Pima County
2014 Annual Stormwater Report

July 2013 – June 2014
AZPDES Permit No. AZS000002

PIMA COUNTY

October 2014

Water and Wastewater Division

Stormwater Management Plan

Prepared in cooperation with:

Regional Wastewater Reclamation Department
Department of Transportation
Regional Flood Control District
Development Services
City of Tucson Environmental Service's Household Hazardous Waste Program
Pima Association of Governments

Stormwater Management Program
Pima County Department of Environmental Quality
33 N. Stone Avenue, Suite 700
Tucson, Arizona 85701-1429

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Executive Summary

Introduction

This report describes activities performed and data collected for Pima County's Arizona Pollutant Discharge System (AZPDES) Permit No. AZS000002 between July 1, 2013 and June 30, 2014. This permit authorizes Pima County to discharge stormwater from a municipal separate storm sewer system (MS4) to waters of the United States.

This report is the third annual report prepared under the new state permit issued on June 16, 2011 and effective on July 18, 2011, herein referred to as the 2011 MS4 permit. Under the previous EPA MS4 permit issued on February 14, 1997, 14 annual reports were prepared.

Certification

Pima County's principal executive officer signs and certifies this annual report was prepared by qualified personnel to properly gather and evaluate the information submitted (Part 2).

Stormwater Management Program (SWMP)

Best management practices (BMPs) were implemented in accordance with the SWMP during the reporting period. Information for the SWMP is found in the following parts: Narrative summary of SWMP activities (Part 3 and Appendices), Numeric summary of SWMP activities (Part 4), Evaluation of SWMP (Part 5), and Modifications to SWMP (Part 6).

Wet Weather Monitoring

Water quality samples were collected from the five Monitoring Sites (Part 7). Storm event records were automatically recorded and summarized (Part 8). Analytical results for the water quality samples (Part 9), the water quality assessment (Part 10) and the estimate of annual pollutant loadings (Part 11) document the quality of surface water flows.

Expenditures and Proposed Budget

A summary of the annual expenditures and the proposed budget are summarized (Part 12).

Conclusions

Pima County implemented the SWMP and Wet Weather Monitoring Program. Activities included maintenance of the roadways and drainage systems. Inspections were performed at 39 outfalls, 75 construction sites and 22 industrial facilities. The public reported 1,458 environmental complaints. All were inspected resulting in 459 Notices of Violation and 423 remediated sites. Seven stormwater samples were collected at five monitor sites. Analysis of the water quality results for 134 parameters shows copper and *E. Coli* are the only pollutants detected above Arizona's Surface Water Quality Standards indicating the surface waters in Pima County are fairly clean.

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PART 1: GENERAL INFORMATION

A. Name of Permittee: Pima County

B. Permit Number: AZS000002

C. Reporting Period: July 1, 2013 - June 30, 2014

D. Name of Stormwater Management Program Contact: Marie Light

Title: Principal Hydrologist

Mailing Address: 33. N. Stone, Suite 700

City: Tucson

Zip: 85701-1429

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Fax Number: 520-838-7432

Email Address: marie.light@pima.gov

E. Name of Certifying Official: John M. Bernal

Title: Deputy County Administrator for Public Works

Mailing Address: 130 W. Congress

City: Tucson

Zip: 85701-1317

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Fax Number: 520-740-8171

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F. Scope of Permit

The physical components within the permit area include 2,087 miles of roadway, 39 miles of storm drains and appurtenances that collect and convey runoff from precipitation events, with lengths reported by Pima County Department of Transportation (PDOT) and Regional Flood Control District (RFCD, respectively. The permit area is unincorporated Pima County within the Santa Cruz River watershed (Figure 1-1, blue area). In both rural areas and metropolitan areas, runoff collects in ephemeral stream channels and infiltrates into alluvial deposit in the valley (USGS, 1973). Flows in ephemeral stream channels occur in response to rainfall events that are larger than 0.2 inches. Most runoff infiltrates within Pima County.

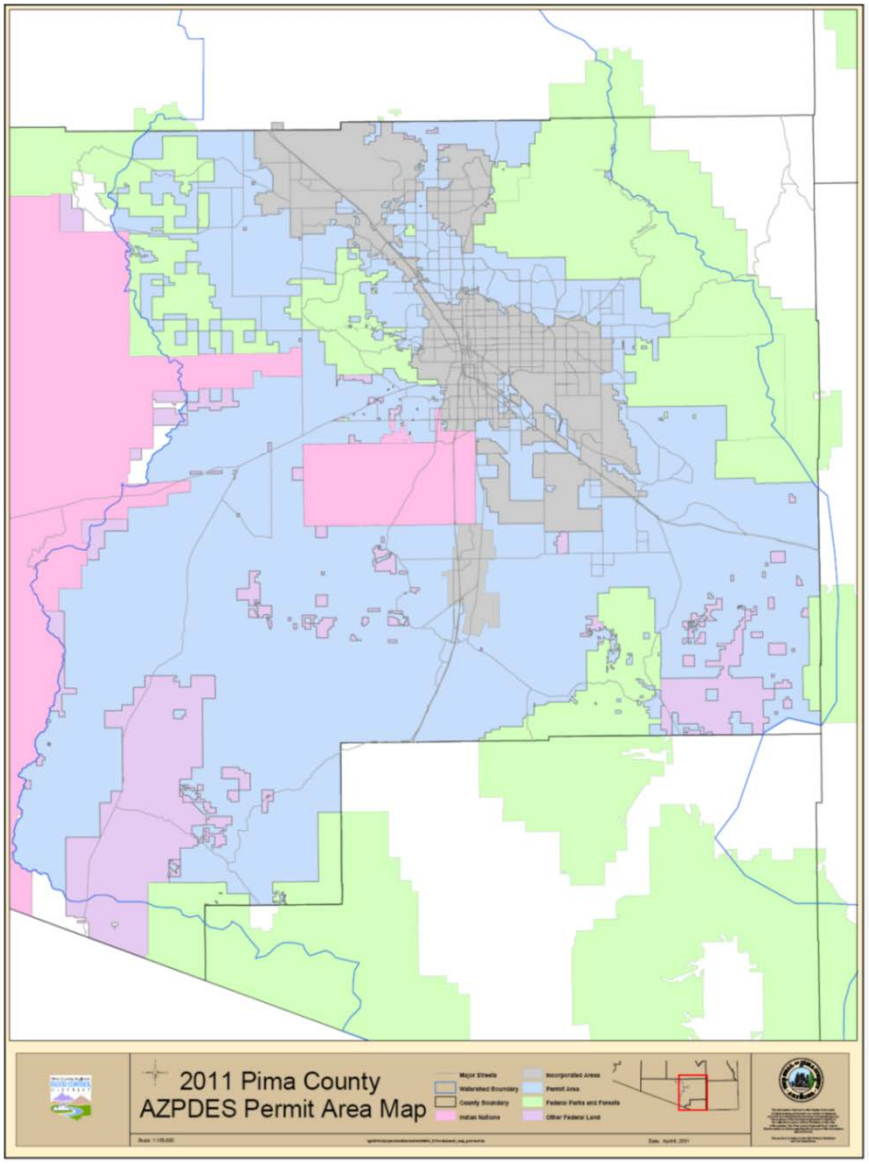

Figure 1-1. 2011 AZPDES Permit Area Map

Managements Activities

Management of the program includes coordinating with Pima County departments maintain roadways and drainageways, purchasing open space to conserve land and manage stormwater operations between five county departments. Pima County collaborates with local jurisdictions, businesses, educational institutions, and interested members of the public to engage the public in restoring and maintaining the integrity of surface waters in the county. Education and training include teaching techniques to keep water clean and using stormwater as a resource for landscape irrigation and other beneficial uses. Staff engages the novice to the profession as well as kids to great grandparents.

Field Activities

Pima County inspects outfalls, construction sites, industrial facilities, and reported environmental complaints that could lead to illicit discharge detection and elimination. To characterize water quality, Pima County collects water samples at five monitor sites representing low density residences, medium density residences, high density residences, commercial, and industrial land uses.

This report documents these activities and results.

References

USGS, 1973. *Geohydrology and Water Resources of the Tucson Basin, Arizona*, Geological Survey Water-Supply Paper 1939-E, 80 pp.

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Part 2: ANNUAL REPORT CERTIFICATION AND LEGAL AUTHORITY

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 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.

John M. Bernal
Deputy County Administrator for Public Works

October 30, 2014

PIMA COUNTY

COUNTY ADMINISTRATORS OFFICE
PIMA COUNTY GOVERNMENTAL CENTER
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(520) 724-8661 FAX (520) 724-8171

C.H. HUCKELBERRY
County Administrator

October 30, 2014

Christopher P. Henninger
Manager
Stormwater & General Permits Unit
Arizona Department of Environmental Quality
1110 W. Washington Street
Phoenix, Arizona 85007

Re: Pima County 2014 Annual Stormwater Report, July 2013 – June 2014
AZPDES Permit No. AZS000002

Dear Mr. Henninger:

Enclosed is the 2014 Annual Report for Pima County's Arizona Pollutant Discharge Elimination System (AZPDES) Municipal Separate Storm Sewer System (MS4) Discharge Permit. This report has been prepared in conformance with the requirements of the above referenced permit.

Sincerely,

John M. Bernal
County Administrator for Public Works

Attachment: Pima County 2014 Annual Stormwater Report

Cc: C.H. Huckelberry, County Administrator
Ursula Kramer, Director, Pima County DEQ

3. NARRATIVE SUMMARY OF STORMWATER MANAGEMENT PROGRAM

Pima County's municipal separate storm sewer storm drain system consists of 2,087 miles of roadways, 39 miles of storm drains, and infrastructure collecting runoff into drainageways or discharging runoff to ephemeral stream channels. Pima County utilizes a Public Awareness Program and a Public Participation Program to invest in behaviors protecting the quality of stormwater as it flows through the county. The public is encouraged to report illegal dumping and unusual environmental conditions to remove materials in washes or on land that could be transported into a wash during rainfall events. Management of Pima County Facilities includes maintenance of infrastructure and acquisition of property to prevent stormwater pollution. Inspections of Industrial Facilities and Construction Sites also reduce stormwater pollution. Post Construction activities include inspections once construction is completed at a site as well as implementation of Green Infrastructure and Low Impact Development (GI/LID) to prevent flooding and stormwater pollution.

A. Public Awareness

The public awareness program involves on-going education of the public and businesses, and contributes to environmental and stormwater educational events. Pima County DEQ staff delivered the keep-stormwater-clean message using literature, promotional materials, presentations, and assistance to business. A wide range of literature provided to the public includes 32 types ranging from bookmarks, booklets, brochures, posters, stickers, bags and fact sheets (Appendix A). Literature is being prepared in both Spanish and English as the demographic population is 35% Hispanic or Latino and 74% white. A stormwater awareness statement was made during nearly 30 annual Clean Air Program outreach events stating that motor vehicles can contribute to stormwater pollution.

<u>Conferences, Seminars and Presentations</u>

Pima Community College requests PDEQ staff to provide a three-hour presentation for students in the class *Building/Construction Technology 265 Sustainability.* The presentation is provided once each semester, and class sizes range between 5 to 30 registered students. This fiscal year the topic addressed the application of Low Impact Development and Green Infrastructure to achieve sustainable water use. Presentations were made on February 5, 2014.

Additional presentations were made to the public, including Methods of Keeping Washes Clean delivered to the Southern Arizona Environmental Managers Society on March 26, 2014.

The topics presented to the general public include wash protection, illicit discharges, and illegal dumping. The "Protect Our Water with Proper Trash Disposal" campaign reaches the public with PowerPoint presentations and media releases. The pre-monsoon media releases began on June 23, 2014 identified the following methods of reducing illegal dumping and stormwater pollution: hire someone you know and can trust, or hire a permitted solid waste hauler (list available through PDEQ); know your hauler's name, address, and phone number; pay by check and get a

receipt from the hauler; and make arrangements to pay the hauler half of the fee up front and the balance upon return with a dated landfill receipt. In addition, the press release provided the PDEQ Illegal Dumping Hotline number to encourage the public to report illegal dumping. PDEQ staff continued the provision of previous key stormwater pollution prevention messages to the public including reducing pollution caused by improper disposal of animal waste and keeping vehicles well-maintained, while introducing the anti-illegal dumping and littering message.

MS4s within Pima County, ADEQ and the construction industry meet regularly at the Stormwater Management Working Group (SWMWG) hosted by Pima Association of Governments (PAG) to develop a stormwater message for the area. PDEQ helped define messages for residents, home owners, schools and the development community. The group developed a multi-media outreach campaign designed to educate residents about stormwater pollution, watershed awareness, wash protection, illicit discharges and illegal dumping. Public events, media interviews, magazine ads, articles, signage, website and social media communication, promotional materials and educational literature formed the multi-media campaign.

The slogan “Clean Water Starts with Me” was used for the sixth consecutive year to increase familiarity with the successful message. Artwork and style matches the imagery used by the local jurisdictions in school programs. Public Service Announcements (PSAs), radio ads, billboards, magazine ads and social media ads were run beginning in July of 2013. Comprehensive topics addressed by outreach include animal waste, management and disposal of used oil, proper vehicle washing, residential practices including LID, post-construction LID and water harvesting, preventing improper dumping and litter, and construction related issues. Pima County continues to utilize the GIS layer showing the area distribution of all MS4s in Pima County.

SWMWG formed a key partnership this past fiscal year with the University of Arizona’s Project Water Education for Teachers (WET) to expand outreach to youth audiences. Project WET is based in Science, Technology, Engineering & Math (STEM) standards and meets Arizona State Science Standards. Students address real world problems through a variety of experiments using watershed models and observing relative effectiveness of stormwater management systems. SWMWG collaborated with Project WET staff to further enhace development of the stormwater curriculum.

A phone survey was conducted in early June to assess the public’s attitudes towards stormwater and their trash disposal behaviors. The results were finalized in a report (FMR Associates, 2013). The results of the survey were initially presented to Pima County, Town of Oro Valley, City of Tucson, Town of Marana and PAG staff working on air and water quality public outreach in early July 2013. Additional presentations were made to PAG’s Stormwater Management Working Group and for collaborators on the Low Impact Development Guidance Manual in August 2013 as well as the 2014 MS4 Summit on June 4, 2014. The results were integrated into the Third Year Topic by developing an outreach message to 1) dispose of trash properly in landfills using permitted solid waste haulers, 2) recycling wastes and 3) volunteering in citizen clean-up programs like Adopt-A-Wash and Adopt-A-Road.

Pima County, in cooperation with Arizona Department of Transportation, City of Phoenix, City of Flagstaff, Chandler, Maricopa County, City of Tempe and Pima Association of Governments, planned and implemented the 2014 MS4 Summit held on June 4, 2014. A survey of the MS4s determined the topics to be presented at the summit. Speakers with experience and good presentation skills were selected to provide the needed information.

EcoNook for Desert Dwellers and Eco Kids Corner

This community outreach project continues to provide a significant source of stormwater literature to the public at 33 Pima County Public Libraries and community centers. Librarians and program staff are invited to create special areas within each library where free environmental literature is available for patrons. "EcoNook for Desert Dwellers" targets teenagers and adults while "Eco Kids Corner" serves children 12 years and under. Educational materials cover stormwater quality topics including stormwater pollution prevention, water harvesting, desert gardening, and Green Infrastructure/Low Impact Development. About 125 people attended the summit and actively discussed the presentation materials.

Business Assistance Program

Activities in the Business Assistance Program help local businesses comply with applicable environmental requirements (Table 3-1). Pima County DEQ staff assists businesses in the completion of permit applications, clarifies the complex regulations, identifies potential violations, informs businesses about pollution prevention methods and makes suggestion to reducing stormwater discharges to stay in compliance. Free literature is provided upon request.

Table 3-1. Summary of Business Assistance Program

Type of Assistance	Number
Telephone/E-mail inquiries	200
DEQ office assistance visits	10
Letters/information mailed	10
Educational literature distributed	20,547
Seminars/presentations given	14
Number of times stormwater website was visited	>300*

- The website was updated in January 2014. When the old web pages were disconnected, access to the analytical information of site traffic was lost. The value presented represents half a year.

B. Public Participation

Engaging the public in substantive actions to reduce pollutants from entering stormwater is key to long-term success. Members of the public clean trash from roadways and drainageways, recycle or dispose of hazardous materials at the Household Hazardous Waste Facility and report environmental issues to Pima County DEQ.

Adopt-a-Roadway Program

Volunteers in Pima County's Adopt-a-Roadway program clean up roadways and public lands. The program had 367 clean-up events over a total length of 596 miles. Pima County tracks the amount of material cleaned up from each adopted road (Appendix B).

Environmental Complaints

The public and businesses are encouraged to fax, phone or e-mail information about environmental complaints to Pima County DEQ. Each complaint is inspected or, if the location of the complaint places it within another jurisdiction, the complaint is referred to the responsible jurisdiction. Additional information about the inspection and potential enforcement process is described in the next section on illicit discharge detection and elimination activities.

Household Hazardous Waste Program

The Household Hazardous Waste Program, funded jointly by Pima County and the City of Tucson, provides a means for small businesses and the public to properly dispose of common household and automotive products. The public is encouraged to bring automotive fluids, batteries, drain openers, hobby chemicals, household cleaners, lawn and garden products, pesticides, paint products, medications, polishes, pool chemicals, solvents and items labeled acid, flammable, caustic, poison, caution, toxic, danger or warning. Program managers track the amount of waste collected from the public and small businesses as well as the number of participants and events (Appendix C).

C. Illicit Discharge Detection and Elimination Activities

Pima County DEQ receives complaints from the general public, elected officials, regulators, and local governments identifying potential sources of pollutants that could endanger public health or the environment. Each complaint within Pima County's jurisdiction is inspected to determine if a pollutant has entered the environment and if so, the severity of the problem. The complaint is tracked until it is closed (Appendix D) or is escalated to the enforcement action of a Notice of Violation (NOV). NOVs are closed when the pollutant has been abated (Appendix E).

The number of complaints filed within Pima County's jurisdiction during this fiscal year was 1,458. Each complaint was inspected and the average time between filing the complaint and the inspection was 0.8 days. The number of inspections performed within three days was 1,276, or 88% of all Pima County responses. Some complaints are addressed by sending an information letter, such as how to remove buffelgrass or how to drain a pool properly.

These inspections led to 459 NOVs. During the fiscal year 423 cases were closed or rescinded and 36 remained open. The open cases are either in the process of closing or have entered an escalated enforcement process such as assessment of penalties, referral to Pima County Attorney's Office, an order to show cause with the court, or contempt of court. The enforcement phase has a closure rate of 96% and average closure time is 36 days. Illicit discharges of solid wastes, such as wildcat dumping and improper disposal of solid wastes, comprise 58% of complaints received by Pima County DEQ and 84% of issued NOVs.

Illicit discharges of liquids to the MS4 are relatively rare due to the open nature of the system and the high likelihood that illicit discharges will be seen and tracked to the source. Typically, a building or cleaning contractor has extra material and makes a one-time dump in a remote location. These types of events are reported by the public as an environmental complaint. Pima County has identified 39 outfalls within the permit area (Appendix F-1). 23 are major outfalls, all of which are not considered priority outfalls due to the lack of illicit liquid discharges. Pima County Regional Flood Control District (RFCD) inspected 39 major outfalls (Appendix F-1), or 100% of all outfalls. This is over and above the permit requirement of inspecting 20% each year. In addition, both the Pima County Department of Transportation (PDOT) and Regional Wastewater Reclamation Department (RWRD) document when the public spills hazardous materials within the county (Table 3-2).

Table 3-2. Spills within Permit Area

Date	Depart-ment	Location	Town-ship-Range-Section	Description	Response
08/05/13	PCDOT	North side Silverbell Rd between Luckett and Trico Rds	11-10-36	Truck with oil totes overturned. 762 gallons of hydraulic fluid & gear oil spilled on pavement and soil in ROW. Truck owner is Brown Evans Distributing Co.	Spill clean-up and containment on 8/5/2013 by EnCore Consulting, LLC and Environmental Response, Inc. Soil excavation and sampling on 8/19,20/2013. Excavated soil below PCS levels.
08/07/13	PCDOT	West side of Sandario Rd. 100' S of intersection with Golden Gate Rd. Outside MS4 area.	13-11-28	Tire on PCDOT water truck blew out causing rollover. Approx. 35 gallons of truck hydraulic fluids leaked from truck to pavement and soil in ROW.	Clean-up and soil excavation on 8/7/2013 by PCDOT. Site and excavated soil testing indicated non-regulated PCS.
09/16/13	PCDOT	West side of la Cholla Rd. @ NW corner with Ruthrauff Rd.	13-13-16	AAA pesticide contractor spilled less than 2 gallons of Kleen Up Pro and Turf Trax to pavement.	Contractor cleaned-up spill with absorbent. Disposal at Household Hazardous Waste.

Table 3-2. Spills within Permit Area

Date	Depart-ment	Location	Town-ship-Range-Section	Description	Response
10/02/13	PCDOT	Ruthrauff & Calle Harmonia	13-13-21	Triple AAA contractor spilled approximately 15 gallons of Kleen-Up Pro and Turf Trax on pavement.	Contractor cleaned-up spill with absorbent. Disposal at Household Hazardous Waste.
11/21/13	PCDOT	La Cholla Blvd, south of McCarty @ PCDOT road construction site	12-13-27	Hydraulic line on Specialty Contracting truck blew out. Less than 5 gallons spilled on soil in ROW.	Soil excavated and removed from site by Waste Management. Excavated soil disposed at Los Reales Landfill.
12/19/13	PCDOT	Mission Rd yard, 1313 S Mission Rd	14-13-23	Equipment failure on PCDOT striping truck. Less than 20 gallons of diesel fuel spilled into concrete containment area.	Clean-up using absorbent on 12/19/2013.Waste disposed at Los Reales Landfill.
01/14/14	RWRD	3355 N Dodge Blvd	13-14-28SE	Rodder truck engine was just repaired. As PTO was engaged, an improperly installed seal leaked hydraulic fluid.	A berm of kitty litter was immediately built to contain the hydraulic fluid.
04/01/14	PCDOT	ROW near 1288 W. River Rd,	13-13-14	Homeless camp. Trash & human feces discarded.	Cleaned up by PCDOT operations.
06/07/14	PCDOT	N Houghton Rd @ E Catalina Hwy	13-15-25	1 gal containers of muriatic acid fell off truck. Total 11 gals. Chemical release to pavement.	Rural Metro responded and contacted clean-up on 6/7/2014. Neutralized acid with soda ash. Waste placed in buckets. Transported by Pima County to Houghton Rd Yard for disposal.

Table 3-2. Spills within Permit Area					
Date	**Depart-ment**	**Location**	**Town-ship-Range-Section**	**Description**	**Response**
6/7/2014	RWRD	8400 S Wilmot	15-14-25NE	Sludge tanker truck from treatment plant was dumping into manhole when discharge valve malfunctioned releasing sludge in a 3,200 sf area	Crews were called in to reclaim the site and report the spill.
6/18/2014	RWRD	3830 River Oak Trail	13-14-27NE	Rodder crew was rodding lines when hose in cage was leaking oil onto street in a 6 sf area.	Oil absorbent was added the swept up. Vactor crew washed down area and vacuumed up water in the area.
6/18/2014	RWRD	3840 River Oak Trail	13-14-27NE	Rodder crew was rodding lines when hose in cage was leaking oil onto street in an 8 sf area.	Oil absorbent was added the swept up. Vactor crew washed down area and vacuumed up water in the area.
6/18/2014	RWRD	4470 River Oak Trail	13-14-27NE	Rodder crew was rodding lines when hose in cage was leaking oil onto street in a 14 sf area.	Oil absorbent was added the swept up. Vactor crew washed down area and vacuumed up water in the area.

g = gallon
sf = square feet
PDOT = Pima County Department of Transportation
RWRD = Pima County Regional Wastewater Reclamation Department

D. County Facilities

Management of County Facilities includes preparing an inventory of county facilities, GIS mapping of the MS4 features, maintaining roadway and drainageway infrastructure, drainageways, acquiring land to conserve open spaces, inspecting facilities for implementation of

Material Handling and Spill Response Procedures and training staff directly involved in stormwater activities. All activities are preventive measures to keep stormwater clean.

County Facility Inventory and Spill Prevention

An inventory of county-owned or operated facilities with the potential to discharge pollutants to receiving waters shows none of them have a high potential for discharge pollutants (Appendix G). Many facilities are permitted with Arizona Department of Environmental Quality water permits such as Aquifer Protection Permits (APP) and Arizona Pollutant Discharge Elimination System (AZPDES). Others are restoration projects ameliorating issues such as erosion of sediment and loss of flora and fauna.

Proper use and storage of chemicals is regulated within Pima County through enforcement of local requirements (environmental nuisance, solid waste, and liquid waste requirements) established in Title 7 of the Pima County Code (Pima County, 2011b). Contractors hired to maintain Pima County landscaped areas and public right-of-ways are required to follow spraying protocols established by State of Arizona rules and manufacturer's recommendations.

County facilities were scheduled for inspections during this fiscal year. Four were completed. The remaining facilities were not inspected due to replacement of staff conducting field inspections.

GIS Mapping

Pima County's Geographic Information System (GIS) maintains geographic data in ArcGIS and AutoDesk products and is called MapGuide. The area covered is Pima County within Universal Transverse Mercator (UTM) Zone 12. The coordinate system is based on the State Plane Project North American Datum of 1983 (NAD83) with High Accuracy Reference Network (HARN). The layers of information within GIS are maintained in the Stormwater theme of MapGuide. Many layers are included in this theme, including the following layers identified in the permit:

- Points (Outfalls and storm drain inlets)
- Lines (storm drain pipes, streams and washes, streets, and topographic lines)
- Polygons (retention/detention basins, MS4 permit areas, zoning, and vegetative cover)

Two layers are planned for addition to the GIS Mapping system, namely the drainage area of the five monitor sites and the location of Outstanding Arizona Waters and Impaired Waters (Appendix H).

Infrastructure Maintenance

Roadways

Pima County Department of Transportation (PDOT) maintains 2,087 miles of roads and the drainageways in the road right-of-ways. The types of roadway maintenance include sweeping, shoulder repairs, pothole repairs, grading and blading, sidewalk and curb repair, street surface repairs and litter and debris removal (Appendix I).

Drainageways
Pima County RFCD maintains 450 miles of drainage, excluding the major water courses of the Santa Cruz River, Rillito River, Pantano Wash and Cañada Del Oro Wash. RFCD prioritizes 150 miles for inspection, and inspects the identified outfalls (Appendix F) and drainage reaches. They then follow up with grading; spot litter, debris, weed control; sediment removal; mowing; and spraying vegetation where needed (Appendix J).

Land Conservation
Land has been purchased under the 1997 Open Space Bond Program (OSBP), the 2004 Conservation Acquisition Bond Program (CABP) and the Flood prone Land Acquisition Program (FLAP) to conserve land (Appendix K). The 1997 OSBP and 2004 CABP protect the region's most prized natural and cultural resources (Pima County, 2011d). The FLAP preserves land in floodways.

Training staff directly working on stormwater control measures
Pima County trains field personnel to recognize and report potential illicit discharges to Pima County DEQ by fax, phone or e-mail. Additionally, Pima County DEQ trained fifteen staff members whose work contributes to stormwater management. The October 1, 2013 presentation described the regulations, PDEQ's method of handling used oil complaints, how discharges of oil impact the environment and why it is important to clean it up, and how to clean it up.

E. Industrial and Commercial Facilities

The Industrial Facilities Inventory is based on ADEQ's list of facilities that filed for the 2010 Multi-Sector General Permit (2010 MSGP) and facilities which need to file a Notice of Intent for the 2010 MSGP. Facilities located within the permit area and which have the potential to discharge to a Pima County roadway or drainageway were added to the inventory (Appendix L-1). Stormwater inspections are designed to evaluate consistency with the ADEQ's 2010 MSGP and compliance with Pima County ordinances. The Site Inspection Report form was modified to incorporate the 2010 MSGP and Pima County 2011 MS4 permit. Of the 51 industrial facilities, eleven were inspected for the first time during this fiscal year (Appendix L-2). As the permit requires inspections of 20%, the permit requirement has been met. All inspections conducted this year were conducted at facilities that were in compliance with the MSGP.

At the beginning of the fiscal year, eleven industrial facilities were out-of-compliance. Six were brought into compliance with the 2010 MSGP and Pima County ordinances. Three were referred to ADEQ. The remaining two require modifications to their SWPPP. By June 30, 2014, two facilities remained out-of-compliance for over one year.

F. Construction Sites

Activities reducing pollutants to stream channels include plan reviews, issuance of air quality permits and Floodplain Use Permits, construction site inspections, and staff training.

Plan Reviews

Before grading permits or construction permits are issued, plans for development are first reviewed by Pima County Development Services Department (DSD). These plans must conform to requirements for Pima County Buffer Overlay Zone (BOZO), grading standards (GS), setback requirements for BOZO and GS, hydro seeding and revegetation, Hillside Development Overlay Zone and surface stabilization (Appendix M). Pima County DSD staff inspects the sites to verify the construction is proceeding according to approved plans.

Pima County Permits

Septic Systems

All new septic systems within Pima County must undergo pre-construction design approval, percolation testing, and post-construction installation approval. Septic system failure or exfiltration of water from these systems into the Pima County MS4 rarely occurs. If a surface discharge from a septic system were to occur, it would be regulated under Title 7 of the Pima County Code §7.21.025.A.

Floodplain Use Permit (FLUP)

Pima County RFCD issues FLUPs for specific improvements within the regulatory floodplain or erosion hazard area (Appendix N). The permits are required prior to beginning construction in areas were flows exceed 100 cubic feet per second or where sheet flooding occurs.

Pima County Air Quality Activity Permits

Pima County requires air quality activity permits, called fugitive dust activity permits, for trenching operations, road construction, and land stripping or earthmoving activities that disturb one acre or more. Each permit requires the construction site operator to take reasonable precautions to control fugitive dust emissions from the site. Proper dust suppression techniques prevent the deposition of windblown dust that may later become entrained in stormwater and reduces tracking from construction sites.

Construction Site Inventory and Inspections

Pima County DEQ prepares a construction site inventory based on ADEQ's list of operators filing for the 2008 Construction General Permit (CGP) as well as identification of sites that need to file an NOI for the 2008 CGP. A total of 75 Notices of Intent were inspected during the fiscal year, eighteen of which were high priority projects requiring quarterly inspections. The remaining sites were inspected semi-annually during the first half of the fiscal year. Construction site inspections were conducted at sites with complaints during the second half of the fiscal year due to a replacement of field staff conducting the inspections. The construction site inventory lists all the permitted sites and dates of the inspections (Appendix O-1). The results of the site inspection reports show the level of consistency with the 2008 and 2013 CGP as well as

compliance with ordinances (Appendix O-2). The construction inspection reports were found to meet written protocols and industry standards for inspection on construction sites.

G. Post Construction

After construction has been completed, an inspection is performed to track the effectiveness of the new construction and if the site has been properly cleaned of temporary sediment and erosion control measures. The post-construction site inventory (Appendix P-1) identifies which sites have been inspected and copies of the site inspection reports show how well the projects are functioning (Appendix P-2). Post-construction inspections area conducted within one year after the completion of the project. The completion of the project is determined by the date of which the notice of termination, (NOT), is submitted to the Arizona Department of Environmental Quality. Post-construction inspections ensure that post-construction stormwater controls are adequate, complete and maintainable. Post-construction inspections also encompass the verification of compliance with specific Pima County ordinances. These ordinances confirm that retention/detention basins do not cause an environmental nuisance, proper disposal of used oil and the removal of construction debris and temporary stormwater controls.

While assembling the appendices for the post construction inspections, eight inspection reports were found to not follow written protocols or meet industry standards. An inventory (Appendix P-3) lists the inspections reports and identifies what quality standards were not met. The sites with substandard inspection reports (Appendix P-4) will be inspected in the next fiscal year.

H. References

FMR Associates, 2013. *Evaluation of the 2012-2013 Pima County Clean Air Campaign and Baseline Stormwater Issue Awareness Survey*, prepared for Pima County Department of Environmental Quality, June 2013.

Pima County, Arizona, 2011. *Municipal Separate Storm Sewer System AZPDES Permit No. AZS000002.*

Pima County, Arizona. 2011. *14th Annual Report for Pima County's National Pollutant Discharge Elimination System [NPDES] Storm Water Discharge Permit No. AZS000002*. Pima County Department of Environmental Quality. September.

Pima County, Arizona, 2011. Code of Ordinances, Title 7, Environmental Quality, http://library.municode.com/index.aspx?clientID=16119&stateID=3&statename=Arizon.

Pima County, Arizona, 2011. *Protecting Our Land, Water and Heritage, Pima County's Voter-supported conservation Efforts*, Pima County Sonoran Conservation Plan. February.

Schueler, Thomas R. 1987. *Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs*. Metropolitan Washington Council of Governments.

U.S. Environmental Protection Agency. 1992. *Guidance Manual For The Preparation Of Part 2 Of The NPDES Permit Applications For Discharges From Municipal Separate Storm Sewer Systems*. Office of Water (EN-336), EPA 833-B-92-002. November.

Table 4-1. Numeric Summary of Stormwater Management Program Activities

Control Measures (number, unless specified otherwise)	**11/12**	**12/13**	**13/14**	**14/15**	**15/16**
A. Public Awareness (Appendix A)					
Conference, seminars, presentations	8	16	14		
Literature distributed	18,133	16,841	20,547		
B. Public Participation (Appendix B & C)					
Adopt-a-Roadway (bags collected)	2,624	3,522	4,898		
Household Hazardous Waste Collection (tons)	540	490	440		
C. Illicit Discharge Detection and Elimination Program					
1. County Employee Training					
Training sessions (non-stormwater discharges, IDDE program)	1	1	1		
Employees attending training	15	14	15		
2. Spill Prevention (Appendix D & E)					
County facilities identified with hazardous materials	9	9	9		
Spills in outside areas @ county facilities w/ hazardous materials	0	0	7		
Facility assessments completed	NA	10/28/13	4		
Site Specific Materials Handling & Spill Response Procedures (date)	11/12/11		12/01/13		
Environmental complaints	1,220	1,366	1,185		
Environmental complaints inspected within 3 days	1,054	1,342	1,287		
Notices of Violation for illicit liquid discharges	61	107	59		
Notices of Violation for illicit solid discharges	392	405	406		
Notices of Violation closed for illicit discharges, solid and liquid	425	492	465		
3. Outfall Inspections (Appendix F)					
Outfalls inspected[2]	9	39	39		
Priority Outfalls identified to date	20	39	39		
Priority Outfalls inspected	9	39	39		
Dry weather flows detected	0	0	0		
Dry weather flows investigated	NA	NA	NA		
Major outfalls sampled during dry weather flows	0	0	0		
Illicit discharges identified	0	0	0		
Illicit discharges eliminated	NA	NA	NA		
Amount of stormwater drainage system inspected	53%	100%	100%		
Storm drain cross-connection investigations	0	0	0		
Illicit connections detected	0	0	0		
Illicit connections eliminated	NA	NA	NA		
Corrective/enforcement actions initiated w/ 60 days of identification	NA	NA	NA		
Cases resolved w/ 1 year of original enforcement action (%)	NA	NA	NA		
Illicit discharge reports received from public	1,220	1,366	1,185		
Illicit discharge reports responded to (%)	100%	98%	100%		
Responses initiated within three (3) business days of receipt	1,075	1,101	1,276		
D. County Facilities (See Appendix G, I & J for details)					
1. Employee Training					
Training events (Part 3 for dates & topics)	1	1	1		
Staff trained	15	14	15		
2. Inventory, Map, or Database of County Owned/Operated Facilities					
Facilities on inventory	46	39	39		
Date identification of Higher Risk facilities completed [begins 12/13]	NA	10/18/13			
Date prioritization of county facilities completed	NA	NA	09/30/13		

Table 4-1. Numeric Summary of Stormwater Management Program Activities

Control Measures (number, unless specified otherwise)	**11/12**	**12/13**	**13/14**	**14/15**	**15/16**
3. Inspections					
Miles of MS4 drainage system prioritized for inspection	150	150	150		
Miles of MS4 drainage system visually inspected	238	238	238		
Higher Risk county facilities inspected	NA	0	0		
Higher Risk county facilities needing improved stormwater controls "	NA	NA	NA		
4. Infrastructure Maintenance					
Linear miles of MS4 drainage system cleaned each year	175	175	175		
Spot litter, debris, weed control (acres)	133.5	243	518		
Number of retention/detention basins cleaned	50	52	52		
Catch basins identified to date [begins FY12/13]	NA	0	953		
Catch basins cleaned	0	0	0		
Amount of waste collected from catch basin cleaning (tons)	0	0	0		
Roadway surface maintenance (CY)	2,925	504,263	342,090		
Street and intersection sweeping (miles)	4,208	2,180	2,720		
Shoulder repair sites (CY)	26,468	24,534	30,391		
Pothole repair (tons)	10,068	4,896	6,587		
Sidewalk & curb repair (LF)	3,306	1,355	6,619		
Roadway grading (miles)	965.35	208	239		
Drainageway grading (miles)	0.25	0.25	0.25		
E. Industrial & Commercial Sites Not Owned by the County (Appendix L)					
Training events for county staff	1	1	1		
County staff trained	15	14	15		
Facilities on priority list	49	51	52		
Industrial facilities inspected	10	10	10		
Corrective/enforcement actions initiated on industrial facilities	8	9	9		
Cases resolved w/ 1 year of original enforcement action (%)	1	8	7		
F. Construction Program Activities (Appendix K, M, N & O)					
Training events for county staff (Part 3.A for topics)	1	1	1		
County staff trained	80	14	15		
Construction/grading plans submitted for review	62	53	72		
Construction/grading plans reviewed	27	47	70		
Construction sites inspected	75	123	75		
Corrective/enforcement actions initiated on Construction Sites	16	25	21		
Corrective/enforcement actions resolved on Construction Sites	15	23	15		
Buffer overlay zone plan reviews	4	2	0		
Floodplain Use Permits issued	108	354	319		
Floodplain Use Permit violations	0	0	0		
Open Space land acquisition (acres)	473.03	2393.86	57473		
Flood-prone Acquistion Program (FLAP) (# of sites)	0	0	13		
Hillside development overlay zone plan reviews	0	2	11		
Hydroseeding and revegetation projects	0	0	14		
Set-back requirements	0	0	36		
Slope stabilization	0	0	68		
G. Post Construction Program Activities (Appendix P)					
Post-construction inspections completed for Post Construction	32	52	35		
Corrective/enforcement actions initiated for Post Construction	0	2	1		

NA - Not applicable

PART 5: EVALUATION OF STORMWATER MANAGEMENT PROGRAM

Activities of the Stormwater Management Program (SWMP) include control measures to reduce discharges in stormwater through public awareness and public involvement programs, maintenance of roadways and drainage ways, and investigation of illicit connection and illegal dumping, new development and significant redevelopment programs, industrial facility inspections, construction site inspections, and enforcement actions. Water quality data from five monitor points documents runoff quality. Inspections at construction sites and industrial facilities maintain awareness of the importance of following Stormwater Pollution Prevention Plans. Regular inspections and business assistance is needed to maintain surface water quality consistent with state SWQS and AZPDES permits.

Recommendations from previous annual reports have been continued. Additions were implemented this year to improve the program. A summary is described below.

1. Assess status of enforcement cases by watershed.

The distribution of enforcement actions in the four watersheds parallels the population density, with the Upper Santa Cruz watershed with the most at 51%, Rillito watershed at 17%, Brawley watershed at 30% and the Lower Santa Cruz watershed at 3%. The most frequently issued NOVs are for solid waste on private property and wildcat dumping on public land in the Upper Santa Cruz watershed and the Brawley watershed.

Table 5-1. Distribution of NOVs within four watersheds of permit area

Type of NOV	FY13/14	Brawley %	Lower Santa Cruz %	Upper Santa Cruz %	Rillito %
Air	9	0%	0%	1%	0%
Asbestos	0	0%	0%	0%	0%
Grey Water	1	0%	0%	0%	0%
Hazardous Waste	9	0%	0%	2%	0%
Nuisance	0	0%	0%	0%	0%
Septic System	8	0%	0%	2%	0%
Sewage Release	37	0%	1%	5%	2%
Solid Waste	241	18%	2%	23%	10%
Wildcat dumps	141	10%	0%	17%	3%
Waste Hauler	4	0%	0%	0%	0%
Water Quality	9	0%	0%	1%	0%
Total	459	30%	3%	51%	17%

2. Evaluate water quality and pollutant loadings by season

Three years of water quality data have been collected under the new permit. Full sets of analytes are collected in both seasons, when water is available. Four monitor points have two

summer samples, which makes a seasonal interpretation difficult. Four sample sites have three winter samples where an early trend could be evident. The data is insufficient at this time to characterize seasonal pollutant loadings.

3. Tracking spills by County Facilities, not just by public in county property

County departments report the spills caused by the public or county employees (Table 3-2).

4. **Track drainage cleanup the way PDOT tracks roadway cleanup.**

Maintenance of the drainageways has detailed tracking and is reported in Appendix J. The maintenance of retention and detention basins has been added to the record.

5. Track training in PDEQ, RWRD, PDOT, and RFCD.

Training within the departments is tracked individually for the staff working in the field and the methodology is different between each department and division. A new program will be developed and implemented in fiscal year 2014-2015.

6. Arrange for analytical work with detection limits smaller than Surface Water Quality Standards, if laboratories are certified for the analytical method.

The licensed laboratory is following protocols established by 40 CFR Part 136, Appendix B. The detection limit cannot be changed without approval from ADHS and EPA Region 9.

7. Calculate acres of five land uses within new permit area to facilitate evaluation of pollutant loading estimates by land use.

The areas of the five land uses within the new permit area have been calculated. The MS4 is dominantly Low Density Residential.

Table 5-2. Land Use Area within Unincorporated Pima County

Land Use	Area (square miles)	Percent
High Density Residential	5.7	0%
Commercial	5.9	0%
Industrial	21.2	1%
Medium Density Residential	160.0	8%
Low Density Residential	1,766.7	90%

8. Calculate acres of five land uses within new permit area to facilitate evaluation of pollutant loading estimates by land use.

This recommendation will not be implemented due to the limitations of the pollutant load estimates. For the low density residential land use, the percent imperviousness in unincorporated Pima County is expected to be less than the imperviousness of monitor site #1, which is zoned for low density residences. This is likely result in a different contribution of parameters to the pollutant load.

Evaluation of 2014 Stormwater Management Program

The construction site inventory was updated to calculate the time construction firms take to return to compliance with the Construction General Permit and Pima County ordinances. With the new tracking process, the compliance rate is easy to track as well as identify if there are chronic non-compliance problems. While most issues are resolved during the inspection, five sites did not return to compliance within the 30 day time frame specified in the permit.

A comprehensive training program is needed to verify staff working directly on stormwater management activities has the needed knowledge and skills. Also, awareness training will be developed for staff with responsibilities related to stormwater management activities. A record keeping process is needed to document new staff have received full training and existing staff have a refresher course every couple years as well as to document the type of training provided.

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6. Stormwater Management Program Modifications

ADEQ issued the new 2011 MS4 permit on June 16, 2011. A new Stormwater Management Program was developed to meet the provisions of the 2011 MS4 permit. Below are the identified changes to the 2014 SWMP.

1. **Addition of New Control Measures**
   The Construction Site Inventory was updated to track the time it takes for a site to return to compliance, if the site has been found out of compliance or deficient.

   The maintenance of retention/detention basins has been added to Table 4 and the data for the last three years has been included.

2. **Addition of Temporary Control Measures**
   No temporary control measures were proposed.

3. **Increase of Existing Control Measures**
   Existing control measures were maintained.

4. **Replacement of Existing Control Measures**
   None.

5. **Modifications to SWMP**
   Minor modifications include the removal of Wash-ups in Table 4 as no events were scheduled since the new permit was issued.

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7. Monitoring Locations

Five monitor sites are sampled each summer and winter season for field parameters, microbiology, metals, nutrients, toxic organic pollutants, volatile organic compounds (VOCs), semi-VOCs, PCBs and pesticides, as identified in the permit. Water quality data from each site is intended to characterize the water chemistry of runoff from five land uses, namely low density residential, medium density residential, high density residential, commercial and industrial. Results may also be used to identify and eliminate illicit discharges. The data is evaluated to assess the effectiveness of control measures to reduce the discharge of pollutants.

Site No.	Receiving Water	Monitor Site Location Information				
		Location	Latitude Longitude	Elevation (famsl*)	Drainage Area (acres)	Dominant Land Use
1	Unnamed wash, tributary to Rillito River	Calle Esplendor/ Calle Barril	32°17'46.1" -110°54'30.6"	2642	2.8	Residential Low Density
2	Unnamed wash, tributary to Rillito River	Ruthrauff Road/La Cholla Blvd.	32°17'32.6" -111°00'42.6"	2275	56.8	Residential Medium Density
3	Valley View Wash	Valley View Rd/ Sunrise Drive	32°18'22.9" -110°54'38.8"	2709	7.3	Residential High Density
4	Valley View Wash	Valley View Rd/ Sunrise Drive	32°18'23.0" -110°54'38.8"	2710	41.6	Commercial
5	Unnamed wash, tributary to Tucson Diversion Channel	4101 S. Country Club Rd	32°10'27.5" -110°55'34.1"	2542	52.2	Industrial

* famsl – feet above mean sea level

Table 7.1 Monitor Site Locations

All sites have an adjacent weather station with a tipping bucket rain gage and remote data collection equipment using Pima County's Automated Local Evaluation in Real Time (ALERT) system. Flow is measured using a depth gage and channel characteristics or the bucket method. When sampling the stormwater, a pH meter with a temperature sensor is used to collect pH. For deep sampling locations, a dipping pole is used to collect the water samples.

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Part 8: Storm Event Records

Summer storms in Pima County typically have a short duration and high intensity. Winter storms are generally longer in duration and less intense. The extended event duration in the winter may result in a delay from the time rainfall begins and runoff begins that is greater than one hour. Although permit and guidance documentation indicates the first sample is to be collected within an hour of the start of rainfall, storm runoff may not begin until several minutes or hours after the initial rainfall. In this case, first flush is collected when runoff begins.

During the reporting period there were 42 rainfall events, of which only 10 qualified for stormwater sampling (Table 8-1). The annual rainfall at the monitor sites ranged from 5.0 to 7.28 inches, which is significantly lower than the annual normal rainfall of 11.59 inches (National Weather Service Forecast Office, Tucson, AZ, 2011).

Seven of ten wet weather samples were collected during this fiscal year. Summer rainfall was unusually low as the area received only 1.7" to 4.0" of rain when the normal rainfall is 7.02". There was one qualifying event during the summer sampling season for Sites #1, #3, and #4. Rainfall was sufficient on September 10, 2014 to collect a sample at 11:53 pm; however, the laboratory was temporarily closed between midnight and 6:00 am precluding the delivery and analysis within the holding time for *E. coli*; therefore, a sample was not collected.

Table 8-1. Storm Event Records for Monitor Sites

Season	Date	Site #1	Rainfall (in)	Site #2	Rainfall (in)	Site #3	Rainfall (in)	Site #4	Rainfall (in)	Site #5	Rainfall (in)
W	04/26/14	NR	0.04			NR	0.04	NR	0.04		
W	03/02/14	NR	0.16	-	0.36	NR	0.16	NR	0.16	-	0.60
W	03/01/14	-	0.20			-	0.20	-	0.20		0.04
W	03/01/14	NR	0.08			NR	0.08	NR	0.08		
W	02/01/14	NR	0.04	NR	0.04	NR	0.04	NR	0.04		
W	12/21/13	NR	0.04			NR	0.04	NR	0.04		
W	12/20/13	-	0.44	-	0.24	-	0.44	-	0.44	-	0.36
W	12/05/13	NR	0.12	-	0.24	NR	0.12	NR	0.12	-	0.32
W	11/23/13	-	1.48	-	1.44	-	1.48	-	1.48	-	1.40
W	11/22/13	SC	0.76	SC	0.88	SC	0.76	SC	0.76	SC	0.56
W	11/21/13			NR	0.04						
W	11/03/13	NR	0.08			NR	0.08	NR	0.08	NR	0.08
S	09/10/13	NR	0.00			NR	0.00	NR	0.00		
S	09/10/13	TD *	0.36	NR	0.08	TD *	0.36	TD *	0.36	-	0.40
S	09/09/13	NR	0.12	NR	0.08	NR	0.12	NR	0.12	NR	0.16
S	09/08/13	NR	0.04	NR	0.04	NR	0.04	NR	0.04		
S	09/06/13			NR	0.08						

Season	Date	Site #1	Rainfall (in)	Site #2	Rainfall (in)	Site #3	Rainfall (in)	Site #4	Rainfall (in)	Site #5	Rainfall (in)
S	09/03/13									-	0.28
S	08/30/13			NR	0.04						
S	08/29/13			NR	0.04						
S	08/26/13	NR	0.04			NR	0.04	NR	0.04		
S	08/26/13	NR	0.16			NR	0.16	NR	0.16		
S	08/25/13	NR	0.12	NR	0.04	NR	0.12	NR	0.12	NR	0.08
S	08/24/13	NR	0.08	NR	0.04	NR	0.08	NR	0.08		
S	08/22/13			SC	0.96						
S	08/18/13			NR	0.16						
S	08/15/13	NR	0.08	NR	0.12	NR	0.08	NR	0.08		
S	08/06/13	NR	0.04	NR	0.16	NR	0.04	NR	0.04	-	0.20
S	08/02/13			NR	0.08						
S	07/26/13	NR	0.04			NR	0.04	NR	0.04	-	1.84
S	07/25/13	NR	0.16			NR	0.16	NR	0.16		
S	07/25/13	NR	0.04			NR	0.04	NR	0.04		
S	07/24/13	NR	0.04	TD *	0.20	NR	0.04	NR	0.04		
S	07/20/13			NR	0.04					NR	0.12
S	07/16/13									NR	0.08
S	07/15/13			NR	0.04					NR	0.16
S	07/12/13			NR	0.04					NR	0.12
S	07/11/13	NR	0.12	NR	0.08	NR	0.12	NR	0.12	NR	0.08
S	07/10/13	NR	0.08	NR	0.04	NR	0.08	NR	0.08	NR	0.04
S	07/05/13									SC	0.36
S	07/04/13									NR	0.04
S	07/02/13	NR	0.16	NR	0.04	NR	0.16	NR	0.16		
Winter total			3.32		3.20		3.32		3.32		3.32
Summer Total			1.68		2.40		1.68		1.68		3.96
Annual total			5.00		5.60		5.00		5.00		7.28

Seasons: S = June 1 - October 31 W = November 1 - May 31

NR - Not Representative (storm event < 0.2 inches or within 72 hours of last qualifying rain)

SC - Sample collected

TD - Technical Difficulty (Refer to Part 3H for details)

- Sample already collected

References

National Weather Service Forecast Office, Tucson, AZ. 2011. Monthly and Daily Normals (1981 – 2010) plus Daily Extremes (1895-2011) for TUCSON, ARIZONA. Downloaded from the National Weather Service, NOAA website on October 5, 2011 from http://www.wrh.noaa.gov/twc/climate/tus.php.

Part 9. Water Quality Data from Monitor Sites

Site	Summer	Type	Winter	Type
1			11/22/13	Full Suite
2	08/22/13	Full suite	11/22/13	Full suite
3			11/22/13	Full suite
4			11/22/13	Full suite
5	07/05/13	Full suite	11/22/13	Full suite

The permit requires a full suite of water quality parameters on the first, third, and fifth years of the permit. In the other years a smaller set of analytes are defined. Due to drought conditions and missing samples from a monitor site, the pattern of collecting full suites every other year was difficult to track. To maintain a good data set, a full suite is now collected for every event.

Analytical Methods in Full Suite:

- SM 9233B E. Coli
- SM4500-CN-BCE Total Cyanide
- EPA 1664A Oil & Grease, Total Petroleum Hydrocarbons
- EPA 624 Acrolein, Acrylonitrile
- EPA 8260 Volalite Organic Compounds (VOCs)
- EPA 625-BNA Semi-volatile Organic Compounds (SVOCs)
- EPA 625-P&PCBS Pesticides and PCBs
- SM 4500-NH3D Ammonia
- EPA 351.2 Total Kjheldahl Nitrogen
- EPA 365.1 Total Phosphorus, Ortho Phosphate
- EPA 353.2 Nitrate-Nitrite
- Hach 8000 Chemical Oxygen Demand
- EPA 200.8 Total Metals, Dissolved Metals
- EPA 245.1 Mercury
- SM 2540C Total Dissolved Solids
- SM 2450D Total Suspended Solids
- SM 5210B Biological Oxygen Demand

Analytical Methods in Small Set (no VOCs, SVOCs, P&PCBs):

- SM 9233B E. Coli
- SM4500-CN-BCE Total Cyanide
- EPA 1664A Oil & Grease, Total Petroleum Hydrocarbons
- EPA 624 Acrolein, Acrylonitrile
- SM 4500-NH3D Ammonia

- EPA 351.2 Total Kjheldahl Nitrogen
- EPA 365.1 Total Phosphorus, Ortho Phosphate
- EPA 353.2 Nitrate-Nitrite
- Hach 8000 Chemical Oxygen Demand
- EPA 200.8 Total Metals, Dissolved Metals
- EPA 245.1 Mercury
- SM 2540C Total Dissolved Solids
- SM 2450D Total Suspended Solids
- SM 5210B Biological Oxygen Demand

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2015-16
Date		**7/4/2011**		**-**		**07/15/12**		**12/14/12**		**-**		**11/22/13**									
Conventional Parameters										1											
Average Flow Rate[3] (m^3/s)	-		0.0003				0.00044		0.0006		0		0.0004								
Ph	6.5-9.0		6.4				7.6		8.1				6.9								
Temperature (°Celcius)	-		29°C				27.5		12.1				15.1								
Hardness[4] (mg/L)[5]	-	67	67			30.7	30.7	37.4	37.4			26	26								
Total Dissolved Solids (TDS) (mg/L)	-		-				71.4		34.0				72								
Total Suspended Solids (TSS) (mg/L)	-		60				35.0		50.0				62								
Biological Oxygen Demand (BOD) (mg/L)	-		-				10.5		5.00				4.9								
Chemical Oxygen Demand (COD) (mg/L)	-		-				62		40.0				57								
Inorganics																					
Cyanide, total (ug/L)[6]	84		-				ND		2.98				3.78								
Nutrients																					
Nitrate + Nitrite as N (mg/L)			-				0.40		0.20				0.17								
Ammonia as N (mg/L)			-				0.58		0.53				0.53								
TKN (mg/L)			-				2.12		1.63				1.41								
Total Phosphorus (mg/L)			-				0.25		0.22				0.15								
Total Orthophosphate (mg/L)			-				0.09		0.07				ND0.50								
Microbiological																					
Escherichia coli (*E. coli*) (CFU/100 mg or MPN)[7]	126		48840				10						10								
Total Metals[8]																					
$Antimony_T$ (µg/L)	747		-				0.25		0.21				0.53								
$Arsenic_T$ (µg/L)	200		-				1.19		1.87				1.46								
$Barium_T$ (µg/L)	98,000		-				30		67.2				57.6								
$Beryllium_T$ (µg/L)	1,867		-				ND		0.26				0.23								
$Cadmium_D$ (µg/L)			-			7	ND	9	ND			6	ND								
$Chromium_D$ (µg/L)			-			727	ND	854	1.18			634	ND								
$Copper_D$ (µg/L)		16.0	30.8			8.0	5.77	9.0	3.26			7.0	4.2								
$Lead_D$ (µg/L)			Trace			38	0.24	47	0.12			31	ND								
$Mercury_T$ (µg/L)	10.00		-				ND		ND				0.32								
$Nickel_D$ (µg/L)			-			1,532	1.72	1,810	0.72			1,331	1.01								
$Selenium_T$ (µg/L)	33		-				ND		ND				ND								
$Silver_D$ (µg/L)			-			0.4	ND	0.6	2.66			0.3	ND								
$Thallium_T$ (µg/L)	75		-				ND		ND				ND								
$Zinc_D$ (µg/L)			70.9			409	6.61	483	3.74			355	4.68								
Organic Toxic Pollutants																					
Total Petroleum Hydrocarbons (TPH) (mg/L)	-		-				2.59		10				9.39								
Total Oil & Grease (mg/L)	-		-				3.78		4.89				10.1								

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2015-16
Date		**7/4/2011**		**-**		**07/15/12**		**12/14/12**		**-**		**11/22/13**									
VOCs[9], Semi-VOCs, and Pesticides																					
Acrolein (µg/L)	467		-				ND		-				ND								
Acrylonitrile (µg/L)	37,333		-				ND		-				ND								
Benzene (µg/L)	3,733		-				ND		-				ND								
Bromoform (µg/L)	18,667		-				ND		-				ND								
Carbon tetrachloride (µg/L)	1,307		-				ND						ND								
Chlorobenzene (µg/L)	18,667		-				ND		-				ND								
Chlorodibromomethane (µg/L)	18,667		-				ND		-				ND								
Chloroethane (µg/L)	-		-				ND		-				ND								
2-chloroethylvinyl ether (µg/L)	-		-				ND		-				ND								
Chloroform (µg/L)	9,333		-				ND		-				ND								
Dichlorobromomethane (µg/L)	18,667		-				ND		-				ND								
1,2-dichlorobenzene (µg/L)	5,900		-				ND		-				ND								
1,3-dichlorobenzene (µg/L)	-		-				ND		-				ND								
1,4-dichlorobenzene (µg/L)	######		-				ND		-				ND								
1,1-dichloroethane (µg/L)	-		-				ND		-				ND								
1,2-dichloroethane (µg/L)	186,667		-				ND		-				ND								
1,1-dichloroethylene (µg/L)	46,667		-				ND		-				ND								
1,2-dichloropropane (µg/L)	84,000		-				ND		-				ND								
1,3-dichloropropylene (µg/L)	28,000		-				ND		-				ND								
Ethylbenzene (µg/L)	93,333		-				ND		-				ND								
Methyl bromide (µg/L)	-		-				ND		-				ND								
Methyl chloride (µg/L)	-		-				ND						ND								
Methylene chloride (µg/L)	-		-				-		-				-								
1,1,2,2-tetrachloroethane (µg/L)	93,333		-				ND		-				ND								
Tetrachloroethylene (µg/L)	9,333		-				ND		-				ND								
Toluene (µg/L)	373,333		-				ND		-				ND								
1,2-trans-dichloroethylene (µg/L)	18,667		-				ND		-				ND								
1,1,1-trichloroethane (µg/L)	######		-				ND		-				ND								
1,1,2-trichloroethane (µg/L)	3,733		-				ND		-				ND								
Trichloroethylene (µg/L)	280		-				ND		-				ND								
Trimethylbenzene (µg/L)	-		-				-		-				-								
Vinyl chloride (µg/L)	2,800		-				ND		-				ND								
Xylene (µg/L)	186,667		-				ND		-				ND								
SVOCs - Acid Extractables																					
2-chlorophenol (µg/L)	4,667		-				ND		-				ND								
2,4-dichlorophenol (µg/L)	2,800		-				ND		-				ND								
2,4-dimethylphenol (µg/L)	18,667		-				ND		-				ND								
4,6-dinitro-o-cresol (µg/L)	3,733		-				-		-				-								
2,4-dinitrophenol (µg/L)	1,867		-				ND		-				ND								
2-nitrophenol (µg/L)	-		-				ND		-				ND								
4-nitrophenol (µg/L)	-		-				ND		-				ND								
p-chloro-m-cresol (µg/L)	48,000		-				-		-				-								
Pentachlorophenol (µg/L)	8.14		-				ND		-				ND								
Phenol (µg/L)	180,000		-				ND		-				ND								
2,4,6-trichlorophenol (µg/L)	130		-				ND		-				ND								

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2015-16
Date		**7/4/2011**		**-**		**07/15/12**		**12/14/12**		**-**		**11/22/13**									
SVOCs - Bases/Neutrals																					
Acenaphthene (µg/L)	56,000		-				ND		-				ND								
Acenaphthylene (µg/L)	-		-				ND		-				ND								
Anthracene (µg/L)	280,000		-				ND		-				ND								
Benzo(a)anthracene (µg/L)	0.20		-				ND1.44		-				ND1.44								
Benzo(a)pyrene (µg/L)	0.20		-				ND1.55		-				ND1.55								
Benzo(b)fluoranthene (µg/L)	-		-				ND		-				ND								
Benzo(g,h,i)perylene (µg/L)	-		-				ND		-				ND								
Benzo(k)fluoranthene (µg/L)	1.9		-				ND2.28		-				ND2.28								
Chrysene (µg/L)	19		-				ND		-				ND								
Dibenzo(a,h)anthracene (µg/L)	1.9		-				ND		-				ND								
3,3-dichlorobenzidine (µg/L)	3		-				ND		-				ND								
Diethyl phthalate (µg/L)	746,667		-				ND		-				6.68								
Dimethyl phthalate (µg/L)	-		-				ND		-				ND								
Di-n-butyl phthalate (µg/L)	1,100		-				ND		-				26.6								
2,4-dinitrotoluene (µg/L)	1,867		-				ND		-				ND								
2,6-dinitrotoluene (µg/L)	3,733		-				ND		-				ND								
Di-n-octyl phthalate (µg/L)	373,333		-				ND		-				ND								
1,2-diphenylhydrazine (as azobenzene) (µg/L)	1.8		-				ND		-				ND								
Fluroranthene (µg/L)	37,333		-				ND		-				ND								
Fluorene (µg/L)	37,333		-				ND		-				ND								
Hexachlorobenzene (µg/L)	747		-				ND		-				ND								
Hexachlorobutadiene (µg/L)	187		-				ND		-				ND								
Hexachlorocyclopentadiene (µg/L)	11,200		-				ND		-				ND								
Hexachloroethane (µg/L)	850		-				ND2.25		-				ND2.25								
Indeno(1,2,3-cd)pyrene (µg/L)	1.90		-				ND		-				ND								
Isophorone (µg/L)	186,667		-				ND		-				ND								
Naphthalene (µg/L)	18,667		-				ND		-				ND								
Nitrobenzene (µg/L)	467		-				ND4.23		-				ND4.23								
N-nitrosodimethylamine (µg/L)	0.03		-				ND		-				ND								
N-nitrosodi-n-propylamine (µg/L)	88,667		-				ND		-				ND								
N-nitrosodiphenylamine (µg/L)	290		-				ND		-				ND								
Phenanthrene (µg/L)	-		-				ND		-				ND								
Pyrene (µg/L)	28,000		-				ND		-				ND								
1,2,4-trichlorobenzene (µg/L)	9,333		-				ND		-				ND								

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2015-16
Date		**7/4/2011**		**-**		**07/15/12**		**12/14/12**		**-**		**11/22/13**									
PCB/Pesticides																					
Aldrin (µg/L)	0.00		-				ND0.10		-				ND0.10								
Alpha-BHC (µg/L)	1,600		-				ND		-				ND								
Beta-BHC (µg/L)	560		-				ND		-				ND								
Gamma-BHC (µg/L)	11		-				ND		-				ND								
Delta-BHC (µg/L)	1,600		-				ND		-				ND								
Chlordane (µg/L)	3.2		-				ND		-				ND								
4,4'-DDT (µg/L)	1.1		-				ND		-				ND								
4,4'-DDE (µg/L)	1.1		ND				ND		-				ND								
4,4'-DDD (µg/L)	1.1		-				ND		-				ND								
Dieldrin (µg/L)	0.00		-				ND0.07		-				ND0.07								
Alpha-endosulfan (µg/L)	3		-				ND		-				ND								
Beta-endosulfan (µg/L)	3		-				ND		-				ND								
Endosulfan sulfate (µg/L)	3		-				ND		-				ND								
Endrin (µg/L)	0.004		-				ND0.10		-				ND0.10								
Endrin aldehyde (µg/L)	0.7		-				ND		-				ND								
Heptachlor (µg/L)	0.9		-				ND		-				ND								
Heptachlor epoxide (µg/L)	0.9		-				ND		-				ND								
PCB-1242 (AROCLOR-1242) (µg/L)	0.001		-				ND0.10		-				ND0.10								
PCB-1254 (AROCLOR-1254) (µg/L)	0.001		-				ND0.07		-				ND0.07								
PCB-1221 (AROCLOR-1221) (µg/L)	0.001		-				ND0.09		-				ND0.09								
PCB-1232 (AROCLOR-1232) (µg/L)	0.001		-				ND0.16		-				ND0.16								
PCB-1248 (AROCLOR-1248) (µg/L)	0.001		-				ND0.16		-				ND0.16								
PCB-1260 (AROCLOR-1260) (µg/L)	0.001		-				ND0.25		-				ND0.25								
PCB-1016 (AROCLOR-1016) (µg/L)	0.001		-				ND0.10		-				ND0.10								
Toxaphene (µg/L)	0.005		-				ND5.08		-				ND5.08								

Note:Results higher than SWQ are shown in red font. Non-detectable results with the Method Detection Limit (MDL) above the SWQS are shown as ND with the MDL in parentheses.

1 - Partial Body Contact (PBC), Aquatic & Wildlife ephemeral (A&We) or Agricultural Livestock watering (AgL).

2 - Surface Water Quality Standards (A.A.C R18-11-101 through Appendix B) selected from lowest of PBC, A&We or AgL.

3 - Average flow rate during the sampling event. m^3/s = meters cubed per second.

4 - Hardness of sample event is used to calculate SWQS for Cadmium, Chromium, Copper, Lead, Nickel, Sliver, and Zinc.

5 - mg/l = milligram per liter

6 - µg/L = micrograms per liter

7 - CFU/100 ml = colony forming unit per 100 milliliters, MPN = Most probable number per 100 ml

8 - SWQS for Total Metals are denoted with "T". SWQS for Dissolved Metal for A&We are denoted with a "D".

9 - Volatile Organic Compounds

10 - Dash means information unavailable (ie. SWQS was not established or sample was not collected).

11 - Total of α-BHC, β-BHC, γ-BHC, δ-BHC.

12 - Refer to Appendix Part 13O for Analytical Laboratory Reports

Receiving Water: Rillito
Designiated Uses: AWe, PBC
Table 9-2. Water Quality Data Monitor Site #2

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		-		03/18/12		-		01/26/13		08/22/13		11/22/13		07/05/14							
Conventional Parameters									0.2866618												
Average Flow Rate[3] (m^3/s)	-				0.0050				0.013		0.040		0.016		0.0065						
Ph	6.5-9.0				7.5				8.73				6.7		6.6						
Temperature (°Celcius)	-				13.7°C				15.1				13.9		27						
Hardness4 (mg/L)[5]				50	Trace 50			48.9	48.9	147	147	62.5	62.5								
Total Dissolved Solids (TDS) (mg/L)	-				36				109		126		114								
Total Suspended Solids (TSS) (mg/L)	-				40.8				45		426		88								
Biological Oxygen Demand (BOD) (mg/L)	-				19				12.6		12.2		9.3								
Chemical Oxygen Demand (COD) (mg/L)	-				106				53.0		124		107								
Inorganics																					
Cyanide, total (ug/L)[6]	84T				ND1.7				1.31		1.31		ND1.40								
Nutrients																					
Nitrate + Nitrite as N (mg/L)					5.3				1.6		2.52		0.96								
Ammonia as N (mg/L)					1				0.63		0.98		0.53								
TKN (mg/L)					2.8				1.88		2.83		1.97								
Total Phosphorus (mg/L)					T0.06				0.30		0.23		0.49								
Total Orthophosphate (mg/L)					T0.02				0.16		0.98		0.22								
Microbiological																					
Escherichia coli (E. coli) (CFU/100 mg or MPN)[7]	126				30				4884		19863		4884								
Total Metals[8]																					
AntimonyT (µg/L)	747				ND				0.72		1.08		0.85								
ArsenicT (µg/L)	200				1.3				1.48		4.1		2.11								
BariumT (µg/L)	98,000				22				38.4		163		83.6								
BerylliumT (µg/L)	1,867				ND				ND		0.64		0.28								
CadmiumD (µg/L)				12	ND			11	ND	33	ND	14	ND								
ChromiumD (µg/L)				1084	ND			1064	0.51	2621	1.28	1301	0.67								
CopperD (µg/L)				12	61			12	6.37	33	8.18	15	7.45								
LeadD (µg/L)				64.5	ND			62.9	0.53	207.2	0.62	82.1	0.5								
MercuryT (µg/L)	5D								ND		ND		ND								
NickelD (µg/L)				2314	1.2			2271	0.87	5762	0.76	2795	0.72								
SeleniumT (µg/L)	33				ND				ND		0.94		ND								
SilverD (µg/L)				1.01	ND			0.97	ND	6.46	ND	1.48	ND								
ThalliumT (µg/L)	75				ND				ND		0.2		ND								
ZincD (µg/L)				618	22			606	9.51	1542	7.46	747	10.7								
Organic Toxic Pollutants																					
Total Petroleum Hydrocarbons (TPH) (mg/L)	-				T0.745				1.12		2.09		8.38								
Total Oil & Grease (mg/L)	-				T0.829				11.2		3.72		8.08								

Receiving Water: Rillito
Designiated Uses: AWe, PBC
Table 9-2. Water Quality Data Monitor Site #2

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		-		03/18/12		-		01/26/13		08/22/13		11/22/13		07/05/14							
VOCs9, Semi-VOCs, and Pesticides																					
Acrolein (µg/L)	467				ND				ND		ND		ND								
Acrylonitrile (µg/L)	37333				ND				ND		ND		ND								
Benzene (µg/L)	3733				ND				ND		ND		ND								
Bromoform (µg/L)	18667				ND				ND		ND		ND								
Carbon tetrachloride (µg/L)	1307				ND				ND		ND		ND								
Chlorobenzene (µg/L)	18667				ND				ND		ND		ND								
Chlorodibromomethane (µg/L)	18667				ND				ND		ND		ND								
Chloroethane (µg/L)	-				ND				ND		ND		ND								
2-chloroethylvinyl ether (µg/L)	-				ND				ND		ND		ND								
Chloroform (µg/L)	9333				ND				ND		ND		ND								
Dichlorobromomethane (µg/L)	18667				ND				ND		ND		ND								
1,2-dichlorobenzene (µg/L)	5,900				ND				ND		ND		ND								
1,3-dichlorobenzene (µg/L)	-				ND				ND		ND		ND								
1,4-dichlorobenzene (µg/L)	6,500				ND				ND		ND		ND								
1,1-dichloroethane (µg/L)	-				ND				ND		ND		ND								
1,2-dichloroethane (µg/L)	186,667				ND				ND		ND		ND								
1,1-dichloroethylene (µg/L)	46,667				ND				ND		ND		ND								
1,2-dichloropropane (µg/L)	84,000				ND				ND		ND		ND								
1,3-dichloropropylene (µg/L)	28,000				ND				ND		ND		ND								
Ethylbenzene (µg/L)	93,333				ND				ND		ND		ND								
Methyl bromide (µg/L)	-				ND				ND		ND		ND								
Methyl chloride (µg/L)	-				ND				ND		ND		ND								
Methylene chloride (µg/L)	-				ND				-		-		-								
1,1,2,2-tetrachloroethane (µg/L)	93,333				ND				ND		ND		ND								
Tetrachloroethylene (µg/L)	9,333				ND				ND		ND		ND								
Toluene (µg/L)	373,333				ND				ND		ND		ND								
1,2-trans-dichloroethylene (µg/L)	-				ND				ND		ND		ND								
1,1,1-trichloroethane (µg/L)	1,866,667				ND				ND		ND		ND								
1,1,2-trichloroethane (µg/L)	3,733				ND				ND		ND		ND								
Trichloroethylene (µg/L)	280				ND				ND		ND		ND								
Trimethylbenzene (µg/L)	-				-				-		-		-								
Vinyl chloride (µg/L)	2,800				ND				ND		ND		ND								
Xylene (µg/L)	186,667				ND				ND		ND		ND								
SVOCs - Acid Extractables																					
2-chlorophenol (µg/L)	4,667				ND				ND		ND		-								
2,4-dichlorophenol (µg/L)	2,800				ND				ND		ND		-								
2,4-dimethylphenol (µg/L)	18,667				ND				ND		ND		-								
4,6-dinitro-o-cresol (µg/L)	3,733				-				-		-		-								
2,4-dinitrophenol (µg/L)	1,867				ND				ND		ND		-								
2-nitrophenol (µg/L)	-				ND				ND		ND		-								
4-nitrophenol (µg/L)	-				ND				ND		ND		-								
p-chloro-m-cresol (µg/L)	48,000				-				-		-		-								
Pentachlorophenol (µg/L)	8.141				ND				ND		ND		-								
Phenol (µg/L)	180,000				ND				ND		ND		-								
2,4,6-trichlorophenol (µg/L)	130				ND				ND		ND		-								

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		-		03/18/12		-		01/26/13		08/22/13		11/22/13		07/05/14							
SVOCs - Bases/Neutrals																					
Acenaphthene (µg/L)	56,000				ND				ND		ND		-								
Acenaphthylene (µg/L)	-				ND				ND		ND		-								
Anthracene (µg/L)	280,000				ND				ND		ND		-								
Benzo(a)anthracene (µg/L)	0.2				ND1.44				ND1.44		ND1.44		-								
Benzo(a)pyrene (µg/L)	0.2				ND1.55				ND1.55		ND1.55		-								
Benzo(b)fluoranthene (µg/L)	-				ND				ND		ND		-								
Benzo(g,h,i)perylene (µg/L)	-				ND				ND		ND		-								
Benzo(k)fluoranthene (µg/L)	1.9				ND2.28				ND2.28		ND2.28		-								
Chrysene (µg/L)	19				ND				ND		ND		-								
Dibenzo(a,h)anthracene (µg/L)	1.9				ND				ND		ND		-								
3,3-dichlorobenzidine (µg/L)	3				ND				ND		ND		-								
Diethyl phthalate (µg/L)	746,667				ND				ND		ND		-								
Dimethyl phthalate (µg/L)	-				ND				ND		ND		-								
Di-n-butyl phthalate (µg/L)	1,100				56.79				ND		4.94		-								
2,4-dinitrotoluene (µg/L)	1,867				ND				ND		ND		-								
2,6-dinitrotoluene (µg/L)	3,733				ND				ND		ND		-								
Di-n-octyl phthalate (µg/L)	373,333				ND				ND		ND		-								
1,2-diphenylhydrazine (as azobenzene) (µg/L)	1.8				ND				ND		ND		-								
Fluroranthene (µg/L)	37,333				ND				ND		ND		-								
Fluorene (µg/L)	37,333				ND				ND		ND		-								
Hexachlorobenzene (µg/L)	747				ND				ND		ND		-								
Hexachlorobutadiene (µg/L)	187				ND				ND		ND		-								
Hexachlorocyclopentadiene (µg/L)	11,200				ND				ND		ND		-								
Hexachloroethane (µg/L)	850				ND				ND		ND		-								
Indeno(1,2,3-cd)pyrene (µg/L)	1.9				ND (2.25)				ND (2.25)		ND (2.25)		-								
Isophorone (µg/L)	186,667				ND				ND		ND		-								
Naphthalene (µg/L)	18,667				ND				ND		ND		-								
Nitrobenzene (µg/L)	467				ND				ND		ND		-								
N-nitrosodimethylamine (µg/L)	0.03				ND (1.06)				ND (4.23)		ND (4.23)		-								
N-nitrosodi-n-propylamine (µg/L)	88,667				ND				ND		ND		-								
N-nitrosodiphenylamine (µg/L)	290				ND				ND		ND		-								
Phenanthrene (µg/L)	-				ND				ND		ND		-								
Pyrene (µg/L)	28,000				ND				ND		ND		-								
1,2,4-trichlorobenzene (µg/L)	9,333				ND				ND		ND		-								

Receiving Water: Rillito
Designiated Uses: AWe, PBC
Table 9-2. Water Quality Data Monitor Site #2

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		-		03/18/12		-		01/26/13		08/22/13		11/22/13		07/05/14							
PCB/Pesticides																					
Aldrin (µg/L)	0.003				ND0.10				ND0.10		ND0.10		-								
Alpha-BHC (µg/L)	1,600				ND				ND		ND		-								
Beta-BHC (µg/L)	560				ND				ND		ND		-								
Gamma-BHC (µg/L)	11				ND				ND		ND		-								
Delta-BHC (µg/L)	1600				ND				ND		ND		-								
Chlordane (µg/L)	3.2				ND				ND		ND		-								
4,4'-DDT (µg/L)	1.1				ND				ND		ND		-								
4,4'-DDE (µg/L)	1.1				ND				ND		ND		-								
4,4'-DDD (µg/L)	1.1				ND				ND		ND		-								
Dieldrin (µg/L)	0.003				ND0.07				ND0.07		ND0.07		-								
Alpha-endosulfan (µg/L)	3				ND				ND		ND		-								
Beta-endosulfan (µg/L)	3				ND				ND		ND		-								
Endosulfan sulfate (µg/L)	3				ND				ND		ND		-								
Endrin (µg/L)	0.004				ND0.10				ND0.10		ND0.10		-								
Endrin aldehyde (µg/L)	0.7				ND				ND		ND		-								
Heptachlor (µg/L)	0.9				ND				ND		ND		-								
Heptachlor epoxide (µg/L)	0.9				ND				ND		ND		-								
PCB-1242 (AROCLOR-1242) (µg/L)	0.001				ND0.10				ND0.10		ND0.10		-								
PCB-1254 (AROCLOR-1254) (µg/L)	0.001				ND0.07				ND0.07		ND0.07		-								
PCB-1221 (AROCLOR-1221) (µg/L)	0.001				ND0.09				ND0.09		ND0.09		-								
PCB-1232 (AROCLOR-1232) (µg/L)	0.001				ND0.16				ND0.16		ND0.16		-								
PCB-1248 (AROCLOR-1248) (µg/L)	0.001				ND0.16				ND0.16		ND0.16		-								
PCB-1260 (AROCLOR-1260) (µg/L)	0.001				ND0.25				ND0.25		ND0.25		-								
PCB-1016 (AROCLOR-1016) (µg/L)	0.001				ND0.10				ND0.10		ND0.10		-								
Toxaphene (µg/L)	0.005				ND5.08				ND5.08		ND5.08		-								

Note:Results higher than SWQ are shown in red font. Non-detectable results with the Method Detection Limit (MDL) above the SWQS are shown as ND with the MDL in parentheses.

1 - Partial Body Contact (PBC), Aquatic & Wildlife ephemeral (A&We) or Agricultural Livestock watering (AgL).
2 - Surface Water Quality Standards (A.A.C R18-11-101 through Appendix B) selected from lowest of PBC, A&We or AgL.
3 - Average flow rate during the sampling event. m3/s = meters cubed per second.
4 - Hardness of sample event is used to calculate SWQS for Cadmium, Chromium, Copper, Lead, Nickel, Sliver, and Zinc.
5 - mg/l = milligram per liter
6 - µg/L = micrograms per liter
7 - CFU/100 ml = colony forming unit per 100 milliliters, MPN = Most probable number per 100 ml
8 - SWQS for Total Metals are denoted with "T". SWQS for Dissolved Metal for A&We are denoted with a "D".
9 - Volatile Organic Compounds
10 - Dash means information unavailable (ie. SWQS was not established or sample was not collected).
11 - Total of α-BHC, β-BHC, γ-BHC, δ-BHC.
12 - Refer to Appendix Part 13O for Analytical Laboratory Reports

Receiving Water: Rillito
Designated Uses: AWe, PBC
Table 9-3. Water Quality Data for Monitor Site #3

PARAMETERS	Standard SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summmer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		09/10/11		03/18/12		07/20/12		12/14/12		-		11/22/2013									
Conventional Parameters										1											
Average Flow Rate[3] (m^3/s)	-		0.4203		0.2280		0.27		0.185		0		0.276								
Ph	6.5-9.0		6.3		7.4		7.2		7.5				7.1								
Temperature (°Celcius)	-		47.4		12.4°C		28.7		13.6				18.7								
Hardness[4] (mg/L)[5]	-	50	Trace 50	50	Trace 50	27.4	27.4	13.4	13.4			23.5	23.5								
Total Dissolved Solids (TDS) (mg/L)	-		-		57		66.0		38				44								
Total Suspended Solids (TSS) (mg/L)	-		21.5		55		30.0		4.50				18								
Biological Oxygen Demand (BOD) (mg/L)	-		-		10		8.00		3.00				5.5								
Chemical Oxygen Demand (COD) (mg/L)	-		-		140		72.0		28.0				42								
Inorganics			-																		
Cyanide, total (ug/L)[6]	84T				ND		ND		ND				ND								
Nutrients			-																		
Nitrate + Nitrite as N (mg/L)			-		0.3		0.75		0.2				0.22								
Ammonia as N (mg/L)			-		0.5		0.91		0.400				0.49								
TKN (mg/L)			-		1.1		1.61		0.68				1.03								
Total Phosphorus (mg/L)			-		T0.06		0.14		ND				0.16								
Total Orthophosphate (mg/L)			-		T0.02		0.03		0.04				0.1								
Microbiological																					
Escherichia coli (E. coli) (CFU/100 mg or MPN	126		7701		10		20		63				100								
Total Metals[8]																					
AntimonyT (µg/L)	747		-		ND		1.23		0.45				0.79								
ArsenicT (µg/L)	200		-		1.3		1.19		0.69				0.42								
BariumT (µg/L)	98,000		-		38		29.2		9.33				14								
BerylliumT (µg/L)	1,867		-		ND		ND		ND				ND								
CadmiumD (µg/L)		12		12	ND	6	ND	3	ND			6	ND								
ChromiumD (µg/L)		1084	-	1084	2.0	662	ND	369	1.32			584	0.49								
CopperD (µg/L)		12	ND1.0	12	21	7	10.9	3	4.66			6	8.7								
LeadD (µg/L)		64.5	ND	64.5	3.1	33.3	0.12	14.5	ND			28	ND								
MercuryT (µg/L)	5D		-		ND		ND		ND				0.287								
NickelD (µg/L)			-	2314	3.1	1391	1.26	760	0.49			1222	0.98								
SeleniumT (µg/L)	33		-		ND		ND		ND				ND								
SilverD (µg/L)			-	1.01	ND	0.36	ND	0.10	2.25			0.28	ND1								
ThalliumT (µg/L)	75		-		ND		ND		ND				ND								
ZincD (µg/L)			51.9	618	110	371	42.6	202	38.5			326	70								
Organic Toxic Pollutants			-																		
Total Petroleum Hydrocarbons (TPH) (mg/L)	-		-		3.02		18.0		ND				7.37								
Total Oil & Grease (mg/L)	-		-		86.63		11.60		3.12				9.29								

PARAMETERS	Standard SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summmer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		09/10/11		03/18/12		07/20/12		12/14/12		-		11/22/2013									
VOCs9, Semi-VOCs, and Pesticides																					
Acrolein (µg/L)	467		-		ND		ND		-				ND								
Acrylonitrile (µg/L)	37333		-		ND		ND		-				ND								
Benzene (µg/L)	3733		-		ND		ND		-				ND								
Bromoform (µg/L)	18667		-		ND		ND		-				ND								
Carbon tetrachloride (µg/L)	1307		-		ND		ND		-				ND								
Chlorobenzene (µg/L)	18667		-		ND		ND		-				ND								
Chlorodibromomethane (µg/L)	18667		-		ND		ND		-				ND								
Chloroethane (µg/L)	-		-		ND		ND		-				ND								
2-chloroethylvinyl ether (µg/L)	-		-		ND		ND		-				ND								
Chloroform (µg/L)	9333		-		ND		ND		-				ND								
Dichlorobromomethane (µg/L)	18667		-		ND		ND		-				ND								
1,2-dichlorobenzene (µg/L)	5,900		-		ND		ND		-				ND								
1,3-dichlorobenzene (µg/L)	-		-		ND		ND		-				ND								
1,4-dichlorobenzene (µg/L)	6,500		-		ND		ND		-				ND								
1,1-dichloroethane (µg/L)	-		-		ND		ND		-				ND								
1,2-dichloroethane (µg/L)	186,667		-		ND		ND		-				ND								
1,1-dichloroethylene (µg/L)	46,667		-		ND		ND		-				ND								
1,2-dichloropropane (µg/L)	84,000		-		ND		ND		-				ND								
1,3-dichloropropylene (µg/L)	28,000		-		ND		ND		-				ND								
Ethylbenzene (µg/L)	93,333		-		ND		ND		-				ND								
Methyl bromide (µg/L)	-		-		ND		ND		-				ND								
Methyl chloride (µg/L)	-		-		ND		ND		-				ND								
Methylene chloride (µg/L)	-		-		ND		ND		-				ND								
1,1,2,2-tetrachloroethane (µg/L)	93,333		-		ND		ND		-				ND								
Tetrachloroethylene (µg/L)	9,333		-		ND		ND		-				ND								
Toluene (µg/L)	373,333		-		ND		ND		-				ND								
1,2-trans-dichloroethylene (µg/L)	-		-		ND		ND		-				ND								
1,1,1-trichloroethane (µg/L)	1,866,667		-		ND		ND		-				ND								
1,1,2-trichloroethane (µg/L)	3,733		-		ND		ND		-				ND								
Trichloroethylene (µg/L)	280		-		ND		ND		-				ND								
Trimethylbenzene (µg/L)	-		-		-		-		-				-								
Vinyl chloride (µg/L)	2,800		-		ND		ND		-				ND								
Xylene (µg/L)	186,667		-		ND		ND		-				ND								
SVOCs - Acid Extractables																					
2-chlorophenol (µg/L)	4,667		-		ND		ND		-				ND								
2,4-dichlorophenol (µg/L)	2,800		-		ND		ND		-				ND								
2,4-dimethylphenol (µg/L)	18,667		-		ND		ND		-				ND								
4,6-dinitro-o-cresol (µg/L)	3,733		-		-		-		-				-								
2,4-dinitrophenol (µg/L)	1,867		-		ND		ND		-				ND								
2-nitrophenol (µg/L)	-		-		ND		ND		-				ND								
4-nitrophenol (µg/L)	-		-		ND		ND		-				ND								
p-chloro-m-cresol (µg/L)	48,000		-		-		-		-				-								
Pentachlorophenol (µg/L)	8.141		-		ND		ND		-				ND								
Phenol (µg/L)	180,000		-		ND		ND		-				ND								
2,4,6-trichlorophenol (µg/L)	130		-		ND		ND		-				ND								

PARAMETERS	Standard SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summmer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		09/10/11		03/18/12		07/20/12		12/14/12		-		11/22/2013									
SVOCs - Bases/Neutrals																					
Acenaphthene (µg/L)	56,000		-		ND		ND		-				ND								
Acenaphthylene (µg/L)	-		-		ND		ND		-				ND								
Anthracene (µg/L)	280,000		-		ND		ND		-				ND								
Benzo(a)anthracene (µg/L)	0.2		-		ND1.44		ND1.44		-				ND1.44								
Benzo(a)pyrene (µg/L)	0.2		-		ND1.55		ND1.55		-				ND1.55								
Benzo(b)fluoranthene (µg/L)	-		-		ND		ND		-				ND								
Benzo(g,h,i)perylene (µg/L)	-		-		ND		ND		-				ND								
Benzo(k)fluoranthene (µg/L)	1.9		-		ND2.28		ND2.28		-				ND2.28								
Chrysene (µg/L)	19		-		ND		ND		-				ND								
Dibenzo(a,h)anthracene (µg/L)	1.9		-		ND		ND		-				ND								
3,3-dichlorobenzidine (µg/L)	3		-		ND		ND		-				ND								
Diethyl phthalate (µg/L)	746,667		-		ND		ND		-				ND								
Dimethyl phthalate (µg/L)	-		-		ND		ND		-				ND								
Di-n-butyl phthalate (µg/L)	1,100		-		65.86		10.1		-				21.6								
2,4-dinitrotoluene (µg/L)	1,867		-		ND		ND		-				ND								
2,6-dinitrotoluene (µg/L)	3,733		-		ND		ND		-				ND								
Di-n-octyl phthalate (µg/L)	373,333		-		ND		ND		-				ND								
1,2-diphenylhydrazine (as azobenzene) (µg/L)	1.8		-		ND		ND		-				ND								
Fluroranthene (µg/L)	37,333		-		ND		ND		-				ND								
Fluorene (µg/L)	37,333		-		ND		ND		-				ND								
Hexachlorobenzene (µg/L)	747		-		ND		ND		-				ND								
Hexachlorobutadiene (µg/L)	187		-		ND		ND		-				ND								
Hexachlorocyclopentadiene (µg/L)	11,200		-		ND		ND		-				ND								
Hexachloroethane (µg/L)	850		-		ND		ND		-				ND								
Indeno(1,2,3-cd)pyrene (µg/L)	1.9		-		ND2.25		ND2.25		-				ND2.25								
Isophorone (µg/L)	186,667		-		ND		ND		-				ND								
Naphthalene (µg/L)	18,667		-		ND		ND		-				ND								
Nitrobenzene (µg/L)	467		-		ND		ND		-				ND								
N-nitrosodimethylamine (µg/L)	0.03		-		ND1.06		ND4.23		-				ND4.23								
N-nitrosodi-n-propylamine (µg/L)	88,667		-		ND		ND		-				ND								
N-nitrosodiphenylamine (µg/L)	290		-		ND		ND		-				ND								
Phenanthrene (µg/L)	-		-		ND		ND		-				ND								
Pyrene (µg/L)	28,000		-		ND		ND		-				ND								
1,2,4-trichlorobenzene (µg/L)	9,333		-		ND		ND		-				ND								

Receiving Water: Rillito
Designated Uses: AWe, PBC
Table 9-3. Water Quality Data for Monitor Site #3

PARAMETERS	Standard SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summmer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		09/10/11		03/18/12		07/20/12		12/14/12		-		11/22/2013									
PCB/Pesticides																					
Aldrin (µg/L)	0.003		-		ND0.1		ND0.10		-				ND0.10								
Alpha-BHC (µg/L)	1,600		-		ND		ND		-				ND								
Beta-BHC (µg/L)	560		-		ND		ND		-				ND								
Gamma-BHC (µg/L)	11		-		ND		ND		-				ND								
Delta-BHC (µg/L)	1600		-		ND		ND		-				ND								
Chlordane (µg/L)	3.2		-		ND		ND		-				ND								
4,4'-DDT (µg/L)	1.1		-		ND		ND		-				ND								
4,4'-DDE (µg/L)	1.1		ND		ND		ND		-				ND								
4,4'-DDD (µg/L)	1.1		-		ND		ND		-				ND								
Dieldrin (µg/L)	0.003		-		ND0.07		ND0.07		-				ND0.07								
Alpha-endosulfan (µg/L)	3		-		ND		ND		-				ND								
Beta-endosulfan (µg/L)	3		-		ND		ND		-				ND								
Endosulfan sulfate (µg/L)	3		-		ND		ND		-				ND								
Endrin (µg/L)	0.004		-		ND0.10		ND0.10		-				ND0.10								
Endrin aldehyde (µg/L)	0.7		-		ND		ND		-				ND								
Heptachlor (µg/L)	0.9		-		ND		ND		-				ND								
Heptachlor epoxide (µg/L)	0.9		-		ND		ND		-				ND								
PCB-1242 (AROCLOR-1242) (µg/L)	0.001		-		ND0.10		ND0.10		-				ND0.10								
PCB-1254 (AROCLOR-1254) (µg/L)	0.001		-		ND0.07		ND0.07		-				ND0.07								
PCB-1221 (AROCLOR-1221) (µg/L)	0.001		-		ND0.09		ND0.09		-				ND0.09								
PCB-1232 (AROCLOR-1232) (µg/L)	0.001		-		ND0.16		ND0.16		-				ND0.16								
PCB-1248 (AROCLOR-1248) (µg/L)	0.001		-		ND0.16		ND0.16		-				ND0.16								
PCB-1260 (AROCLOR-1260) (µg/L)	0.001		-		ND0.25		ND0.25		-				ND0.25								
PCB-1016 (AROCLOR-1016) (µg/L)	0.001		-		ND0.10		ND0.10		-				ND0.10								
Toxaphene (µg/L)	0.005		-		ND5.08		ND5.08		-				ND5.08								

Note:Results higher than SWQ are shown in red font. Non-detectable results with the Method Detection Limit (MDL) above the SWQS are shown as ND with the MDL in parentheses.

1 - Partial Body Contact (PBC), Aquatic & Wildlife ephemeral (A&We) or Agricultural Livestock watering (AgL).
2 - Surface Water Quality Standards (A.A.C R18-11-101 through Appendix B) selected from lowest of PBC, A&We or AgL.
3 - Average flow rate during the sampling event. m3/s = meters cubed per second.
4 - Hardness of sample event is used to calculate SWQS for Cadmium, Chromium, Copper, Lead, Nickel, Sliver, and Zinc.
5 - mg/l = milligram per liter
6 - µg/L = micrograms per liter
7 - CFU/100 ml = colony forming unit per 100 milliliters, MPN = Most probable number per 100 ml
8 - SWQS for Total Metals are denoted with "T". SWQS for Dissolved Metal for A&We are denoted with a "D".
9 - Volatile Organic Compounds
10 - Dash means information unavailable (ie. SWQS was not established or sample was not collected).
11 - Total of α-BHC, β-BHC, γ-BHC, δ-BHC.
12 - Refer to Appendix Part 13O for Analytical Laboratory Reports

Receiving Water: Rillito
Designated Uses: AWe, PBC
Part 9-4. Water Quality Data for Monitor Site #4

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		09/27/11		03/18/12		07/15/12		12/14/12		-		11/22/13									
Conventional Parameters										1											
Average Flow Rate[3] (m^3/s)	-		0.65		0.46		0.202		0.228		0		0.39								
Ph	6.5-9.0		7.0		7.4		7.70		7.75				6.7								
Temperature (°Celcius)	-		26.6		11.8°C		27.1		13.9				17								
Hardness[4] (mg/L)[5]		54	54	50	Trace 50	42.3	42.3	90.9	90.9			50	50								
Total Dissolved Solids (TDS) (mg/L)	-		-		51		98.6		24.0				114								
Total Suspended Solids (TSS) (mg/L)	-		44		37.3		12.5		4.50				12								
Biological Oxygen Demand (BOD) (mg/L)	-		-		15		7.6		4.00				7.3								
Chemical Oxygen Demand (COD) (mg/L)	-		-		100		35.0		25.0				50								
Inorganics																					
Cyanide, total (ug/L)[6]	84T		-		ND		ND		ND				ND								
Nutrients																					
Nitrate + Nitrite as N (mg/L)			-		0.3		0.68		0.7				0.39								
Ammonia as N (mg/L)			-		0.7		0.59		0.35				0.46								
TKN (mg/L)			-		1.4		1.39		0.94				1.43								
Total Phosphorus (mg/L)			-		T0.06		0.19		0.11				0.1								
Total Orthophosphate (mg/L)			-		T0.02		0.07		0.07				0.09								
Microbiological																					
Escherichia coli (E. coli) (CFU/100 mg or MPN)[7]	126		12997		697		1789		1850				1178								
Total Metals[8]																					
AntimonyT (µg/L)	747		-		ND		1.70		0.51				1.46								
ArsenicT (µg/L)	200		-		1.9		1.41		1.68				1.13								
BariumT (µg/L)	98,000		-		29		112		44.9				33.7								
BeryllliumT (µg/L)	1,867		-		ND		ND		ND				ND								
CadmiumD (µg/L)			-	12	ND	10	ND	21	ND			12	ND								
ChromiumD (µg/L)			-	1084	1.3	945	0.65	1768	1.14			1084	0.79								
CopperD (µg/L)		13	29.6	12	29	10	12.9	21	12.7			12	16								
LeadD (µg/L)			ND	64.5	ND	53.7	0.27	123	0.15			64.5	0.47								
MercuryT (µg/L)	5D		-		ND		ND		ND				0.185								
NickelD (µg/L)			-	2314	1.5	2009	0.78	3837	0.78			2314	2.2								
SeleniumT (µg/L)	33		-		ND		ND		ND				ND								
SilverD (µg/L)			-	1.01	ND	0.76	0.24	2.83	0.96			1.01	ND1.0								
ThalliumT (µg/L)	75		-		ND		ND		ND				ND								
ZincD (µg/L)			192	618	290	536	217	1026	66.5			618	67.6								
Organic Toxic Pollutants																					
Total Petroleum Hydrocarbons (TPH) (mg/L)	-		-		3.02		1.40		5.57				6.67								
Total Oil & Grease (mg/L)	-		-		5.47		1.40		8.07				7.07								

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		09/27/11		03/18/12		07/15/12		12/14/12		-		11/22/13									
VOCs9, Semi-VOCs, and Pesticides																					
Acrolein (µg/L)	467		-		ND		ND		-				ND								
Acrylonitrile (µg/L)	37333		-		ND		ND		-				ND								
Benzene (µg/L)	3733		-		Trace 0.10		ND		-				ND								
Bromoform (µg/L)	18667		-		ND		ND		-				ND								
Carbon tetrachloride (µg/L)	1307		-		ND		ND		-				ND								
Chlorobenzene (µg/L)	18667		-		ND		ND		-				ND								
Chlorodibromomethane (µg/L)	18667		-		ND		ND		-				ND								
Chloroethane (µg/L)	-		-		ND		ND		-				ND								
2-chloroethylvinyl ether (µg/L)	-		-		ND		ND		-				ND								
Chloroform (µg/L)	9333		-		ND		ND		-				ND								
Dichlorobromomethane (µg/L)	18667		-		ND		ND		-				ND								
1,2-dichlorobenzene (µg/L)	5,900		-		ND		ND		-				ND								
1,3-dichlorobenzene (µg/L)	-		-		ND		ND		-				ND								
1,4-dichlorobenzene (µg/L)	6,500		-		ND		ND		-				ND								
1,1-dichloroethane (µg/L)	-		-		ND		ND		-				ND								
1,2-dichloroethane (µg/L)	186,667		-		ND		ND		-				ND								
1,1-dichloroethylene (µg/L)	46,667		-		ND		ND		-				ND								
1,2-dichloropropane (µg/L)	84,000		-		ND		ND		-				ND								
1,3-dichloropropylene (µg/L)	28,000		-		ND		ND		-				ND								
Ethylbenzene (µg/L)	93,333		-		Trace 0.08		ND		-				ND								
Methyl bromide (µg/L)	-		-		ND		ND		-				ND								
Methyl chloride (µg/L)	-		-		ND		ND		-				ND								
Methylene chloride (µg/L)	-		-		ND		ND		-				ND								
1,1,2,2-tetrachloroethane (µg/L)	93,333		-		ND		ND		-				ND								
Tetrachloroethylene (µg/L)	9,333		-		ND		ND		-				ND								
Toluene (µg/L)	373,333		-		1.06		ND		-				ND								
1,2-trans-dichloroethylene (µg/L)	-		-		ND		ND		-				ND								
1,1,1-trichloroethane (µg/L)	1,866,667		-		ND		ND		-				ND								
1,1,2-trichloroethane (µg/L)	3,733		-		ND		ND		-				ND								
Trichloroethylene (µg/L)	280		-		ND		ND		-				ND								
Trimethylbenzene (µg/L)	-		-		ND		-		-				-								
Vinyl chloride (µg/L)	2,800		-		ND		ND		-				ND								
Xylene (µg/L)	186,667		-		ND		ND		-				ND								
SVOCs - Acid Extractables																					
2-chlorophenol (µg/L)	4,667		-		ND		ND		-				ND								
2,4-dichlorophenol (µg/L)	2,800		-		ND		ND		-				ND								
2,4-dimethylphenol (µg/L)	18,667		-		ND		ND		-				ND								
4,6-dinitro-o-cresol (µg/L)	3,733		-		-		-		-				-								
2,4-dinitrophenol (µg/L)	1,867		-		ND		ND		-				ND								
2-nitrophenol (µg/L)	-		-		ND		ND		-				ND								
4-nitrophenol (µg/L)	-		-		ND		ND		-				ND								
p-chloro-m-cresol (µg/L)	48,000		-		-		-		-				-								
Pentachlorophenol (µg/L)	8.141		-		ND		ND		-				ND								
Phenol (µg/L)	180,000		-		ND		ND		-				ND								
2,4,6-trichlorophenol (µg/L)	130		-		ND		ND		-				ND								

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		09/27/11		03/18/12		07/15/12		12/14/12		-		11/22/13									
SVOCs - Bases/Neutrals																					
Acenaphthene (µg/L)	56,000		-		ND		ND		-				ND								
Acenaphthylene (µg/L)	-		-		ND		ND		-				ND								
Anthracene (µg/L)	280,000		-		ND		ND		-				ND								
Benzo(a)anthracene (µg/L)	0.2		-		ND1.44		ND1.44		-				ND1.44								
Benzo(a)pyrene (µg/L)	0.2		-		ND1.55		ND1.55		-				ND1.55								
Benzo(b)fluoranthene (µg/L)	-		-		ND		ND		-				ND								
Benzo(g,h,i)perylene (µg/L)	-		-		ND		ND		-				ND								
Benzo(k)fluoranthene (µg/L)	1.9		-		ND2.28		ND2.28		-				ND2.28								
Chrysene (µg/L)	19		-		ND		ND		-				ND								
Dibenzo(a,h)anthracene (µg/L)	1.9		-		ND		ND		-				ND								
3,3-dichlorobenzidine (µg/L)	3		-		ND		ND		-				ND								
Diethyl phthalate (µg/L)	746,667		-		ND		ND		-				ND								
Dimethyl phthalate (µg/L)	-		-		ND		ND		-				ND								
Di-n-butyl phthalate (µg/L)	1,100		-		88.44		17.5		-				25								
2,4-dinitrotoluene (µg/L)	1,867		-		ND		ND		-				ND								
2,6-dinitrotoluene (µg/L)	3,733		-		ND		ND		-				ND								
Di-n-octyl phthalate (µg/L)	373,333		-		ND		ND		-				ND								
1,2-diphenylhydrazine (as azobenzene) (µg/L)	1.8		-		ND		ND		-				ND								
Fluroranthene (µg/L)	37,333		-		ND		ND		-				ND								
Fluorene (µg/L)	37,333		-		ND		ND		-				ND								
Hexachlorobenzene (µg/L)	747		-		ND		ND		-				ND								
Hexachlorobutadiene (µg/L)	187		-		ND		ND		-				ND								
Hexachlorocyclopentadiene (µg/L)	11,200		-		ND		ND		-				ND								
Hexachloroethane (µg/L)	850		-		ND		ND		-				ND								
Indeno(1,2,3-cd)pyrene (µg/L)	1.9		-		ND2.25		ND2.25		-				ND2.25								
Isophorone (µg/L)	186,667		-		ND		ND		-				ND								
Naphthalene (µg/L)	18,667		-		ND		ND		-				ND								
Nitrobenzene (µg/L)	467		-		ND		ND		-				ND								
N-nitrosodimethylamine (µg/L)	0.03		-		ND		ND		-				ND								
N-nitrosodi-n-propylamine (µg/L)	88,667		-		ND1.06		ND4.23		-				ND4.23								
N-nitrosodiphenylamine (µg/L)	290		-		ND		ND		-				ND								
Phenanthrene (µg/L)	-		-		ND		ND		-				ND								
Pyrene (µg/L)	28,000		-		ND		ND		-				ND								
1,2,4-trichlorobenzene (µg/L)	9,333		-		0.00		ND		-				ND								

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date		09/27/11		03/18/12		07/15/12		12/14/12		-		11/22/13									
PCB/Pesticides																					
Aldrin (µg/L)	0.003		-		ND0.1		ND0.1		-				ND0.1								
Alpha-BHC (µg/L)	1,600		-		ND		ND		-				ND								
Beta-BHC (µg/L)	560		-		ND		ND		-				ND								
Gamma-BHC (µg/L)	11		-		ND		ND		-				ND								
Delta-BHC (µg/L)	1600		-		ND		ND		-				ND								
Chlordane (µg/L)	3.2		-		ND		ND		-				ND								
4,4'-DDT (µg/L)	1.1		-		ND		ND		-				ND								
4,4'-DDE (µg/L)	1.1		ND		ND		ND		-				ND								
4,4'-DDD (µg/L)	1.1		-		ND		ND		-				ND								
Dieldrin (µg/L)	0.003		-		ND0.07		ND0.07		-				ND0.07								
Alpha-endosulfan (µg/L)	3		-		ND		ND		-				ND								
Beta-endosulfan (µg/L)	3		-		ND		ND		-				ND								
Endosulfan sulfate (µg/L)	3		-		ND		ND		-				ND								
Endrin (µg/L)	0.004		-		ND		ND		-				ND								
Endrin aldehyde (µg/L)	0.7		-		ND		ND		-				ND								
Heptachlor (µg/L)	0.9		-		ND		ND		-				ND								
Heptachlor epoxide (µg/L)	0.9		-		ND		ND		-				ND								
PCB-1242 (AROCLOR-1242) (µg/L)	0.001		-		ND0.10		ND0.10		-				ND0.10								
PCB-1254 (AROCLOR-1254) (µg/L)	0.001		-		ND0.07		ND0.07		-				ND0.07								
PCB-1221 (AROCLOR-1221) (µg/L)	0.001		-		ND0.09		ND0.09		-				ND0.09								
PCB-1232 (AROCLOR-1232) (µg/L)	0.001		-		ND0.16		ND0.16		-				ND0.16								
PCB-1248 (AROCLOR-1248) (µg/L)	0.001		-		ND0.16		ND0.16		-				ND0.16								
PCB-1260 (AROCLOR-1260) (µg/L)	0.001		-		ND0.25		ND0.25		-				ND0.25								
PCB-1016 (AROCLOR-1016) (µg/L)	0.001		-		ND0.10		ND0.10		-				ND0.10								
Toxaphene (µg/L)	0.005		-		ND5.08		ND5.08		-				ND5.08								

Note:Results higher than SWQ are shown in red font. Non-detectable results with the Method Detection Limit (MDL) above the SWQS are shown as ND with the MDL in parentheses.

1 - Partial Body Contact (PBC), Aquatic & Wildlife ephemeral (A&We) or Agricultural Livestock watering (AgL).
2 - Surface Water Quality Standards (A.A.C R18-11-101 through Appendix B) selected from lowest of PBC, A&We or AgL.
3 - Average flow rate during the sampling event. m3/s = meters cubed per second.
4 - Hardness of sample event is used to calculate SWQS for Cadmium, Chromium, Copper, Lead, Nickel, Sliver, and Zinc.
5 - mg/l = milligram per liter
6 - µg/L = micrograms per liter
7 - CFU/100 ml = colony forming unit per 100 milliliters, MPN = Most probable number per 100 ml
8 - SWQS for Total Metals are denoted with "T". SWQS for Dissolved Metal for A&We are denoted with a "D".
9 - Volatile Organic Compounds
10 - Dash means information unavailable (ie. SWQS was not established or sample was not collected).
11 - Total of α-BHC, β-BHC, γ-BHC, δ-BHC.
12 - Refer to Appendix Part 13O for Analytical Laboratory Reports

Receiving Water: Santa Cruz R.
Designated Uses: AWe, PBC
Part 9-5. Water Quality Data for Monitor Site #5

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date	DATE:	07/04/11		12/03/11		07/04/12		01/26/13		07/05/13		11/22/13		07/05/14							
Conventional Parameters										0.5											
Average Flow Rate[3] (m^3/s)	-		0.0411		0.0075		0.012		0.0021		0.0206		0.0206		0.0403						
Ph	6.5-9.0		6.5		8.5		7.8		8.0		7.6		6.8		7.5						
Temperature (°Celcius)	-		28.2		8.5°C		26.4		16.3		27.5		15.4		27.4						
Hardness[4] (mg/L)[5]		105	105	80	80	143	143	68.7	68.7	185	185	86.7	86.7								
Total Dissolved Solids (TDS) (mg/L)	-		-		71		270		139		269		162								
Total Suspended Solids (TSS) (mg/L)	-		73		110		214		40.0		336		68								
Biological Oxygen Demand (BOD) (mg/L)	-		-		5		ND		9.60		37.4		11.7								
Chemical Oxygen Demand (COD) (mg/L)	-		-		73		192		46.0		244		65								
Inorganics																					
Cyanide, total (ug/L)[6]	84T		-		ND		ND		1.10		2.43		ND								
Nutrients																					
Nitrate + Nitrite as N (mg/L)			-		2.553		2.75		2.3		4.35		1.47								
Ammonia as N (mg/L)			-		ND		0.68		0.36		1.28		0.36								
TKN (mg/L)			-		0.79		3.77		2.45		5.75		1.83								
Total Phosphorus (mg/L)			-		0.43		0.75		0.29		1.02		0.48								
Total Orthophosphate (mg/L)			-		0.12		0.34		0.17		0.45		0.29								
Microbiological																					
Escherichia coli (E. coli) (CFU/100 mg or MPN)[7]	126		>241960		4611		52		4106		11199		3873								
Total Metals[8]																					
AntimonyT (µg/L)	747		-		ND		1.73		8.22		2.28		4.5								
ArsenicT (µg/L)	200		-		ND		3.36		2.15		5.6		3.21								
BariumT (µg/L)	98,000		-		76		152		57.9		19.3		81.2								
BerylliumT (µg/L)	1,867		-		0.27		0.36		ND		0.39		ND								
CadmiumD (µg/L)			-	18	1.4	32	0.53	16	ND	20	ND	20	ND								
ChromiumD (µg/L)			-	1593	6.2	2563	1.66	1406	0.62	3164	1.41	3164	1.38								
CopperD (µg/L)		24	35	19	33	33	41.2	16	19.8	42	60.2	20	28.9								
LeadD (µg/L)			Trace	107.2	20	201.1	1.58	90.9	0.88	266.3	1.94	116.9	1.03								
MercuryT (µg/L)	5D		-		ND		ND		ND		ND0.2		0.136								
NickelD (µg/L)			-	3444	ND	5629	2.84	3028	0.95	6999	3.29	3686	1.28								
SeleniumT (µg/L)	33		-		ND		0.89		ND		0.34		0.82								
SilverD (µg/L)			-	2.27	ND	6.16	0.79	1.74	ND	9.60	ND1.0	2.60	ND								
ThalliumT (µg/L)	75		-		ND		0.22		ND		0.18		ND								
ZincD (µg/L)			77.5	920	110	1506	23.9	809	9.48	1874	34.7	985	12.5								
Organic Toxic Pollutants																					
Total Petroleum Hydrocarbons (TPH) (mg/L)	-		-		Trace 0.75		5.56		1.76		2.00		7.88								
Total Oil & Grease (mg/L)	-		-		4.27		7.11		1.76		2.89		10.61								

Receiving Water: Santa Cruz R.
Designated Uses: AWe, PBC
Part 9-5. Water Quality Data for Monitor Site #5

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date	DATE:	07/04/11		12/03/11		07/04/12		01/26/13		07/05/13		11/22/13		07/05/14							
VOCs9, Semi-VOCs, and Pesticides																					
Acrolein (µg/L)	467		-		ND		ND		-		ND		ND								
Acrylonitrile (µg/L)	37333		-		ND		ND		-		ND		ND								
Benzene (µg/L)	3733		-		11		ND		-		ND		ND								
Bromoform (µg/L)	18667		-		ND		ND		-		ND		ND								
Carbon tetrachloride (µg/L)	1307		-		ND		ND		-		ND		ND								
Chlorobenzene (µg/L)	18667		-		ND		ND		-		ND		ND								
Chlorodibromomethane (µg/L)	18667		-		ND		ND		-		ND		ND								
Chloroethane (µg/L)	-		-		ND		ND		-		ND		ND								
2-chloroethylvinyl ether (µg/L)	-		-		ND		ND		-		ND		ND								
Chloroform (µg/L)	9333		-		ND		ND		-		ND		ND								
Dichlorobromomethane (µg/L)	18667		-		ND		ND		-		ND		ND								
1,2-dichlorobenzene (µg/L)	5,900		-		ND		ND		-		ND		ND								
1,3-dichlorobenzene (µg/L)	-		-		ND		ND		-		ND		ND								
1,4-dichlorobenzene (µg/L)	6,500		-		ND		ND		-		ND		ND								
1,1-dichloroethane (µg/L)	-		-		ND		ND		-		ND		ND								
1,2-dichloroethane (µg/L)	186,667		-		ND		ND		-		ND		ND								
1,1-dichloroethylene (µg/L)	46,667		-		ND		ND		-		ND		ND								
1,2-dichloropropane (µg/L)	84,000		-		ND		ND		-		ND		ND								
1,3-dichloropropylene (µg/L)	28,000		-		ND		ND		-		ND		ND								
Ethylbenzene (µg/L)	93,333		-		ND		ND		-		ND		ND								
Methyl bromide (µg/L)	-		-		ND		ND		-		ND		ND								
Methyl chloride (µg/L)	-		-		ND		ND		-		ND		0.11								
Methylene chloride (µg/L)	-		-		ND		ND		-		ND		ND								
1,1,2,2-tetrachloroethane (µg/L)	93,333		-		ND		ND		-		ND		ND								
Tetrachloroethylene (µg/L)	9,333		-		ND		ND		-		ND		ND								
Toluene (µg/L)	373,333		-		ND		ND		-		ND		0.06								
1,2-trans-dichloroethylene (µg/L)	-		-		ND		ND		-		ND		ND								
1,1,1-trichloroethane (µg/L)	1,866,667		-		ND		ND		-		ND		ND								
1,1,2-trichloroethane (µg/L)	3,733		-		ND		ND		-		ND		ND								
Trichloroethylene (µg/L)	280		-		ND		ND		-		ND		ND								
Trimethylbenzene (µg/L)	-		-		-		-		-		-		-								
Vinyl chloride (µg/L)	2,800		-		ND		ND		-		ND		ND								
Xylene (µg/L)	186,667		-		ND		ND		-		ND		ND								
SVOCs - Acid Extractables																					
2-chlorophenol (µg/L)	4,667		-		ND		ND		-		ND		ND								
2,4-dichlorophenol (µg/L)	2,800		-		ND		ND		-		ND		ND								
2,4-dimethylphenol (µg/L)	18,667		-		ND		ND		-		ND		ND								
4,6-dinitro-o-cresol (µg/L)	3,733		-		-		-		-		-		-								
2,4-dinitrophenol (µg/L)	1,867		-		ND		ND		-		ND		ND								
2-nitrophenol (µg/L)	-		-		ND		ND		-		ND		ND								
4-nitrophenol (µg/L)	-		-		ND		ND		-		ND		ND								
p-chloro-m-cresol (µg/L)	48,000		-		-		-		-		-		-								
Pentachlorophenol (µg/L)	8.141		-		ND14.0		ND		-		ND		ND								
Phenol (µg/L)	180,000		-		ND		ND		-		ND		ND								
2,4,6-trichlorophenol (µg/L)	130		-		ND		ND		-		ND		ND								

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date	DATE:	07/04/11		12/03/11		07/04/12		01/26/13		07/05/13		11/22/13		07/05/14							
SVOCs - Bases/Neutrals																					
Acenaphthene (µg/L)	56,000		-		ND		ND		-		ND		ND								
Acenaphthylene (µg/L)	-		-		ND		ND		-		ND		ND								
Anthracene (µg/L)	280,000		-		ND		ND		-		ND		ND								
Benzo(a)anthracene (µg/L)	0.2		-		-		ND1.44		-		ND1.44		ND1.44								
Benzo(a)pyrene (µg/L)	0.2		-		ND2.2		ND1.55		-		ND1.55		ND1.55								
Benzo(b)fluoranthene (µg/L)	-		-		ND		ND		-		ND		ND								
Benzo(g,h,i)perylene (µg/L)	-		-		ND		ND		-		ND		ND								
Benzo(k)fluoranthene (µg/L)	1.9		-		ND2.6		ND2.28		-		ND2.28		ND2.28								
Chrysene (µg/L)	19		-		ND		ND		-		ND		ND								
Dibenzo(a,h)anthracene (µg/L)	1.9		-		ND4.1		ND		-		ND		ND								
3,3-dichlorobenzidine (µg/L)	3		-		ND3.1		ND		-		ND		ND								
Diethyl phthalate (µg/L)	746,667		-		ND		ND		-		ND		ND								
Dimethyl phthalate (µg/L)	-		-		ND		ND		-		ND		8.7								
Di-n-butyl phthalate (µg/L)	1,100		-		ND		14.8		-		ND		ND								
2,4-dinitrotoluene (µg/L)	1,867		-		ND		ND		-		ND		ND								
2,6-dinitrotoluene (µg/L)	3,733		-		ND		ND		-		ND		ND								
Di-n-octyl phthalate (µg/L)	373,333		-		ND		ND		-		ND		ND								
1,2-diphenylhydrazine (as azobenzene) (µg/L)	1.8		-		ND2.2		ND		-		ND		ND								
Fluroranthene (µg/L)	37,333		-		ND		ND		-		ND		ND								
Fluorene (µg/L)	37,333		-		ND		ND		-		ND		ND								
Hexachlorobenzene (µg/L)	747		-		ND		ND		-		ND		ND								
Hexachlorobutadiene (µg/L)	187		-		ND		ND		-		ND		ND								
Hexachlorocyclopentadiene (µg/L)	11,200		-		ND		ND		-		ND		ND								
Hexachloroethane (µg/L)	850		-		ND		ND		-		ND		ND								
Indeno(1,2,3-cd)pyrene (µg/L)	1.9		-		ND3.5		ND2.25		-		ND2.25		ND2.25								
Isophorone (µg/L)	186,667		-		ND		ND		-		ND		ND								
Naphthalene (µg/L)	18,667		-		ND		ND		-		ND		ND								
Nitrobenzene (µg/L)	467		-		ND		ND		-		ND		ND								
N-nitrosodimethylamine (µg/L)	0.03		-		ND5.7		ND4.23		-		ND4.23		ND4.23								
N-nitrosodi-n-propylamine (µg/L)	88,667		-		ND		ND		-		ND		ND								
N-nitrosodiphenylamine (µg/L)	290		-		ND		ND		-		ND		ND								
Phenanthrene (µg/L)	-		-		ND		ND		-		ND		ND								
Pyrene (µg/L)	28,000		-		ND		ND		-		ND		ND								
1,2,4-trichlorobenzene (µg/L)	9,333		-		ND		ND		-		ND		ND								

PARAMETERS	SWQS[2]	Hardness SWQS	Summer 2011	Hardness SWQS	Winter 2011-12	Hardness SWQS	Summer 2012	Hardness SWQS	Winter 2012-13	Hardness SWQS	Summer 2013	Hardness SWQS	Winter 2013-14	Hardness SWQS	Summer 2014	Hardness SWQS	Winter 2014-15	Hardness SWQS	Summer 2015	Hardness SWQS	Winter 2015-16
Date	DATE:	07/04/11		12/03/11		07/04/12		01/26/13		07/05/13		11/22/13		07/05/14							
PCB/Pesticides																					
Aldrin (µg/L)	0.003		-		ND0.14		ND0.10		-		ND0.10		ND0.10								
Alpha-BHC (µg/L)	1,600		-		ND		ND		-		ND		ND								
Beta-BHC (µg/L)	560		-		ND		ND		-		ND		ND								
Gamma-BHC (µg/L)	11		-		ND		ND		-		ND		ND								
Delta-BHC (µg/L)	1600		-		ND		ND		-		ND		ND								
Chlordane (µg/L)	3.2		-		ND		ND		-		ND		ND								
4,4'-DDT (µg/L)	1.1		-		ND		ND		-		ND		ND								
4,4'-DDE (µg/L)	1.1		ND		ND		ND		-		ND		ND								
4,4'-DDD (µg/L)	1.1		-		ND		ND		-		ND		ND								
Dieldrin (µg/L)	0.003		-		ND0.13		ND0.07		-		ND0.07		ND0.07								
Alpha-endosulfan (µg/L)	3		-		ND		ND		-		ND		ND								
Beta-endosulfan (µg/L)	3		-		ND		ND		-		ND		ND								
Endosulfan sulfate (µg/L)	3		-		ND		ND		-		ND		ND								
Endrin (µg/L)	0.004		-		ND		ND0.10		-		ND0.10		ND0.10								
Endrin aldehyde (µg/L)	0.7		-		0.34		ND		-		ND		ND								
Heptachlor (µg/L)	0.9		-		ND		ND		-		ND		ND								
Heptachlor epoxide (µg/L)	0.9		-		ND		ND		-		ND		ND								
PCB-1242 (AROCLOR-1242) (µg/L)	0.001		-		ND9.0		ND0.10		-		ND0.10		ND0.10								
PCB-1254 (AROCLOR-1254) (µg/L)	0.001		-		ND5.6		ND0.07		-		ND0.07		ND0.07								
PCB-1221 (AROCLOR-1221) (µg/L)	0.001		-		ND4.0		ND0.09		-		ND0.09		ND0.09								
PCB-1232 (AROCLOR-1232) (µg/L)	0.001		-		ND6.8		ND0.16		-		ND0.16		ND0.16								
PCB-1248 (AROCLOR-1248) (µg/L)	0.001		-		ND3.5		ND0.16		-		ND0.16		ND0.16								
PCB-1260 (AROCLOR-1260) (µg/L)	0.001		-		ND2.9		ND0.25		-		ND0.25		ND0.25								
PCB-1016 (AROCLOR-1016) (µg/L)	0.001		-		ND3.3		ND0.10		-		ND0.10		ND0.10								
Toxaphene (µg/L)	0.005		-		ND10		ND5.08		-		ND5.08		ND5.08								

Note:Results higher than SWQ are shown in red font. Non-detectable results with the Method Detection Limit (MDL) above the SWQS are shown as ND with the MDL in parentheses.

1 - Partial Body Contact (PBC), Aquatic & Wildlife ephemeral (A&We) or Agricultural Livestock watering (AgL).

2 - Surface Water Quality Standards (A.A.C R18-11-101 through Appendix B) selected from lowest of PBC, A&We or AgL.

3 - Average flow rate during the sampling event. m3/s = meters cubed per second.

4 - Hardness of sample event is used to calculate SWQS for Cadmium, Chromium, Copper, Lead, Nickel, Sliver, and Zinc.

5 - mg/l = milligram per liter

6 - µg/L = micrograms per liter

7 - CFU/100 ml = colony forming unit per 100 milliliters, MPN = Most probable number per 100 ml

8 - SWQS for Total Metals are denoted with "T". SWQS for Dissolved Metal for A&We are denoted with a "D".

9 - Volatile Organic Compounds

10 - Dash means information unavailable (ie. SWQS was not established or sample was not collected).

11 - Total of α-BHC, β-BHC, γ-BHC, δ-BHC.

12 - Refer to Appendix Part 13O for Analytical Laboratory Reports

PART 10: ASSESSMENT OF MONITORING DATA

A. Stormwater Quality

Stormwater from all five sites were sampled in the fiscal year and all five sites were sampled for 134 compounds under the expanded list of parameters.

B. Surface Water Quality Standards (SWQS)

Analytical results from the sampling period were tabulated along with the applicable SWQS (Part 9). Results higher than SWQS are also reported (Table 10-1). Several parameters, namely Benzo(a)anthracene, Benzo(a)pyrene, Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene, N-nitrosodi-methylamine, Aldrin, Dieldrin, Endrin, 7 PCBs and Toxaphene, have Method Detection Limits (MDLs) that are higher than the Surface Water Quality Standards established for the designated uses of the watersheds draining to the five monitor sites. The MDL used by the primary laboratory has been accepted by ADHS under laboratory license AZO159 for the associated methods, as shown in Appendix Q. MDLs are performed in accordance with 40 CFR, part 136 App.B. Any modification of this method is considered a major modification and may not be performed without permission from ADHS and Region 9 EPA. Two VOCs, Diethyl phthalate and Di-n-butyl phthalate, used as plasticizers, were detected at very low concentrations. Given there were no other organic compounds detected, the stormwater was likely free of the compounds with MDLs above the SWQSs.

C. Pollutant Concentration Greater than Applicable SWQS

The concentration of dissolved copper was higher than SWQS for Sites 3, 4 and 5. Sites 3 (high density residential land use) and 5 (industrial land use) are recurrent and Site 4 (commercial land use) does not always have high concentrations of copper. The measured dissolved copper concentrations that were higher than the SWQS ranged from 8.7 to 60.2 μg/L during the last fiscal year. The total copper concentration for all five monitor sites ranged between 3.3 and 60.2 μg/L which means they were well below the SWQS of 500 μg/L for the designated used of Agriculture and Livestock watering.

A literature review of copper concentration in runoff provides a frame work to compare ambient copper concentrations with those in urban runoff in Pima County and mining district streams. The ambient surface water quality is established by stream data from Cienega Creek, Davidson Canyon, and Harshaw Creek. Near the confluence of Cienega Creek and Davidson Canyon, the concentration of total copper ranged between 1.0 to 2.2 μg/l from stream samples collected between September 2008 and February 2012 (PAG, 2013). The natural background level of dissolved copper in the Harshaw Creek ranged between 2.01 and 3.59 μg/L (ADEQ, 2003). The runoff data from the five monitor sites shows the dissolved copper concentrations range from 3.3 to 61 μg/L since the new permit became effective in July 2011. During the previous permit the

total copper concentrations ranged between 1 and 260 ug/L. The few concentrations higher than 100 µg/L were associated with samples having a Total Suspended Solids concentration greater than 230 mg/L (PDEQ, 2011).

Table 10-1. Parameters with Concentrations Higher than Surface Water Quality Standards

Date	Site	Receiving Water	Parameter	SWQS	Result	Source	Recurrence Action and Follow-up
12/14/12	1	Rillito	Silver, dissolved	0.6	2.66	Jewelry, photographic process, silver-bearing rocks	NA
12/14/12	3	Rillito	Silver, dissolved	0.10	2.25	"	NA
08/22/13	2	Rillito	*E. Coli*	126	19,863	Animals	Part 10.C
11/22/13	2	Rillito	*E. Coli*	126	4,884	Animals	Part 10.C
11/22/13	4	Rillito	*E. Coli*	126	1,178	Animals	Part 10.C
08/22/13	5	Santa Cruz	*E. Coli*	126	11,199	Animals	Part 10.C
11/22/13	5	Santa Cruz	*E. Coli*	126	3,873	Animals	Part 10.C
11/22/13	3	Rillito	Copper, dissolved	6	8.7	Brake pads; Cu-bearing pesticides, algaecides & fungicides; industrial uses of copper	Part 10.C
11/22/13	4	Rillito	Copper, dissolved	12	16	"	Part 10.C
08/22/13	5	Santa Cruz	Copper, dissolved	42	60.2	"	Part 10.C
11/22/13	5	Santa Cruz	Copper, dissolved	20	28.9	"	Part 10.C

Additional data from mining areas in southern Arizona show the maximum dissolved copper concentration was 130 µg/L in the ASARCO Mission Complex (EPA, 2008) and was frequently above 250 µg/L in the mining districts in Alum Gulch and Humboldt Canyon (ADEQ, 2012). This analysis shows ambient dissolved copper concentrations range from 1.0 to 4 µg/L, while urban runoff ranges between 1 to 61 µg/L and mining areas are typically higher than 130 µg/L.

Sources of copper in stormwater include vehicle brake pads; architectural copper; copper pesticides in landscaping, wood preservatives and pool, spa, and fountain algaecides; industrial copper use; deposition of air-borne copper emissions from fossil fuel combustion and industrial facilities; and vehicle fluid leaks and dumping (TDC Environmental, 2006). The Brake Pad Partnership showed brakes account for 35 to 60 percent of copper in California's urban watershed runoff (Copper Development Association, 2013). A study of runoff from copper roofs and gutters shows first flush concentrations immediately downstream from the roof have a mean greater than 1340 ug/L for both total and dissolved copper (Michels, et al, 2001). This study noted roofs with the oxidation by-product brochantite release about half as much as cooper roofs exposed to air.

The outreach program is being expanded to include vehicle maintenance for brake pads as well as using pads with lower concentrations of copper. Outreach is also being expanded to pool, spa, and fountain companies to find alternatives to copper-bearing pesticides, algaecides and fungicides or arrange for discharge to the sanitary sewer. Site inspections of the drainage areas are underway to identify potential sources of copper. Inspections of industrial facilities currently include identification of metals sources, including copper, and development of alternatives to reduce exposure to rainfall and runoff.

The concentration of *E. coli* was higher than the SWQS for Sites 2, 4 and 5, which is a recurrence for these sites. The concentration of E. Coli ranged between 3,873 and 19,863 colony forming units (CFU) per 100 milliliters (mL). Sources of E. coli include wild animals and domestic pets. Wild animals have been sighted in urban areas traveling the washes. Pima County's outreach program includes the Stoppin' the Droppin' campaign encouraging people to pick up after their pets. This campaign is well received and remains a primary message for Pima County and Pima Association of Governments. The message is effective in the low density residential areas and high density residential areas.

Silver was detected above the SWQS on December 14, 2012 at the low density residential and the high density residential monitor sites. The potential sources include jewelry, photographic processes, and erosion of silver-bearing rocks (ATSDR, 1990). This was a one-time occurrence and has not been observed since at the reported levels. As this was missed in the 2013 Annual Report, the information is being provided in the 2014 Annual Report**.**

D. References

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PART 11: ESTIMATE OF ANNUAL POLLUTANT LOAD

A. Method of estimating Pollutant Load

Estimates of the annual pollutant loadings were calculated using the "Simple Method" (SMRC, 2012). The Simple Method uses analytical water quality data, precipitation and percent impervious cover to estimate pollutant loadings in urban areas. The data collected at five monitor points represent five land uses within the MS4, namely low density residential, medium density residential, high density residential, commercial, and industrial. Pima County calculated the annual pollutant load estimate for each Monitor Site and each land use category within the permit area.

The following sections describe the methods Pima County used to calculate statistics and estimate the seasonal pollutant load. The results are presented and evaluated.

The amount of pollutants are estimated by multiplying the volume of water that runs off from a precipitation event and the concentration of the pollutants. Runoff is estimated as a fraction of the precipitation based on the type of land use permeability. Pollutant concentration is measured by collecting the stormwater samples after a representative precipitation event occurs. The pollutant load equation is as follows:

$$L = P * P_f * R_c * C * A * 0.0446$$

where

L = annual pollutant load (tons)
P = annual precipitation (inches)
P_f = annual precipitation fraction producing runoff (given a value of 0.9)
R_c = runoff coefficient (unitless)
C = concentration (event mean) of a pollutant (mg/L)
A = area of catchment draining to sample point (acres)
0.0446 = correction factor for measurement units

The parameters in the equation above are defined as follows:

- ***Pollutant load (L)*** is the estimate of total amount of a specific pollutant discharged per time period for the drainage area of each monitor site. Time periods employed for this report were annual and seasonal (winter and summer).

- ***Annual Precipitation***[1] ***(P)*** is the total inches of rainfall occurring during the reporting period July 1, 2012 to June 30, 2013. Anaylsis of available rainfall data for the Tucson metropolitan area shows approximately 52% (or 13.17 cm) of the annual rainfall occurs

[1] The use of average rainfall data for pollutant load calculations de-emphasizes the effect of spatial rainfall variability. This, in turn, makes aggregation of pollutant load estimates less reliable.

during the summer season and 48% (or 12.16 cm) of the annual rainfall occurs during the winter season.

- ***Annual Precipitation fraction***[2] ***(P_f)*** is an adjustment factor for the number of storm events producing measurable runoff. A typical value for this fraction is 0.9 (USEPA, 1992).

- ***Runoff coefficient (Rc)*** is a relative measure of imperviousness, or the percentage of rainfall that becomes surface runoff (EPA, 1992). The following equation was used to calculate "*R*" values for each representative land use category associated with an outfall (EPA, 1992):

  $$R = 0.05 + 0.9*Ia$$

  where *Ia* is the percent impervious area within the drainage area of each monitor site.

- ***Event-mean concentration***[3] ***(C)*** of a pollutant is the flow-weighted average of the pollutant concentration for the summer monsoon sample and the winter rain sample.

  $$C = Fs/(Fs+Fw)*Cs + Fw/(Fs+Fw)*Cw$$

  where

  Fs = Flow during summer sample
  Fw = Flow during winter sample
  Cs = Concentration of summer sample
  Cw = Concentration of winter sample

- ***Area (A)*** is the area of the catchment draining to the sample point.

Parameters specific to each catchment, namely *Ia*, *Rc* and *A* were previously derived during preparation of the Sample and Analysis Plan (Pima County, 2012).

The "Simple Method" transforms a complex set of hydrological processes into an empirical equation. This equation is used to provide reasonable estimates of pollutant loads in storm water runoff (Ohrel, 2000). At the same time, by simplifying these processes, the level of uncertainty increases when attempting to distinguish the influences from runoff characteristics such as rainfall intensity, rainfall duration, runoff, first-flush effects concentrating pollutants, land use, and antecedent weather conditions.

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[2] A measured value is unavailable for the Sonoran Desert region so EPA's standard value (EPA, 1992) was employed.

[3] Analytical results for the monitored parameters ranged from one to five data points per pollutant. These limited data were used to calculate event-mean concentration ("emc") values. As a result, pollutant load estimates may not be representative of the rainfall events, pollutants, outfalls, seasons, and/or land use categories.

Specifically, Schiff (1996) states that "[A]ssumptions based upon extrapolations to un-sampled storms introduces uncertainty because of flow-related variability." For example, he notes the importance of capturing data from representative storm events. Collecting data from the largest storm of the year may result in disproportionately large event mean concentrations and would potentially overestimate un-sampled, smaller storms during the time period of interest. Similarly, capturing smaller storm events might underestimate the actual discharge for a given reporting period. Schiff asserts that "[T]he magnitude of bias associated with un-sampled storm events cannot be assessed" because monitoring programs do not often have sufficient temporal sampling procedures to adequately address the issue. Such is the case for Pima County's monitoring program. This is due, in part, to the fact that the County's program is not designed to measure annual pollutant loads at a specific site, or regional pollutant loads for a specific land use.

According to Dixon and Chiswell (1996), most monitoring programs are instead designed to address regulatory compliance, identify sources of pollutants, and evaluate management actions such as the effectiveness of best management practices. Pima County's program focuses on just such information needs.

Schiff identifies the need to better understand the relationships of water quality to antecedent dry periods and rainfall intensity or duration (pollutant transport). Concepts such as "first flush" and "seasonal flushing" are examples of interactions that have yet to be adequately quantified. The following subsections provide seasonal pollutant load estimates for Pima County's Monitoring sites and identified land use categories within the permit area.

B. Results of Calculations

Analytical results, annual rainfall, drainage area and imperviousness were used to calculate pollutant loads for the five monitor sites were tabulated (Table 11-1). No loadings were calculated for antimony, arsenic, mercury, selenium, silver and thallium as the concentrations were below the detection limits.

C. Evaluation of Results

The pollutant load estimates[4] should be used for comparative purposes only. For the reasons discussed in subsection 11.B, these values cannot be interpreted as representing actual pollutant loads for the watersheds within the permit area. Furthermore, it would be equally inappropriate to extrapolate these estimates in order to predict potential impacts to receiving water bodies.

[4] The term "pollutant load estimate" does not have the same meaning as the term "pollutant load." The Simple Method should only be used when *estimates* are desired and should not be used when *load* values are required (Ohrel, 2000).

Table 11-1. Pollutant Load Estimates for Monitor Sites

	Site #1 Low Density Residential		**Site #2 Med Density Residential**		**Site #3 High Density Residential**		**Site #4 Commercial**		**Site #5 Industrial**	
Annual Rainfall (in)	**5.0**		**5.6**		**5.0**		**5.0**		**7.3**	
Area (acres)	**3.0**		**12.4**		**2.3**		**59**		**56.9**	
Impervious %	**25%**		**65%**		**85%**		**95%**		**70%**	
Parameter	**Flow-weighted Concen-tration**	**Load (tons)**	**Flow-weighted Concen-tration**	**Load (tons)**	**Flow-weighted Concen-tration**	**Load (tons)**	**Flow-weighted Concen-tration**	**Load (tons)**	**Flow-weighted Concen-tration**	**Load (tons)**
Conventional Parameters										
BOD (mg/L)	4.9	0.8	11.4	20.1	5.5	2.1	7.3	78.2	24.6	277.6
COD (mg/L)	57.0	9.4	119.1	210.8	42.0	15.8	50.0	535.8	154.5	1,747
TDS (mg/L)	72.0	11.9	122.6	216.9	44.0	16.6	114.0	1,222	215.5	2,437
TSS (mg/L)	62.0	10.3	329.1	582.5	18.0	6.8	12.0	128.6	202.0	2,284
Nutrients										
TN (mg/L)	2.1	0.3	3.5	6.1	1.7	0.7	2.3	24.4	3.7	41.4
NH4 (mg/L)	0.53	0.1	0.53	0.9	0.49	0.2	0.46	4.9	0.36	4.1
TKN (mg/L)	1.4	0.2	2.0	3.5	1.0	0.4	1.4	15.3	1.8	20.7
Total Metals										
Sb (µg/L)	0.53	0.00	1.01	0.00	0.79	0.00	1.46	0.02	3.39	0.04
As (µg/L)	1.46	0.00	3.53	0.01	0.42	0.00	1.13	0.01	4.41	0.05
Ba (µg/L)	57.6	0.01	140.2	0.25	14.0	0.01	33.7	0.36	9.65	0.11
Be (µg/L)	0.23	0.00	0.54	0.00	0.00	0.00	0.00	0.00	0.20	0.00
Cd (µg/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cr (µg/L)	0.00	0.00	1.11	0.00	0.49	0.00	0.79	0.01	1.40	0.02
Cu (µg/L)	4.20	0.00	7.97	0.01	8.70	0.00	16.0	0.17	44.6	0.50
Pb (µg/L)	0.00	0.00	0.59	0.00	0.00	0.00	0.47	0.01	1.49	0.02
Hg (µg/L)	0.32	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.07	0.00
Ni (µg/L)	1.01	0.00	0.75	0.00	0.98	0.00	2.20	0.02	2.29	0.03
Se (µg/L)	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.58	0.01
Ag (µg/L)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Th (µg/L)	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.09	0.00
Zn (µg/L)	4.68	0.00	8.39	0.01	70.0	0.03	67.6	0.72	23.6	0.27
Total (Tons)		33		1,041		42		2,010		6,812
% conventional		98%		99%		97%		98%		99%
% nutrients		2%		1%		3%		2%		1%

In this regard, qualitative comparisons may be made between outfalls and parameters. The conventional parameters contribute to 97% or greater of the pollutant load for each catchment. TDS is the largest contributor to pollutant load, except for the medium density residential neighborhood which contributed a large volume of TSS. Nutrients contribute less than 3% of the pollutant load and metals contribute less than 0.1%. The low contribution of metals is important due to the higher toxicity levels.

D. Limitations of Pollutant Load Estimation Results

The "Simple Method" is an arithmetic equation based on empirical relationships for complex hydrological processes and average pollutant concentrations in storm water runoff. This method can be used to obtain quick and reasonable storm water pollutant load estimates (Ohrel, 2000), but should only be used for planning-level calculations or identifying data-collection needs.

Numerical results presented in Table 11-1 are pollutant load estimates. Employing event mean concentrations derived from first flush data may result in calculated pollutant load estimates that are higher that the remaining rainfall events.

This type of analysis can be misleading when evaluating potential environmental effects from non-point sources (Silverman et al, 1986). Rainfall events in southern Arizona are sporadic, with loads concentrated into limited periods of time during and after precipitation.

Specifically, flow-related variability may introduce uncertainties when extrapolating from sampled to un-sampled rainfall events. Schiff (1996) uses the example of overestimation for data collected from large storms, versus underestimation for data collected from smaller storm events. In the absence of a sufficient temporal sampling program, the error level associated with un-sampled storm events can be substantial, especially when the un-sampled storm events follow the first flush event.

Estimation errors may also be introduced when using average seasonal precipitation values to calculate pollutant loads. For example, smaller runoff volumes (due to low intensity or short duration rainfall events accompanied by extended antecedent dry periods) may produce disproportionately higher pollutant concentrations per sampling event.

Alternatively, dilution from large volume runoffs (accompanied by shorter antecedent dry periods) may produce lower pollutant concentrations per sampling event. Given that the average seasonal precipitation values might not be representative of a specific storm, calculated values for the estimated pollutant loads might in turn be questionable.

Additionally, the monitoring program was not specifically designed to measure pollutant loads. As a result, phenomena such as pollutant build-up, first flush of pollutants, rainfall intensity, duration, and seasonal flushing of pollutants are not adequately addressed by the County's

current monitoring program. These phenomena are an unavoidable consequence of the weather conditions and climatology of southern Arizona.

E. References

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PART 12: ANNUAL EXPENDITURES

The itemized budget presents total expenditures for activities occurring within all of Pima County (Table 12-1). Pima County reports the budget in this manner because it has not yet developed procedures to track expenditures exclusively associated with the AZPDES permit.

Table 12-1. Annual Expenditures and Budget

Activity	Fiscal Year 2013/2014		Fiscal Year 2014/2015	
	Actual Costs	Department Subtotal	Budgeted Costs	Department Subtotal
Environmental Quality		$ 221,151		$ 260,001
NPDES Stormwater	$ 221,151		$ 260,001	
Regional Flood Control District		5,207,542		9,060,289
Floodplain Permitting [1]	1,223,943		1,582,172	
Development Review	382,373		58,215	
Engineering Support [2]	537,679		535,991	
Basin & Drainage Studies [3]	-		-	
FEMA/Mapping	1,000,001		1,507,832	
Drainage Way Maintenance	2,063,546		5,376,079	
Transportation		11,196,333		9,928,247
Environmental Planning &Compliance	54,281		77,339	
Maintenance Administration	904,509		825,402	
Maintenance District # 1	1,662,362		1,342,220	
Maintenance District # 4	1,532,685		1,358,702	
Maintenance District # 5	1,732,084		1,617,929	
Maintenance Support	2,593,347		2,074,154	
Contract Maintenance Dist. # 2	1,225,112		1,203,404	
Contract Maintenance Dist. # 3	1,491,953		1,429,097	
Development Services		2,020,793		1,966,950
Regional Comprehensive Plan	308,050		235,000	
Landscaping Review	-		-	
Development Review	482,426		-	
Rezoning	1,230,317		1,731,950	
Regional Wastewater Reclamation		294,900		15,000
Ina Road Laboratory Analysis	14,900		15,000	
Household Hazardous Waste Program	280,000		-	
Stormwater Program Total	$ 18,355,796	$ 18,355,796	$ 21,230,487	$ 21,230,487

[1] Landscaping expenses incorporated.

[2] Permitting and Engineering Support are now Budgeted within Floodplain Management.

[3] FEMA/Mapping, Basin and Drainage Studies are now Budgeted within Planning and Development.

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