Annual Report Format

National Pollutant Discharge Elimination System Stormwater Program

MS4 Annual Report Format

Check box if you are submitting an individual Annual Report with one or more cooperative program elements. ☐

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

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

1. MS4(s) Information

Sandoval County

Name of MS4

Fred | Marquez | Project Manager

Name of Contact Person (First) (Last) (Title)

505-306-4706 | fmarquez@sandovalcountynm.gov

Telephone (including area code) E-mail

2708 Iris Road NE

Mailing Address

Rio Rancho | NM | 87144

City State ZIP code

What size population does your MS4(s) serve? 131,561 NPDES number

What is the reporting period for this report? (mm/dd/yyyy) From Mar 4, 2016 to Jun 30, 2016

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, HUC13020203	eColi	☒ Yes	☐ No	☒ Yes	☐ No
Rio Grande, HUC13020203	PCB in fish tissue	☐ Yes	☒ No	☐ Yes	☒ No
Rio Grande, HUC13020203	PCB in water column	☐ Yes	☒ No	☐ Yes	☒ No
Rio Grande, HUC13020203	Gross Alpha	☐ Yes	☒ No	☐ Yes	☒ No

2. B. Continued

Impaired Water	Impairment	Approved TMDL		TMDL assigns WLA to MS4	
		☐ Yes	☐ No	☐ Yes	☐ No
		☐ Yes	☐ No	☐ Yes	☐ No
		☐ Yes	☐ No	☐ Yes	☐ No
		☐ Yes	☐ No	☐ Yes	☐ No

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

pet waste, floatables, illicit discharges

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, floatables, illicit discharges

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.

See Summary report from the Middle Rio Grande Storm Water Quality Team

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. 0

D. How many of the sites identified in 4.C did you inspect during this reporting period? 0

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

Sandoval County job sites are inspected at a minimum weekly. Qualified Contractors inspect the sites at frequencies required in the construction general permit.

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

If Yes, based on what criteria?

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	0	No Authority	☒
☐ Yes	Stop Work Orders	0	No Authority	☒
☐ Yes	Civil penalties	0	No Authority	☒
☐ Yes	Criminal actions	0	No Authority	☒
☐ Yes	Administrative orders	0	No Authority	☒
☒ Yes	Other	Contractual Mechanisms for		

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?

N/A

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

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. 0

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?

0

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? 0

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

Sandoval County does not have any outfalls

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? 0

K. Of those illicit discharges/illegal connections that have been discovered or reported, how many have been eliminated? 0

L. How often do municipal employees receive training on the illicit discharge program? AS NEEDED

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

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

C. If Yes, at what frequency are inspections conducted? As required by the

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

Public Works crews maintain road swales and ditches as necessary for erosion control issues as they arise Visual inspection on these facilities are done on a daily basis.

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?

updates and briefings are implemented at the beginning of the projects.

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 projects that fall under the criteria which requires a SWPPP

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.

http://www.sandovalcounty.com/uploads/Downloads/Divisions/PlanningZoning/ordinance/subdivord.pdf

G. How many development and redevelopment project plans were reviewed during the reporting period to assess impacts to water quality and receiving stream protection? 0

H. How many of the plans identified in 7.G were approved? 0

I. How many privately owned permanent stormwater management practices/facilities were inspected during the reporting period? 0

J. How many of the practices/facilities identified in I were found to have inadequate maintenance? 0

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

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? 0

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? As needed

8. Program Resources

A. What was the annual expenditure to implement MS4 permit requirements this reporting period? $15,000

B. What is next year's budget for implementing the requirements of your MS4 NPDES permit? $25,000

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:	Sandoval County Public Works Professional Servic	Amount $		OR %	100
Source:		Amount $		OR %	
Source:		Amount $		OR %	

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)? 1

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

Entity	Activity/Task/Responsibility	Your Oversight/Accountability Mechanism
MRGSWQT	Public Outreach/Education	Signed Agreement
CMC	Wet Weather Monitoring	Signed Agreement
TAG	Technical Information Exchange	Signed Agreement

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
E.Coli	2016	defined in monitoring plan	2
PCB's	2016	defined in monitoring plan	2
Gross Alpha	2016	defined in monitoring plan	2

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.

This is our first required year to minitor

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. If providing clarification to any of the questions above, 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 Fred S. Marquez Digitally signed by Fred S. Marquez DN: cn=Fred S. Marquez, o=Public Works, ou=Sandoval County, email=fmarquez@sandovalcountynm.gov, c=US Date: 2016.10.19 13:10:04 -06'00'

Name of Certifying Official, Title

Date (mm/dd/yyyy)

October 14, 2016

TO: The Mid Rio Grande Stormwater Quality Team

FROM: Patti Watson, President
CWA Strategic Communications

RE: Summary for Outcomes Report – July 1, 2015-June 30, 2016 for Mid Rio Grande Stormwater Quality Team Public Education and Involvement

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The following is a summary of public education and outreach during the previous fiscal year. Additional information is included in the chart and reports following this summary.

Total spent on public education and outreach (excluding RiverXchange and B.E.M.P): $33,306.19
Total donated by communications subcontractor, CWA Strategic Communications: $712.20

Website (www.keeptheriogrand.org)
Total Visitors: 3,318
Total New Visitors: 2882 (86.9%)

Facebook Page
Total Likes: 134

Community Events
Total Number of Events: 42
Total Number of Attendees/Participants: 36,510

Materials Distribution
Total number of pieces distributed and estimated number of people reached: 3,315

RiverXchange
Total number of children participating: 1,150
Total number of adults participating: 82

Bosque Ecosystem Monitoring Project (B.E.M.P)
Total number of children participating: 1,804
Total number of adults participating: 291

Advertising Campaigns on Proper Disposal of Fats, Oils & Grease
Total number of estimated people reached: 1,841,784 with duplication

Educational Kiosk at Albuquerque Public Library
Total number of people reached: 30,000
Total number of people reading article about kiosk 60,000

Total number of estimated people reached (with duplication): **1,510,749**

MS 4 Permit Category	Activities	Audience(s)
Pet Waste	• Information on Project Website & Facebook Page • Mountain West Brew Fest • Toss No Mas Rio Rancho Cleanup Event • Rolling River Educational Presentation • Festival in the Valley • City of Rio Rancho Children's Water Festival • America Recycles Day • Pilot Educational Program on Scoop the Poop • Earth Force Trios Engaging Youth in the Health of the Middle Rio Grande • KOB TV Health & Wellness Fair • Copper Trailhead Cleanup • Embudo Canyon Trailhead Cleanup • Menaul Picnic Area Cleanup • Earth Day Event – Rio Rancho • MS 4 Permit Presentation to AWWA Rocky Mountain Section • Keep Rio Rancho Beautiful Great American Cleanup • MS4 Watershed Based Permit Presentation at WEFTEC • National River Cleanup • Abrazos – A Celebration of Environmental Justice • Piedra Lisa Open Space Cleanup • Presentation on Middle Rio Grande watershed at MS4 Summit • Route 66 Open Space Cleanup • Survey among AMAFCA Staff during SMP training • Village of Los Ranchos Domestic Animal Waste Reduction Program • Educational Kiosk at Albuquerque Public Library • RiverXchange • Bosque Ecosystem Monitoring Project (B.E.M.P)	Children, Adults and Industry
Animal Sources	• Rolling River Educational Presentation • RiverXchange • Bosque Ecosystem Monitoring Project (B.E.M.P) • Earth Force Trios Engaging Youth in the Health of the Middle Rio Grande • MS 4 Permit Presentation to AWWA Rocky Mountain Section • MS4 Watershed Based Permit Presentation at WEFTEC • Presentation on Middle Rio Grande watershed at MS4 Summit • Local Children Get Wild About Watersheds • Survey among AMAFCA Staff during SMP training	Children, Adults and Industry
Household Hazardous Waste	• Information on Project Website & Facebook Page • Mountain West Brew Fest • Toss No Mas Rio Rancho Cleanup Event • Festival in the Valley • America Recycles Day • Earth Force Trios Engaging Youth in the Health of the Middle Rio Grande • KOB TV Health & Wellness Fair • Earth Day Event – Rio Rancho • Keep Rio Rancho Beautiful Great American Cleanup • MS 4 Permit Presentation to AWWA Rocky Mountain Section • MS4 Watershed Based Permit Presentation at WEFTEC • Abrazos – A Celebration of Environmental Justice • Presentation on Middle Rio Grande watershed at MS4 Summit • Survey among AMAFCA Staff during SMP training	Children, Adults and Industry

	• City of Albuquerque Household Hazardous Waste Collection • Great American Cleanup – Town of Bernalillo	
MS 4 Permit Category	Activities	Audience(s)
General SWP	• Information on Project Website & Facebook Page • Local Children Get Wild About Watersheds • SSCAFCA Facilities Tour • Mountain West Brew Fest • Toss No Mas Rio Rancho Cleanup Event • Rolling River Educational Presentation • Festival in the Valley • Albuquerque 2030 District Sustainability Initiative at CNM • Water Resources Management in the Rio Grande Briefing • City of Rio Rancho Children's Water Festival • America Recycles Day • Kayak New Mexico River Cleanup on the Rio Grande • City of Albuquerque Tree Planting at Academy of Trades & Technology • Arroyo Classroom Program • Students Achieve for Excellence Program • Earth Force Trios Engaging Youth in the Health of the Middle Rio Grande • KOB TV Health & Wellness Fair • Keep Rio Rancho Beautiful Tree Steward Training • Tree Seedling Giveaway with Keep Rio Rancho Beautiful • Copper Trailhead Cleanup • Embudo Canyon Trailhead Cleanup • Menaul Picnic Area Cleanup • Earth Day Event – Rio Rancho • Keep Rio Rancho Beautiful Campus Cleanup Contests • Keep Rio Rancho Beautiful Great American Cleanup • National River Cleanup • Abrazos – A Celebration of Environmental Justice • Piedra Lisa Open Space Cleanup • Route 66 Open Space Cleanup • Survey among AMAFCA Staff during SMP training • Educational Kiosk at Albuquerque Public Library • RiverXchange • Bosque Ecosystem Monitoring Project (B.E.M.P) • Great American Cleanup – Town of Bernalillo	Children and Adults
Septic & Sanitary Sewer Systems	• Albuquerque Bernalillo County Water Utility Authority 2015 Holiday Fats, Oils and Grease Disposal campaign • City of Rio Rancho 2015 Holiday Fast, Oils and Grease Disposal campaign	Adults (specifically women 25+)
Illicit Discharges	• CNM Source Control educational program • Information available on Project Website & Facebook Page • RiverXchange • Bosque Ecosystem Monitoring Project (B.E.M.P) • Earth Force Trios Engaging Youth in the Health of the Middle Rio Grande • Water Quality Cleanup of the North Pino • Stormwater Management Plan Training	Adults
Construction	• Information available on Project Website & Facebook Page	Adults

September 21, 2016

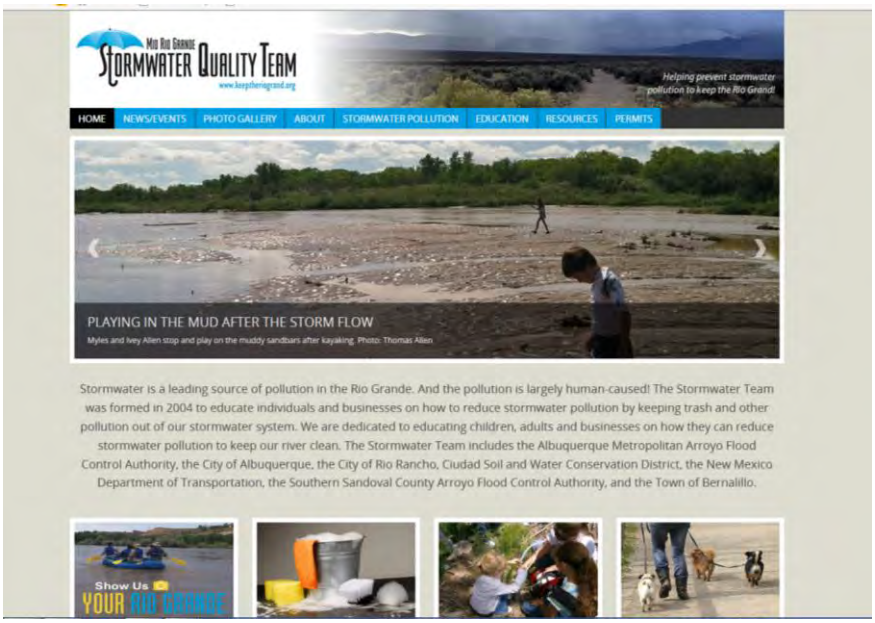
TO: The Mid Rio Grande Stormwater Quality Team

FROM: Patti Watson, President
Phyllis Baker, Lead Account Executive
CWA Strategic Communications

RE: Outcomes Report for first half of 2016 – Mid Rio Grande Stormwater Quality Team
Public Education and Involvement

During the second half of 2016 the Mid Rio Grande Stormwater Quality Team (MRGQST) continued its educational partnerships with the Bosque Ecosystem Monitoring Program (B.E.M.P.) and RiverXchange. The team continued to post relevant information to its website and Facebook page, and also participated in a number of high-profile community events, including the KOB TV Health & Wellness Fair in January 2016. The team publicly launched its interactive kiosk with a news conference at the Downtown ABC Library's Children's Room in February. Finally, Team partners and supporters disseminated information on stormwater through municipal water quality reports to stakeholders. Specialty advertising giveaways relating to stormwater quality awareness were reordered for use at public events. The overall budget spent on these activities, excluding donated hours by team members and RiverXchange and B.E.M.P., was $14,692.50. The contractor, CWA Strategic Communications, donated $302.30 in services during the first half of the 2016 calendar year. We have summarized the activities below and on the following pages:

Website (www.keeptheriogrand.org)
The website received fewer visits in the first half of 2016 than it did in 2015 (*see statistics chart on next page).* The percentage of new visitors rose slightly (to 87.2%) during this period compared to last period (86.03%).
The vast majority of visitors continue to utilize their desktops to access the website, versus tablets or mobile phones.



MRGSQT Website Analytics	Jan. 1-June 30, 2016	July 1-Dec. 31, 2015	Total for 2015-2016 Fiscal Year
Total Visitors	1,152	2,166	3,318
New Visitors	1,004	1,878	2,882
iPhone/Smart Phone	73	94	167
iPad/Tablet	18	23	41
Desktop	1,061	2,049	3,110
Other Mobile Device	0	0	0

A detailed Google Analytics Report is included as an attachment to this report, labeled Appendix M.

Estimated number of individuals reached by this activity: 1,152
Permit Reference(s): General SWP, Construction, Pet Waste, Construction, Household Hazardous Waste
Audience(s): Children, Adults

Facebook Page

In conjunction with the SQT website, a Facebook page contains posts and updated information at: (https://www.facebook.com/Keeptheriogrand). Total "likes" for the page increased from 131 to 134 during the first half of January 2016, a 2 percent increase.

Estimated number of individuals reached by this activity: 134
Permit Reference(s): General SWP, Construction, Pet Waste
Audience(s): Children, Adults

Events

In the second half of 2016, MRGSQT members and their partner agencies reported participating in a total of 24 community outreach/educational events. Details are below.

1. SSCAFCA
Catherine Conran
September 2015-May 2016
Educational Arroyo Classroom Program for 1st and 3rd Graders that teaches children about natural arroyos, how they are affected by stormwater runoff and when and how to safely enjoy arroyos.
714 Attendees*
Permit Reference(s): General SWP
Audience(s): Children,

2. SSCAFCA & City of Rio Rancho
Catherine Conran & David Serrano
January-June 2016
Keep Rio Rancho Beautiful tree steward volunteers volunteered approximately 2,262 hours to clean up and beautify parks and open spaces in that community.
58 Attendees
Permit Reference(s): General SWP
Audience(s): Children, Adults

3. City of Albuquerque
Household Hazardous Waste Collection
January-June 2016
The City of Albuquerque accepts dropped off household hazardous waste including paint, batteries, fluorescents, and solvents and other types of HHW throughout the year. For more information, see *Appendix D.*
6,470 Attendees
Permit Reference(s): Household Hazardous Waste
Audience(s): Children, Adults

4. Sandoval County
Household Hazardous Waste Collection
January-June 2016
Regular events are scheduled for area residents to drop off antifreeze, fluorescents, aerosols, flammable liquids, paints, flammable toxic liquids and solids, acids, corrosive bases and more. In the first six months of 2016, the program collected a 4.35 tons (8,700 pounds) of household hazardous waste. For more information, see *Appendix E.*
143 Attendees
Permit Reference(s): Household Hazardous Waste
Audience(s): Children, Adults

5. KOB TV Health & Wellness Fair
Mid Rio Grande Stormwater Quality Team
January 23 & 24, 2016
The Mid Rio Grande Stormwater Quality Team hosted an information booth at this community event. Some 515 visitors who stopped by the booth filled out a survey. *See Appendix N for survey results.*
7,100 Attendees
Permit Reference(s): General SWP, Pet Waste, Household Hazardous Waste
Audience(s): Children, Adults

6. SSCAFCA
Catherine Conran
March 19, 2016
Partnering with Keep Rio Rancho Beautiful, SSCAFCA promoted a tree seedling giveaway to help increase the tree count in that community.
120 Attendees
Permit Reference(s): General SWP
Audience(s): Children, Adults

7. City of Albuquerque
Kathy Verhage
April 2, 2016
The City's Parks & Recreation Department hosted a cleanup at Copper Trailhead. Volunteers picked up 45 pounds of dog poop, ½ bag of mixed recycling and one bag of trash.
32 Attendees
Permit Reference(s): General SWP, Pet Waste
Audience(s): Children, Adults

8. City of Albuquerque
Kathy Verhage
April 9, 2016
The City's Parks & Recreation Department hosted a cleanup at Embudo Canyon Trailhead at Indian School. Volunteers picked up 95 pounds of dog poop, 1.5 bags of mixed recycling, 5 gallon buckets of broken glass, and 2 bags of trash
54 Attendees
Permit Reference(s): General SWP, Pet Waste
Audience(s): Children, Adults

9. City of Albuquerque
Kathy Verhage
April 16, 2016
The City's Parks & Recreation Department hosted a cleanup at the Menaul Picnic Area. Volunteers picked up 49 pounds of dog poop, ½ bag of mixed recycling, and 1 bag of trash
33 Attendees
Permit Reference(s): General SWP, Pet Waste
Audience(s): Children, Adults

10. AMAFCA
Patrick Chavez
April 21, 2016
AMAFCA (the Albuquerque Metropolitan Arroyo Flood Control Authority) took part in a Water Quality Cleanup of the North Pino organized by CH2M Hill that gathered 20 bags of trash.
12 Attendees
Permit Reference(s): General SWP
Audience(s): Adults

11. SSCAFCA & City of Rio Rancho
Catherine Conran & David Serrano
April 23, 2016
A community-wide Earth Day Event was held to raise awareness of environmental issues, including stormwater runoff quality and ways to prevent stormwater pollution.
300 Attendees
Permit Reference(s): General SWP, Pet Waste, Household Hazardous Waste
Audience(s): Children, Adults

12. SSCAFCA
Catherine Conran
April 29, 2016
SSCAFCA made a presentation on the MS4 Permit to the Rocky Mountain Section of the American Water Works Association
30 Attendees
Permit Reference(s): Pet Waste, Animal Sources, Household Hazardous Waste, Illicit Discharge, Construction
Audience(s): Industry

13. SSCAFCA
Catherine Conran
May 7, 2016
SSCAFCA participated in the Great American Clean up Campus Contests, which involved schools throughout the middle Rio Grande.
3,384 Attendees
Permit Reference(s): General SWP
Audience(s): Children

14. SSCAFCA
Catherine Conran
May 7, 2016
SSCAFCA also participated in the volunteer community-wide Keep Rio Rancho Beautiful Great American Clean Up
1,200 Attendees
Permit Reference(s): General SWP, Household Hazardous Waste
Audience(s): Children, Adults

15. Town of Bernalillo
Maria Rinaldi
May 7, 2016
The Town of Bernalillo hosted a Great American Cleanup that included a clothing and recycling drive, a free half-day of dumping, and car and truck loads of waste at a town dumpster location. The event collected 180 cubic yards of trash.
214 Attendees
Permit References: General SWP, Household Hazardous Waste
Audience(s): Children, Adults

16. SSCAFCA
Catherine Conran
May 11, 2016
SSCAFCA made a presentation on the MS4 watershed-based permit at the WEFTEC (Water Environment Federation) conference
113 Attendees
Permit Reference(s): Pet Waste, Animal Sources, Household Hazardous Waste, Illicit Discharge, Construction
Audience(s): Industry

17. SSCAFCA & City of Rio Rancho
Catherine Conran & David Serrano
May 14, 2016; May 21, 2016 and May 28, 2016
SSCAFCA and the City of Rio Rancho participated in three training sessions for tree stewards
45 Attendees
Permit Reference(s): General SWP
Audience(s): Adults

18. City of Albuquerque
Kathy Verhage
May 21, 2016
The City's Parks & Recreation Department hosted a cleanup at National River at Central NW. Rafters collected 12 bags mixed recycling; 6 bags of glass, filled one half of a trash compactor
110 Attendees
Permit Reference(s): General SWP, Pet Waste
Audience(s): Children, Adults

19. Mid Rio Grande Stormwater Quality Team
Patrick Chavez, Maria Rinaldi, Catherine Conran and Maria Rinaldi
May 21, 2016
Abrazos – A Celebration of Environmental Justice
The Mid Rio Grande Stormwater Quality Team had an informational booth at this community festival celebrating environmental justice at the national wildlife refuge. Visitors were given information on stormwater quality and preventing stormwater pollution. A total of 88 people filled out surveys. *See Appendix O for survey results.*
100 Attendees
Permit Reference(s): General SWP, Pet Waste, Household Hazardous Waste
Audience(s): Children, Adults

20. City of Albuquerque
Kathy Verhage
May 23, 2016
The City's Parks & Recreation Department hosted a cleanup at Piedra Lisa Open Space. Volunteers picked up 28 pounds of dog poop, 3 bags of mixed recycling, 2 bags of trash, and 2.5 gallon buckets of broken glass
63 Attendees
Permit Reference(s): General SWP, Pet Waste
Audience(s): Children, Adults

21. SSCAFCA
Catherine Conran
May 27, 2016
SSCAFCA made a presentation on the Middle Rio Grande watershed at the Statewide MS4 summit
41 Attendees
Permit Reference(s): Pet Waste, Animal Sources, Household Hazardous Waste, Illicit Discharge, Construction
Audience(s): Industry

22. City of Albuquerque
Kathy Verhage
May 27, 2016
The City's Parks & Recreation Department hosted a cleanup at Route 66 Open Space. Volunteers picked up 8 bags mixed recycling; 10 gallon buckets of broken glass and 4 bags of unbroken glass
31 Attendees
Permit Reference(s): General SWP
Audience(s): Children, Adults

23. AMAFCA
Patrick Chavez
June 9, 2016
During a Stormwater Management Plan Training, the stormwater engineer conducted a survey among participants about their awareness of and support for initiatives to reduce stormwater pollution. A total of 21 people filled out the survey. *See Exhibit P for survey results.*
21 Attendees
Permit Reference(s): General SWP, Pet Waste, Animal Sources, Household Hazardous Waste, Illicit Discharge, Construction
Audience(s): Industry

24. Village of Los Ranchos Domestic Animal Waste Reduction Program
Timothy McDonough
January-June 2016
The Village of Los Ranchos posts signs, "doggie waste clean-up bags," and waste receptacles along Village Trails in Open Space and along acequias and ditches which have pedestrian trails. Currently there are 15 "doggie waste clean-up stations." Over the period of this report, 3,130 pounds of pet waste were collected from these stations and deposited in the permitted landfill.
625 Attendees
Permit Reference(s): Pet Waste
Audience(s): Children, Adults

**Half-year allocation from a program lasting an entire school year (two semesters).*

Estimated number of individuals reached by these public education campaigns (with duplications): 21,013

General Materials Distribution
As appropriate, team members distribute materials at events. While the MRGSQT is focusing less on printed collateral pieces and more on community outreach through partnerships and participation in community events, we have included inventories of materials on hand as of January 1, 2016 through June 30, 2016.

MRGSQT Item	1/1/2016 Quantity	6/30/2016 Quantity	Distributed	Cost of Materials Distributed
Scoop the Poop Bumper Sticker	0	0	0	$0.00
Keep the Rio Grand Bumper Sticker	1,728	1,228	500	$105.00
Keep the Rio Grand Brochure	527	0	0	$0.00
Keep the Rio Grand Home Brochure	494	111	383	$134.05
New Dog or Cat Brochure	3,675	3,470	205	$61.50
Scoop the Poop Rack Card	237	0	0	$0.00
MRGSQT Notepad	0	0	0	$0.00
TOTAL	6,661	4,809	1,088	$300.55

Total estimated number of people reached by this activity: 1,088
Permit Reference(s): General SWP, Pet Waste, Household Hazardous Waste
Audience(s): Children, Adults

Educational Activities

Educational Kiosk at the Children's Library at the Main Albuquerque Public Library Albuquerque.

On February 18, 2016, the Mid Rio Grande Stormwater Quality Team held a press conference at the Children's Library at the Main Albuquerque Public Library to unveil its new educational kiosk.
The kiosk features:

- An **interactive stormwater system map** where children can 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 lets children choose one of three dogs and learn how to properly pick up after that dog. This is important, according to the MRGSQT, 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, glass and cement, household cleaners, yard waste, prescription and over-the-counter medicines.
- A **touch screen** that includes facts about each arroyo and the Rio Grande.

The *Albuquerque Journal* did a story on the kiosk that appeared in the state's largest newspaper the next day. See *Appendix Q f*or a copy of that article.

Total number of children and adults viewing the kiosk from February 18-June 30, 2016: 30,000
Total number of estimated readers for article on the kiosk in the *Albuquerque Journal*: 60,000
Permit Reference(s): General SWP, Pet Waste, Household Hazardous Waste
Audience(s): Children, Adults

Students and Teachers Reached through Partner Educational Programs – RiverXchange and Bosque Ecosystem Monitoring Program (B.E.M.P.)

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 a class outside the state to share what they learn about the geography, culture, and ecology of their local river and watershed. Including these partner classes, we have served over 14,000 students! Each student spends about 25 hours engaged with the program over the course of the school year. The curriculum incorporates hands-on activities, multiple classroom presentations by local water resources. A total of 82 adults and 1,150 students in New Mexico participated in the program. For more information, see *Appendix R, RiverXchange's 2015-2016 report to the Mid Rio Grande Stormwater Quality Team.*

The main objective of the Stormwater Science outreach education program of the Bosque Ecosystem Monitoring Program (B.E.M.P.) 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 one and one-half hour classroom activity, and a 4-5 hour study trip to the Rio Grande. During the 2015-2016 school year 1,804 students participated in Stormwater Science activities in their classrooms, in the field or both. Also, 291 adults

participated. The one and one-half hour classroom program was delivered to 955 students in 34 classrooms at 18 different schools in Bernalillo, Rio Rancho, Albuquerque, Los Lunas and Socorro. *See Exhibits S and T for the BEMP Report on the 2015-2016 school year and its Stormwater Science report.*

Total estimated number of people reached by these educational activities: 93,327
Permit Reference(s): General SWP, Pet Waste, Animal Sources, Household Hazardous Waste, Illicit Discharges
Audience(s): Children, Adults

Total Number of People Reached through All Advertising, Educational and Public Outreach Activities during first half of 2016
Obviously, some people were reached by more than one activity, but in gross numbers an estimated **206,714** people were reached with a stormwater quality/stormwater pollution prevention message during the first half of 2016.

CWA STRATEGIC COMMUNICATIONS

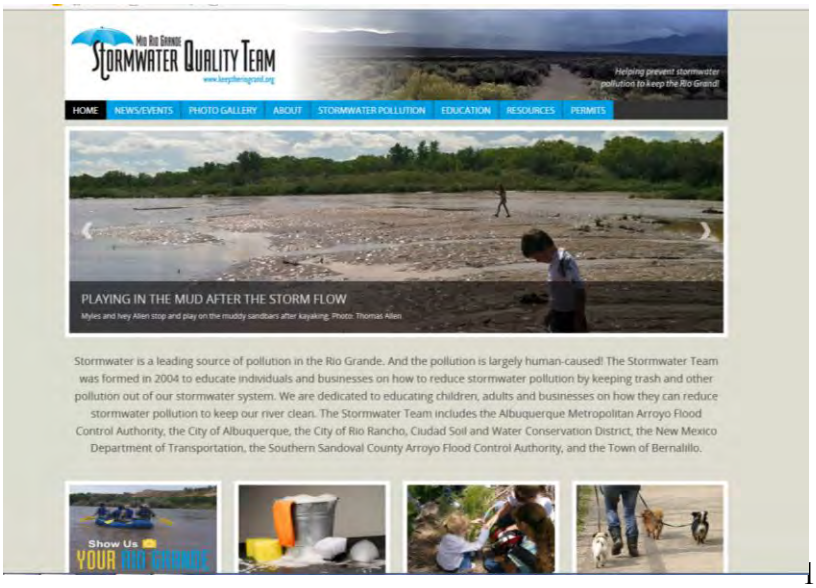
Amended October 13, 2016

TO: The Mid Rio Grande Stormwater Quality Team

FROM: Patti Watson, President
Phyllis Baker, Lead Account Executive
CWA Strategic Communications

RE: Outcomes Report for second half of 2015 – Mid Rio Grande Stormwater Quality Team
Public Education and Involvement

During the second half of 2015 the Mid Rio Grande Stormwater Quality Team (MRGQST) continued its educational partnerships with the Bosque Ecosystem Monitoring Program (B.E.M.P.) and RiverXchange. The team continued to post relevant information to its website and Facebook page, and also participated in a number of high-profile community events. In addition, the team completed fabrication of its interactive educational kiosk and finalized an agreement to place the kiosk in the Downtown ABC Library's Children's Room. Finally, Team partners and supporters planned and implemented public education advertising campaigns on the proper disposal of FOG (Fats, Oils and Grease) during the holiday season. The overall budget spent on these activities, excluding donated hours by team members and RiverXchange and B.E.M.P., was $18,613.69. The contractor, CWA Strategic Communications, donated $409.90 in services during the second half of the 2015 calendar year. We have summarized the activities below and on the following pages:



Website [(www.keeptheriogrand.org)](http://www.keeptheriogrand.org)

The website received 42.8% more total visitors visits in the second half of 2015 than it did in the first six months of the year *(see statistics chart on next page).* There was also a 37.6% increase in unique visitors. The majority of visitors (86.03%) were new visitors to the site.

MRGSQT Website Analytics	July 1-Dec. 31, 2015	Jan. 1-June 30, 2015
Total Visitors	2,166	1,517
Unique Visitors	1,818	1,321
New Visitors	1,878	86.03%
iPhone/Smart Phone	94	102
iPad/Tablet	23	36
Desktop	2,049	1,379
Other Mobile Device	0	138
Top Referring Sites	Traffic2money.com/referral (312) webmassters.org/ Referral (307); Google (297); best-seo-software.xyz/referral (235); direct (213); traffimonetizer.org/referral (96); ranksonic.net/referral (95)	Google (450); direct (313) www.1.social-buttons.com (205); sernault.sernalt.com (140) buttons-for-website.com (104); bing (25); Facebook (22)

A detailed Google Analytics Report is included as an attachment to this report, labeled Appendix A.

Estimated number of individuals reached by this activity: 2,166
Permit Reference(s): General SWP, Construction, Pet Waste
Audience(s): Children, Adults

Facebook Page

In conjunction with the SQT website, a Facebook page contains posts and updated information at: (https://www.facebook.com/Keeptheriogrand). Total "likes" for the page increased from 121 to 131 during the second half of 2015, an 8 percent increase.

Estimated number of individuals reached by this activity: 131
Permit Reference(s): General SWP, Construction, Pet Waste
Audience(s): Children, Adults

Events

In the second half of 2015, MRGSQT members reported participating in a total of 18 community outreach/educational events. Details are on the following pages.

1. City of Albuquerque
Household Hazardous Waste Collection
July-December 2015
The City of Albuquerque accepts dropped off household hazardous waste including paint, batteries and solvents and other types of HHW throughout the year. For a summary table on this program, see *Appendix D.*
5,488 Attendees
Permit Reference(s): Household Hazardous Waste
Audience(s): Children, Adults

2. Sandoval County
Household Hazardous Waste Collection
July-December 2015
Regular events are scheduled for area residents to drop off antifreeze, fluorescents, aerosols, flammable liquids, paints, flammable toxic liquids and solids, acids, corrosive bases and more. In the first six months of 2016, the program collected a 4.48 tons (8,960 pounds) of household hazardous waste. For more information on this program, see *Appendix E.*
165 Attendees
Permit Reference(s): Household Hazardous Waste
Audience(s): Children, Adults

3. City of Albuquerque
Kathy Verhage
July 21, 2014
The City of Albuquerque partnered with The Nature Conservancy to host "Local Children Get Wild About Watersheds," a two-hour interactive lesion about watersheds and how they connect people, plants and animals at the Paradise Hills Community Center. The event featured the "rolling river" model, water cycle models and included children in the 5th through the 8th grades. *A media alert for the event is included as Appendix B.*
105 attendees
Permit Reference(s): General SWP, Illicit Discharges, Pet Waste
Audience(s): Children

4. Southern Sandoval Arroyo Flood Control Authority
Catherine Conran
August 17, 2015
The Southern Sandoval Arroyo Flood Control Authority (SSCAFCA) conducted a tour of its facilities for students attending Central New Mexico Community College.
25 attendees
Permit Reference(s): General SWP
Audience(s): Adults

5. Mid Rio Grande Stormwater Quality Team
Mountain West Brew Fest
September 5 and 6, 2015
The Stormwater Team had a booth at this inaugural two-day community festival, which included craft beers from 50 local and regional breweries, food, and continuous live entertainment. The team also administered 362 surveys. A report of the results is included with this report in *Appendix C.*
5,800 attendees
Permit Reference(s): General SWP, Household Hazardous Waste, Pet Waste
Audience(s); Children, Adults

6. SSCAFCA
Toss No Mas Rio Rancho clean up event
September 12, 2015
The Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA) participated in a community-wide cleanup.
280 attendees
Permit Reference(s): General SWP, Household Hazardous Waste, Pet Waste
Audience(s); Children, Adults

7. Ciudad Soil & Water Conservation District
Steve Glass
September 18, 2015
Education presentations on stormwater pollution reduction using the "rolling river" at the A Montoya Elementary School and Roosevelt Middle School at a Watershed Fair.
433 attendees
Permit Reference(s): General SWP, Pet Waste
Audience(s); Children

8. Stormwater Team
Festival in the Valley
September 19, 2015
The Stormwater Team had a booth at this community event, which featured a farmer's market, chile roasting, traditional music and dancing and works from local artisans. An estimated total of 200 individuals stopped by the booth to visit and 81 filled out survey cards. A report of the results is included in *Appendix F.*
200 attendees
Permit Reference(s): General SWP, Pet Waste, Household Hazardous Waste
Audience(s); Children, Adults

9. Ciudad Soil & Water Conservation District
Steve Glass
October 7, 2015
Central New Mexico students and faculty learned about source control in preventing stormwater pollution and affixed markers to several storm drain inlets around campus as part of the Albuquerque 2030 District sustainability initiative. Photos documenting this event are included with this report in Appendix *G.*
22 attendees
Permit Reference(s): General SWP, Septic & Sanitary Sewer Systems
Audience(s); Adults

10. Ciudad Soil & Water Conservation District
Steve Glass
October 8, 2015
Central New Mexico students attended a briefing on water resources management in the Rio Grande and watched an educational film about the San Juan-Chama project on YouTube.
10 attendees
Permit Reference(s): General SWP
Audience(s); Adults

11. Stormwater Team
City of Rio Rancho Children's Water Festival
October 26, 2015
The Stormwater Team staffed an activity station with interactive exercises and information on the stormwater drainage system and how children can prevent stormwater pollution and provided information packets to participating teachers.
1,542 attendees
Permit Reference(s): General SWP, Pet Waste
Audience(s): Children, Adults

12. SSCAFCA
November 14, 2015
The Southern Sandoval County Arroyo Flood Control Authority participated in America Recycles Day Rio Rancho. Participants in the event removed over 1,697,340 pounds of trash from 113 miles and over 21 acres of open space, parks and arroyos including 60 illegal dump sites
200 attendees
Permit Reference(s): General SWP, Pet Waste, Household Hazardous Waste
Audience(s): Children, Adults

13. Kayak New Mexico
November 21, 2014
A Stormwater Team partner, Kayak New Mexico, launched its inaugural River Cleanup on the Rio Grande, collecting nearly 1,500 pounds of trash and debris from the river in just two hours. The stormwater team posted the results of this activity on its Facebook page.
14 attendees
Permit Reference(s): General SWP
Audience(s): Children, Adults

14. City of Albuquerque
December 17, 2016
The City of Albuquerque sponsored a Parks & Recreation Department program planting 20 whip trees and 5 New Mexico olive trees at the Academy of Trades & Technology charter school as part of an initiative to increase the indigenous tree count and reduce erosion in our community.
7 attendees
Permit Reference(s): General SWP
Audience(s): Children, Adults

15. SSCAFCA
July 1-December 31, 2015
Arroyo Classroom Program
Ongoing program educates third graders and their teachers in the SSCAFCA's district about arroyos – what they are, what role they play in stormwater runoff and recreation and how to be safe in and around arroyos.
286 attendees
Permit Reference(s): General SWP
Audience(s): Children

16. SSCAFCA
July 1-December 31, 2015
Pilot Educational Program on Scoop the Poop
A test program was launched in the second half of 2015 to educate interested individuals, shelters, rescue groups, kennels and pet-related organizations on proper disposal of pet waste.
50 attendees
Permit Reference(s): Pet Waste
Audience(s): Adults

17. City of Rio Rancho & SSCAFCA
July 1-December 31, 2015
Students Achieve for Excellence (SAFE)
Educational program on a variety of curricula including stormwater runoff and prevention of stormwater pollution reaching mixed elementary school classes and their teachers.
370 attendees
Permit Reference(s): General SWP
Audience(s): Children

18. City of Albuquerque
Kathy Verhage
2015
In partnership with the Earth Force Neighborhood Environmental Trios Engaging Youth in the Health of the Middle Rio Grande, a community-wide educational program involving partners from the U.S. Fish & Wildlife Service, Amigos Bravos, the Middle Rio Grande Urban Waters ambassador, the Friends of the Valle de Oro and other stakeholders, a variety of educational and hands-on programs that involved a total of 472 students were planned and implemented that involved water quality testing and education on issues surrounding water quality in in river and its impact on the community. *See Appendix H for a report on this project.*
500 Attendees
Permit Reference(s): General SWP, Pet Waste, Animal Sources, Household Hazardous Waste
Audience(s): Children

Estimated number of individuals reached by events and public outreach: 15,497

Public Education Campaign on Proper Disposal of Fats, Oils & Grease
In November and December 2015, both the Albuquerque Bernalillo County Water Utility Authority (a Stormwater Team supporter) and the City of Rio Rancho (a Stormwater Team member) planned and implemented public education campaigns on how to dispose of cooking grease properly. The campaigns were timed to coincide with the holiday cooking season (Thanksgiving through Christmas).

The **Albuquerque Bernalillo County Water Utility Authority** campaign included:

- **Radio** – A total of 568 30-second radio spots reaching an estimated audience of 277,900 with duplications
- **Television** – A total of 1,354 30-second television spots reaching an estimated audience of 472,342 with duplications
- **Digital Outdoor Boards** – 10 digital boards running in November and December (5 each month) reaching an estimated audience of 310,227 adults (18 years of age and older) with duplication
- **Bill inserts** – Two bill inserts Water Authority bills reaching an estimated audience of 210,000 with duplication
- **Social Media** -- Two Sponsored Facebook Stories with 7,452 views and 952 shares
- **Point of Purchase** -- 102 Johnny Boards (billboards in public restrooms) reaching an estimated 101,250 people with duplications

The **City of Rio Rancho** campaign included:

- **Print advertisements** – five small space print advertisements in the Rio Rancho Observer reaching an estimated audience of 250,000 with duplications
- **Outdoor Boards** – a total of four outdoor boards running two weeks in November and December reaching an estimated audience of 212,613 individuals 18 years of age and older with duplications.

Copies of some of the print materials produced for the Albuquerque Bernalillo County Water Utility Authority Campaign are included in *Appendix I.* Copies of some of the materials produced for the City of Rio Rancho campaign are included in *Appendix J.*

Estimated number of individuals reached by these public education campaigns (with duplications): 1,282,244
Permit Reference(s): Septic & Sanitary Sewers
Audiences: Adults

General Materials Distribution
As appropriate, team members distribute materials at events. While the MRGSQT is focusing less on printed collateral pieces and more on community outreach through partnerships and participation in community events, we have included inventories of materials on hand as of the beginning of July 2015 and at the end of the year.

MRGSQT Item	6/30/2015 Quantity	12/31/2015 Quantity	Distributed	Cost of Materials Distributed
Scoop the Poop Bumper Sticker	323	0	323	$67.83
Keep the Rio Grand Bumper Sticker	2,874	1,728	1,146	$240.66
Keep the Rio Grand Brochure	527	527	0	$0.00
Keep the Rio Grand Home Brochure	494	494	0	$0.00
New Dog or Cat Brochure	3,675	3,675	0	$0.00
Scoop the Poop Rack Card	237	237	0	$0.00
MRGSQT Notepad	758	0	758	$379.00
TOTAL	8,394	6,661	2,227	$687.49

Total estimated number of people reached by this activity: 2,227
Permit Reference(s): General SWP, Pet Waste, Household Hazardous Waste
Audiences: Children, Adults

Educational Programs
Students and Teachers Reached through Partner Educational Programs – RiverXchange and Bosque Ecosystem Monitoring Program (B.E.M.P.)

Because the RiverXChange Program spans a full school year, we are reporting all students and teachers reached for this period. A total of 82 adults and 1,150 students in New Mexico participated in the program. For more information, see *Appendix J,* RiverXchange's mid-year report to the Mid Rio Grande Stormwater Quality Team.

Unlike the RiverXChange Program, which works with specific classrooms throughout the year, the Bosque Ecosystem Monitoring Program (B.E.M.P.) schedules 1.5-hour sessions at individual classrooms throughout the school year and also provides field experiences. Therefore for the first six months we report that B.E.M.P. reached a total of 512 students and 26 adults during the first half of the school year, from July-December 2015. More information is available in *Appendix K,* BEMP's mid-year report to the Mid Rio Grande Stormwater Quality Team.
Total estimated number of people reached by these activities: 1,770
Permit Reference(s): General SWP, Pet Waste, Illicit Discharges, Animal Sources
Audiences: Children

Total Number of People Reached through All Advertising, Educational and Public Outreach Activities during second half of 2015

Obviously, some people were reached by more than one activity, but in gross numbers an estimated **1,304,035** people were reached with a stormwater quality/stormwater pollution prevention message during the first half of 2016.

List of Appendices

Appendix A - *Google Analytics Report – July-December 2015*
Appendix B *- Local Children Get Wild About Women Media Alert*
Appendix C *– Survey Results Mountain West Brew Fest*
Appendix D *– City of Albuquerque Household Hazardous Waste Summary*
Appendix E *– Sandoval County Household Hazardous Waste Report FY 2015-2016*
Appendix F *– Festival in the Valley Survey Results*
Appendix G *– CNM Source Control Public Outreach Event Project (photos)*
Appendix H *– Earth Force Neighborhood Environmental Trios Report*
Appendix I *– ABCWUA FOG Campaign Materials*
Appendix J *– City of Rio Rancho FOG Campaign Materials*
Appendix K *– RiverXchange Mid-Year Report*
Appendix L *– B.E.M.P Mid-Year Report*
Appendix M *– Google Analytics Report – January-June 2016*
Appendix N *– KOB TV Health & Wellness Survey Results*
Appendix O *– Abrazos Valle de Oro Survey Results*
Appendix P *– AMAFCA Storm Management Plan Training Survey Results*
Appendix Q *– Albuquerque Journal article on Educational Kiosk*
Appendix R *– Final RiverXchange Report*
Appendices S&T *– Final B.E.M.P. Report and Science Summary*

Report

Jul 1, 2015 - Dec 31, 2015

All Sessions
100.00%

Pageviews and Unique Pageviews …

Page	Pageviews	Unique Pageviews
/	2,427	1,818
/bosque-eco-system-monitoring-project/	68	52
/storm-team-files/	59	17
/residents/	58	54
/interactive-map/	56	34
/scoop-the-poop-2/	55	43
/mrgsqt-outcomes-form/	51	19
/stormwater-quality-team/	51	41
/category/news/	49	30
/permits/	44	24

Sessions and % New Sessions by Browser

Browser	Sessions	% New Sessions
Chrome	1,144	89.60%
Firefox	241	80.08%
Internet Explorer	216	79.17%
YaBrowser	208	89.90%
Opera	207	86.47%
Safari	107	79.44%
Mozilla Compatible Agent	14	100.00%
Edge	10	50.00%
(not set)	9	100.00%
Mozilla	4	100.00%

Sessions and % New Sessions by Device Category

Device Category	Sessions	% New Sessions
desktop	2,049	87.21%
mobile	94	77.66%
tablet	23	78.26%

Sessions and % New Sessions by User Type

User Type	Sessions	% New Sessions
New Visitor	1,878	100.00%
Returning Visitor	288	0.00%

Sessions and % New Sessions by …

Source / Medium	Sessions	% New Sessions
traffic2money.com / referral	312	91.67%
4webmasters.org / referral	307	95.77%
google / organic	297	82.15%
best-seo-software.xyz / referral	235	91.06%
(direct) / (none)	213	84.04%
trafficmonetizer.org / referral	96	94.79%
ranksonic.net / referral	95	89.47%
website-analyzer.info / referral	89	91.01%
claim4721691.copyrightclaims.org / referral	72	0.00%
seo-platform.com / referral	65	98.46%

Sessions and % New Sessions by …

Mobile Device Info	Sessions	% New Sessions
Apple iPhone	53	73.58%
Apple iPad	14	85.71%
(not set)	9	77.78%
Samsung SCH-i545 Galaxy S4	4	50.00%
Google Nexus 5	3	66.67%
Mozilla Firefox for Android	2	50.00%
Samsung GT-I9060M Galaxy Grand Neo Plus	2	100.00%
Samsung SM-G900A Galaxy S5	2	50.00%
Samsung SM-G920T Galaxy S6	2	100.00%
Samsung SM-N900V Galaxy Note 3	2	100.00%

The Nature Conservancy
New Mexico

Advisory

July 20, 2015
For Immediate Release
Contact Tracey Stone at tstone@tnc.org

Local Children Get Wild about Watersheds

[ALBUQUERQUE] One hundred children – grades 5 through 8 – are getting a wild lesson in watersheds, which play a critical role in the water we drink. As part of the Rio Grande Water Fund, The Nature Conservancy and its partners will educate young people about the connection between forests and water. The Rio Grande Water Fund is designed to leverage public/private funding to increase the scale and scope of forest restoration along the Rio Grande and its tributaries from Taos to Albuquerque. Healthy forests help prevent catastrophic fires and subsequent damaging floods, protecting water, people and wildlife.

Media members are invited to cover the hands-on "Wild about Watersheds" program, led by Krista Bonfantine of Arid Land Innovation, LLC.

WHO	100 children in grades 5th through 8th
WHAT	Interactive lessons about watersheds and how they connect people, plants and animals. Healthy watersheds and forests protect our water and quality of life
WHEN	Tuesday, July 21, from 9:30 – 11:30 a.m.
WHERE	Paradise Hills Community Center 5901 Paradise Blvd, Albuquerque, NM 87114
WHY	To teach children about the connection between forests, watersheds and the water we drink. Healthy watersheds and forests help soak up storm water and prevent soil erosion and pollutants from making their way to waterways. The more children know about nature, the more they'll care.
VISUALS	• Rolling River trailer with watershed including urban area, a farm & more • Children manipulating the Rolling River model • Children using models to explore the components of the water cycle • Children observing tree samples to understand the relationship between forests and water
DETAILS	Rio Grande Water Fund goals, plans, graphics, photos and stories can be found at nature.org/riogrande
PARTNERS	Arid Land Innovation, LLC, Ciudad Soil and Water Conservation District

Media interested in covering the education program, please RSVP Tracey Stone at tstone@tnc.org

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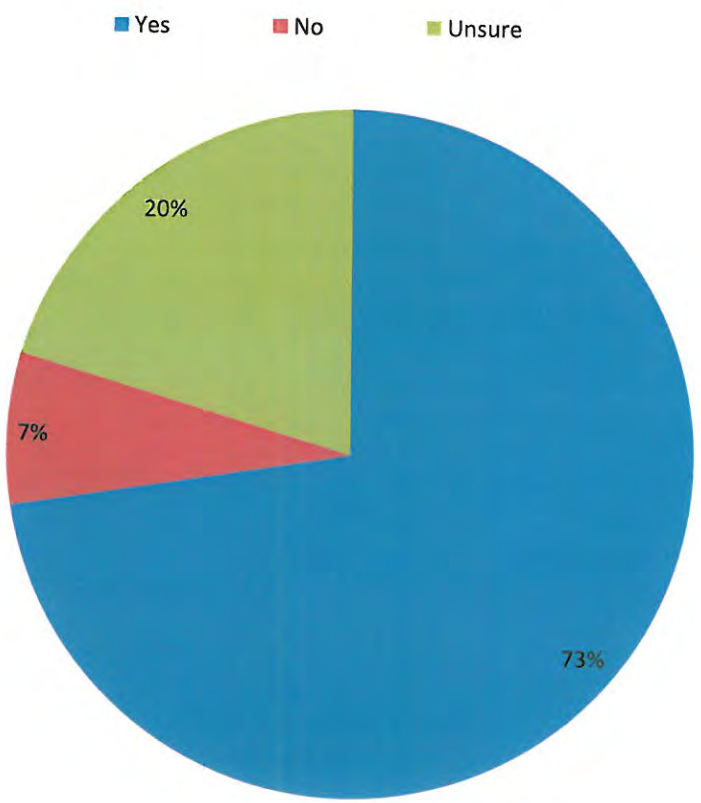
Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Rio Grande Water Quality Survey Results – 9/6/2015

The Mid Rio Grande Storm Water Quality Team organized a short survey addressing various water quality issues affecting the Rio Grande. This survey was conducted on September 9, 2015 as part of a public outreach initiative during the Mountain West Brew fest in Bernalillo County. Depending on the question, an average of 356 people responded to each question given a total of 362 respondents. The following graphics reflect the tallied results of the 10-question voluntary questionnaire. Future surveys are planned at upcoming regional events to provide a comparative baseline.

Do you think that storm water runoff affects the quality of water in the Rio Grande?

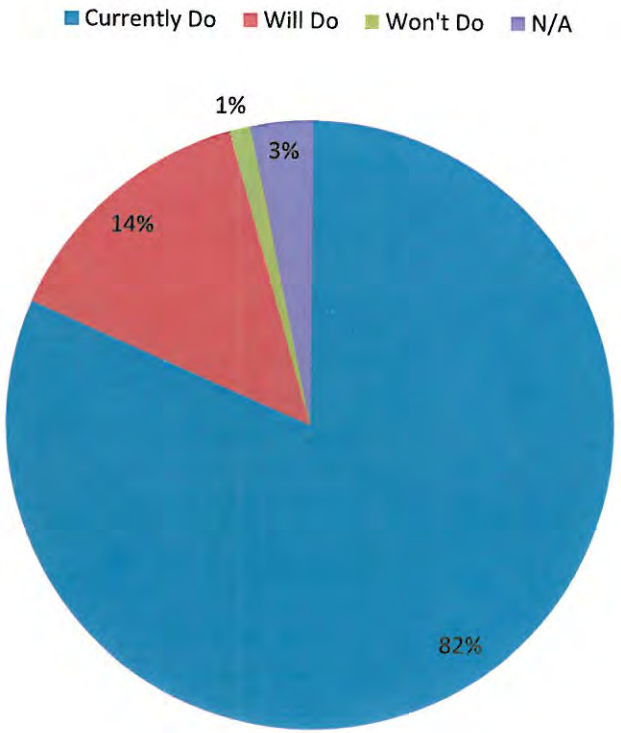
(353 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to pick up after your dog/pet and dispose of waste in the trash to improve the quality of storm water runoff?

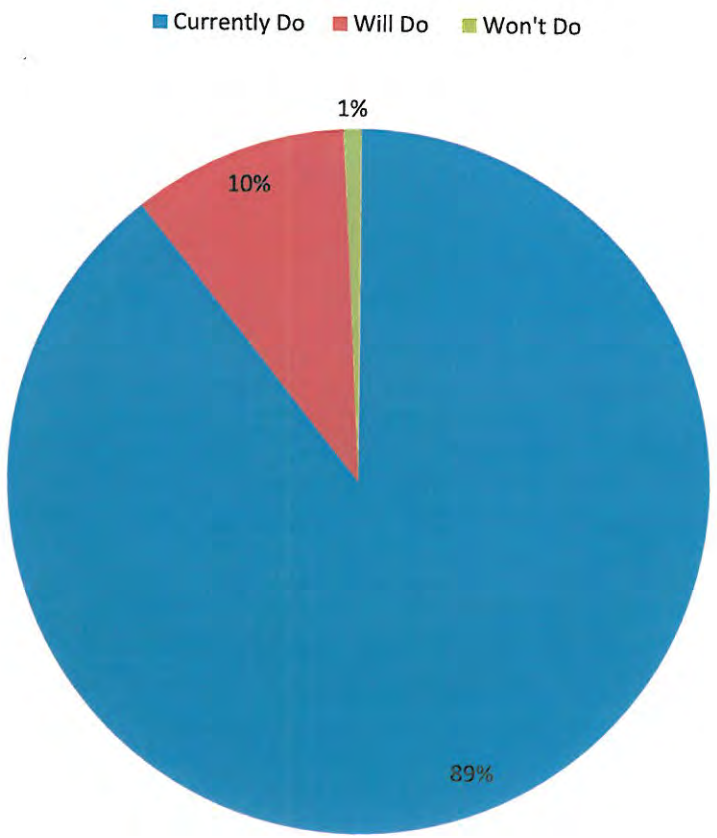
(361 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to reduce, reuse and recycle trash to improve the quality of storm water runoff?

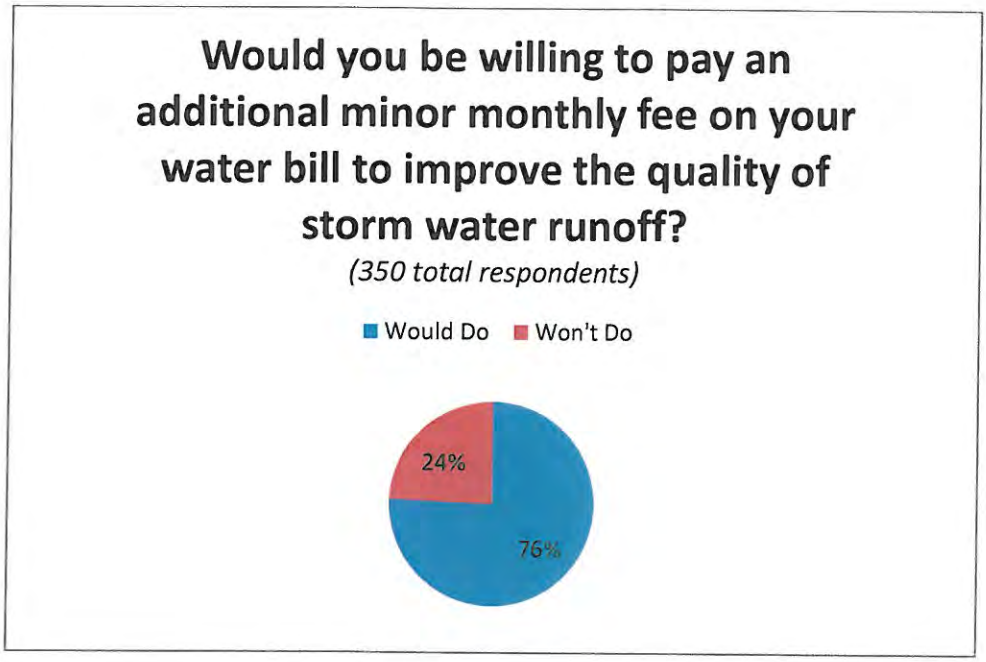
(362 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

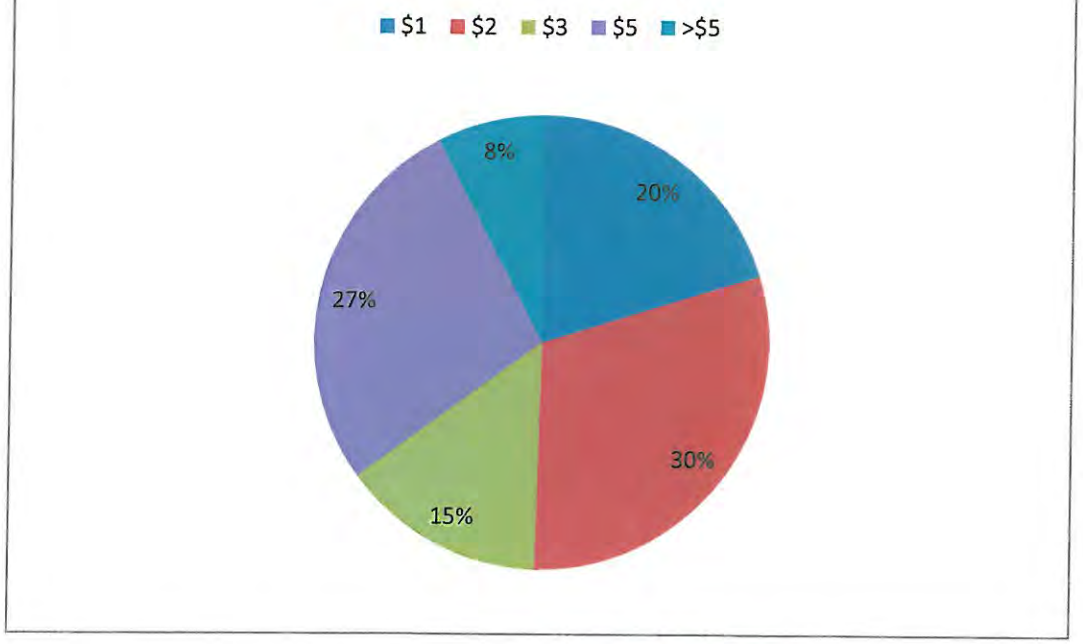
Would you be willing to pay an additional minor monthly fee on your water bill to improve the quality of storm water runoff?

(350 total respondents)



If answered "Would do", how much would you be willing to pay?

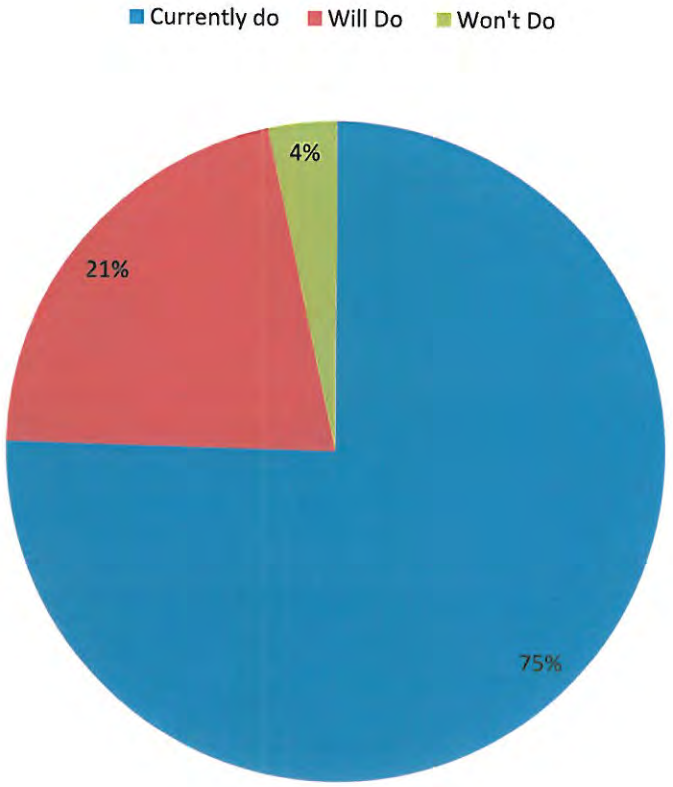
(262 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to reduce use of toxic chemicals outdoors to improve the quality of storm water runoff?

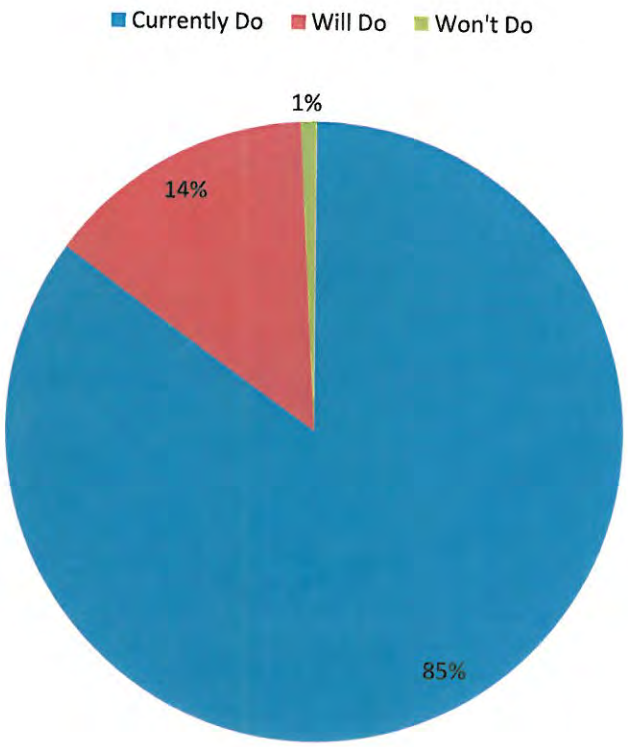
(353 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to fix oil leaks on cars or trucks to improve the quality of storm water runoff?

(354 total respondents)



Mid Rio Grande Stormwater Quality Team
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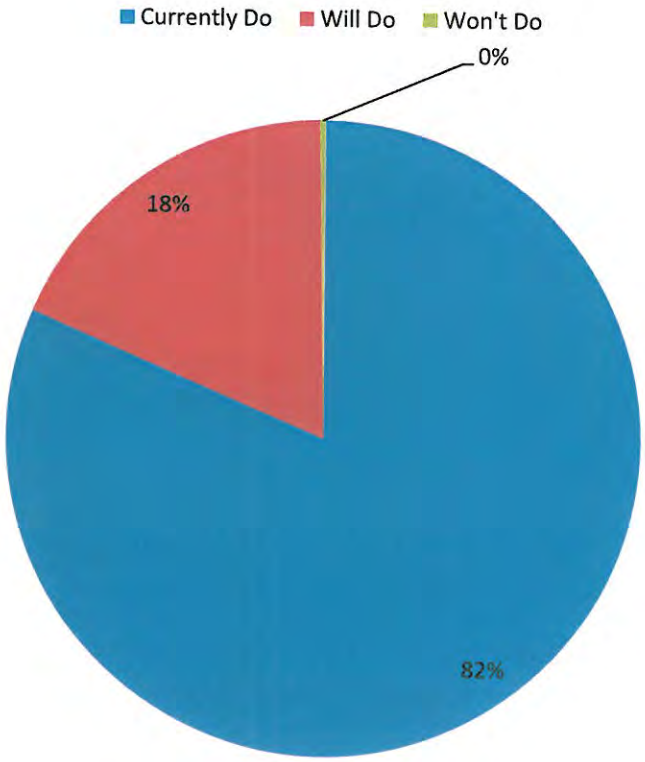
Would you be willing to dispose of household hazardous waste properly at a collection facility or during a recycling event to improve the quality of storm water runoff?

(356 total respondents)



Mid Rio Grande Stormwater Quality Team
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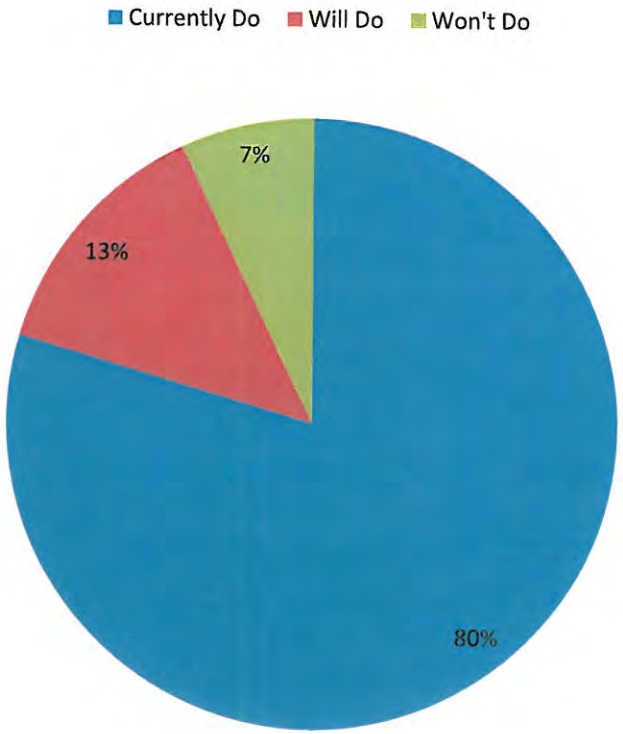
Would you be willing to wash your vehicle(s) at a full or self-service car wash to improve the quality of storm water runoff?

(353 total respondents)



Mid Rio Grande Stormwater Quality Team
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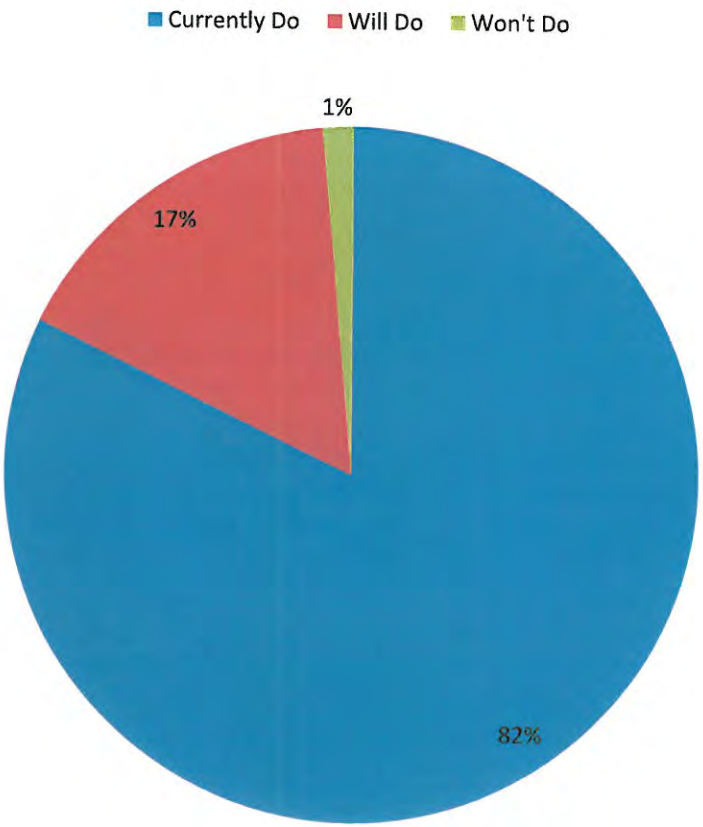
Would you be willing to keep chemicals and trash out of street gutters to improve the quality of storm water runoff?

(353 total respondents)



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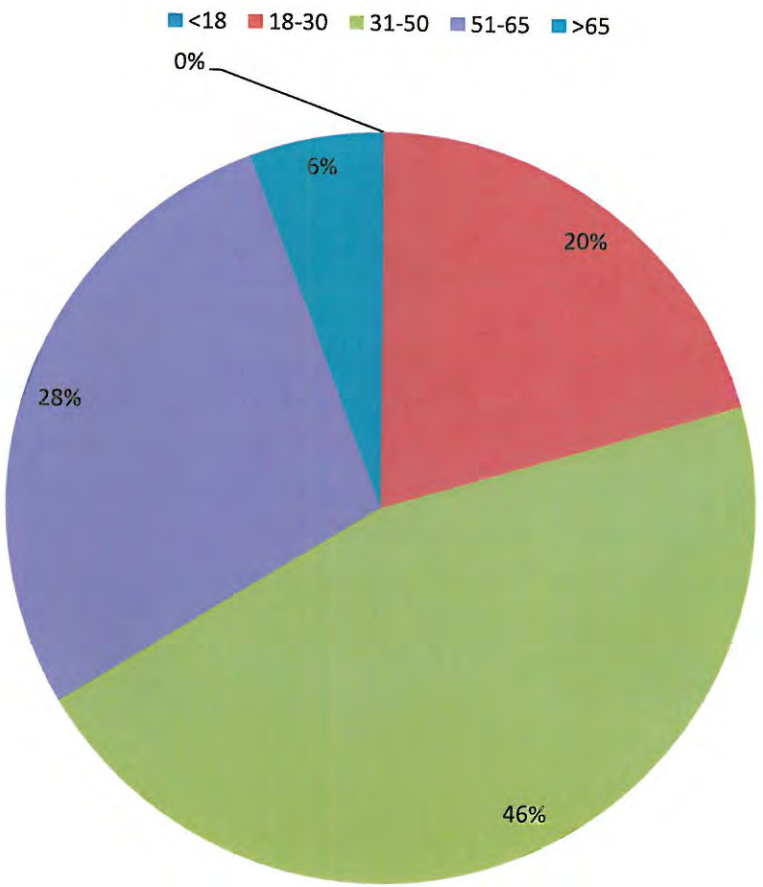
Age Category of Survey Respondent in Years

(362 total respondents)



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Comments

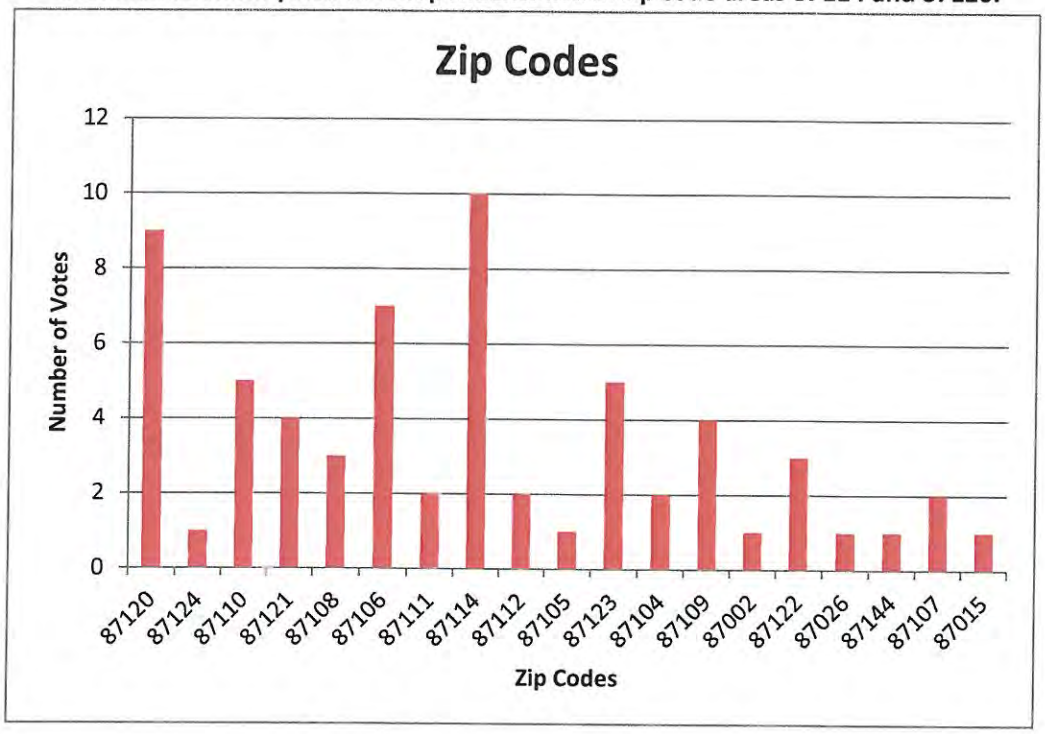
- *Additional education for residents is helpful when it comes to items on your 3rd question, especially for those that don't do them.*
- *Bernalillo water is minerally*
- *Worth the small additional monthly fee- Good Luck!*
- *Be more Demographic specific!*
- *Watched a documentary on ABQ water supply*
- *Thanks!* ☺
- *Live in rural area south of Tijeras, have well and septic system.*
- *I like water*
- *Asphalt roofs major cause of groundwater contamination*
- *Always worry about runoff water*
- *Thank you for the opportunity*
- *Thank you for being the change in the world!* ☺
- *I would like more information on grey water usage*
- *Grey water should be mandatory for yards*
- *Yay! Thank you!*
- *YES*
- *I'm a fisherman, always worried about quality of water.*
- *Thank you!*
- *Thanks!*
- *Thank Sandoval County Landfill for having hazardous waste disposal*
- *Work on environmental issues*
- *Continue your good works*
- *No Gutters in valley*
- *Collect Rainwater for yard use! Grey water uses??*
- *Best to use R/O for drinking water not plain tap!*
- *We have a septic and well system currently*
- *Better way to have communication to household how important it is to clean up after dogs!!*

- *Clean water is important!*
- *Cool Folks! Keep up the good work!*
- *Need to create proper rain water runoff program*

Email and Phone Numbers

- *Crystal Anderson: Doodles79alex@hotmail.com, (505) 290-1791*
- *David Infante: (505) 710-0736*
- *Melsangelzz@yahoo.com*
- *Diazyolanda39@gmail.com*
- *mhenrie@rognm.com*
- *Damen Lucero: (505) 400-7536*
- *LeAnn Aguilar: LeAnnAguilar@gmail.com*
- *Rachel Reese: Reeser14@gmail.com*
- *Yesha Galloway: yeshedreams@yahoo.com*
- *Thomas D Johnston: teamtom@aol.com*
- *Felice Knox: toadie44@yahoo.com*
- *padillasuzie@yahoo.com*
- *Victor Reliable Roofing(Green Roofer): (505) 489-3692*
- *Bgoodacre33@gmail.com*
- *Daniel: (505) 604-9715*
- *Kennaseni@gmail.com*
- *Summone80@gmail.com*
- *sharjean73@aol.com*
- *Rbryants @sfps.info*
- *Beebuck22@yahoo.com*
- *Please send Sandoval County Landfill recycle information to Town of Bernalillo*
    - *Attn: Carla Salazar to be included in water bill Newsletter- Thanks!*

The most common place the respondents live in zip code areas 87114 and 87120.



Household Hazardous Waste Collection

July 2015- June 2016

Month	Total	Orphaned waste at facility	City Participants	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-15	1212	0	1050	155	7	7-Sandoval	12.8%	$75,450.00	$1,518.00	$0.00	$75,450.00
Aug-15	772	0	675	93	4	4-Sandoval	12.0%	$59,227.00	$1,460.00	$0.00	$134,677.00
Sep-15	1037	0	900	131	6	4-Sandoval, 2-Santa Fe	12.6%	$64,714.00	$1,457.00	$0.00	$199,391.00
Oct-15	971	0	812	149	10	10-Sandoval	15.3%	$60,073.00	$842.00	$0.00	$259,464.00
Nov-15	836	0	724	105	7	7-Sandoval	12.6%	$50,996.00	$0.00	$0.00	$310,460.00
Dec-15	660	0	574	84	2	2-Sandoval	12.7%	$43,725.00	$3,465.00	$0.00	$354,185.00
Jul-Dec 2015	**5,488**	**0**	**4,735**	**717**	**36**		**13.0%**	**$ 354,185.00**	**$8,742.00**	**$0.00**	**$354,185.00**
Jan-16	761	0	648	109	4	4-Sandoval	14.3%	$46,620.00	$199	0.00	400,805.00
Feb-16	842	0	734	105	3	3-Sandoval	12.5%	$52,839.00	$1,416	0.00	453,644.00
Mar-16	1082	0	939	138	5	5-Sandoval	12.8%	$66,911.00	$909	0.00	520,555.00
Apr-16	1098	0	957	137	4	4-Sandoval	12.5%	$66,978.00	$0	0.00	587,533.00
May-16	1233	0	1042	185	6	5-Sandoval, 1-Valencia	15.0%	$80,145.00	$1,026	0.00	667,678.00
Jun-16	1462	8	1,246	205	3	3-Sandoval	14.0%	$94,882.50	$373	0.00	762,560.50
Jan-Jun 2016	**6,478**	**8**	**5,566**	**879**	**25**		13.6%	**$408,375.50**	**$3,923**	**0.00**	**762,560.50**
FY16 Total	**11,966**	**0**	**10,301**	**1,596**	**61**		**13.3%**	**$762,560.50**	**$12,665**	**0.00**	**762,560.50**
				11,958					**$12,665**		

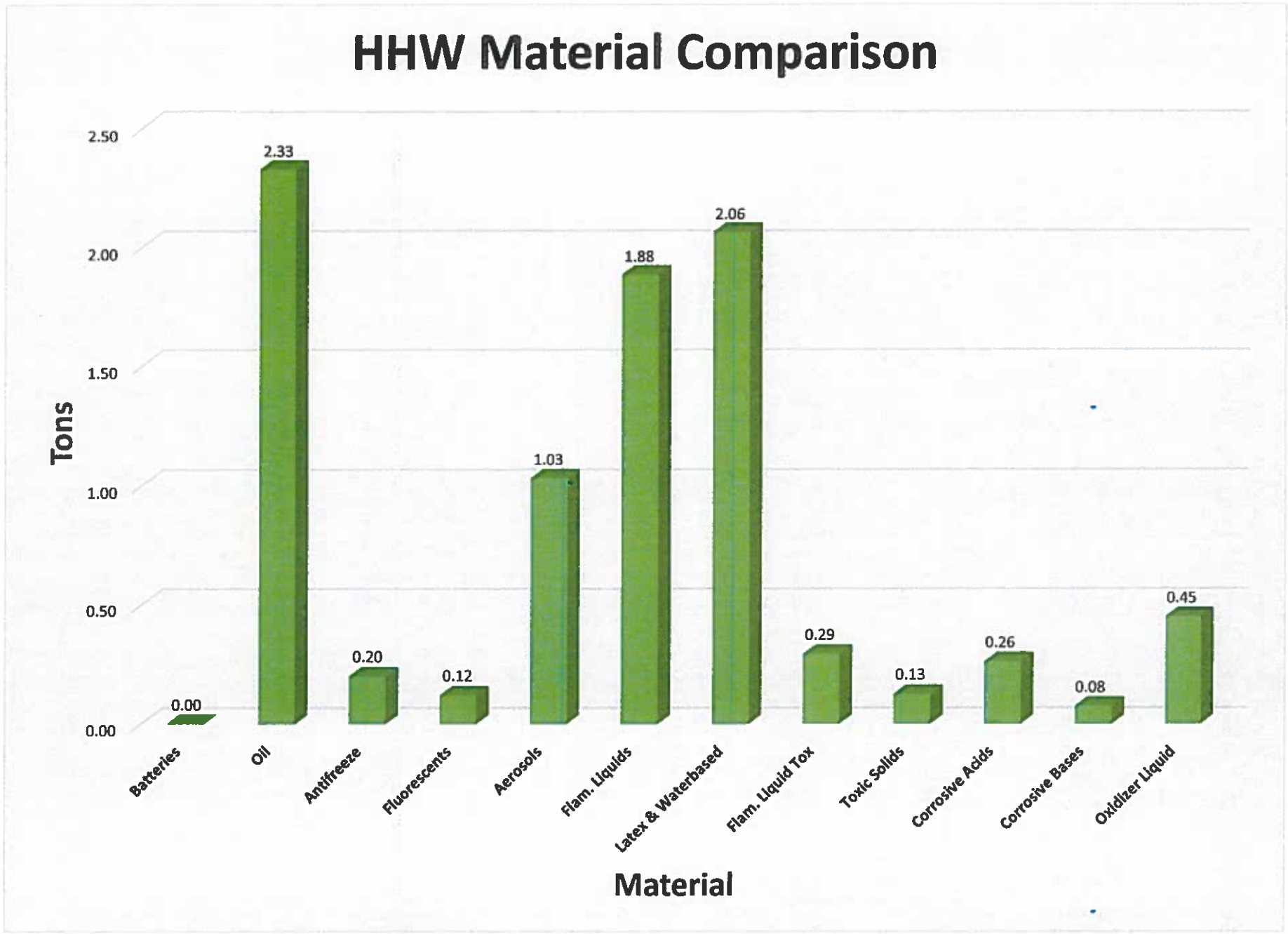
Monthly Average **997.1667**

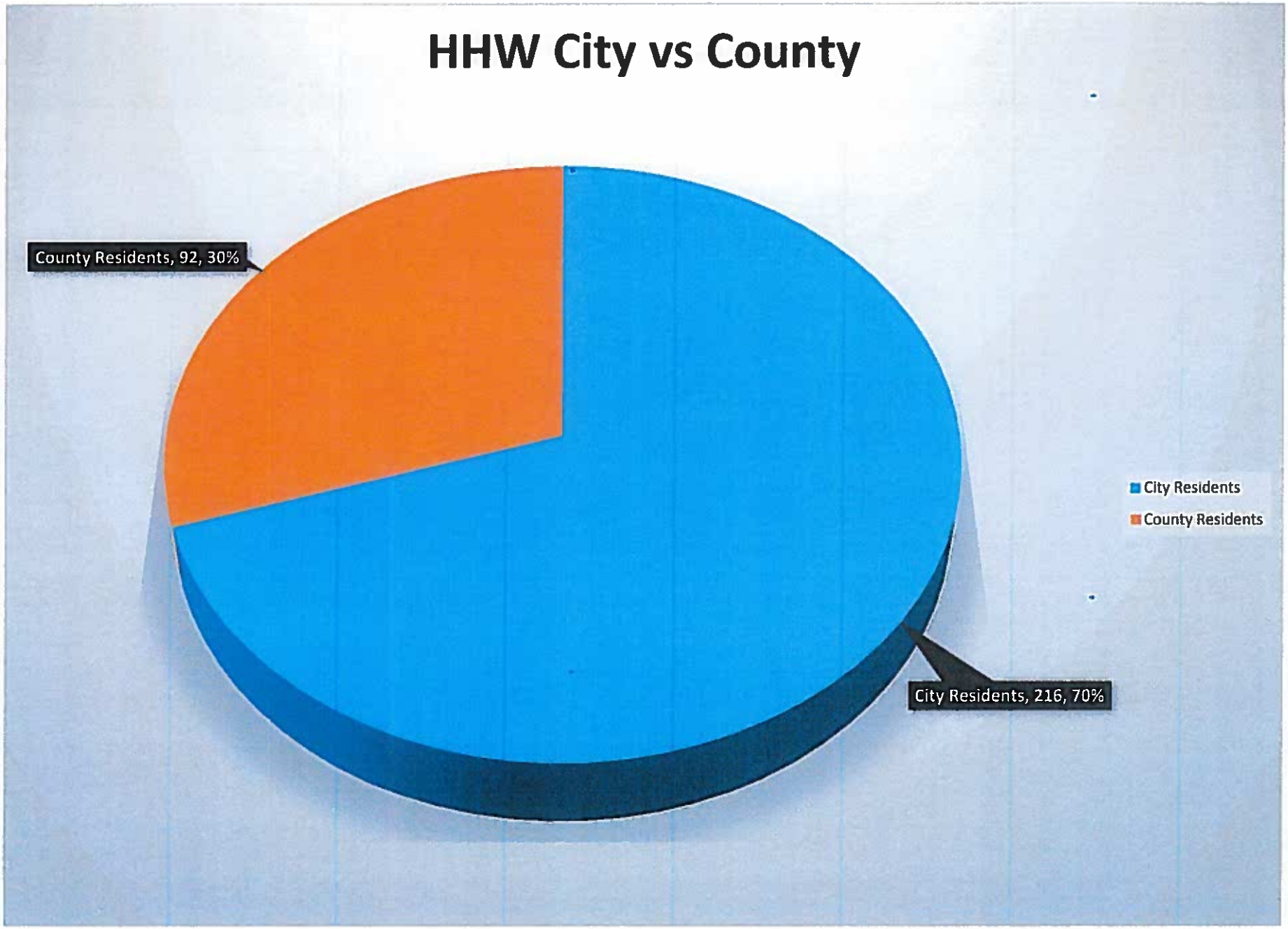
	Participants	Percentage	Cost
BERNCO Participation to date	1,596	13.3%	$97,356

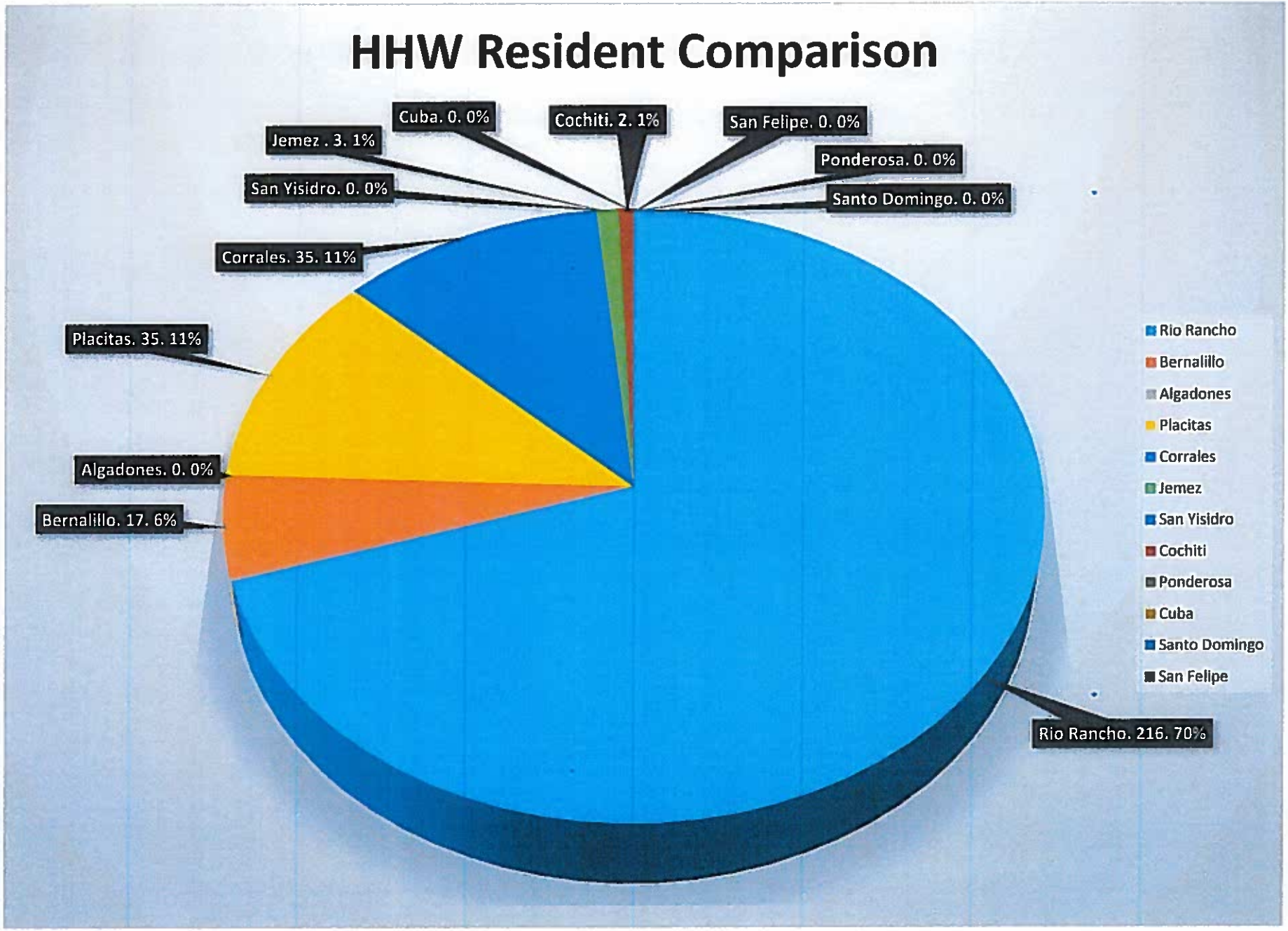
HHW Material Totals

Metric = Tons

	Batteries	Oil	Antifreeze	Fluorescents	Aerosols	Flam. Liquids	Latex & Waterbased	Flam. Liquid Tox	Toxic Solids	Corrosive Acids	Corrosive Bases	Oxidizer Liquid	Totals Tons	Residents
1 st Quarter	0.00	0.00	0.00	0.06	0.23	0.45	0.30	0.08	0.13	0.15	0.00	0.45	1.83	78
2 nd quarter	0.00	1.50	0.00	0.00	0.00	0.40	0.60	0.08	0.00	0.00	0.08	0.00	2.65	87
3 rd quarter	0.00	0.83	0.20	0.01	0.11	0.40	0.41	0.06	0.00	0.00	0.00	0.00	2.03	68
4 th quarter	0.00	0.00	0.00	0.05	0.70	0.63	0.75	0.08	0.00	0.11	0.00	0.00	2.32	75
YTD Totals	0.00	2.33	0.20	0.12	1.03	1.88	2.06	0.29	0.13	0.26	0.08	0.45	8.83	308


HHW Material Comparison
Tons
2.50
2.00
1.50
1.00
0.50
0.00
0.00
2.33
0.20
0.12
1.03
1.88
2.06
0.29
0.13
0.26
0.08
0.45
Batteries
Oil
Antifreeze
Fluorescents
Aerosols
Flam. Liquids
Latex & Waterbased
Flam. Liquid Tox
Toxic Solids
Corrosive Acids
Corrosive Bases
Oxidizer Liquid
Material


HHW City vs County
County Residents, 92, 30%
City Residents, 216, 70%
City Residents
County Residents


HHW Resident Comparison
Cuba. 0. 0%
Cochiti. 2. 1%
San Felipe. 0. 0%
Jemez . 3. 1%
Ponderosa. 0. 0%
San Yisidro. 0. 0%
Santo Domingo. 0. 0%
Corrales. 35. 11%
Placitas. 35. 11%
Algadones. 0. 0%
Bernalillo. 17. 6%
Rio Rancho. 216. 70%
Rio Rancho
Bernalillo
Algadones
Placitas
Corrales
Jemez
San Yisidro
Cochiti
Ponderosa
Cuba
Santo Domingo
San Felipe

HHW Vehicle/Resident Count FY16

Date	Rio Rancho	Bernalillo	Algadones	Placitas	Corrales	Jemez	San Ysidro	Cochiti	Ponderosa	Cuba	Santo Domingo	San Felipe	Total
July 4, 2015-Closed													
7/18/2015	8	0	0	1	0	1	0	1	0	0	0	0	11
8/1/2015	11	0	0	2	5	0	0	0	0	0	0	0	18
8/15/2015	10	1	0	1	1	0	0	0	0	0	0	0	13
9/5/2015	13	1	0	2	1	0	0	0	0	0	0	0	17
9/19/2015	15	2	0	1	0	0	0	1	0	0	0	0	19
Quarter 1 Totals	**57**	**4**	**0**	**7**	**7**	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**78**
10/3/2015	7	1	0	1	1	0	0	0	0	0	0	0	10
10/17/2015	11	0	0	2	1	0	0	0	0	0	0	0	14
11/7/2015	9	0	0	2	3	0	0	0	0	0	0	0	14
11/21/2015	9	0	0	3	1	1	0	0	0	0	0	0	14
12/5/2015	12	0	0	2	1	0	0	0	0	0	0	0	15
12/19/2015	17	2	0	0	1	0	0	0	0	0	0	0	20
Quarter 2 totals	**65**	**3**	**0**	**10**	**8**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**87**
1/2/2016	3	0	0	2	1	0	0	0	0	0	0	0	6
1/16/2016	10	1	0	2	0	0	0	0	0	0	0	0	13
2/6/2015	10	0	0	2	1	0	0	0	0	0	0	0	13
2/20/2015	8	0	0	0	2	0	0	0	0	0	0	0	10
3/5/2015	11	1	0	1	2	0	0	0	0	0	0	0	15
3/19/2015	4	0	0	5	2	0	0	0	0	0	0	0	11
Quarter 3 totals	**46**	**2**	**0**	**12**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**68**
4/2/2016	9	1	0	1	0	0	0	0	0	0	0	0	11
4/16/2015	5	3	0	2	1	0	0	0	0	0	0	0	11
5/7/2015	8	1	0	0	3	0	0	0	0	0	0	0	12
5/21/2015	8	1	0	0	3	0	0	0	0	0	0	0	12
6/4/2015	11	0	0	1	2	1	0	0	0	0	0	0	15
6/18/2015	7	2	0	2	3	0	0	0	0	0	0	0	14
Quarter 4 totals	**48**	**8**	**0**	**6**	**12**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**75**
FY 16 Totals	**216**	**17**	**0**	**35**	**35**	**3**	**0**	**2**	**0**	**0**	**0**	**0**	**308**
City Residents	216												
County Residents	92												

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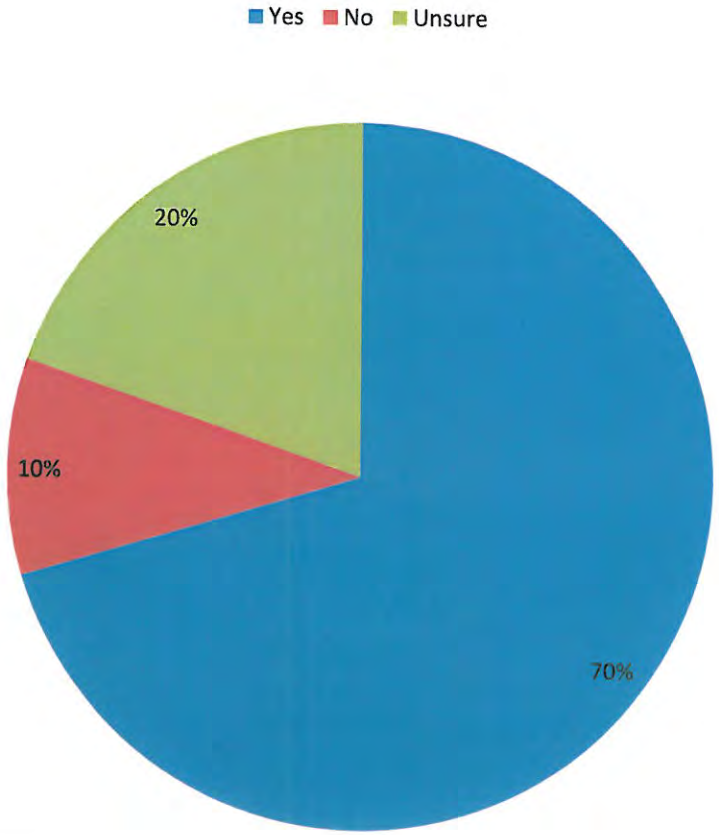
Rio Grande Water Quality Survey Results – 9/19/1015

The Mid Rio Grande Storm Water Quality Team organized a short survey addressing various water quality issues affecting the Rio Grande. This survey was conducted on September 9, 2015 as part of a public outreach initiative during The Valley Street Festival. Depending on the question, an average of 77 people responded to each question given a total of 81 respondents. The following graphics reflect the tallied results of the 10-question voluntary questionnaire. Future surveys are planned at upcoming regional events to provide a comparative baseline.

Do you think that storm water runoff affects the quality of water in the Rio Grande?

(81 total respondents)



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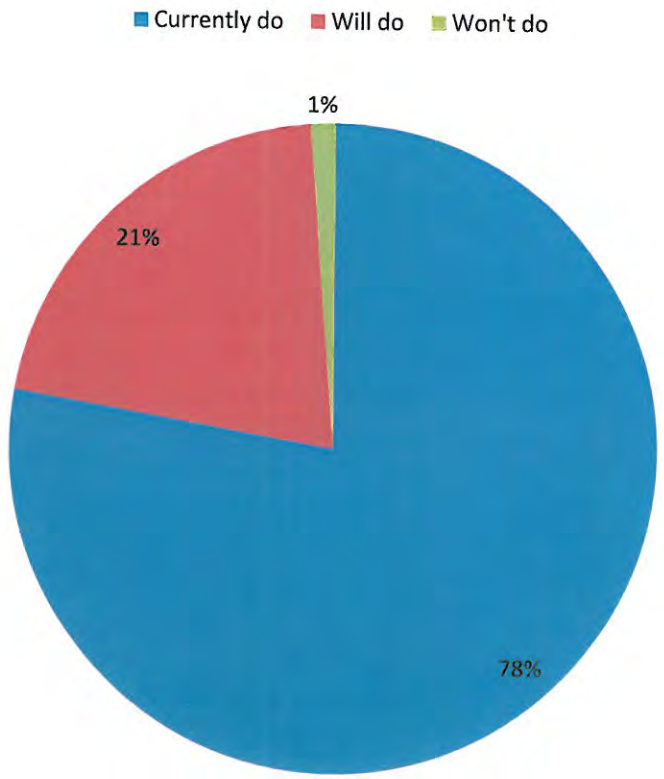
Would you be willing to pick up after your dog/pet and dispose of waste in the trash to improve the quality of storm water runoff?

(81 total respondents)



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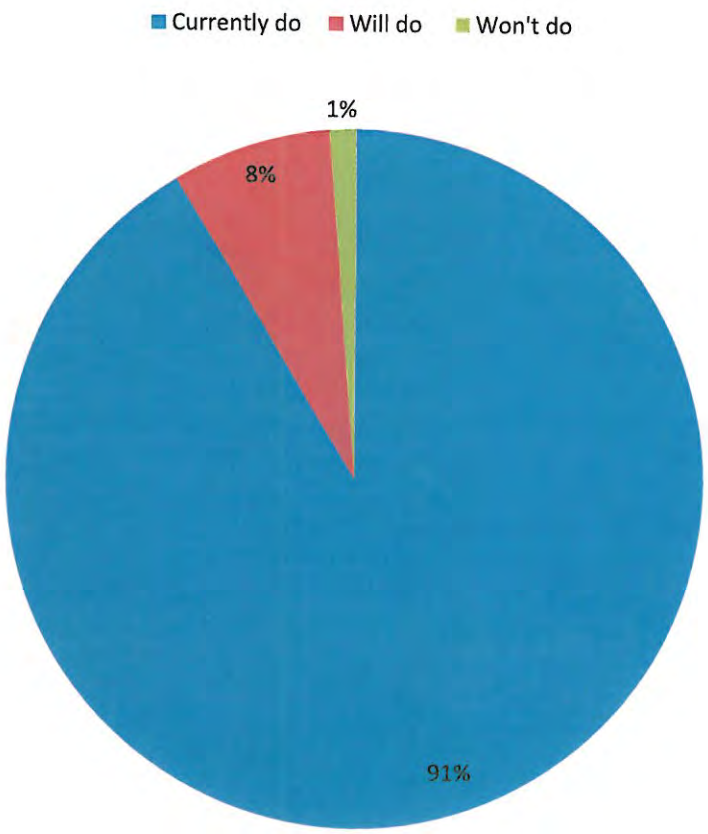
Would you be willing to reduce, reuse and recycle trash to improve the quality of storm water runoff?

(81 total respondents)



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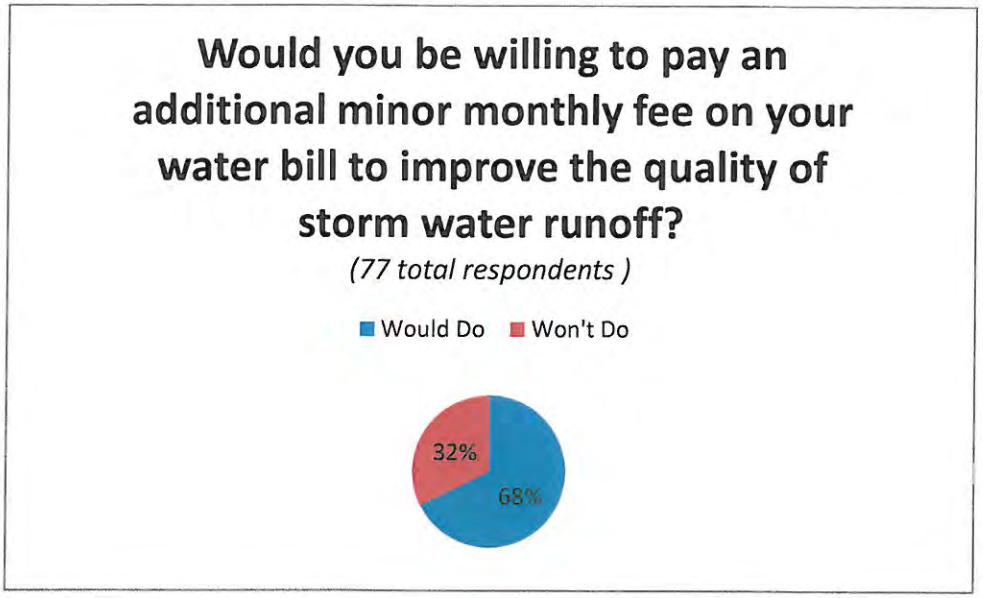
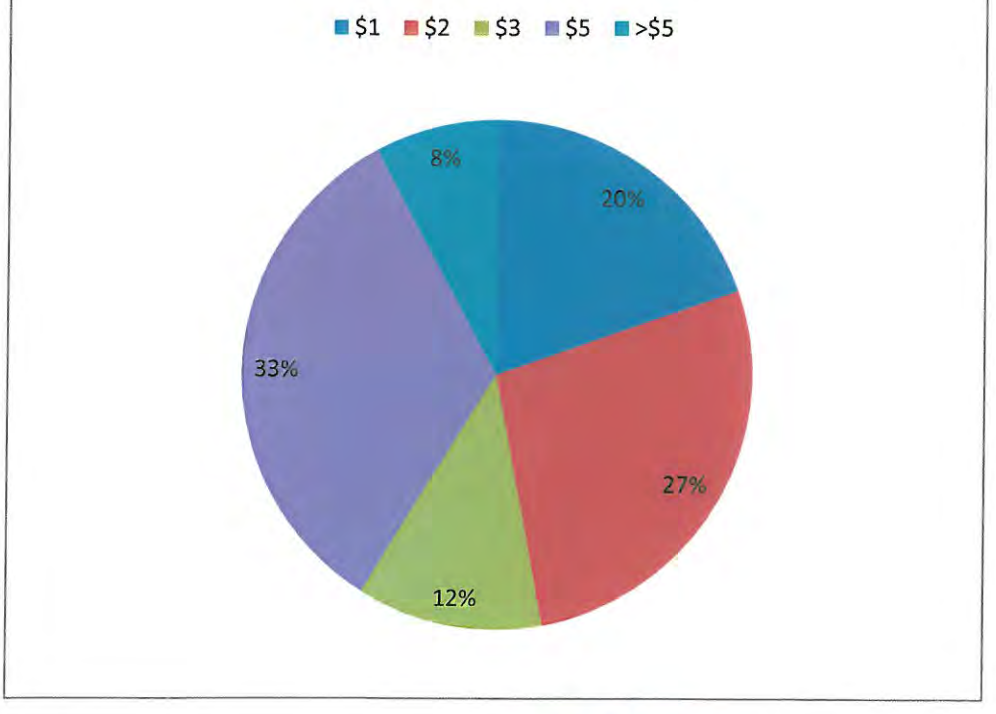
Would you be willing to pay an additional minor monthly fee on your water bill to improve the quality of storm water runoff?

(77 total respondents)



If answered "Would do", how much would you be willing to pay?

(51 total respondents)



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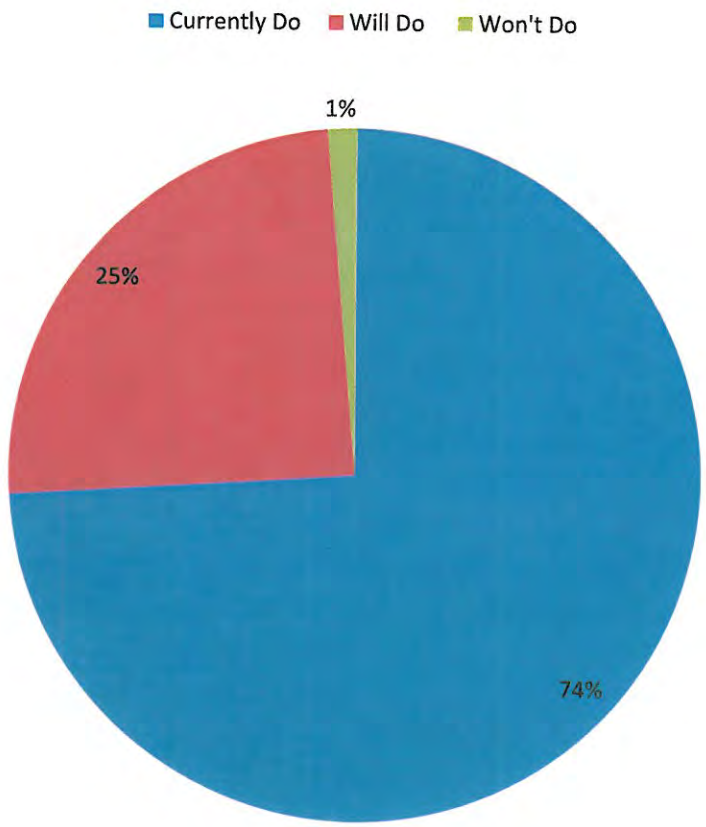
Would you be willing to reduce use of toxic chemicals to improve the quality of storm water runoff?

(73 total respondents)



Mid Rio Grande Stormwater Quality Team
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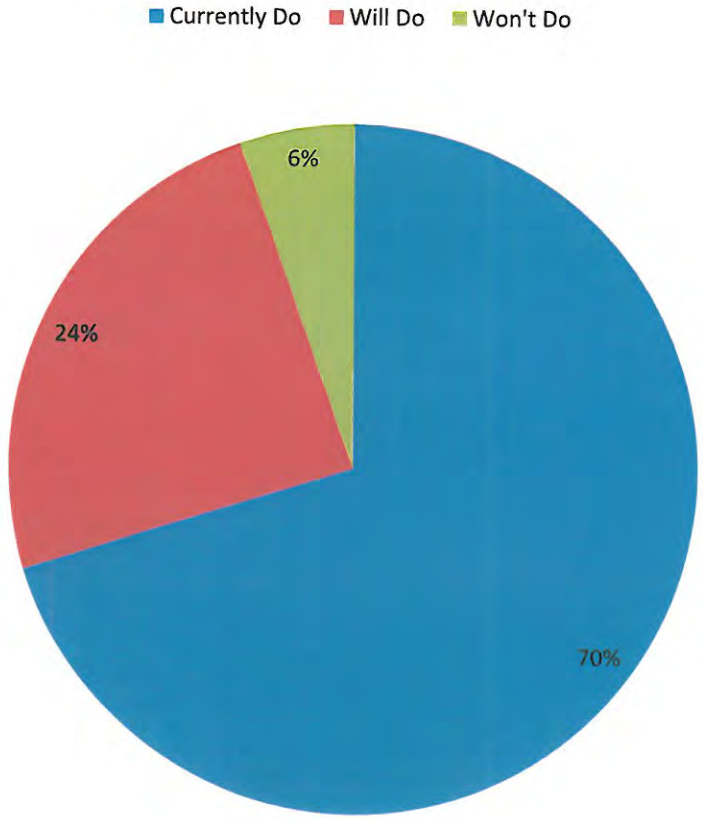
Would you be willing to fix oil leaks on cars or trucks to improve the quality of storm water runoff?

(74 total respondents)



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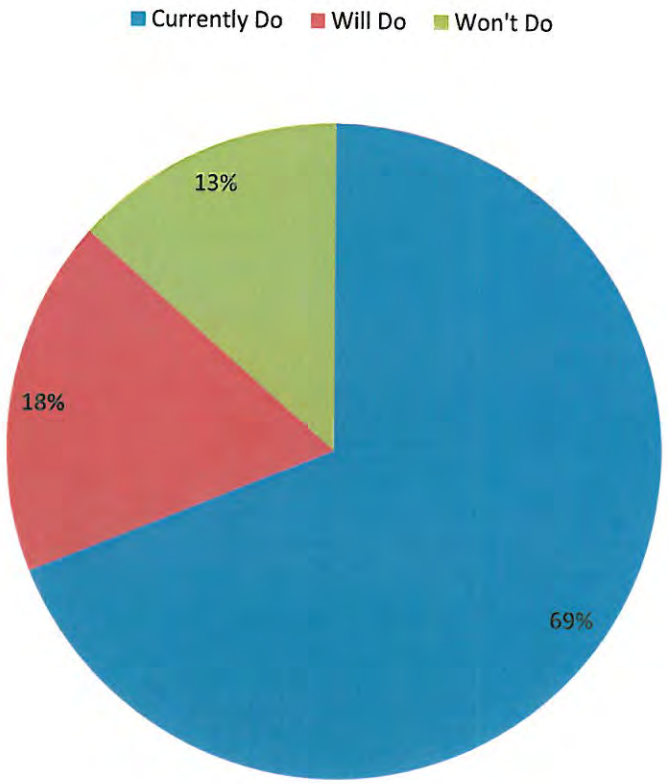
Would you be willing to wash your vehicle(s) at a full or self-service car wash to improve the quality of storm water runoff?

(74 total respondents)



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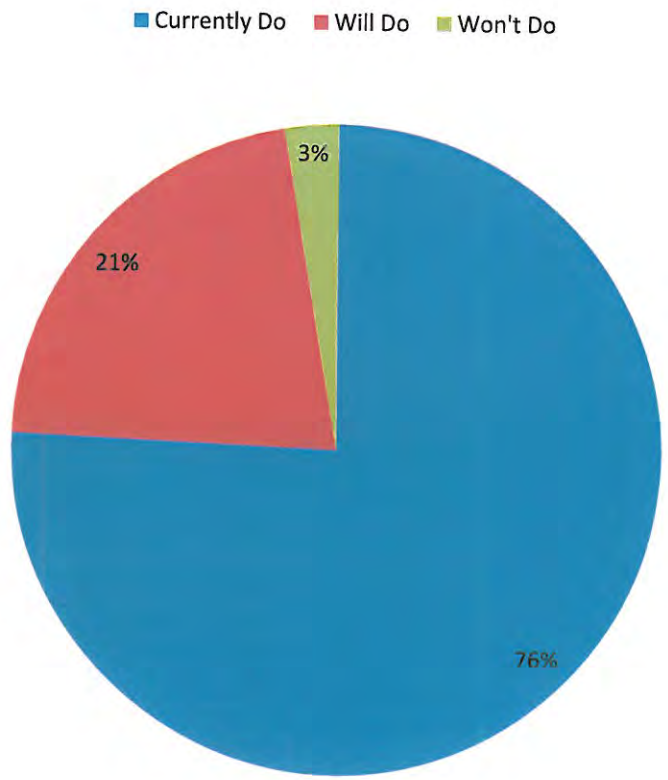
Would you be willing to dispose of household hazardous waste properly at a collection facility or during a recycling event to improve the quality of storm water runoff?

(74 total respondents)



Mid Rio Grande Stormwater Quality Team
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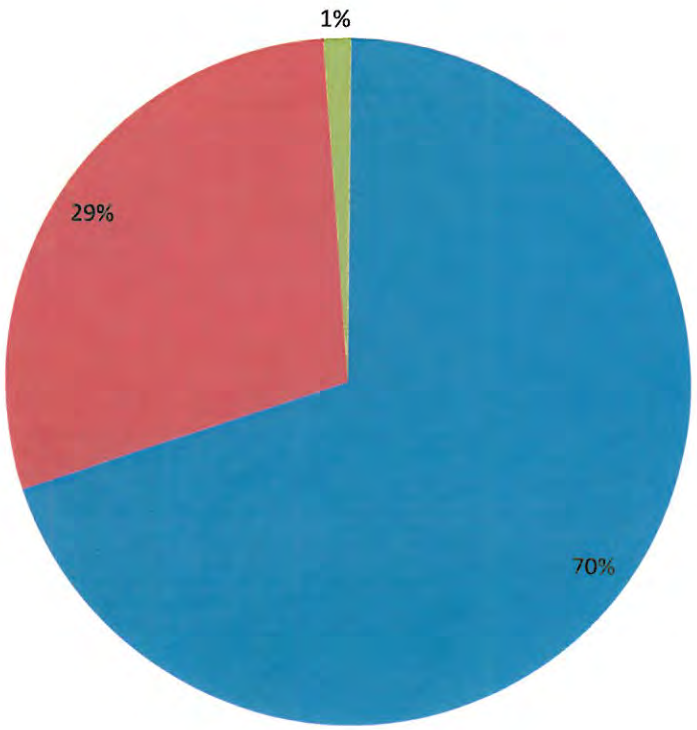
Would you be willing to keep chemicals and trash out of street gutters to improve the quality of storm water runoff?

(76 total respondents)



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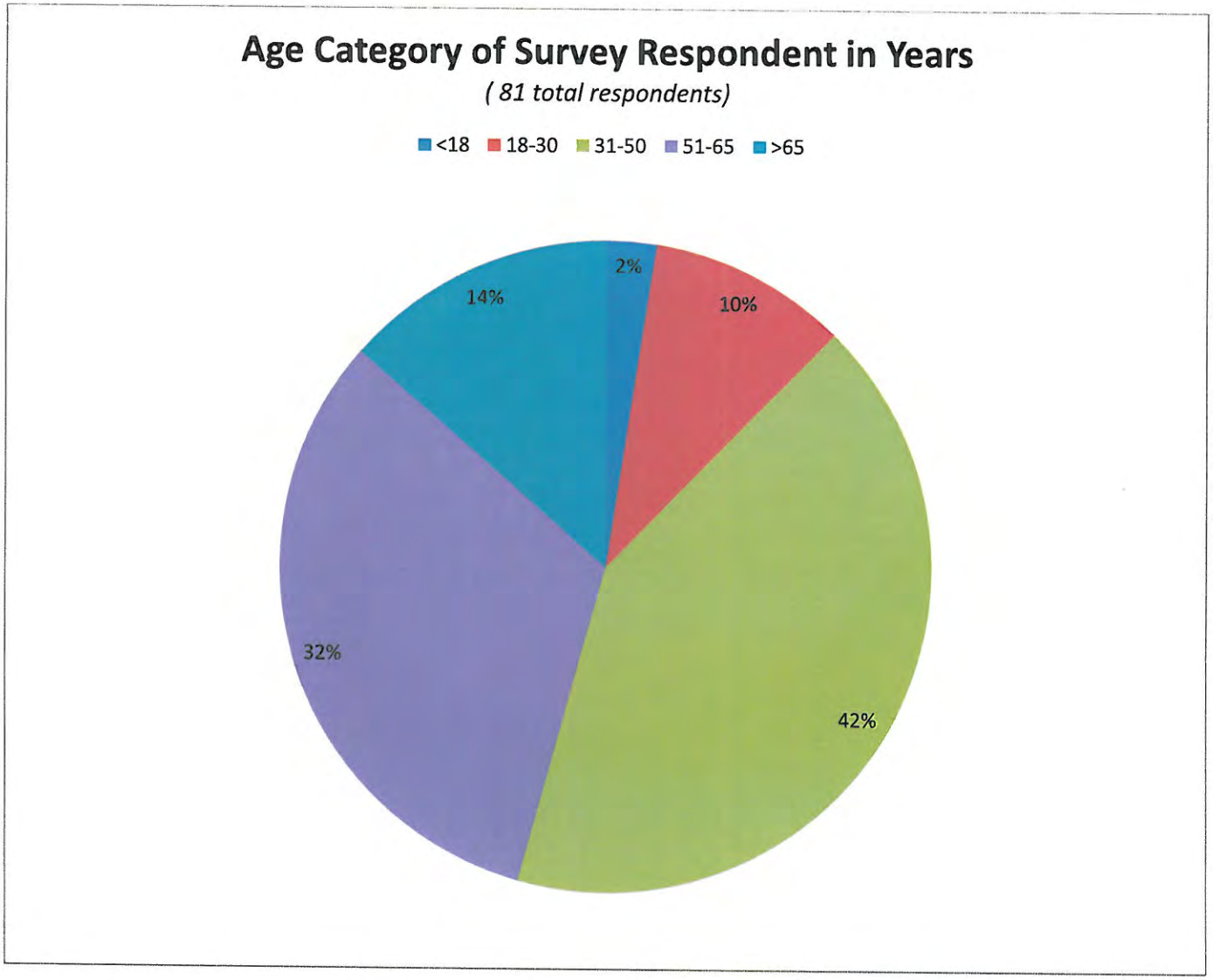

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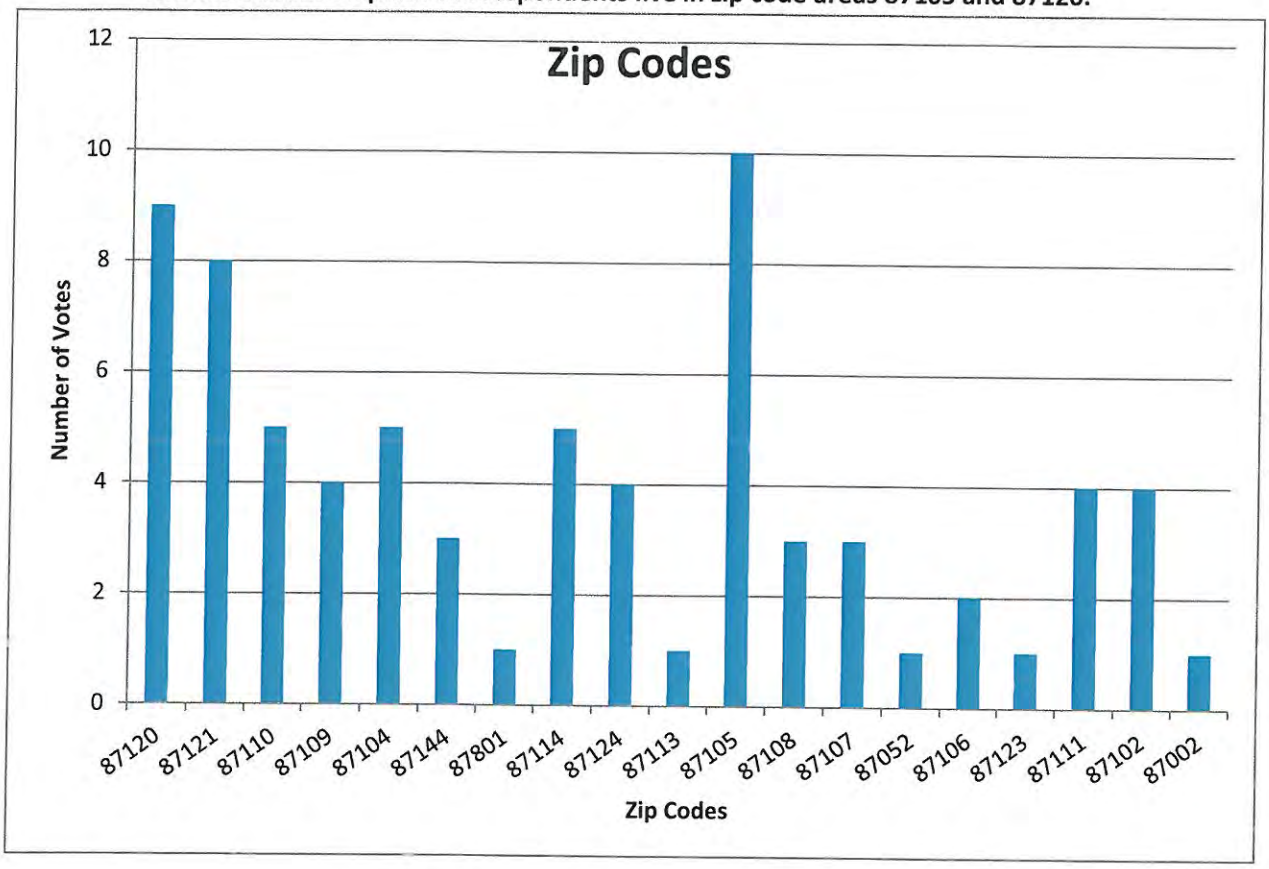
Comments

- *Water issues are high priority. (505) 399-9003*
- *Need more participation from everyone*
- *Authorize Rain Barrels in the city for gardens etc. reuse is good use.*
- *Thank you*
- *I feel that there should be more screens along the river to clear up trash and junk and also maybe an R.V. Park near Tingly and old town over-looking the river. Brown.Erc@gmail.com*
- *Thanks*
- *Thank you, our river is important*
- *Would like to see nothing running off into rivers, creek etc. in New Mexico*
- *Nice work*
- *Thanks for your work, still need more work on pet waste disposal in public spaces*
- *The river needs help from all*
- *I wouldn't be willing to pay any extra fees ever to the City of Rio Rancho thieves for water! For any reason*
- *Thanks for the recyclable cans*
- *I keep the earth clean all the time*

Add to mailing list

- *Mike Hamman- mikeh@mrgcd.us*
- *leoApodaca- 247-0234*
- *zilwyman@msn.com*
- *Eldon Nieto- Eldonnieto@gmail.com*
- *Kaddala13@gmail.com*

The most common place the respondents live in zip code areas 87105 and 87120.



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Appendix G – Photos from Central New Mexico College Source Control Public Outreach Event

SEMIANNUAL PROGRESS REPORT #2 – Urban Waters Small Grant 2014-16 "Neighborhood Environmental Trios: Engaging Youth in the Health of the Middle Rio Grande," Earth Force	**Grant Agreement No. UW-00F85901**
__July-December, due by 1/31; _X_ January –June , due by 7/31	
Work plan Deliverables Due this period • Convene partner forums each quarter • Participate in River Rally 2015 and Urban Waters Learning Network meetings • Support approximately 325 students in watershed inventories, conducting water quality monitoring at Valle de Oro National Wildlife Refuge, and creation of action projects addressing environmental issues • Use data management dashboard to measure results (Conduct evaluation)	**Grant Award** **$ 60,000.00** **Previous Drawdowns** **$11,545.30** **Drawdowns this Period** $20,033.84 **Balance** $28,420.86

Deliverables Completed this period and Associated Costs

- Partner forums were held on 1/14/15, 3/5/15, and 5/7/15, with USFWS, Amigos Bravos, Middle Rio Grande Urban Waters ambassador, City of Albuquerque, Friends of Valle de Oro NWR, and other refuge stakeholders
- Earth Force and project partners facilitated water quality testing, lesson planning, or in-school student activities 21 times during this 6-month period.
- Professional development workshop has been scheduled for 8/4/15, for at least 10 educators, representing 5 new schools currently being recruited for the 2015-16 school year
- Planning held for World Water Monitoring Day in October 2015, potentially in conjunction with EarthEcho International
- Support provided for 472 students from 5 Albuquerque Public Schools, including 12 lesson-planning visits with educators, 2 facilitated field trips to Valle de Oro, 5 self-organized water quality field trips, and 4 educational presentations by students
- Collecting project data to measure results, including environmental inventory data (mostly water quality) and qualitative formative evaluation data from educators and students

Earth Force encumbered $24,347.14 in the second 6 months of this project, including $10,200.34 in personnel and $14,146.80 in direct costs such as equipment and supply purchases, bus rentals, printing, and staff travel, as well as a $4,000 subgrant to Amigos Bravos. (This total includes June expenses which we not drawn-down by 6/30/15.)

Project Highlights this period:

Students developed and implemented impressive environmental action projects. Two schools in particular – Coronado Elementary and Truman Middle School – completed exemplary projects:

Coronado, a dual language school near Albuquerque's National Hispanic Cultural Center, paired a 1st grade classroom with a 5th grade classroom to study water quality at the bosque near the Hispanic Center and at Valle de Oro. The 1st graders made monthly visits to the Rio Grande and conducted water quality tests, giving their collected data to the 5th grade class. The older students took the data and used it as a seed for a year-long investigation into dog waste's role in urban water quality. Their long-term investigation tied all parts of their curriculum together, and included heavy lessons in science, literacy, art, technology, math, and social studies. They created multiple culminating student products: an Earth Day TV news spot on KOAT, a video explaining stormwater runoff, a PowerPoint presentation, dog treat carriers as a fund-raiser, and a presentation to City of Albuquerque officials explaining their finding and recommendations. Educators Lauren Gutierrez and Barbara Andreu

rose to the challenge this project presented, worked diligently, and exceeded expectations.

Truman Middle School, through the 120-student MESA (Math Science Engineering Achievement) enrichment program, conducted chemical, physical, and biological tests at their school and the refuge. Finding elevated phosphorus levels in their samples, they searched for and studied informational texts about phosphates. For their action project, they prepared a presentation about their study, and included tips about reducing phosphate pollution. It was presented at River Rally (May 2) and the MESA Awards Banquet and Parents Night (May 4). Educators/advisors Lynn Schuler and Jenny Duff guided this work and have both expressed excitement for continuing with Earth Force in the coming school year.

At Montessori of the Rio Grande and Lew Wallace Elementary, projects were planned and partially implemented. Montessori students learned about ecological restoration at the refuge. They took their learning back to their school campus, applying it to planting suggestions around a constructed wetland. Lew Wallace's 3rd-5th gifted students planned a May water festival, but were unable to host the event due to scheduling conflicts. No project resulted from our work at Ernie Pyle Middle School, though they did conduct inventorying activities.

Quarterly partner forums allow for coordination among the project team. Our January 14 discussion focused on river safety and resulted in a "Water Safety Policy" distributed to all of our schools. On March 5, representatives of organizations conducting educational activities and environmental research on the refuge met with community members, and shared progress reports in a round-robin. On May 7, a similar group convened; Earth Force facilitated a SWOT Analysis (Strengths-Weaknesses-Opportunities-Threats). A set of strategic suggestions for education at the refuge was captured.

As part of our project evaluation, we conducted a series of Most Significant Change Technique interviews. Stories from 5 educators and 6 students were captured. These interviews are the qualitative portion of our project's evaluation. We also began planning for administering our pre-/post-student surveys, which are the quantitative evaluation component.

After Albuquerque Public Schools released on May 22, we began summer work on three major tasks: qualitative evaluation analysis (transcribing interviews, pulling out themes, and documenting memorable stories for presenting to participants), activity guide revising (writing an environment history of the South Valley, selecting geographically and ecologically appropriate activities (including scanning macroinvertebrate data for a Middle Rio Grande specific biological index), and school recruitment.

We had an active six months sharing our project in professional circles. At River Rally (May 1-4 at Santa Ana Pueblo), we took part in Friday's Urban Waters Learning Network meetings, presented KIC-NET as part of "Youth Take Action: Three Creative Approaches to Youth Engagement" on Saturday, and had seven students and two educators from Truman Middle School present their project as a poster during the networking reception on Saturday evening. In February, a fact sheet about KIC-NET, "An Urban Waters Impact Story: A Model to Engage Youth," was published by the Urban Waters Learning Network. We had peer-reviewed presentations accepted for three upcoming conferences: Water Environment Federation Technical Exhibition and Conference (Sept. 30 in Chicago), North American Association for Environmental Education Annual Conference (Oct. 17 in San Diego), and American Water Resources Association Annual Conference (Nov. 19 in Denver). Finally, KIC-NET was accepted as an "Accomplished" program in Change the Equation's Colorado STEMworks database.

For our autumn World Water Monitoring Day event, we met with EarthEcho International (home organization for World Water Monitoring Challenge) about scheduling Phillippe Cousteau for an appearance. This remains tentative.

Problem Areas, Delays, or Areas of Concern for this period:

In response to feedback from teachers, we worked with our partners at Amigos Bravos, Valle de Oro National Wildlife Refuge, and the Friends of the Valle de Oro National Wildlife Refuge to modify project duties in Year 2, especially in interfacing with students. Julia Bernal, a Native

American Water Corps member who has been working at Valle de Oro for the last year, will have her term extended through the cooperation of the refuge, the Friends group, Amigos Bravos, Earth Force and Conservation Legacy/Environmental Stewards. With her environmental education experience, Julia will be the first choice for facilitating field work for students at the refuge. Christian LeJeune, Amigos Bravos Urban Waters coordinator, will focus on their project and other monitoring work, while remaining available to consult on student analysis and action projects.

Unresolved Problems, Delays, or Areas of Concern from the Previous Period

We continued to manage our budget, with the recognition that about $5,000 in additional funding for our Year 2 would allow us to meet all transportation and equipment needs. The Friends of Valle de Oro did earmark $5,000 for transportation to and from the refuge. We continue to discuss this with partners and to search for additional support.

Resolutions to Problems Previously Reported

The MOU between Earth Force and the City of Albuquerque was signed on March 10, 2015. It will be completed on October 31, 2015, with payment of $10,000 to be invoiced on the closing date. These City dollars serve as part of our project's match. In addition, we will work with partners, especially schools, to capture further match since many educators are putting many hours into this project.

Erika C. Rodriguez was hired as an Earth Force program coordinator in January 2015. She holds a BA from Lake Forest College in environmental studies, educational studies, sociology, and anthropology. Having administered an environmental leadership program for three years, she has experience in stream monitoring and environmental education, with both adults and youth. She joins Donny Roush and Genora Givens as Earth Force staff assigned to this project.

Activities Anticipated/Planned for Next Six Months and Budgeted Costs: We will hold a partner forum at the refuge on Aug. 3 and a full-day educator professional development workshop on Aug. 4. We will have the Albuquerque edition of the KIC-NET Activity Guide to distribute at this workshop. On Aug. 5, Donny Roush and Erika Rodriguez will participate in a New Mexico Museum of Natural History and Science educator workshop on the Bosque Education Guide. We will distribute copies of this extensive curricular resource and the KIC-NET guide to all project schools following the workshop.

Planning will continue for World Water Monitoring Day. Scheduling of field work/school visits to the refuge will be made through Valle de Oro AmeriCorps water educator Julia Bernal, whose term is being extended. Bus rentals will continue to be paid directly by Earth Force. During the school year, we will have five new schools to support, as well as student surveys and a May youth summit to organize. The summit will serve as a culminating and public demonstration of learning, with table top displays, student presentations, and an authentic audience of stakeholders.

I certify that this report is true and correct, project is on schedule except as noted, and funds are being utilized as planned and agreed to in the award document.

Signature of Project Official_____

Printed Name___**Donny Roush**_____

Date **7/23/15** **Title** ___**Director, KIC-NET Stormwater Partnerships**_____

Attachments:

1. **Coronado Elementary 5th grade presentation**
2. **Truman Middle School MESA presentation**
3. **Earth Force Water Safety Policy**

4. **May 7 partner forum minutes**
5. **Most Significant Change Technique interview guide**
6. **River Rally 2015 presentation**
7. **Urban Waters Learning Network fact sheet**
8. **Change the Equation acceptance letter and review summaries**
9. **Pierce Foundation letter**
10. **Erika Rodriguez resume**
11. **Amigos Bravos status report**
12. **EJSCREEN report on Albuquerque's South Valley**

Media links:

Friends of the Valle de Oro newsletter:
http://friendsofvalledeoro.wildapricot.org/Resources/Documents/Volume%202%20Issue%201%20January.pdf

Valle de Oro social media: https://www.facebook.com/ValleDeOroNationalWildlifeRefuge

Earth Force social media: https://www.facebook.com/EarthForceGREEN?fref=ts

http://earthforce.org/blog/kic-net-program-flourishes-in-and-out-of-the-water/

http://blog.yourwatercolorado.org/2015/02/19/colorado-water-education-pilot-project-expands-nationally/

"There's too much dog poop in the Rio Grande," April 22, 2015 – KOAT-TV News: https://youtu.be/lxrPHWFODs4

Appendix I – Samples of 2015 Albuquerque Bernalillo County Water Utility Authority FOG Campaign

Digital Outdoor Board 1

Digital Outdoor Board 2

Bill Insert

Appendix J – Samples of 2015 City of Rio Rancho FOG (Fats, Oils & Grease) Campaign

Outdoor Board

Print Ad in *Rio Rancho Observer*

2015-2016 Mid-Year Report

RiverXchange is an innovative outreach program that combines a year-long curriculum about stormwater, municipal water, and riparian habitat, with service-learning field trips and online class partnerships, giving New Mexico 5th grade teachers and students a broad understanding of how they can protect local water resources.

RiverXchange leverages relationships with a wide network of agencies to bring technical expertise directly to participants through classroom presentations, as well as field trips, which engage students in riparian restoration and water quality testing. This direct communication between water resource managers and young citizens encourages students to engage with these issues.

Long-term engagement with the topic from many different perspectives helps participants develop a more personal connection to their own river ecosystem. This sense of stewardship motivates and empowers students to conserve and protect water resources.

Writing to online pen pals reinforces knowledge by requiring them to explain concepts in their own words, and persuasive writing assignments help them develop critical thinking skills. Other creative projects, such as videos and shared photo documentation of their learning, demonstrate students' use of technology. Posting their projects, assessments and reflections about their experiences on their Kidblog site gives students a safe platform to share their knowledge and interests concerning critical water-resources issues not only with their partner class, but with all classes involved in RiverXchange.

The program is exciting for students, so there is an increased likelihood that they will influence their families, friends and other students by sharing their learning experiences, leading to behavior change in the larger community. Through participation in real environmental restoration projects and teaching others about watershed issues, we believe students will be inspired to put these skills to use outside of school and grow up to be environmentally responsible citizens.

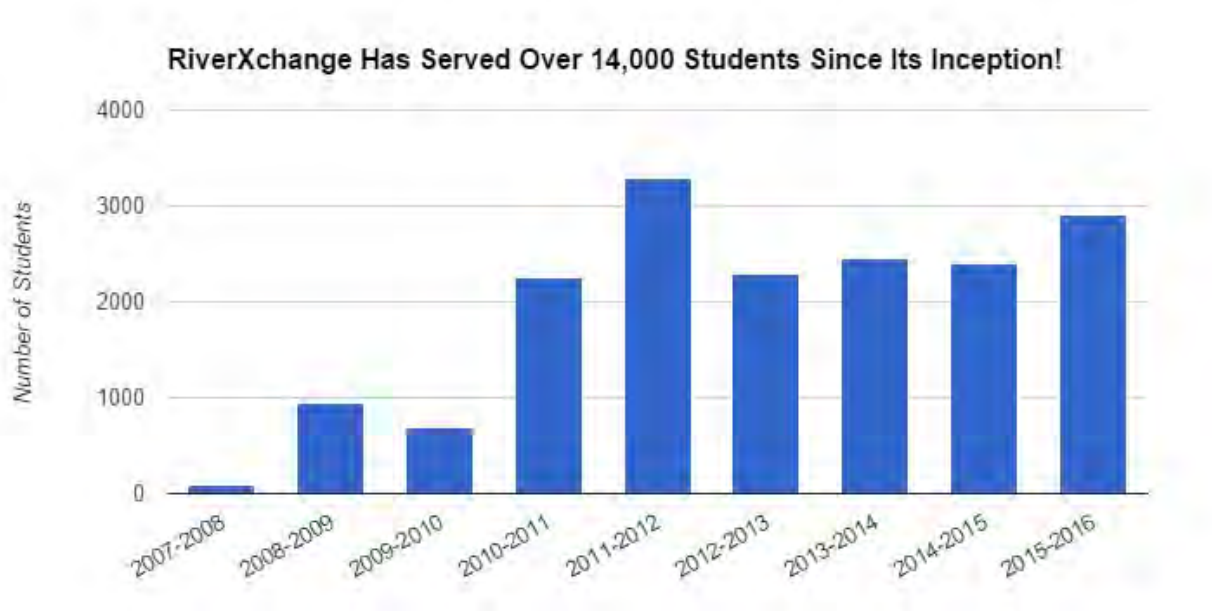
Program Highlights:

- 45 New Mexico classes, 1150 students
    - MRGSQT (30 classes – 750 students)
    - SSCAFCA (15 classes – 400 students)
    - NFWF - Field trips 30 classes for the year - 1,150 students total

      (16 classes completed to date, 400 students contributing 1,260 hours of riparian restoration)
        - Rolling River Presentations for 24 classes, 600 students
- 63 Partner classes, 1756 students
- Each student spends at least 25 hours engaged with the program over the course of the school year
- 184 hours of in-class presentations
- Guest presenters have contributed 120 hours delivering in-class programs
- 4,025 student-hours of riparian restoration
- We see evidence of critical thinking in students' writing and creative projects on each classroom's Kidblog
- Students completed Pre-Survey in September. Post-Survey will be completed in May and results will measure students' learning and assess specific behavior changes
- Teacher survey results will be compiled by May 31 and inform future program planning

The Numbers:

	Students	Classes
Albuquerque	686	27
Total Bernalillo County	**686**	**27**
Placitas	19	1
Rio Rancho	413	15
Unincorporated Sandoval County	32	2
Total Sandoval County	**464**	**18**
Total New Mexico	**1,150**	**45**
Partners	**1756**	**63**
Program Total	**2906**	108



Participating Schools:

Bernalillo County
Arroyo del Oso Elementary (3)
Bandelier Elementary (1)
Cochiti Elementary (2)
Edward Gonzales (6)
Georgia O'Keeffe (2)
Lew Wallace Elementary (1)
Los Ranchos Elementary (2)
Monte Vista Elementary (3)
Mountain View Elementary (2)
Osuna Elementary (3)
Zia Elementary (2)

Sandoval County
Cochiti Elementary & Middle School (2)
Colinas del Norte Elementary (3)
Maggie Cordova (2)
Martin Luther King Elementary (5)
Placitas Elementary (1)
Rio Rancho Elementary (5)

Upcoming Field Trips:

Please call Bonnie Schmader at 999-9679 for details and directions to the site.
All field trips are at the Shining River bosque access. Students arrive at 9:45am and leave at 1:00pm.

January 21 - Colinas del Norte Elementary
January 22 - Martin Luther King Jr. Elementary
January 29 - Georgia O'Keeffe Elementary
February 4 - Cochiti Pueblo Elementary
February 5 - Zia Elementary
February 10 - Los Ranchos Elementary
February 11 - Colinas del Norte
February 12 - Rio Rancho Elementary
February 18 - Rio Rancho Elementary
February 19 - Martin Luther King Jr. Elementary
March 3 - Martin Luther King Jr. Elementary
March 4 - Rio Rancho Elementary
May 11 - Cochiti Elementary (location is at Tingley Wetland)

What Students Are Saying:

(Albuquerque, NM)
From Soren and Aaliyah:

How can we protect our storm water? Well first, we could stop pollution from entering storm drains and flowing into rivers. Storm drains are those holes on the street. To prevent that horrible pollution, you can pick up after your pet and not litter your trash.

> *(Washington)*
> *-Dear Soren and Aaliyah*
> *Thanks for the video, it was great. i learned a lot about how polluted the water in the world is and how people suffer without fresh water. Also, I learned how terrible it is for the animals. Do you have any ideas to try to save water?-Vanshita*

> *(Washington)*
> *-From David and Hailey:*
> *It's important to protect storm water because it heads straight back to our rivers and lake and gets are water dirty so we can't use it and it kills the fishes and it hurts animals.*
> *We can protect are storm water by picking up our dogs poop, recycling, picking up trash, not pouring oils outside, and don't flush trash down the toilet.*

> *(ISRAEL)*
> *-Hi we are Lorenz and Johannes.I am Lorenz I like Harry Potter,ballet and math.I am Johannes I like soccer and my favorite animal is a rabbit. Who rolled around the wall in the video without talking? That machine that the boy used to speak is very interesting. How does it work? It gets very hot where you live. Does the river evaporate because it is so hot? We have that problem with the Dead Sea here.*

(New Mexico)
Hi, my name is Ella, just like the girl in your class. We have a lot in common Ella. My favorite color is green, blue, and black. My favorite subject is math, because I am really good at it and I am clumsy. Our river is the Rio Grande if you are wondering. The Rio Grande is one of the longest rivers in our country. Do you know anything about our river? And what is the C&O canal? Also, the Rio Grande is the 21st longest river in the world and the 5th longest in the North America.

> *(Maryland)*
> *-Hello Ella. My name is Ella as well. You are correct, we are a lot alike. The C&O Canal is a canal that closed down in 1924. It was supposed to go from the Chesapeake Bay to Ohio River but after many years they decided to stop working on it. A canal is like a street but with water and boats instead of cars and concrete.*

(Maryland)
-It cool that the Rio Grande is the 5th longest river in North America. The C&O canal is a canal that runs along close to the Potomac River. The C&O canal construction started in 1828. It took 22 years to build! The C&O canal flows in between Cumberland and Georgetown. Also the canal closed in 1924. Did you know? The C&O in C&O canal stand for Chesapeake and Ohio River. That's where the canal was supposed to reach but it took longer than expected. So it never reached that. -Lillia

(New Mexico)
Surface water gets polluted by us throwing trash the It goes to the river when it rains. When farmers use chemicals to kill insects off plants that goes to the ocean and kills the fish . When you throw old medicine on the toilet then you flush it goes into the water we drink. This doesn't help our watershed or the environment. -Juan

(Iowa)
Hi, my name is Jonathan. I go to Oelwein middle school. I am a 6th grader. We are the Oelwein Huskies. The closest major river we have is the Mississippi River. It is 2,320 miles long! it starts at Lake Itasca in northern Minnesota. It's watershed is the 4th largest in the world and the watershed includes all or parts of 31 states and 2 Canadian Provinces. It covers 1.2 million square miles and 40% of the lower 48 states. Just a few facts about the mighty Mississippi. Sincerely, Jonathan

(Maryland)
-Hi i'm back to tell you more! we have three rivers. The Susquehanna River it is 464 miles long. it passes through New York, Pennsylvania,and Maryland-7 million people live on or near it. It provides HALF of the fresh water Inflow.The James river 348 Miles long and 8 major dams along its coast. The Potomac is near Washington DC and has over million people using it for water every day! -Breonna W.

(New Mexico)
Dear Pen Pal,
My name is Alissah. I live in the Rio Grande watershed.I learned that you should never throw plastic water bottles in a watershed,because they can flow into the ocean.A watershed can also be known as natures kidneys, or a strainer ,because it flows down lower land.I also learned it is a recreational area.Sincerely ,Alissah

(New Mexico)
Dear friend,

My name is Ari. I learned about EROSION! If your wondering what that is, I can tell you. Erosion is when there's a rock or land and it might snow at night and, melt in the day and then and then the rock breaks down. That happens because when the snow melts it turns to water and dissolves the rock down to be thinner and look different the next day. A good and easy way to stop/slow down erosion is by vegetation! Vegetation is when planting trees, bushes, vines and lots of other plants. The plants help slow down erosion it. would be pretty cool to watch happen step by step (it would be pretty cool and tiring). This is what I learned about erosion. -Ari

(New Mexico)
Hello my name is Vash and me and my group are going to tell you what a watershed is. I like the Rio Grande because it is really the only source of natural water around! A water shed is all the land that leads the water into our river

(Connecticut)
-Hi Vash my name is Kevin R our river is called the Housatonic River we have different trees than you they are called desidguous trees. I am sorry if I spelled desidguous wrong. My favorite song is Watch Me Whip. What is yours I would like to know! -Kevin

-Hey Kevin I was just learning about the deciduous forest and actually we do have deciduous trees even though were a desert deciduous trees are trees that lose there leaves and our rainfall stays and goes it soaks into the permeable surface like dirt,planters,annnnd gravel!!The impermeable surface is concrete sorry if i spell anything wrong all the extra rainfall goes to our storm drains!
My favorite song is We are the champions by queen. -Vash

(New Mexico)
Hello my name is Paco, and I live in New Mexico. We have been doing our river-x project. A watershed is when land feeds water into a body of water such as rivers, lakes, seas, and oceans. The name of our river is the Rio Grande. The journey our river takes is it starts in the Rocky Mountains and ends in the Gulf of Mexico, and travels over 2000 miles. The Rio Grand goes through Texas, Colorado, and New Mexico. Our river is muddy in some places, big in some places, and small in some places. We get 5-10 inches of rain every year, but we have got a lot of rain this year. The end of summer and the beginning of fall is our monsoon season. Sincerely, Paco

> *(Connecticut)*
> *-Many greetings from Redding, CT. We are a New England State and we are in the North East part of the United States. Redding is a rural community for our area and there is a lot of open land. The water that we use and drink comes from underground wells. We are close to the Atlantic Ocean but we are only a few miles form the Long Island Sound. All the water in our area flows to Long Island Sound. We need it to stay clean because we swim and fish in that water. Here in Redding we have four watershed areas in our town. The biggest river is the Saugatuck River. We want to learn how we can help keep our water clean. -Christina*

(CAMBODIA)
Hello! My name is Sreyneang. You can called SO.
I love to play sport and listen to music and audio. Also I like to make a quote when I doing something.

Have you seen my watershed or learned anythings. Here is the cool think about us, we are living on one of the river name Basic that has divided from Mekong river (a big flow river). Also there is current problem like trash, sewage, industrial pollution, over fishing and the building of dam. In the future, I will try to solve this issue. Who want to work with me?

> *(New Mexico)*
> *-We have the same problems. I also want to help rivers some day! To be able to help all the animals that need the water and be able to save all these fish and let them survive. Our river was pretty much destroyed by humans! At first our river was called the Rio Bravo, which means brave river, (Rio means river and Bravo means brave) it was full of life and there was a big amazing curving river! Until humans came and made it Rio Manso, and made it strait, killed animals and destroyed almost all the nature. Now we are trying to make it a better place, but humans are still destroying it with pollutants. Did you know we actually find bath tubs in our river! Comment back soon.-Maddoz*

(CAMBODIA)

Sou Sdey! My name is Thiny. I am from Cambodia. I like English writing and my friends also said I am good at it. Cambodia's watershed is the Mekong River. Every time I go to my hometown, I cross the Mekong River using a ferry. This is what our ferry looks like.

Hello everyone! My name is Sythong I am 13 years old. I like fashion. I learn at Liger Learning Cener and I would like to share with you some information about Mekong River about. Mekong River flow through many countries such as China, Myanmar, Thailand, Laos, Cambodia, and Vietnam.In most of the countries Mekong is their water source. In cambodia 80% of the protein in their diet is from the fish from the Mekong River. The farmer in Vietnam use water from Mekong River and 50% of the water is used for iriigation. Mekong River few many names. The Chiness call it "Lancang Jiang" which means "Unstable River". Thai and Lao call it "Mae Nam Kong" which means "Mother Water". Vietnamess call it "Cuu Long" which means "New Deagons". The name Mekong means "The mother of water"

> *(New Mexico)*
> *-Were having a water drought our self's so we Shure could use some of your water. In NEW MEXICO we also have a trash problem, where people are too lazy to pick up there dogs poop and the rain washes up the dog poop into the rivers and lakes polluting the water. Also for some odd reason people dump their old beds and bath tubs in the river even though that they know there's a dump!!! P.S I like the picture # :)*

(New Mexico)
Nicole and Steve were talking about the commercial uses of the river. They talked about the 4 H program, the 4 h's stand for head, hands, heart, and health. They talked about different ways that people water different type of crops. The first way they talked about was flooding, flooding is where you just flood your crop with water at lot of times you might see people flooding Chile crops that use a lot of water. Another way that Nicole and Steve talked about is the sprinkler that is when water gets mist at the plants to grow a lot of times sprinklers are set up to spray for the time as needed. The last way to water crops is the drip system that is where a tube runs along a tree with a hole to allow the water to come out but not a lot of water comes out because plants that use a drip system most-likely those plants don't use a lot of water. I would have to say that the drip system uses a lot less water than the flood. -Lexi

2015-2016 Stormwater Science Education Outreach Numbers

Storm WS classroom presentation	
Study Trips	
Storm WS field activities	
Other Storm WS science related events	

Elementary School	
Middle School	
High School	

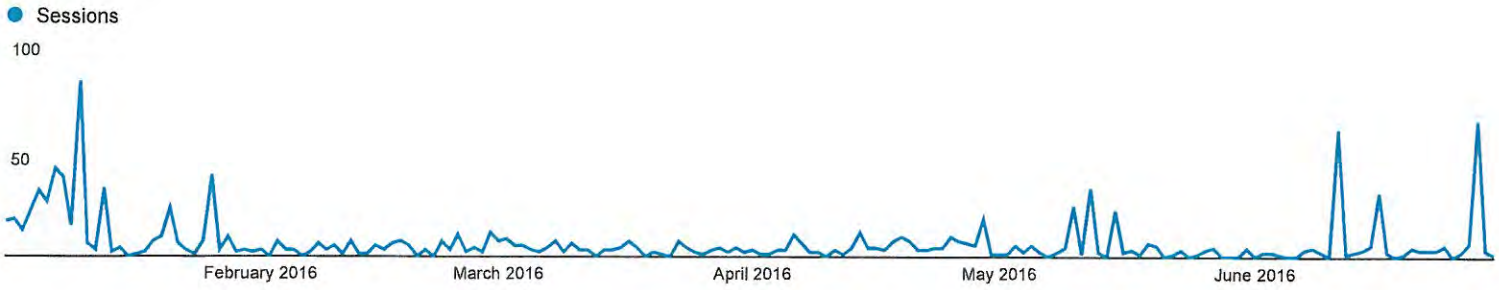
Date	Teacher	School	City	# students classroom	# students in Field	# adults	Grade	Activity	# Presentations	Hours	School Level
9/8/2015	Sylvia Meyers	Chamiza Elementary	Albuqerque	22		1	4th	Classroom	1	1.5	ES
9/8/2015	Janis Hirsh	Chamiza Elementary	Albuqerque	24		1	4th	Classroom	1	1.5	ES
9/28/2015	Janis Hirsh	Chamiza Elementary	Albuqerque		24	5	4th	study trip	1	4	ES
10/6/2015	Rona Gomez/Colleen	Madison Middle School	Albuqerque	172		4	7th-8th	Classroom	6	6	MS
10/13/2015	Rona Gomez	Madison Middle School	Albuqerque		30	4	8th	study trip	1	4	MS
11/3/2015	Sylvia Meyers	Chamiza Elementary	Albuqerque		22	4	8th	study trip	1	4	ES
12/1/2015	Ms. Summerbell	Martin Luther King Elementary	Rio Rancho	24		1	4th	Classroom	1	1	ES
12/1/2015	Ms. Council	Martin Luther King Elementary	Rio Rancho	20			4th	Classroom	1	1	ES
12/1/2015	Ms. Thompson	Martin Luther King Elementary	Rio Rancho	20			4th	Classroom	1	1	ES
12/1/2015	Mr. Pearson	Martin Luther King Elementary	Rio Rancho	20			4th	Classroom	1	1	ES
12/1/2015	Ms. Dengler/Kits	Martin Luther King Elementary	Rio Rancho	27			4th	Classroom	1	1	ES
12/8/2015	Kari Daniels	Bosque School	Albuqerque	16		1	7th	Classroom	1	1.5	MS
12/8/2015	Ms. Salaz	Martin Luther King Elementary	Rio Rancho	22		1	4th	Classroom	1	1	ES
12/8/2015	Beth Northness	Martin Luther King Elementary	Rio Rancho	21		1	4th	Classroom	1	1	ES
12/10/2015	Kari Daniels	Bosque School	Albuqerque	15		1	7th	Classroom	1	1.5	MS
12/14/2015	Kari Daniels	Bosque School	Albuqerque	16		1	7th	Classroom	1	1.5	MS
12/15/2015	Cathy Bailey	Bosque School	Albuqerque	17		1	7th	Classroom	1	1.5	MS
Total #'s				436	76	26			22	34	

Audience Overview

Jan 1, 2016 - Jun 30, 2016

All Users
100.00% Sessions

Overview



Sessions
1,152

Users
1,015

Pageviews
1,843

Pages / Session
1.60

Avg. Session Duration
00:01:09

Bounce Rate
77.43%

% New Sessions
87.15%

	Language	Sessions	% Sessions
1.	en-us	589	51.13%
2.	(not set)	401	34.81%
3.	ru	109	9.46%
4.	ru-ru	38	3.30%
5.	pt-br	4	0.35%
6.	c	2	0.17%
7.	en	2	0.17%
8.	de-de	1	0.09%
9.	en-gb	1	0.09%
10.	es-ar	1	0.09%

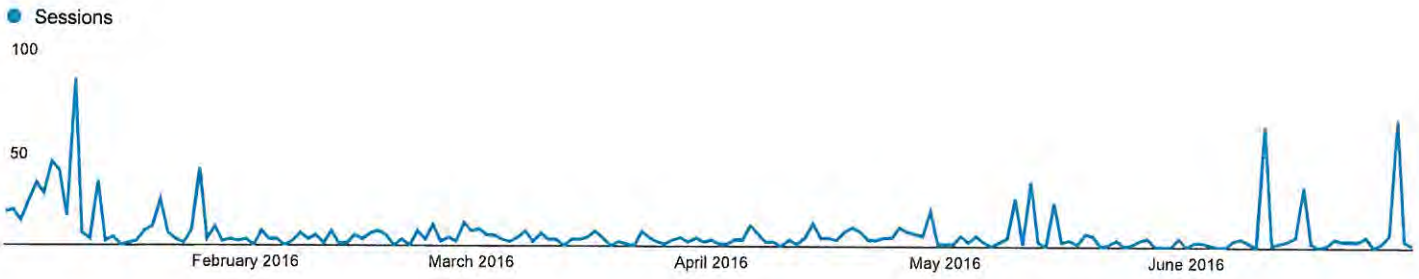
Browser & OS

Jan 1, 2016 - Jun 30, 2016

All Users
100.00% Sessions

Explorer

Summary



	Browser	Acquisition			Behavior			Conversions		
		Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration	Goal Conversion Rate	Goal Completions	Goal Value
		1,152 % of Total: 100.00% (1,152)	87.15% Avg for View: 87.15% (0.00%)	1,004 % of Total: 100.00% (1,004)	77.43% Avg for View: 77.43% (0.00%)	1.60 Avg for View: 1.60 (0.00%)	00:01:09 Avg for View: 00:01:09 (0.00%)	0.00% Avg for View: 0.00% (0.00%)	0 % of Total: 0.00% (0)	$0.00 % of Total: 0.00% ($0.00)
1.	Chrome	725 (62.93%)	90.48%	656 (65.34%)	84.83%	1.38	00:00:36	0.00%	0 (0.00%)	$0.00 (0.00%)
2.	Internet Explorer	131 (11.37%)	80.15%	105 (10.46%)	53.44%	2.16	00:02:19	0.00%	0 (0.00%)	$0.00 (0.00%)
3.	Firefox	110 (9.55%)	77.27%	85 (8.47%)	53.64%	2.75	00:03:49	0.00%	0 (0.00%)	$0.00 (0.00%)
4.	Safari	107 (9.29%)	80.37%	86 (8.57%)	68.22%	1.61	00:01:29	0.00%	0 (0.00%)	$0.00 (0.00%)
5.	YaBrowser	26 (2.26%)	100.00%	26 (2.59%)	100.00%	1.00	00:00:00	0.00%	0 (0.00%)	$0.00 (0.00%)
6.	Opera	25 (2.17%)	76.00%	19 (1.89%)	96.00%	1.08	00:00:03	0.00%	0 (0.00%)	$0.00 (0.00%)
7.	Mozilla Compatible Agent	13 (1.13%)	100.00%	13 (1.29%)	100.00%	1.00	00:00:00	0.00%	0 (0.00%)	$0.00 (0.00%)
8.	Edge	5 (0.43%)	100.00%	5 (0.50%)	80.00%	1.60	00:00:08	0.00%	0 (0.00%)	$0.00 (0.00%)
9.	Mozilla	4 (0.35%)	100.00%	4 (0.40%)	100.00%	1.00	00:00:00	0.00%	0 (0.00%)	$0.00 (0.00%)
10.	Android Browser	3 (0.26%)	100.00%	3 (0.30%)	66.67%	1.00	00:00:05	0.00%	0 (0.00%)	$0.00 (0.00%)
11.	Safari (in-app)	2 (0.17%)	50.00%	1 (0.10%)	50.00%	1.50	00:00:08	0.00%	0 (0.00%)	$0.00 (0.00%)
12.	semanticbot	1 (0.09%)	100.00%	1 (0.10%)	100.00%	1.00	00:00:00	0.00%	0 (0.00%)	$0.00 (0.00%)

Rows 1 - 12 of 12

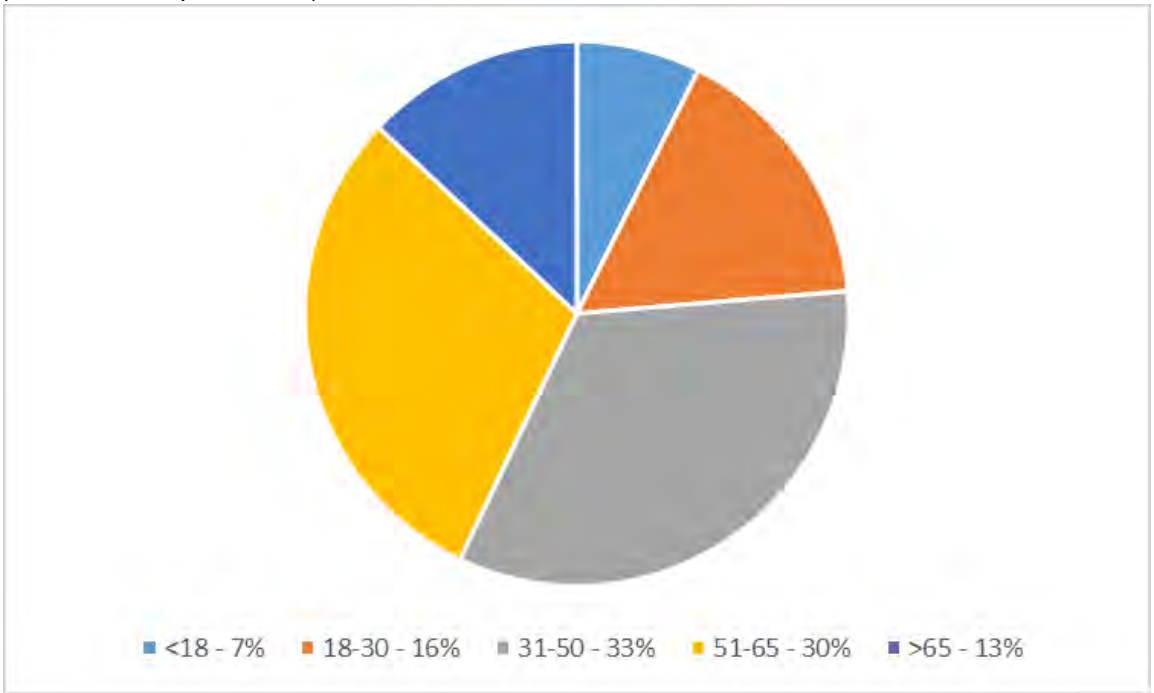
Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Survey Results

On January 23 and 24, 2016, members of the Mid Rio Grande Stormwater Quality Team staffed a booth at the 2016 KOB TV Health & Wellness Fair. A total of 515 attendees filled out surveys. The following are the results.

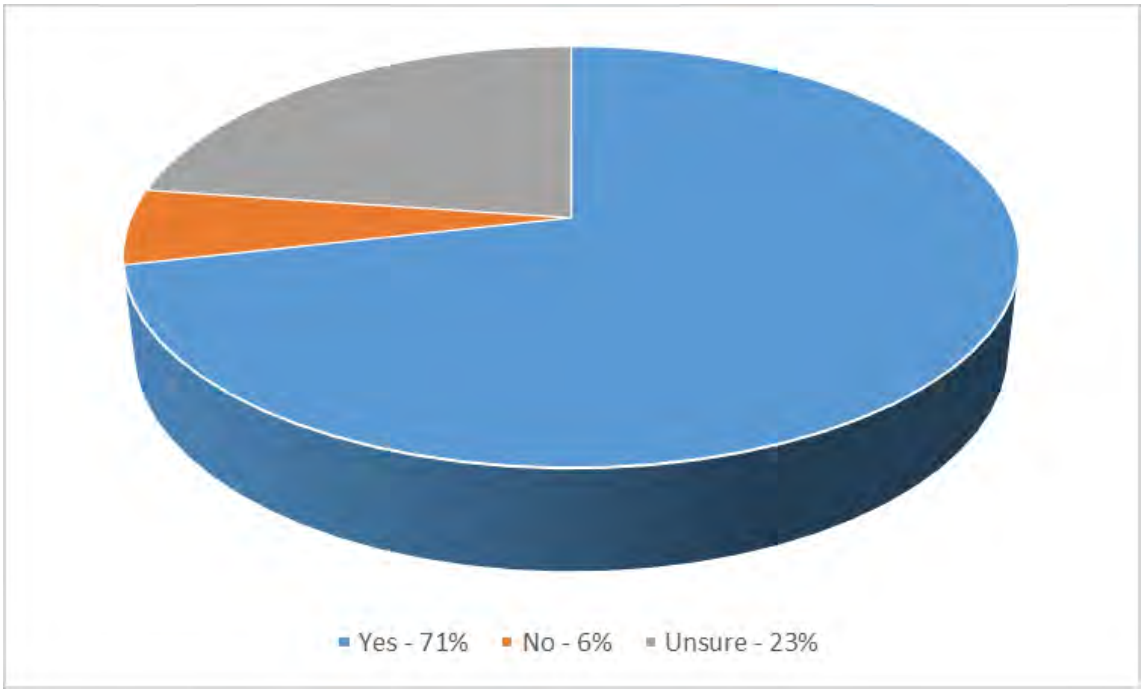
Age Category of Survey Respondents in Years

(515 total respondents)

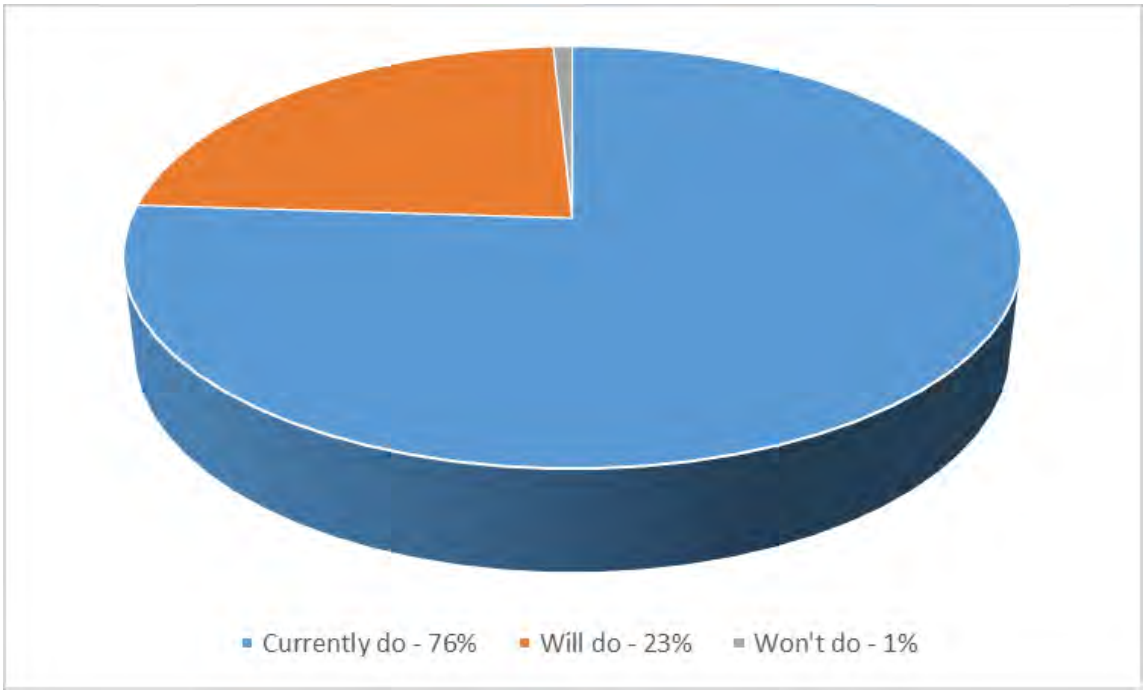


Do you think that stormwater runoff affects the quality of water in the Rio Grande?

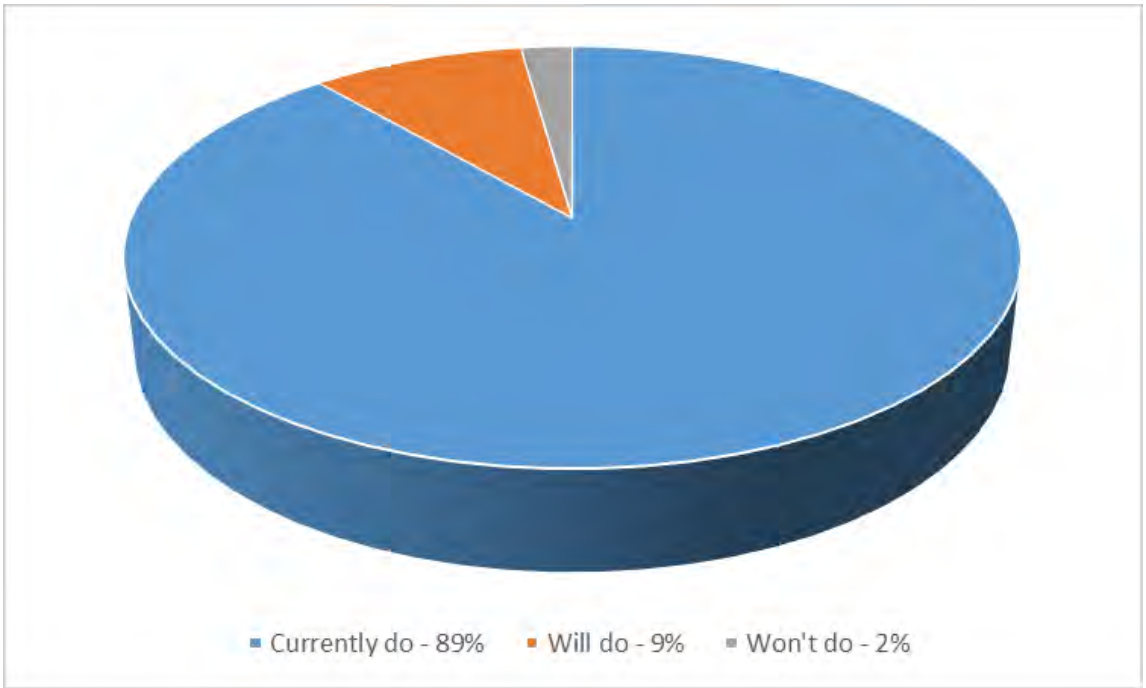
(483 total respondents)



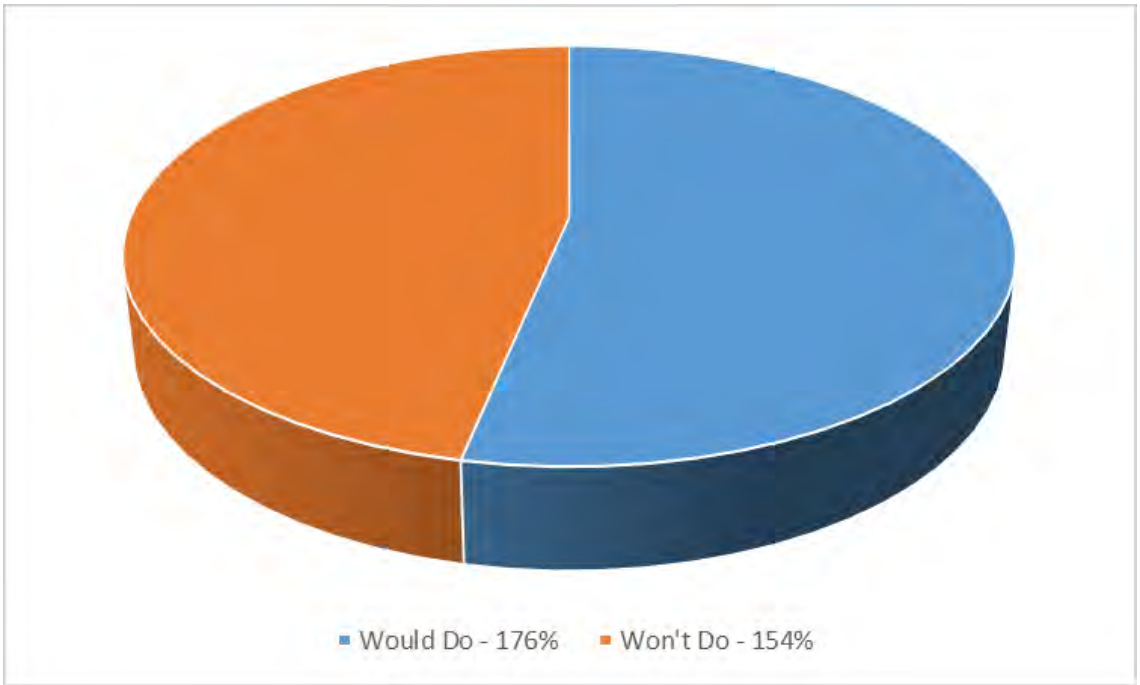
Would you be willing to pick up after your dog/pet and dispose of waste in the trash to improve the quality of stormwater runoff?
(367 total respondents)



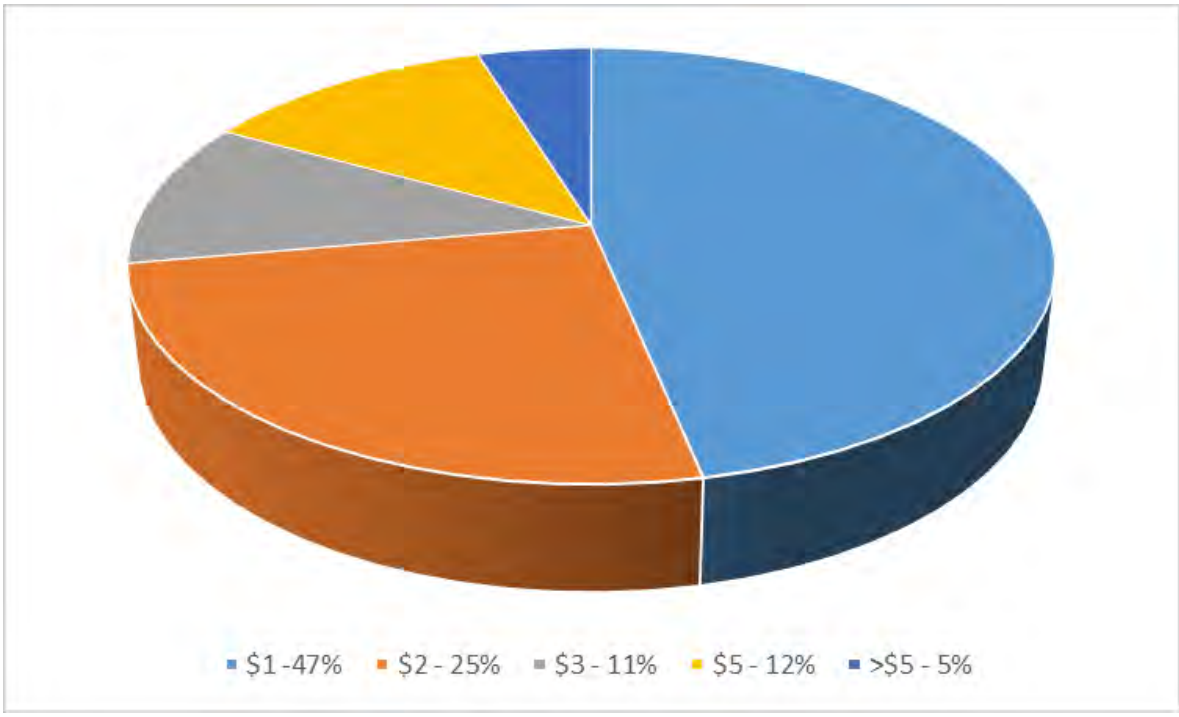
Would you be willing to reduce, resue and recycle trash to improve the quality of stormwater runoff?
(317 total respondents)



Would you be willing to pay an additional minor monthly fee on your water bill to improve the quality of stormwater runoff?
*(571 responses)**

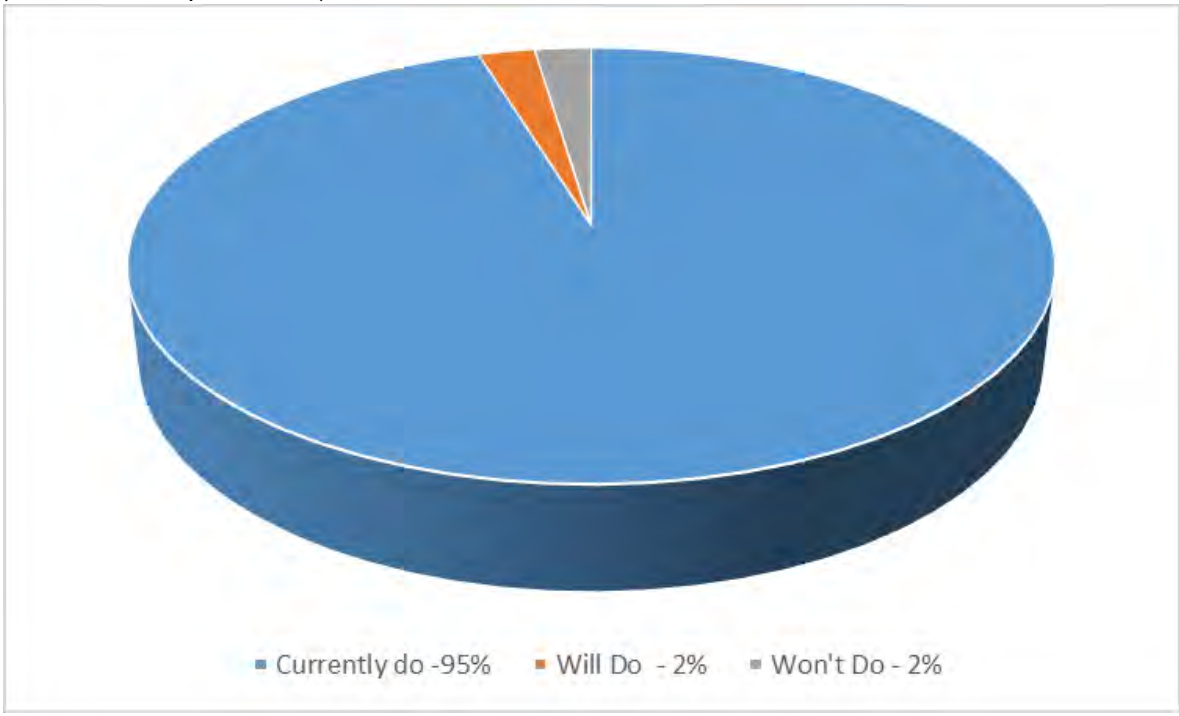


If you answered "would do," how much would you be willing to pay?
(295 total respondents)



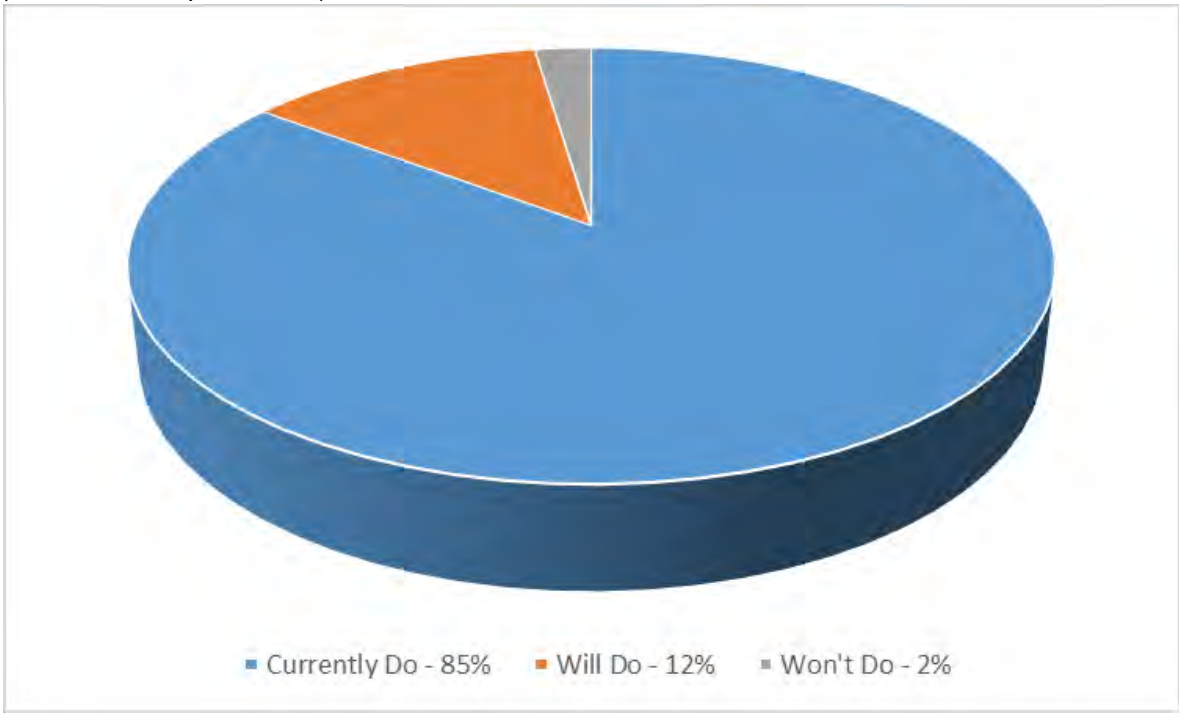
Would you be willing to reduce use of toxic chemicals to improve the quality of storm water runoff?

(255 total respondents)



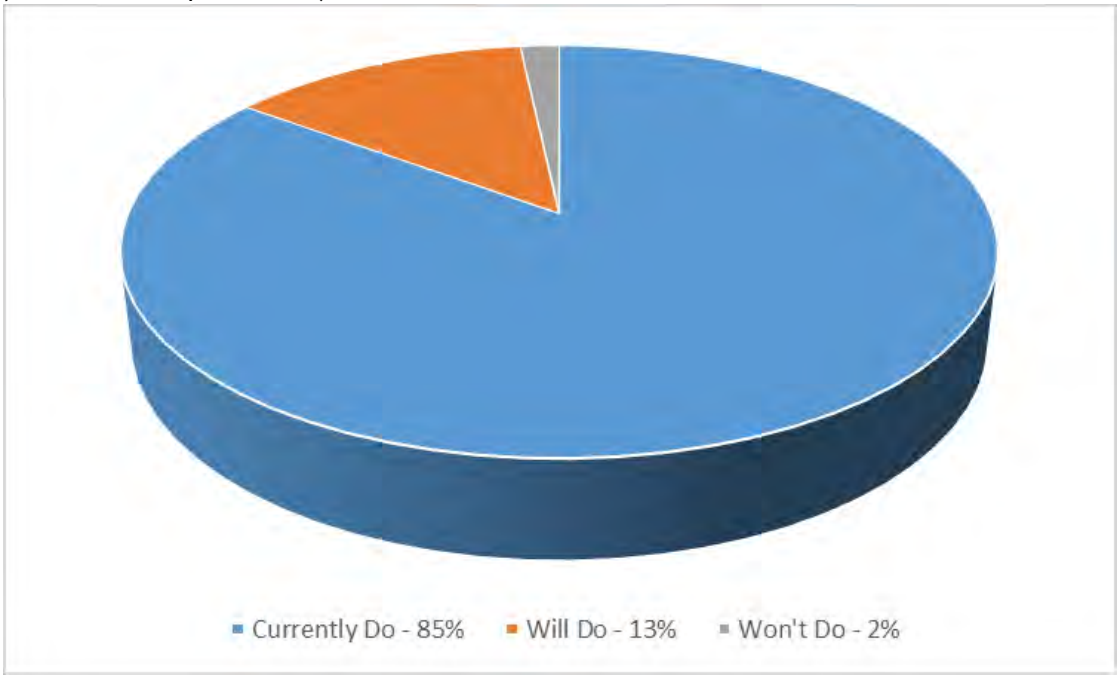
Would you be willing to fix oil leaks on cars or trucks to improve the quality of stormwater runoff?

(298 total respondents)



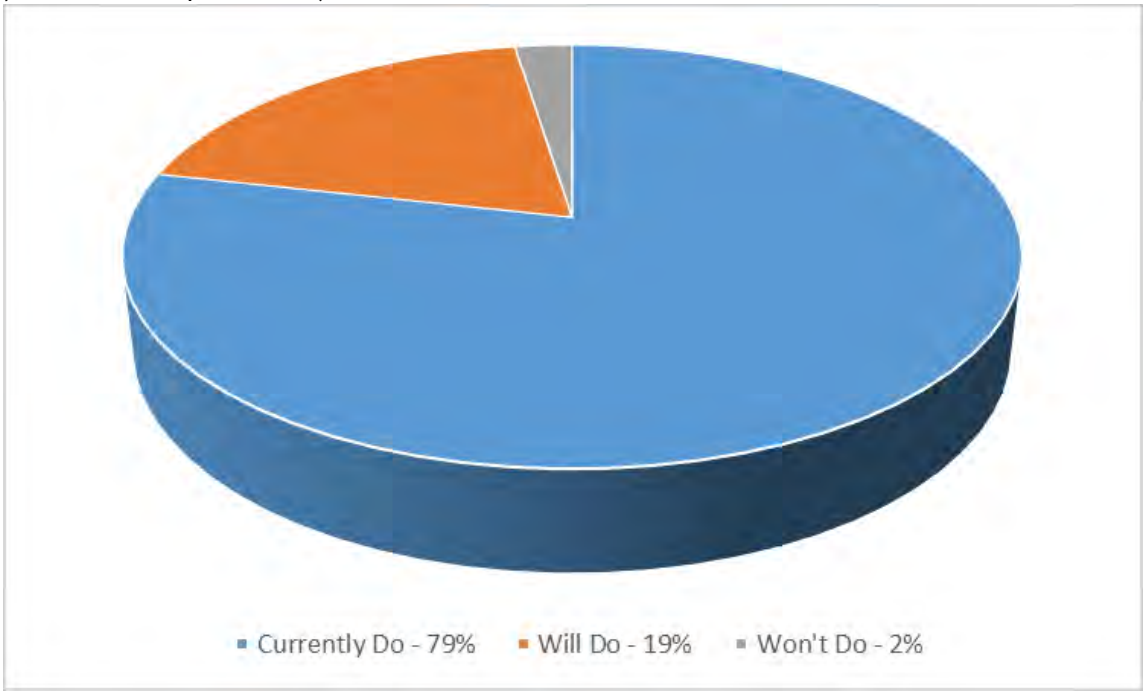
Would you be willing to wash your vehicle(s) at a full or self-service car wash to improve the quality of stormwater runoff?

(409 total respondents)



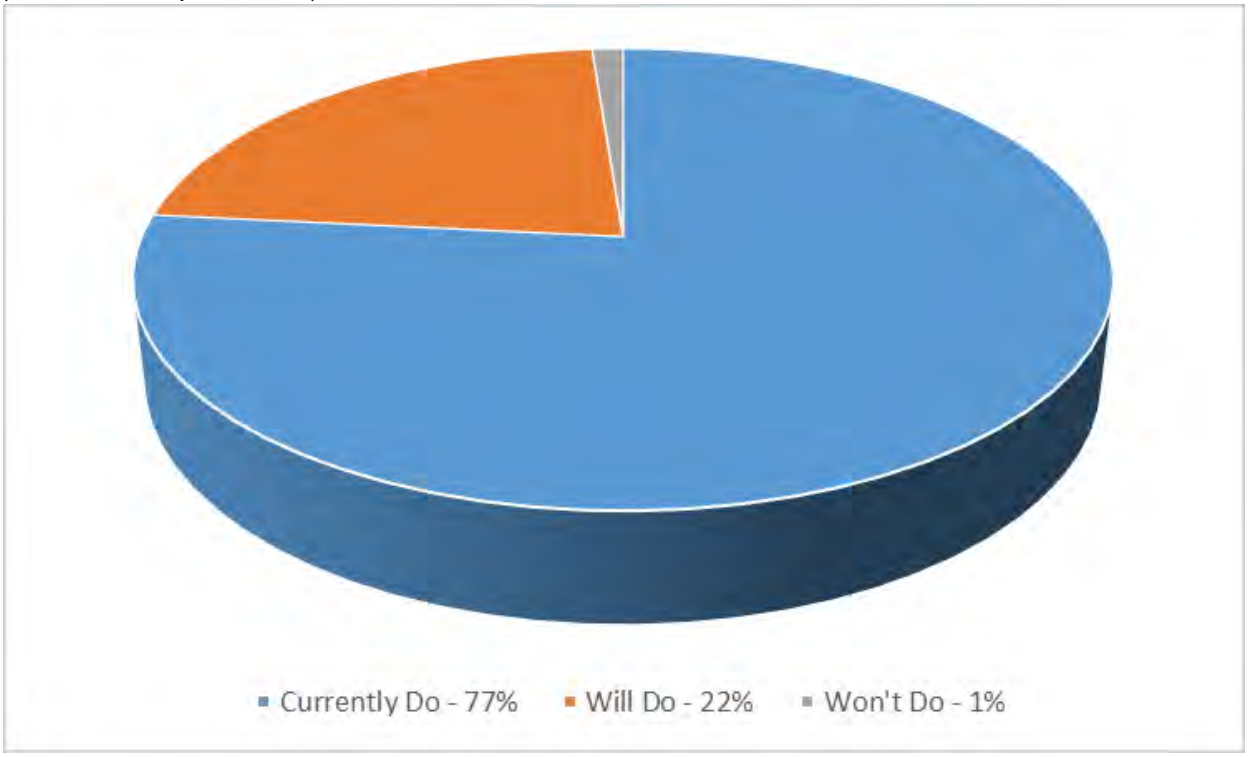
Would you be willing to dispose of household hazardous waste properly at a collection facility or during a recycling event to improve the quality of stormwater runoff?

(326 total respondents)



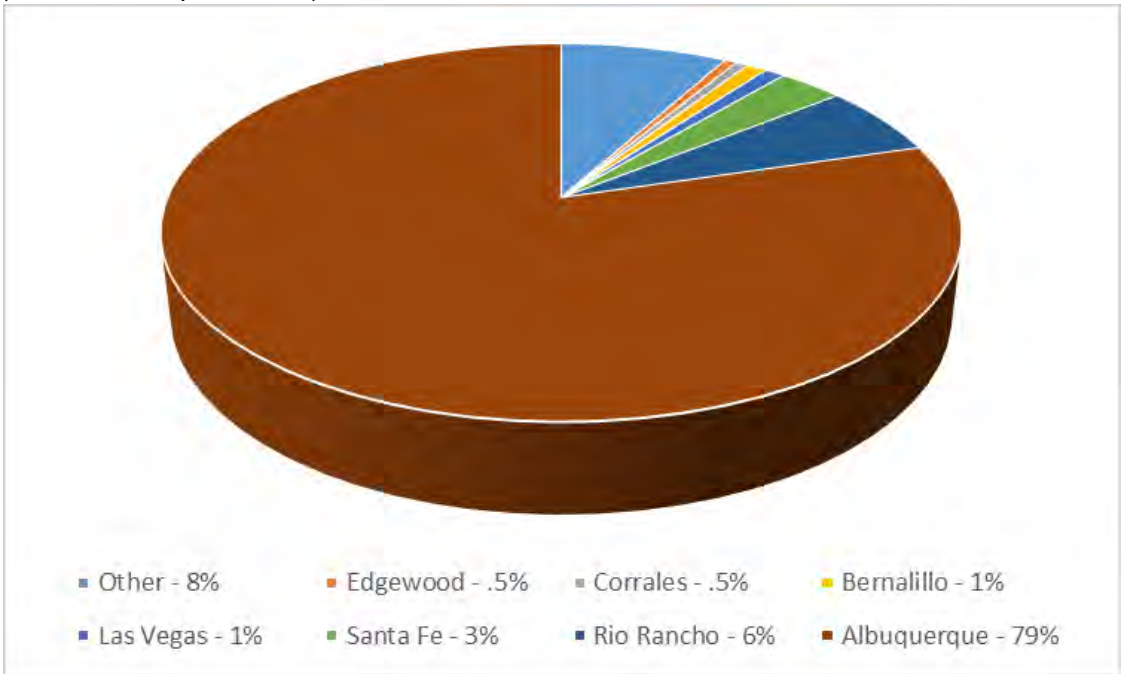
Would you be willing to keep chemicals and trash out of street gutters to improve the quality of stormwater runoff?

(491 total respondents)



Zip Code Distribution of Respondents

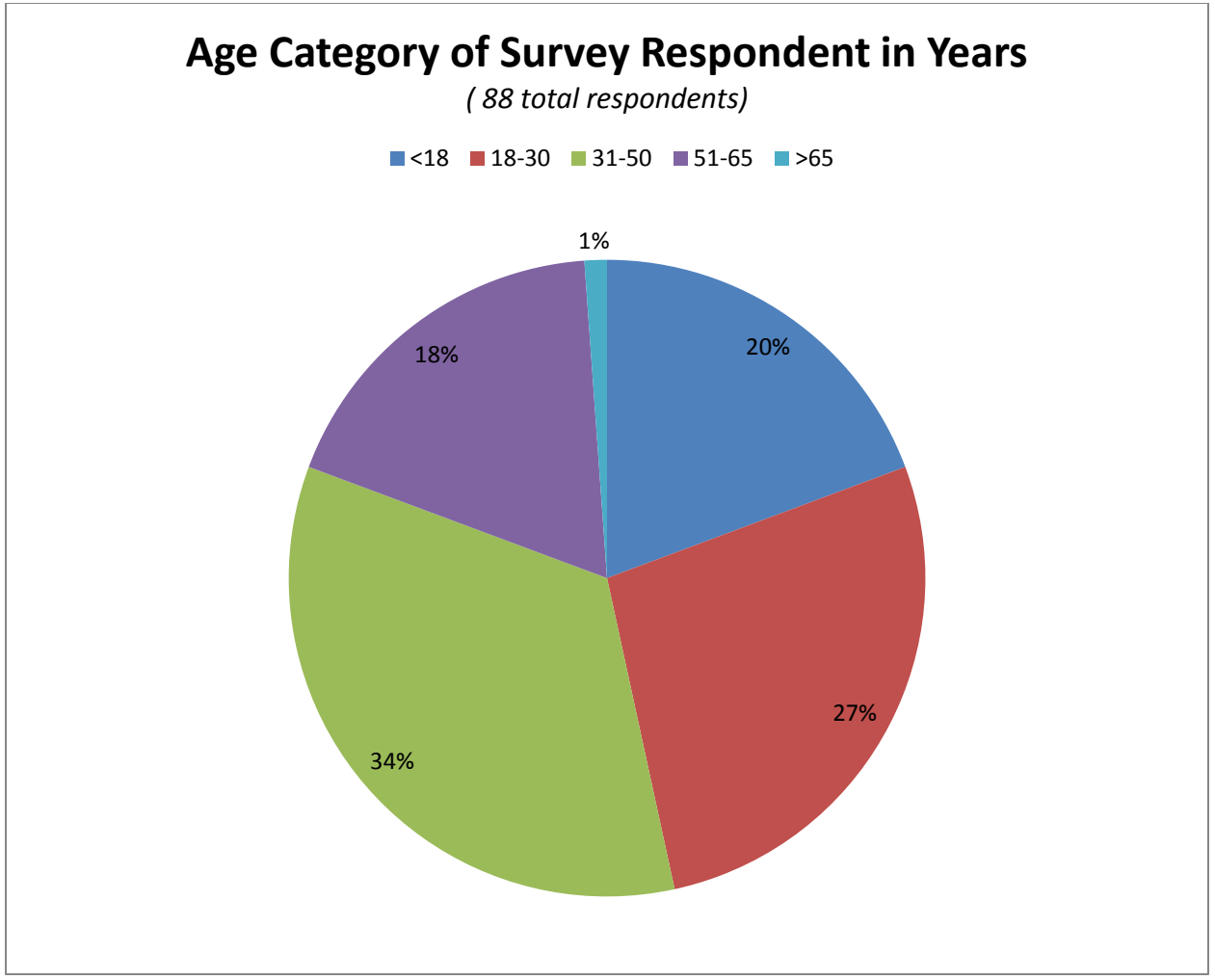
(515 total respondents)



**Based on the tabulation, some respondents apparently filled out more than one survey.*

Survey Results

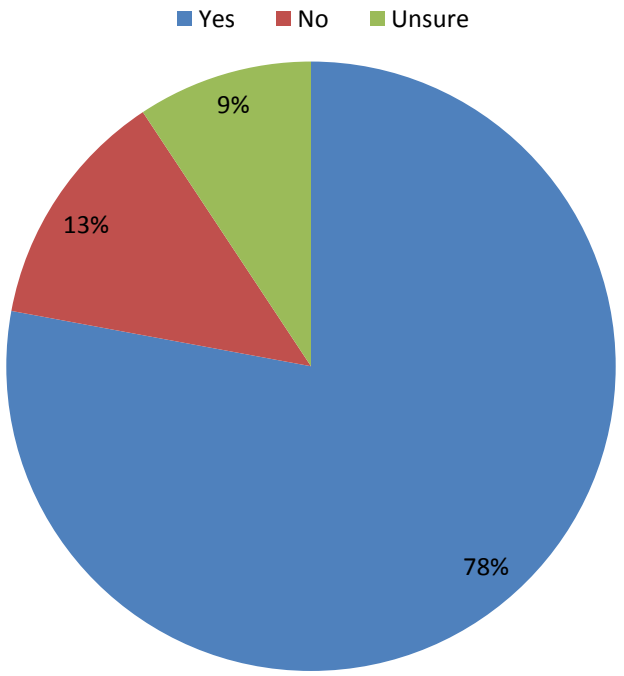
The Middle Rio Grande Storm Team conducted a short survey about the water quality of the Rio Grande on May 21, 2016. This survey took place at the 2016 Valle de Oro EJ Day. There were a total of 88 people that participated. The following are the results of the survey.



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Do you think that storm water runoff affects the quality of water in the Rio Grande?

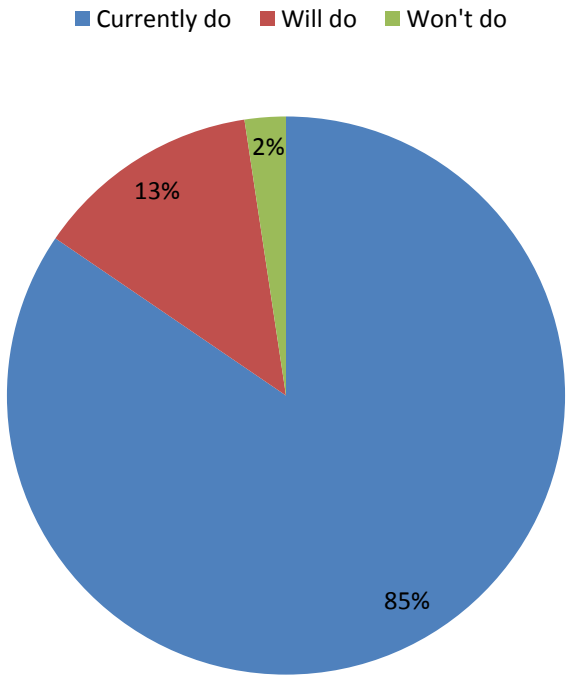
(86 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to pick up after your dog/pet and dispose of waste in the trash to improve the quality of storm water runoff?

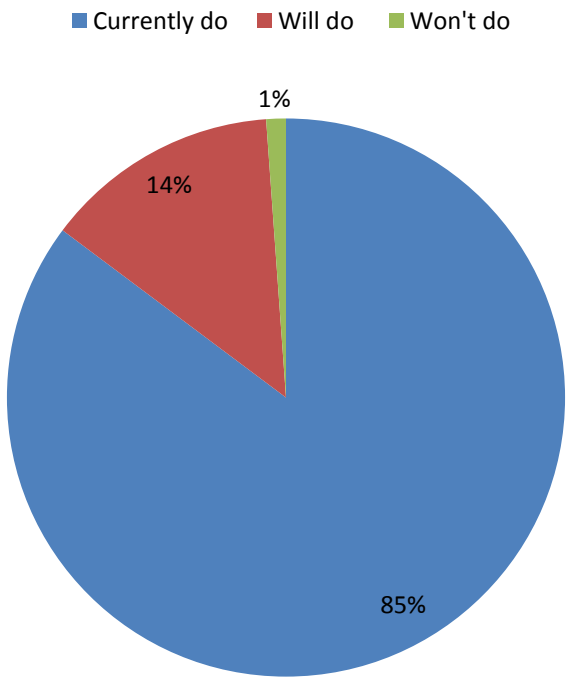
(84 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to reduce, reuse and recycle trash to improve the quality of storm water runoff?

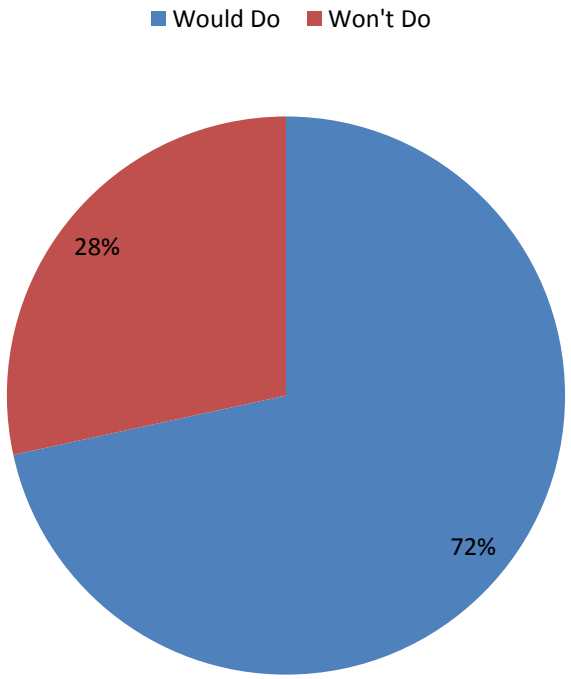
(88 total respondents)



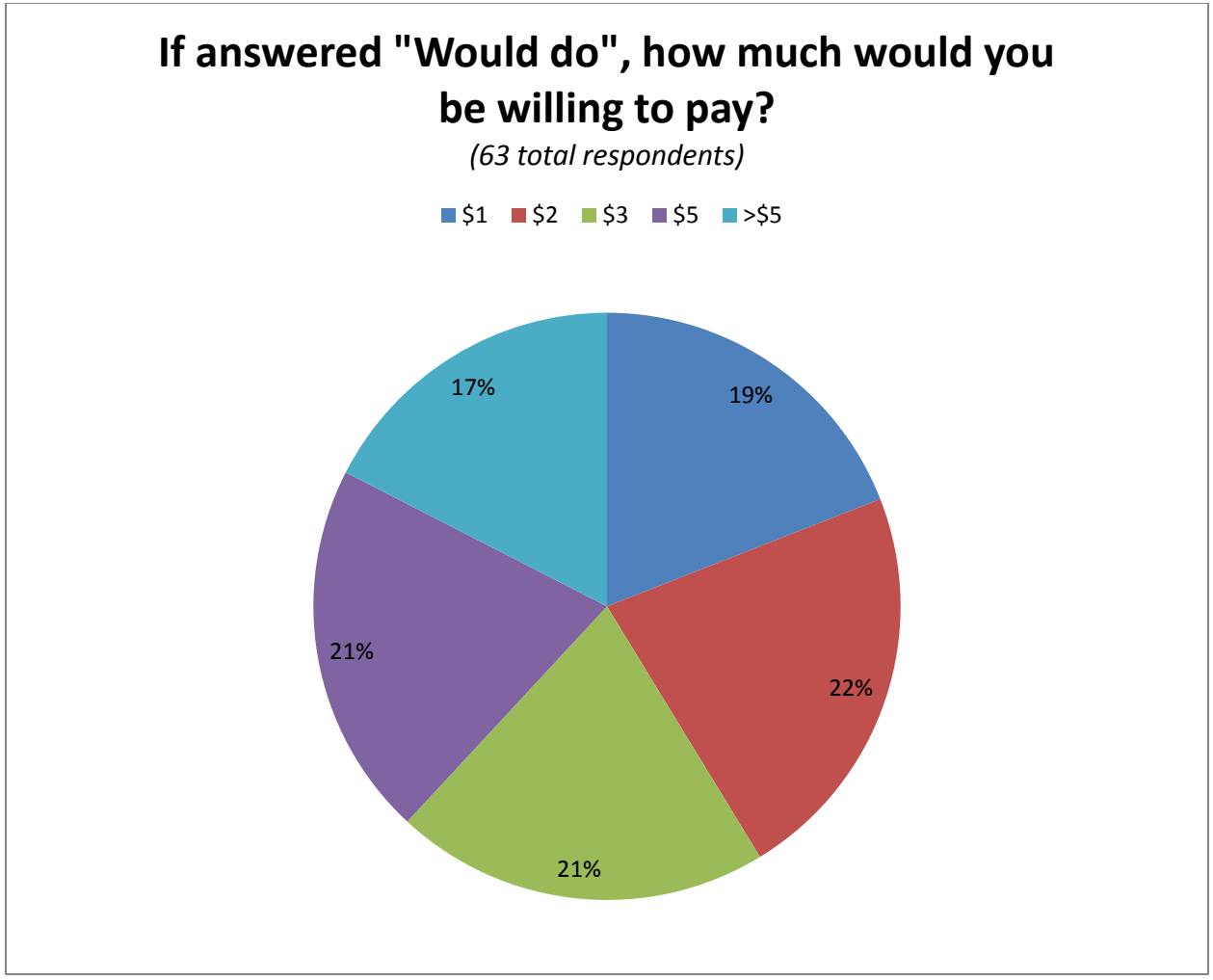
Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to pay an additional minor monthly fee on your water bill to improve the quality of storm water runoff?

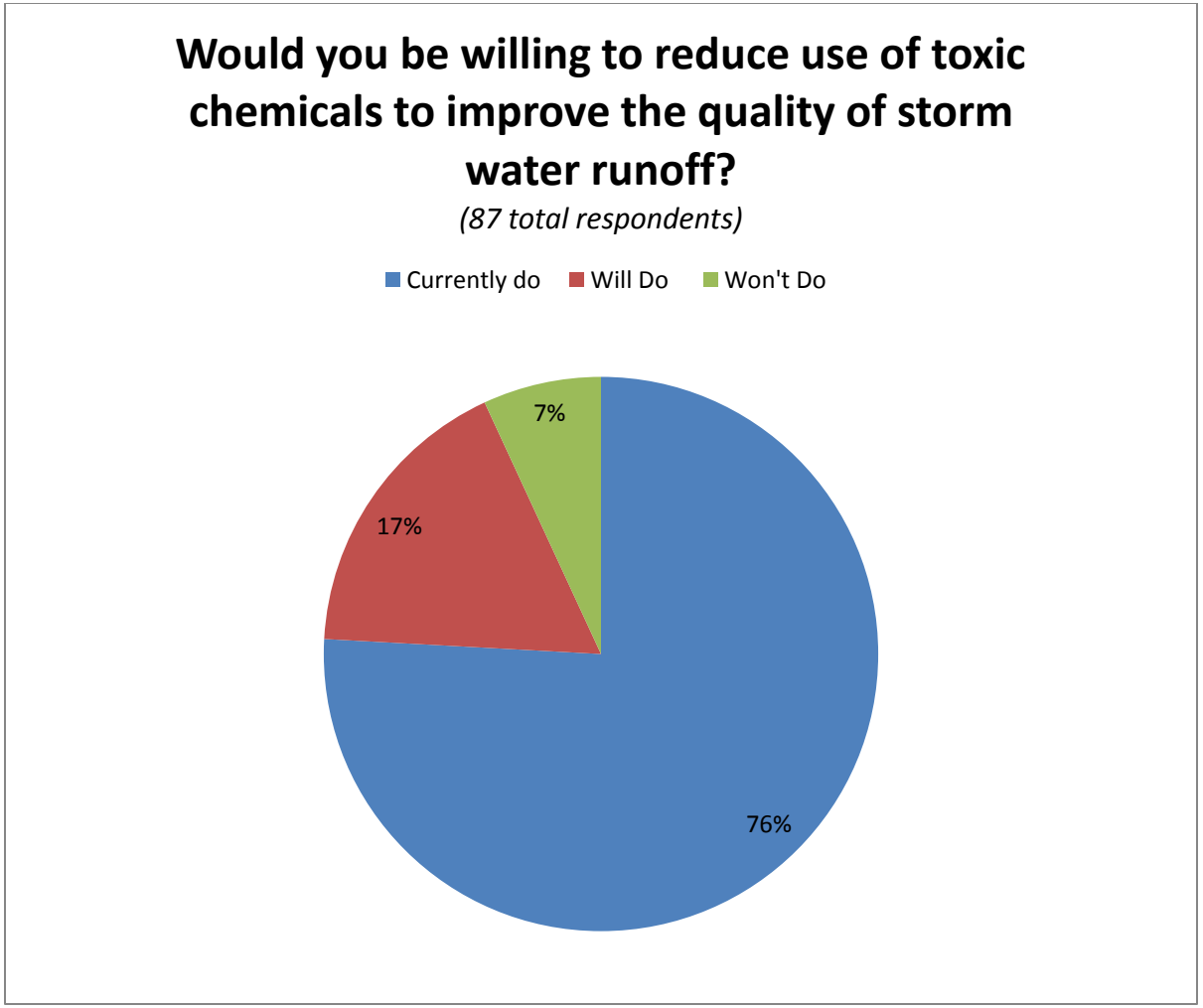
(88 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org



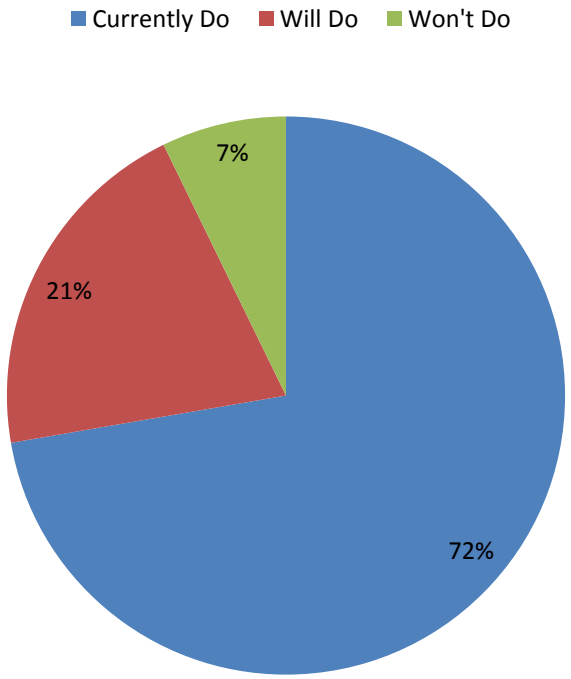
Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to fix oil leaks on cars or trucks to improve the quality of storm water runoff?

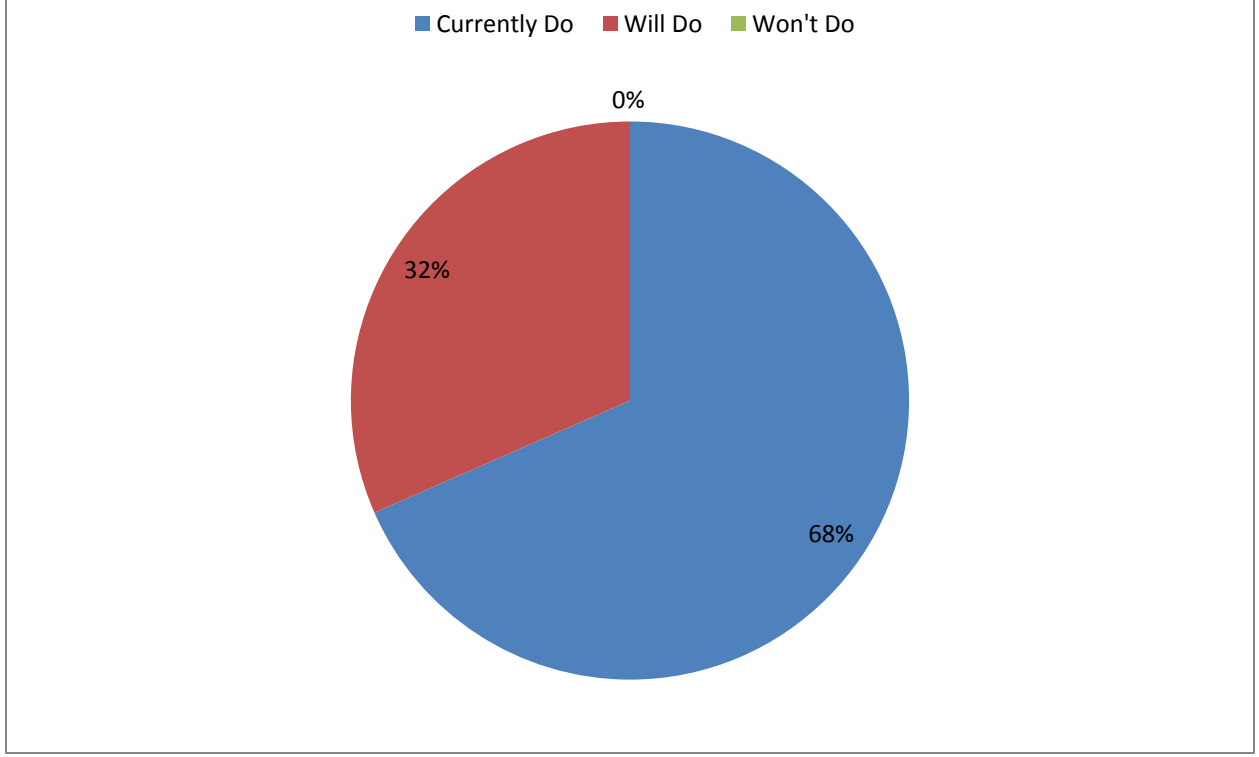
(83 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to wash your vehicle(s) at a full or self-service car wash to improve the quality of storm water runoff?

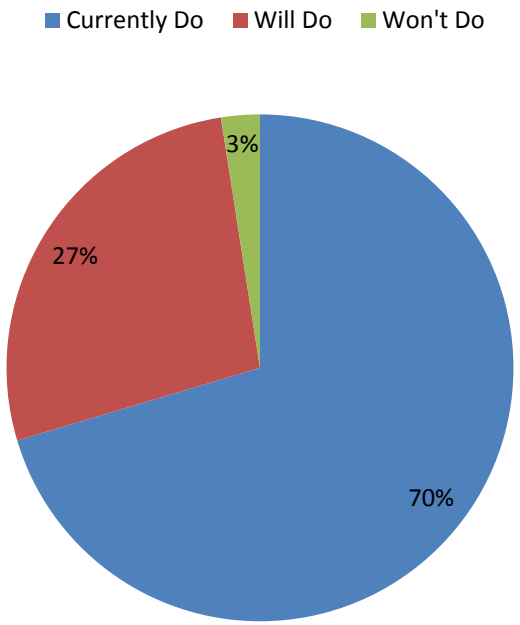
(76 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to dispose of household hazardous waste properly at a collection facility or during a recycling event to improve the quality of storm water runoff?

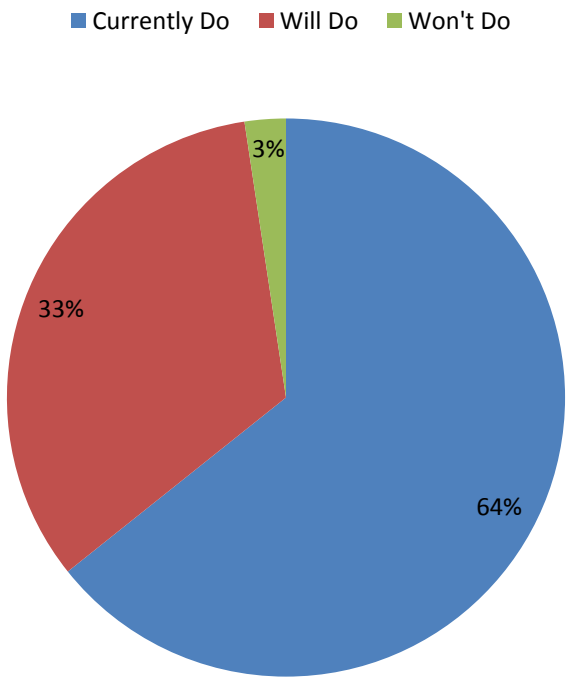
(74 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to keep chemicals and trash out of street gutters to improve the quality of storm water runoff?

(84 total respondents)



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Stormwater Quality Team
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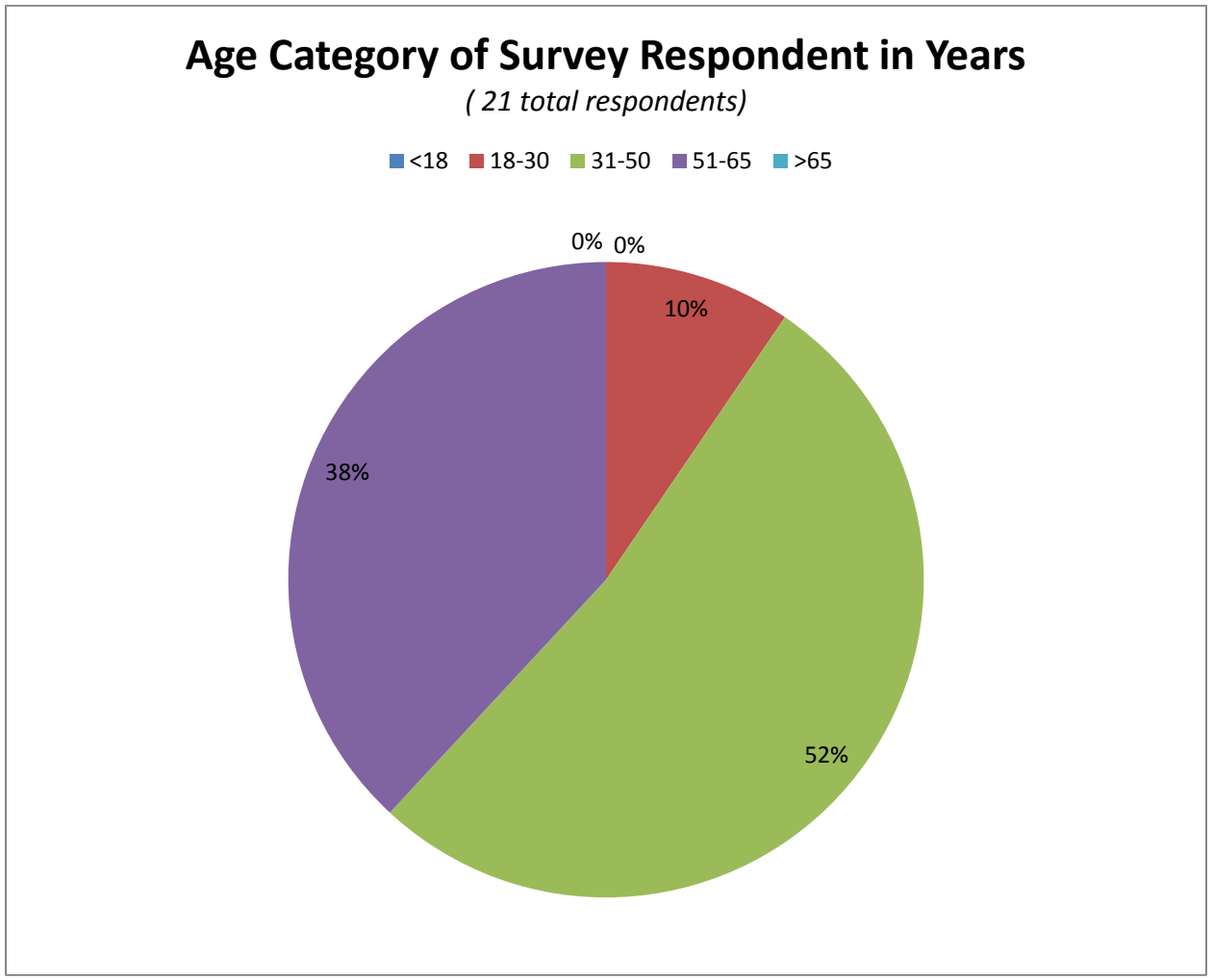
Survey Results

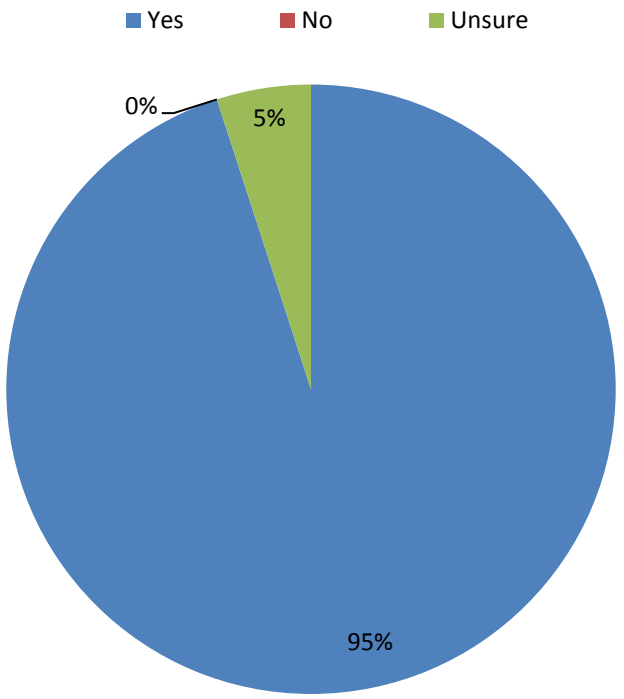
AMAFCA's Storm Water Quality Engineer conducted a short survey about the water quality of the Rio Grande on June 9, 2016. This survey took place at the 2016 AMAFCA SWMP Training. There were a total of 21 people that participated. The following are the results of the survey.



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Do you think that storm water runoff affects the quality of water in the Rio Grande?

(20 total respondents)



Mid Rio Grande Stormwater Quality Team
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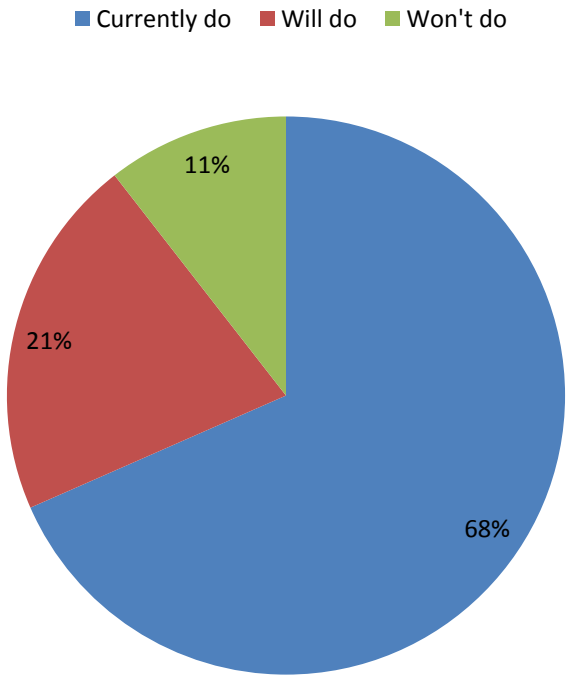
Would you be willing to pick up after your dog/pet and dispose of waste in the trash to improve the quality of storm water runoff?

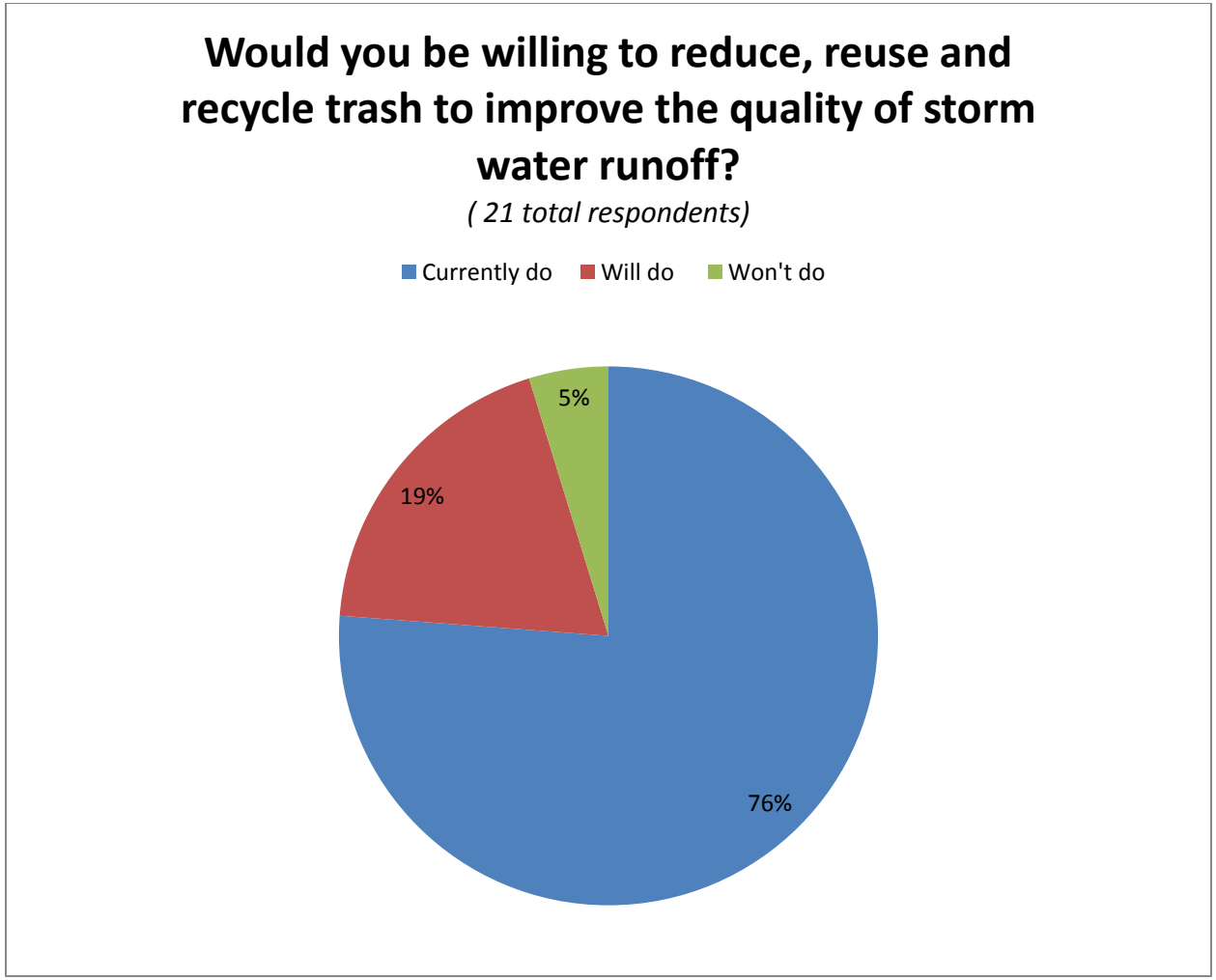
(19 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to reduce, reuse and recycle trash to improve the quality of storm water runoff?

(21 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

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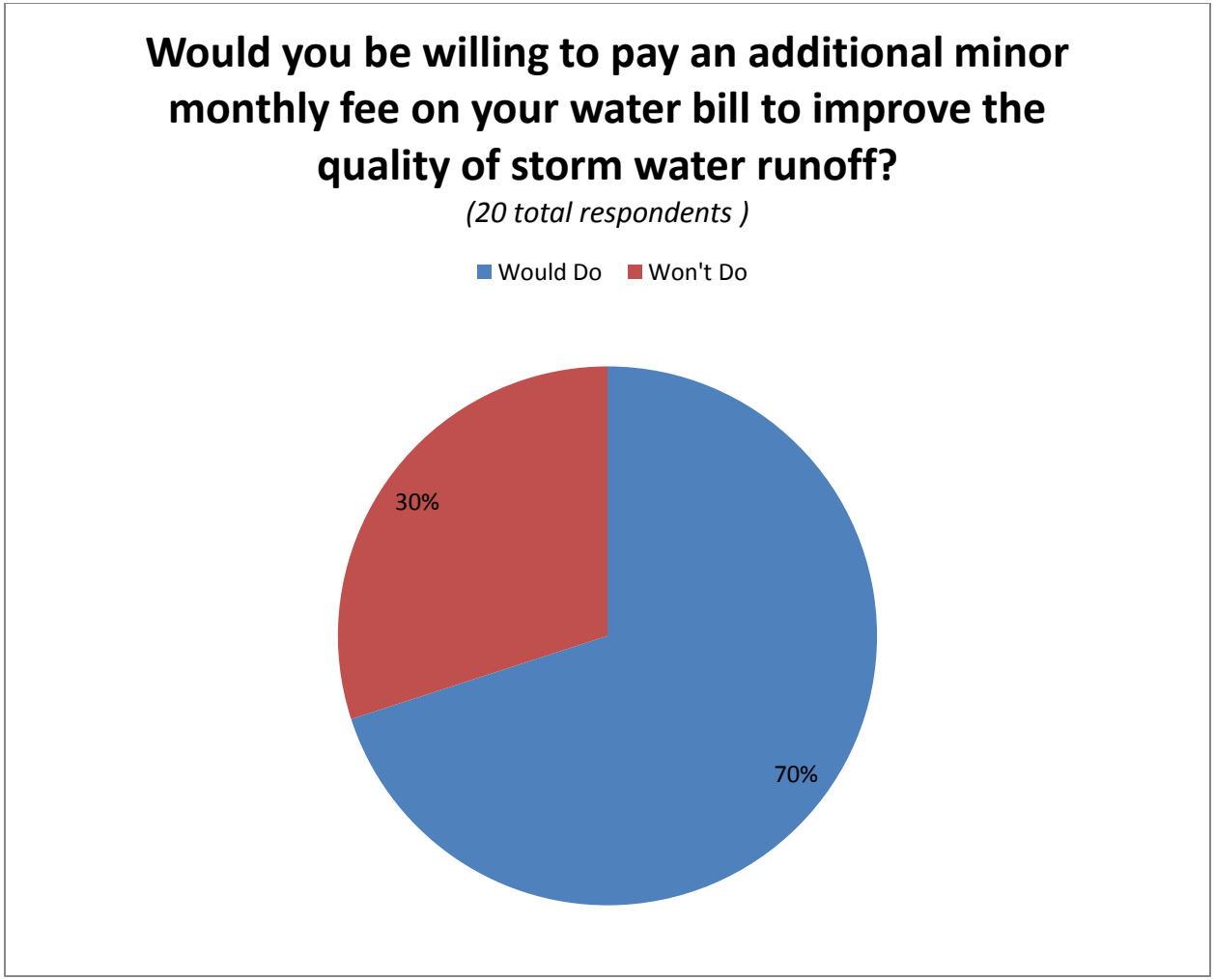
(20 total respondents)



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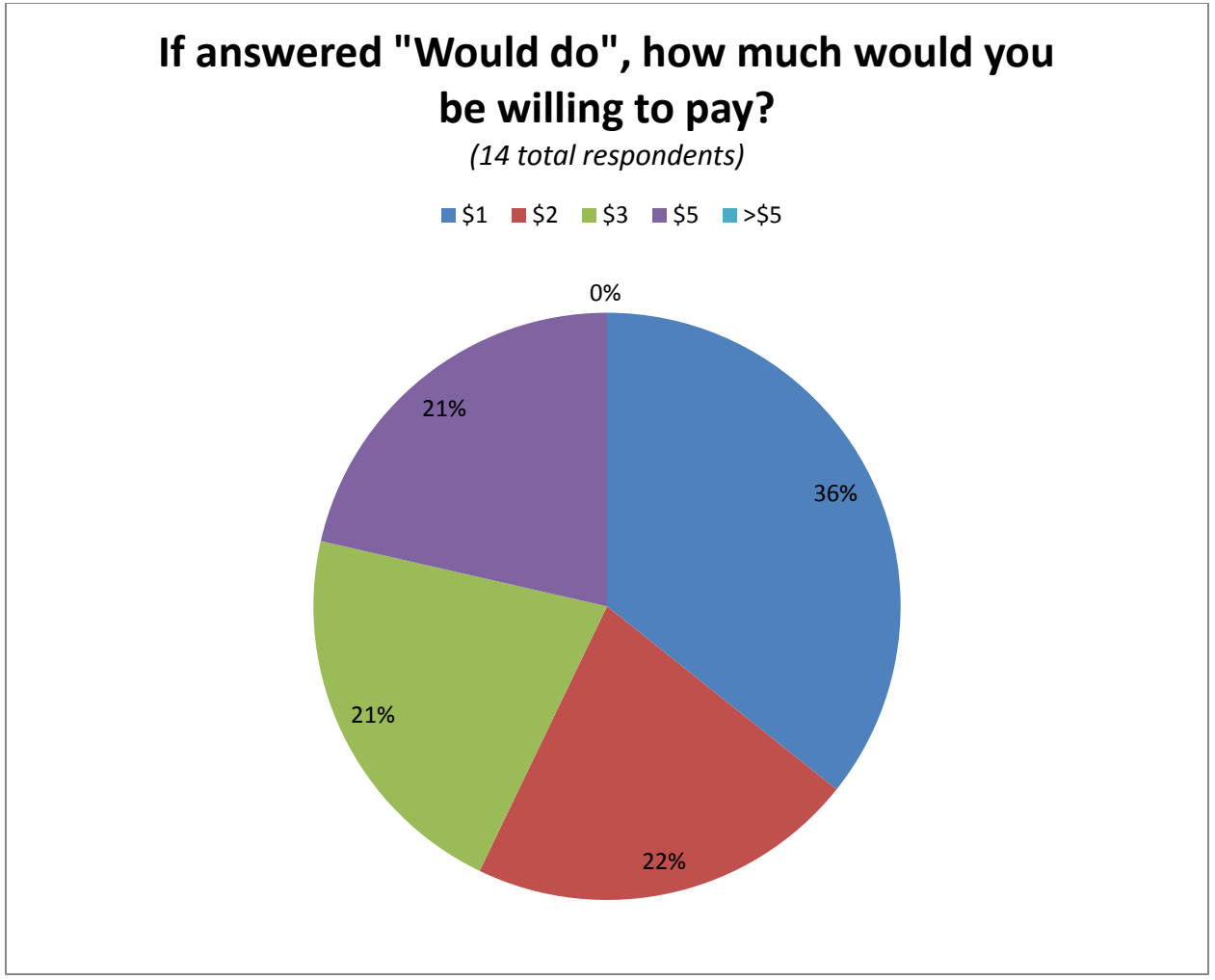

Mid Rio Grande Stormwater Quality Team
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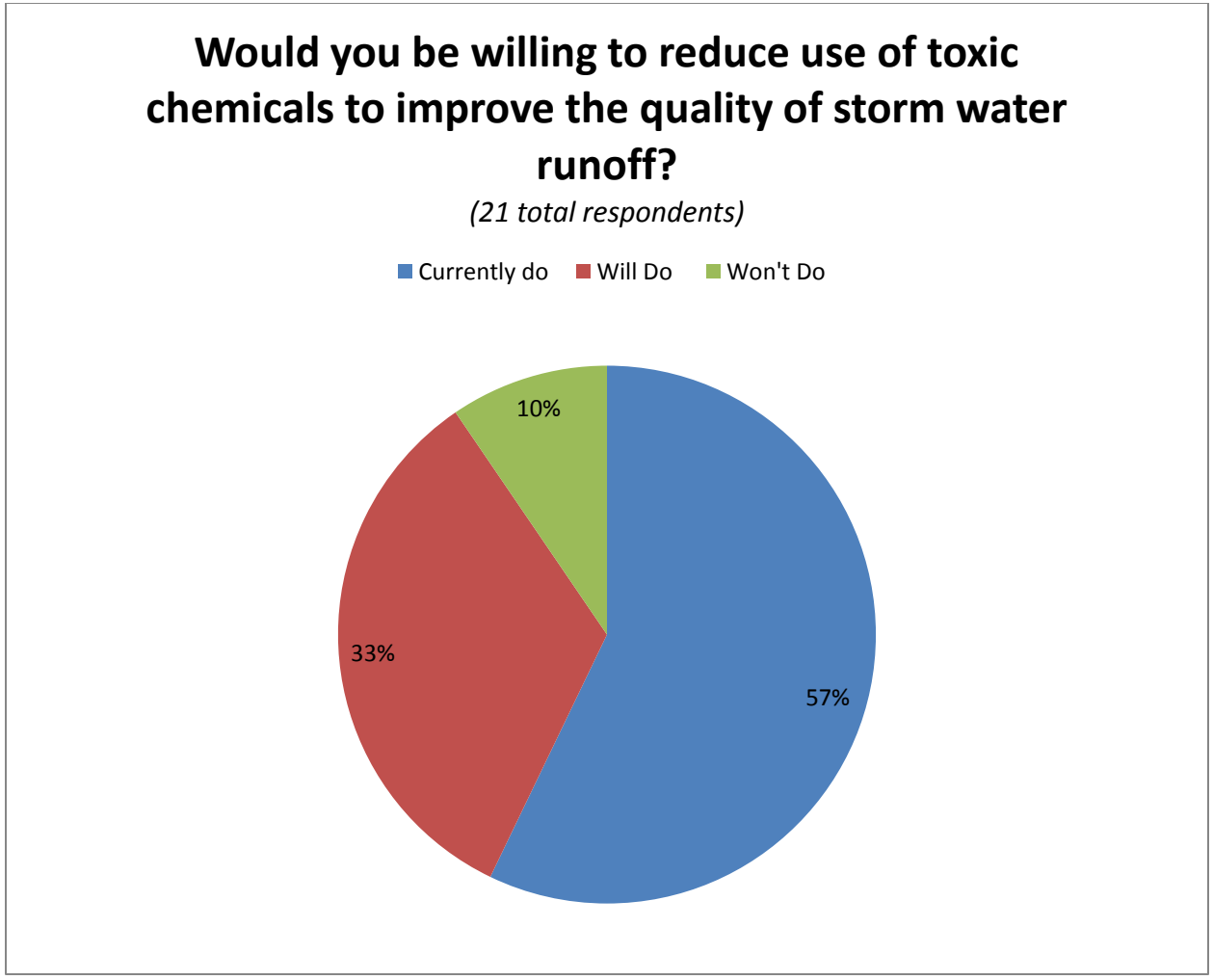

Mid Rio Grande Stormwater Quality Team
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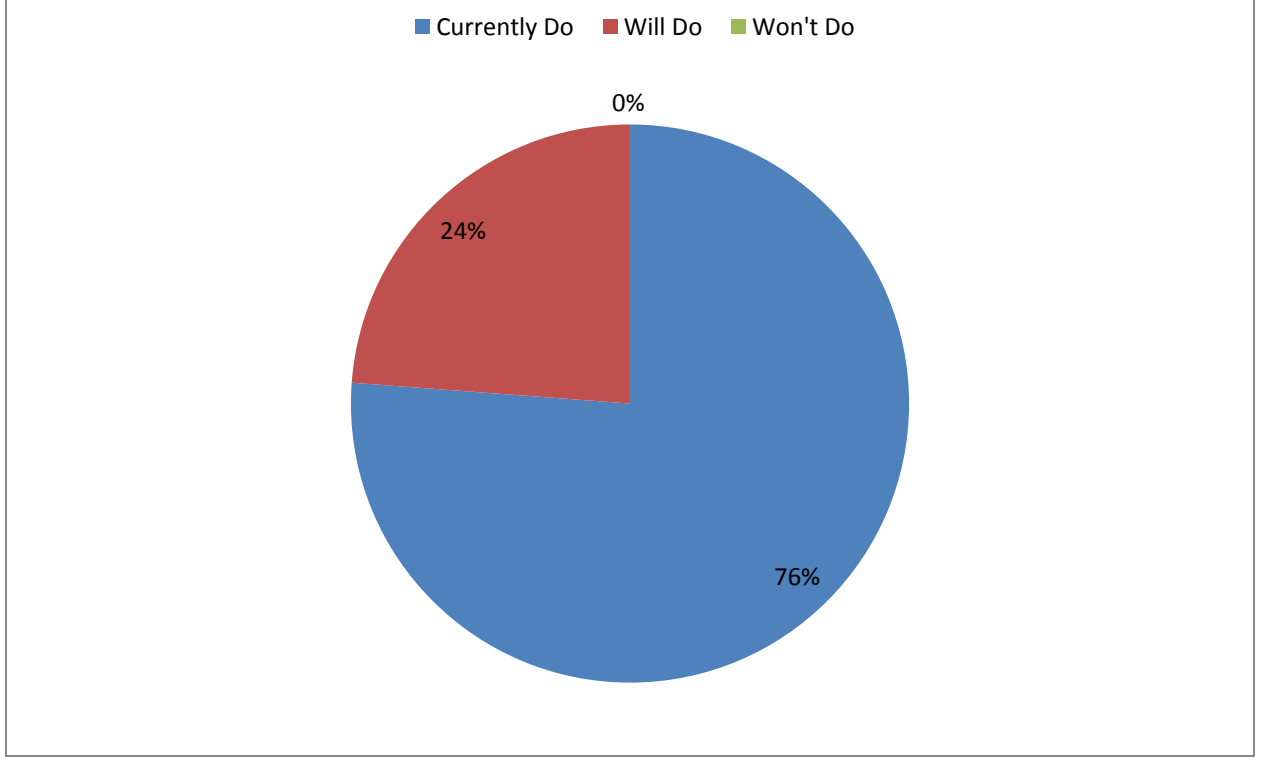
(21 total respondents)



Mid Rio Grande Stormwater Quality Team
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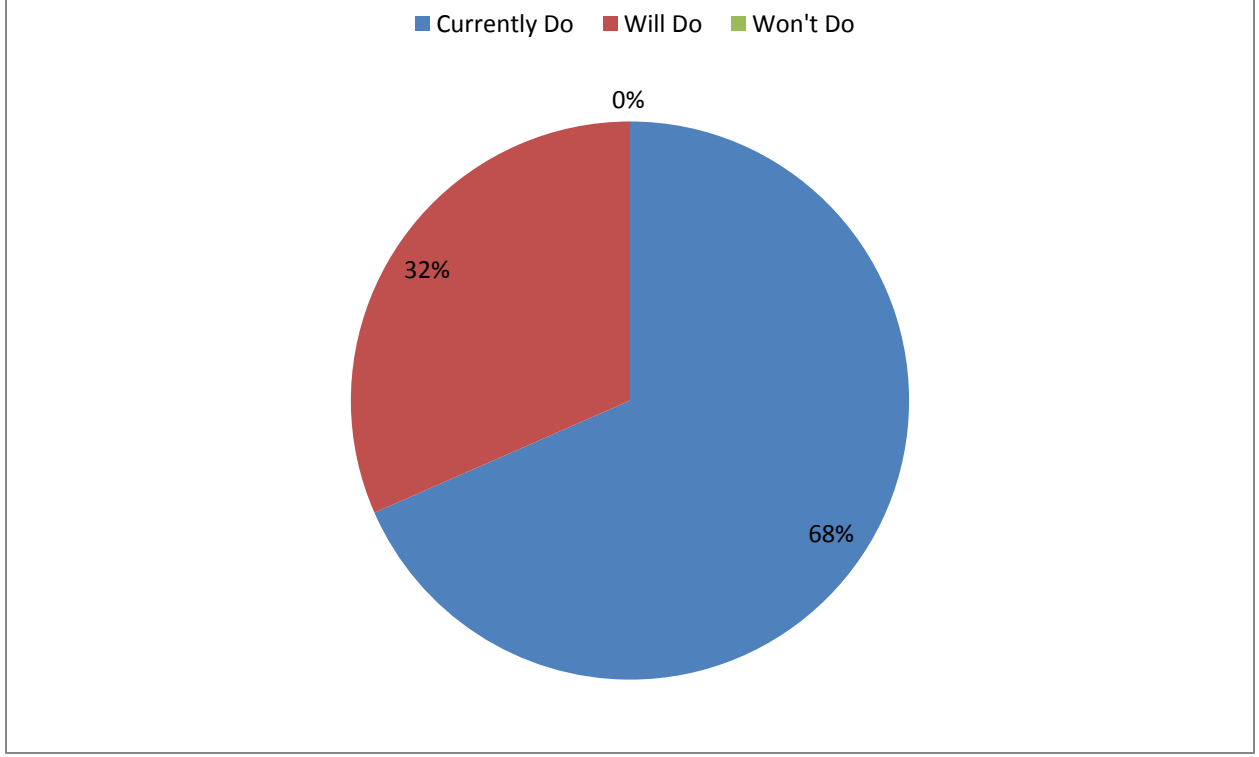
(19 total respondents)



Mid Rio Grande Stormwater Quality Team
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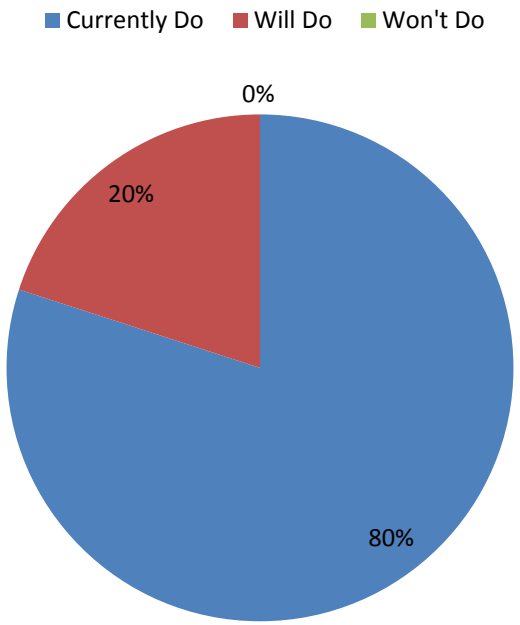
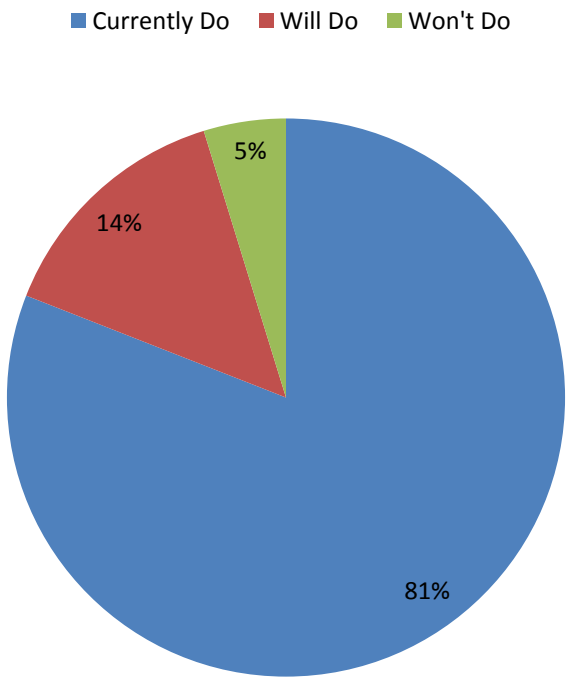
(20 total respondents)



Mid Rio Grande Stormwater Quality Team
www.keeptheriogrand.org

Would you be willing to keep chemicals and trash out of street gutters to improve the quality of storm water runoff?

(21 total respondents)



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Fourth-graders get a lesson on stormwater

By Ollie Reed Jr. / Journal Staff Writer

Published: Friday, February 19th, 2016 at 11:43pm

Updated: Saturday, February 20th, 2016 at 12:14am

Students from Lew Wallace Elementary School crowd around an interactive kiosk at the Main Library on Thursday. The three-sided kiosk helps children learn what they can do to prevent stormwater pollution. (Adolphe Pierre-Louis/Albuquerque Journal)

Fifty fourth-graders huddled together on the floor of the children's section in the basement of the city-county's Main Library as Patti Watson talked about all the stuff stormwater washes into the Rio Grande.

“Stormwater is what happens when it rains, or, sometimes, when it snows,” Watson said during the Thursday morning presentation. She told the children that stormwater rumbling through drainage ditches at 55 mph pushes plastic bottles, cigarettes, leaves, limbs, gasoline, oil, concrete, any kind of trash, rubble or debris you can imagine into the Rio Grande.

“We’ve even found wedding dresses and rusted-out pieces of cars in the river,” Watson said. “We’ve found furniture.”

And then there’s dog poop.

Stormwater Kiosk for Kids To learn about the Mid Rio Grande Stormwater Quality Team and its programs, click here.
A three-sided interactive kiosk, designed to teach kids about stormwater pollution, will be at the Main Library, 501 Copper NW, for at least six months before rotating to other locations.

“The average dog poops 1 to 2 pounds a day,” Watson said. “There are 70,000 dogs in this area. That’s 140,000 pounds of dog poop a day, enough poop to reach to the next floor. Imagine if all that poop flowed into the Rio Grande. Yuck!”

“Yuck,” the kids chorused in agreement.

The kids are from Lew Wallace Elementary School on Sixth Street, just north of the Main Library.

Watson represents the Mid Rio Grande Stormwater Quality Team, an interagency group organized in 2004 to teach the public how to reduce stormwater pollution. Team members include Albuquerque, Rio Rancho, Los Ranchos, Sandoval County, the town of Bernalillo, the Albuquerque Metropolitan Arroyo Flood Control Authority and several others.

Watson and fellow team representatives met with the Lew Wallace fourth-graders to unveil a $30,000-plus, interactive kiosk designed to help kids learn about stormwater pollution and ways to limit it. The three-sided kiosk features maps, games and videos that illustrate the middle Rio Grande’s stormwater system and its connection to the river.

There is, for example, the “Scoop the Poop” game aimed at showing kids how to properly dispose of pet waste. By touching his or her finger to a screen, a child can move images of poop piles from the ground to a waste can. On another side of the kiosk, an interactive educational screen allows children to watch videos reminding them that everything they throw on the ground flows into the Rio Grande.

The third side of the kiosk showcases an interactive stormwater system map. By touching different points on the map, kids learn the role arroyos and channels play in the stormwater system. On Thursday, this map appeared to be the kiosk feature most popular with the Lew Wallace kids.

“The pump station was the dirtiest place on the map,” Jade Chavez, 10, said with conviction.

She was talking about the map display that shows the huge amount of garbage pulled out of the river by trash racks at Rio Grande pump stations.

“I feel bad for 7-Bar Channel,” said Asher Barreiro, 10, referring to another display on the interactive map. “It’s like the dump for plastic stuff.”

Levi Citrin, 10, punched the button on the map that tells the story of the wildlife living along the stormwater system.

“I was surprised how much wildlife is in these arroyos,” he said. “They’ve got rock doves, scaled quail and black-tailed jackrabbits.” Levi’s discovery punctuates a point Watson made earlier.

“When the river gets polluted, it’s not only bad for humans but also for animals that use the river,” she said.

Innovative, Long-term Outreach Program for Upper Elementary Students Integrating Water Resources Topics with High Tech Pen Pal Partnerships and Measurable Outcomes

2016 Report

Presented by
Ciudad Soil & Water Conservation District

June 2016

EXECUTIVE SUMMARY

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 a class outside the state to share what they learn about the geography, culture, and ecology of their local river and watershed. Including these partner classes, we have served over 14,000 students! Each student spends about 25 hours engaged with the program over the course of the school year.

The curriculum incorporates hands-on activities, multiple classroom presentations by local water resources professionals, and a field trip to the local river or an important watershed feature. The field trip includes water quality monitoring and/or a service learning project. Students write about the various curriculum topics and the field trip via a private wiki website that can be viewed by their partner class. The computer technology and writing components provide a unique way to reinforce what was learned, increase student motivation to learn, and enable organizers to collect valuable metrics. RiverXchange is a great way to teach 21st Century Skills such as Collaboration, Communication, Creativity, and Critical Thinking.

This year, funding enabled 45 NM classes (1,150 students and 45 teachers) to participate. The majority of participating schools were Title I schools. Each NM class was partnered with one or more classes outside the state for a total of nearly 2,900 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 $71,823.41 in cash and received total match valued at $157,637.00 in the form of in-kind contributions including workshop space and computer lab use, classroom resources, presenters' time in the classroom, field trip docents, donated trees and shrubs as well as the teachers' and students' time.

All major “Next Steps” recommended in the RiverXchange 2015 Report were completed, including improvements to the program such as requiring teachers to communicate by phone to form a stronger relationship, and creating a more user-friendly online forum for teachers. Our pre- and post-survey showed a significant increase in water conservation behaviors. Students demonstrated significant knowledge of water resources issues on three online assessments. We saw many wonderful student video and PowerPoint projects as well as great writing that demonstrated critical thinking skills and understanding of the connections between issues.

Teachers faced a major challenge this year with the implementation of the new computer-based PARCC test, which made it more difficult to access computer labs. Feedback indicated that teachers found the program helpful in teaching Common Core standards as well as 21st Century Skills. Those who did participate in the program were especially committed, and many plan to return next year.

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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 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 K-12 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.
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 teleconferencing 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 nearly 17,000 students!

This year, the program featured the following components:

- 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, 2015 through June 30, 2016. All components including fundraising, design, planning, implementation and analysis were carried out by employees of Ciudad Soil & Water Conservation District, including:

Amelia White (through December 2015)
Bonnie Schmader
Melissa McLamb
Jennifer Moss

Sponsors

- Southern Sandoval County Arroyo and Flood Control Authority (15 classes)
- Mid Rio Grande Stormwater Quality Team (30 classes)
- US EPA: Urban Waters Small Grant, in partnership with Ciudad Soil and Water Conservation District
- National Fish & Wildlife Federation
- US EPA Region 6 Small Grant, in partnership with New Mexico Water Conservation Alliance (teacher workshop for all classes)

Sponsors provided $71,823.41 in cash. Program expenses included:

- Substitute teachers for NM teacher workshops
- Field trip bus transportation for NM classes
- Field trip portable toilet rentals for NM classes
- USGS water education posters for each teacher
- Coordination services (planning, implementing and assessing all program components)

New Mexico In-Kind Partners

- Albuquerque Bernalillo County Water Utility Authority
- Bernalillo County Cooperative Extension, 4-H
- CDM Smith, Inc.
- City of Albuquerque – Open Space Division and Municipal Development
- City of Rio Rancho – Environmental Programs Office
- Daniel B. Stephens and Associates
- New Mexico DEpartment of Transportation
- Rocky Mountain Youth Corps
- Sandia Laboratories
- Sandoval County Cooperative Extension
- Smith Engineering
- Southern Sandoval County Arroyo and Flood Control Authority
- University of New Mexico

In-kind contributions totaled $157,637.00. For NM classes, in-kind contributions included classroom guest speakers, field trip docents, planting materials, workshop space and computer lab use, and classroom resources. This year, we were informed that teachers' and students' time attending the presentations and

field trips could be counted as match. For partner classes, in-kind contributions included classroom guest speakers, field trip docents and field trip bus transportation. Sponsors and in-kind partners were recognized on our website and in presentations.

Participant Selection

All 45 participating NM classes were fifth grade classes. The majority of participating schools were Title I schools. There were approximately 1,150 students and 45 teachers, distributed as follows:

Bernalillo County	Sandoval County
Arroyo Del Oso Elementary School (3 classes) Title I	Cochiti Elementary and Middle School (2 classes) Title I
Bandelier Elementary (1 class)	Colinas del Norte Elementary (3 classes) Title I
Cochiti Elementary (2 classes) Title I	Maggie Cordova (2 classes)
Edward Gonzales Elementary (6 classes) Title I	Martin Luther King, Jr. Elementary (5 classes) Title I
Georgia O'Keeffe Elementary (2 classes)	Placitas Elementary (1 class)
Lew Wallace Elementary (1 class) Title I	Rio Rancho Elementary School (5 classes) Title I
Los Ranchos Elementary (2 classes) Title I	
Monte Vista Elementary (3 classes)	
Mountain View Elementary (2 classes) Title I	
Osuna Elementary (3 classes)	
Zia Elementary (2 classes)	
750 students, 30 teachers	400 students, 15 teachers

Partner classes were located in 21 U.S. States, as well as in Cambodia, Ecuador, Israel, Nepal and Rwanda. There were about 1,756 students and 45 teachers (some teachers had more than one class participating). We have found that partner teachers are highly motivated and come to the program with a willingness to participate even though our NM-based funding cannot be used to help coordinate their classroom guest speakers, arrange a field trip, or pay for any direct costs.

Teacher Professional Development Workshop

Although preparation began many months earlier, RiverXchange officially kicked off in September with a full-day teacher workshop for NM teachers and online training sessions for partner teachers. Teachers learned how to implement the activities in the curriculum and how to operate and manage their class blog (KidBlog). Volunteer presenters were on hand at the NM workshops to schedule classroom presentations. Guest speakers Rick Billings from the ABCWUA and Kathleen Verhage from the City of Albuquerque

spoke to the teachers about challenges to riparian ecosystems due to watershed pollution and contamination issues. They also discussed the importance of endangered species and habitat restoration.

KidBlog Technology

One of the most important, yet challenging, aspects of program implementation continued to be the training of teachers on how to use computer/internet technology for the online pen pal communication component. This year we used KidBlog instead of the Wiki platform and found it to be simpler for the teachers to use. However, there were still glitches and similar challenges to blogging for teachers. We plan to use KidBlog again for 2016-2017. We will be better prepared for training and troubleshooting next year.

Online Partner Training

Teachers were able to access an online video training regarding how to set-up and use their Kidblog throughout the year. We used a free video service called Vimeo. This was an efficient and effective way to have teachers access the same quality of training on their own time. Many teachers contacted us if they had difficulties and we also checked in with many of them mid Fall to answer any questions and troubleshoot any issues.

Curriculum

A key component of RiverXchange is the hands-on curriculum, which is carried out from September through May for NM 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. 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 including Common Core Standards. Each student spends about 25 hours engaged with the program over the course of the school year!

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 class(es). 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 Science and 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 standards. For a summary of the RiverXchange Curriculum, see Appendix 1.

Guest Speakers

We coordinated four guest speakers to visit each NM classroom. In all cases, guest speakers were water resources professionals from local agencies. Guest speakers introduced technical information that was often completely new to a teacher. Topics included:

- watershed/nonpoint source pollution
- drinking water
- wastewater
- water and agriculture

Partner teachers were strongly encouraged to invite guest speakers into the classroom to help carry out the curriculum. Since program funding is NM-based, we were not able to assist partner teachers with coordinating guest speakers into the classroom; however, we provided partner teachers with names of regional U.S. agencies and offered a resource guide that be able to assist. This year, many partner teachers had presentations from stormwater and wastewater educators as well as watershed specialists and county conservationists.

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 helped plant more than 700 trees and shrubs and restore more than 10 acres of riparian habitat along the Rio Grande in Albuquerque. Some of the fall and spring field trips included a water quality monitoring component.

New Mexico Field Trip Locations

Shining River Open Space

Managed by City of Albuquerque Open Space, this property is located in on the east side of the Rio Grande, immediately south of Paseo del Norte. This area was part of the ABCWUA Paseo del Norte drinking water mitigation project, which included planting native vegetation along a silvery minnow channel. While students planted native trees, they observed porcupines, bald eagles, coyotes and other bosque animals.

Tingley Wetland

This 18 acre tract, adjacent to the Bosque in downtown Albuquerque, is owned by the City of Albuquerque and features a restored constructed pond and peripheral wetlands include native and non-native aquatic habitat. Students took a hike into the Bosque, planted native shrubs near the wetland, tested water quality, and observed macroinvertebrates.

Teachers were encouraged to invite additional water-related guest speakers into the classroom and/or go on additional field trips. Several teachers organized additional field trips to Albuquerque's Southside Water Reclamation Plant, Cooperative Extension's "Kids, Kows, and More" event, or a Bosque Ecosystem Monitoring Program site, to expand upon what their students learned through RiverXchange.

Partner Field Trip Locations

Since program funding is NM-based, we were not able to assist partner teachers with coordinating a field trip; however, we did provide partner teachers with names of agencies located in most parts of the U.S. that may be able to assist. We know that many of them did water quality testing. Many also went on field trips, to relevant places including water treatment plants, local reservoirs, dams and river/watershed museums.

EVALUATION

Teacher Surveys

Using FluidSurveys, we asked for feedback from NM and partner teachers to help us identify areas in which we could improve the program to make it easier and more useful for them. The response rate for NM teachers was about 45%. The response rate for partner teachers was about 25%, though they had much less notice to submit their responses. We received valuable information from all teachers throughout the school year. Here are the main points:

- Most teachers chose to participate in the program to learn about local water resources issues, connect with a classroom in a thematic learning environment and enhance their writing skills with meaningful content for their students. Many teachers reported that they were pleased with their experience and met their learning objectives as participants.

- It was difficult for teachers to maintain communication with their partners, even though we encouraged them to get in touch by phone or Skype within the first two weeks of school. Many resorted to e-mail introductions due to time differences and for ease.

- More partner teachers posted and responded on the blogs than NM teachers.

- Most teachers liked the Kidblog format this year and many found it easier to use than the wiki. Many teachers who experienced difficulty with the blog reported that this could have been resolved at the beginning of the year with more tech support from RiverXchange organizers.

- Scheduling computer time continued to be especially difficult with many NM teachers reporting that they had extremely limited access to computers due to limited technology access in the classroom and computer-based tests taking up the computer labs for the majority of the year.

- Teachers who used the curriculum found it very effective and useful for learning about their local watershed and teaching about critical water resources issues, including conservation.

- As in previous years, we see the more engaged teachers are in the partnership aspect of the program the greater their learning outcomes are for their classrooms. Many teachers expressed a strong interest in returning to the program next year and offered useful ideas for improvement regarding the partnership aspect and implementation of the curriculum.

Almost all of NM teachers found RiverXchange helpful in teaching Common Core Standards.

How useful is RiverXchange in helping your students achieve Common Core English/Language Arts Standards in the following areas?

Variable	Very helpful	Somewhat helpful	Not that helpful	I really haven't explored this much yet	
Producing coherent writing through planning, revision and regular practice	13 *65.0%*	7 *35.0%*	0 *0.0%*	0 *0.0%*	*Total:* 20
Researching different aspects of a topic from several sources	15 *75.0%*	5 *25.0%*	0 *0.0%*	0 *0.0%*	*Total:* 20
Narrative writing to describe experiences	12 *60.0%*	7 *35.0%*	0 *0.0%*	1 *5.0%*	*Total:* 20
Informative/explanatory writing to explain a topic	16 *80.0%*	4 *20.0%*	0 *0.0%*	0 *0.0%*	*Total:* 20
Writing opinion pieces and supporting a point of view with evidence	15 *75.0%*	5 *25.0%*	1 *5.0%*	0 *0.0%*	*Total:* 20
Reading informational texts	13 *65.0%*	7 *35.0%*	0 *0.0%*	0 *0.0%*	*Total:* 20

Many teachers felt there was value in having an authentic audience for students to write to concerning water related issues and reported that their students enjoyed learning about the other school in another state or country. Here are some of their comments:

From NM teachers:
"My students were exposed to places and things that they had not seen before. It also really sparked their interest in science. "

"Exposure to the issues of water in NM. My students had a partner class in another country, so that really helped them understand the scope of the world beyond NM."

"It also really helped them learn how to use and comment on a website. And, of course, it greatly increased their awareness of water related issues"

"My students have a true understanding of how important water is to our life and all things that are alive. They also see how they can impact our river with their actions. "

From partner teachers:
"Students are provided a "real" audience in which to share their learning. That is the main reason I have continued to participate."

"I was able to work on collaborative structures with my children, increase their knowledge of geography and show them several new careers."

"To collaborate with others outside of our classroom and improve writing and computer skills."

As always, New Mexico teachers were thrilled with the guest speakers and field trips.

"We planted trees in the bosque. This was a great trip and families enjoyed their involvement."

"My students loved planting the trees. Many of them commented on how they had never been to the Bosque before...."

RiverXchange also helped overwhelmingly in teaching students 21st Century Skills.

How useful is RiverXchange in helping your students develop the following 21st Century Skills?

Variable	Very helpful	Somewhat helpful	Not that helpful	I really haven't explored this much yet	
Critical Thinking/Problem Solving	12 *60.0%*	8 *40.0%*	0 *0.0%*	0 *0.0%*	*Total:* 20
Teamwork	*18* *90.0%*	2 *10.0%*	0 *0.0%*	0 *0.0%*	*Total:* 20
Adaptability to new learning/working structures	15 *75.0%*	4 *20.0%*	0 *0.0%*	1 *5.0%*	*Total:* 20
Communication Skills	13 *65.0%*	7 35.*0%*	0 *0.0%*	0 *0.0%*	*Total:* 20
Taking initiative	10 *50.0%*	10 *50.0%*	0 *0.0%*	0 *0.0%*	*Total:* 20
Accessing and analyzing information	13 *65.0%*	7 *35.0%*	0 *0.0%*	0 *0.0%*	*Total:* 20
Curiosity/ Imagination	18 *90.0%*	2 *10.0%*	0 *0.0%*	0 *0.0%*	*Total:* 20

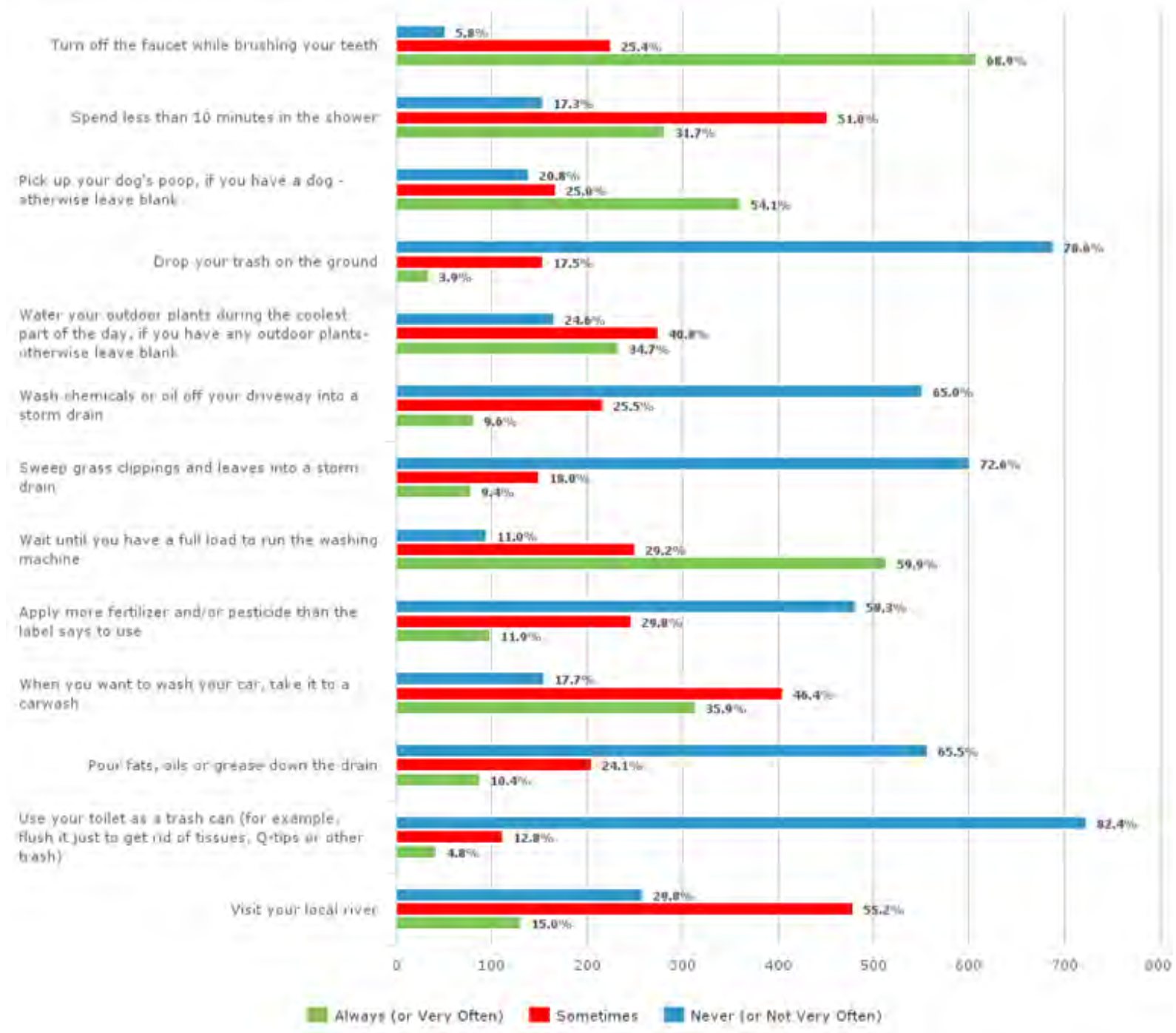
Student Surveys

A key component of RiverXchange is its specific, 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.

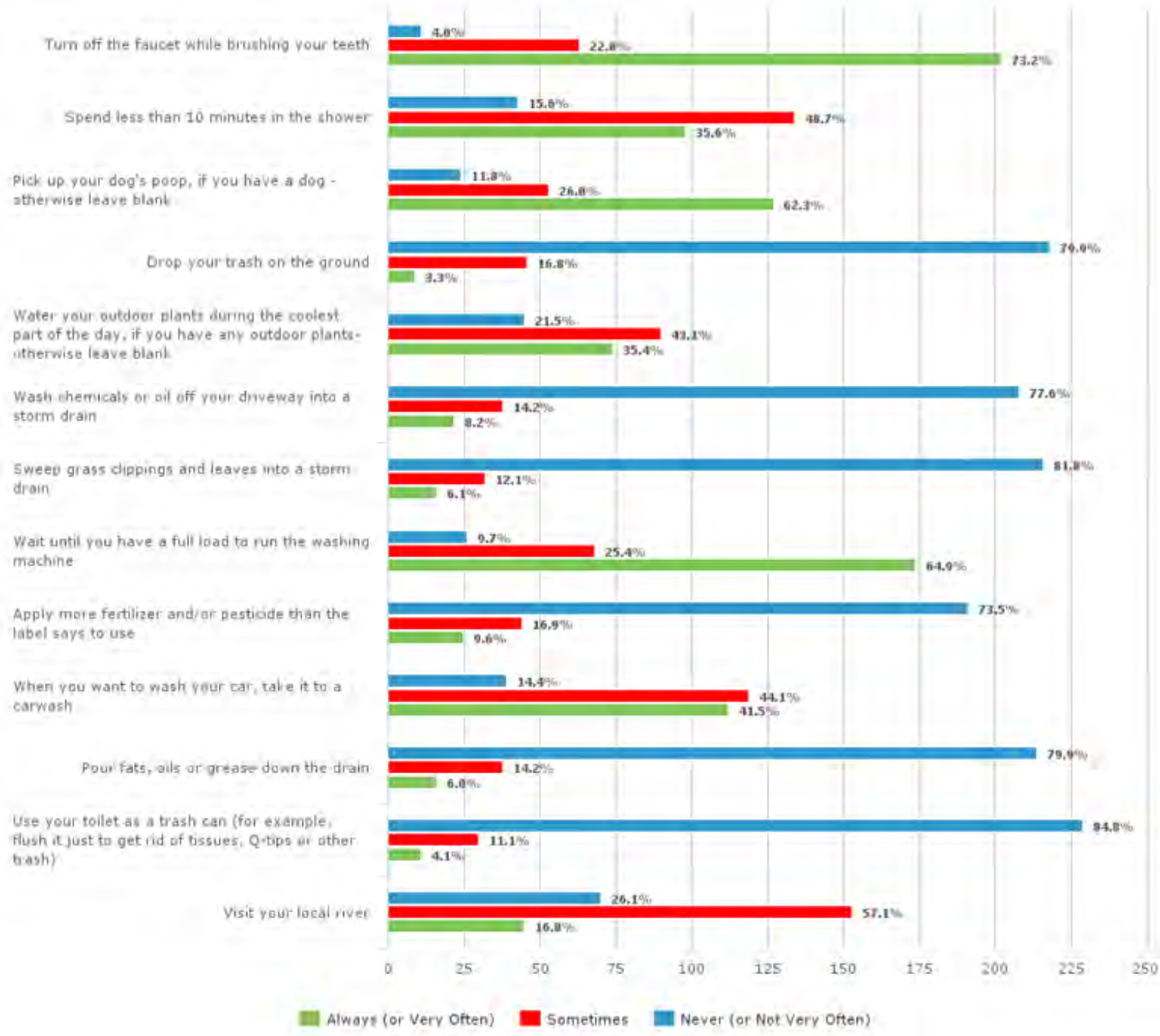
Pre/Post Behavior Survey

We asked students about their actions regarding water use before and after the program; improvements were observed in several areas, most notably picking up dog poop and not pouring fats, oils or grease down the drain!

How often do you or your family do the following things?(PRE)



How often do you or your family do the following things? (POST)



Student Writing

The writing component is one of the most valuable aspects of the program, yet it continues to be our biggest challenge. We are continually striving to improve participation in this area because it helps teachers integrate writing in the content areas and reinforces student understanding of key water resources concepts. Teachers continued to face major challenges this year in getting efficient internet access in the classroom and/or access to computer labs, which are tied up for much of the year for NM teachers with the PARCC and other computer-based tests.

Many teachers joined the program this year planning to to use RiverXchange as a major component of their writing program to meet Common Core Language Arts standards, which require teachers to focus more on writing within content areas. Each year, we strongly encourage teachers to have students write and edit paragraphs before going to the computer lab because this promotes higher-quality thinking and writing. When students do go through this process, it shows. We also encouraged teachers to use various forms of communication in addition to writing, such as videos, PowerPoint presentations, or audio files.

This year, we switched to a new online learning platform, KidBlog, which seemed less conducive to small group projects than previous formats though more intuitive for teachers and students to use. KidBlog allowed all participating classes to see all the other classes' blogs. We saw many great classroom video and PowerPoint projects. We also saw a lot of well constructed individual writing. Much of the writing shows critical thinking, as well as a broad understanding of how our ecosystem, stormwater, drinking water, wastewater and agriculture are connected.

Teachers and students expressed frustration if the pen pals did not write back quickly or at all. We explain to teachers that the writing component is valuable for students even if pen pals don't post because students in the same class could read and comment on each other's writing. Still, our biggest challenge is to increase the number of successful partnerships, in which both partners are actively engaged.

This year, we had more partner teachers register with us than ever before. The interest was exciting at first but proved to create more difficulty in ensuring successful partnerships for NM classes as many were partnered with more than one class to accommodate the excess of registrants and added to the sense of workload for teachers.

It was much easier to assess and manage student writing with KidBlog than on the previous wiki format. Rather than nearly 2,400 student pages to track throughout the school year, we had about 115 class blogs to track.

We noticed more postings from partner classes than NM classes. Many partner teachers register for the program having already prioritized the need to organize classroom time to blog throughout the school year, so as to ensure they have a successful experience as participants. In contrast, many NM teachers register for the program to receive the beneficial learning experiences of the presentations and field trip; the blogging and partnership aspect is not as strong of an incentive for their participation as it is the main incentive for the partner teachers.

We know from discussions with teachers over the years that the absence of student writing does not mean they did not do the activities, or that no learning took place. Many teachers were dealing with issues

unrelated to the program, such as new curriculum in other areas, school reorganization, construction which prevented access to the computer lab for a portion of the year, or personal life changes that conflicted with engaging more with the program. We did our best to foster successful online partnerships. Even though some blogs had minimal to no activity, NM students still benefited from the guest speakers and the field trip.

Samples of Student Writing (spelling and punctuation are original)

River Geography

"Hello my name is Paco, and I live in New Mexico. We have been doing our river-x project. A watershed is when land feeds water into a body of water such as rivers, lakes, seas, and oceans. The name of our river is the Rio Grande. The journey our river takes is it starts in the Rocky Mountains and ends in the Gulf of Mexico, and travels over 2000 miles. The Rio Grand goes through Texas, Colorado, and New Mexico. Our river is muddy in some places, big in some places, and small in some places. We get 5-10 inches of rain every year, but we have got a lot of rain this year. The end of summer and the beginning of fall is our monsoon season. Sincerely, Paco"

Watershed Model

"On October 14, our class had Catherine Conran came to our class to talk about where our storm water goes, and how it can be polluted. We learned that the storm water here doesn't go to a water treatment plant. Instead it goes either straight to the Rio Grnde River or it is infiltrated into our aquifer. Another thing we learned is that there are a lot of pollutants that can contaminate our water. Dog poop is a big problem here because people don't pick up after their dogs, and because it is so dry here it just becomes hard and floats into the river. The best part of the presentation was when we got to use different "pollutants" to really mess up the model of the city that Ms. Conran brought with her. Some of the students sprinkled or dumped different pollutants like: oil, trash, fertilizer, pesticide, etc. Then a rainstorm came and we saw how those pollutants ran down into the river and eventually the aquifer. Gross!"

Infiltration and Runoff

"Hi my name is Abi and I'm in a cloud with my friends Haley and Bailey. So I'm here to tell you about my journey through the "water cycle". Never mind can't talk falling out of the cloud now! This is what they call precipitation, when you fall out of the sky. Now I am underground refilling the aquifer. Here we go again wait… where is Haley? She must have gone another way, well we still have ba… never mind just me. Now I'm in some ocean some people call this a collection. It is where all the water comes then there is evaporation when the sun soaks up all the water and forms it into a gas. I am now into a cloud again ''oh" look there is Haley now we are together again but where is bailey? Oh here she comes! This one is called condensation it is where little rain drops like me go to clouds and produce precipitation again. How it happens is simple you were a gas then form into a liquid again. So I forgot to tell you that a runoff is where you basically run off the mountain but don't try this at home please. Then you flow underground, geez this is going by fast but anyway finally we have transpiration that is when water comes out of the leaves of plants and goes into the air. In fact I think Haley and bailey went that way. Sorry can't talk falling again…….. Ok so now I'm on top of the mountain. Nope never mind down the hill so that was the runoff and next is infiltration again where you go underground. Haley is already in the ocean and bailey who knows where she is. She is evaporating now. Bye Haley! Now I'm going to evaporate talk to you in the

clouds again. … Oh hi bailey have you seen Haley? ‘’no sorry”. Ok that’s fine. So now I’m in the clouds so that was basically my life I do that all the time it is fun!! Talk to you later!!!!”

Water and Agriculture

“Nicole and Steve were talking about the commercial uses of the river. They talked about the 4 H program, the 4 h's stand for head, hands, heart, and health. They talked about different ways that people water different type of crops. The first way they talked about was flooding, flooding is where you just flood your crop with water at lot of times you might see people flooding Chile crops that use a lot of water. Another way that Nicole and Steve talked about is the sprinkler that is when water gets mist at the plants to grow a lot of times sprinklers are set up to spray for the time as needed. The last way to water crops is the drip system that is where a tube runs along a tree with a hole to allow the water to come out but not a lot of water comes out because plants that use a drip system most likely those plants don't use a lot of water. I would have to say that the drip system uses a lot less water than the flood.”

Drinking Water

“a few days ago someone from the water utility authority came and told our class about how much water gets wasted when you have a leaky faucet. if you have a leaky faucet that drips 8.5 ml a minute, you waste 1,157.1 gallons a year!”

“How many gallons are used each year? Well there is about 10,275,93 gallons of water that is used, i think that is a crazy amount of water that is used a year.That is what we learned last week in my class because a person from W,U,A. Everyone knows that you take 2 minutes brush your teeth right, you can save water by turning the water off that way water is not just going down the drain because that would make more water be wasted and we don't want water to be wasted. Another way that we don't waste water is by turn your shower water off if your not in the water yet and after done taking a shower just turn the water off and don't get out with it on that is still wasting water just more water. You know what the biggest thing that is being wasted is our totients. That is weird to think about that the totients in your house is being used the most out of all the thing that we used the number 1 thing that is used is our totients.“

Wastewater

“Surface water gets polluted by us throwing trash the It goes to the river when it rains. When farmers use chemicals to kill insects off plants that goes to the ocean and kills the fish . When you throw old medicine on the toilet then you flush it goes into the water we drink. This doesn't help our watershed or the environment.”

(from CAMBODIA)

“Hello! My name is Sreyneang. You can called SO.
I love to play sport and listen to music and audio. Also I like to make a quote when I doing something.
Have you seen my watershed or learned anythings. Here is the cool think about us, we are living on one of the river name Basic that has divided from Mekong river (a big flow river). Also there is current problem like trash, sewage, industrial pollution, over fishing and the building of dam. In the future, I will try to solve this issue. Who want to work with me?“

(from New Mexico)

“We have the same problems. I also want to help rivers some day! To be able to help all the animals that need the water and be able to save all these fish and let them survive. Our river was pretty much destroyed

by humans! At first our river was called the Rio Bravo, which means brave river, (Rio means river and Bravo means brave) it was full of life and there was a big amazing curving river! Until humans came and made it Rio Manso, and made it strait, killed animals and destroyed almost all the nature. Now we are trying to make it a better place, but humans are still destroying it with pollutants. Did you know we actually find bath tubs in our river! Comment back soon."

Forests and Wetlands
"Dear friend,

My name is Ari. I learned about EROSION! If your wondering what that is, I can tell you. Erosion is when there's a rock or land and it might snow at night and, melt in the day and then and then the rock breaks down. That happens because when the snow melts it turns to water and dissolves the rock down to be thinner and look different the next day. A good and easy way to stop/slow down erosion is by vegetation! Vegetation is when planting trees, bushes, vines and lots of other plants. The plants help slow down erosion it. would be pretty cool to watch happen step by step (it would be pretty cool and tiring). This is what I learned about erosion. -Ari"

Field Trips
"I loved the tree planting field trip! It was a very good learning experience. My favorite fact was that the trees "sleep" during winter and they can't feel anything. My favorite part of planting a tree was twisting the auger to make a hole. An auger is a long metal pole with a handle on top. At the bottom there is a metal cylinder that has blades and it digs dirt out of the ground. We had to dig until we could see water at the bottom of the hole. Then, we put the tree in the hole and used a shovel to fill the hole with dirt. When we were done our tree was a little crooked, but we named him C. Branchy. Come visit him at the Bosque! The experience of planting trees was super cool and amazing. If you ever have the chance to do it, check it out."

"The first thing I learned is you have to dig until you reach the water table. My hole got to about 8 feet. We had to dig until the soil was dripping wet in order to plant the tree. The second thing I learned is some trees can feed insects. They also provide birds' nests and shelter for animals. Some trees provide food like berries. Trees that are planted by the river prevent erosion. The roots of the tree prevent it."

RECOGNITION

We acknowledged the exceptional commitment made by presenters and field trip providers by sending thank you cards with quotes from student KidBlog writing about the activities they provided. We also acknowledged sponsors and in-kind contributors on our website.

NEXT STEPS

- We have applied for funding from several sources for 2016-2017, including:
    - Southern Sandoval County Arroyo and Flood Control Authority
    - Mid Rio Grande Stormwater Quality Team
    - City Of Albuquerque

- Teacher Workshop:
    - Eliminate original teacher workshop and offer a recognition event, with an engaging and relevant speaker, for participating teachers in early to mid Spring. New Mexico classes will learn to operate the blog via online training video and phone conversation(s) with RiverXchange organizers.
- Partnerships:
    - Conduct more thorough interviews with interested teachers outside of NM to enhance understanding of the commitment to participate and promote better engagement throughout the year.
    - Partner teachers more systematically for mentoring and/or technologies available to them.
    - Require teachers to communicate with their partner twice a semester.
    - Offer a reward incentive for partner classes to demonstrate outstanding engagement in the program (responsiveness on the blog).
    - Partner New Mexico classes together and coordinate joint field trips if possible.
    - Offer an additional field trip or other reward incentive for outstanding participation from NM classes.
- Curriculum:
    - Revise the curriculum to simplify and emphasize fun, engaging activities for classrooms.
    - Review possibilities of organizing Kidblog to be more easeful for teachers who rather make whole class or group postings and add to blog training for next school year.
    - Create a general blog next year to highlight interesting blog submissions for all participants to view and comment on.
    - Provide access to informational texts on same topic, appropriate for varying reading levels.
    - Continue to encourage audio, video, or other presentation formats as an option along with writing assignments.
    - Encourage classes to create a culminating project towards the end of the year to be presented to a larger audience.
- Assessment:
    - Distribute the Pre and Post Survey in a more timely manner so we receive as many responses as possible. Share results with teachers.

APPENDIX 1: CURRICULUM

Welcome to RiverXchange... learning and sharing across borders!

RiverXchange is about communication and developing 21st Century Skills while learning about our watersheds!
Each class will be partnered with one or more classes in a different state. The big idea is to communicate with your partners at least twice each semester by posting projects on your shared wiki website and responding to what your partners have posted.

A firm "handshake" will get your partnership off to a great start! As soon as you get your partnership assignments, you MUST contact each other by phone, Skype, or FaceTime, to establish a working relationship. Most importantly, you will set two dates each semester for sharing your projects, and let your partner know what you plan to do. Then, post these dates on the Teacher Collaboration page of your wiki, which can be seen only by wiki administrators.

The curriculum in the following pages is what New Mexico teachers will be doing throughout the year, and is a rich resource for teachers in other states. However, many partner teachers will be doing other excellent river and watershed-related projects and will post about these on the wiki instead. Our goal is that students be able to understand and discuss all of the Big Water Questions by the end of the year.

The Big Water Questions

Understanding a Watershed

1. What is a watershed?
2. Where does your community's stormwater go?
3. How can surface water become polluted?
4. How does the water cycle relate to weather?
5. What role do forests play in a watershed?
6. What role do wetlands play in a watershed?
7. What actions can all of us take to keep water clean?

Water in Our Society

1. In what ways does our society use water?
2. From what source does your community get its drinking water?
3. Does everyone have the right to use as much water as they want?
4. What actions can all of us take to conserve water?
5. How are groundwater and surface water connected?
6. How can groundwater become polluted?
7. Where does your community's wastewater go?
8. What is the difference between wastewater, stormwater, and drinking water?

River Ecosystem

1. How does water affect living things in an ecosystem?
2. What are some of the ways scientists can determine the health of a river, lake, bay or ocean?
3. What are some of the ways humans have changed rivers or other aquatic ecosystems?
4. What actions can all of us take to improve the health of our ecosystem?

Student Assignments:

All of the lessons in our curriculum include a "Student Assignment" which can be expressed through writing, photos, video, audio, powerpoint, or other projects. The only requirement is that you post two projects each semester, and respond to what your partners have posted. This new format supports the essence of our program - meaningful sharing between classes.

Suggestions include:

- Create a public service announcement
- Create a newscast with various reporters discussing different areas
- Create a short documentary
- Create an animation (using a tool such as kid pix)
- Create a powerpoint presentation
- Write a poem
- Write a book report for one of the suggested books
- Create a poster and post a photo of it on the wiki

We know that with all the other pressures in schools today, it may be difficult to find time to share on the wiki. Here are some suggestions we have gathered over many years of working with teachers on this great program.

Strategies for making the most of limited computer time:

1. Take videos on your smartphone, then post them yourself to group pages
2. Take pictures of posters or hand written assignments, then post to group pages.
3. Do a whole class project/posting using the Promethean or Smart Board. For instance, write down all the things that can pollute our river, group them by source/non-source, identify which ones the kids can help prevent, save and post the final diagram in each of the groups on the wiki.
4. Read postings from partners using Promethean or Smart Board, as a "Friday fun day" activity on the weeks they have posted. This could be done as a reading aloud/public speaking exercise.
5. Identify and train one student from each group to be the "tech leader." Have just these students use the limited classroom computers to post the group projects.
6. Encourage posting from home as homework. Just be sure to monitor what was posted the next day. Even if not all students have computers at home, some will. Consider dividing students up so that at least one person in each group has computer access at home, and they could become the "tech leader."

Strategies for planning and integrating with other curriculum:

- When looking at your plans for the year, for all subjects, keep RiverXchange in mind. Remember, if you want to post "out of order" that is fine!
- Modify the style of writing to match what you are planning to cover at that point in the year.
- Posting shortly after a guest speaker comes to your class is recommended, so you could also consider rearranging your language arts curriculum (and scheduling your computer lab time) to coordinate with times when presenters are scheduled.
- Whatever subject you enjoy the most, see how you can use RiverXchange to enhance it.

- Social studies: history of why early settlers lived where they did, economic impact of rivers and water, use of water by industries
- Math: calculate water use, waste, length of rivers, etc
- Science: volume, density, states of matter
- Language arts: writing is obvious but also poetry, reading informational texts, public speaking
- Other specialized topics such as engineering, careers, art, music

New Mexico Curriculum Overview

Remember, partners in other states may be doing their own curriculum, but we hope you will be able to have good discussion on several of these topics over the course of the year. You may also want to combine some of the lessons so that students do a project that incorporates elements of multiple topics from the curriculum. For example, you could have students write about their river's geography while also talking about its watershed and ways to keep pollution out of it.

Unit 1: Understanding a Watershed

1. River Geography
2. Watershed Model
3. Infiltration and Runoff
4. Forests and Wetlands

Unit 2: Water in Our Society

5. Commercial Uses of Our Rivers
6. Drinking Water
7. Groundwater
8. Wastewater

Unit 3: River Ecosystems

9. Field Trip (with pre and post activities)

Unit 1: Understanding a Watershed (September-December)

Project 1: River Geography

Student Assignment

Write a friendly letter to your partners (on your group page) or create another type of project, explaining:

a) what a watershed is
b) the name of your river - this is also the name of your watershed!
c) the journey of your river from its headwaters to the ocean
d) what the river is like in your area - big/small, clear/muddy, fast/slow?
e) how much precipitation your area receives each year, and what season gets the most precipitation

Informational Texts

- Follow the Water from Brook to Ocean, by Arthur Dorros or Paddle-to-the-Sea, by Holling C. Holling
- "Rains make a dent in drought ranking" article. http://www.abqjournal.com/439037/news/rains-quench-much-of-the-state.html

Classroom Activity – Flexible! Just do as much as you want, and feel free to substitute other activities.

1. Read the book, Follow the Water from Brook to Ocean, by Arthur Dorros (about the Colorado River) OR Paddle-to-the-Sea, by Holling C. Holling (most U.S. School or public libraries have one or the other, or they can be purchased online). Explain how water flows from smaller bodies of water into a larger body. Introduce the concept of a watershed as the land area that drains into a body of water, and explain that this is where surface water comes from.
2. Show students the U.S. Watersheds Map (see link below), pointing out your watershed and your partners' watershed. Talk about the significance of the Continental Divide in North America, and show them where it is in New Mexico. Ask students "Is every place in the world part of a watershed?" Even if there are no hills or mountains, and there is no visible surface water, every place IS in a watershed because precipitation that falls on that land area eventually drains somewhere.
3. Have students identify your river or stream on a large classroom map, and show them where your school is located in relation to your river (north, south, east, west). Figure out where your river or stream starts (headwaters), what tributaries flow into it, and what ocean it flows into at its delta (many students may not know that the Gulf of Mexico is part of the Atlantic Ocean).
4. Point out what towns (if any) are upstream from you and discuss how they could affect your water (quantity and quality) either positively or negatively. Discuss what towns are downstream (if any) and how your town could affect their water, either positively or negatively. Trace your river's path to the ocean, recording each body of water it passes through.
5. Locate your school and your partners' school on the Precipitation Map (see link below). How many inches of precipitation does your area receive? Compare with your partner's ecosystem.
6. Discuss seasons, timing of your area's precipitation, the altitude of your area and how these affect weather. Explain how precipitation and snowpack affect the river.
7. Show students the Major Cities and Rivers Map (see link below), and ask them why they think so many big cities are located near major bodies of water.
8. Optional: If you have time, students (or groups of students) could research major flora and fauna in different regions along the length of your river or tributaries and create a picture postcard from that place. Or, they could write a story about a journey down the river.

9. Optional: New Mexico classes -- for more information about the Rio Grande watershed in New Mexico, show students the Everything is Connected in a Watershed poster (in teacher packet), then visit the All About Watersheds website (see link below) to explore the interactive version.

Vocabulary

- Watershed: The land area from which snowmelt and rain drain into a river, lake or other body of water. Also known as a drainage basin or catchment.
- Surface water: Water collected on the ground or in a waterbody such as a stream, river, lake, wetland or ocean.
- Continental Divide: A drainage divide on a continent (in the U.S., the Rocky Mountains) such that the drainage basin on one side of the divide feeds into one ocean or sea, and the basin on the other side either feeds into a different ocean or sea.
- Headwaters: The source of a river (where it starts).
- Tributary: A creek, stream, or river which feeds a larger stream or river or a lake.
- Delta: The mouth of a river (so named because it is triangle-shaped like the Greek capital letter Delta).
- Desert: A region that receives less than 10" of precipitation per year.
- Precipitation: All the water that falls from the sky, in solid or liquid form, such as rain, snow or hail.
- Snowpack: The amount of snow that accumulates annually in a mountainous area.
- Floodplain: Land that may be submerged by flood waters, or a plain built up by materials deposited by a river.

Materials

- U.S. Watersheds map: http://maps.howstuffworks.com/united-states-watersheds-map.htm
- Precipitation Map: http://www.wrcc.dri.edu/pcpn/us_precip.gif
- Major Cities and Rivers Map: http://cgee.hamline.edu/rivers/Resources/watershedmaps/quiz3.htm
- Optional: Everything is Connected in a Watershed poster and All About Watersheds website link: http://allaboutwatersheds.org/poster/poster_view

Project 2: Watershed Model

For NM classes, this is presented by a guest speaker. For partner classes, we encourage you to see if you can find someone from a local agency who has an watershed model, such as the Enviroscape.

Student Assignment

Write a persuasive paragraph, or create another type of project, about why it is important to keep stormwater clean and what we should do.

Informational Texts

- "Dead Zone" article. http://www.sciencenewsforkids.org/2012/03/suffocating-waters/
- "Garbage Man of the River" article. http://www.cnn.com/2013/04/18/us/cnnheroes-pregracke-rivers-garbage

Classroom Activity – Flexible! Just do as much as you want, and feel free to substitute other activities.

1. Watch The Human Solution to Water Pollution video (see link below).
2. Schedule a guest speaker to bring a model of a watershed, OR make your own using the activity on the back of the USGS poster – Watersheds: Where We Live (the poster may be shown on a SmartBoard – see link below, and a printable copy of the activity is on your wiki).
3. 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). Find out how your community handles stormwater – is it combined with a municipal wastewater (sewage) system?
4. Read news articles (see links below) about garbage in rivers and dead zones caused by nutrients in agricultural runoff. Review the Top Ten Ways to Protect Our Precious Water handout (in teacher packet), and brainstorm other ways to reduce nonpoint-source pollution.
5. Optional: For a great math-based extension activity, try Don't Trash Our Rio (in teacher packet) 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. Even though it is based on an Albuquerque news article, this activity is applicable to any area that has a storm drain system.
6. Optional: Watch The Majestic Plastic Bag video (see link below).
7. Optional: New Mexico classes, watch Segment 3 of the Mid Rio Grande Stormwater Quality Team's educational video (link below) to learn about Albuquerque's and Rio Rancho's stormwater system.
8. Optional: Partner classes, Google "stormwater" in your area and see what information is there. Water districts, the Departments of Heath and Environment etc. have many educational resources.

Materials

- The Human Solution to Water Pollution video: http://sscafca.org/teacher-resources/
- Top Ten Ways to Protect Our Precious Water handout (in teacher packet and on wiki Curriculum page)
- Watershed model such as Enviroscape, OR USGS poster – Watersheds: Where We Live (the poster is available at http://water.usgs.gov/outreach/Posters/watersheds/grade.html and a printable copy of the activity is on your wiki) and supplies:
    - Butcher paper (or newspaper) and plastic wrap
    - Several large baking pans or plastic containers (clear ones can be reused for Project 4: Groundwater)
    - Waterproof marker
    - Spray bottles filled with water
    - Small plastic houses, cows and cars (or little pieces of modeling clay to represent these)
    - Cocoa powder and colored drink powders
- Optional: Don't Trash Our Rio activity (in teacher packet)
- Optional: The Majestic Plastic Bag video: http://www.youtube.com/watch?v=GLgh9h2ePYw
- Optional: Segment 3 of the Mid Rio Grande Stormwater Quality Team's educational video: http://www.keeptheriogrand.org/downloads.htm

Vocabulary

- Watershed: The land area from which snowmelt and rain drain into a river, lake or other body of water. Also known as a drainage basin or catchment.
- Point-source pollution: Water pollution coming from a single point, such as a sewage-outflow pipe or a factory.
- Nonpoint-source pollution: Water pollution coming from a wide land area, not from one specific location. Occurs when rainwater, snowmelt, or irrigation runs off plowed fields, city streets, or suburban backyards, picking up soil particles and pollutants, such as nutrients, pesticides, and other chemicals.
- Storm drain: A drain, often under sidewalks, designed to collect excess rain and ground water from impermeable surfaces such as streets, parking lots, sidewalks, and roofs. Also known as a storm sewer.
- First flush: The first surface runoff of a rainstorm. This is when we see the highest levels of pollution in water entering the storm drains.
- Stormwater: Runoff from a storm which either flows directly into a water body or is channeled into storm drains, which eventually discharge to surface waters.
- Wastewater: All the water that goes down a drain into a municipal sewer system or septic system. Also known as sewage.

Project 3: Infiltration and Runoff

Student Assignment

Where does rainwater go when it falls on your school grounds? Write a RACE paragraph, or create another type of project, using evidence from your mini-field trip around the school.

Informational Texts

- USA Today article. La Niña Brings Flood Risks, Drought to the West (a printable copy is on your wiki).
- LA Times article. 3 days after rain, beach water can still make swimmers ill, study says http://www.latimes.com/science/sciencenow/la-sci-sn-beach-advisories-storm-runoff-20140303-story.html#axzz2v99eazt7 (a printable copy is on your wiki).

Classroom Activity – Flexible! Just do as much as you want, and feel free to substitute other activities.

1. Listen to the Water Cycle Song (see link below). You may want to print out the lyrics for students (a printable copy is on your wiki). Review the six major components of the water cycle: precipitation, runoff, infiltration, evaporation, transpiration, and condensation.
2. Discuss how the sun's energy starts the whole process, and how the water cycle relates to weather, recalling the amount and timing of your area's precipitation.
3. Point out that when precipitation hits the ground, it can either run off, sink in (infiltration, also known as percolation) or evaporate back into the air. Explain how all plants move water from the ground to the air through the process of transpiration.
4. Read the USA Today article (see link below) and discuss how La Niña and El Niño bring dry weather or wet weather to your area. Discuss what happens in different areas of the school when you have too much rain – are there areas that flood?

5. Using Investigating the School Grounds (a printable copy is on your wiki) as a guide, take students on a "mini field trip" to investigate where rainwater goes on your school grounds to observe changes in land contours, and the location of downspouts and catchment areas. Discuss where runoff appears to be occurring, what affects infiltration, and the difference between permeable and impermeable surfaces.
6. Discuss how storm drains carry pollution from impermeable surfaces into the nearest body of water, whereas the process of infiltration into permeable surfaces helps filter out pollution.
7. Discuss how runoff can cause flash floods. In Albuquerque, concrete-lined arroyos are very dangerous because runoff comes from a larger area and the water moves very fast – people have drowned. In Rio Rancho, the arroyos in their natural state are generally safe unless rain clouds are visible.
8. Optional: For a math-based extension, test infiltration on various surfaces, using Does it Soak Right In? (a printable copy is on your wiki) as a guide. Graph the data as a class to build data analysis skills.

Materials

- Investigating the School Grounds activity (a printable copy is on your wiki)
- Water Cycle Song: http://www.abcwua.org/education/music/water%20cycle%20song.mp3
- Water Cycle Song lyrics (a printable copy is on your wiki)
- Optional: Does It Soak Right In? activity (a printable copy is on your wiki)
    - A soup can for each group, all the same size, with both ends cut off
    - Stopwatches
    - Rulers
    - Measuring cups

Vocabulary

- Precipitation: All the water that falls from the sky, in solid or liquid form, such as rain, snow or hail.
- Runoff: The rain or snow that does NOT sink into the ground, that runs off the land into a river, lake or other body of water (often carrying dirt and pollution with it).
- Infiltration: The process of water sinking down into the ground to refill the aquifer. Also called percolation.
- Evaporation: The process by which water changes from liquid to vapor (water in a puddle, river, lake, ocean, or other body of water evaporates into the air).
- Transpiration: The process by which water comes out of the leaves of plants, primarily through openings in the leaves, and goes into the air.
- Condensation: The process by which water changes from vapor to liquid (water in clouds condenses to form rain).
- Impermeable surface: A material that water can NOT soak into (or infiltrate); also called an impervious surface.
- Permeable surface: A material that water can soak (or infiltrate) into; also called a pervious surface.
- Flash flood: A rapid flooding (less than six hours) of low-lying areas (such as washes, rivers, dry lakes, basins), caused by heavy rain, snow or sudden icemelt in surrounding areas.
- Arroyo: A Spanish word for a drainage ditch, gully or ravine which was carved by water drainage.

Project 4: Forests and Wetlands

Student Assignment

Write a persuasive paragraph, or create another type of project, about why wetlands and forests are important in our watersheds.

Informational Texts

- ABQ Journal article. River Diversions Halted Due to Burn Scar Runoff (a printable copy is on your wiki).

Classroom Activity – Flexible! Just do as much as you want, and feel free to substitute other activities.

- Watch The Adventures of Junior Raindrop video (see link below) to learn about how vegetation helps prevent erosion.
- Read the ABQ Journal article (a printable copy is on your wiki) about erosion from wildfires polluting the Rio Grande.
- Do the Wetland Model activity from the back of the USGS poster – Wetlands: Water, Wildlife, Plants (the poster may be shown on a SmartBoard – see link below, and a printable copy of the activity is on your wiki) to examine the effects of a wetland in reducing erosion and controlling flooding.
    - To model forests in the watershed, stick cotton balls in the clay and repeat the experiment again to see that the muddy water gets even cleaner as it travels through the "forest."
- Even in desert areas like New Mexico, there are wetlands, and riparian areas. Many are constructed (man-made) specifically for cleaning stormwater. Discuss how these areas also support a diverse community of living things, and how many people used to think wetlands were not important. In fact, they would fill them in with soil and build right on top of them!
- Find books from your library on different kinds of wetlands, and discuss the differences in wildlife and plant communities they support – OR watch the NatureWorks video (see link below).
- Optional: Do the Water Treatment Plants activity (see link below) to see how celery sticks, like wetland plants, can help filter water by absorbing pollution. This activity is very quick to set up, then just wait one day to see what happens.
- Optional: New Mexico classes, watch Segment 2 of the Mid Rio Grande Stormwater Quality Team's educational video (link below) to learn how stormwater from our roadways is handled, and how a constructed wetland helps clean stormwater.

Materials

- The Adventures of Junior Raindrop video: http://www.archive.org/details/Adventur1948
- USGS poster – Wetlands: Water, Wildlife, Plants. The poster is available at http://water.usgs.gov/outreach/Posters/wetlands/middle.html, and a printable copy of the activity is on your wiki.
- Supplies:
    - Small rectangular plastic storage containers, or baking pans or paint trays
    - Modeling clay
    - Small pieces of carpet

    - Cotton balls
- NatureWorks video http://video.nhptv.org/video/1491178229
- Optional: Water Treatment Plants activity (a printable copy is on your wiki)
    1. Celery sticks
    2. Cups of colored water
- Optional: Segment 2 of the Mid Rio Grande Stormwater Quality Team's educational video: http://www.keeptheriogrand.org/downloads.htm.

Vocabulary

- Erosion: The process in which a material (such as a river bank) is worn away by water or air, often due to the presence of abrasive particles in the stream.
- Wetland: An area such as a marsh or swamp that is covered with shallow water or where the soil is naturally soaked with water.
- Riparian area: The area around the banks of a natural body of fresh water, where the vegetation and landscape is directly influenced by that water.

Unit 2: Water in Our Society (January-May)

Project 5: Commercial Uses of Our Waterways

For NM classes, this is presented by a guest speaker from the county's Cooperative Extension. For partner classes, we encourage you to see if you can find someone from a local agency or business who can present on this topic.

Student Assignments

Write an informational paragraph or a friendly letter to your partners, or create another type of project, explaining:

a) How was the river (or other waterway) important when people first settled in your community?
b) How has your waterway been used by people for commerce (to make money) in your community's history?
c) Do some people still rely on the waterway for their jobs, such as farming, fishing, shipping, or recreation?
d) What technologies have people developed to solve water problems in your area (like drilling wells, building dams, locks, and fish ladders, different kinds of irrigation, or technologies to conserve water or prevent pollution?)

Informational Texts

- ABQ Journal article. Deal Allows Farmers to Sell Irrigation Water (printable copy on your wiki).

Classroom Activity – Flexible! Just do as much as you want, and feel free to substitute other activities.

- Research the major commercial use(s) of your river/waterway (such as agricultural irrigation, shipping/transportation, electricity, fisheries and/or recreation) and invite a guest speaker to present, or find an activity that relates. In New Mexico, the only major commercial use of the Rio Grande is agriculture – 80% of the water goes to irrigation!

- Discuss how these commercial uses influenced the location/history of your community, and how these users can also help a community conserve water and keep water clean (such as conserving water when irrigating, controlling erosion, keeping boat engines in good repair).
- 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.
- In NM, discuss the acequia system which was put in place by the Pueblo people and early Spanish settlers. Watch one of the YouTube videos, or read an article about water rights (see links below).
- Show students the USGS poster - Navigation: Traveling the Water Highways (see link below, and a printable copy of the activity is on your wiki). Discuss how some communities use their river for transportation, while New Mexico rivers are used mainly for agricultural irrigation. New Mexico students may not be familiar with dams, locks and boats traveling on the river. If your river is used for transportation, you may want to do the River Profile activity on the back of the poster.
- Optional: Water Ripples games (see link below). Review ways our society uses water, particularly in agriculture.
- Optional: Water Rights. Using the Pass the Jug activity guide (see link below), 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. Revisit the Precipitation Map and discuss why this makes a difference. Read about farmers being allowed to sell their water rights to allow more water for the ecosystem.

Materials

1. USGS poster - Navigation: Traveling the Water Highways. The poster is available at http://water.usgs.gov/outreach/Posters/navigation/grade.html, and a printable copy of the activity is on your wiki.
2. Optional: Water Ripples games. http://aces.nmsu.edu/ces/watertaskforce/water%20ripples%20gameshow%20quiz/index.html
3. Optional: Water Rights
   - Pass the Jug activity: http://www.earthsciweek.org/forteachers/passthejug_cont.htm
   - Precipitation Map: http://www.wrcc.dri.edu/pcpn/us_precip.gif
   - Ancient Irrigation video: http://www.youtube.com/watch?v=RUv2Tz1ayTc
   - Ditch Cleaning at Arroyo Hondo video: http://www.youtube.com/watch?v=YyqxdbsEObU

Vocabulary

- Irrigation: Watering crops. When natural precipitation is not enough for crops, farmers use flood irrigation (common in New Mexico), drip irrigation and/or overhead sprinklers.
- Acequia: An irrigation ditch used to distribute water from rivers to farms. Most are simple ditches with dirt banks, but they can be lined with concrete. An important form of irrigation in the development of agriculture in the American Southwest.
- Erosion: The process in which a material (such as a river bank) is worn away by water or air, often due to the presence of abrasive particles in the stream.

- Dam: A barrier built across a river to hold water back; sometimes used to generate electricity.
- Lock: A chamber with gates that close off for raising and lowering boats on a river or canal.

Project 6: Drinking Water

For NM classes, this is presented by a guest speaker from the water utility. For partner classes, we encourage you to see if your local utility can send someone to present.

Student Assignments

Write a persuasive paragraph (or create another type of project) explaining why it is important to conserve water, and what we should do.

Informational Texts

- Jacksonville Journal Courier article. City Cracking Down on Water Use (a printable copy is on your wiki).
- ABQ Journal articles (several on drought and drinking water; printable copies on your wiki).
- "Americans use twice as much water as they think they do, study says" article. http://www.latimes.com/science/sciencenow/la-americans-underestimate-personal-water-usage-study-says-20140227-story.html#axzz2v99eazt7 (printable copy on your wiki)
- A Long Walk to Water, by Linda Sue Park (2010: Clarion Books, 128 pages)

Classroom Activity – Flexible! Just do as much as you want, and feel free to substitute other activities.

1. Discuss the Indoor Water Use graph (see link below), emphasizing that all of these activities use clean drinking water. Explain that in homes and other buildings there is one set of pipes that bring clean drinking water into the home and a different set of pipes that takes the dirty water away. Be sure to mention that in many parts of the country (like in NM) people use almost as much for watering plants outdoors as all their indoor water use combined. Discuss how xeriscape and watering during the coolest part of the day can help.
2. Schedule a guest speaker to present on where your drinking water comes from, how it is treated to make it safe for drinking, and/or ways to conserve water. OR research where your drinking water comes from, and do The Value of Water activity from the back of the USGS poster - Water: The Resource That Gets Used & Used & Used For Everything (see link below, and a printable copy of the activity is on your wiki). Students will examine their water use by using play money to record their daily usage, then brainstorm how to conserve. For a math-based extension activity, you can graph the data as a class to build data analysis skills.
3. Discuss how flooding or drought can affect your community's drinking water. Look for articles in your local paper, or read one of the suggested articles (printable copies are on your wiki). The Jacksonville Journal Courier article talks about flooding in Illinois, while one ABQ Journal article talks about the emergency water restrictions in Las Vegas, NM. Other ABQ Journal articles discuss Albuquerque and Santa Fe drinking water projects and the current drought.
4. Optional: Water Footprint. Calculate your impact using an online tool (see link below).
5. Optional: Water Use in Other Countries. To learn more about water use in other countries, invite a guest speaker from Water for People (see link below) and/or watch the Water for Life video, and/or

read the book A Long Walk to Water, by Linda Sue Park. Compare average indoor water use in the U.S. to that in other nations.

6. Optional: The Water-Energy Connection. Show students the Power Couple video and/or water-energy posters to learn about the connection between electricity and water use, then do the activity (see links below.).

Materials

- Indoor Water Use Graph http://www.epa.gov/WaterSense/pubs/indoor.html
- USGS Poster – Water: The Resource That Gets Used & Used & Used For Everything. The poster is available at http://water.usgs.gov/outreach/Posters/water_use/grade.html, printable copy of the activity is on your wiki.
- Optional: Water Footprint Calculator
  - http://kidsblogs.nationalgeographic.com/greenscene/2010/08/water-footprint-calculator.html
- Optional: Water Use in Other Countries
  - Speaker: http://www.waterforpeople.org/assets/pdfs/committees/water-for-people-committee.pdf
  - OR Water for Life video: http://www.archive.org/details/Unworks-MTV-WFL
- Optional: The Water-Energy Connection
  - Power Couple: The Shocking True Story of Water and Electricity video, with viewers' guide and posters. http://www.abcwua.org/education/Energy_Water_Nexus.html
  - Understanding the Energy Demand of Bottled Water. http://www.eeweek.org/assets/files/water_and_energy/3%20%20Understanding%20the%20Energy%20Demand%20of%20Bottled%20Water_5-8%20Lesson%20Plan.pdf

Vocabulary

- Drinking water: Water that has been purified to standards set for human consumption.
- Xeriscape: The use of low water use plants in landscape (not "zeroscape".) Xeros is Greek for "dry."
- Conserve: To use something wisely; not wasting.
- La Niña: An irregularly occurring movement of deep cold water to the ocean surface along the western coast of South America that brings less precipitation to the southern U.S. and more to the northern U.S.
- El Niño: An irregularly occurring flow of unusually warm surface water along the western coast of South America that brings more precipitation to the southern U.S. and less to the northern U.S.

Project 7: Groundwater

Student Assignment

How are groundwater and surface water connected? Write a RACE paragraph, or create another type of project, using what you learned from the aquifer model.

Informational Texts

- ABQ Journal article. State: Kirtland Jet Fuel Leak Massive (printable copy is on your wiki)
- ABQ Journal article. KAFB Ramps Up Fuel Spill Cleanup (printable copy is on your wiki)

Classroom Activity – Flexible! Just do as much as you want, and feel free to substitute other activities.

- Watch The Story of Groundwater video (see link below) to learn the difference between groundwater and surface water.
- Show students the Major U.S. Aquifers map (see link below) and locate your aquifer.
- Do the activity Recharge-Discharge from the back of the USGS poster – Groundwater: The Hidden Resource (the poster may be shown on a SmartBoard – see link below, and a printable copy of the activity is on your wiki). Students build a simple aquifer model to learn about the water table, how a well works, and how groundwater and surface water are connected. Discuss how if we pump too much of surface water it can deplete groundwater, and vice versa. Also, if one person pumps too much groundwater from their well, it can affect their neighbors' wells.
- Leaking underground tanks (such as septic tanks or gas tanks beneath gas stations) are a major source of groundwater pollution. This can be demonstrated using small plastic cups with holes poked in the bottom. Sink a cup into the gravel of the model and fill it with colored water to see how pollution spreads through groundwater. Note that contaminated groundwater can pollute surface water and vice versa.
- Read articles from the Albuquerque Journal about a jet fuel leak from Kirtland Air Force Base (printable copies are available on your wiki) or find articles about similar issues in your area. Discuss what types of pollution can get into groundwater and what can't. Solids such as trash and dog poop on the earth's surface cannot travel down to the aquifer. Dissolved chemicals, heavy metals, and very large amounts of farm animal waste can, however.
- Read articles about groundwater from the Groundwater Foundation. Review the Top Ten Ways to Protect Our Precious Water handout (in teacher packet). Brainstorm other ways to prevent groundwater pollution.

Materials

- The Story of Groundwater video http://www.groundwater.org/kc/groundwater_animation.html
- Major U.S. Aquifers map http://pubs.usgs.gov/ha/ha730/ch_a/gif/A004_us.gif
- Top Ten Ways to Protect Our Precious Water handout (in teacher packet)
- USGS poster – Groundwater: The Hidden Resource. The poster is available at http://water.usgs.gov/outreach/Posters/groundwater/grade.html, and a printable copy of the activity is on your wiki.
- Supplies:
    1. Several clear baking pans or plastic containers
    2. Gravel to fill containers 2/3 full
    3. Several pump tops from soft-soap or hand-lotion containers
    4. Paper cups with holes punched in the bottom to sprinkle water
    5. Colored drink powder
- The Groundwater Foundation - Uses of groundwater including chart http://www.groundwater.org/get-informed/basics/groundwater.html
- The Groundwater Foundation - Contamination http://www.groundwater.org/get-informed/groundwater/contamination.html

Vocabulary

- Aquifer: A wet underground layer of water-bearing rock or materials (gravel, sand, silt or clay) from which groundwater can be extracted using a well.
- Groundwater: Water located beneath the earth's surface in cracks between soil particles and fractures in rock formations. A large and usable quantity of groundwater is called an aquifer.
- Surface water: Water collected on the ground or in a waterbody such as a stream, river, lake, wetland or ocean.
- Water table: The top surface of an aquifer (how far you have to dig down to find water).
- Well: A man-made hole with a pipe that goes down to the water table. A pump helps bring the groundwater up.

Project 8: Wastewater

For NM classes, this is presented by a guest speaker from the water utility. For partner classes, we encourage you to see if your local utility can send someone to present.

Student Assignment

Write a narrative or creative paragraph, or create another type of project, explaining the journey of your community's wastewater.

Informational Texts

- ABQ Journal article. Aging Pipes Mean Higher Water Bills (printable copy on your wiki).
- Combined sewer overflows article (Includes a fantastic video! Scroll way down to see "A Drop's Life"). http://all-geo.org/highlyallochthonous/2013/03/combined-sewer-overflows-solving-a-19th-century-problem-in-the-21st-century/

Classroom Activity – Flexible! Just do as much as you want, and feel free to substitute other activities.

- Invite a guest speaker to learn about where your community's wastewater goes, OR (if your community has a municipal sewer system) do the activity Where Does Your Used Water Go? on the back of the USGS poster - How Do We Treat Our Wastewater? (see link below; printable copy is on your wiki).
- Show students the Septic System poster (a printable copy is on your wiki) 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. If desired, watch the Dirty Jobs video (see link below). If your community has mostly septic systems, discuss how important it is to have the tanks pumped out regularly to avoid groundwater pollution.
- Discuss what kinds of things NOT to put down the drain or toilet – for example, fats, oils, and grease can solidify in pipes and cause a backup. Read the articles about Albuquerque's crumbling sewer infrastructure (a printable copy is on your wiki), read the article about combined sewer overflows by a geology professor from Kent State (see link below), or find local news articles about issues in your area.

- Discuss how treated wastewater is recycled in many communities (such as watering golf courses), and how a community's treated wastewater will be used by downstream communities.
- Review the differences between stormwater, drinking water, and wastewater, emphasizing how different sets of pipes are involved, and that the "quality" of the water being transported is very different.

Materials

1. USGS poster - How Do We Treat Our Wastewater? The poster is available at http://water.usgs.gov/outreach/Posters/wastewater/grade.html, and a printable copy of the activity is on your wiki.
2. Supplies:
    1. 14 feet of yarn, string or rope
    2. Shredded paper or packing peanuts and a cardboard box
3. Septic System poster (a printable copy is on your wiki).
4. Combined Sewer Overflow video: A Drop's Life. Applies to certain cities only, mostly in the eastern US, find out if your city has this type of system. https://www.youtube.com/watch?v=5Ug1hravb9Q
5. Dirty Jobs: Septic Tank Technician video (Caution – this video has one bad word at 1:16) http://home.howstuffworks.com/home-improvement/plumbing/sewer2.htm

Vocabulary

1. Wastewater: All the water that goes down a drain into a municipal sewer system or septic system. Also known as sewage.
2. Sewer system: A system of underground pipes used to transport human waste. In some communities, the sewer system is combined with the storm system (known as a combined sewer).
3. Septic system: A small-scale sewage treatment system common in areas with no connection to a municipal wastewater system. A septic tank is a key component of a septic system.
4. Stormwater: Runoff from a storm which either flows directly into a water body or is channeled into storm drains, which eventually discharge to surface waters.
5. Drinking water: Water that has been purified to standards set for human consumption.

Unit 3: River Ecosystem Field Trip (any time during the year)

Project 9: Field Trip

Student Assignment

Write a narrative paragraph or a friendly letter to your partners, or create another type of project, about your field trip experience:

a) If you tested the water, explain why we collect water quality data and what it means.

b) If you planted trees or did another service learning project, explain how your project will help the river ecosystem.

Informational Texts

1. A Waterproof Case (in teacher packet)
2. The Water Down Under booklet (in teacher packet)

3. Local ecosystem articles (These are for NM, printable copies are on your wiki. Teachers in other areas should search local newspapers for articles about their own ecosystem).
    - ABQ Journal article. Battle with Beavers.
    - ABQ Journal article. Birds Divert Work on Buckman Project.
    - ABQ Journal article. COMING BACK - Fish Biologists Are Optimistic That the Silvery Minnow Will Recover After Being Close to Extinction.

Pre-Field Trip Activities

1. Define an ecosystem (the physical environment together with all the species that live there). Discuss how living things depend on the nonliving things, such as water, air, soil/rocks, and the sun.
2. Read The Water Down Under booklet to learn more about macroinvertebrates and water quality. OR watch Macroinvertebrate Lunch and have students complete the student guide (see link below) to learn about the role of aquatic macroinvertebrates in the food web and what they can tell us about the health of our ecosystem. Many animals depend on them for food. Some aquatic macroinvertebrates are sensitive to pollution, so one way scientists can tell how healthy a river ecosystem is by looking at which types of macroinvertebrates are living in the water. Many of them spend only part of their lives in the water, so if the water is polluted, it has far-reaching effects on the ecosystem. Discuss producers, consumers and decomposers, and where aquatic macroinvertebrates fit (some are consumers, some are decomposers).
3. Talk about the field trip and location, and what students can expect.
4. Optional: Frogline News. Watch a newscast by frogs (see link below) to revisit how pollution gets into surface water. Discuss the significance of the frog (i.e., the frog is a biological indicator species because it is very sensitive to water pollution). Remind students of the watershed model and how they can prevent nonpoint-source pollution.
5. Optional: Acid Rain. Watch the video How Acid Rain Works (see link below).

Field Trip

1. For New Mexico Classes: Field trips may include a service learning project, such as tree planting or an agricultural activity. Otherwise, they will incorporate hands-on lessons about riparian areas, wetlands, macroinvertebrates and water quality, and students will use a field journal. On the field trip, students will gather data about pH, temperature, turbidity and dissolved oxygen.
2. For Partner Classes: We strongly encourage you to take any water-related field trip available in your area, and we can help if you have trouble finding one. Please let us know if you'd like a water quality monitoring kit!
3. Water quality data will be sent to the World Water Monitoring Challenge program and will appear on their website. If you receive a water quality testing kit from us, please submit your data to the Partner Teacher Coordinator immediately after your field trip.

Post-Field Trip Activity

1. Review how land use affects water quality and what the water quality data tells us about the ecosystem.
    - Increased river temperature can be caused by many things including low river flow, large areas of impermeable surfaces, lack of vegetation, and stormwater that is warm from flowing over roads.
    - High temperature and/or fertilizers (including pet waste) can cause algae bloom, which can reduce dissolved oxygen.
    - Erosion or algae bloom can cause turbidity, leading to higher temperature.

- Acid rain, mine drainage or algae bloom can cause low pH (normally pH is determined by the types of rocks or trees present in the watershed).
- Compare the class data to other World Water Monitoring Day sites on the 2013 map on their website (see link below).
- Read news articles about issues in your local ecosystem. A few articles for NM are provided (printable copies are on your wiki).
- Optional: River Food Web. Make a food web for your 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. NM Classes: use Bosque plant and animal cards to do The Web activity (a printable copy is on your wiki), discussing how all living things depend on each other. For Partner Classes: The Web activity can be applied to any ecosystem and is a simple, yet fun way to get kids thinking "on their feet".

Materials

Pre-Field Trip Activities:

- Macroinvertebrate Lunch activity
    - Video, student sheet, answer sheet: http://www.watersheds.org/earth/macro_resources.htm

Frogline News video: http://www.youtube.com/watch?feature=player_embedded&v=HhlPtNX5XTM
Optional: Acid Rain. How Acid Rain Works video,
http://science.howstuffworks.com/nature/climate-weather/atmospheric/acid-rain.htm

Field Trip:

Macroinvertebrate Data Sheets (if desired, printable copies are on your wiki).

Post-Field Trip Activities:

World Water Monitoring Challenge website http://worldwatermonitoringchallenge.com/
Optional: The Web food web activity (a printable copy is on your wiki).

Vocabulary

Ecosystem: All the living and nonliving things that interact in a particular place.
Bosque: A Spanish word for woodlands, it refers to the riparian areas of stream and river banks in the southwestern U.S.
pH: A measure of the acidity or alkalinity of water (or a solution) on a scale that ranges from 0 (extremely acidic) to 14 (extremely alkaline). Pure water has a pH of 7 (neutral).
Turbidity: A measure of water clarity based on the amount of particles suspended in it.
Dissolved oxygen: The concentration of oxygen dissolved in water, expressed in milligrams per liter or as a percent saturation.
Riparian area: The area around the banks of a natural body of fresh water, where the vegetation and landscape is directly influenced by that water.
Aquatic macroinvertebrates: Animals that have no backbone, are visible with the naked eye, and spend all or part of their life in water. This diverse group of animals includes worms, mollusks, arachnids, crustaceans and insects.
Food web: A representation of the predator-prey relationships between species within an ecosystem.
Producers: Organisms, generally plants, that make their own food (using only the sun's energy, water, and inorganic compounds), and are the foundation of the food chain.

Consumers: Organisms that obtain nutrients by eating other organisms (such as plants or other animals).
Decomposers: Organisms (such as bacteria, fungi, other plants and animals) that break down the remains of dead organisms, releasing the substances that can be used by other members of the ecosystem.
Native species: A species that naturally occurs in a particular ecosystem.
Invasive species: A plant or animal introduced from a different area that competes with native species that is taking over an area.
Endangered species: A plant or animal species existing in such small numbers that it is in danger of becoming extinct (dying out completely).

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Bosque Ecosystem Monitoring Program

Science, Education, and Stewardship

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Middle Rio Grande Stormwater Quality Team

2015-2016 BEMP Stormwater Science Education Overview

The main objective of the *Stormwater Science* outreach education program 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 one and one-half hour classroom activity, a four to five hour study trip to the Rio Grande and . **During the 2015-2016 school year 1804 students participated in *Stormwater Science*** activities in their classrooms, in the field or both. The one and one-half hour classroom program was delivered to **955 students** in **34 classrooms** at **18 different schools** in **Bernalillo, Rio Rancho, Albuquerque, Los Lunas and Socorro.**

The classroom portion of the program demonstrates that runoff carries contamination to the Rio Grande. Students in 4th grade and higher construct a model of the Rio Grande Watershed (image 1). The watershed has 5 different communities along the river: a cattle ranch, up-and-downstream eco-friendly towns, an urban city, and agricultural fields. Students add different 'runoff cards' to the river downstream of the community where they came from. Some of the runoff is naturally occurring (turbidity), and others are human caused (pesticides, oil, etc.). The program runs through two different scenarios, a *before-the-storm* and *after-the-storm* river. They demonstrate the harmful effects storm water contamination can have on aquatic organisms and downstream communities. Students in grades one through three build a simplified version of the watershed model and discuss how runoff impacts habitat health. They also work with a 3D water model (image 2); students can place food coloring representing pollution in the city and watch it run into the river when they sprinkle water to represent rain.

The program encourages students to change their daily behavior in ways that can help to keep their watershed clean. Educators help to provide solutions as well as having students come up with ideas on their own. The handout to accompany this activity is available to students in both English and Spanish, the middle school level handout is included below.

188 students also took part in study trips. This field portion of the program is a four to five hour trip to the Rio Grande during which students investigate how stormwater moves through the city and collect and interpret water quality data. The program starts with a trail/arroyo survey which examines and categorizes the amount of visible pollutants (plastics, paper, dog poop, animal scat, etc…) in the San Antonio arroyo in Albuquerque or the Arroyo de la Baranca in Rio Rancho, both of which empty into the Rio Grande. In the arroyo students calculate how fast erosion occurs and test water quality. When the students arrive at the bank of the Rio Grande they examine the water using a LaMotte water quality monitoring kit and search for macro-invertebrates. Students share their results, compare them to results gathered by students in the past and to the data they gathered in the arroyo, and discuss what they could mean in terms of river health.

Hundreds of students also took part in *Stormwater Science* related field activities at BEMP's events or during BEMP's monthly data collection. These field activities included a discussion on urban runoff and a hands-on water quality investigation, either through chemical tests or macro-invertebrate identification. Students are then asked to come up with ways they could prevent pollution from reaching the river. Events included BEMP Student Congresses, (where BEMP students to share their research and experiences in the Bosque) and Bosque School's Otter Day, (an event for first graders, hosted by high school students to teach about endangered animals in New Mexico).

Image 1.
Students at Martin Luther King Jr. Elementary brainstorm ideas for ways to prevent runoff from reaching the Rio Grande after building a watershed model in their classroom.

Image 2.
Lower elementary students can place food coloring on this model before using a sponge to create a rainstorm. Water washes the contamination through the city and into tnto the river.

Image 3.
Students from Madison Middle School perform water quality tests on the banks of the Rio Grande to compare to the tests they ran on water they found in the arroyo.

Classroom Handout – Mid/High School

Hydrologist: _____ Date: _____

Stormwater Science

What 2 sources can New Mexicans get their drinking water from?

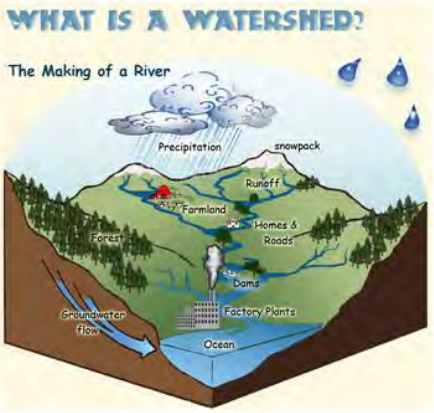
1. _____

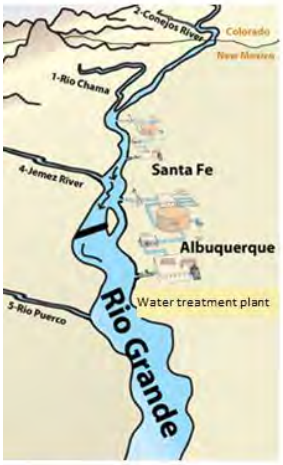
2. _____

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

Cattle Ranch

Upstream eco-friendly town

Farm Fields

How do the living things in the river ecosystem react to the stormwater?

_____

_____

_____

_____

_____

Stromwater carries runoff and pollution from every part of the watershed to the river. List some types of runoff that come from natural areas.

_____

_____

_____

List some types of runoff that come from your community:

_____

_____

_____

_____

_____

_____

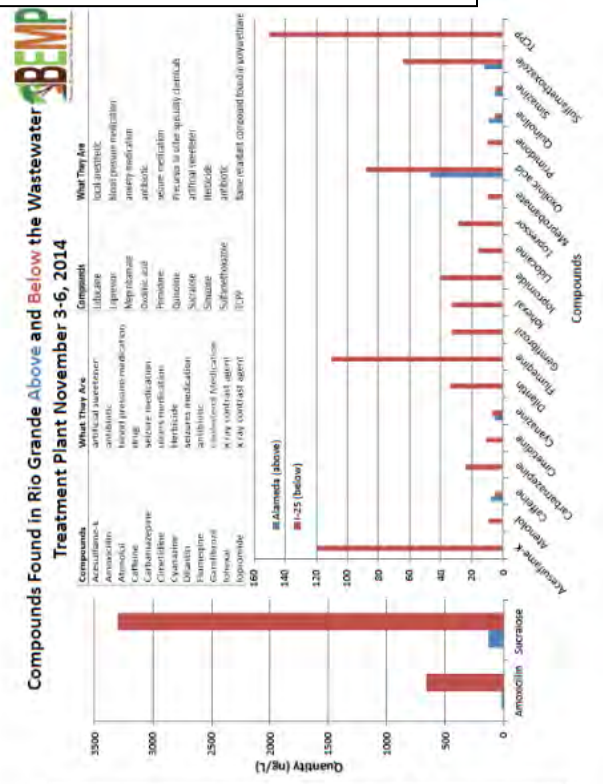
City

Downstream eco-friendly town

How can *YOU* help to keep our watershed clean?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

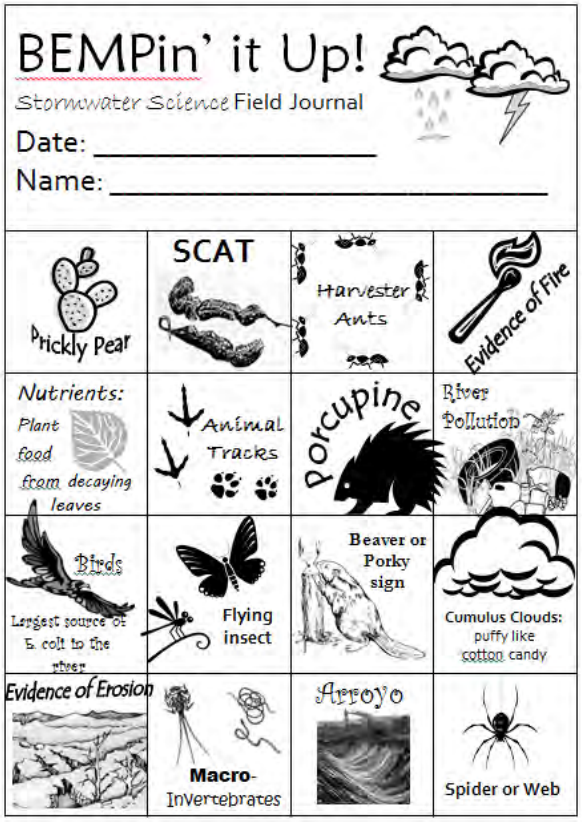
Field Journal for outdoor study trips



List two things that ***you*** can do to help keep our watershed clean (besides picking up trash)

1.) _____

2.) _____



UNM Bosque Ecosystem Monitoring Program www.bosqueschool.org/bemp.htm BOSQUE

Litter Survey

The San Antonio Arroyo collects water from all over the west side of Albuquerque. Anything that ends up in these arroyos could travel to the river.

	Type of Pollutant	In the arroyo	In the bosque	Total
1	Paper trash			
2	Plastic trash			
3	Glass or aluminum			
4	Other trash			
5	Dog poop			
6	Coyote scat			
7	Other types of scat			
8	Evidence of erosion			
9	Cigarette butts			
10	Chemicals			

What is the main type of pollutant you found today? _____

How many of these items could have been recycled? _____

Water Chemistry

	Arroyo or Ditch	Which is better?	River
Temperature	0-2 3-5 6-10 >10 _____ °C		0-2 3-5 6-10 >10 _____ °C
Turbidity	0 0-40 40-100 >100 _____ JTU		0 0-40 40-100 >100 _____ JTU
Nitrate	1-4 5 20 40 _____ ppm		1-4 5 20 40 _____ ppm
Phosphate	0 4 8 _____ ppm		0 4 8 _____ ppm
pH	4 5 6 7 8 9 10		4 5 6 7 8 9 10
Fecal Coliform	Present / Not		Present / Not
Dissolved O2	0 4 8 _____ ppm _____ % saturation		0 4 8 _____ ppm _____ % saturation

Scoop the Poop Keep the Rio Grande

What grade would you assign to this section of the river? _____

Phosphate: 1ppm (Excellent) 2ppm (Good) 4ppm (Fair) 6ppm (Poor)

Nitrate: 1-4 ppm (Good) 5ppm (Fair) 20ppm (Poor) 40ppm (Xtra Poor)

Turbidity: 0 JTU (Excellent) 1-40 JTU (Good) 39-100 JTU (Fair) >101 JTU (Poor)

Dissolved Oxygen: 91-100% (Excellent) 71-90% (Good) 51-70% (Fair) <50% (Poor)

Temp: Good 0 - >10°C Poor

Iron: (Good) 0 - .03 - .05 – 1 – 3 – 5 (Poor)

E.coli: Present (poor) Absent (good)

Copper: (Good) 0 – 0.3 – 0.6 – 1 – 3 Poor)

pH: 1-2-3-4-5-6-7-8-9-10-11-12-13-14 poor good poor

Weather Report

1. Time: _____ am / pm

2. Cloud Cover _____%

3. Humidity_____%

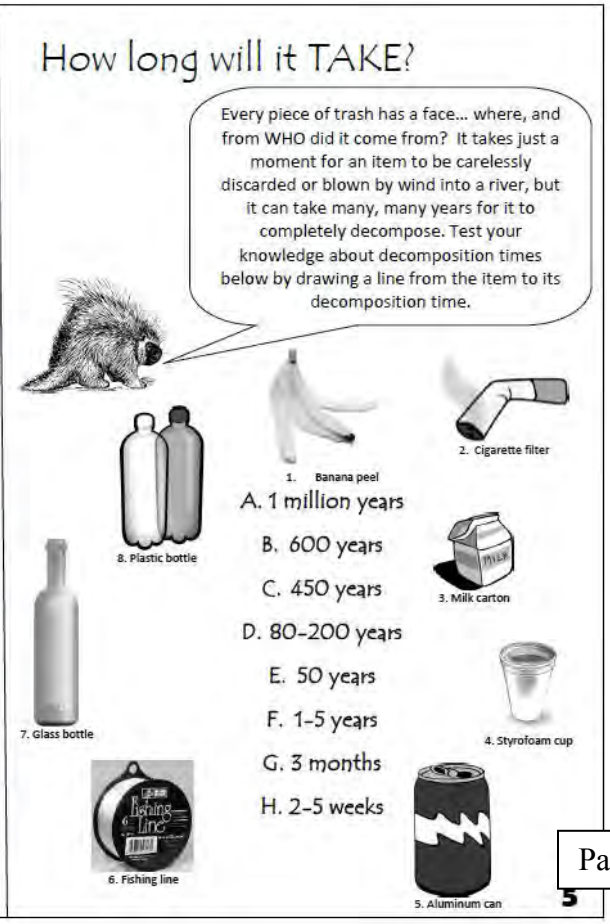
4. Temperature: _____

5. Wind Speed _____km/h

Journal Space

How long will it take? Answers:
1=H, 2=F, 3=G, 4=E, 5=C, 6=B, 7=A, 8=D

Page 3



Page 4

2015-2016 Stormwater Science Education Outreach Numbers

Stormwater Sci classroom presentation	
Study Trips	
Stormwater Sci field activities	
Other Stormwater Sci science related events	

Elementary School	
Middle School	
High School	

Date	Teacher	School	City	# students in classroom	# students in Field	# adults	Grade	Activity	# Presentations	Hours	School Level
9/8/2015	Sylvia Meyers	Chamiza Elementary	Albuquerque	22		1	4th	Classroom	1	1.5	ES
9/8/2015	Janis Hirsh	Chamiza Elementary	Albuquerque	24		1	4th	Classroom	1	1.5	ES
9/28/2015	Janis Hirsh	Chamiza Elementary	Albuquerque		24	5	4th	study trip	1	4	ES
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10/13/2015	Rona Gomez	Madison Middle School	Albuquerque		30	4	8th	study trip	1	4	MS
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12/1/2015	Ms. Dengler/Kits	Martin Luther King Elementary	Rio Rancho	27			4th	Classroom	1	1	ES
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Total #'s				955	849	291			75	108.5	

The University of New Mexico
Department of Biology
MSC03 2020
Albuquerque, NM 87131-0001
(505) 277-0758

Bosque Ecosystem Monitoring Program

Science, Education, and Stewardship

BOSQUE SCHOOL
4000 Learning Rd NW
Albuquerque, NM 87120
(505) 898-6388

Middle Rio Grande Stormwater Quality Team

2015-2016 BEMP Stormwater Science Education Overview

The main objective of the *Stormwater Science* outreach education program 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 one and one-half hour classroom activity, a four to five hour study trip to the Rio Grande and . **During the 2015-2016 school year 1804 students participated in *Stormwater Science*** activities in their classrooms, in the field or both. The one and one-half hour classroom program was delivered to **955 students** in **34 classrooms** at **18 different schools** in **Bernalillo, Rio Rancho, Albuquerque, Los Lunas and Socorro.**

The classroom portion of the program demonstrates that runoff carries contamination to the Rio Grande. Students in 4th grade and higher construct a model of the Rio Grande Watershed (image 1). The watershed has 5 different communities along the river: a cattle ranch, up-and-downstream eco-friendly towns, an urban city, and agricultural fields. Students add different 'runoff cards' to the river downstream of the community where they came from. Some of the runoff is naturally occurring (turbidity), and others are human caused (pesticides, oil, etc.). The program runs through two different scenarios, a *before-the-storm* and *after-the-storm* river. They demonstrate the harmful effects storm water contamination can have on aquatic organisms and downstream communities. Students in grades one through three build a simplified version of the watershed model and discuss how runoff impacts habitat health. They also work with a 3D water model (image 2); students can place food coloring representing pollution in the city and watch it run into the river when they sprinkle water to represent rain.

The program encourages students to change their daily behavior in ways that can help to keep their watershed clean. Educators help to provide solutions as well as having students come up with ideas on their own. The handout to accompany this activity is available to students in both English and Spanish, the middle school level handout is included below.

188 students also took part in study trips. This field portion of the program is a four to five hour trip to the Rio Grande during which students investigate how stormwater moves through the city and collect and interpret water quality data. The program starts with a trail/arroyo survey which examines and categorizes the amount of visible pollutants (plastics, paper, dog poop, animal scat, etc…) in the San Antonio arroyo in Albuquerque or the Arroyo de la Baranca in Rio Rancho, both of which empty into the Rio Grande. In the arroyo students calculate how fast erosion occurs and test water quality. When the students arrive at the bank of the Rio Grande they examine the water using a LaMotte water quality monitoring kit and search for macro-invertebrates. Students share their results, compare them to results gathered by students in the past and to the data they gathered in the arroyo, and discuss what they could mean in terms of river health.

Hundreds of students also took part in *Stormwater Science* related field activities at BEMP's events or during BEMP's monthly data collection. These field activities included a discussion on urban runoff and a hands-on water quality investigation, either through chemical tests or macro-invertebrate identification. Students are then asked to come up with ways they could prevent pollution from reaching the river. Events included BEMP Student Congresses, (where BEMP students to share their research and experiences in the Bosque) and Bosque School's Otter Day, (an event for first graders, hosted by high school students to teach about endangered animals in New Mexico).

Image 1.
Students at Martin Luther King Jr. Elementary brainstorm ideas for ways to prevent runoff from reaching the Rio Grande after building a watershed model in their classroom.

Image 2.
Lower elementary students can place food coloring on this model before using a sponge to create a rainstorm. Water washes the contamination through the city and into tnto the river.

Image 3.
Students from Madison Middle School perform water quality tests on the banks of the Rio Grande to compare to the tests they ran on water they found in the arroyo.

Classroom Handout – Mid/High School

Hydrologist: _____ Date: _____

Stormwater Science

What 2 sources can New Mexicans get their drinking water from?

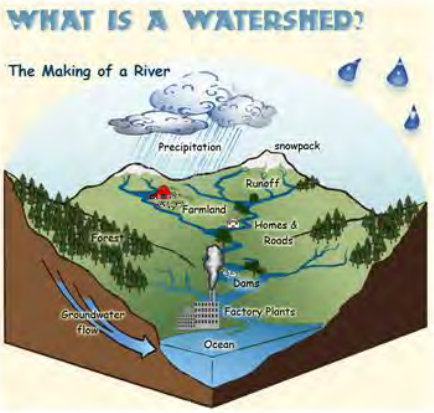
1. _____

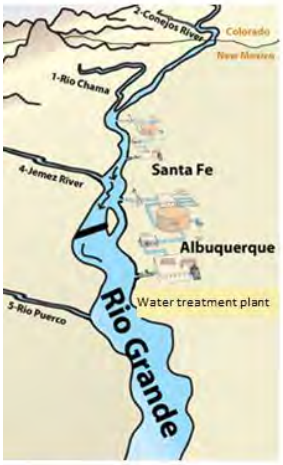
2. _____

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

Cattle Ranch

Upstream eco-friendly town

Farm Fields

How do the living things in the river ecosystem react to the stormwater?

_____

_____

_____

_____

_____

Stromwater carries runoff and pollution from every part of the watershed to the river. List some types of runoff that come from natural areas.

_____

_____

_____

List some types of runoff that come from your community:

_____

_____

_____

_____

_____

_____

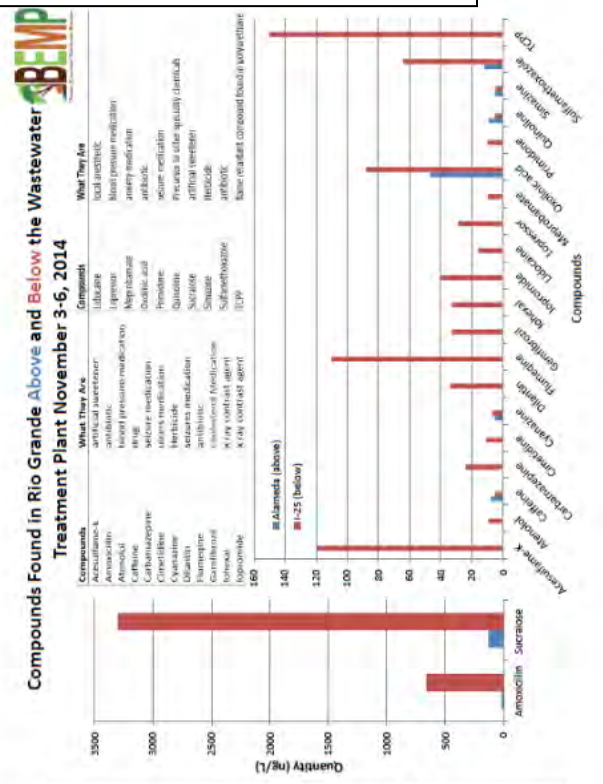
City

Downstream eco-friendly town

How can *YOU* help to keep our watershed clean?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

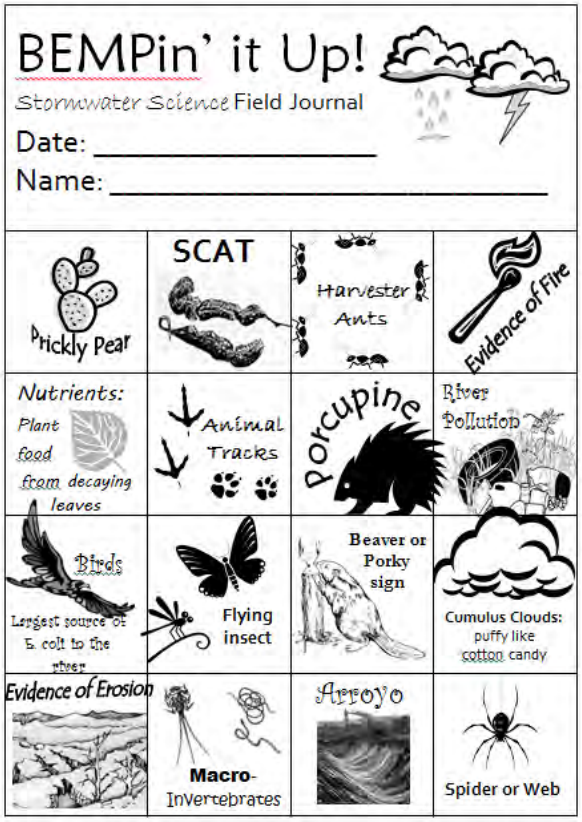
Field Journal for outdoor study trips



List two things that ***you*** can do to help keep our watershed clean (besides picking up trash)

1.) _____

2.) _____



UNM Bosque Ecosystem Monitoring Program www.bosqueschool.org/bemp.htm BOSQUE

Litter Survey

The San Antonio Arroyo collects water from all over the west side of Albuquerque. Anything that ends up in these arroyos could travel to the river.

	Type of Pollutant	In the arroyo	In the bosque	Total
1	Paper trash			
2	Plastic trash			
3	Glass or aluminum			
4	Other trash			
5	Dog poop			
6	Coyote scat			
7	Other types of scat			
8	Evidence of erosion			
9	Cigarette butts			
10	Chemicals			

What is the main type of pollutant you found today? _____

How many of these items could have been recycled? _____

Water Chemistry

	Arroyo or Ditch	Which is better?	River
Temperature	0-2 3-5 6-10 >10 _____ °C		0-2 3-5 6-10 >10 _____ °C
Turbidity	0 0-40 40-100 >100 _____ JTU		0 0-40 40-100 >100 _____ JTU
Nitrate	1-4 5 20 40 _____ ppm		1-4 5 20 40 _____ ppm
Phosphate	0 4 8 _____ ppm		0 4 8 _____ ppm
pH	4 5 6 7 8 9 10		4 5 6 7 8 9 10
Fecal Coliform	Present / Not		Present / Not
Dissolved O2	0 4 8 _____ ppm _____ % saturation		0 4 8 _____ ppm _____ % saturation

Scoop the Poop Keep the Rio Grande

What grade would you assign to this section of the river? _____

Phosphate: 1ppm (Excellent) 2ppm (Good) 4ppm (Fair) 6ppm (Poor)

Nitrate: 1-4 ppm (Good) 5ppm (Fair) 20ppm (Poor) 40ppm (Xtra Poor)

Turbidity: 0 JTU (Excellent) 1-40 JTU (Good) 39-100 JTU (Fair) >101 JTU (Poor)

Dissolved Oxygen: 91-100% (Excellent) 71-90% (Good) 51-70% (Fair) <50% (Poor)

Temp: Good 0 - >10°C Poor

Iron: (Good) 0 - .03 - .05 – 1 – 3 – 5 (Poor)

E.coli: Present (poor) Absent (good)

Copper: (Good) 0 – 0.3 – 0.6 – 1 – 3 Poor)

pH: 1-2-3-4-5-6-7-8-9-10-11-12-13-14 poor good poor

Weather Report

1. Time: _____ am / pm

2. Cloud Cover _____%

3. Humidity_____%

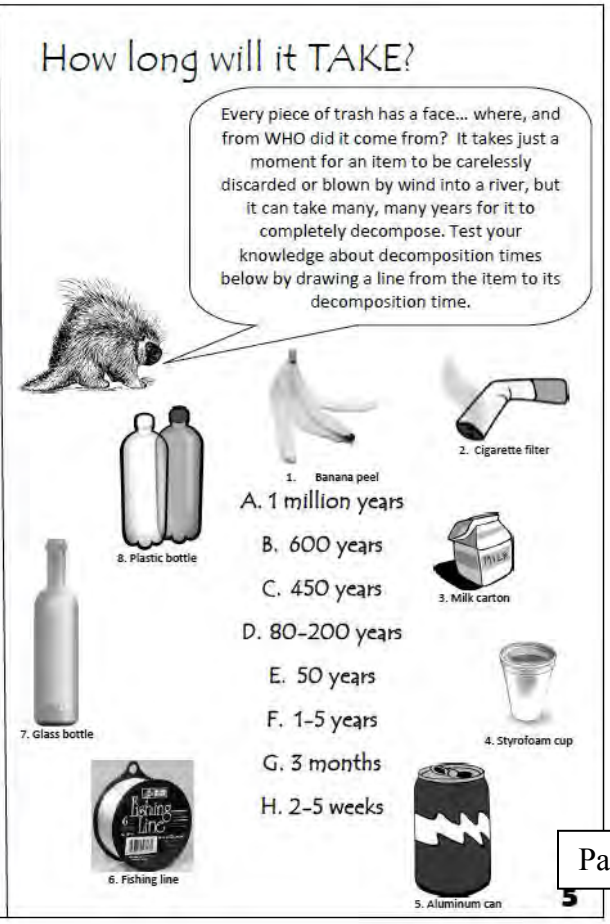
4. Temperature: _____

5. Wind Speed _____km/h

Journal Space

How long will it take? Answers:
1=H, 2=F, 3=G, 4=E, 5=C, 6=B, 7=A, 8=D

Page 3



Page 4

2015-2016 Stormwater Science Education Outreach Numbers

Stormwater Sci classroom presentation	
Study Trips	
Stormwater Sci field activities	
Other Stormwater Sci science related events	

Elementary School	
Middle School	
High School	

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Total #'s				955	849	291			75	108.5	

Middle Rio Grande Stormwater Quality Team
Annual Member
Cooperative Funding Agreement

This Cooperative Funding Agreement is made and entered into this 9th day of January, 2015, 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 (hereinafter collectively referred to as the "Storm Water Team"), and Sandoval County (hereinafter referred to as "Annual Member").

WHEREAS, the Intergovernmental Agreement Regarding the Operation, Function, and Funding of the Storm Water Team, as amended by the First Amendment thereto dated_____ ("Intergovernmental Agreement"), provides that potentially eligible MS4s may be added to the Team at any time on an annual basis as additional voting members, provided all requirements for membership have been fulfilled, including providing payment for the expected contribution; and

WHEREAS, the Storm Water Team wishes to add the Annual Member as an additional voting member to the Team on an annual basis; and

WHEREAS, the Annual Member wishes to be added to the Team as an additional voting member on an annual basis; and

WHEREAS, the Annual Member agrees to fulfill all requirements for membership, including providing payment for its expected annual contribution; and

NOW, THEREFORE, in consideration of the covenants and promises set forth herein, the Annual Member agrees as follows:

1. The Annual Member will be invoiced by the Storm Water Team for its annual contribution for Fiscal Year 2015 as tabulated below. The Annual Member agrees to pay the annual contribution to the Storm Water Team's fiscal agent within forty-five (45) days of the date of invoice. Failure to provide payment prior to the deadline will result in the Annual Member's membership being suspended as provided for in the Intergovernmental Agreement.

2. Upon payment of the annual contribution and fulfillment of any other requirements of membership, the Storm Water Team will update Attachment A, Contribution Schedule, and Attachment B, Annual Roster, to include the Annual Member.

3. The Annual Member agrees that by executing this Agreement it is subject to the requirements of the Intergovernmental Agreement as it may be amended from time to time, which is hereby incorporated by reference as if fully set forth herein. The Annual Member agrees to abide by the terms and conditions of the Intergovernmental Agreement as it may be amended from time to time.

4. This Agreement, including Annual Member's membership on the Team, shall be effective for the 2015 fiscal year. This Agreement may be extended beyond the initial fiscal year for additional one (1) year periods running concurrently with the fiscal year. Any extension must be completed in writing at the initiative of and authorization of AMAFCA, as the fiscal agent of the Storm Water Team, with concurrence of the Annual Member. All extensions are subject to the terms set forth herein, provided however, that the annual contribution for any subsequent years shall be established by the Storm Water Team in the Contribution Schedule, which shall be incorporated fully as if set forth herein.

5. The Annual Member's contact, designated voting member, and billing information is as follows:

Annual Member Entity:	Sandoval County
Designated Voting Member:	Fred S. Marquez 2708 Iris Road NE, Rio Rancho, NM 87144 505-306-4706 fmarquez@sandovalcountynm.gov
Billing Instructions:	Send invoices to the name and address above
Expected Contribution:	$10,000.00

The Annual Member agrees to immediately notify the Storm Water Team and its fiscal agent in the event of any changes to the information listed herein.

Middle Rio Grande Stormwater Quality Team
Annual Member
Cooperative Funding Agreement

Date: 01/09/2015

Phillip Rios, Sandoval County Manager

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.

NOW, THEREFORE, BE IT AGREED THAT:

1. **PURPOSE.** The CMC will serve as the focal point for the development, execution, and, as needed, the amendment of the Monitoring Plan required as part of the MS4 Permit. The intent of the CMC is to attain and demonstrate permit compliance for member Co-permittees with respect to the provisions of the MS4 Permit. The Monitoring Plan will be developed cooperatively among the member Co-permittees of the CMC.

2. **ELIGIBILITY.** All Co-permittees specifically identified in the MS4 Permit are eligible to be members of the CMC.

3. **MEMBERSHIP.** The CMC will include as members all Co-permittees that have signed this Intergovernmental Agreement ("Members"). Members are expected to provide funding for the ongoing operations of the CMC and to contribute financially or materially to the benefit of the CMC, either from their own assets or through the securing of contributions from others. The Members shall elect a Chairman of the CMC. The Chairman shall be elected by a majority vote of the members.

4. **VOTING.** The CMC will be made up of one voting Member from each Co-permittee in good standing, which is defined as having paid their expected contribution, as defined in the Contribution Schedule included as Attachment 1. Attachment 1 shall be updated annually by the Fiscal Agent (See Paragraph 7) to reflect Members in good standing. Each Member will designate a staff person to represent the Member's interest on the CMC and to vote on that Member's behalf. Designation of a representative may be completed at any time and under any circumstances. Other/outside agencies may participate on the CMC by attending meetings and giving input; however, only the Members in good standing may vote on CMC decisions. Decisions of the CMC will be decided by majority vote of the Members in good standing. The CMC may take action during a meeting, by telephone, or by e-mail.

5. **TERM.** 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 Members to this Agreement.

6. **FISCAL MATTERS.** In the first Calendar Year of this Agreement, the CMC will meet to develop a budget based on the costs for implementing the Monitoring Plan for MS4 Permit compliance. To ensure sufficient funding is available to carry out the Monitoring Plan, the budget shall equal 110% of the estimated costs associated with the Monitoring Plan, including estimated contingencies. In subsequent years, the budget will be based on the actual expenditures from the prior year's monitoring activities plus any reasonable increases identified by the CMC. Each Member shall commit funding to the CMC based on the Contribution Schedule established for that year, which Contribution Schedule shall be in a total amount of not less than the budgeted costs. In-kind contributions shall be permitted in lieu of all or a portion of

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

one hundred twenty (120) days of the date of the invoice. Failure to pay invoices within 120 days of the date of the invoice shall deem the Member not in good standing status until payment is made in full. Invoices will be sent to CMC Member entities listed in Attachment 1.

9. **PARTICIPATION.** It is intended that the CMC's operation and function described in this Agreement are ongoing, subject to continued support and authorized funding by each of the Members. Each Member has the option to not participate in this Agreement in the future by sending written notice to all the other participating Members twelve (12) months prior to the Member's proposed withdrawal. This time requirement is made so that all Member Co-permittees will have the opportunity to update their Storm Water Management Plans (SWMP) to reflect the change in status of the cooperative sampling effort and obtain EPA's concurrence on the amended SWMP. In such an event, the terminating Member 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 Members.

10. **OUTSIDE CONTRIBUTIONS.** The CMC may accept contributions from outside funding sources, to be used to support the CMC's mission. Such contributions shall not establish any voting privileges on the CMC, which privileges are reserved exclusively to eligible Members. Outside contributions shall be supplementary to the Contribution Schedule, and no Member's contribution shall be reduced based on receipt of any outside contributions except upon adoption of an amended Contribution Schedule by the Members.

11. **CONTRACTING.** Each Member agrees that a variety of contractors (e.g. sample collection, laboratory, sample results interpretation, geotechnical, etc.) may need to be hired in accordance with the State Procurement Code, in advance of any contractor taking any actions on behalf of the CMC. No contractor shall be an employee of either the Fiscal Agent or any Member of this Agreement. Responsibilities of the contractor shall be included in any resulting contract and the contractor shall only be authorized to provide approved services determined to help Member Co-permittees comply with the provisions of the MS4 permit. For procurement purposes, the CMC will form a Selection Advisory Committee ("SAC"), composed of representatives from Members in good standing. Each Member in good standing will have one representative on the SAC for the RFP process. The SAC will rank proposals and recommend the top three respondents to the Fiscal Agent for selection through the Fiscal Agent's existing procurement selection process. Upon approval, the Fiscal Agent will negotiate an agreement with the selected contractor. The CMC will provide input on scope and fees; however, final negotiations and approval will be the Fiscal Agent's responsibility. If contractor services are obtained using the procurement process set forth in this paragraph, then, with concurrence of the other members of the CMC, funds collected as part of the CMC group may be used to pay that contractor directly for services associated with execution of the monitoring plan. 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 but shall be deemed third party beneficiary hereunder.

12. **ALTERNATIVE CONTRACTING.** As an alternative contracting process, and in order to leverage existing and future contracts between Contractors and Members in good

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.

18. **NO RIGHTS CREATED.** It is specifically agreed among the Members 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, and does not authorize anyone not a Member of this Agreement to maintain a suit for wrongful death or any other claim whatsoever.

19. **LIABILITY.** As among the Members, 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 Member, its officials, agents, contractors or employees pursuant to this Agreement. Liabilities of each Member shall be subject to the immunities and limitation of the New Mexico Tort Claims Act, §§41-4-1, et seq., NMSA, 1978, and any amendments thereto. By entering into this Agreement, all public agencies 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.

20. **AMENDMENT.** This Agreement may only be altered or amended upon written approval by a majority of the CMC Members.

21. **DATE OF EFFECTIVENESS.** Regardless of the date when this Agreement is signed by each Permittee, this agreement shall not become effective for each Permittee until that Permittee has received official notification from the Environmental Protection Agency that they have received coverage under NPDES General Permit No. NMR04A000.

EACH ENTITY WILL EXECUTE AGREEMENT INDIVIDUALLY. SIGNATURE PAGES WILL BE CONSOLIDATED INTO SINGLE DOCUMENT

Sandoval County, New Mexico
Flood Control Authority

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

ATTACHMENT 1

CONTRIBUTION SCHEDULE

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	