be considered in-kind contributions. The value of in-kind contributions will be determined by the membership of the CMC by equating the value of the service to the cost that would be paid by the membership of the CMC to have the in-kind service performed by a third party (non-CMC member) contractor. The Contribution Schedule is located in Attachment 1 to this Agreement. This Contribution Schedule may be modified by the CMC annually without requiring modification to this agreement, provided however, that it shall be adopted by unanimous vote of the Members. Any funds remaining at the end of the Agreement Year will be carried into the next Calendar Year of this agreement. In such event, the CMC may either elect to retain the excess funds from the prior Calendar Year as a contingency fund, or may lower the annual contribution schedules for that year for all Members in equal proportion, based on the total amount carried forward. In the event a Member does not have the resources to provide full payment for any funds required by the Contribution Schedule, the remaining Members may agree, by unanimous vote, amend the Contribution Schedule if it is in the best interest of the CMC. Each Member's obligations under this Agreement are contingent upon sufficient appropriations being made therefor by such Member's governing body sufficient to fulfill such Member's said obligations. If such appropriations are insufficient to such Member's obligations hereunder, such Member's shall promptly notify the other Members, and this Agreement shall terminate forthwith with respect to such Member.

7. **FISCAL AGENT**. The Members shall select one (1) Co-permittee to act as Fiscal Agent for the CMC for the purposes of this Agreement. The Fiscal Agent shall act as the custodian of the CMC's funds, securities, and property. All funds will be held in a separate bank account for the purposes of this Agreement. All CMC funds shall be deposited promptly by the Fiscal Agent to the credit of the CMC. The CMC shall adhere to the Fiscal Agent's accounting and procurement procedures, provided such procedures comply with law. The Fiscal Agent shall make available to any interested Member, all records, receipts, and other documentation with respect to all matters concerning this agreement and shall have this account included in its annual audit. The Fiscal Agent shall maintain funds in accordance with all applicable state and Federal statutes. The Fiscal Agent shall be authorized on the CMC's behalf to sign checks, drafts, or other instruments for payment of money, acceptances, notes, or other evidences of indebtedness, to enter into contracts, or to execute and deliver other documents and instruments. This authority to enter into any contract or negotiated agreement shall be subject to approval by the CMC and subject to any limitations as set forth in this Agreement. Subject to the provisions of this Agreement, no loans shall be contracted on behalf of the CMC and no evidence of indebtedness shall be issued in its name unless authorized by a unanimous vote of the CMC Members. In consideration of the in-kind contributions anticipated from the Fiscal Agent, the total financial contribution requirements of the Fiscal Agent's Member agency, under any applicable agreement, shall be credited by the sum of one thousand dollars ($1,000.00) for the term of the permit in which that Member serves as the Fiscal Agent.

8. **PAYMENTS.** The Fiscal Agent will invoice each Member for their respective participation, minus the values of any CMC approved in-kind contributions at the start of each member entity's Fiscal Year. Each Member will pay such invoices to the Fiscal Agent within

standing of the CMC, contracts may be used, with concurrence from all Members of the CMC, that have been issued by Members to perform elements of the monitoring program. If a contractor is used that has been procured by a Member in good standing of the CMC instead of the Fiscal Agent, then, with concurrence of the other Members of the CMC, an entity that is not the Fiscal Agent for the CMC may contract to have the services performed and upon successful completion of the services, submit an invoice, with no mark-up, to the Fiscal Agent for reimbursement. Reimbursement shall only be authorized for reasonable and necessary costs. All contractor's utilized for the purposes identified in this Agreement shall be procured in accordance with the State Procurement Code. Contractors will be agents of the Member issuing the contract. Other Members of the CMC shall not be bound by the terms of the contract.

13. **EVALUATION.** The Members agree that the Stormwater Monitoring contract is an ongoing program. The effectiveness of the Stormwater Monitoring contract, with regard to permit compliance, will be evaluated by the CMC prior to annual renewal(s) or request for proposals.

14. **LIMITATION ON SAMPLING ACTIVITIES.** The contractor's scope of services will be limited to the CMC-developed and EPA approved sampling plan and associated reporting. If, in the event of an exceedence during routine monitoring events, additional investigation is required by the EPA to identify the source of a potential contaminant, the CMC may expand monitoring activities to the degree necessary to locate the likely entry point of the potential contaminants. Once the likely entry point is identified, further investigation into the source of the potential contaminant will become the responsibility of the specific Co-permittee(s) having jurisdiction at the location where the likely entry occurred. The CMC shall have no responsibility, fiscal or otherwise, to investigate potential sources of contamination outside of the river or its affiliated Middle Rio Grande Conservancy District-owned water conveyances.

15. **PARTICIPATION AFFECTED.** If any situation arises which adversely affects any Member's participation in this Agreement, said Member will immediately, and in writing, notify the other Members. Any circumstance that materially affects this Agreement will be promptly and equitably resolved by all Members and if necessary, an amendment to this Agreement shall be executed.

16. **COMPLIANCE WITH GOVERNING LAWS.** The obligations of each Member under this Agreement shall be performed in compliance with all applicable laws, statues, and ordinances. Nothing herein is intended to constitute any agreement for the Members to perform any activity in violation of the Constitution or Laws of the State of New Mexico or the Ordinances of any Co-permittee that is a Member of this Agreement.

17. **SEVERABILITY.** If any clause or provision of this Agreement is illegal, invalid or unenforceable, under present or future laws effective during the term of this Agreement, then and in that event, it is the intention of the Members hereto that the remainder of this Agreement shall not be affected thereby.

EACH ENTITY WILL EXECUTE AGREEMENT INDIVIDUALLY. SIGNATURE PAGES WILL BE CONSOLIDATED INTO SINGLE DOCUMENT

Albuquerque Metropolitan Arroyo Flood Control Authority

Bruce M Thomson

Bruce M. Thomson, Chair
Board of Directors

6/23/2016
Date

Attest:

Ronald D. Brown, Secretary-Treasurer
Board of Directors

Approved as to Form:

Randy Autio
AMAFCA Attorney

Date: 6/23/16

City of Rio Rancho

Keith Riesberg
City Manager

5/27/16
Date

Approved as to Form:

Jennifer Vega-Brown
City Attorney

Date: 5/26/16

Date for of beginning of Fiscal Year: July 1

EACH ENTITY WILL EXECUTE AGREEMENT INDIVIDUALLY. SIGNATURE PAGES WILL BE CONSOLIDATED INTO SINGLE DOCUMENT

City of Albuquerque

Approved as to Form

Jessica M. Hernandez
City Attorney

6/15/16
Date

Purchasing Approval
:

Ramona Martinez
Chief Procurement Officer

6/16/16
Date

Recommended By:

Melissa Lozoya
Director, Department of Municipal Development

6/16/16
Date

Approved By

Robert J. Perry
Chief Administrative Officer

6/17/16
Date

Date for of beginning of Fiscal Year: July 1

ATTACHMENT 1

CONTRIBUTION SCHEDULE

CCN 2016-0407

County of Bernalillo:

APPROVED BY:

6-28-16

Julie M. Baca — Date
Bernalillo County Manager

RECOMMENDED BY:

6/27/16

Roger A. Paul, P.E. — Date
Deputy County Manager for Public Works

APPROVED AS TO FORM ONLY:

6-24-2016

for Deputy County Attorney — Date

EACH ENTITY WILL EXECUTE AGREEMENT INDIVIDUALLY. SIGNATURE PAGES WILL BE CONSOLIDATED INTO SINGLE DOCUMENT

Village of Los Ranchos de Albuquerque

Kelly S. Ward 6/21/16

Kelly Ward Date
Administrator

Village of Corrales

Scott A. Kominiak, Mayor

Date 5/26/16

Attest:

Jennifer A. Rise, Village Clerk

Approved as to Form:

John L. Appel
Coppler Law Firm P.C.
Village of Corrales Attorney

Date 5/26/16

Date for beginning of Fiscal Year: July 1

EACH ENTITY WILL EXECUTE AGREEMENT INDIVIDUALLY. SIGNATURE PAGES WILL BE CONSOLIDATED INTO SINGLE DOCUMENT

Town of Bernalillo

Jack Torres, Mayor
Board of Directors

5/23/2016
Date

Attest:

Ida Fierro, Town Clerk

Date for of beginning of Fiscal Year: July 1

EACH ENTITY WILL EXECUTE AGREEMENT INDIVIDUALLY. SIGNATURE PAGES WILL BE CONSOLIDATED INTO SINGLE DOCUMENT

Southern Sandoval County Arroyo Flood Control Authority

James Fahey, M.D., Chair
Board of Directors

5/20/16
Date

Approved as to Form:

Bernard Metzgar
SSCAFCA Attorney

Date: 5/20/16

Date for of beginning of Fiscal Year: July 1

EACH ENTITY WILL EXECUTE AGREEMENT INDIVIDUALLY. SIGNATURE PAGES WILL BE CONSOLIDATED INTO SINGLE DOCUMENT

Sandoval County, New Mexico
Flood Control Authority

Phillip Rios
Phillip Rios
County Manager

5/16/2016
Date

Approved as to Form:

Patrick Trujillo
Sandoval County Attorney

Date: 5/16/2016

Date for of beginning of Fiscal Year: July 1

EACH ENTITY WILL EXECUTE AGREEMENT INDIVIDUALLY. SIGNATURE PAGES WILL BE CONSOLIDATED INTO SINGLE DOCUMENT

New Mexico Department of Transportation - District 3

Approved as to Form:

Elizabeth J. Jarvis
Office of the General Counsel

6·29·2016
Date

Approved By:

Kenneth Murphy
Kenneth Murphy, NMDOT District Three Engineer

7/7/16
Date

Date for of beginning of Fiscal Year: July 1

EACH ENTITY WILL EXECUTE AGREEMENT INDIVIDUALLY. SIGNATURE PAGES WILL BE CONSOLIDATED INTO SINGLE DOCUMENT

Eastern Sandoval County Arroyo Flood Control Authority

_____ Date May 25 2016
Sal Reyes, Chair
Board of Directors

Attest:

_____
Ida Fierro, Secretary
Board of Directors

Approved as to Form:

_____
Bernie Metzgar
ESCAFCA Attorney

Date: _____

ATTACHMENT 1

Sampling Cooperative Cost Allocation Determination (CAD) Tool

28-Apr-16

Number	Participant			$ 132,000.00	ENTITY PAYMENT	FISCAL AGENT CREDIT ($1k)
1	City of Albuquerque		1.38	$ 45,574.50	$45,600.00	
2	AMAFCA		0.43	$ 14,319.39	$14,400.00	$ (1,000.00)
3	UNM		0.41	$ 13,553.53	$13,600.00	
4	NMDOT		0.12	$ 3,865.56	$3,900.00	
5	Bernalillo County		0.59	$ 19,549.95	$19,600.00	
6	Sandoval County		0.46	$ 15,094.20	$15,100.00	
7	Village of Corrales		0.04	$ 1,393.20	$1,400.00	
8	City of Rio Rancho		0.42	$ 13,997.46	$14,000.00	
9	Los Ranchos de Albuquerque		0.02	$ 705.79	$1,000.00	
10	Town of Bernalillo		0.03	$ 903.81	$1,000.00	
11	ESCAFCA		0.01	$ 338.88	$500.00	
12	SSCAFCA		0.08	$ 2,703.72	$2,900.00	
	Ratio Check (Sum = Weighting Factor)		4.00		$132,000.00	

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TEXAS 75202-2733

RECEIVED APR 25 2017

APR 10 2017

CERTIFIED MAIL – RETURN RECEIPT REQUESTED: 7014 0150 0000 2454 3244

Mr. Dave Gatterman, P.E.
Southern Sandoval County
Arroyo Flood Control Authority
1041 Commercial Dr. S.E.
Rio Rancho, NM 87124

Re: Request for Delegation of Entering Data

Mr. Gatterman:

Thank you for your email of February 8, 2017, requesting that the Middle Rio Grande member for entering monitoring events data into NetDMR on behalf of the other members. It is our understanding that Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) will be the member who will be inputing the data. EPA approves CMC's request for the delegation because it is efficient and not duplicative. While we approve the CMC's request for the delegation, EPA would like to emphasize a few items.

EPA's NPDES Permits and TMDLs Branch has pointed out that AMAFCA has certain obligations:

- If AMAFCA agrees to enter monitoring events data on the permittees' (CMC member entities) behalf, this should be memorialized in a Memorandum of Agreement (MOA) or its equivalent. AMAFCA must maintain this obligation as part of their SWMP description and it should also be incorporated into the AMAFCA's SWMP.

- The CMC's SWMPs should also indicate that AMAFCA is responsible for implementing this action.

EPA's Water Enforcement Branch would also like to highlight Part I D.3.b of the Middle Rio Grande MS4 Permit requirements regarding Shared Responsibility and cooperative Programs, and Part IV.A of the MS4 Permit regarding Standard Permit Conditions and Duty to Comply.

- **Part I D.3.b** states that Implementation of the SWMP may be achieved through participation with other permittees, public agencies, or private entities in cooperative efforts to satisfy the requirements of Part I. D in lieu of creating duplicate program elements for each individual permittee, only if:

  "(c) The permittee remains responsible for compliance with the permit obligations if the other entity fails to implement the control measure component."

- **Part IV A** states that the permittee(s) must comply with all conditions of this permit insofar as those conditions are applicable to each permittee, either individually or jointly. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action.

As stated above, please note that each permittee is responsible for meeting its own permit obligations. If you have any questions, please contact Robert Houston, Special Projects Section Chief, at (214) 665-8565.

Sincerely,

Cheryl T. Seager
Division Director
Compliance Assurance and
Enforcement Division

County of Bernalillo
State of New Mexico
Technical Services Department
2400 Broadway SE, Building N
Albuquerque, New Mexico 87102
Office: (505) 848-1500 Fax: (505) 848-1510
www.bernco.gov

August 9, 2017

Mr. Jerry Lovato, Executive Engineer
Albuquerque Metropolitan Arroyo Flood Control Authority
2600 Prospect Ave NE
Albuquerque, NM 87107

RE: Memorandum of Understanding for Delegation of Authority for Data Entry into netDMR System

Dear Mr. Lovato,

As you are aware, twelve of the permittees under NPDES Permit No. NMR04A000 (Permit) have entered into a cooperative agreement for the performance of permit-mandated water quality monitoring. Currently, results from the samples taken during monitoring events are shared among the twelve members of the Compliance Monitoring Cooperative (CMC) and must be entered by each entity into the netDMR database individually, creating twelve identical (barring typos or other data entry error) records. This is clearly inefficient, at best.

Following discussions between the CMC and the EPA, the EPA has approved a methodology whereby one member of the CMC will enter data in netDMR on behalf of any other CMC-member entity. Each CMC-member entity that wishes to participate will delegate authority to the data entry CMC-member entity or their designed contractor, for this purpose. We appreciate Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) volunteering to be the data entry CMC entity on behalf of the CMC.

Therefore, Bernalillo County hereby delegates authority for data entry and approval of sampling results into netDMR to AMAFCA for the purposes of compliance with Permit requirements. Please provide us notification of the completion of data entry via email for our records.

In the event that AMAFCA becomes unable to perform this function on behalf of Bernalillo County, please notify me a minimum of 60 days prior to the deadline for date entry so that we may arrange to perform this function internally.

If you have any questions or need any clarification regarding this letter, please feel free to contact me at kbronson@bernco.gov or at 505-848-1544. Thank you again for your willingness to perform this operation on behalf of the membership of the CMC.

Kali Bronson
Stormater Program Compliance Manager, Bernalillo County

Jerry Lovato, P.E.
Executive Director, AMAFCA

COMMISSIONERS

Debbie O'Malley, Chair, District 1 *Steven Michael Quezada, Vice Chair, District 2*
Maggie Hart Stebbins, Member, District 3 *Lonnie C. Talbert, Member, District 4* *Wayne A. Johnson, Member, District 5*

ELECTED OFFICIALS

Tanya R. Giddings, Assessor *Linda Stover, Clerk* *Willow Misty Parks, Probate Judge* *Manuel Gonzales III, Sheriff* *Nancy M. Bearce, Treasurer*

COUNTY MANAGER
Julie Morgas Baca

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TEXAS 75202-2733

RECEIVED APR 25 2017

APR 10 2017

CERTIFIED MAIL – RETURN RECEIPT REQUESTED: 7014 0150 0000 2454 3244

Mr. Dave Gatterman, P.E.
Southern Sandoval County
Arroyo Flood Control Authority
1041 Commercial Dr. S.E.
Rio Rancho, NM 87124

Re: Request for Delegation of Entering Data

Mr. Gatterman:

Thank you for your email of February 8, 2017, requesting that the Middle Rio Grande member for entering monitoring events data into NetDMR on behalf of the other members. It is our understanding that Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) will be the member who will be inputing the data. EPA approves CMC's request for the delegation because it is efficient and not duplicative. While we approve the CMC's request for the delegation, EPA would like to emphasize a few items.

EPA's NPDES Permits and TMDLs Branch has pointed out that AMAFCA has certain obligations:

- If AMAFCA agrees to enter monitoring events data on the permittees' (CMC member entities) behalf, this should be memorialized in a Memorandum of Agreement (MOA) or its equivalent. AMAFCA must maintain this obligation as part of their SWMP description and it should also be incorporated into the AMAFCA's SWMP.

- The CMC's SWMPs should also indicate that AMAFCA is responsible for implementing this action.

EPA's Water Enforcement Branch would also like to highlight Part I D.3.b of the Middle Rio Grande MS4 Permit requirements regarding Shared Responsibility and cooperative Programs, and Part IV.A of the MS4 Permit regarding Standard Permit Conditions and Duty to Comply.

- **Part I D.3.b** states that Implementation of the SWMP may be achieved through participation with other permittees, public agencies, or private entities in cooperative efforts to satisfy the requirements of Part I. D in lieu of creating duplicate program elements for each individual permittee, only if:
-

> "(c) The permittee remains responsible for compliance with the permit obligations if the other entity fails to implement the control measure component."

- **Part IV A** states that the permittee(s) must comply with all conditions of this permit insofar as those conditions are applicable to each permittee, either individually or jointly. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action.

As stated above, please note that each permittee is responsible for meeting its own permit obligations. If you have any questions, please contact Robert Houston, Special Projects Section Chief, at (214) 665-8565.

Sincerely,

Cheryl T. Seager
Division Director
Compliance Assurance and
Enforcement Division

contract book
2008-29

Intergovernmental Agreement Regarding the Operation, Function, and Funding of the Storm Water Team

THIS AGREEMENT is made and entered into this 27th day of August, 2008, by and among the County of Bernalillo ("COUNTY"), the City of Albuquerque ("COA"), the Albuquerque Metropolitan Arroyo Flood Control Authority ("AMAFCA"), the New Mexico Department of Transportation ("NMDOT"), the Southern Sandoval County Arroyo Flood Control Authority ("SSCAFCA"), and the Ciudad Soil and Water Conservation District ("CIUDAD"), all political subdivisions of the State of New Mexico, and the University of New Mexico ("UNM"), a state educational institution, individually referred to as "Party" and collectively referred to as "Parties."

WITNESSETH:

WHEREAS, the National Pollution Discharge Elimination System (NPDES) storm water discharge permits for small and large municipal separate storm sewer systems ("MS-4") include a minimum control measure regarding public outreach and education; and

WHEREAS, this minimum control measure requires each permittee to develop and distribute educational materials to the community or conduct equivalent public outreach activities about the impacts of storm water discharges on receiving water bodies and the actions that the public can take to reduce pollutants in storm water runoff; and

WHEREAS, COA, AMAFCA, NMDOT, and UNM, co-permittees of a MS-4 Phase I permit, and the COUNTY, a permittee of a Phase II permit, entered into a Cooperative Agreement dated October 20, 2005 in order to accomplish said public outreach and education, and the group informally became known as the Storm Water Team; and

WHEREAS, the Storm Water Team hired a Storm Water Quality Education Coordinator ("Coordinator") to help develop a public education campaign and produce public service announcements including print materials for distribution, and that contract expires November 2008; and

Intergovernmental Agreement Regarding the Operation, Function,

and Funding of the Storm Water Team

WHEREAS, SSCAFCA desires to combine efforts to educate the public on storm water quality as required in their Phase II storm water discharge permit, and to become one of the participating agencies of the Storm Water Team; and

WHEREAS, CIUDAD desires to combine efforts to educate the public on storm water quality as part of their Watershed Restoration Action Strategy, and to become one of the participating agencies of the Storm Water Team; and

WHEREAS, SSCAFCA and CIUDAD both desire to provide funding as part of their membership to the Storm Water Team; and

WHEREAS, each Party has an interest in reducing pollution and/or meeting storm water permit requirements within their respective boundaries, which are shown in Exhibit 1; and

WHEREAS, with new members being added, it is appropriate to enter into this Agreement in order to formalize the Storm Water Team mission and function, and establish future funding streams.

THEREFORE IN CONSIDERATION OF THE PROMISES AND COVENANTS CONTAINED HEREIN, THE PARTIES HERETO AGREE AS FOLLOWS:

1. The Storm Water Team ("Team") will include all members that have signed a Cooperative Funding Agreement, comply with its terms and continue to fund the team. Additional non-voting members will include other agencies, organizations, or individuals that will provide technical assistance needed to allow the Team to accomplish its mission.
2. The Team will serve as the focal point on public education and outreach regarding storm water quality in the Albuquerque Reach of the Rio Grande watershed, which is

the area that drains to the Rio Grande between Algodones and Isleta Pueblo. The Team mission statement is hereby agreed to by the Parties:

The Storm Water Team is a multi-agency committee dedicated to providing public education and awareness regarding storm water pollution and how to reduce debris and other pollutants in the Albuquerque Reach of the Rio Grande and its tributary arroyos.

3. The Team will have an Executive Committee made up of one voting member from each Party in good standing, which is defined as having paid their expected contribution, as described in Section 4. Each Party in good standing will designate a staff member to be on the Executive Committee. Other staff liaisons will be assigned to the Team as necessary to support the Team mission. Other/outside agencies may participate on the Team by attending meetings and giving input; however, only the Executive Committee may vote on Team decisions. The purpose of the Executive Committee will be to administer and direct the Team and Coordinator in accordance with the provisions herein. Decisions of the Executive Committee will be decided by majority vote of the Executive Committee.

4. Each Party agrees to provide payment for Fiscal Year 2009 in the amount shown in the Contribution Schedule, which may include the value of Executive Committee approved in-kind services, in Attachment A. For subsequent Fiscal Years, the Contribution Schedule may be adjusted by the Executive Committee, including the value of in-kind contributions.

5. AMAFCA will be the fiscal agent for the purposes of this Agreement. All funds will be held in a separate bank account for the purposes of this Agreement. AMAFCA shall make available to any interested Party, all records, receipts, and other

documentation with respect to all matters concerning this Agreement, and shall have this account included in its annual audit.

6. Each Party agrees that a Storm Water Quality Education Coordinator will be hired through the Request for Proposal (RFP) process in advance of the expiration of the current Coordinator's contract. The Coordinator shall be a contractor and not an employee of AMAFCA. Responsibilities included in the Storm Water Quality Education Coordination contract will be to develop and manage a comprehensive educational and awareness campaign, arrange all purchases for deliverables and advertising on behalf of the Team, and make presentations to the public as directed. Each Party will have one representative on the Selection Advisory Committee for the request for proposals process. The Selection Advisory Committee will rank proposals and recommend the top three respondents to the AMAFCA Board of Directors. Upon AMAFCA Board of Directors' approval, AMAFCA will negotiate an agreement with the selected consultant. The Executive Committee will provide input on scope and fees; however, final negotiations and approval will be at AMAFCA's sole discretion.

7. The Parties agree that the Storm Water Quality Education Coordination contract is an ongoing program. The effectiveness of the Storm Water Quality Education Coordination contract, with regard to the Team mission statement, will be evaluated prior to annual renewal(s) or request for proposals.

8. AMAFCA will invoice each Party for their respective participation, minus the value of any Executive Committee approved in-kind contributions, in July, at the start of the Fiscal Year. Each Party will pay such invoices to AMAFCA within forty-five

(45) days of the date of the invoice. Invoices will be sent to Team members listed in Attachment B.

9. It is intended that the Team's operation and function described in this Agreement are ongoing, subject to continued support and authorized funding by each of the Parties. Each Party has the option to not participate in this Agreement in the future by sending written notice to all the other participating Parties at or before the expiration of the Fiscal Year. In such event, the terminating Party shall not be entitled to return of any contribution(s) made under this Agreement; and this Agreement shall remain in full force and effect by and among the remaining Parties.

10. The Team may accept one-time contributions from outside funding sources, to be used to support the Team mission. The Executive Committee will consider the requested uses of such one-time contributions and will ensure the uses are consistent with the Team's ongoing public outreach and education program. Such contributions shall not constitute voting privileges on the Executive Committee.

11. The Parties agree that effort will be expended within the respective boundaries of each participating agency, proportional to funding contributions.

12. If any situation arises which adversely affects any Party's participation in this Agreement, said Party will immediately, and in writing, notify the other Parties. Any circumstance that materially affects this Agreement will be promptly and equitably resolved by all Parties and if necessary, an amendment to this Agreement shall be executed.

13. The obligations of each Party under this Agreement shall be performed in compliance with all applicable laws, statutes and ordinances. Nothing herein is intended to

constitute any agreement for the Parties to perform any activity in violation of the Constitution or Laws of the State of New Mexico or the Ordinances of any entity that is a Party to this Agreement.

14. If any clause or provision in this Agreement is illegal, invalid or unenforceable, under present or future laws effective during the term of this Agreement, then and in that event, it is the intention of the parties hereto that the remainder of this Agreement shall not be affected thereby.

15. It is specifically agreed among the Parties that this Agreement does not, and is not intended to, create in the public, or any member thereof, any rights whatsoever, such as but not limited to, the rights of a third Party beneficiary, nor to authorize anyone not a Party to this Agreement to maintain a suit for wrongful death or any other claim whatsoever.

16. As among the Parties, each shall be solely responsible for any and all liability from personal injury, including death, or damage to property, arising from any negligent or intentional act or failure to act of the respective Party, its officials, agents, contractors or employees pursuant to this Agreement. Liabilities of each Party shall be subject to the immunities and limitations of the Tort Claims Act, §§41-4-1, et seq., NMSA, 1978, and any amendments thereto. By entering into this Agreement, the COUNTY and its "public employees" as defined in the New Mexico Tort Claims Act, the COA and its "public employees" as defined in the New Mexico Tort Claims Act, AMAFCA and its "public employees" as defined in the New Mexico Tort Claims Act, NMDOT and its "public employees" as defined in the New Mexico Tort Claims Act, UNM and its "public employees" as defined in the New Mexico Tort Claims

Act, SSCAFCA and its "public employees" as defined in the New Mexico Tort Claims Act, and CIUDAD and its "public employees" as defined in the New Mexico Tort Claims Act, do not waive sovereign immunity, do not waive any defense and/or do not waive any limitation of liability pursuant to law. No provision in this Agreement modifies and/or waives any provision of the New Mexico Tort Claims Act.

17. The effective date of this Agreement shall be the latest date of approval by all of the interested Parties.

18. Upon approval by all Parties, the covenants, terms and conditions of this Agreement shall be binding upon and inure to the benefit of the Parties hereto, their successors and assigns.

IN WITNESS WHEREOF, the undersigned have caused this Agreement to be executed as of the day and year set forth above.

Albuquerque Metropolitan Arroyo Flood Control Authority

Date: March 20, 2008

Danny Hernandez
Chair of the Board of Directors

Attest:

Tim Eichenberg,
Secretary/Treasurer

Date: March 20, 2008

County of Bernalillo

Date: 5/22/08

Thaddeus Lucero, County Manager

Approved As To Form Only:

Deborah Seligman,
Assistant County Attorney

Date: 5/19/2008

Recommended By:

Tom Zdunek
~~Tim West~~, Deputy County Manager
Public Works Division

Date: 5/21/8

BC CCN 2008-0264

Intergovernmental Agreement Regarding the Operation, Function,

and Funding of the Storm Water Team

City of Albuquerque

Approved As To Form Only:

_____
City Attorney

Date: 5-12-8

Recommended By:

_____
John Castillo, Director

Date: 5/13/08

Approved By:

_____
Dr. Bruce Perlman, Chief Administrative Officer

Date: 5/16/08

Intergovernmental Agreement Regarding the Operation, Function,

and Funding of the Storm Water Team

University of New Mexico

Recommended By:

Donna K. Smith
Director, Safety & Risk Services

Date: 4-23-8

Approved As To Form Only:

Richard Mertz
Associate University Counsel

Date: 4/29/08

Approved By:

David W. Harris
Executive Vice President for Administration

Date: 5/1/08

New Mexico Department of Transportation

Approved As To Form Only:

G Chappelle

Office of the General Counsel

Date: 5/22/08

Approved By:

Larry Velasquez, NMDOT District Three Engineer

Date: 8/28/08

Intergovernmental Agreement Regarding the Operation, Function,

and Funding of the Storm Water Team

Ciudad Soil and Water Conservation District

Date: April 7, 2008

Lauro Silva, Chair

Approved as to Form:

Bernard P. Metzgar
SSCAFCA Attorney

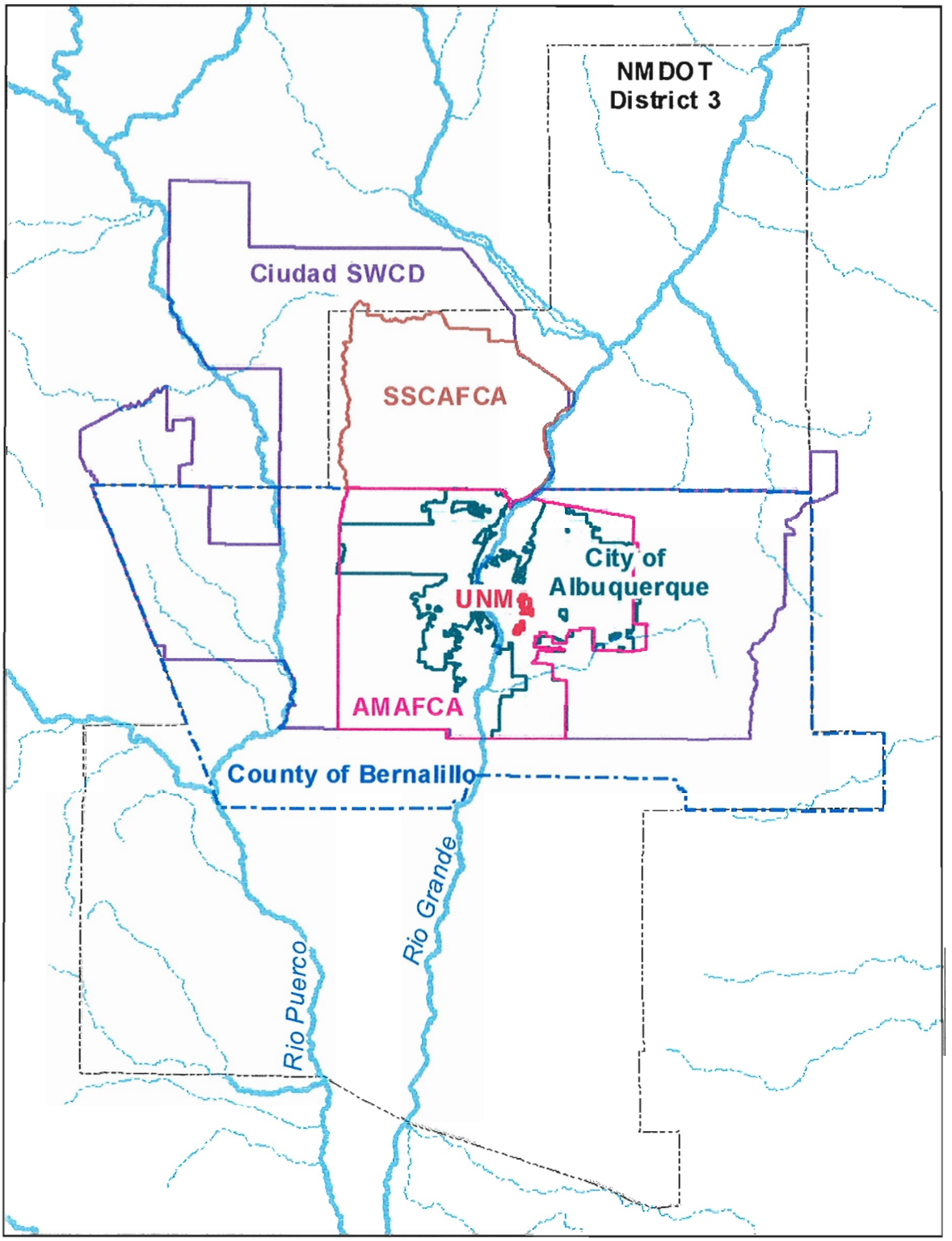
Date: 4/18/08

Southern Sandoval County
Arroyo Flood Control Authority

Date: 5/2/08

John Chaney, Chairman

Exhibit 1
Boundaries of Participating Agencies



Storm Water Team Intergovernmental Agreement – Attachment A

STORM WATER TEAM CONTRIBUTIONS

			Date received by AMAFCA	
FY 05				
	AMAFCA	$10,000	12/01/2004	
	City of Albuquerque	10,000	04/28/2005	
	County of Bernalillo	10,000	12/02/2004	
	UNM	7,000*	07/19/2005	* $5,000 in cash, $2,000 in KNME video
	NMDOT	10,000	05/26/2005	
	Total	$47,000		
FY 06				
	AMAFCA	$10,000	12/23/2005	
	City of Albuquerque	10,000	01/23/2006	
	County of Bernalillo	10,000	06/29/2006	
	UNM	7,000	02/02/2006	
	NMDOT	10,000	06/29/2006	
	Total	$47,000		
FY 07				
	AMAFCA	$10,000	03/21/2007	
	City of Albuquerque	10,000	06/13/2007	
	County of Bernalillo	10,000	02/11/2008	
	UNM	7,000	05/22/2007	
	NMDOT	10,000	04/02/2008	
	Total	$47,000		
FY 08				
	AMAFCA	$10,000	10/03/2007	
	City of Albuquerque	10,000	09/25/2007	
	County of Bernalillo	10,000	03/18/2008	
	UNM	7,000	12/10/2007	
	NMDOT	10,000	04/02/2008	
	Total	$47,000		
FY 09 Expected Contributions				
	AMAFCA	$10,000		
	City of Albuquerque	10,000		
	County of Bernalillo	10,000		
	UNM	7,000		
	NMDOT	10,000		
	SSCAFCA	10,000		
	Ciudad	10,000		
	Total	$67,000		

Storm Water Team Intergovernmental Agreement - Attachment B

STORM WATER TEAM CONTACT ADDRESSES

Christy Burton
AMAFCA
2600 Prospect Ave NE
Albuquerque, NM 87107

cc Irene Jeffries (same address)
on invoices

Storm Drainage Section
Dept. of Municipal Development
Attn: Kathy Verhage
P.O. Box 1293, Rm. 301
Albuquerque, NM 87103

cc Roland Penttila (same address)
on invoices

Vern Hershberger 277-9756
Safety & Risk Services
1 University of New Mexico
MSC07 4100
Albuquerque, NM 87131

Send original invoices to:
Accounts Payable
1 University of New Mexico
MSC01 1290
Albuquerque, NM 87131

invoice must contain P.O. Number. Contact Vern Hershberger for a P.O. # before sending invoices.

Carol Moritz, Administrative Manager
Ciudad Soil & Water Conservation District
6200 Jefferson NE, Room 125
Albuquerque, NM 87109

Kathy Trujillo
New Mexico Department of Transportation
District 3
PO Box 91750
Albuquerque, NM 87199-1750

Patricia Dominguez
Bernalillo County
Public Works Division
2400 Broadway Blvd SE
Bldg N
Albuquerque, NM 87102

cc Mary Murnane (same address)
on invoices

David Stoliker
SSCAFCA
1041 Commerical N.E.
Rio Rancho, New Mexico 87124

FIRST AMENDMENT TO
"Intergovernmental Agreement Regarding the Operation, Function, and Funding of the Storm Water Team"

THIS FIRST AMENDMENT to Intergovernmental Agreement ("Agreement") Regarding the Operation, Function, and Funding of the Storm Water Team ("Team") is made and entered into this 22nd day of January, 2014, by and among the County of Bernalillo, the City of Albuquerque ("COA"), the Albuquerque Metropolitan Arroyo Flood Control Authority ("AMAFCA"), the New Mexico Department of Transportation ("NMDOT"), and the Southern Sandoval County Arroyo Flood Control Authority ("SSCAFCA"), all political subdivisions of the State of New Mexico, individually referred to as "Party" and collectively referred to as "Parties."

RECITALS:

WHEREAS, the U.S. Environmental Protection Agency ("EPA") is proposing to issue the Middle Rio Grande Watershed Based Municipal Separate Storm Sewer System (MS4) Permit, to supersede the existing MS4 Permits for Phase I and Phase II permittees; and

WHEREAS, the EPA has identified the following potentially eligible MS4s: COA, AMAFCA, University of New Mexico, NMDOT, County of Bernalillo, County of Sandoval, Village of Corrales, City of Rio Rancho, Village of Los Ranchos de Albuquerque, Kirtland Air Force Base, Town of Bernalillo, State Fairgrounds Expo NM, SSCAFCA, Eastern Sandoval County Arroyo Flood Control Authority ("ESCAFCA"), Sandia National Laboratories, Pueblo of Sandia, Pueblo of Isleta, and Pueblo of Santa Ana; and

WHEREAS, the EPA promotes Cooperative Programs of two or more MS4s to satisfy one or more permit obligations by granting extended Implementation Schedules; and

FIRST AMENDMENT TO
"Intergovernmental Agreement Regarding the Operation, Function, and Funding of the Storm Water Team"

WHEREAS, the MS4 Permits include minimum control measures regarding Public Education and Outreach on Stormwater Impacts and Public Involvement and Participation; and

WHEREAS, the Parties of the Team find it in the best interest to extend annual membership to the potentially eligible MS4s; and

WHEREAS, the Ciudad Soil and Water Conservation District and University of New Mexico were Parties to the original Agreement, but elected to terminate funding and their participation as Parties to the Agreement prior to this Amendment; and

WHEREAS, the Team also operates under the name Middle Rio Grande Stormwater Quality Team.

NOW THEREFORE, County of Bernalillo, COA, AMAFCA, NMDOT, and SSCAFCA hereby agree to amend the original Agreement as follows:

Paragraph No. 1 shall be modified in its entirety to read as follows: The Team will include all members that have signed a Cooperative Funding Agreement, comply with its terms and continue to fund the Team ("Parties"). Potentially Eligible MS4s may be added to the Team at any time on an annual basis as additional voting members ("Annual Member") without amending this Agreement, provided all requirements for membership have been fulfilled, including providing payment for that Annual Member's expected contribution as described in Section 4. Upon approval by the Team, and without the need to amend this Agreement, other entities may be added to the Team at any time in an advisory capacity only ("Non-Voting Members"). The Team shall establish the requirements for inclusion of an entity on the Team as a Non-Voting Member. The Fiscal Agent will maintain an Annual Roster in the

form set forth in Attachment B, which shall list all Parties and Annual Members in good standing and Non-Voting Members approved by the Team. The Annual Roster shall include the contact information for each entity and, if applicable, their designated voting member and billing information. The Annual Roster shall be updated and revised at least annually to reflect the current Parties, Annual Members, and Non-Voting Members and without the need to amend this Agreement. Parties and Annual Members must remain in good standing by providing payment for their respective contributions in order to continue to participate on the Team as either a Party or Annual Member. Any Party and/or Annual Member that does not maintain good standing will be removed from the Annual Roster, and all membership rights will be suspended, except that the entity shall be permitted to participate as a Non-Voting Member. Upon payment of the Party or Annual Members required contribution, the Party or Annual Member will be restored to full membership and will be listed as a Party or Annual Member in good standing, whichever applies, on the Annual Roster.

Paragraph No. 2 shall be modified in its entirety to read as follows: The primary objective of the Team is to develop a program to meet the Public Education, Outreach, Involvement and Participation requirements of the MS4 Permits in effect for each Party and Annual Member.

Paragraph No. 3 shall be modified in its entirety to read as follows: Each Party and Annual Member in good standing will designate one person from its staff to serve as the voting member. The voting members from each Party in good standing shall form the Executive Committee of the Team, which shall administer and direct the Team and Coordinator in accordance with the provisions herein. The voting members from each Annual

Member in good standing shall be permitted to participate in the activities, votes, and decisions of the Executive Committee, except as otherwise set forth in this Agreement. Non-Voting Members, other staff liaisons assigned to the Team as necessary to support the Team's objectives, and other individual staff members may participate on the Team by attending meetings and giving input, provided however, that only the Executive Committee and voting members of the Annual Members may vote on Team decisions. Decisions of the Team will be decided by majority vote of those members of the Executive Committee and voting members of the Annual Members present, except as otherwise set forth in this Agreement.

Paragraph No. 4 shall be modified in its entirety to read as follows: The annual contribution of each Party and Annual Member shall be established for each fiscal year by the Contribution Schedule set forth in Attachment A. Each Party and Annual Member agrees to provide payment for its contribution in the amount shown in the Contribution Schedule, which may include the value of in-kind services previously approved by the Executive Committee for such purposes. Annual revisions and/or adjustments to the Contribution Schedule shall be determined by majority vote of the Executive Committee. The voting members representing Annual Members may participate in discussions regarding revisions and/or adjustments to the Contribution Schedule, but will not be permitted to vote on any such revisions or adjustments. The Fiscal Agent will keep record of future changes to the Contribution Schedule on Attachment A. Revisions to Attachment A will not require an amendment to this Agreement.

FIRST AMENDMENT TO
"Intergovernmental Agreement Regarding the Operation, Function, and Funding of the Storm Water Team"

IN WITNESS WHEREOF, the undersigned have caused this FIRST AMENDMENT to be executed as of the day and year set forth above.

Albuquerque Metropolitan Arroyo Flood Control Authority

Date: 11/7/2013

Tim Eichenberg
Chair of the Board of Directors

Attest:

Bruce M. Thomson
Secretary/Treasurer

Date: 11/7/13

FIRST AMENDMENT TO
"Intergovernmental Agreement Regarding the Operation, Function, and Funding of the Storm Water Team"

County of Bernalillo

Date: 12/16/10

Tom Zdunek, County Manager

Approved As To Form Only:

Peter Auh,
Deputy County Attorney

Date: 12/12/13

Recommended By:

12/13/13

Jarvis D. Middleton P.E.
Deputy County Manager for Public Works

Date: 12/13/13

FIRST AMENDMENT TO
"Intergovernmental Agreement Regarding the Operation, Function, and Funding of the Storm Water Team"

City of Albuquerque

Approved As To Form Only:

_____
City Attorney

Date: 1/7/2014

Recommended By:

_____
Michael Riordan, Director

Date: 1.9.14

Approved By:

_____
Robert J. Perry, Chief Administrative Officer

Date: 1/22/14

FIRST AMENDMENT TO
"Intergovernmental Agreement Regarding the Operation, Function, and Funding of the Storm Water Team"

New Mexico Department of Transportation

Approved By:

_____ Date: 12/22/13
Timothy L. Parker, M.S., P.E.
NMDOT District Three Engineer

Approved As To Form Only:

_____ Date: 12/20/2013
Office of the General Counsel

FIRST AMENDMENT TO
"Intergovernmental Agreement Regarding the Operation, Function, and Funding of the Storm Water Team"

Approved as to Form:

Bernard P. Metzgar
SSCAFCA Attorney

Date: 11/15/13

Southern Sandoval County
Arroyo Flood Control Authority

Date: 11/15/13

Donald Rudy, Chairman

MIDDLE RIO GRANDE STORMWATER QUALITY TEAM
BYLAWS

ARTICLE I: NAME AND PURPOSE

These bylaws have been proposed and accepted by majority vote of the Storm Water Team ("Team") Voting Members as defined herein, on August 27, 2014. These bylaws stand as operating principles in addition to the "Intergovernmental Agreement Regarding the Operation, Function, and Funding of the Storm Water Team" ("Original Agreement") implemented in 2008, and the "First Amendment to the Intergovernmental Agreement Regarding the Operation, Function, and Funding of the Storm Water Team" ("First Amendment") as signed and finalized in 2014 and any subsequent amendments as signed and finalized. In the event of a conflict between the terms of these bylaws and the Original Agreement and/or First Amendment, the Original Agreement and/or First Amendment shall control.

ARTICLE II: THE EXECUTIVE COMMITTEE AND VOTING MEMBERS

The voting members of the Team ("Voting Members"), and the members of the executive committee ("Executive Committee"), shall be those identified as such in the First Amendment.

ARTICLE III: OFFICERS

Section 1

Officers of the Team shall include the following:

A. *Chair*. Responsible for directing meeting activities in conjunction with business agendas, and generally ensuring the effectiveness of the Team.

B. *Secretary*. Acts as the record-keeper for the Team, including recording the minutes of all meetings and making the minutes and records available to members upon request. Minutes shall include at a minimum a record of all votes, resolution of agenda items, those agenda items carried over for further discussion, and other discussion or notes for the next meeting. The Secretary is also responsible to keep on file all committee reports, the Team's official membership roll and to call roll where it is required.

C. *Treasurer*. Responsible for providing a Treasurer's Report at each meeting, which may consist of the cash balance and outstanding obligations or committed costs. In addition, the Treasurer is required to make a full financial report annually in conjunction with the Fiscal Agent. The annual financial report may consist of summary of annual receipts and disbursements. The Treasurer shall also serve as the Chair *pro tem* and preside over meetings in the absence of the Chair.

In the event that the number of Voting Members exceeds eight (8), the functions of Treasurer shall be divided into two (2) positions: Treasurer and Vice Chair. In such event, the Treasurer shall retain all financial functions, and the Vice Chair shall serve as the Chair *pro tem* and preside over meetings in the absence of the Chair. The Vice Chair shall be elected by majority vote of Voting Members present at the next meeting of the Team and serve the remainder of the fiscal year.

Section 2

Election of all officers shall take place at the first scheduled meeting of each Fiscal Year. Officers of the Team shall be elected by majority vote of the Voting Members present. Each officer shall serve one year, and may succeed themselves in office so long as elected in accordance with these bylaws for each subsequent term. An officer may only be removed from office by a majority vote of all Voting Members.

Section 3

In the event an officer resigns prior to the expiration of their term, their successor shall be elected at the next meeting of the Team. A successor elected to fill a vacancy in an office due to an officer's resignation or removal shall serve the remainder of the vacated term. Until a successor is elected, the remaining officer(s) shall assume the duties of the vacant office, with the exception of a vacancy in the position of Chair, which duties shall be assumed by the Vice Chair if that position then-exists.

ARTICLE IV: COMMITTEES

A Budget Committee will be formed each year in order to manage the budget and coordinate with the Fiscal Agent regarding all financial matters. Additional or other working committees or groups may be formed to address issues or projects which may arise upon the majority vote of the Voting Members present.

ARTICLE V: MEETINGS

Section 1

Meetings shall be officially scheduled during the first meeting of the fiscal year, with meetings to be scheduled bi-monthly. The complete annual schedule shall be distributed to Voting Members via e-mail. Posting or e-mailing of the annual schedule shall constitute notice for all meetings listed therein.

Section 2

Alternate meeting dates must be scheduled no later than the prior month's meeting by majority vote of the Voting Members. Additional meetings may be called for and scheduled by majority vote of Voting Members. The Chair may cancel any regularly scheduled meeting if no items are before the Team for that meeting, provided however, that the Team shall hold a minimum of four (4) meetings per year.

Section 3

The Chair shall distribute the agenda to all Voting Members at least one (1) week prior to any meeting. Order of agenda items and deletion or addition of items may be changed by majority vote of the Voting Members.

Section 4

Notice of the annual schedule, meeting dates and agendas should be posted on the "Keep the Rio Grand" website.

Section 5

Meetings shall be presided over by the Chair and shall be conducted in substantial compliance with Robert's Rules of Order. Voting Members shall be considered members for purposes of applying Robert's Rules of Order.

Section 6

Members of the public may request time on the meeting agenda by request to the Chair or Education Coordinator at least ten (10) days prior to a scheduled meeting. The Chair may include such an item, or list it to be considered if time allows.

ARTICLE VI: RULES OF VOTING

Section 1

At all meetings of the Team, the presence of at least a majority of the Voting Members of the Team shall be necessary and sufficient to constitute a quorum for the transaction of business. Any action of the Team upon any matter shall be valid and effective, with the affirmative vote of a majority of the Voting Members present at a meeting duly convened and at which a quorum is present, unless otherwise required herein or by the Original Agreement or First Amendment. In the event the agenda includes items which require a quorum vote and a quorum is not established, the item shall be moved to the next meeting. Voting shall be conducted in substantial compliance with Robert's Rules of Order, except provided for otherwise herein.

Section 2

Any item may be approved by acclamation or by roll-call vote, unless otherwise required by Robert's Rules of Order. Any Voting Member may call for a vote on any item under discussion at any time during a meeting. If that call for vote is seconded, the Chair shall open for discussion, and call for a vote. Likewise, any item may be tabled by a two-thirds vote. All votes shall be recorded by the Secretary. In the event of a tie, any Voting Member may call for a re-vote.

Section 3

Any Voting Member who must be absent from a meeting and consequent vote(s) may delegate their vote to a temporary replacement from their agency.

Section 4

Electronic or e-mail voting on business between regularly scheduled meetings shall be permitted in accordance with the policy duly adopted by the Team.

ARTICLE VII: FINANCES

Section 1

An annual budget for the Team shall be adopted prior to the beginning of each fiscal year. The fiscal year for the Team runs from July 1 to June 30. The annual budget shall be subject to a vote. An updated budget shall be presented at each meeting.

Section 2

The Fiscal Agent shall be AMAFCA or any other entity identified as such in the Original Agreement and the First Amendment and any subsequent amendments as signed and finalized.

Section 3

The annual budget shall contain a line-item for an Education Coordinator selected by the Team. Selection of the Education Coordinator shall be subject to a vote.

Section 4

All expenditures for special projects shall be determined by a simple majority vote of the Voting Members. Proposals and projects including a scope of work and cost shall be voted and approved before any work shall commence.

Section 5

Invoices for prior approved projects shall include a percentage of work accomplished, or itemized direct costs, as well as a current schedule for completion. Invoices exceeding the percentage of work accomplished shall not be paid, except where prior approved direct itemized costs are billed.

Invoices for prior approved projects may be approved at any time either at a meeting or via email by one of the following Officers in the order listed: (1) Treasurer; (2) Chair; (3) Chair pro tem or Vice Chair; or (4) Secretary. Invoices for work in progress (partial payments) shall be evaluated according to the percentage of work completed and the percentage of money drawn.

Any invoices for expenditures not previously approved by majority vote of the Voting Members can only be approved during a scheduled meeting.

ARTICLE VIII: AMENDMENTS

These bylaws may be amended during a scheduled meeting upon a two-thirds vote of the Voting Members present. Notice of discussion and amendment shall be posted in the agenda at least seventy (72) hours prior to the scheduled meeting at which the vote will be taken. This notice must include both the text of the current bylaws, as well as the text of any proposed change(s). Amendments become effective immediately upon adoption.

County of Bernalillo
State of New Mexico

Technical Services Department
2400 Broadway SE, Building N
Albuquerque, New Mexico 87102
Office: (505) 848-1500 Fax: (505) 848-1510
www.bernco.gov/technical-services/

COMMISSIONERS

Maggie Hart Stebbins, Chair
District 3

Art De La Cruz, Vice Chair
District 2

Debbie O'Malley, Member
District 1

Lonnie C. Talbert, Member
District 4

Wayne A. Johnson, Member
District 5

COUNTY MANAGER

Tom Zdunek

ELECTED OFFICIALS

Tanya R. Giddings
Assessor

Maggie Toulouse Oliver
Clerk

Willow Misty Parks
Probate Judge

Manuel Gonzales III
Sheriff

Manny Ortiz
Treasurer

December 14, 2015

Mr. Tim Trujillo P.E.
Drainage Development Engineer
NMDOT
7500 Pan American Freeway NE
Albuquerque, NM 87109

Mr. Trujillo
As part of Bernalillo County's MS4 permitting requirements we would like to document that Bernalillo County and the New Mexico Department of Transportation currently, and will continue to, coordinate and cooperate on development reviews of projects with overlapping jurisdictions as they pertain to storm water runoff.

As part of this cooperative arraignment, review costs will continue to be absorbed by the respective agency.

Please sign and return this letter indicating your concurrence that NMDOT will continue to coordinate and cooperate with Bernalillo County throughout the duration of the current permit which was authorized by EPA dated November 16th 2015.

This letter will become a part of Bernalillo County's Storm Water Management Plan.

I would suggest that you retain a copy for your records also.

Sincerely,

Don Briggs

Don Briggs, PE, CFM
Grading & Drainage Engineer
Floodplain Administrator
Bernalillo County Public Works Division
2400 Broadway SE, Albuquerque, NM 87102
Ph: (505) 848-1511; Fax: (505) 848-1510

NMDOT Concurrence by:

Tim Trujillo Date 12/16/15

Title D3 Drainage

County of Bernalillo
State of New Mexico

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Albuquerque, New Mexico 87102
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Manuel Gonzales III
Sheriff

Manny Ortiz
Treasurer

December 14, 2015

Mr. Tim McDonough
Planning & Zoning Director
Village of Los Ranchos de Albuquerque
6718 Rio Grande Blvd. NW
Los Ranchos, NM 87107

Mr. McDonough,
As part of Bernalillo County's MS4 permitting requirements we would like to document that Bernalillo County and the Village of Los Ranchos currently, and will continue to, coordinate and cooperate on development reviews of projects with overlapping jurisdictions as they pertain to storm water runoff.

As part of this cooperative arraignment, review costs will continue to be absorbed by the respective agency.

Please sign and return this letter indicating your concurrence that the Village of Los Ranchos will continue to coordinate and cooperate with Bernalillo County throughout the duration of the current permit which was authorized by EPA dated November 16th 2015.

This letter will become a part of Bernalillo County's Storm Water Management Plan.

I would suggest that you retain a copy for your records also.

Sincerely,

Don Briggs

Don Briggs, PE, CFM
Grading & Drainage Engineer
Floodplain Administrator
Bernalillo County Public Works Division
2400 Broadway SE, Albuquerque, NM 87102
Ph: (505) 848-1511; Fax: (505) 848-1510

Village of Los Ranchos Concurrence by:

Tim McDonough

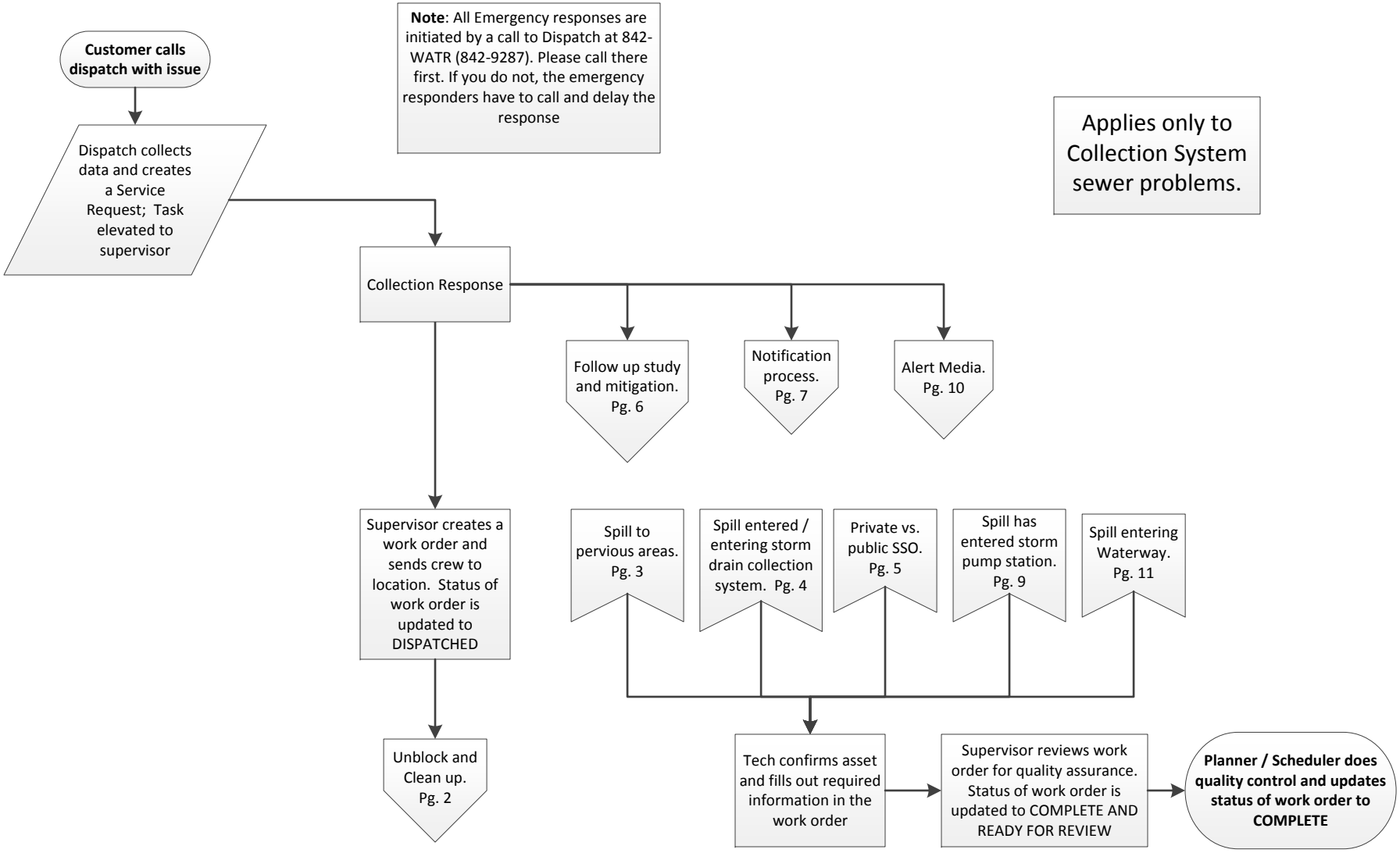
Date 12/16/15

Title Director, Planning + Zoning Department

Overflow Emergency Response Plan

10-10-2018

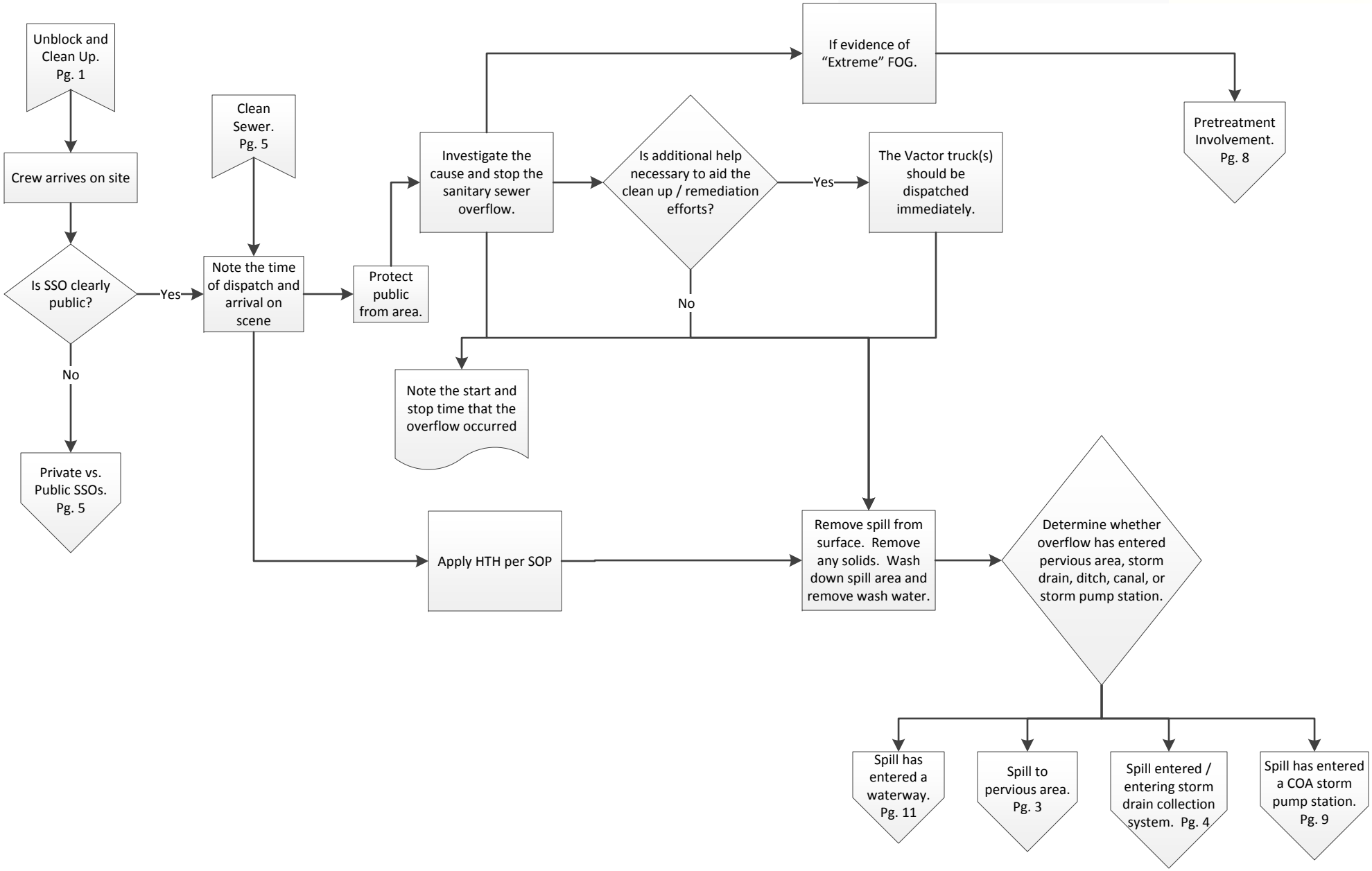
Albuquerque Bernalillo County Water Utility Authority

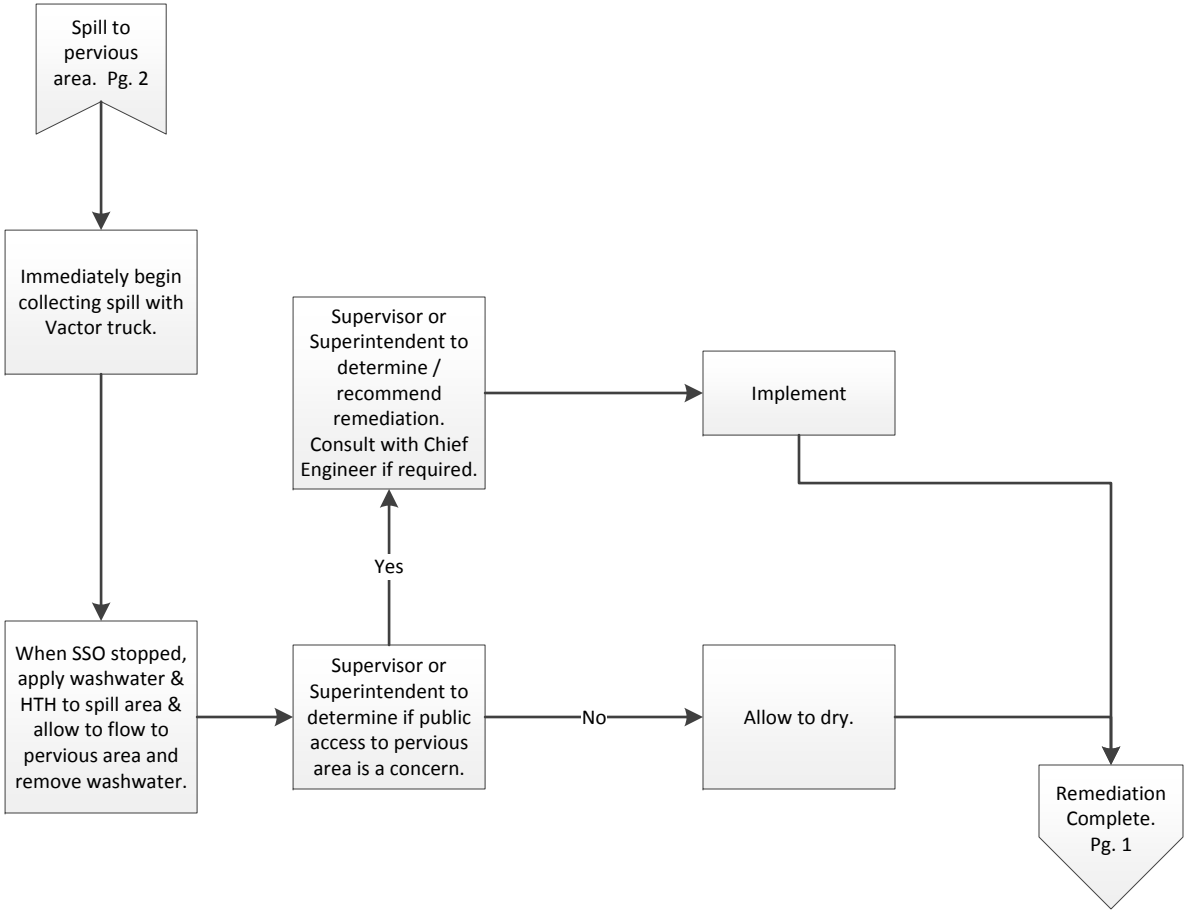


Overflow Emergency Response Plan

10-10-2018

Albuquerque Bernalillo County Water Utility Authority



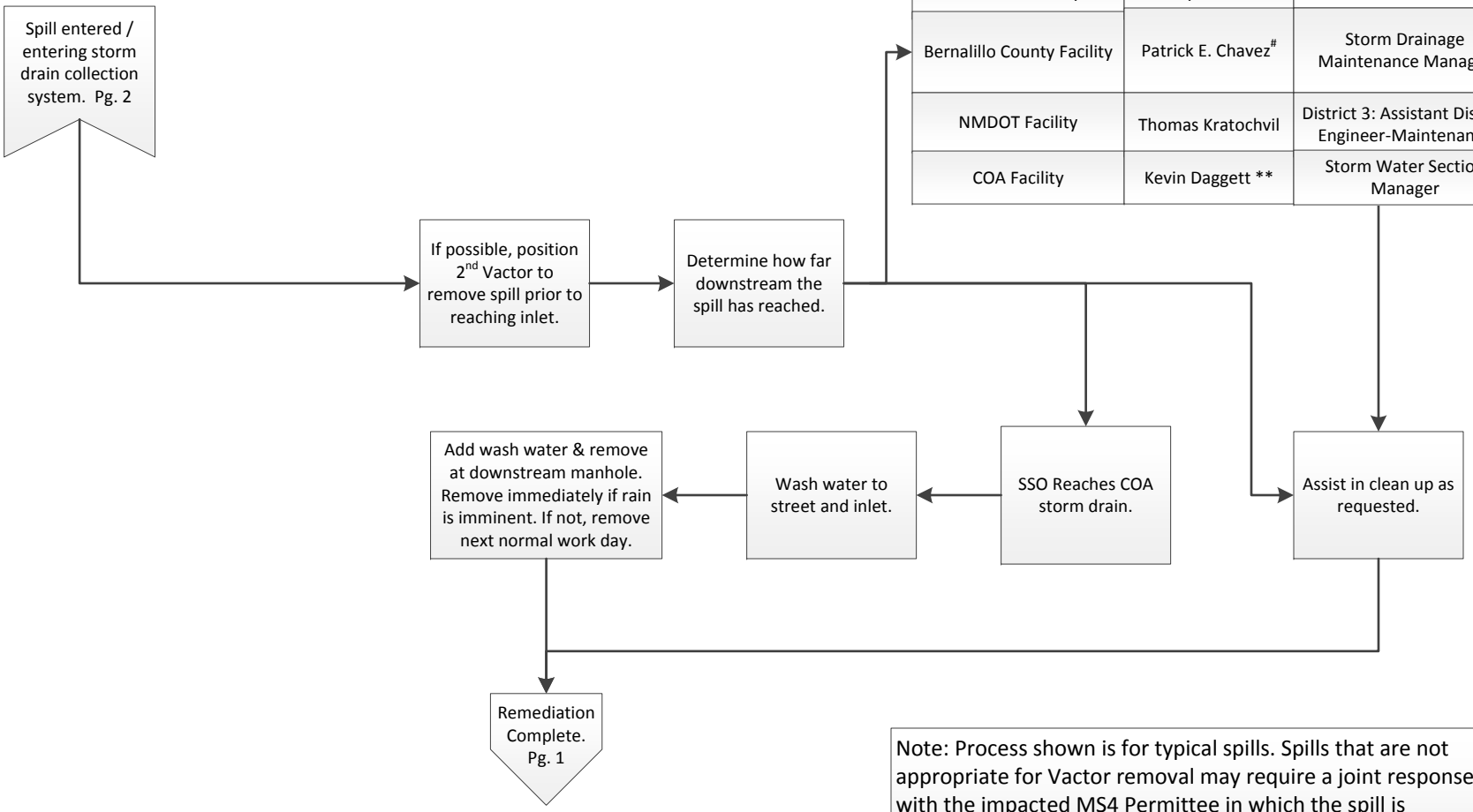

Spill to pervious area. Pg. 2
Immediately begin collecting spill with Vactor truck.
When SSO stopped, apply washwater & HTH to spill area & allow to flow to pervious area and remove washwater.
Supervisor or Superintendent to determine if public access to pervious area is a concern.
Yes
Supervisor or Superintendent to determine / recommend remediation. Consult with Chief Engineer if required.
Implement
No
Allow to dry.
Remediation Complete. Pg. 1

Overflow Emergency Response Plan

10-10-2018

Albuquerque Bernalillo County Water Utility Authority

SSO Reaches	Contact			
	Name	Position	Office	Cell
AMAFCA Facility	Jerry Lovato*	Executive Engineer	884-2215	362-0020
Bernalillo County Facility	Patrick E. Chavez#	Storm Drainage Maintenance Manager	848-1505	934-2704
NMDOT Facility	Thomas Kratochvil	District 3: Assistant District Engineer-Maintenance	N/A	228-8169
COA Facility	Kevin Daggett **	Storm Water Section Manager	768-2778	803-8058



Note: Process shown is for typical spills. Spills that are not appropriate for Vactor removal may require a joint response with the impacted MS4 Permittee in which the spill is captured, treated, and determined appropriate for release.

*If Jerry Lovato is not immediately available, call:

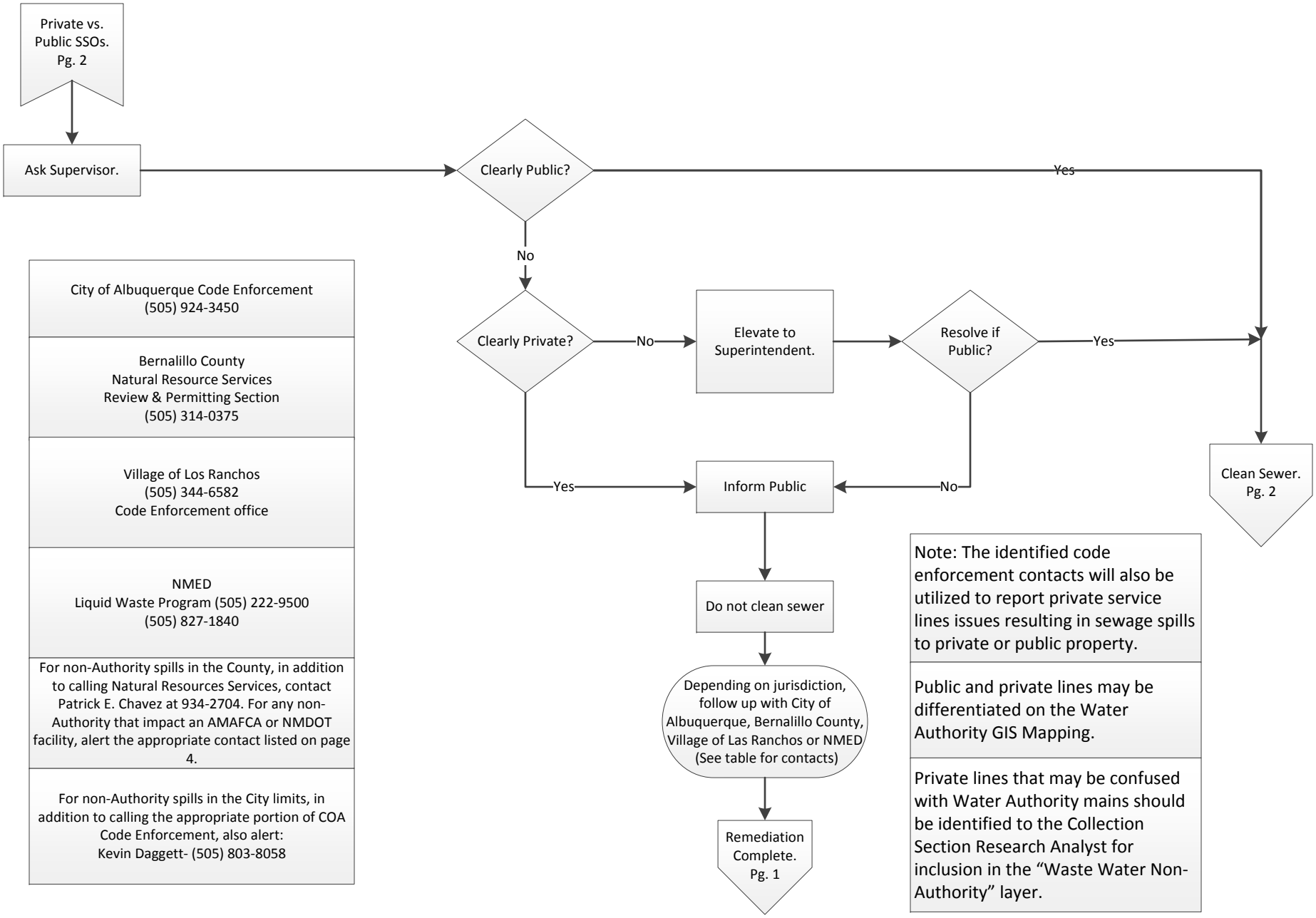
Nolan Bennett: Field Engineer (505) 301-6941
Herman Gabaldon: Superintendent (505) 366-8209

**If Kevin Daggett is not immediately available, call:

David Harrison: Engr. Div. Manager (505) 238-4158
Carl Rinkenberger: O&M Manager (505) 250-4334
Daniel Tapia: O&M Supt (505) 228-6874

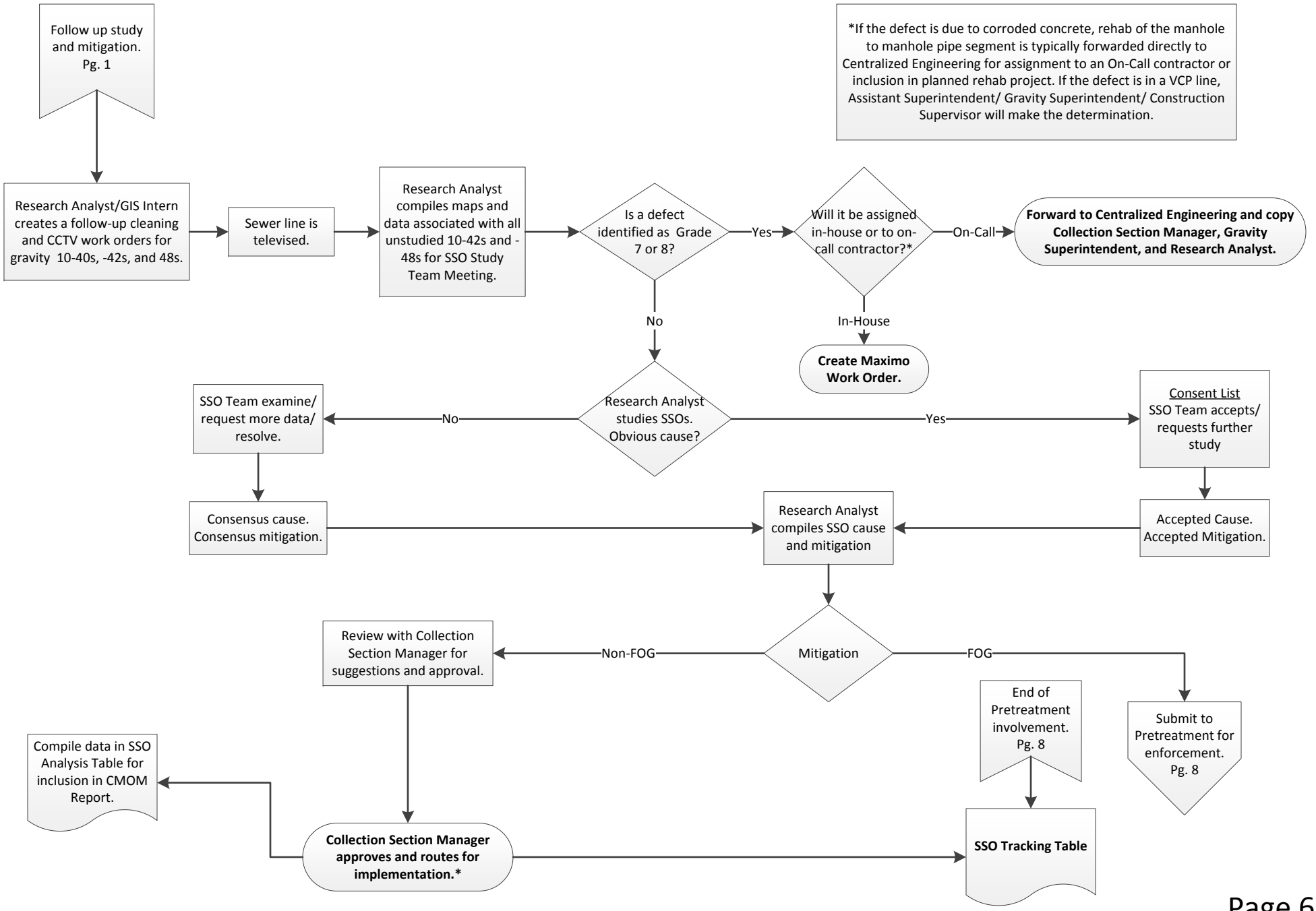
#If Patrick E. Chavez is not immediately available, call:

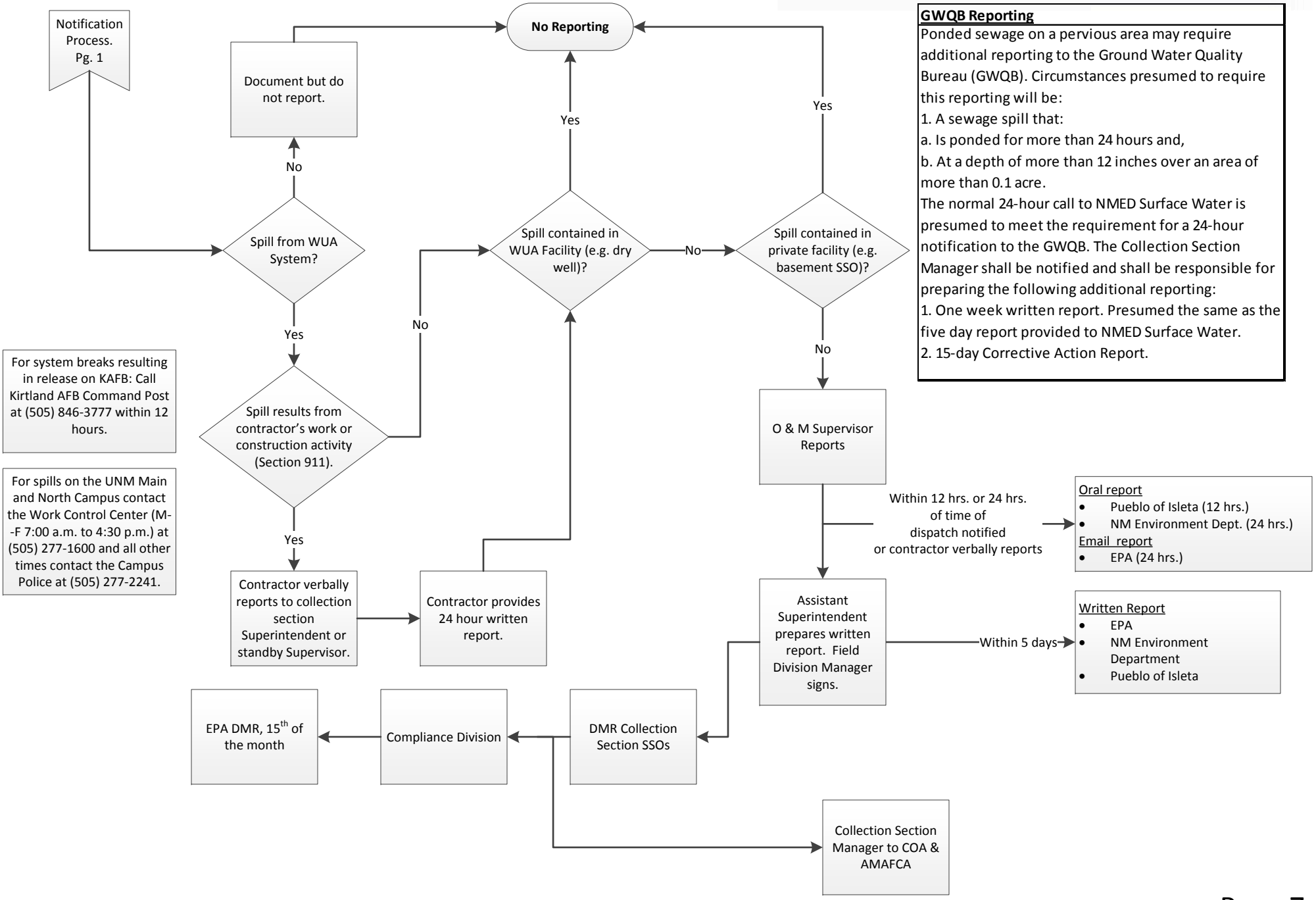
Kali Bronson: Stormwater Program Compliance Manager (505) 401-1779



City of Albuquerque Code Enforcement (505) 924-3450
Bernalillo County Natural Resource Services Review & Permitting Section (505) 314-0375
Village of Los Ranchos (505) 344-6582 Code Enforcement office
NMED Liquid Waste Program (505) 222-9500 (505) 827-1840
For non-Authority spills in the County, in addition to calling Natural Resources Services, contact Patrick E. Chavez at 934-2704. For any non-Authority that impact an AMAFCA or NMDOT facility, alert the appropriate contact listed on page 4.
For non-Authority spills in the City limits, in addition to calling the appropriate portion of COA Code Enforcement, also alert: Kevin Daggett- (505) 803-8058

Note: The identified code enforcement contacts will also be utilized to report private service lines issues resulting in sewage spills to private or public property.
Public and private lines may be differentiated on the Water Authority GIS Mapping.
Private lines that may be confused with Water Authority mains should be identified to the Collection Section Research Analyst for inclusion in the “Waste Water Non-Authority” layer.


Follow up study and mitigation. Pg. 1
*If the defect is due to corroded concrete, rehab of the manhole to manhole pipe segment is typically forwarded directly to Centralized Engineering for assignment to an On-Call contractor or inclusion in planned rehab project. If the defect is in a VCP line, Assistant Superintendent/ Gravity Superintendent/ Construction Supervisor will make the determination.
Research Analyst/GIS Intern creates a follow-up cleaning and CCTV work orders for gravity 10-40s, -42s, and 48s.
Sewer line is televised.
Research Analyst compiles maps and data associated with all unstudied 10-42s and -48s for SSO Study Team Meeting.
Is a defect identified as Grade 7 or 8?
Yes
Will it be assigned in-house or to on-call contractor?*
On-Call
Forward to Centralized Engineering and copy Collection Section Manager, Gravity Superintendent, and Research Analyst.
In-House
Create Maximo Work Order.
No
Research Analyst studies SSOs. Obvious cause?
No
SSO Team examine/ request more data/ resolve.
Consensus cause. Consensus mitigation.
Yes
Consent List
SSO Team accepts/ requests further study
Accepted Cause. Accepted Mitigation.
Research Analyst compiles SSO cause and mitigation
Mitigation
Non-FOG
Review with Collection Section Manager for suggestions and approval.
FOG
End of Pretreatment involvement. Pg. 8
Submit to Pretreatment for enforcement. Pg. 8
Compile data in SSO Analysis Table for inclusion in CMOM Report.
Collection Section Manager approves and routes for implementation.*
SSO Tracking Table



GWQB Reporting

Ponded sewage on a pervious area may require additional reporting to the Ground Water Quality Bureau (GWQB). Circumstances presumed to require this reporting will be:

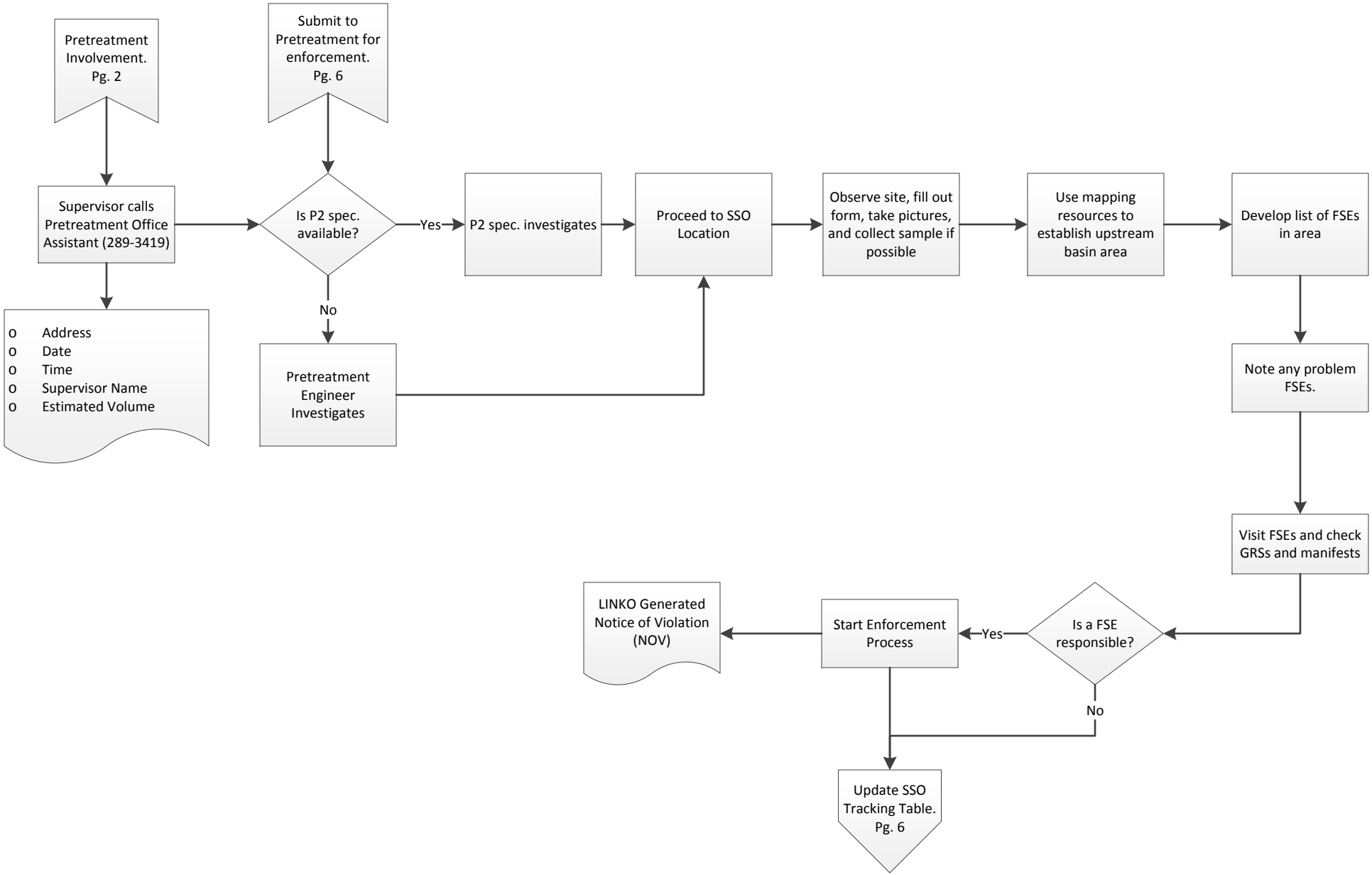
1. A sewage spill that:

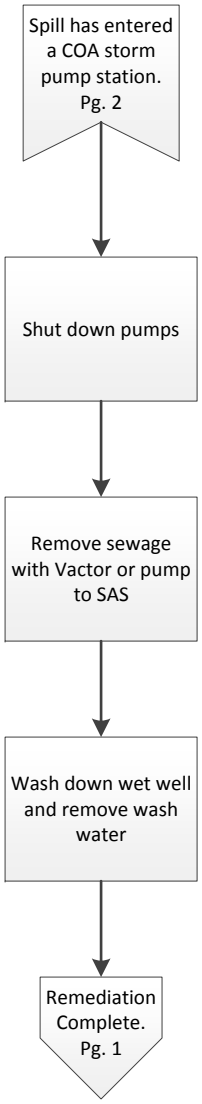
a. Is ponded for more than 24 hours and,

b. At a depth of more than 12 inches over an area of more than 0.1 acre.

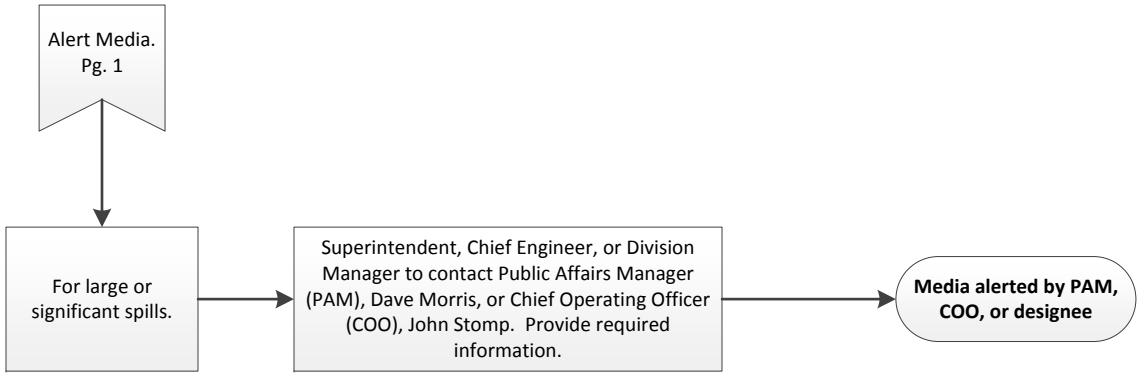
The normal 24-hour call to NMED Surface Water is presumed to meet the requirement for a 24-hour notification to the GWQB. The Collection Section Manager shall be notified and shall be responsible for preparing the following additional reporting:

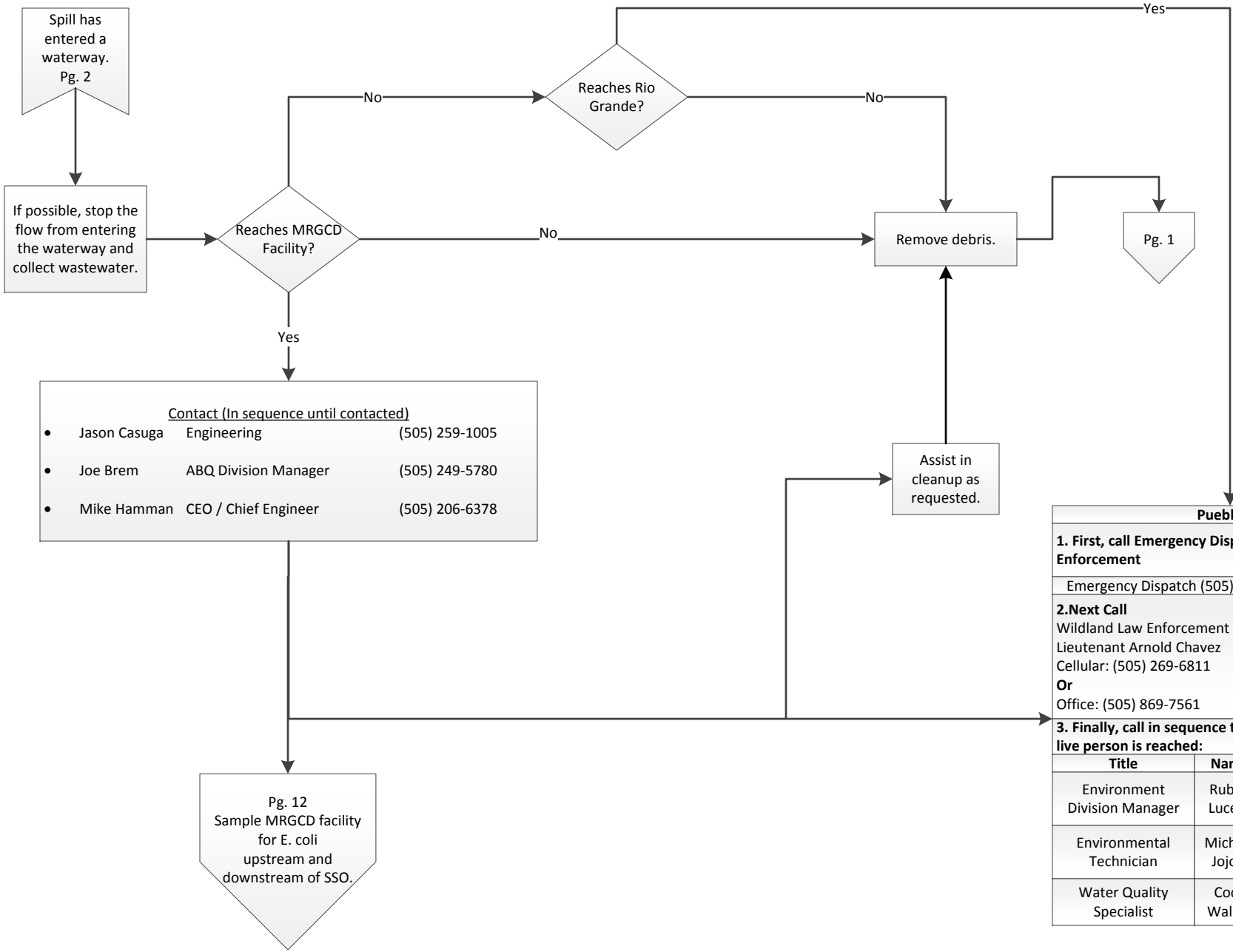
1. One week written report. Presumed the same as the five day report provided to NMED Surface Water.
2. 15-day Corrective Action Report.


Pretreatment Involvement. Pg. 2
Submit to Pretreatment for enforcement. Pg. 6
Supervisor calls Pretreatment Office Assistant (289-3419)
Is P2 spec. available?
Yes
No
P2 spec. investigates
Proceed to SSO Location
Observe site, fill out form, take pictures, and collect sample if possible
Use mapping resources to establish upstream basin area
Develop list of FSEs in area
o Address
o Date
o Time
o Supervisor Name
o Estimated Volume
Pretreatment Engineer Investigates
Note any problem FSEs.
Visit FSEs and check GRSs and manifests
LINKO Generated Notice of Violation (NOV)
Start Enforcement Process
Yes
Is a FSE responsible?
No
Update SSO Tracking Table. Pg. 6



Note: Process shown is for typical spills. Some spills may require a joint response with the City of Albuquerque in which the spill is captured, treated, and determined appropriate for release.


Alert Media.
Pg. 1
For large or significant spills.
Superintendent, Chief Engineer, or Division Manager to contact Public Affairs Manager (PAM), Dave Morris, or Chief Operating Officer (COO), John Stomp. Provide required information.
Media alerted by PAM, COO, or designee



Pueblo of Isleta

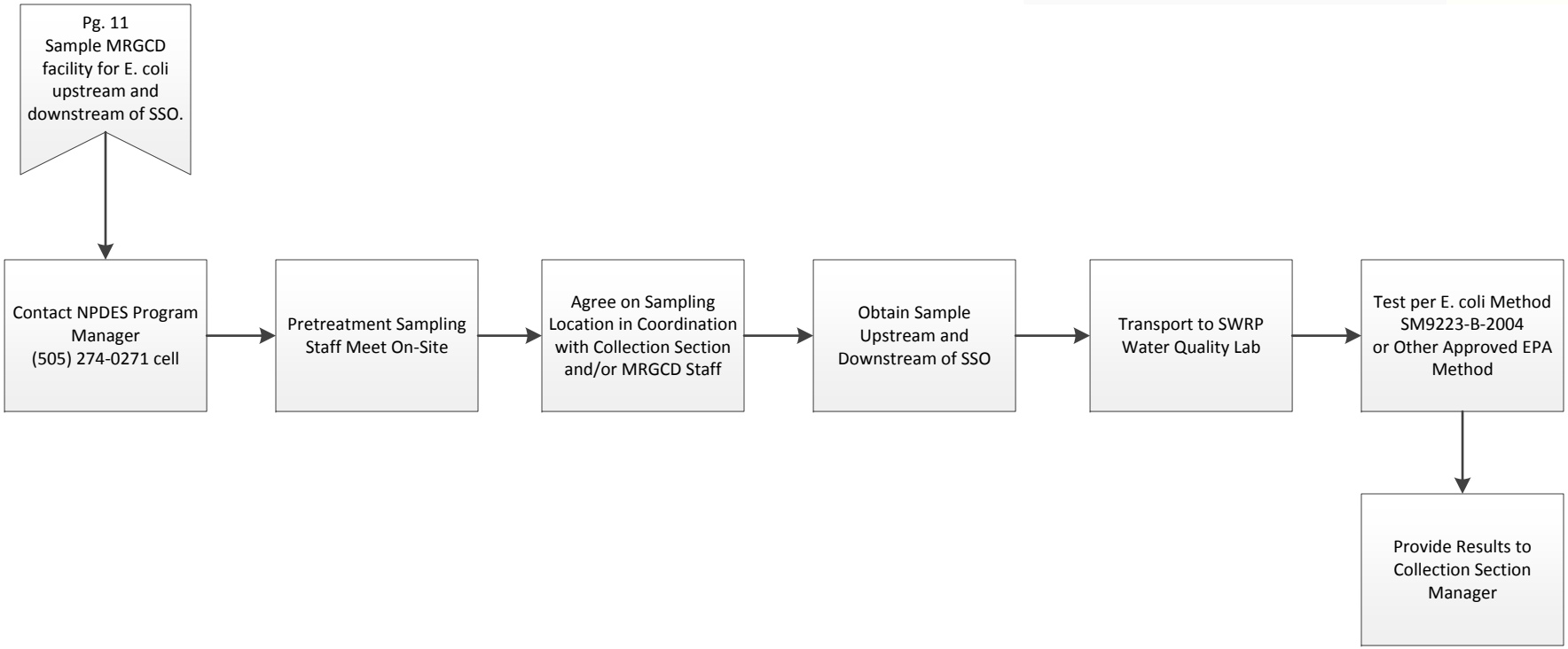
1. First, call Emergency Dispatch and Wildland Law Enforcement

Emergency Dispatch (505) 869-3030 (Voice Message OK)

2.Next Call
Wildland Law Enforcement
Lieutenant Arnold Chavez
Cellular: (505) 269-6811
Or
Office: (505) 869-7561

3. Finally, call in sequence the following numbers until a live person is reached:

Title	Name	Office	Cellular
Environment Division Manager	Ruben Lucero	(505) 869-9819	(505) 917-8346
Environmental Technician	Michael Jojola	(505) 869-9814	NA
Water Quality Specialist	Cody Walker	(505) 869-9623	(505) 220-4595


Pg. 11
Sample MRGCD facility for E. coli upstream and downstream of SSO.
Contact NPDES Program Manager (505) 274-0271 cell
Pretreatment Sampling Staff Meet On-Site
Agree on Sampling Location in Coordination with Collection Section and/or MRGCD Staff
Obtain Sample Upstream and Downstream of SSO
Transport to SWRP Water Quality Lab
Test per E. coli Method SM9223-B-2004 or Other Approved EPA Method
Provide Results to Collection Section Manager

BC CNN 2016-0154
CCN# 201600624

INTERGOVERNMENTAL AGREEMENT

THIS AGREEMENT is made and entered into this 29th day of April, 2016, by and between the City of Albuquerque, New Mexico, a municipal corporation ("City"), and the County of Bernalillo, a political subdivision of the State of New Mexico, One Civic Plaza NW, Albuquerque, New Mexico 87102 ("County").

RECITALS

WHEREAS, the City through its Solid Waste Management Department manages a Household Hazardous Waste Collection Center ("HHWCC"); and

WHEREAS, the County wishes to contribute to the HHWCC and expand the scope of the operation to allow County residents to use the HHWCC.

NOW THEREFORE, in consideration of the premises and mutual obligations herein, the parties hereto do mutually agree as follows:

1. **Scope of Services**. The City and the County shall perform the following services in a satisfactory and proper manner, as determined by the City:

A. The City Shall:

1. Coordinate and conduct all administrative and operational activities associated with the HHWCC.

2. Include, in all advertisements of the HHWCC, acknowledgement of the County as a joint sponsor of the HHWCC.

3. Encourage and allow participation by County residents in the HHWCC up to an expense amount equal to the level of County Funding detailed below in Section 3.

B. The County shall provide financial assistance for the HHWCC as described below.

2. **Time of Performance**. This Agreement shall commence on May 1, 2016, and all of the Services required hereunder shall be completed by April 30, 2017.

3. **Financial Assistance and Method of Payment**.

A. **Financial Assistance**. The County agrees to provide the City financial assistance for the HHWCC up to the amount of One Hundred Eight Thousand and No/100 Dollars ($108,000.00).

B. **Method of Payment**. Such amount shall be payable to the City quarterly at the rate of Twenty-seven Thousand and No/100 Dollars ($27,000.00) upon receipt by the County of properly documented requisitions for payment.

C. **Appropriations**. Notwithstanding any other provisions in this Agreement, the terms of this Agreement are contingent upon the City Council of the City of Albuquerque making the appropriations necessary for the performance of this Agreement. If sufficient appropriations and authorizations are not made by the City Council, this Agreement may be terminated at the end of the City's then current fiscal year upon written notice given by the City to the County. Such event shall not constitute an event of default. The City's decision as to whether sufficient appropriations are available shall be accepted by the County and shall be final.

4. **Independent Contractor**. Neither the County nor its employees are considered to be employees of the City of Albuquerque for any purpose whatsoever. The County is considered as an independent contractor at all times during the term of this Agreement. The County further agrees that neither it nor its employees are entitled to any benefits from the City under the provisions of the Workers' Compensation Act of the State of New Mexico, or to any of the benefits granted to employees of the City under the provisions of the Merit System Ordinance as now enacted or hereafter amended.

5. **Liability**. Neither party shall be responsible for liability incurred as a result of the other party's acts or omissions in connection with this Agreement. Any liability incurred in connection with this Agreement is subject to the immunities and limitations of the New Mexico Tort Claims Act, Section 41-4-1 et seq., NMSA 1978, as amended.

6. **Discrimination Prohibited**. Neither party shall discriminate against any person on the basis of race, color, religion, gender, sexual preference, sexual orientation, national origin or ancestry, age, physical handicap, or disability as defined in the Americans with Disabilities Act of 1990, as now enacted or hereafter amended.

7. **ADA Compliance**. Both parties agree to meet all the requirements of the Americans with Disabilities Act of 1990, and all applicable rules and regulations, which are imposed directly on the parties or which would be imposed on either party as a public entity.

8. **Reports and Information**. At such times and in such forms as the City may require, there shall be furnished to the City such statements, records, reports, data and information, as the City may request pertaining to matters covered by this Agreement.

9. **Establishment and Maintenance of Records**. Records shall be maintained by the County in accordance with applicable law and requirements prescribed

by the City with respect to all matters covered by this Agreement. Except as otherwise authorized by the City, such records shall be maintained for a period of three (3) years after the City's receipt of final payment under this Agreement.

10. **Audits and Inspections**. At any time during normal business hours and as often as the City may deem necessary, there shall be made available to the City for examination all of the County's records with respect to all matters covered by this Agreement. The County shall permit the City to audit, examine, and make excerpts or transcripts from such records, and to make audits of all contracts, invoices, materials, payrolls, records of personnel, conditions of employment and other data relating to all matters covered by this Agreement. The County understands and will comply with the City's Accountability in County Ordinance, §2-10-1 et seq. and Inspector General Ordinance, §2-17-1 et seq. R.O.A. 1994, and also agrees to provide requested information and records and appear as a witness in hearings for the City's Board of Ethics and Campaign Practices pursuant to Article XII, Section 8 of the Albuquerque City Charter.

11. **Publication, Reproduction and Use of Material**. No material produced in whole or in part under this Agreement shall be subject to copyright in the United States or in any other country. The City shall have unrestricted authority to publish, disclose, distribute and otherwise use, in whole or in part, any reports, data or other materials prepared under this Agreement.

12. **Compliance With Laws**. Both parties shall comply with all applicable laws, ordinances, and codes of the Federal, State and local governments.

13. **Changes**. Either party may request changes to this Agreement; provided that such changes are mutually agreed upon by and between the City and the County, and incorporated in written amendments to this Agreement.

14. **Assignability**. The County shall not assign any interest in this Agreement and shall not transfer any interest in this Agreement (whether by assignment or novation), without the prior written consent of the City thereto.

15. **Termination for Convenience**. Either the City or the County may terminate this Agreement at any time by giving at least thirty (30) days notice in writing to the other party.

16. **Construction and Severability**. If any part of this Agreement is held to be invalid or unenforceable, such holding will not affect the validity or enforceability of any other part of this Agreement so long as the remainder of the Agreement is reasonably capable of completion.

17. **Entire Agreement**. This Agreement contains the entire agreement of the parties and supersedes any and all other agreements or understandings, oral or written, whether previous to the execution hereof or contemporaneous herewith.

18. **Applicable Law**. This Agreement shall be governed by and construed and enforced in accordance with the laws of the State of New Mexico, and the laws, rules and regulations of the City of Albuquerque.

19. **Approval Required**. This Agreement shall not become binding upon the City until approved by the highest approval authority of the City required under this Agreement.

IN WITNESS WHEREOF, the City and the County have executed this Agreement as of the date first above written.

BC CCN 2016-0154

CITY OF ALBUQUERQUE

Approved By:

Robert J. Perry
Chief Administrative Officer

Date: 5/2/16

John W. Soladay, Director
Solid Waste Management Department

Date: 4-18-16

Ramona C. Martinez
Chief Procurement Officer

Date: 4/26/16

County of Bernalillo, a political subdivision of the State of New Mexico

Approved By:

Julie M. Baca
County Manager

Date: 4-7-16

Kenneth Martinez, County Attorney
Bernalillo County Legal Department

Date:

County of Bernalillo:

RECOMMENDED BY:

4/6/16

Roger A. Paul, P.E. Date
Deputy County Manager for Public Works