



Clean Water Act
Section 106 Water Pollution Control Program

Tribal Assessment Report
Fiscal Year 2017

U.S. EPA Cooperative Agreement I-01F143-01
October 1, 2016 – September 31, 2017

Table of Contents

| | |
|--|-----------|
| 1.0 Introduction | 2 |
| 1.1 Water Quality Standards | 2 |
| 2.0 Pueblo of Laguna Physical Description | 2 |
| 2.1 Geology | 2 |
| 2.2 Vegetation | 2 |
| 2.3 Hydrology..... | 3 |
| 2.4 Hydrogeology..... | 3 |
| 3.0 Monitoring | 3 |
| 3.1 Monitoring Objectives..... | 3 |
| 3.2 Monitoring Strategy | 4 |
| 4.0 STORET Upload Verification | 4 |
| 5.0 Data Assessment Results | 4 |
| 5.1 Rio San Jose | 5 |
| 5.2 Rio Puerco | 8 |
| 5.3 Rio Paguata and Rio Moquino | 11 |
| 5.4 Mountain Streams & Springs | 14 |
| 5.5 Encinal Creek | 17 |
| 5.6 Mountain Ponds..... | 18 |
| 5.7 Water Canyon Creek | 18 |
| 6.0 Data Assessment Summary | 19 |
| 6.1 Rio San Jose | 19 |
| 6.2 Rio Puerco | 19 |
| 6.3 Rio Paguata and Rio Moquino | 20 |
| 6.4 Mountain Streams & Springs | 20 |
| 6.5 Encinal Creek | 21 |
| 6.6 Water Canyon Creek | 21 |
| Appendix A | 22 |
| Table 1: Paguata-Jackpile Mine and Area of Concern..... | 22 |
| Table 2: Pueblo of Laguna’s Surface Water Quality Monitoring Sites | 23 |

1.0 Introduction

This Tribal Assessment Report is the culmination of four complete rounds of surface water quality monitoring on the Pueblo of Laguna (POL) in compliance with the EPA §106 Surface Water Quality Assistance Agreement.

The Pueblo of Laguna is one of 19 federally recognized Pueblo Tribes in New Mexico. The Laguna Tribe was the first Pueblo to adopt a written constitution in 1908, it was later replaced by the Indian Reorganization Act of 1934, then revised in 1958, 1984 and in 2012. The POL is located in West Central New Mexico, its eastern border is approximately ten miles west of Albuquerque, NM. It is comprised of approximately 500,000 acres of land. Laguna is situated in four New Mexico counties: Cibola, Valencia, Bernalillo, and Sandoval. There are six villages within the reservation boundaries: Seama, Paguete, Encinal, Paraje, Laguna (Figure 1) and Mesita.

1.1 Water Quality Standards

On September 30, 2014, the POL adopted Tribal Water Quality Standards (WQS) and submitted their Application and Jurisdictional Statement to the EPA Region IV Headquarters. On July 19, 2017, the U.S. Environmental Agency (USEPA) approved the POL's WQS.



Figure 1: Photo of the Village of Laguna, March 24, 2017

2.0 Pueblo of Laguna Physical Description

2.1 Geology

Regional geology is a mix of mostly Jurassic age sedimentary deposition overlain by Tertiary volcanic deposition from Mt. Taylor volcanic complex, and a series of laminar flows in the Rio San Jose Valley. Laguna is situated primarily on the Colorado Plateau and partially in the eastern edge of the San Juan Basin, which is bounded by the Rio Grande Rift System. The Rio Grande Rift is a spreading center, while the Colorado Plateau is a relatively stable section of the North American Tectonic plate characterized by stratified rocks cut by deep canyons.

2.2 Vegetation

According to USEPA-Region VI, the POL is located in three Ecoregions: Semiarid Tablelands, Conifer Woodlands and Savannas, and at higher elevations Montane Conifer Forests. Semiarid Tablelands consists of scattered juniper and pinyon-juniper woodland, with alkali sacaton, shadscale, fourwing saltbush, and mixed grama grasses. Conifer Woodlands and Savannas are dominated by pinyon-juniper woodlands with some Gambel oak, blue grama, junegrass, galleta, bottlebrush

squirreltail, and at higher elevations some alligator juniper, and ponderosa pines. Montane Conifer Forests are predominately ponderosa pine and Gambel oak, some Douglas-fir, white pine, and aspen trees. The POL land use is based upon the vegetative cover. The land is divided up into grazing, hunting, recreational, and farmland units.

2.3 Hydrology

Precipitation averages 8.9 inches per year for the majority of the POL making water a limited, and highly valuable resource. The POL’s primary surface waters consist of the spring and runoff fed Rio Paguante, Encinal Creek, and Water Canyon Creek. These surface waters flow into the Rio San Jose which discharges into the Rio Puerco. An estimated 143 miles of rivers, streams, and springs recharge shallow alluvial aquifers that are the main supply of domestic drinking water for the entire POL.

| Atlas of Tribal Waters | |
|------------------------------|-----|
| Total number of stream miles | 143 |
| Total number of lake acres | 272 |

Table 1: Atlas of Tribal Waters

2.4 Hydrogeology

The POL is situated within two primary watersheds; the Rio Puerco and the Rio San Jose. The Rio San Jose drains from west to east converging with the Rio Puerco, which drains from north to south. The Rio Puerco then flows to a confluence with the Rio Grande. Both watersheds are sub-basins within the Rio Grande Basin. The Rio Puerco watershed supplies more than 70% of the suspended sediment settling above the Elephant Butte reservoir located on the Rio Grande five miles north of Truth or Consequences.

3.0 Monitoring

3.1 Monitoring Objectives

The primary purpose of the POL Surface Water Quality Program is to identify, reduce, and prevent surface water pollution within the POL. The data obtained from water quality sampling will be used to develop trend analysis that will assist in decision making for drought management, monitoring uranium contamination from the former Paguante-Jackpile mine, provide the Tribe with information for the development of a Tribal Climate Adaptation Plan, and determining impairments and sources of impairment in Tribal waters.

Point Source concerns include, but are not limited to: accidental spillage of hazardous materials along the I-40, railroad, and natural gas pipeline corridors; regulated discharge from upstream users such as the City of Grants into the Rio San Jose; and regulated discharge from Tribal facilities including the Dancing Eagle Casino into Acoma Creek a tributary of the Rio San Jose, and Route 66 Casino into an unnamed tributary of the Rio Puerco.

Nonpoint Source concerns include, but are not limited to soil and streambank erosion, loss of riparian vegetation, the intrusion of non-native species, and high sediment loads. The Paguante-Jackpile Uranium Mine is located in an area of canyons and arroyos on the eastern border of the Village of Paguante and is upstream approximately nine stream miles from the Village of Mesita. The mine encompasses 7,868 acres of which 2,656 acres were disturbed by mining activities consisting of three open pits, 32 waste dumps, 23 sub-grade ore stockpiles, four topsoil stockpiles, and 66 acres of buildings and roads. Reclamation of the mine was completed in 1996. However, surface water samples at the Mesita dam, downstream of the mine, show total uranium levels in exceedance of the designated use as primary human contact, which affects cultural and ceremonial uses. A map of the sampling sites and associated areas of concern regarding the Paguante-Jackpile Uranium mine can be found in Appendix A, Table 1 and Table 2.

During the 2017 fiscal year, the Surface Water Quality Staff collected four rounds of water quality data from 27 sampling sites. Physical data were collected at all sites, and analytical laboratory data were collected at 14 sites. Sampling sites are selected for targeted assessment based on the potential for the highest contamination and the greatest impact on human health. Sampling sites include natural springs, spring-fed manmade ponds, pristine high-mountain streams, chronically contaminated streams, and ephemeral streams. Surface water flow is greatly diminished during summer months due to high evapotranspiration and low precipitation rates. In instances where water is not present, basic habitat information is recorded. This information is integral to the POL’s development of a Tribal Climate Adaptation Plan.

3.2 Monitoring Strategy

Detailed descriptions of the POL’s Monitoring Strategy can be found in the listed Sections of the POL’s 2016 Quality Assurance Project Plan (QAPP) for the Surface Water Monitoring Program, expires February 18, 2018. A map of the POL’s surface water quality monitoring sites can be found in Appendix A, Table 2.

| TAR Elements | QAPP | |
|--|-----------|-------------|
| | Section | Page Number |
| Quality Objectives and Criteria <ul style="list-style-type: none"> ◦ Data Quality Objectives ◦ Decision Criteria ◦ Documents and Records | Section 2 | Page 10 |
| | 2.1 | 10-11 |
| | 2.2 | 11-12 |
| | 2.4 | 13 |
| Monitoring and Analysis <ul style="list-style-type: none"> ◦ Monitoring Process and Design ◦ Field Observation, Conditions, and Measurements Documents ◦ Sample Handling and Custody ◦ Quality Control | Section 3 | Page 15 |
| | 3.1 | 15-17 |
| | 3.2 | 17-22 |
| | 3.3 | 22-24 |
| | 3.4 | 25-28 |
| Instrumentation and Equipment <ul style="list-style-type: none"> ◦ Testing, Inspection, and Maintenance | Section 4 | Page 28 |
| | 4.1 | 28-31 |
| Data Management | Section 5 | Page 31 |
| Data Validation and Usability <ul style="list-style-type: none"> ◦ Data Review, Verification, and Usability | Section 6 | Page 32 |
| | 6.1 | 32-34 |
| Assessment and Oversight <ul style="list-style-type: none"> ◦ Management Assessment and Response Actions | Section 7 | Page 34 |
| | 7.1 | 34-35 |

Table 2: TAR Elements described in detail within POL’s current QAPP.

4.0 STORET Upload Verification

The POL strives to upload data to STORET within 30 days of physical data collection, and within three weeks of receiving analytical results from the laboratory. The POL also strives to download data from STORET shortly after it is uploaded to verify that it was successfully completed. All water quality data from October 1, 2016 through September 30, 2017 was uploaded to STORET. The POL has downloaded all data and verified that all data was successfully uploaded.

5.0 Data Assessment Results

Water quality criteria are considered to be in exceedance where measurements fall outside of the criteria limits in conjunction with the stated accuracy levels of the EXO1 Sonde for conductivity, dissolved oxygen, pH, temperature, and the HACH 2100Q for turbidity. The following chart lists the manufactures’ accuracy levels:

| Parameter | Accuracy |
|----------------------|---|
| Conductivity (mS/cm) | 0-100 mS/cm: ±0.5% of reading or 0.001 mS/cm, whichever is greater 100-200 mS/cm: ±1% of reading |
| DO (mg/L) | 0-20 mg/L: ±1% of reading or 0.1 mg/L 20-50 mg/L: ±5% of reading |
| pH | ±0.2 pH units for entire temperature range |
| Temp (C°) | -5 to 35°C: ±0.01 °C 35 to 50 °C: ±0.05 °C |
| Turbidity (NTU) | 0-1000NTU: ±2% of reading |

Table 3: Accuracy levels of EXO 1 Sonde, and HACH 2100Q.

5.1 Rio San Jose

The Rio San Jose flows from west to east through the center of the POL. There are seven sampling sites along the Rio San Jose that are systematically monitored. Sources of concern for the Rio San Jose are listed in Section 3.1 of this document. The Designated Uses with the most stringent criteria for this waterbody are Domestic Water Supply (DWS), Primary Human Contact/Ceremonial (PHCC), Aquatic Life (AL), and Narrative standards (Nar).

| RSJ01 | | Rio San Jose | | | Location: 35.04116°, -107.52355° | | | | | |
|---|-------------------------|--|----------------------|------------------------|----------------------------------|--------|--------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | - | - | 4 | 1** | 9.04 | 9.04 | 9.04 | - | - | |
| pH | DWS | 6.5 - 8.5 ≤20% of samples exceed criterion | 4 | 2* | 8.60 | 8.8 | 8.38 | 50% | No | |
| Temp. (C°) | - | - | 4 | 2* | 9.15 | 10.8 | 7.4 | - | - | |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 2* | 54.92 | 62.79 | 47.04 | - | - | |
| Conductivity (µS/cm) | - | - | 4 | 2* | 1226.6 | 1407.6 | 1045.5 | - | - | |
| TDS | PHCC | 205 / No criterion | 4 | 2* | 1138 | 1254 | 1022 | 100% | No | |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 2* | 0.295 | 0.49 | 0.1 | 100% | No | |
| Nitrate*** (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 2* | 0.345 | 0.51 | 0.18 | 50% | No | |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 2* | 42.5 Geometric Mean | 79.4 | 22.8 | 0% | Yes | |

*Dry conditions. **DO sensor not calibrated Round 2.

***When Total Nitrogen results are below the laboratory Practical Quantitative Limit (PQL) of 1 mg/L, Nitrate results (PQL = 0.1 mg/L) are used to calculate exceedances.

| RSJ02 | | Rio San Jose | | | Location: 35.03075°, -107.38932° | | | | | |
|----------------------|-------------------------|---|----------------------|------------------------|----------------------------------|--------|--------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | - | - | 4 | 2*** | 5.79 | 8.90 | 2.68 | - | - | |
| pH | DWS | 6.5 - 8.5 ≤20% of samples exceed criterion | 4 | 3* | 8.02 | 8.57** | 7.28 | 0% | Yes | |
| Temp. (C°) | - | - | 4 | 3* | 9.61 | 13.996 | 5.812 | - | - | |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 3* | 51.42 | 92.01 | 27.94 | - | - | |
| Conductivity (µS/cm) | - | - | 4 | 3* | 1656.6 | 2551.8 | 1037.4 | - | - | |
| TDS | PHCC | 250 / No criterion | 4 | 3* | 1485 | 2100 | 1064 | 100% | No | |

*Dry conditions. **Within the margin of error. ***DO sensor not calibrated Round 2.

RSJ03 Rio San Jose **Location: 35.02010°, -107.30979°**

| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported |
|----------------------|-------------------------|---|----------------------|------------------------|---------|--------|--------|---------------------|---------------|
| DO (mg/L) | - | - | 4 | 1* | 7.9 | 7.9 | 7.9 | - | - |
| pH | DWS | 6.5 - 8.5 ≤20% of samples exceed criterion | 4 | 2* | 7.96 | 8.0 | 7.91 | 0% | Yes |
| Temp. (C°) | - | - | 4 | 2* | 8.40 | 9.294 | 7.5 | - | - |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 2* | 48.23 | 51.32 | 45.14 | - | - |
| Conductivity (µS/cm) | - | - | 4 | 2* | 1459.1 | 1669.2 | 1249.0 | - | - |
| TDS | PHCC | 250 / No criterion | 4 | 2* | 1464 | 1550 | 1377 | 100% | No |

*Dry conditions. **DO sensor not calibrated Round 2.

RSJ04 Rio San Jose **Location: 34.93183°, -107.10397°**

| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported |
|---|-------------------------|--|----------------------|------------------------|------------------------|--------|--------|---------------------|---------------|
| DO (mg/L) | - | - | 4 | 3** | 8.61 | 9.44 | 7.96 | - | - |
| pH | DWS | 6.5 - 8.5 ≤20% of samples exceed criterion | 4 | 4 | 8.05 | 8.32 | 7.76 | 0% | Yes |
| Temp. (C°) | - | - | 4 | 4 | 14.97 | 18.58 | 10.65 | - | - |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 4 | 90.04 | 318.05 | 4.43 | - | - |
| Conductivity (µS/cm) | - | - | 4 | 4 | 2798.7 | 4090.5 | 1063.2 | - | - |
| TDS | PHCC | 250 / No criterion | 4 | 4 | 2189 | 3030 | 957 | 100% | No |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 3* | 0.036 | 0.062 | 0.022 | 100% | No |
| Nitrate*** (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 3* | 0.437 | 0.60 | 0.19 | 67% | No |
| Total Uranium (mg/L) | DWS | 0.03 ≤1/3 increase over background | 4 | 3* | 0.0133 | 0.016 | 0.010 | 0% | Yes |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 3* | 33.3 Geometric Mean | 70.3 | 7.5 | 0% | Yes |

*Too turbid for analytical samples to be taken. **DO sensor not calibrated Round 2.

***When Total Nitrogen results are below the laboratory Practical Quantitative Limit (PQL) of 1 mg/L, Nitrate results (PQL = 0.1 mg/L) are used to calculate exceedances.

| RSJ05 | | Rio San Jose | | | Location: 34.89406°, -107.06928° | | | | | |
|---|-------------------------|--|----------------------|------------------------|----------------------------------|--------|--------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | - | - | 4 | **3 | 8.44 | 9.34 | 7.78 | - | - | |
| pH | DWS | 6.5 - 8.5 ≤20% of samples exceed criterion | 4 | 4 | 7.91 | 8.29 | 7.39 | 0% | Yes | |
| Temp. (C°) | - | - | 4 | 4 | 16.41 | 25.269 | 8.44 | - | - | |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 4 | 74.90 | 190.17 | 15.91 | - | - | |
| Conductivity (µS/cm) | - | - | 4 | 4 | 4209.7 | 6936.3 | 1351.0 | - | - | |
| TDS | PHCC | 250 / No criterion | 4 | 4 | 3083 | 4780 | 1285 | 100% | No | |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 3* | 0.029 | 0.035 | 0.025 | 100% | No | |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 3* | <1 | <1 | <1 | 0% | Yes | |
| Total Uranium (mg/L) | DWS | 0.03 ≤1/3 increase over background | 4 | 3* | 0.0134 | 0.016 | 0.009 | 0% | Yes | |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 3* | 22.0 Geometric Mean | 123.4 | 5.2 | 33% | No | |

*Too turbid for analytical samples to be taken. ** DO sensor not calibrated Round 2.

| RSJ06 | | Rio San Jose | | | Location: 35.02373°, -107.32633° | | | | | |
|---|-------------------------|--|----------------------|------------------------|----------------------------------|--------|--------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | - | - | 4 | 1*** | 8.62 | 8.62 | 8.62 | - | - | |
| pH | DWS | 6.5 - 8.5 ≤20% of samples exceed criterion | 4 | 2* | 7.76 | 8.08 | 7.43 | 0% | Yes | |
| Temp. (C°) | - | - | 4 | 2* | 8.30 | 9.87 | 6.727 | - | - | |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 2* | 36.17 | 38.84 | 33.5 | - | - | |
| Conductivity (µS/cm) | - | - | 4 | 2* | 1524.7 | 1670.9 | 1378.5 | - | - | |
| TDS | PHCC | 250 / No criterion | 4 | 2* | 1451 | 1527 | 1375 | 100% | No | |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 2* | 0.083 | 0.055 | 0.11 | 100% | No | |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 2* | 6.0 | 6.0 | <1 | 50% | No | |
| Total Uranium (mg/L) | DWS | 0.03 ≤1/3 increase over background | 4 | 3** | 0.0056 | 0.0065 | 0.0037 | 0% | Yes | |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 2* | 17.2 Geometric Mean | 98.2 | 3.0 | 50% | No | |

*Dry conditions. ** Sampling after rain event. *** DO sensor not calibrated Round 2.

| RSJ07 | | Rio San Jose | | | Location: 34.96847°, -107.20378° | | | | | |
|---|-------------------------|--|----------------------|------------------------|----------------------------------|--------|--------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | - | - | 4 | 0** | - | - | - | - | - | |
| pH | DWS | 6.5 - 8.5 ≤20% of samples exceed criterion | 4 | 1* | 8.45 | 8.45 | 8.45 | 0% | Yes | |
| Temp. (C°) | - | - | 4 | 1* | 14.47 | 14.47 | 14.47 | - | - | |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 1* | 37.55 | 37.55 | 37.55 | - | - | |
| Conductivity (µS/cm) | - | - | 4 | 1* | 2378.2 | 2378.2 | 2378.2 | | | |
| TDS | PHCC | 250 / No criterion | 4 | 1* | 1546 | 1546 | 1546 | 100 | No | |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 1* | 0.057 | 0.057 | 0.057 | 100% | No | |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 1* | <1 | <1 | <1 | 0% | Yes | |
| Total Uranium (mg/L) | DWS | 0.03 ≤1/3 increase over background | 4 | 1* | 0.0064 | 0.0064 | 0.0064 | 0% | Yes | |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 1* | 9.8 Geometric Mean | 9.8 | 9.8 | 0% | Yes | |

*Dry conditions. ** DO sensor not calibrated Round 2.

5.2 Rio Puerco

The Rio Puerco flows from north to south forming a large portion of the eastern border of the POL. There are four sampling sites along the Rio Puerco that are systematically monitored. Sources of concern for the Rio Puerco are listed in Section 3.1 of this document. The Designated Uses with the most stringent criteria for this waterbody are Primary Human Contact/Ceremonial (PHCC), Warmwater Fishery (WWF), Aquatic Life (AL), and Narrative standards (Nar).

| RPC01 | | Rio Puerco | | | Location: 35.19397°, -107.45278° | | | | | |
|----------------------|-------------------------|--|----------------------|------------------------|----------------------------------|--------|--------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | WWF | Minimum 5 ≤20% of samples exceed criterion | 4 | 0** | - | - | - | - | - | |
| pH | SHC | 6.6 – 9.0 ≤20% of samples exceed criterion | 4 | 1* | 8.21 | 8.21 | 8.21 | 0% | Yes | |
| Temp. (C°) | WWF | 32.2 maximum ≤20% of samples exceed criterion | 4 | 1* | 10.84 | 10.84 | 10.84 | 0% | Yes | |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 1* | 6518.1 | 6518.1 | 6518.1 | - | - | |
| Conductivity (µS/cm) | - | - | 4 | 1* | 740.8 | 740.8 | 740.8 | - | - | |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 1* | 660 | 660 | 660 | 100% | No | |

*Dry conditions. ** DO sensor not calibrated Round 2.

| RPC02 | | Rio Puerco | | | Location: 35.15941°, -107.43113° | | | | | |
|----------------------|-------------------------|--|----------------------|------------------------|----------------------------------|--------|--------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | WWF | Minimum 5 ≤20% of samples exceed criterion | 4 | 1*** | 4.93** | 4.93** | 4.93** | 0% | Yes | |
| pH | SHC | 6.6 – 9.0 ≤20% of samples exceed | 4 | 2* | 7.67 | 7.92 | 7.41 | 0% | Yes | |
| Temp. (C°) | WWF | 32.2 maximum ≤20% of samples exceed criterion | 4 | 2* | 14.05 | 20.042 | 8.056 | 0% | Yes | |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 2* | 2477.0 | 3943.5 | 1010.5 | - | - | |
| Conductivity (µS/cm) | - | - | 4 | 2* | 1343.0 | 2200.3 | 485.6 | - | - | |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 2* | 1024 | 1580 | 467 | 100% | No | |

*Dry conditions. **Within the margin of error. *** DO sensor not calibrated Round 2.

| RPC03 | | Rio Puerco | | | Location: 35.02510°, -106.93928° | | | | | |
|---|-------------------------|--|----------------------|------------------------|----------------------------------|--------|--------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | WWF | Minimum 5 ≤20% of samples exceed criterion | 4 | 0** | - | - | - | - | - | |
| pH | SHC | 6.6 – 9.0 ≤20% of samples exceed | 4 | 1* | 8.68 | 8.68 | 8.68 | 0% | Yes | |
| Temp. (C°) | WWF | 32.2 maximum ≤20% of samples exceed criterion | 4 | 1* | 18.68 | 18.68 | 18.68 | 0% | Yes | |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 1* | 18.44 | 18.44 | 18.44 | - | - | |
| Conductivity (µS/cm) | - | - | 4 | 1* | 2105.6 | 2105.6 | 2105.6 | - | - | |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 1* | 1423 | 1423 | 1423 | 100% | No | |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 1* | 6.1 | 6.1 | 6.1 | 100% | No | |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 1* | 7.7 | 7.7 | 7.7 | 100% | No | |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 1* | 146.7 Geometric Mean | 146.7 | 146.7 | 100% | No | |

*Dry conditions. ** DO sensor not calibrated Round 2.

| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported |
|---|-------------------------|--|----------------------|------------------------|-----------------------|--------|--------|---------------------|---------------|
| DO (mg/L) | WWF | Minimum 5 ≤20% of samples exceed criterion | 4 | 0** | - | - | - | - | - |
| pH | SHC | 6.6 – 9.0 ≤20% of samples exceed | 4 | 1* | 8.21 | 8.21 | 8.21 | 0% | Yes |
| Temp. (C°) | WWF | 32.2 maximum ≤20% of samples exceed criterion | 4 | 1* | 8.2 | 8.2 | 8.2 | 0% | Yes |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 1* | 77.92 | 77.92 | 77.92 | - | - |
| Conductivity (µS/cm) | - | - | 4 | 1* | 2608.6 | 2608.6 | 2608.6 | - | - |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 1* | 2496 | 2496 | 2496 | 100% | No |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 1* | 0.086 | 0.086 | 0.086 | 100% | No |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 1* | <1 | <1 | <1 | 0% | Yes |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 1* | 4.1 Geometric Mean | 4.1 | 4.1 | 0% | Yes |

*Dry conditions. ** DO sensor not calibrated Round 2.

5.3 Rio Paguate and Rio Moquino

The Rio Paguate’s headwaters begin as mountain springs and seeps along the southeastern base of Mount Taylor, and flows southeast to a confluence with the Rio Moquino where it turns south, and discharges into the Rio San Jose. There are four sampling sites along the Rio Paguate, and one on the Rio Moquino that are systematically monitored. Sources of concern for these water bodies are listed in Section 3.1 of this document. The Designated Uses with the most stringent criteria for the waterbodies upstream of the Jackpile uranium mine are Primary Human Contact/Ceremonial (PHCC), Domestic Water Supply (DWS), and High-Quality Coldwater Fishery (HQCF). The most stringent criteria for the Rio Paguate in and south of the mine are PHCC, Secondary Human Contact (SHC), Warmwater Fishery (WWF), Aquatic Life (AL), and Narrative standards (Nar).

| RPG01 Rio Paguate | | Location: 35.46085°, -107.11845° | | | | | | | |
|---|-------------------------|--|----------------------|------------------------|------------------------|--------|-------|---------------------|---------------|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 3** | 5.29 | 10.01 | 0.71 | 67% | No |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 4 | 6.44 | 6.97 | 5.35 | 25% | No |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 4 | 10.25 | 14.978 | 5.569 | 0% | Yes |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed criterion | 4 | 4 | 3.99 | 5.63 | 2.41 | 0% | Yes |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C / No criterion | 4 | 3* | 186.1 | 216.4 | 157.0 | 0% | Yes |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 3* | 175 | 191 | 161 | 0% | Yes |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 4 | 0.078 | 0.098 | 0.061 | 100% | No |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 4 | <1 | <1 | <1 | 0% | Yes |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 4 | 49.0 Geometric Mean | 1046.2 | 3.1 | 50% | No |

*TDS/Conductivity sensor malfunction. ** DO sensor not calibrated Round 2.

| RPG02 | | Rio Paguate | | | Location: 35.34746°, -107.04247° | | | | | |
|---|-------------------------|--|----------------------|------------------------|----------------------------------|--------|-------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 3** | 7.83 | 8.21 | 7.44 | 0% | Yes | |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 4 | 8.27 | 8.53* | 8.12* | 0% | Yes | |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 4 | 13.50 | 20.923 | 4.29 | 25% | No | |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed criterion | 4 | 4 | 9.16 | 16.61 | 1.53 | 50% | No | |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C / No criterion | 4 | 4 | 238.9 | 272.1 | 210.7 | 0% | Yes | |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 4 | 202 | 227 | 175 | 0% | Yes | |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 4 | 0.043 | 0.063 | 0.028 | 100% | No | |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 4 | <1 | <1 | <1 | 0% | Yes | |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 4 | 20.3 Geometric Mean | 65.0 | 0 | 0% | Yes | |

*Within the margin of error. ** DO sensor not calibrated Round 2.

| RPG03 | | Rio Paguate | | | Location: 35.12333°, -107.33633° | | | | | |
|---|-------------------------|--|----------------------|------------------------|----------------------------------|--------|-------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | WWF | Minimum 5 ≤20% of samples exceed criterion | 4 | 3** | 6.99 | 8.37 | 5.9 | 0% | Yes | |
| pH | SHC | 6.6 – 9.0 ≤20% of samples exceed | 4 | 4 | 7.90 | 8.0 | 7.74 | 0% | Yes | |
| Temp. (C°) | WWF | 32.2 maximum ≤20% of samples exceed criterion | 4 | 4 | 14.58 | 21.671 | 3.586 | 0% | Yes | |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 4 | 23.13 | 47.8 | 3.55 | - | - | |
| Conductivity (µS/cm) | - | - | 4 | 4 | 1895.5 | 3243.9 | 835.3 | - | - | |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 4 | 1488 | 2252 | 918 | 100% | No | |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 4 | 0.030 | 0.056 | 0.012 | 50% | No | |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 4 | 0.251 | 1.004 | <1 | 25% | No | |
| Total Uranium (mg/L) | PHCC | 0.03 ≤1/3 increase over background | 4 | 5* | 0.260 | 0.62 | 0.065 | 80% | No | |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 4 | 32.5 Geometric Mean | 387.3 | 4.1 | 25% | No | |

*Sampling after rain event. ** DO sensor not calibrated Round 2.

| RPG04 | | Rio Paguate | | Location: 35.06784°, -107.32697° | | | | | |
|---|-------------------------|--|----------------------|----------------------------------|---------------------|--------|--------|---------------------|---------------|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported |
| DO (mg/L) | WWF | Minimum 5 ≤20% of samples exceed criterion | 4 | 0** | - | - | - | - | - |
| pH | SHC | 6.6 – 9.0 ≤20% of samples exceed | 4 | 1* | 6.68 | 6.68 | 6.68 | 0% | Yes |
| Temp. (C°) | WWF | 32.2 maximum ≤20% of samples exceed criterion | 4 | 1* | 4.68 | 4.68 | 4.68 | 0% | Yes |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 1* | 0.24 | 0.24 | 0.24 | - | - |
| Conductivity (µS/cm) | - | - | 4 | 1* | 1093.6 | 1093.6 | 1093.6 | - | - |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 1* | 1161 | 1161 | 1161 | 100% | No |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 1* | 0.067 | 0.067 | 0.067 | 100% | No |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 1* | 1.3 | 1.3 | 1.3 | 100% | No |
| Total Uranium (mg/L) | PHCC | 0.03 ≤1/3 increase over background | 4 | 1* | 0.087 | 0.087 | 0.087 | 100% | No |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 1* | 0 Geometric Mean | 0 | 0 | 0% | Yes |

*Dry conditions. ** DO sensor not calibrated Round 2.

| RMQ01 | | Rio Moquino | | Location: 35.15328°, -107.35515° | | | | | |
|---|-------------------------|--|----------------------|----------------------------------|------------------------|--------|--------|---------------------|---------------|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 0***** | - | - | - | - | - |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 1* | 7.78 | 7.78 | 7.78 | 0% | Yes |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 1* | 3.814 | 3.814 | 3.814 | 0% | Yes |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed criterion | 4 | 1* | 11.92 | 11.92 | 11.92 | 100% | No |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C / No criterion | 4 | 1* | 1005.4 | 1005.4 | 1005.4 | 100% | No |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 1* | 1097 | 1097 | 1097 | 100% | No |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 2** | 0.151 | 0.013 | 0.011 | 50% | No |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 2** | 1.5 | 3.0 | <1 | 50% | No |
| Total Uranium (mg/L) | PHCC DWS | 0.03 ≤1/3 increase over background | 4 | 3** | 0.0072 | 0.013 | 0.0022 | 0% | Yes |
| <i>E.coli</i> (cfu/mL) Single sample max | HQCF | 88 ≤10% of samples exceed single sample criterion | 4 | 2*** | 26.4 Geometric Mean | 32.7 | 21.3 | 0% | Yes |

*Dry conditions/multi-parameter probe malfunction Round 3. **Dry conditions, sampling after a rain event. ***Dry conditions. **** DO sensor not calibrated Round 2.

5.4 Mountain Streams & Springs

Mountain streams and springs are primarily located on and around Mount Taylor, and along the bases of the many sandstone cliffs, and basaltic mesas. There are six spring sampling sites and one mountain stream sampling sites that are systematically monitored. Sources of concern for these waterbodies are listed in Section 3.1 of this document. The Designated Uses with the most stringent criteria for this waterbody are Primary Human Contact/Ceremonial (PHCC), Domestic Water Supply (DWS), Aquatic Life (AL), and High-Quality Coldwater Fishery (HQCF).

| BKG01 Background Spring | | Location: 35.18123°, -107.57010° | | | | | | | |
|---|-------------------------|--|----------------------|------------------------|-----------------------|-------|-------|---------------------|---------------|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 3* | 1.75 | 3.4 | 0.82 | 100% | No |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 4 | 7.04 | 7.35 | 6.53 | 0% | Yes |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 4 | 11.96 | 13.56 | 9.969 | 0% | Yes |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed criterion | 4 | 4 | 1.91 | 3.94 | 0 | 0% | Yes |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C | 4 | 4 | 289.8 | 328.2 | 254.6 | 25% | No |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 4 | 240 | 295 | 200 | 50% | No |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 1 | 1 | 6.0 Geometric Mean | 6.0 | 6.0 | 0% | Yes |

* DO sensor not calibrated Round 2.

| BKG02 Background Spring | | Location: 35.17447°, -107.57466° | | | | | | | |
|---|-------------------------|--|----------------------|------------------------|-----------------------|--------|--------|---------------------|---------------|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 2** | 5.55 | 5.83 | 5.27 | 100% | No |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 3* | 6.64 | 7.05 | 6.14 | 33% | No |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 3* | 12.51 | 13.701 | 10.175 | 0% | Yes |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed criterion | 4 | 3* | 2.01 | 3.23 | 0.29 | 0% | Yes |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C / No criterion | 4 | 3* | 201.4 | 211.5 | 185.4 | 0% | Yes |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 3* | 172 | 188 | 154 | 0% | Yes |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 3* | 0.443 | 0.051 | 0.039 | 100% | No |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 3* | <1 | <1 | <1 | 0% | Yes |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 3* | 1.0 Geometric Mean | 1.0 | 1.0 | 0% | Yes |

*Multi-parameter probe malfunction during Round 3. **DO sensor not calibrated Round 2.

| CSC01 | | Seco Canyon Spring | | | Location: 35.14389°, -107.57428° | | | | | |
|----------------------|-------------------------|--|----------------------|------------------------|----------------------------------|--------|--------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 2*** | 6.69 | 8.02 | 5.35 | 50% | No | |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 3* | 6.47 | 6.59** | 6.32** | 0% | Yes | |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 3* | 12.88 | 13.66 | 12.25 | 0% | Yes | |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed criterion | 4 | 3* | 9.35 | 20.98 | 3.31 | 33% | Mo | |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C / No criterion | 4 | 3* | 246.9 | 321.1 | 208.9 | 33% | No | |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 3* | 205 | 263 | 173 | 33% | No | |

*Dry conditions. ** Within margin of error. ***DO sensor not calibrated Round 2.

| KSP01 | | Kemp Santiago Spring | | | Location: 34.95133°, -107.45133° | | | | | |
|----------------------|-------------------------|--|----------------------|------------------------|----------------------------------|-------|-------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 3* | 5.35 | 7.83 | 3.52 | 67% | No | |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 4 | 6.31 | 6.6 | 5.9 | 50% | No | |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 4 | 13.54 | 21.17 | 7.73 | 25% | No | |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed criterion | 4 | 4 | 1.06 | 2.13 | 0 | 0% | Yes | |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C / No criterion | 4 | 4 | 326.9 | 371.2 | 283.2 | 75% | No | |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 4 | 273 | 291 | 246 | 75% | No | |

* DO sensor not calibrated Round 2.

| SDR01 | | Silver Dollar Ranch Spring | | | Location: 35.19648°, -107.44056° | | | | | |
|----------------------|-------------------------|--|----------------------|------------------------|----------------------------------|-------|-------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 3** | 8.88 | 11.76 | 6.92 | 0% | Yes | |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 4 | 7.11 | 7.54 | 6.66 | 0% | Yes | |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 4 | 16.77 | 19.11 | 14.39 | 0% | Yes | |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed criterion | 4 | 4 | 0.66 | 1.7 | 0 | 0% | Yes | |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C / No criterion | 4 | 3* | 187.0 | 179.9 | 176.0 | 0% | Yes | |
| TDS | PHCC | 250 / No criterion | 4 | 3* | 147 | 164 | 133 | 0% | Yes | |

*TDS/Conductivity sensor malfunction. ** DO sensor not calibrated Round 2.

| TMB01 | | Timber Canyon Creek | | | Location: 35.18055°, -107.51101° | | | | | |
|---|-------------------------|--|----------------------|------------------------|----------------------------------|-------|-------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 3** | 9.00 | 11.36 | 7.19 | 0% | Yes | |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 4 | 7.77 | 8.06 | 7.21 | 0% | Yes | |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 4 | 15.11 | 23.07 | 5.15 | 50% | No | |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed criterion | 4 | 4 | 3.19 | 4.02 | 2.53 | 0% | Yes | |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C / No criterion | 4 | 3* | 198.7 | 218.8 | 174.0 | 0% | Yes | |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 3* | 168 | 179 | 154 | 0% | Yes | |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 4 | 0.049 | 0.075 | 0.033 | 100% | No | |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 4 | <1 | <1 | <1 | 0% | Yes | |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 4 | 22.1 Geometric Mean | 201.4 | 7.3 | 25% | No | |

*TDS/Conductivity sensor malfunction. ** DO sensor not calibrated Round 2.

| TSP01 | | Turquoise Spring | | | Location: 34.98554°, -107.47489° | | | | | |
|----------------------|-------------------------|--|----------------------|------------------------|----------------------------------|--------|-------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 2** | 3.99 | 6.62 | 1.35 | 50% | No | |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 3* | 6.63 | 6.72 | 6.56 | 0% | Yes | |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 3* | 6.50 | 12.37 | 2.29 | 0% | Yes | |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed criterion | 4 | 3* | 74.70 | 199.01 | 3.14 | 67% | No | |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C / No criterion | 4 | 3* | 375.9 | 431.5 | 323.1 | 100% | No | |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 3* | 374 | 412 | 341 | 100% | No | |

*Dry conditions. ** DO sensor not calibrated Round 2.

5.5 Encinal Creek

Encinal Creek's headwaters begin as mountain springs and seeps along the southeastern base of Mount Taylor, flows south, and discharges into the Rio San Jose. There are two sampling sites that are systematically monitored. Sources of concern for this waterbody are listed in Section 3.1 of this document. The Designated Uses with the most stringent criteria for this waterbody are Primary Human Contact/Ceremonial (PHCC), Domestic Water Supply (DWS), Coldwater Fishery (CWF), Aquatic Life (AL), and Narrative standards (Nar).

| ENC01 Encinal Creek | | Location: 35.18187°, -107.46672° | | | | | | | |
|----------------------|-------------------------|--|----------------------|------------------------|---------|-------|-------|---------------------|---------------|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported |
| DO (mg/L) | CWF | Minimum 6 ≤20% of samples exceed criterion | 4 | 3** | 7.88 | 9.07 | 7.24 | 0% | Yes |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 4 | 7.34 | 7.49 | 6.94 | 0% | Yes |
| Temp. (C°) | CWF | 20 maximum ≤20% of samples exceed criterion | 4 | 4 | 11.52 | 14.99 | 8.09 | 0% | Yes |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 4 | 6.40 | 11.67 | 1.0 | - | - |
| Conductivity (µS/cm) | - | - | 4 | 3* | 126.1 | 134.3 | 120.8 | - | - |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 3* | 114 | 116 | 112 | 0% | Yes |

*TDS/Conductivity sensor malfunction. ** DO sensor not calibrated Round 2.

| ENC02 Encinal Creek | | Location: 35.17327°, -107.467411° | | | | | | | |
|---|-------------------------|--|----------------------|------------------------|------------------------|-------|-------|---------------------|---------------|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 3** | 9.38 | 11.82 | 7.53 | 0% | Yes |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 4 | 7.46 | 7.82 | 6.63 | 0% | Yes |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 4 | 12.51 | 20.43 | 1.386 | 25% | No |
| Turbidity (NTU) | Nar | Do not exceed 10% increase over background | 4 | 4 | 12.15 | 36.15 | 2.4 | - | - |
| Conductivity (µS/cm) | - | - | 4 | 3* | 129.1 | 151.2 | 104.8 | - | - |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 3* | 119 | 123 | 114 | 0% | Yes |
| Phosphorus (mg/L) | AL | 0.02188 ≤20% of samples exceed criterion | 4 | 4 | 0.096 | 0.21 | 0.046 | 100% | No |
| Total Nitrogen (mg/L) | AL | 0.233 ≤20% of samples exceed criterion | 4 | 4 | <1 | <1 | <1 | 0% | Yes |
| Total Uranium (mg/L) | PHCC | 0.03 ≤1/3 increase over background | 4 | 4 | 0.0002 | 0.009 | <1 | 0% | Yes |
| <i>E.coli</i> (cfu/mL) Single sample max | PHCC | 88 ≤10% of samples exceed single sample criterion | 4 | 4 | 21.9 Geometric Mean | 410.6 | 6.2 | 25% | No |

*TDS/Conductivity sensor malfunction. ** DO sensor not calibrated Round 2.

5.6 Mountain Ponds

Mountain ponds are primarily spring fed, manmade structures located in the high elevation areas of the POL. There is one sampling site that is systematically monitored. Sources of concern for this waterbody are listed in Section 3.1 of this document. The Designated Uses with the most stringent criteria for this waterbody are Domestic Water Supply (DWS), and High-Quality Coldwater Fishery (HQCF).

| WCC01 | | Water Creek Canyon | | | Location: 35.22484°, -107.55467° | | | | | |
|----------------------|-------------------------|--|----------------------|------------------------|----------------------------------|-------|------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed criterion | 4 | 3** | 9.76 | 11.17 | 8.1 | 0% | Yes | |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed criterion | 4 | 4 | 6.95 | 8.65 | 5.35 | 75% | No | |
| Temp. (C°) | HQCF | 20 maximum ≤20% of samples exceed criterion | 4 | 4 | 12.08 | 19.19 | 4.46 | 0% | Yes | |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed criterion | 4 | 4 | 8.68 | 17.69 | 1.68 | 50% | No | |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C / No criterion | 4 | 3* | 109.8 | 157.0 | 76.7 | 0% | Yes | |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 3* | 104 | 161 | 71 | 0% | Yes | |

*TDS/Conductivity sensor malfunction. ** DO sensor not calibrated Round 2.

5.7 Water Canyon Creek

Water Canyon Creek's headwater begins as high-mountain springs and seeps located in the caldera of Mount Taylor. The creek flows south through a series of manmade mountain ponds and discharges into the Rio San Jose. There is one sampling site that is systematically monitored. Sources of concern for this waterbody are listed in Section 3.1 of this document. The Designated Uses with the most stringent criteria for this waterbody are Domestic Water Supply (DWS), and High-Quality Coldwater Fishery (HQCF).

| WCC02 | | Water Creek Canyon | | | Location: 35.22603°, -107.55125° | | | | | |
|----------------------|-------------------------|-------------------------------------|----------------------|------------------------|----------------------------------|-------|------|---------------------|---------------|--|
| Parameter | Beneficial Use Assessed | Target / Criterion | # of Samples Planned | # of Samples Collected | Average | Max | Min | % Samples Exceeding | Use Supported | |
| DO (mg/L) | HQCF | Minimum 6 ≤20% of samples exceed | 4 | 3** | 9.39 | 11.2 | 7.61 | 0% | Yes | |
| pH | DWS | 6.5 – 8.5 ≤20% of samples exceed | 4 | 4 | 7.20 | 7.79 | 6.23 | 25% | No | |
| Temp. (C°) | HQCF | ≤20% of samples exceed 20 | 4 | 4 | 10.00 | 16.57 | 2.81 | 0% | Yes | |
| Turbidity (NTU) | HQCF | 10 ≤20% of samples exceed | 4 | 4 | 7.11 | 20.44 | 1.74 | 25% | No | |
| Conductivity (µS/cm) | HQCF | 300 @ 25°C / No criterion | 4 | 3* | 83.41 | 106.0 | 64.2 | 0% | Yes | |
| TDS (mg/L) | PHCC | 250 / No criterion | 4 | 3* | 81 | 90 | 66 | 0% | Yes | |

*TDS/Conductivity sensor malfunction. ** DO sensor not calibrated Round 2.

6.0 Data Assessment Summary

The Pueblo of Laguna's Surface Water Quality Monitoring program successfully completed another year of monitoring the POL's surface waters with the exception of equipment failure listed in the above summary tables. Surface water flow is greatly diminished during summer months due to high evapotranspiration and low precipitation rates. The Rio San Jose, Rio Puerco, Rio Moquino, and the downstream reach of the Rio Paguata are the waterbodies most susceptible to this yearly variation. The Rio Moquino and Rio San Jose are further impacted due to water diversion for irrigation of agricultural fields by upstream users.

The multi-parameter probe was pre- and post-calibrated between sampling rounds as described by the QAPP. All calibrations met established requirements with the exception of Dissolved Oxygen which was not calibrated prior to Round 2 (March 2017). Data from that period for Dissolved Oxygen was not included in the calculations in the above Tables. Field duplicates and blanks were collected for Total Uranium, Isotopic Uranium, Total Nitrogen, Total Phosphorus, and *E.coli* during each sampling round. The relative percent difference (RPD) was calculated for duplicate samples and did not exceed our precision goal of $\pm 20\%$ as outlined in the QAPP. Field blanks were taken to determine if any of the conditions or processes caused sample contamination. All field blanks resulted as "zero", or "non-detect" when below the laboratory's method detection limit.

6.1 Rio San Jose

The water quality criterion for pH was exceeded at a 50% rate for RSJ01. The exceedance rate is greater than the decision criterion of 20% allowable exceedances. High pH levels could be a result of wastewater discharges from upstream users such as the City of Grants. Low or no flow conditions resulted in the collection of only two datasets for the fiscal year, which may not adequately reflect this section of the Rio San Jose. Time permitting, additional measurements during flowing periods will be collected in the future to better characterize the water at this location. The water quality target value for TDS was exceeded at all seven monitoring sites every time data was collected. Currently, there is not a decision criterion for POL waters. The target value for single sample maximum for *E.coli* was exceeded at RSJ05 and RSJ06, 33% and 50% of the time, respectively. The exceedance rates for *E.coli* are greater than the decision criteria of 10% allowable sample exceedances. Cattle and wildlife frequent the waters at these locations, as evident by several cow droppings at RSJ05, and elk droppings at RSJ06. The criterion for Total Phosphorus was exceeded at RSJ01, 04, 05, 06, and 07. The criterion for Total Nitrogen was exceeded at RSJ 01, 04, and 06. These exceedance rates are greater than the decision criteria of 20% allowable sample exceedances. Nutrient exceedances may be attributed to soil/streambank erosion, organic waste, and/or upstream effluent discharge.

Currently, conditions on the Rio San Jose do not adequately support the designated use for Domestic Water Supply, Primary Human Contact/Ceremonial, or Aquatic Life.

6.2 Rio Puerco

The water quality target value for TDS was exceeded at all four monitoring sites on the Rio Puerco. Currently, there is not a decision criterion for POL waters. The target value for single sample maximum for *E.coli* was exceeded at RPC03. The exceedance rate for *E.coli* is greater than the decision criteria of 10% allowable sample exceedances. This is of concern as this monitoring site is located downstream of the Route 66 Casino treated wastewater discharge location. While all monitoring site on the Rio Puerco met temperature criterion RPC03 was approximately 10° C higher than that of RPC01 and 02 which may also be related to Route 66 Casino discharge. There were also numerous cow droppings between the streambanks. These concerns may also attribute to Total Phosphorus and Total Nitrogen exceedances at RPC03. Total Phosphorus exceeded criteria at RPC04 as well. These exceedance rates are greater than the decision criteria of 20% allowable sample exceedances. The POL has not established a numeric value for background turbidity levels. This makes it difficult to numerically translate the decision criteria where there "shall be no more than a 10% increase when background turbidity is more than 50 NTU". When water is flowing, turbidity is often in the thousands (NTU). This inhibits the growth of aquatic biota and is aesthetically unappealing. Soil and streambank erosion, loss of riparian vegetation, the intrusion of

non-native species, and high sediment loads are exacerbated by livestock grazing, unfenced waterways, and roadways through adjoining arroyos. The Rio Puerco Watershed Based Plan states that the Rio Puerco contributes less than 10% of the total water flow to the Rio Grande while contributing up to 80% of its sedimentation (2017).

Currently, the Rio Puerco does not adequately support the designated uses for Primary Human Contact/Ceremonial, Aquatic Life, and likely does not support Warmwater Fishery. The POL is currently building a partnership with the Rio Puerco Management Committee with the common goal to improve the Rio Puerco watershed.

6.3 Rio Paguete and Rio Moquino

The water quality criteria for DO and pH were exceeded at rates of 67% and 25%, respectively, at RPG01. These exceedance rates are greater than the decision criteria of 20% allowable exceedances for both DO and pH. The target value for single sample maximum for *E.coli* was exceeded at a 50% rate for RPG01. The exceedance rate for *E.coli* is greater than the decision criteria of 10% allowable sample exceedances. Total Phosphorus was exceeded at a 100% rate. The exceedance rate is more than the decision criteria of 20% allowable sample exceedances. Temperature and turbidity were exceeded at rates of 25% and 50%, respectively, at RPG02. These exceedance rates are greater than the decision criteria of 20% allowable sample exceedances for both temperature and turbidity. RMQ01 was found to exceed target values for conductivity, TDS, and turbidity at rates of 100% for all parameters. Currently, there are no decision criteria for these parameters. RMQ01 also exceeded criterion for Total Phosphorus and Total Nitrogen at 100% rates may be attributed to soil/streambank erosion and/or organic waste.

The water quality target value of 0.03 mg/L for total Uranium was exceeded at rates of 80% and 100% RPG03 and RPG04, respectively. Decision criterion states that there shall not be a 1/3 increase above background levels which have not been established for POL waters. The water quality target value for TDS was exceeded at both sites for all sample taken. Currently, there is not a decision criterion for TDS. The target value for single sample maximum for *E.coli* was exceeded at a 25% rate for RPG03. RPG03 exceeded Total Phosphorus and Total Nitrogen criteria at 50% and 100% rates, respectively and RPG04 exceeded at 25% and 100% rates, respectively. RPG03 is located within the fenced boundary of the Paguate-Jackpile mine. *E.coli* results show that wildlife frequent the contaminated water and surrounding areas. Total Uranium levels at RPG04 a cause for concern. This area is not fenced off and is frequented by tribal members and wildlife. A map of the area of concern for the Rio Paguate can be found in Appendix A, Table 1.

Currently, the Rio Paguate and the Rio Moquino above the Paguate-Jackpile mine do not adequately support the designated use for High-Quality Coldwater Fishery, Domestic Water Supply, Primary Human Contact/Ceremonial, and Aquatic Life. The Rio Paguate in and downstream of the Paguate-Jackpile mine do not adequately support the designated use for Primary Human Contact/Ceremonial or Aquatic Life.

6.4 Mountain Streams & Springs

With the exception of SDR01, all springs exceeded target values for DO. The exceedance rates were greater than the decision criterion of 20% allowable exceedances. These springs do not have excessive algal growth that typically deplete DO. The low DO is likely due to the pooled nature of the springs, allowing for little chance of oxygenation. BKG02 and KSP01 exceeded pH levels at rates greater than the 20% allowable exceedances. KSP01 exceeded temperature level at a rate greater than the 20% allowable exceedances. BKG01, CSC01, KSP01, and TSP01 exceeded conductivity levels at rates greater than the 20% allowable exceedances. CSC01 and TSP01 exceeded turbidity levels at rates greater than the 20% allowable exceedances. BKG01, CSC01 KSP01, and TSP01 exceeded target values for TDS. Currently, there is not a decision criterion for TDS. TMB01, a mountain stream, exceeded temperature levels and exceeded *E.coli* target value at a 25% rate which is greater than the 10% allowable exceedance. BKG02 and TMB01 exceeded Total Phosphorus levels at rates greater than 20% allowable exceedances.

Currently, only SDR01 meets all of the standards for the most stringent designated use as High-Quality Coldwater Fishery (HQCF). All springs fail, in at least one parameter, to meet HQCF standards. However, all springs meet criteria for Primary

Human Contact/Ceremonial (PHCC) use which is significant to tribal ceremonial purposes. TMB01 does not adequately support the designated use for HQCF or PHCC. TMB01 and BKG02 do not support Aquatic Life designated use.

6.5 Encinal Creek

The water quality criterion for temperature was exceeded at a rate of 25% at ENC02. This exceedance rate is greater than the decision criteria of 20% allowable exceedance. The target value for single sample maximum for *E.coli* was exceeded at a 25% rate which is greater than the 10% allowable exceedance.

Currently, ENC01 adequately supports its designated uses. While ENCO2 exceeded temperature standards for High-Quality Coldwater Fishery, narrative standards state, “normal, seasonal variation of temperature in shall be maintained. However, high water temperatures caused by unusually high ambient air temperatures are not violations of these standard.”

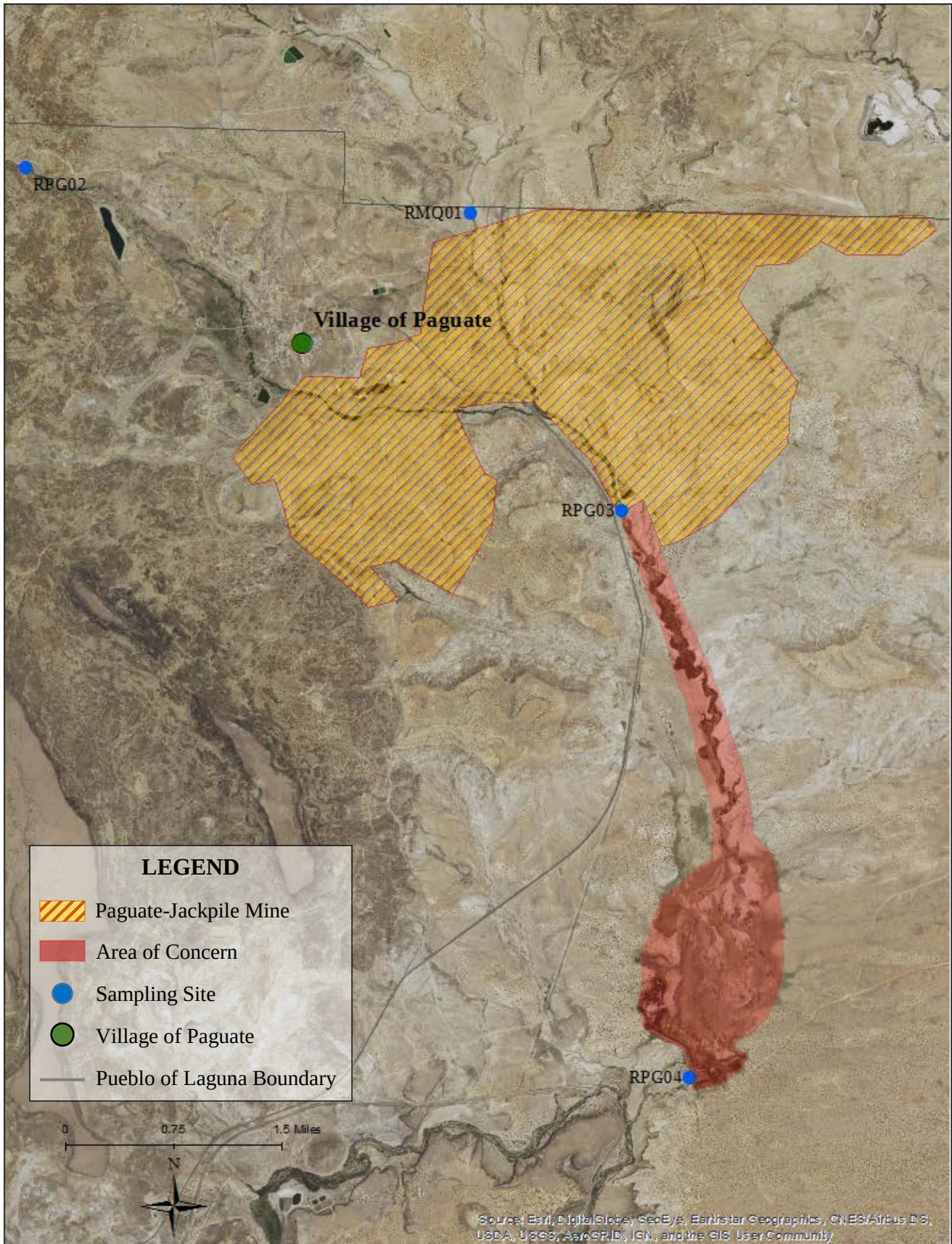
6.6 Water Canyon Creek

The water quality criterion for pH was exceeded at a 75% and 25% rate at WCC01 and WCC02, respectively. The exceedance rate is greater than the decision criteria of 20% allowable exceedances. Turbidity was exceeded by a 50% and 25% rate at WCC01 and WCC02, respectively. The exceedance rate is greater than the decision criteria of 20% allowable exceedances. However, the higher turbidity levels followed a heavy precipitation event. It is reasonable to assume that the turbidity levels dropped shortly after the event. These monitoring locations are remote making it difficult to immediately follow up after such events.

Currently, Water Canyon Creek does not adequately support the designated uses for Domestic Water Supply, or High-Quality Coldwater Fishery.

Appendix A

Table 1: Paguate-Jackpile Mine and Area of Concern



Appendix A

Table 2: Pueblo of Laguna’s Surface Water Quality Monitoring Sites

