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

2016-2017 Annual Water Quality Assessment Report

SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY

2016-2017 Annual Water Quality Assessment Report

December 2017

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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 10,200 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 organic 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.

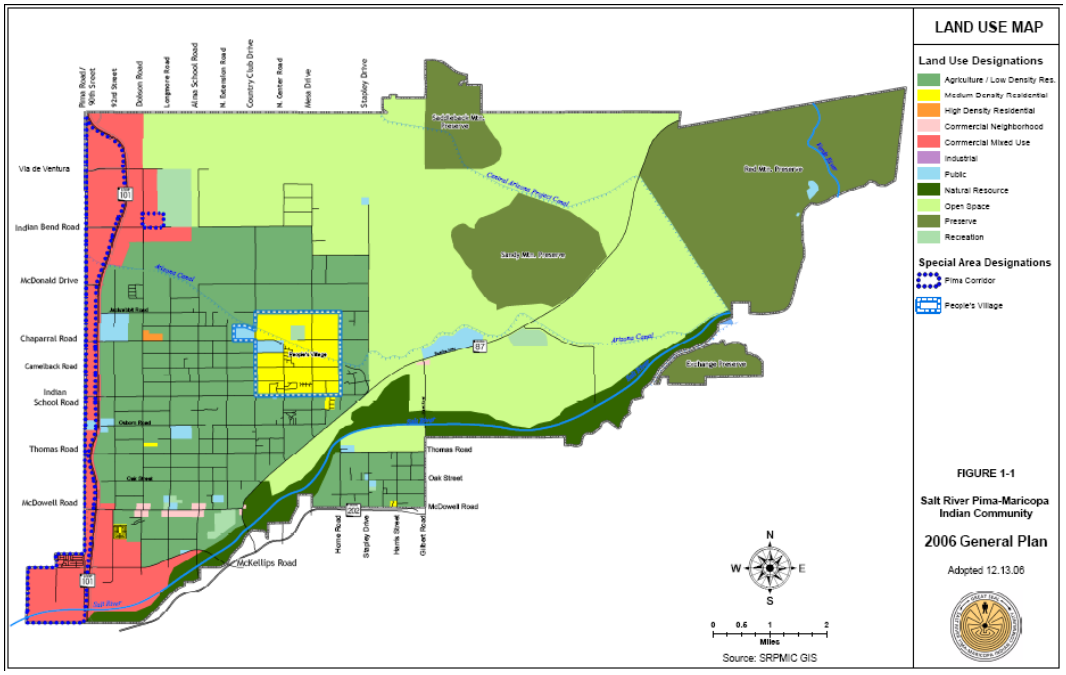

Figure 1. Approved land use map for SRPMIC

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.

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.

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.

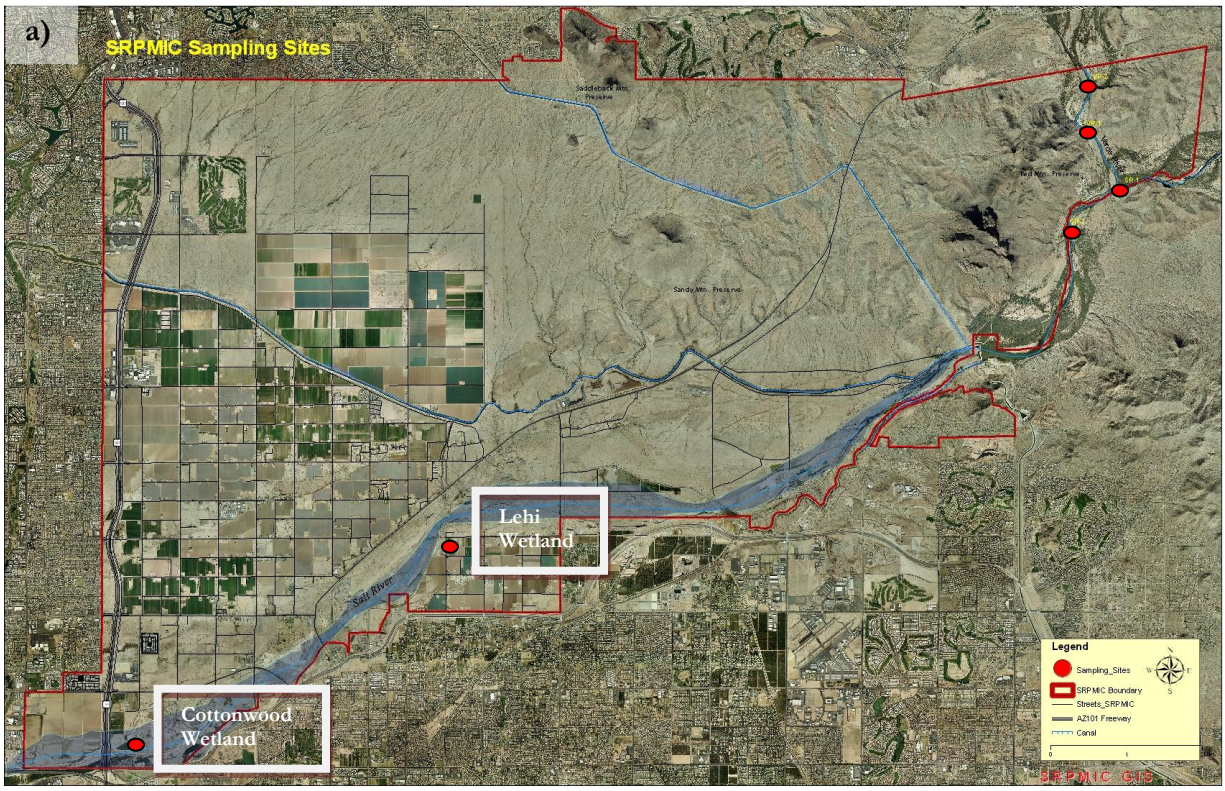

Figure 4. Map of SRPMIC showing river sampling sites and locations of Community wetlands.

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.

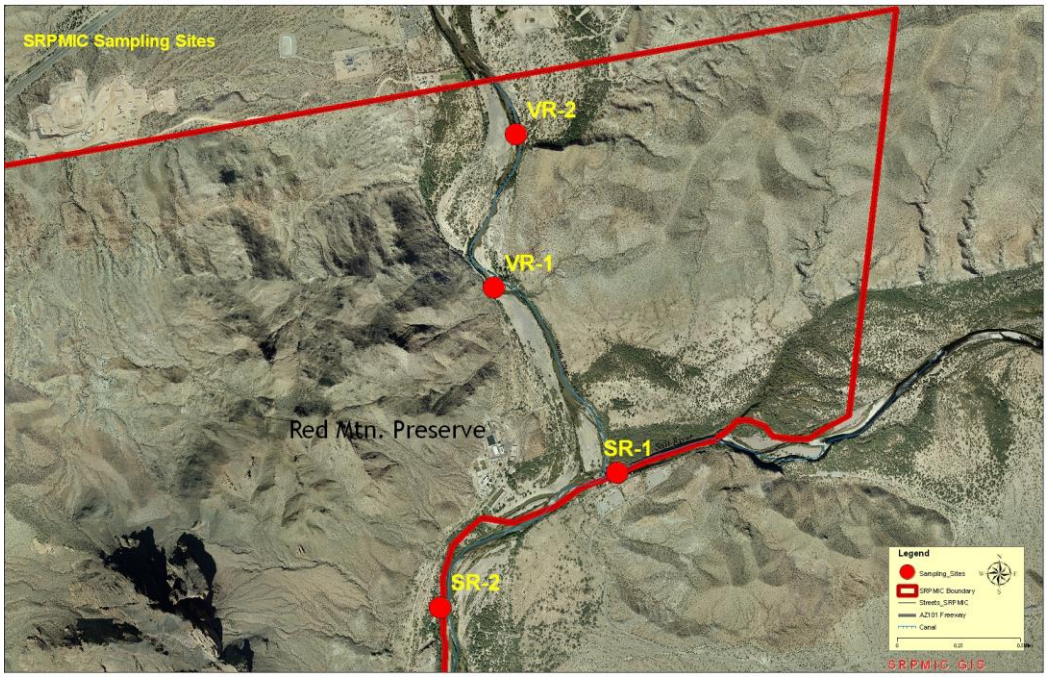

Figure 5. Close up of surface water sampling sites along the SRPMIC northeastern border.

Macroinvertebrate data is also collected along both the Salt and Verde Rivers at various sites. These sites correspond to specific site requirements outlined in the SRPMIC Surface Water and Groundwater Monitoring QAPP.

SRPMIC Wetlands

When appropriate and water is present, field measurements are typically taken on a monthly basis and samples are collected for laboratory analysis four (4) times per year at the Cottonwood and Lehi Wetlands. 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 each 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.

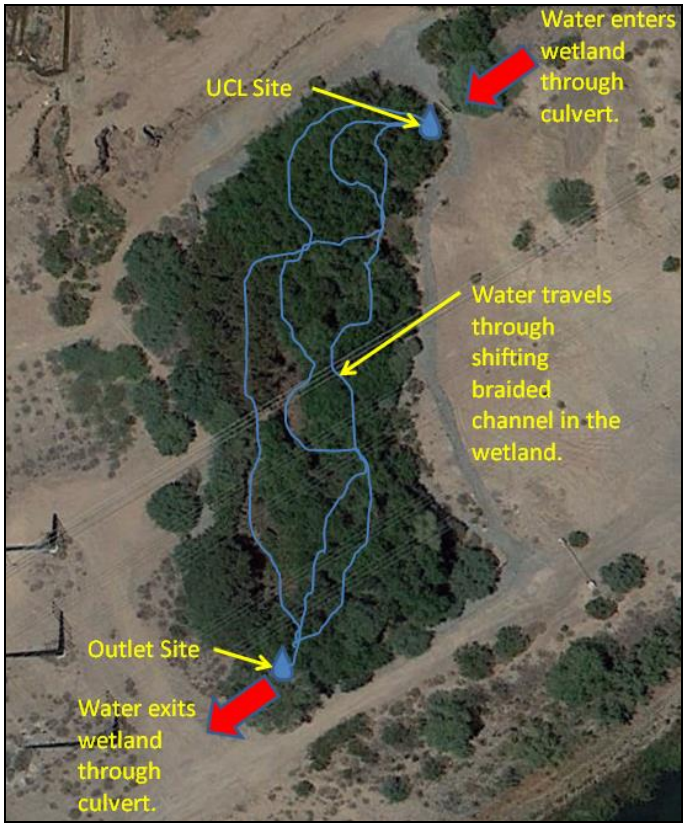

Figure 6. Locations of the Cottonwood Wetland sampling sites (UCL and OUTLET)

Figure 7. Locations of the current Lehi Wetland original sampling sites. Site 2 and Sediment Gauge 1 have become overgrown with willows and are 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

The Oasis Wetland is the third constructed wetland habitat in the Community (Figure 8). This Wetland is fed by runoff from a small facility managed by another SRPMIC Department. This Wetland also receives occasional stormwater. Native vegetation including mesquite, willows and cottonwoods were planted in several locations throughout this Wetland. Seeds from several culturally significant plants like devil's claw, arrowweed, and gourds were dispersed also.

Figure 8. The Oasis Wetland before construction in 2011(left) and in 2016 (right) two years after construction.

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 approximately forty (40) 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. During FY15 and FY16 several parameters that had not been detected during sampling events over the past four (4) years were removed from the list of sampling parameters for the Bi-annual Sampling Events.

Monthly from May through September, samples are collected to monitor bacteria and nutrient levels based upon an increase in recreation and water temperature. Additionally, biomonitoring is conducted in April and November if flow conditions meet the sampling requirements. Macroinvertebrates were not collected from the Salt and Verde Rivers during FY17.

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 typically 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. Typical 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 QAPP. 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 laboratory 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.

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.

<u>Compliance with water quality standards</u>

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 are 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 FY18.

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 Office of General Counsel (OGC).

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 FY17 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, 2016 to September 30, 2017. One (1) hardcopy 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

Water quality sampling in FY17 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.

Macroinvertebrate sampling did not occur as scheduled during FY17. Flow requirements as outlined in the QAPP were again not met. Staff will work to reevaluate these requirements and make adjustments as needed in order to complete sampling at least one (1) time per fiscal year.

Water quality samples were collected at the Cottonwood and Lehi Wetland during in the second through fourth quarters of FY17 and data uploaded to the water quality exchange network. Samples were not collected during the first quarter due to lack of water. *In-situ* measurements of water quality occurred monthly. Monthly pedestrian surveys, monitoring of the sediment staff gauges and photograph documentation were completed.

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, and 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 1998 was predominately associated with drinking water wells, monitoring wells, and irrigation wells within SRPMIC.

After the completion of the WQM Plan (1998), 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.

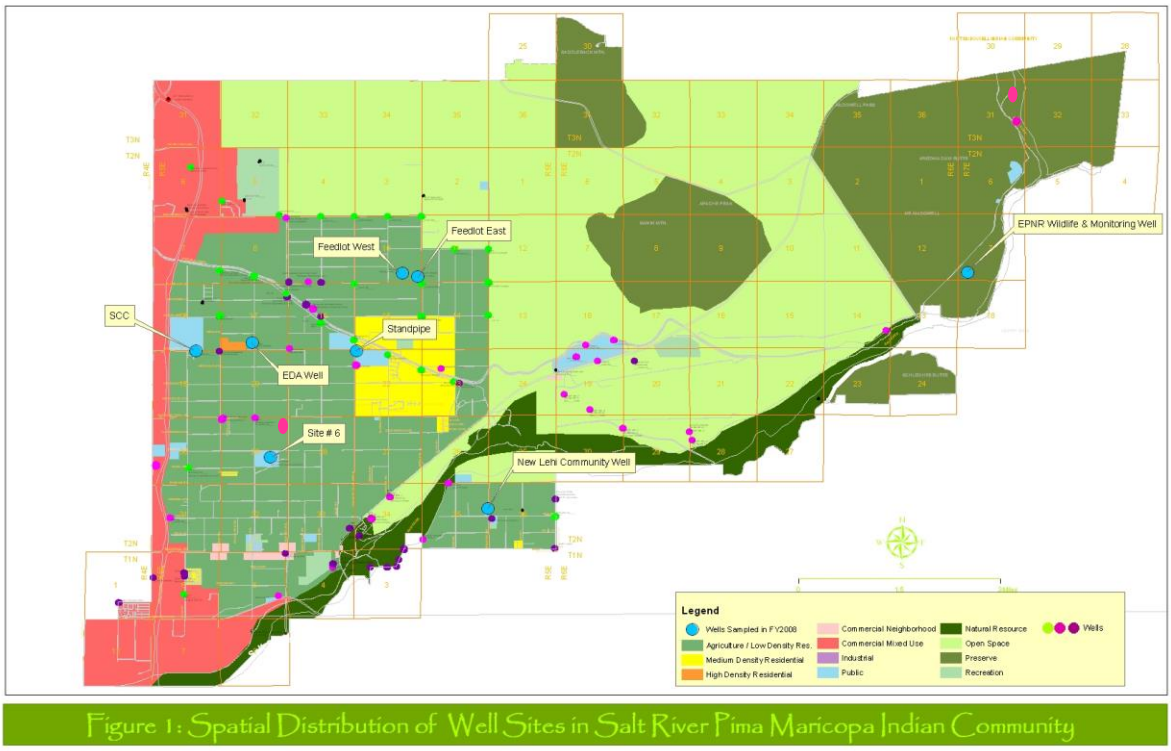

Figure 9. SRPMIC wells.

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 objectives 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. These standards have not been approved by the 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.

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 future SRPMIC hopes 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 OGC.

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, 2016 to September 30, 2017. One (1) hardcopy 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. During the FY17 groundwater sampling event many organic compounds on the list of parameters for

analysis were dismissed. Staff chose not to include these parameters because of past "non-detects" and staff's judgement that parameters would not be found within the sampling area. These parameters however were not deleted from the list and will be included in future groundwater sampling events depending upon the sampling area.

Chapter 7

Conclusions

Bi-Annual River Sampling Assessments—FY 2017

The surface water quality along the Salt and Verde Rivers was found to be in good quality as no parameters exceeded the draft SRPMIC Surface Water Quality Standards. Analyses showed that there were traces of multiple inorganic parameters including chromium, sulfate, copper, arsenic, boron, nitrate, magnesium, chloride, and nickel found during both sampling events within the four (4) sites. The figure below shows several metals found in the highest concentrations during the 3/27/2017 sampling event.

Due to upstream dam releases and flooding along the Verde River, *E. coli* concentrations were relatively high. Samples taken at VR-1 and VR-2 yielded concentrations at 82 MPN and 74 MPN, while further downstream past the Salt and Verde River confluence concentrations were 52 MPN. SR-1 is the only one of the four sites that captures flows from ONLY the Salt River. The *E. coli* concentration at this site was a mere 4.1 MPN.

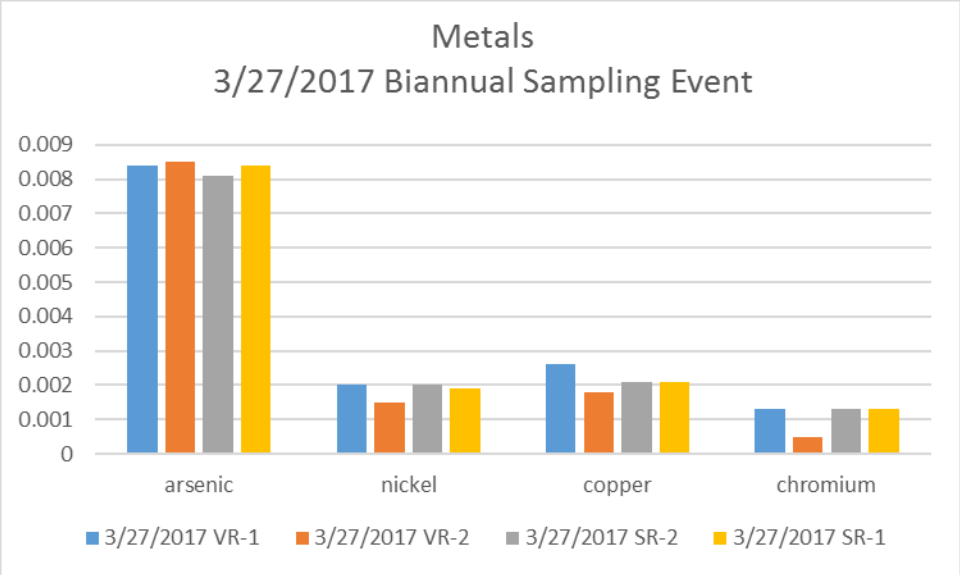

Figure 10. Graph of metal concentrations at river sampling sites during spring biannual sampling event.

Summer Bacteria Sampling Assessments—FY 2017

E. coli levels exceeded the draft surface water quality standards for Full Body Contact at ALL four (4) sampling sites during the July Summer Bacteria Sampling Event. E. coli concentrations reached 650 MPN at VR-2. High concentrations of bacteria are expected during the summer months due to extremely high temperatures and increased recreation. The lowest concentrations of E. coli were seen during sampling events conducted in May and September. During the September sampling event at SR-1, *E. coli* concentrations were only at 3.1 MPN.

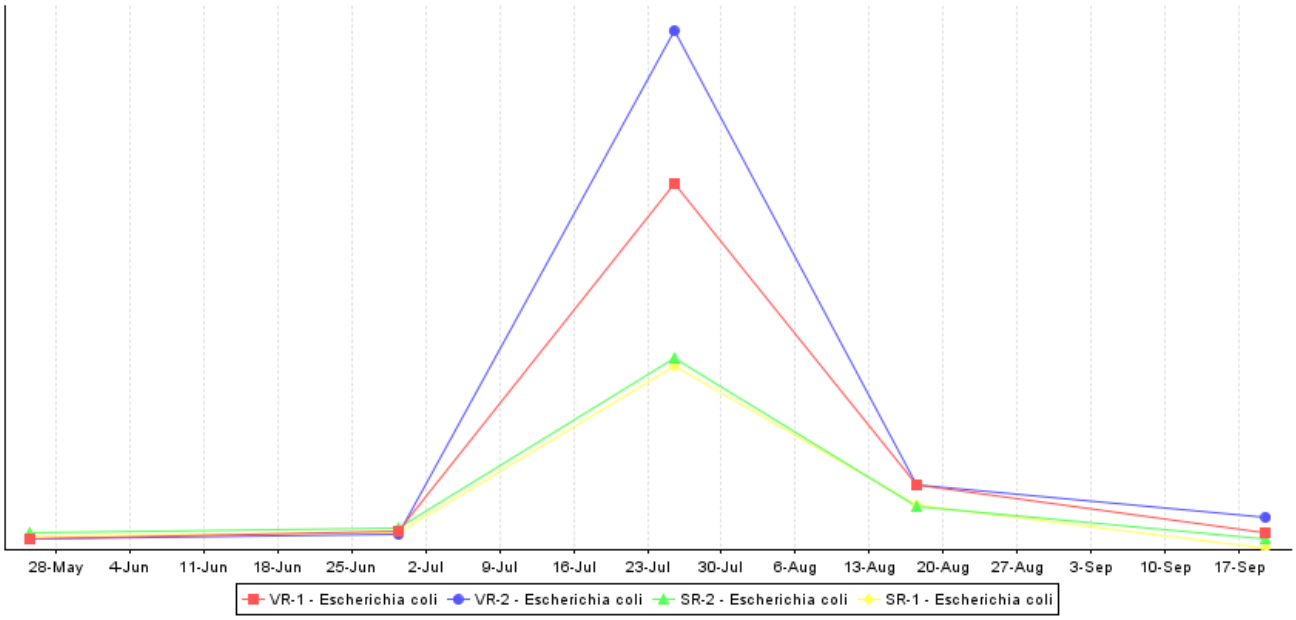

Figure 11. Graph of bacteria concentrations at river sampling sites throughout the summer months.

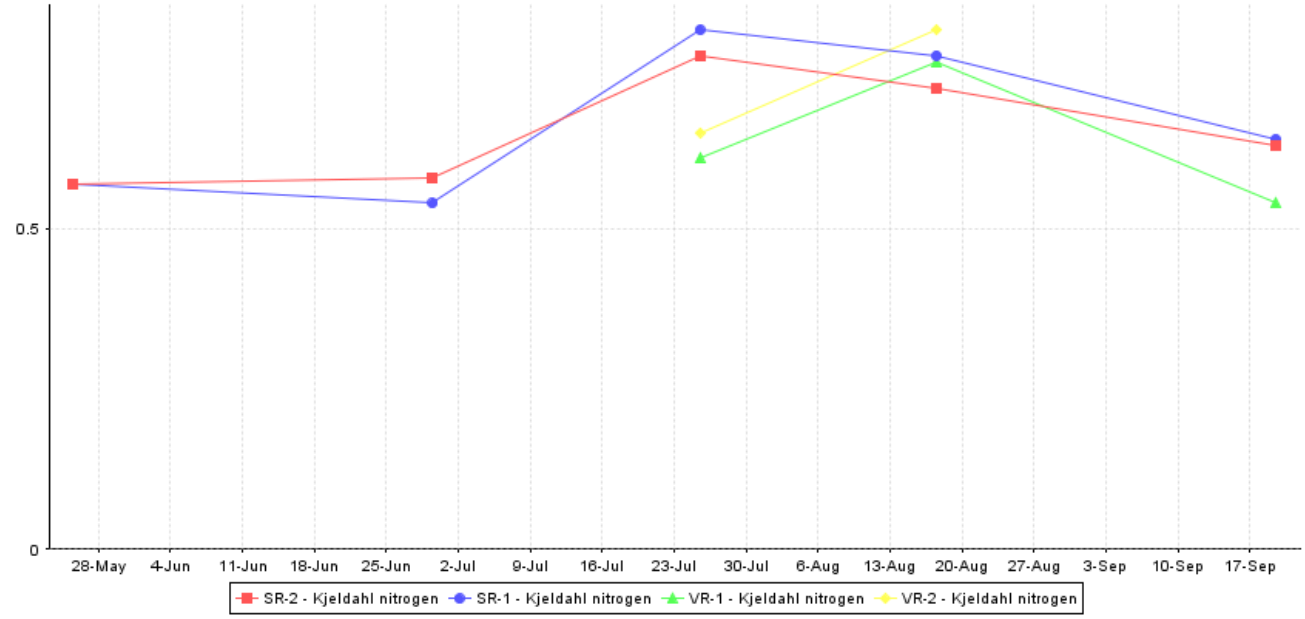

Figure 12. Graph of TKN concentrations at river sampling sites throughout the summer months.

Macroinvertebrate Sampling Assessments—FY 2017

Sampling did not occur in April 2017 because of abnormally high flows that continued through May. This procedure follows that which is stated in the SRPMIC Surface Water and Groundwater Monitoring QAPP. The QAPP specifies flows shall be wadeable. The QAPP stipulation reflects standard monitoring protocols so that results are comparable to established reference conditions.

River flows, managed by the Salt River Project (SRP) at Bartlett and Stewart Dams are routinely changed in spring for recreational purposes. The SRPMIC is in contact with SRP to coordinate sampling events prior to SRP adjustments. The WQP is reviewing the QAPP to possibly amend the sampling window to better adjust for up-stream flow management by SRP.

Wetland Monitoring – FY 2017

Water quality samples were collected at the Cottonwood or Lehi Wetland during the fiscal year. *In-situ* measurements of water quality occurred monthly. Monthly pedestrian surveys and monitoring of the two (2) sediment staff gauges located within both Wetlands were however completed and showed that the wetlands were performing as expected in slowing water flow when it occurred, accumulating sediment, and supporting a diverse wetland biotic communities. Both the Lehi and Cottonwood Wetlands aggraded according to staff gauge measurements. 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 by staff and disposed of.

Groundwater Sampling Assessment—FY 2017

One (1) well is being reported as sampled during FY17. This monitoring well is located within the SRPMIC preserve area. Sample analysis yielded several ions, metals, and bacteria. Although Uranium concentrations found in this well (7.6 ug/l) did not exceed the federal drinking water standard (30 ug/l), staff collect samples from this well at least every 2-3 years in order to monitor uranium levels. Both nitrate and arsenic exceeded the federal drinking water standards. Lead was also past the current action level. Staff will monitor these levels in the future and take necessary actions if needed. Chloride and manganese exceeded the Secondary National Drinking Water Standard, which is a non-enforceable standard. These contaminants cause water to taste salty and bitter/metallic tasting, but they have no known major health effects.

Chapter 8

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. 2016-2016. *Annual Water Quality Assessment Report*. Salt River Pima-Maricopa Indian Community.
3. SRPMIC. 2010. *Procedures Manual for Sampling Surface Water*. Salt River Pima-Maricopa Indian Community.
4. SRPMIC. 2010. *Procedures Manual for Sampling Groundwater*. Salt River Pima-Maricopa Indian Community.