SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY
Environmental Protection & Natural Resources Division
Community Development Department

2014-2015 Annual Water Quality Assessment Report

SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY

2014-2015 Annual Water Quality Assessment Report

December 2015

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Chapter 1

SRPMIC Background

The Salt River Pima-Maricopa Indian Community (SRPMIC or Community) is a federally recognized tribe located in Maricopa County in central Arizona and was decreed by Executive Order on June 14, 1879 by President Rutherford B. Hayes.

The Salt River Pima-Maricopa Indian Community is comprised of approximately 52,675 acres covering nearly 80 square miles and is home to over 9,500 O'odham and Piipaash (Pima and Maricopa Indians). The Community is located east of the cities of Phoenix and Scottsdale, north of the cities of Tempe and Mesa, and south of the city of Fountain Hills and the Fort McDowell Yavapai Nation.

The tribal government consists of nine elected members (President, Vice President and a seven-member Community Council) who preside over SRPMIC governmental affairs. The Community government administers public policy and social services much like a state or municipal government. The top-down administrative structure consists of a Community Manager and Assistant Community Managers who oversee various Departments. The Environmental Protection & Natural Resources Division (EPNR) is organized within the Community Development Department (CDD) and is comprised of the following programs: Air Quality, Water Quality, Pesticides & Hazardous Substances, Environmental Compliance, Community Action and Revitalization Program (CARP), Land Use Compliance, Waste Management, Range Management, and Brownfields. Via these programs, CDD-EPNR has successfully managed several Environmental Protection Agency (EPA) grants. SRPMIC's Code of Ordinances outline the laws of the Community and include several environmental codes.

The Community is divided into two districts – the Salt River district and the Lehi district. The districts are separated from each other by the Salt River. The Community's population density is just over 100 people per square mile. By comparison, the adjoining cities average approximately 1,000 people per square mile.

Land uses are illustrated in Figure 1. Land use practices include agriculture, commercial and industrial development, and open space/preserves. Residential areas primarily occur on land depicted as agricultural use in Figure 2. Approximately 23% of the Community lands (12,000 acres) cultivate cotton and a variety of vegetables. Prime commercial lands extend for nine miles along the Pima Freeway (Loop 101), which spans the Community's

western boundary. Approximately 19,000 acres of the Community's northeastern region is designated as open space/preserve for future generations. Commercial developments, farm leases, two tribally owned and managed casinos, and several Tribal enterprises generate revenue for the SRPMIC. Each of the four major types of land use brings with it a unique set of nonpoint source issues and possible pollutants. Figure 1 lists the land use types and associated issues.

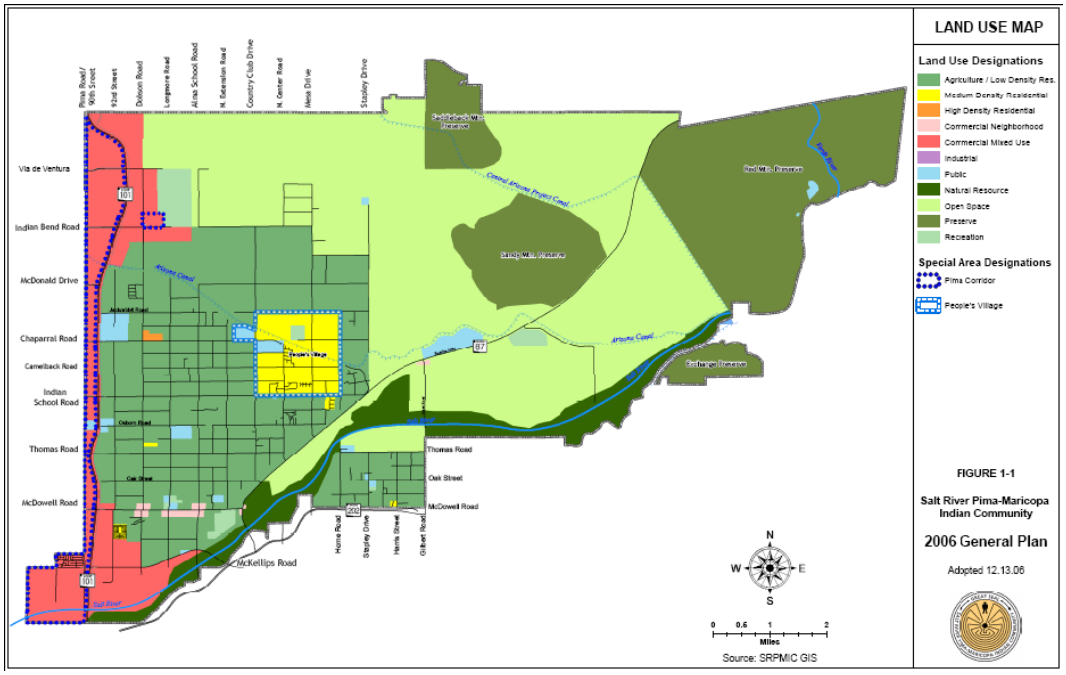

Figure 1. Approved land use map for SRPMIC

Chapter 2

Surface Water Introduction

The Salt River Pima-Maricopa Indian Community is an important environmental steward for the waters of Arizona, as it has the confluence of two major rivers within its boundaries.

The Community's surface waters are comprised of the portions of flowing, but regulated Verde and Salt Rivers upstream of Granite Reef Dam and the dry and altered Salt River downstream of Granite Reef Dam. There are numerous human-made surface water bodies throughout the Community, including irrigation delivery and return flow canals, golf-course water features, irrigation reservoirs, and livestock reservoirs. In the past CDD-EPNR's Water Quality Program (WQP) had not regularly monitored these water bodies, however in fiscal year 2012, a monitoring schedule for various irrigation ditches was developed to protect irrigation outfall areas. The WQP monitors these areas based upon funding and the fiscal year's monitoring priorities.

The Community's official surface water quality monitoring program began in 2000 with the monitoring of the Verde and Salt Rivers. The Salt River Project (SRP) and the U.S. Geographical Survey (USGS) also collect monitoring data from these rivers. There is a USGS gauging station on the Verde River on Community lands that is utilized by WQP staff to ensure flows are at a safe level prior to sampling, double check flow data collected in the field, and for historical perspective.

Both the Verde and Salt Rivers flow perennially. The Verde River originates from aquifer springs, mountain precipitation, and snow melt north of the SRPMIC. It is a high quality surface water of low range total dissolved solids (TDS ~300 mg/L) during normal weather events and low suspended solids (SS<20 mg/L). It is generally low in turbidity, nutrients, and also bacteria, until the warmer summer months bring elevated bacteria levels.

The Salt River originates from springs, mountain precipitation, and snow melt northeast of the SRPMIC and travels through soils high in salt concentration, which, not only contributed to the name 'Salt River', but also results in much higher TDS ranges (600–1,000 mg/L TDS as compared to the Verde). The Salt River is also generally lower in suspended solids (SS<10 mg/L) and nutrients. The Salt River, however, has a high summer recreation population (persons floating and swimming in river) that results in seasonally elevated bacterial contamination (>1,600 Most Probable Number).

The continued monitoring of these surface waters will help establish baseline seasonal trends, indicate possible bacterial contamination from human recreation and cattle grazing, and warn of possible water quality changes. Developing a long-term data set of these surface waters will provide critical information not only for the SRPMIC, but for the condition of water resources in Arizona.

The only human-made surface water bodies included in the current monitoring program are sampling sites at the Cottonwood and Lehi Wetlands. The wetlands receive water from irrigation, agricultural runoff and stormwater. The wetlands were created in order to improve the quality of water, especially in relation to sediment load before entering the Salt River. These nonpoint source treatment wetlands were constructed in 2003 and 2008, respectively. The Quality Assurance Project Plan (QAPP) was approved in July 2014 for the Cottonwood Wetland and 2012 for the Lehi Wetland.

Figure 2. Before and after aerial photographs of the Cottonwood Wetland.

Figure 3. Before and after aerial photographs of the Lehi Wetland.

Chapter 3

Monitoring Strategy

The Salt River Pima-Maricopa Indian Community has a monitoring strategy that is consistent with the EPA-approved QAPP prepared for the SRPMIC for surface water and groundwater monitoring. The Water Quality Program bases all of its surface water monitoring activities on this QAPP. For more detailed information, please refer to the SRPMIC QAPP.

Monitoring Objectives

The objective of implementing the annual monitoring strategy is to identify water quality status and trends over the years, track and report on water quality status, and identify whether action needs to be taken by comparing monitoring results to the Community's baseline water quality conditions. Identification of impaired waters, causes and sources of water quality problems, and evaluating the effectiveness of our program are key goals of the monitoring strategy.

The SRPMIC began sampling macroinvertebrates along the Community's rivers during the previous fiscal year. The macroinvertebrate sampling was the WQP's final step towards "mature" status as defined by the USEPA. The Benthic Macroinvertebrate Monitoring QAPP was approved by the USEPA Quality Assurance Office (QAO) in November of 2011. In response to comments from the QAO, the Surface and Groundwater Monitoring QAPP was revised in 2012, and the Benthic Macroinvertebrate Monitoring QAPP was incorporated into the general Surface and Groundwater Monitoring QAPP.

Monitoring Design

The intent of the surface water monitoring design for performing water quality assessments is to collect data that are representative of an entire stream reach (macrolocation) over the course of four seasons and to locate sampling sites (microlocation) on a stream reach with regard to tributary inflows, man-made discharges, and stream morphology. Meeting this intent requires thoughtful selection of monitoring sites while taking into account potential pollution sources, flow conditions, site accessibility, and safety. More information on the Community's rationale for selecting surface water sampling site locations may be found in the Standards of Operating Procedures (SOP). The extent of surface water quality monitoring activities undertaken by the CDD-EPNR Water Quality

Program (WQP) depends upon personnel, resources, site availability, and budgetary considerations. When these criteria are met, the surface water quality monitoring is implemented as detailed.

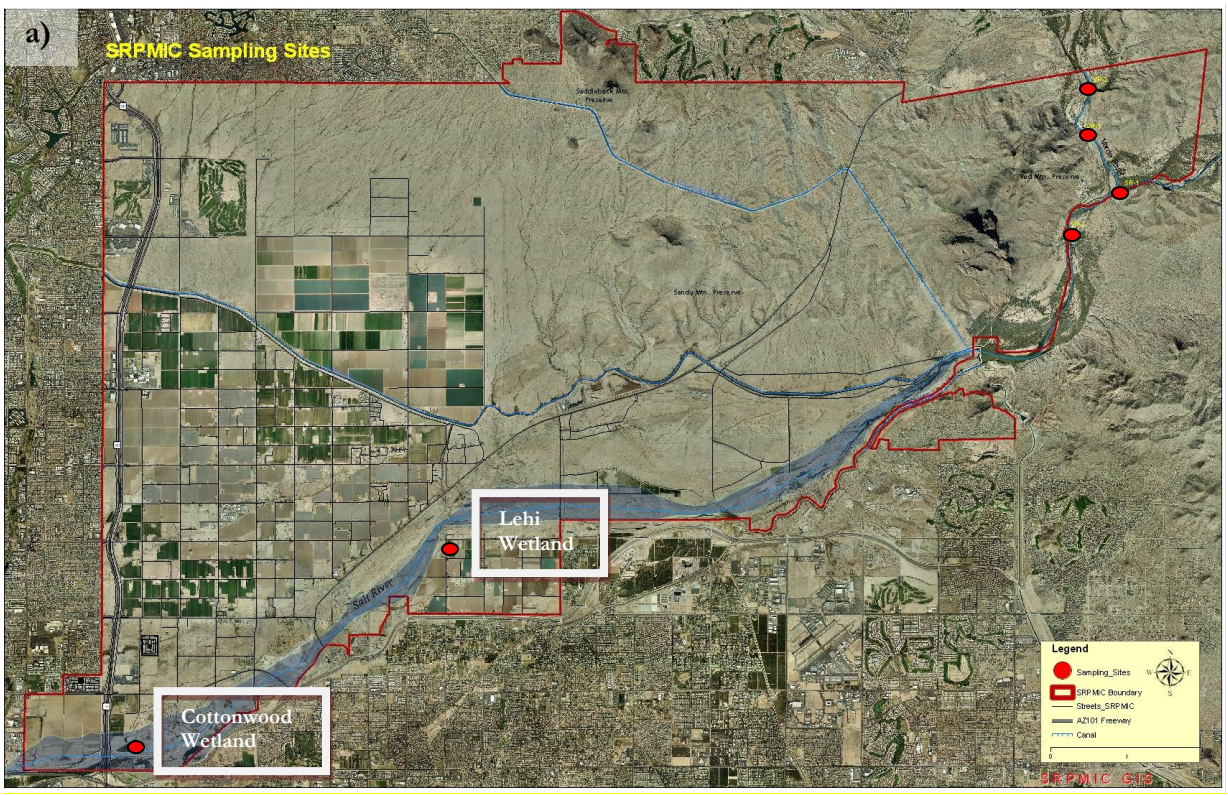

Figure 4. Map of SRPMIC showing river sampling sites and locations of Community wetlands.

Verde and Salt Rivers

There are four established sampling locations for surface water monitoring. These include:

1. Verde River just downstream of SRPMIC boundary with Ft. McDowell (VR-2).
2. Verde River approximately ½ mile downstream of VR-2 located at the site of the USGS gauging station (VR-1).
3. Salt River just upstream of its confluence with the Verde River near the Phon D. Sutton Recreational Center (SR-1).
4. Salt River just downstream of its confluence with the Verde River (SR-2).

Sampling sites VR-1, VR-2, and SR-1 measure ambient conditions associated with the Verde and Salt Rivers, respectively, whereas site SR-2 measures water quality downstream of the confluence of these two rivers. Given that much recreation in the rivers occurs upstream of these sites and that recreation on the Community itself is scattered both upstream and downstream of SR-2, sampling surface water at these sites may also provide information on the impacts of these activities on the quality of the Community's surface water resources.

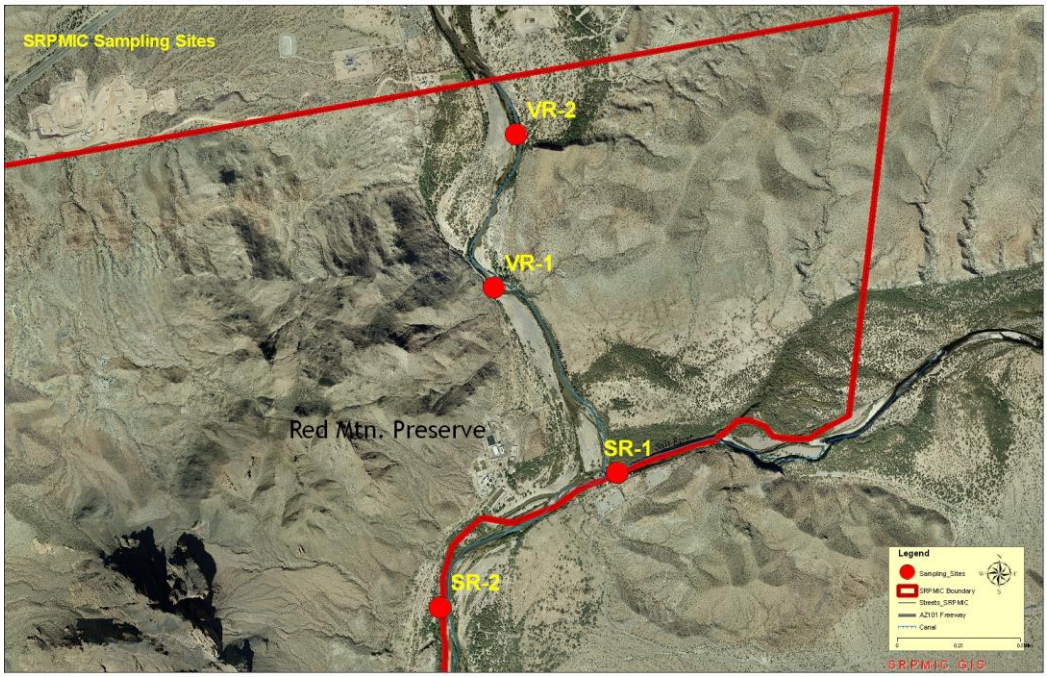

Figure 5. Close up of surface water sampling sites along the SRPMIC northeastern border.

Cottonwood and Lehi Wetlands

When appropriate and water is present, field measurements are taken on a monthly basis and samples are collected for laboratory analysis four (4) times per year. Two (2) sediment gauges are also located within the wetlands to help measure sediment trapping. Each wetland is visited at least monthly and photographs taken including ones of the sediment gauges. The Cottonwood and Lehi Wetlands contain two (2) sampling locations: the upstream channel location and the exit point of water from the project area. The data collected at both wetland areas depicts the quality of water entering and exiting the wetlands in order to determine how efficient the wetlands are at eliminating pollutants.

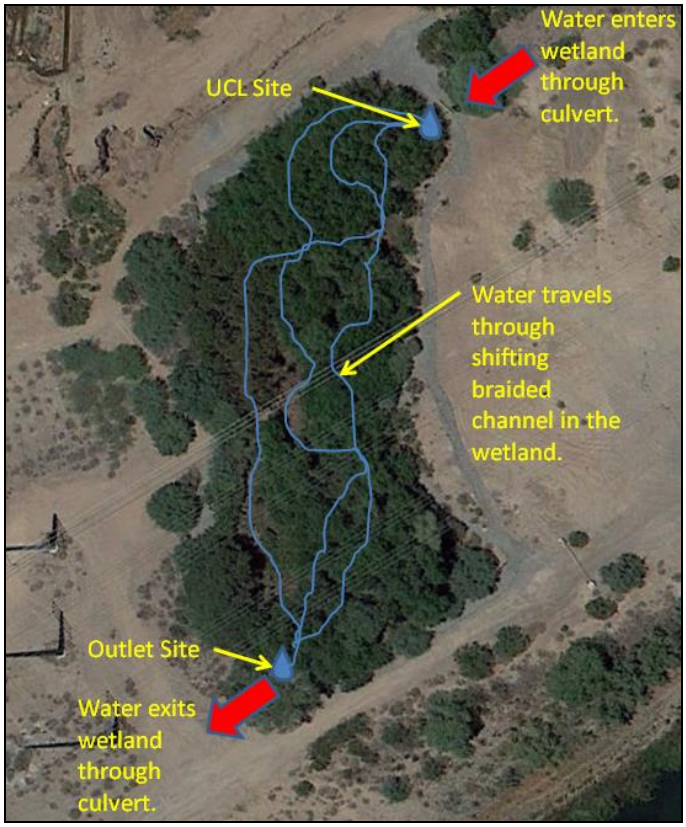

Figure 6. Locations of the Cottonwood Wetland sampling sites (UCL and OUTLET)

Figure 7. Locations of the current Lehi Wetland original sampling sites. Site 2 has become overgrown with willows and is not accessible now.

Table 1. Wetland Sampling Tasks and Frequency

Task	Frequency	Data Collection per year
Water Depth and Velocity	monthly	12
Water Field Parameters (pH, temp., DO, cond., turbidity)	monthly	12
Sedimentation Photographs (visual and narrative records)	monthly	12
Sample Collection (TKN, NO_x, NH_4, TSS, fecal, TOC, Grease & Oils)	quarterly	4
Sample Collection (Metals)	twice annually	2

Core and Supplemental Water Quality Indicators

Salt and Verde Rivers

Basic water quality parameters are measured *in situ* (pH, water temperature, turbidity, dissolved oxygen, flow, and conductivity) seven (7) times per year (March/April, May, June, July, August, September, and November). Water samples are collected in March/April and November, and sent to a laboratory for the measurement of nearly fifty (50) parameters including mercury, bacteria (*E. coli*), and arsenic (Table 2). Water quality parameters or analytes that consistently are not detected will either be removed from the list of future monitoring, or their monitoring frequency will be reduced for financial considerations. This fiscal year several parameters that had not been detected during sampling events over the past four (4) years were removed from the list of sampling parameters.

Monthly from May through September, samples are collected to monitor bacteria and nutrient levels based upon an increase in recreation and water temperature. Additionally, in April and November macroinvertebrates from the Salt and Verde Rivers are collected as part of the biomonitoring effort.

Table 2. Parameters measured in surface water monitoring.

Parameters			
Ammonia	Sulfide	Nickel	
Arsenic	Manganese	Nitrate-N	Iron*
Barium	Cyanide	Nitrite-N	Mercury (inorganic)*
Copper	Fluoride	Sulfate	Mercury*
Boron	Iron	Hardness, CaCO3	Nickel*
Cadmium	Sulfide	Sodium	Copper*
Calcium	Aluminum	Zinc	Arsenic*
Chloride	Total Phosphorous	Total Dissolved Solids (TDS)	Zinc*
Total Nitrogen	Pentachlorophenol%	Dissolved Oxygen	
Copper	Chlorine (Total Residue)	pH	
E. coli	TKN	Electrical Conductivity	
Methyl Mercury	E. coli	Suspended Sediment Conc.	
Magnesium	Chromium		
Mercury (inorganic)	Lead		

Note: "*" signifies dissolved.

Cottonwood and Lehi Wetlands

When appropriate and water is present, basic water quality parameters are measured monthly *in situ* (pH, water temperature, turbidity, dissolved oxygen, flow, and conductivity) and four (4) times per year water samples are collected and sent to a laboratory for the measurement of an extensive suite of parameters including mercury, bacteria (*E. coli*), chromium IV, and total suspended solids. Sediment in the water is observed through the measurement of turbidity and total suspended solids. In addition to these parameters, two (2) staff gauges are located within the Wetland in order to measure aggradation or the accretion of ground level from sediment deposition.

Table 3. Wetland Sampling and Analysis Schedule

Samples Collected for Laboratory Analysis	***December***	***March***	***June***	***September***
Total Kjeldahl Nitrogen (TKN)	X	X	X	X
Ammonia (NH_4)	X	X	X	X
Nitrite/nitrate (NO_x)	X	X	X	X
Total Suspended Solids (TSS)	X	X	X	X
Fecal Coliform (CFU)	X	X	X	X
Total Organic Carbon (TOC)	X	X	X	X
Grease and Oils (GAO)	X	X	X	X
Metals (10 metals)		X		X

Quality Assurance

Federal requirements state that water quality testing for assessment or compliance and enforcement include the collection of Quality Assurance/Quality Control (QA/QC) samples. QA/QC samples are used to check the quality of data. Data can be skewed or inaccurate due to equipment contamination, poor sample collection techniques or sample handling procedures. The WQP collects several types of QA/QC samples to ensure good data quality. Samples are collected according to the methods outlined in the SOP. Field QC requirements include the collection of equipment blanks, travel blanks, duplicates, and splits. The two most common types of QA/QC samples collected by the WQP are duplicates and splits. The duplicate samples collected are processed by TestAmerica Laboratories along with the other samples. This laboratory is designated as the primary laboratory. Legend Technical Services has been designated as the lab to receive split samples.

Data Management

All field and laboratory surface water data gathered is stored in a database created by the SRPMIC Information Technology Department, which utilizes EPA's approved STORET-compatible format. This database stores all current data related to the Salt and Verde River sampling, as well as monitoring and sampling events conducted at the Cottonwood and Lehi Wetlands. Historical surface water data continues to be transferred from the old surface water database, which houses data from the start of the sampling program, to the new database when time allows.

All hardcopies of laboratory reports and field data sheets are filed in appropriate folders on site and kept for a minimum of five (5) years.

Data Analysis/Assessment

Data will be used to assess SRPMIC surface water and groundwater resources for: 1) Compliance with water quality standards, and 2) identification, location, and remediation of environmental stressors.

Compliance with water quality standards

Compliance will be determined by screening data for the exceedance of surface water and aquifer water quality standards. The SRPMIC's Treatment in the Same Manner as a State (TAS) document for the CWA 303 program and the corresponding water quality standards is in the process of being revised. The WQP intends to have both of these documents revised and resubmitted to the USEPA Region IX office prior to the end of FY16.

Identification, location, and remediation of environmental stressors

This will be accomplished by plotting water quality exceedance data and potential pollution sources on maps and determining if a hydrologic connection exists. Exceedance information may be supplemented by collecting additional water quality data, if necessary, to further pinpoint the source of the environmental stressors. Non-compliance with water quality standards due to the actions of an

individual or activity occurring on Community land will be dealt with by SRPMIC environmental compliance officers. Non-compliance with water quality standards due to the actions of an individual or activity occurring off Community land will be dealt with through the Community's legal representatives.

Reporting

EPA encourages tribes to develop the capability to assess and report on all assessments related to the surface and groundwater quality of the tribal water resources. For FY15 a node to node data exchange was utilized by the WQP to submit surface water data to the EPA.

The Water Quality Assessment Report provides a management tool that can be used to look at trends in data that may show areas of concern. SRPMIC is required to submit an assessment of its water resources annually to EPA. Information for this report is based on any data obtained from surface water monitoring from October 1, 2014 to September 30, 2015. At least two (2) hardcopies of the report will be housed in the SRPMIC library for public viewing and an electronic copy of the document may be added to the SRPMIC website.

For surface water, in order to perform a monitored assessment, which is the preferred type of assessment for the Water Quality Assessment Report, at least four quarterly samples with complete data sets must be collected at each sampling site within two (2) years. All data must be less than five (5) years old. An evaluated assessment, which is inferior to a monitored assessment, will be performed when there are not enough data for a monitored assessment, when data sets are incomplete, or when data are more than five (5) years old. Cooperation with other data collection agencies may provide a more comprehensive data set for performing assessments.

Programmatic Evaluation

According to the Draft SRPMIC Surface Water Quality Standard Ordinance, SRPMIC is required to review and revise surface water quality standards to respond to regulatory, environmental, or land uses changes. This is to take place once every three (3) years.

For surface water, reported values will be used to determine compliance with surface water quality standards. When a water quality standards exceedance has been detected, the sampling site may be re-sampled immediately depending upon the potential threat posed by the contamination. If any of the water quality standards exceedance poses an immediate health threat to recreationists, the public will be notified. If the *E.coli* water quality standards are exceeded, immediate bacteriological sampling will be conducted until analysis yields a normalcy in data. If the water quality standards exceedance is chronic, action will be taken to locate the source of the exceedance and, if possible, eliminate the source. Analytes that have not been detected for four (4) consecutive seasonal samplings may be deleted from the list of analytes to be tested in future samplings.

Chapter 4

Water Quality Assessment Report

Reliable data is essential for assessment and reporting. The WQP takes measures to ensure the integrity of data collected. The SRPMIC Water Quality Program complies with both federal and tribal reporting requirements. Table 4 illustrates some relevant quantitative information on SRPMIC's surface water resources.

Table 4. Information on SRPMIC's surface waters

Total number of stream miles	20.4
Total number of lake acres	0
Total number of wetland acres	4.0
Total number of estuary square miles	0

Monitoring in FY15 occurred as scheduled at river sites including seven (7) out of the proposed seven (7) times along the two (2) rivers. Surface waters were monitored for a suite of parameters chosen from the Tribal and Federal water quality standards that would give the program adequate information to determine whether the waters are meeting their designated uses and remain within budget parameters.

Water quality samples were collected at two (2) wetlands four (4) out of the four (4) proposed times. *In-situ* measurement of water quality occurred in October, December, January, March, June and September. Monitoring at the Lehi and Cottonwood Wetlands did not always occur as scheduled due to dry conditions at the wetlands which receive intermittent flows. Monthly pedestrian surveys and monitoring of the sediment staff gauges however showed that the wetlands were performing as expected in slowing water flow when it occurred, accumulating sediment, and supporting a diverse wetland biotic communities.

Chapter 5

Groundwater Introduction

The Water Quality Program establishes and enforces guidelines for wellhead protection, point source control, nonpoint source control, and sole source aquifer designation. Diligence in these matters is important as good groundwater quality is critical to the health and welfare of Community residents as it is the SRPMIC's potable water source.

The entire SRPMIC sits on tops of two (2) groundwater subbasins which are components of the major Salt River Valley Groundwater Basin within the Phoenix Active Management Area (AMA) designed by the Arizona Department of Water Resources (ADWR). The northeastern part of SRPMIC which covers about 10% of the entire area lies on the Fountain Hills Subbasin (FHSB) whereas the remaining 90% of SRPMIC land is associated with the East Salt River Valley Subbasin (ESRVSB). According to ADWR, while major natural sources of groundwater recharge of FHSB includes streambed recharge from the Verde River and the Salt River and their tributaries, those associated with ESRVSB appear to be from mountain front recharge (Superstition Mountains and McDowell Mountains) and river underflows (Gila River and Queen Creek).

There are about 80 active and inactive wells within the boundary of SRPMIC and most of them are located south of the Arizona Canal. Most of the active wells are for irrigation and domestic consumption including drinking, a few of them are dedicated for various monitoring purposes.

In 1996, SRMIC applied for and received a grant from the U.S. Environmental Protection Agency (USEPA) to assess the quality of its water resources (surface water and groundwater) and complete a Water Quality Assessment Report. In 1997, SRPMIC began developing a Water Quality Management Plan (WQM Plan) in accordance with the requirements set forth by USEPA's Clean Water Act (CWA). In March, 1998, the WQM Plan (1998) which contained an initial assessment of the quality SRPMIC's water resources was completed. The groundwater quality data in the WQM Plan of 1988 was predominately associated with drinking water wells, monitoring wells, and irrigation wells within SRPMIC.

After the completion of the WQM Plan (1988), SRPMIC applied for and received a 106 grant from USEPA to develop the Quality Assurance Project Plan (QAPP, 2000) for the implementation of a water quality monitoring program. After the QAPP was completed and approved in 2000, SRPMIC subsequently implemented the Surface Water Quality Monitoring Program with the 106 grant received from USEPA. Due to the lack of sampling equipment and training, staff did not resume the Groundwater Quality Monitoring Program initially implemented in FY 2000 until FY 2008.

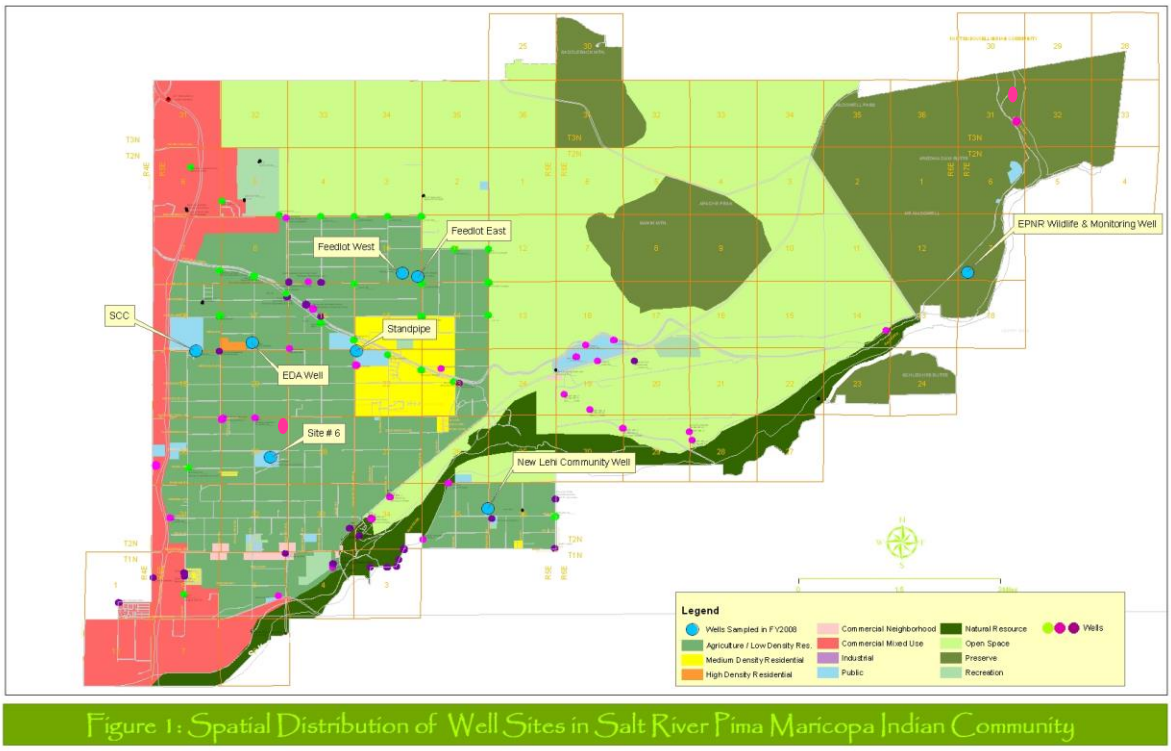

Figure 8. SRPMIC wells.

Chapter 6

Monitoring Strategy

The Salt River Pima-Maricopa Indian Community (SRPMIC or Community) has a monitoring strategy that is consistent with the EPA-approved Quality Assurance Project Plan (QAPP) prepared for the SRPMIC for groundwater monitoring.

Monitoring Objectives

The WQM Plan (1998) identified several program elements that should be part of a monitoring program. In general, these elements can be summarized as primary and secondary objectives for SRPMIC.

Primary/major groundwater quality monitoring objective are:

- To assess ambient conditions;
- To support the designated beneficial uses established for groundwater on Community lands; and
- To locate and identify stressors posing a threat to the Community environment and health.

Secondary groundwater quality monitoring objectives are:

- To enforce the Community's Aquifer Water Quality Standards using intensive survey; as a tool;
- To respond to complaints and special requests using intensive surveys;
- To support various USEPA grant programs;
- To address Community's concerns regarding groundwater quality; and
- To prepare federally mandated groundwater quality planning and management reports.

In addition to staff in EPNR's WQP, other SRPMIC agencies such as the Public Works Department (PW), Engineering and Construction Services Department (ECS) also undertake groundwater monitoring activities to meet their respective departmental objectives. Coordination with these SRPMIC agencies routinely occurs to prevent the duplication of the groundwater monitoring related activities within the Community.

Given that all aquifers underneath the Salt River-Pima Maricopa Indian Community have been classified for drinking water protected uses, SRPMIC has therefore adopted aquifer water quality standards which are in association with USEPA Safe Drinking Water Act (SDWA) Primary and Secondary MCLs since 1999. These standards have been updated continuously to reflect the most current federal standards. However, these standards have not been approved by USEPA.

Monitoring Design

The intent of the groundwater monitoring design is to collect groundwater quality data that are representative of an entire aquifer unit (macrolocation) over a specific time interval (monthly, quarterly, bi-annual, or annual) and to locate sampling sites (microlocation) within an aquifer with regard to its characteristics such as the nature of its associated vadose zone, water table depth below the respective land surface, well physical characteristics including well depth and perforation/screen intervals, and proximity of potential pollution sources as related to specific land uses. Meeting this intent entails thoughtful selection of wells while taking into account nearby pollution sources, aquifer characteristics, well characteristics, and accessibility. The collection of groundwater samples over a specific interval, should it be possible, could minimize the effects of a random water quality standards exceedance while maximizing the non-random detection of an aquifer water quality standard exceedance.

Existing groundwater quality data or the lack of it may be the rationale to select additional wells for sampling. Duplication of efforts with respect to groundwater quality data collection is avoided by coordinating with other SRPMIC agencies which also have similar responsibilities. Such entities include, but are not limited to the Public Works Department (PWD), Engineering and Construction Services Department (ECS), Environmental Health Department (EHD), and Salt River Landfill (SRL).

Two types of wells are sampled for monitoring purposes. These are primary and secondary index wells. The primary index wells are sampled at least once every three (3) years to assess impacts of potential pollution sources whereas secondary index wells, which are sampled less frequently, are to be sampled either to supplement data collected from primary wells or assess ambient groundwater conditions.

During the FY 2015 sampling, only one (1) well was sampled. This monitoring well is located within a residential area. Analysis of samples collected yielded a high amount of total dissolved solids within the sample, which is not uncommon for aquifers in the area. There was also a high amount of chloride. Levels for both parameters mentioned exceed the Secondary National Drinking Water Standard. Although not health concerns, they may affect the look and taste of the water. No pesticides were found in the groundwater during this testing. The only parameter of concern was nitrate. Nitrate levels found were at 9.4 mg/L, which although is high, does not exceed the Primary National Drinking Water Standard.

Core and Supplemental Water Quality Indicators (WQI)

Water quality parameters or indicators which are to be tested from index wells depend upon their intended uses, geology, historical and current land use patterns above the respective aquifers, and the associated historical monitoring data. For instances, groundwater samples collected from index wells should be tested for pesticide residues and other inorganic parameters or indicators such as nitrate, phosphorous, and other plant micronutrients if the land surface above the associated aquifer is currently or historically being used for crop productions or concentrated animal feeding operations

(CAFO) such as feedlots or dairies. On the other hand, groundwater samples collected from an aquifer above which the respective vadose zone currently or historically acts as a leach field of septic systems, must be tested for nitrogenous compounds and other septic system related parameters or indicators such as chloride, sulfate, and total dissolved solids (TDS).

As indicated by the SRPMIC's proposed Aquifer Water Quality Standards, "all aquifers underlying the Salt River-Pima Maricopa Indian Community shall be classified for the drinking water protected use". Therefore, the water quality parameters or indicators regulated under the federal National Primary Drinking Water Regulations (NPDWRs) of the Safe Drinking Water Act (SDWA) form the core of parameters or indicators that are to be tested in groundwater samples collected from index wells that are being used predominately as public water systems (PWS). However, not all these parameters or indicators will be tested in every groundwater sample collected from these PWS.

Parameters or indictors which consistently exceed the associated USEPA SDWA Maximum Contaminant Levels (MCLs) are closely monitored. For example, due to the very unique geology associated with the southwestern part of the United States, an elevated level of arsenic is frequently found as a naturally-occurring constituent in aquifers underneath SRPMIC. Specifically, SRPMIC has been closely monitoring the spatial distribution of nitrate-N and arsenic in its aquifers through the various groundwater monitoring activities undertaken by its agencies to enhance the ongoing remediation process established to comply with the USEPA SDWA MCL for nitrate-N (10 mg/L) and arsenic (0.01 mg/L).

In addition to the inorganic parameters or indicators commonly used to reflect the general ambient condition of an aquifer, groundwater samples collected from these index wells are routinely tested for pesticides, radiochemistry, volatile organic chemicals (VOCs) and semi-volatile organic chemicals (SVOCs).

Quality Assurance

In order to ensure the validity of monitoring activities, the field and laboratory data collected must be reviewed by staff in accordance with the processes and requirements prescribed in the SRPMIC WQM Plan and SRPMIC QAPP previously approved by USEPA in 1998 and 2013, respectively. At the same time, the collection of groundwater samples was conducted in accordance with the Procedure Manual for Sampling Groundwater (2010) as a component of the USEPA approved SRPMIC QAPP.

Data Management

Groundwater quality data collected for the Groundwater Monitoring Program is stored in the Excel-based Groundwater Quality Database (GWQDB) and in filed hardcopies. Prior to loading the data into the GWQDB, instructions for data entry and checking as described in the SRPMIC QAPP are followed. Other than the groundwater quality data, pertinent information such as groundwater depth, well depth, observation, analytical methodologies used, and respective federal and SRPMIC groundwater quality standards was also loaded into the GWQDB. In the near future SRPMIC plans to

convert the current Excel-based GWQDB to the newly developed STORET-compatible database, which houses the most current surface water data.

Data Analysis and Assessment

Groundwater data was used to assess SRPMIC groundwater resources for:

- Compliance with federal groundwater quality standards; and
- Identification, location, and remediation of environmental stressors.

Compliance with Groundwater Standards

Compliance was determined by screening data for the exceedance of either the USEPA SDWA Primary and Secondary MCLs in accordance with the procedures and requirements prescribed in the SRPMIC QAPP (2013) previously approved by USEPA.

Identification, location, and remediation of environmental stressors

This will be accomplished by plotting water quality exceedance data and potential pollution sources on maps and determining if a hydrologic connection exists. Exceedance information may be supplemented by collecting additional water quality data, if necessary, to further pinpoint the source of the environmental stressors. Non-compliance with water quality standards due to the actions of an individual or activity occurring on Community land will be dealt with by SRPMIC environmental compliance officers. Non-compliance with water quality standards due to the actions of an individual or activity occurring off Community land will be dealt with through the Community's legal representatives.

Reporting

EPA encourages tribes to develop the capability to assess and report on all assessments related to the surface and groundwater quality of the tribal water resources. The Water Quality Assessment Report provides a management tool that can be used to look at trends in data that may show areas of concern. SRPMIC is required to submit an assessment its water resources annually. Information for this report is based on any data obtained from groundwater monitoring from October 1, 2014 to September 30, 2015. At least two (2) hardcopies of the report will be housed in the SRPMIC library for public viewing, and an electronic copy may be added to the SRPMIC website.

Programmatic Evaluation

According to the Draft SRPMIC Aquifer Water Quality Standard Ordinance, SRPMIC is required to review and revise aquifer water quality standards to respond to regulatory, environmental, or land use changes. This is to take place once every three (3) years.

For groundwater, reported values will be used to determine compliance with the proposed set of aquifer water quality standards that reflect the most current USEPA's recommendation. When a water quality standards exceedance has been detected, the well may be re-sampled immediately depending upon the potential threat posed by the contamination. If any of the water quality standards exceedance poses an immediate threat to SRPMIC's drinking water resources, such information will immediately be conveyed to relevant Community's agencies that are responsible for the maintenance of the public water systems (PWS) and public health issues for immediate remedy. If the water quality standards exceedance is detected repeatedly, action will be taken to locate the source of the exceedance and, if possible, eliminate the source. Analytes that have not been detected during a baseline or ambient sampling may be deleted from the list of analytes to be tested in future samplings.

Chapter 7

Conclusions

Bi-Annual River Sampling Assessments—FY 2015

The surface water quality along the Salt and Verde Rivers was found to be satisfactory. Analyses showed that there were traces of multiple parameters including phosphorus, chloride, lead, chromium, arsenic, and *E. coli*. Surface water quality standards were met for all parameters analyzed during the FY 2015 sampling event. Total dissolved solid concentrations were high, which is not uncommon for the Salt and Verde Rivers. Total dissolved solid concentrations are especially consistently high in the Salt River. *See graph below.*

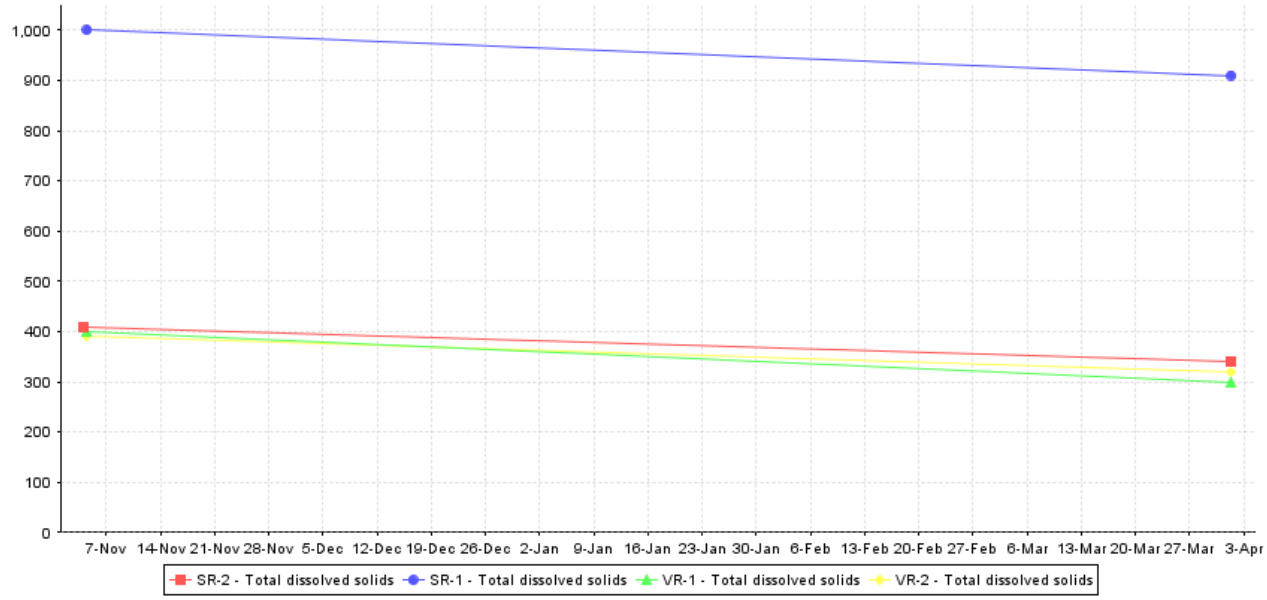

Figure 9. Graph of TDS concentrations at river sampling sites.

Summer Bacteria Sampling Assessments—FY 2015

E. coli levels did not exceed the surface water quality standards for Full Body Contact throughout the fiscal year. *See graph below.*

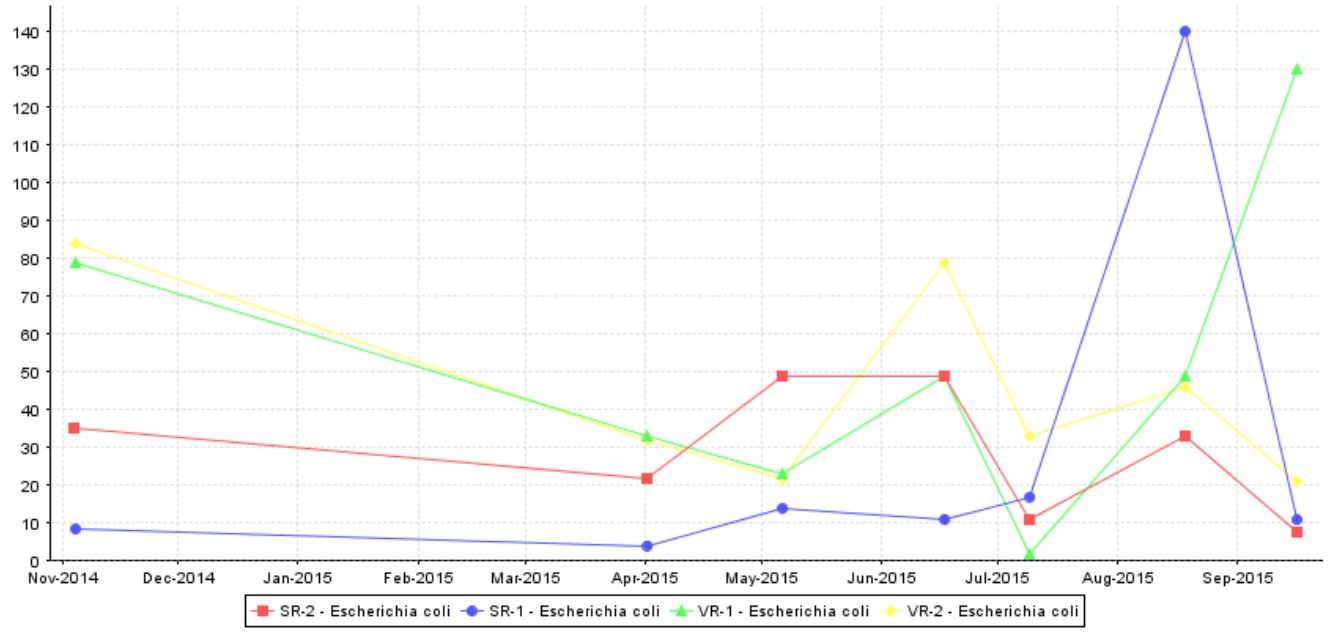

Figure 10. Graph of bacteria concentrations at river sampling sites.

Macroinvertebrate Sampling Assessments—FY 2015

Sampling did not occur in April 2015 because of abnormal flows disqualified sampling and data comparison based upon the QAPP. The QAPP specifies that two weeks of consistent flows must occur prior to sampling in order that data be comparable to reference standards. When flows decrease the river bed substrate is exposed to air leaving sensitive macroinvertebrate communities vulnerable to population declines. Similarly, high peak flows can scour river bed substrate and significantly affect macroinvertebrate diversity through abnormal drift and substrate turnover. The Verde River hydrograph is included below. The figure shows that in November 2014 there was a decline of 50% of the river flow and in April 2015 and increase of 50%. River flows are controlled by up-stream dams and these variations could not be predicted.

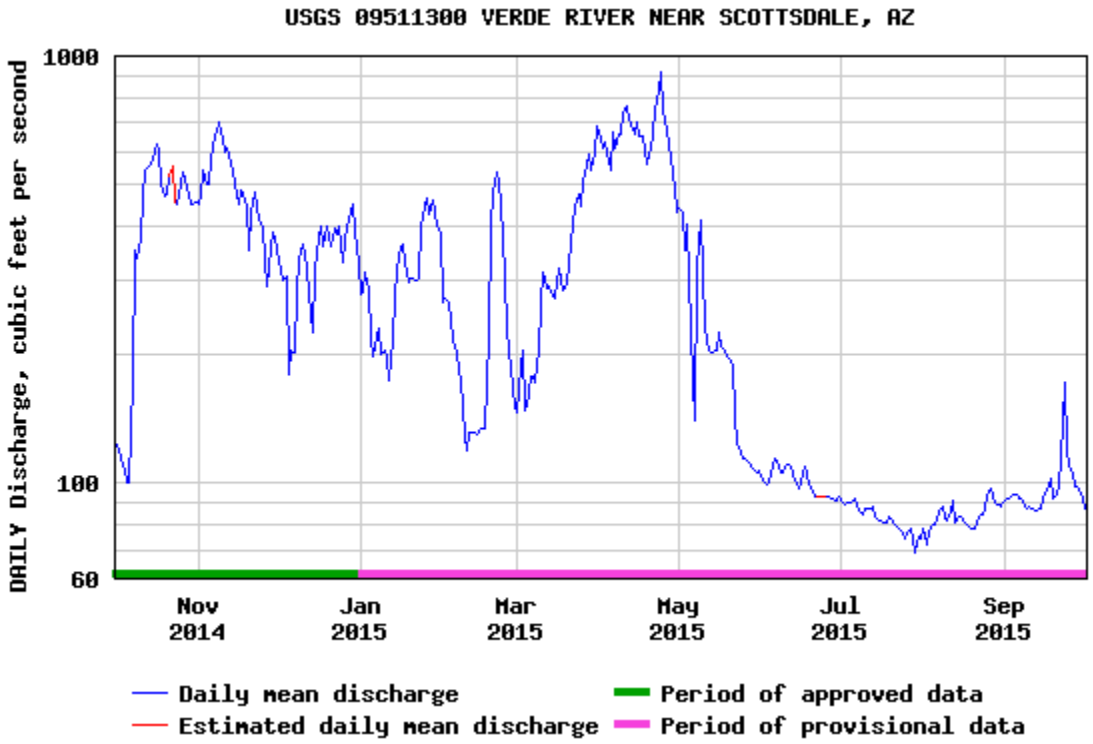

Figure 11. Graph of discharge measurements along the Verde River.

Macroinvertebrate Sampling Assessments—FY 2015

FY 2015 Wetland Monitoring

The wetlands aggraded according to staff gauge measurements in the wetlands (Figures 9 and 10). The physical act of deposition leads to a reduction in suspended solids and turbidity. Sediment gauges are perhaps the best *in situ* measurement of wetland function in regards to improvements in suspended sediments and turbidity, since they measure continuously. Litter carried by the water flow was routinely captured in the wetland, collected and disposed of.

Figure 12. The upper staff gauge in Cottonwood Wetland in FY2014 (left) and one year later in FY2015 (right). Observed sedimentation is approximately 0.1 feet.

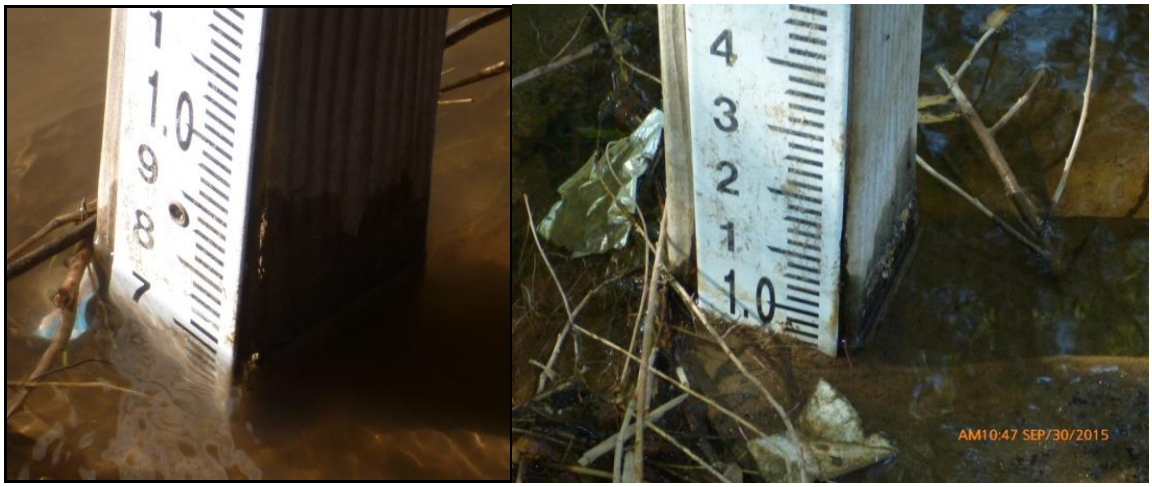

Figure 13. The upper staff gauge in Lehi Wetland in FY2014 (left) and one year later in FY2015 (right). Observed sedimentation is approximately 0.3 feet.

Groundwater Sampling Assessment—FY 2015

Based on the FY 2015 sampling results, the quality of groundwater resources beneath SRPMIC is of good quality. Based on the monitoring data associated within the well sampled several detections were found among the various groundwater quality parameters or indicators that were tested during the assessment period, however, bacteria was the only parameter which exceeded the Primary Drinking Water Standard. During the FY 2015 sampling, only one (1) well was sampled. This monitoring well is located within a residential area. Analysis of samples collected yielded a high amount of total dissolved solids and chloride, which neither exceeded the Secondary National Drinking Water Standard.

Chapter 8

Fourth Quarter Activities

The WQP's goal is to ensure a sustainable Community by safeguarding the Community's surface and groundwater quality, implementing measures so that good water quality is maintained, and any possible pollution sources are addressed. These activities are guided by EPA-approved CWA 106 and CWA 319 workplans.

CWA 106

Sampling activities, including the groundwater sampling event, completed during the fourth quarter satisfied the remaining sampling requirements for the fiscal year. With the submission of the 2014-2015 Annual Water Quality Assessment Report, all CWA 106 Goal 1 tasks have been completed.

The Water Quality Program conducts numerous outreach activities throughout the fiscal year to increase environmental awareness and stewardship as it relates to surface and groundwater quality, pollution prevention, wetlands, riparian areas, and water conservation. During the fourth quarter of FY15 Program staff conducted an outreach activity for a group of Community parents about river systems and erosion, and presented to over 50 high schoolers with the Hoop of Learning program concerning hydrology and stream dynamics as part of a conference for Science, Technology, Engineering and Mathematics education. A tour of one of the Community's wetlands, the Cottonwood Wetland, was given to youth working over the summer months. The Annual River Rafting Cleanup with the Youth Council along the Verde & Salt Rivers continued this fiscal year during the fourth quarter. This was the fourth year of the cleanup and the most trash was collected during this event.

An article was submitted to the Community's newspaper, the Au-Authm Action News, during the fourth quarter. The article was a collaborative effort between Water Quality Program staff and the Community's Public Works Water Division staff. With the submission of this article all CWA 106 Goal 2 workplan tasks have been completed.

Over the course of the fiscal year the WQP made an important effort to support green practices in various ways in order to ensure a more sustainable future. The WQP carpooled to meetings and

trainings sponsored by both the Community and other outside entities whenever possible. Carpooling practiced by the WQP continued to increase over the fourth quarter by 7% to 71%. To diminish the carbon footprint through heavy travel to off-site trainings the WQP participated in webinars whenever feasible. This quarter the WQP participated in a total of two webinars. Used printer cartridges, collected in one central location for the entire Community Development Department (CDD), were collected and properly recycled 100% of the time. All CWA Goal 3 workplan tasks were completed.

All activities relating to the CWA 106 workplan were reported above. This satisfies the CWA workplan Goal 4 task.

CWA 319

Post-implementation monitoring was done along the area of an unlined irrigation ditch where hydrologic engineering and vegetative measures were implemented. Pre and post implementation data shows a significant decrease in bacteria after the measures were implemented along the ditch. This can be equated mostly to the amount of sediment being trapped. Visual observations taken also show a difference in channel morphology due to large amounts of sediment trapping caused by the new structures and vegetation. All CWA 319 Goal 1 workplan tasks were completed.

Figure 14. Picture of a mechanical measure implemented along irrigation ditch.

Table 5. Post-implementation monitoring data

Sample Name	Analyte	Result	Units	Result Basis
Lower	Chromium	ND	mg/L	Total
Lower	Cadmium	ND	mg/L	Total
Lower	Lead	ND	mg/L	Total
Lower	Nitrogen, Kjeldahl	ND	mg/L	Total
Lower	Silver	ND	mg/L	Total
Lower	Selenium	ND	mg/L	Total
Lower	Arsenic	ND	mg/L	Total
Lower	Nitrite as N	ND	mg/L	Total
Lower	Nitrate as N	ND	mg/L	Total
Lower	Ammonia	ND	mg/L	Total
Lower	Nitrate Nitrite as N	ND	mg/L	Total
Lower	Hg	ND	mg/L	Total
Lower	HEM	ND	mg/L	Total
Lower	Escherichia coli	110	MPN/100mL	Total

WQP staff participated in trainings throughout the year. During the fourth quarter staff attended a local presentation to learn about Phoenix's plans for water storage and what the current and projected drought conditions are. The CWA 319 goal 2 workplan task was completed.

All CWA 319 Goal 3 workplan tasks except Task 1 (e). During the fourth quarter several signs were designed for fabrication. Staff intends to have signage placed at the Lehi Wetland during the second quarter of FY16.

All activities relating to the CWA 319 workplan were reported above. This satisfies the CWA workplan Goal 4 task.

References

1. SRPMIC. 2013. *Quality Assurance Project Plan for Water Quality Monitoring for the Salt River Pima-Maricopa Indian Community, Scottsdale, Arizona*. Salt River Pima-Maricopa Indian Community.
2. SRPMIC. 2013-2014. *Annual Water Quality Assessment Report*. Salt River Pima-Maricopa Indian Community.
3. SRPMIC. 1998. *Water Quality Management Plan.* Salt River Pima-Maricopa Indian Community.
4. SRPMIC. 2010. *Procedures Manual for Sampling Surface Water*. Salt River Pima-Maricopa Indian Community.
5. SRPMIC. 2010. *Procedures Manual for Sampling Groundwater*. Salt River Pima-Maricopa Indian Community.