

2013 Taos Water Quality Sampling Report – Rio Hondo, Rio Fernando and Rio Pueblo de Taos

Lead: Sentinels-Rios de Taos

Support: Amigos Bravos

Summary: Surface water quality sampling was conducted in the Taos NM area in June, August, and September 2013. Samples were collected from 3 sites in the Rio Hondo, 4 sites in the Rio Pueblo de Taos, 3 sites in the Rio Fernando de Taos, 4 sites in the Red River, and 1 site in the Rio Grande del Rancho. All sites were monitored for dissolved oxygen, temperature, electrical conductivity, pH, and E.coli. Several sites near the Taos Wastewater Treatment Facility were also monitored for nutrients. Sites on the Red River were monitored for hardness and total Aluminum. Water quality standards were exceeded in the Rio Pueblo de Taos, Rio Fernando de Taos and Rio Grande del Rancho. There were no water quality standard exceedances in the Rio Hondo or the Red River.

On all three sampling dates there were sites in the Rio Fernando that did not meet standards for dissolved oxygen and electrical conductivity. The lower site in the Rio Fernando (at Fred Baca Park) did not once meet dissolved oxygen or electrical conductivity standards. F1A, the most upgradient site on the Rio Fernando (near Valle Escondido) had an E.coli exceedance in August. The Rio Fernando site the near divisidero trailhead also had high levels of E.coli in August, though the standard was not exceeded. There was also a moderately high level of E.coli at F1A in September, though there was not an exceedance of the standard.

In 2013 we continued to monitor the impact of the Taos wastewater treatment plant on the Rio Pueblo and on a small perennial unnamed stream that flows from the wastewater treatment plant. The results from the perennial unnamed wastewater was the only site in the Rio Pueblo to not meet dissolved oxygen standards. This unnamed perennial wastewater stream also had the highest conductivity readings of all the sites in all rivers sampled (though there is not an electrical conductivity standard for the unnamed perennial stream, so a standard was not exceeded). There is not a phosphate standard for the lower Rio Pueblo sites, although if the one that applies to all other river systems in the area, including the upper Rio Pueblo, there would have been multiple high phosphate exceedances in the unnamed perennial stream and one slight phosphate exceedances in the mainstem of the lower Rio Pueblo.

Sampling from the one site on the Rio Grande del Rancho showed consistent high electrical conductivity readings. All other water quality standards were met on the Rio Grande del Rancho.

Sampling results in 2013 confirm the New Mexico Environment Department's previous listing of the lower segment of the Rio Fernando de Taos for electrical conductivity. In addition, 2013 sampling results indicate that the Rio Fernando from the USFS boundary upstream to Tienditas Creek should also be listed as impaired for electrical conductivity. 2013 sampling results confirm 2011 and 2012 results that indicated that the unnamed

arroyo below the wastewater treatment plant should be listed as impaired for dissolved oxygen. The 2013 data confirms sampling results from the past 6 years as well as the New Mexico Environment Department's impairment listing at the Rio Fernando de Taos sampling site at Fred Baca Park, which has had consistently high conductivity and low dissolved oxygen levels.

Introduction: This sampling project was initiated by Sentinels – Rios de Taos due to a concern that inadequate data were available to accurately assess the health of the Rio Hondo, Rio Fernando, and Rio Pueblo de Taos watersheds. Sentinels- Rios de Taos contacted Amigos Bravos in 2005 with concerns about water quality in local watersheds. Specifically, there was some concern about nutrient loading in the upper Rio Hondo. With Amigos Bravos' assistance Sentinels-Rios de Taos identified sampling locations and developed a monitoring plan. National representatives from Sierra Club's Water Sentinels program traveled to Taos and gave several trainings to the Sentinels-Rios de Taos' volunteers. Sentinels- Rios de Taos initiated sampling first in February of 2007 with assistance from Amigos Bravos. In 2012 four sites in the Red River were also monitored. This year (2013) one site in the Rio Grande del Rancho was added. Six previous sampling reports have been prepared for sampling that occurred in 2007, 2008, 2009, 2010, 2011 and 2012 respectively. This report covers the sampling that occurred in 2013.

Methods: Surface water quality samples were collected from 3 sites in the Rio Hondo, 4 sites in the Rio Pueblo de Taos, 3 sites in the Rio Fernando de Taos, 4 sites in the Red River and 1 site in the Rio Grande del Rancho. (Appendix A and Appendix C). All samples were kept on ice until they were processed by Sangre de Cristo labs in Alamosa Colorado. Laboratory samples were collected for, *E. coli*. For some samples nitrates, ammonia, BOD, or aluminum were also analyzed. All laboratory samples were collected and processed within an 8hr holding time. EPA approved methods and holding times were used to analyze the samples (Appendix B). Field measurements for pH, temperature, dissolved oxygen and conductivity were conducted. Field measurements of hardness were collected for all samples for which laboratory samples for aluminum were collected (Appendix B).

Results:

A list of the full sampling results for 2013 can be found in Appendix C.

Rio Hondo:

June 12, 2013: Laboratory samples were collected from 3 sites in the Rio Hondo. These samples were analyzed for *E. coli*. Field readings for temperature, pH, conductivity, and dissolved oxygen were also taken at these three locations. No water quality standard exceedences were recorded for the tested parameters during this period (Appendix C)

August 14, 2013: Laboratory samples were collected from 3 sites in the Rio Hondo. These samples were analyzed for *E. coli*. Field readings for temperature, pH, conductivity, and dissolved oxygen were also taken at these three locations. No water

quality standard exceedences were recorded for the tested parameters during this period (Appendix C)

September 26, 2013: Laboratory samples were collected from 3 sites in the Rio Hondo. These samples were analyzed for *E. coli*. Field readings for temperature, pH, conductivity, and dissolved oxygen were also taken at these four locations. No water quality standard exceedences were recorded for the tested parameters during this period (Appendix C)

Rio Pueblo:

June 12, 2013: Laboratory samples were collected from 4 sites in Rio Pueblo de Taos and analyzed for *E. coli*. Two of these sites were also analyzed for phosphate and ammonia. Field readings for temperature, pH, DO, and conductivity were taken. At P2, (right below Los Cordovas bridge), electrical conductivity was measured at 498 microsiemens/cm which is above the standard (≤ 400 microsiemens/cm). In addition pH at PS2 (unnamed perennial stream below wastewater plant) and PS3 (mainstem below wastewater treatment) were slightly above the standard of 8.8. No other tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C). Though it is important to note that there is no standard for phosphate at PS2 and PS3. The phosphate level of 5.14mg/L found at PS2 is well above the standard that applies to the other river segments in the sampling project. In addition there aren't standards for electrical conductivity for the lower sites in the Rio Pueblo yet electrical conductivity at PS3 (mainstem below wastewater treatment) was measured at 509 microsiemens/cm which is above the standard that applies to the other river segments that we sample in this project.

August 14, 2013: Laboratory samples were collected at 3 sites in the Rio Pueblo de Taos and analyzed for *E. coli*. Two of these sites (PS2 and PS3) were also analyzed for phosphate and ammonia. Field readings for temperature, pH, DO, and conductivity were taken. Dissolved oxygen at PS2 (unnamed perennial stream below wastewater plant) and PS3 (mainstem below wastewater treatment) was measured at 5 ppm which is not meeting the minimum standard of 6ppm. No other tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C). Though it is important to note that there is no standard for phosphate at PS2 and PS3. The phosphate level of 1.59mg/L found at PS2 is well above the standard of .1mg/L that applies to the other river segments in the sampling project. The phosphate level of .24mg/L found at PS3 (the mainstem of the Rio Pueblo below where the wastewater arroyo feeds into the Rio Pueblo) was also above the .1 mg/L standard that applies to other rivers in the sampling area. In addition there aren't standards for electrical conductivity for the lower sites in the Rio Pueblo yet electrical conductivity at PS2 (unnamed perennial stream below the wastewater plant) was measured at 730 microsiemens/cm and at PS3 (mainstem below wastewater treatment) electrical conductivity was measured at 510 microsiemens/cm both of which are above the standard

that applies to the other river segments (400-500 microsiemens/cm) that we sample in this project.

September 26, 2013: Laboratory samples were collected at 2 sites in the Rio Pueblo de Taos and analyzed for *E. coli*, phosphate, and nitrate. Field readings for temperature, pH, DO, and conductivity were taken. No tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C). Though it is important to note that there is no standard for phosphate or electrical conductivity at PS2 and PS3, the two sites that were sampled. The phosphate level of 1.98mg/L found at PS2 is well above the standard of .1mg/L that applies to the other river segments in the sampling project. Electrical conductivity at PS2 (unnamed perennial stream below the wastewater plant) was measured at 800 microsiemens/cm and at PS3 (mainstem below wastewater treatment) electrical conductivity was measured at 432 microsiemens/cm both of which are above the standard that applies to the other river segments (400-500 microsiemens/cm) that we sample in this project.

Rio Fernando:

June 12, 2013: Laboratory samples were collected at 2 sites (F1 and F4) in the Rio Fernando and analyzed for *E. coli*. Field readings for temperature, pH, DO, and conductivity were also taken. Dissolved oxygen was measured at 3mg/L at F4, (Fred Baca Park), the applicable water quality standard is ≥ 6 mg/L. Electrical conductivity exceeded the standard of 500 microsiemens/cm both sites. No other tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C).

August 14, 2013: Laboratory samples were collected at 3 sites (F1, F1A, and F4) in the Rio Fernando and analyzed for *E. coli*. Field readings for temperature, pH, DO, and conductivity were also taken. Dissolved oxygen at F4 (Fred Baca Park) was measured at 3 mg/L, the applicable water quality standard is ≥ 6 mg/L. Electrical conductivity readings exceeded the standard of 500 microsiemens/cm at 2 of the 3 sites (F1 and F4). *E.coli* at F1A (near Valle Escondido) was measured at 382 colonies/100ml which above the standard of 235 colonies/100ml. *E.coli* at F1 (near divisidero trailhead) was measured at 232 colonies/100ml which is close, though not exceeding, the standard of 235 colonies/100ml. No other tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C).

September 26, 2013: Laboratory samples were collected at 3 sites in the Rio Fernando (F1, F1A, and F4) and analyzed for *E. coli*. Field readings for temperature, pH, DO, and conductivity were also taken. Water quality standards for dissolved oxygen and conductivity were not met at the lower site (F4 – at Fred Baca Park). Electrical conductivity levels were also above standards at F1 (Divisidero Trailhead). No other tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C).

Red River:

On June 12, August 14 and September 26 2013, samples were collected from 4 sites (RR1, RR2, RR3 and RR4) on the Red River. Some of these sites were tested for E.coli and all of the sites were tested for hardness, aluminum, dissolved oxygen, electrical conductivity, pH and temperature. No tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C). Though the samples on August 14 showed much higher levels of aluminum than what was found on the other sampling dates. The levels found on August 14 fell in the range of 1781-2306 ug/L which is well above the pre 2010 New Mexico water quality standard for aluminum of 750 ug/L.

Rio Grande del Rancho:

On June 12, August 14 and September 26 2013, samples were collected from 1 site on the Rio Grande del Rancho and analyzed for E.col, dissolved oxygen, pH, temperature and electrical conductivity. As expected, since the Rio Grande del Rancho is listed by the New Mexico Environment Department as impaired for electrical conductivity, electrical conductivity readings were above standards on all three of the sampling dates. No other tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C).

Discussion:

Rio Hondo

In 2013 The Rio Hondo continued to have good water quality. No water quality standards were observed during 2013. These results are similar to the previous three years (2009-2012) of sampling in the Rio Hondo which have showed little to no exceedances of water quality standards. In 2007 and 2008 we did observe some high levels of E.coli in the lower sections of the Rio Hondo but these high E.coli levels have not been observed since 2008.

Rio Fernando

Over the 6 years of sampling, the Fred Baca Park Site (F4) on the Rio Fernando has had the most consistent problems with *E.coli*, conductivity, and dissolved oxygen. These results, especially the high *E.coli* results, are of considerable concern since the site is located about 20 yards from a public children's playground area. The most upgradient site on the Rio Fernando (F1A – near Valle Escondido) has also had consistently high E.coli readings and was the only site to exceed E.coli standards in 2013. The 2013 sampling results at F1A reinforces historical concern with high E.coli levels in headwaters of the Rio Fernando. Visual inspections of the upper Rio Fernando watershed indicate considerable impacts from grazing on the upper watershed. Riparian vegetation is missing from much of the upper watershed and cow feces can often be seen dotting the banks and even in the middle of flow. Exceedances of dissolved oxygen and electrical conductivity were again observed in 2013 at the F4 site demonstrating water quality issues continue there as well. Electrical conductivity exceedances were also observed at F1 (near the divisidero trailhead) which is in a segment that is not listed as impaired for

electrical conductivity. Electrical conductivity was high throughout the Rio Fernando during all sampling events indicating a consistent source.

Rio Pueblo de Taos

While there is no standard electrical conductivity standard for the lower Rio Pueblo de Taos and therefore no exceedances of standards, the electrical conductivity readings in the lower Rio Pueblo were some of the highest recorded in the four river systems sampled. The levels were well above the standards that apply to similar river systems such as the Rio Hondo and Red River where the electrical conductivity standard is ≤ 400 microsiemens/cm. The Rio Grande del Rancho which is located only about a mile upstream from the lower Rio Pueblo sites is impaired for conductivity and could be having an impact on this stretch of the Rio Pueblo.

There is no phosphate standard in the lower Rio Pueblo sites either yet the phosphate levels recorded are well above the standard of .1mg/L that applies to all the other river segments in the sampling project. The slightly high levels at PS3 (mainstem below wastewater tributary) are most likely coming from the wastewater treatment plant as the readings in a PS2 (perennial stream from wastewater treatment plant) are consistently very high. Sampling at PS1 should be conducted to get a good upstream sample on mainstem that is not impacted from the wastewater tributary.

Sampling in 2013 in the perennial arroyo with flow from the wastewater treatment plant (PS2) continues to show improvement in water quality from 2011. This could be a result of the recently completed upgrade to the wastewater treatment facility which went online at the end of 2011 (after the conclusion of our 2011 sampling).

Red River

While all aluminum results were below standards, in general the sample results immediately below the Chevron mine were all higher than the samples above the mine. In addition to the mine there is also a lot of natural scaring in the drainages that feed into the Red River in this section of the river. The high aluminum levels could be coming from either or both of these sources. It is also important to note that all 4 sites sampled on August 14, 2013 had aluminum levels that were above the New Mexico Aluminum standard of 750 ug/L that was in place prior to 2012. The new aluminum standard is lot less protective and therefore sampling results in 2013 did not result in an exceedance of the new standard.

Conclusion/Recommendations:

- Electrical conductivity exceeded standards in both the upper section of the Rio Fernando and the lower section. Only the lower Rio Fernando is currently listed as impaired for electrical conductivity by the New Mexico Environment Department. 2013 sampling results indicate that the upper section should also be listed as impaired.

- Sampling done in the Rio Hondo for the past five years has not shown water quality exceedances. Perhaps the problem observed in 2007 and 2008 has been fixed or our sampling events are not occurring at the times when levels are high.
- The high E.coli levels in the Upper Rio Fernando in 2013 combined with previous year's sampling results and with monitoring results from other parties (NMED and USFS), point to a problem in the upper watershed. Cattle grazing and wildlife use on Forest Service land has been suggested as a source of contamination. Efforts to improve land management and grazing practices should be made.
- While there were no E.coli exceedances at the Fred Baca Rio Fernando site during sampling in 2013, there were numerous instances where the dissolved oxygen and electrical conductivity standards were not met. Over the 7 years of sampling conducted in the project this site has consistently had serious water quality problems with E.coli, dissolved oxygen and electrical conductivity. Efforts should be made to further identify sources and restore water quality at the Fred Baca site.
- Electrical conductivity readings in the lower Rio Pueblo de Taos continue to be high, though standards are not exceeded since there is no standard applied to this section of the Rio Pueblo. Similar river systems such as the Rio Hondo and Red River have an electrical conductivity standard of ≤ 400 microsiemens/cm. An electrical conductivity standard should be considered for the lower stretch of the Rio Pueblo de Taos during the 2014 Triennial Review process.
- Phosphate levels in the lower Rio Pueblo de Taos were high in 2013, though standards are not exceeded since there is no standard applied to this section of the Rio Pueblo. Similar river systems such as the Rio Hondo and Red River have a phosphate standard of .1mg/L. An electrical conductivity standard should be considered for the lower stretch of the Rio Pueblo de Taos during the 2014 Triennial Review process.
- The huge difference between the Aluminum standard that applied to the Red River prior to 2010 and the current standard is worrisome. Especially since many samples in 2013 were above the 2010 standard and below the 2013 standard. More investigation should be done to determine if the current 2013 standard is truly protective of designated uses in the Red River.

APPENDIX A

SENTINELS-RIOS de TAOS WATER SAMPLING SITES

ON THE RIO FERNANDO

- F1A Above Shadybrook Development, about 5 miles east of Taos, by bridge on road to Valle Escondido
N 36 22' 19.76"
W 105 23' 07.75" (GE)
- F1B About 200 meters downstream from Shadybrook, by NF La Sombra campground.
N 36 22' 10.45"
W 105 28' 08.51" (GE)
- F 1 About 10 yards downstream from the west bridge by the USFS parking lot at the Divisidero/South Boundary trailhead. On the north bank.
N 36 22' 32.56"
W 105 32' 49.92"
- F2 About 10 yards upstream from Paseo del Pueblo Sur, across street from ABC Lock.
On the north bank. We'll usually use this site only when a storm is in progress.
N 36 23' 54.99"
W 105 34' 38.76" (GE)
- F3 About 25 yards downstream from Paseo del Pueblo Sur, by ABC Lock. On the south bank, by a concrete bar.
N 36 23' 55.02"
W 105 34' 39.25" (GE)
- F4 Fred Baca Park, about 50 yards downstream from the footbridge at the bend. On northwest side. of stream.
N36 23' 56.8"
W105 35' 23.2"

F4G

ON THE RIO PUEBLO

- P 1 About 27 yards downstream from the stop sign on Upper Ranchitos Road at Paseo del Pueblo Norte. On north side of stream by the car wash.
N36 25' 13"
W105 34' 23"
- P1A Perennial spring about 100 feet from where it feeds into Rio Pueblo de Taos. Right where spring comes out of culvert that goes under Upper Ranchitos Rd about 200 feet from intersection with Ranchitos Rd.

N 36 24' 16.01"
W 105 35' 53.35

- P1B Ranchitos Rd. Near bridge by Callegon Rd and SR 240 (near Hacienda de los Martinez). Mile Marker 4.
N 36 24' 1.30"
W 105 36' 25.71"
- P1C Ranchitos Rd near mile marker 13 go down dirt road to the left by road to Blackstone Ranch.
N36 23' 34.6"
W 105 37' 26.4"
- P 2 About 15 yards downstream from bridge (right near turn to Los Cordovas Rd) at Ranchitos Road and Culebra Road. On north side of stream by survey sign.
N 36 23' 23.74
W105 37' 50.46"
- P2A Brad Hockmeyer and Janet Gauthier's property on the Rio Pueblo de Taos. Take Los Cordovas Rd. south towards the wastewater treatment facility. Take a right at number 118C. Take this drive all the way to the end making a sharp right at the Webber's property to continue onto the geodesic domes. Park at the domes and walk down to the river from here.
N 36 23'11.78"
W 105 39'03.37"
- PS1 mainstem of Rio Pueblo de Taos about 200 yards upstream from the town of Taos wastewater effluent discharge arroyo. Valerie Graves is the property owner. Sample on rocky point bar in the middle of her property.
N 36 22' 50.47"
W105 39' 44.30"
- PS2 Perennial effluent dependent arroyo (town of Taos wastewater discharge). Turn right onto Thomas Romero Rd and then an immediate right onto Paintbrush Rd. Sample immediately after the gate (which is usually left open) in the arroyo.
N 36 22' 32.05"
W 105 39' 25.36"
- PS3 Rio Pueblo de Taos about a quarter mile downstream from the confluence of the town of Taos wastewater arroyo and the Rio Pueblo. Drive on Thomas Romero Rd, past the open gravel pit on right until you reach the small subdivision. The road is usually gated past this point. Take a right at the subdivision and then your first right (on small dirt road) at the large map sign then take your first right again onto a small two track that crosses a couple of rough patches and then winds down to the river. Park on grassy open area upstream from the gazebo.
N 36 22' 41.26"
W 105 40' 05.63"
- P 3 About 10 yards upstream from the road barrier from the parking lot on the northeast corner of Taos Junction Bridge area. On east bank of stream.

N 36 20' 19.63"
W 105 43' 47.36" (GE)

ON THE RIO HONDO

- H 1 Above Phoenix Restaurant, which is upstream from the Bavarian Inn
N 36 34' 30.67"
W 105 26' 20.47" (GE)
- H 2A Rio Hondo just upstream from where the branch coming from Bavarian Inn
(after going through the culvert under the trail) empties into the Rio Hondo.
N 36 34' 41.38"
W 105 26' 25.62 (GE)
- H2B Branch coming from Bavarian Inn just before it empties into the main Rio
Hondo.
N 36 34' 41.90"
W 105 26' 25.88" (GE)
- H 2C About 10 yards upstream from the bridge near the day care center in the Ski
Village. On the north bank.
N 36 35' 47.23
W 105 27' 15.19" (GE)
- H2C2 Directly above Taos Ski Valley Effluent Pipe
N 36 35' 46.85"
W 105 27' 41.76" (GE)
- H2D Just above the Riverside property, about 175 yards downstream from the stop
sign at the intersection of the Village of TSV maintenance road and Route 150.
North bank.
N 36 35' 41.78"
W 105 28 16.37" (GE)
- H2E Rio Hondo directly downstream of effluent pipe
N36 35' 47"
W105 27' 43"
- H2F Taos Ski Valley effluent pipe
N 36 35' 46.77"
W 105 27' 42.29" (GE)
- H 3 Cuchilla Campground, just downstream from entrance road. North bank.
N 36 32' 32.08
W 105 33' 22.90 (GE)
- H 4 Kaufman Property. About 20 yards downstream from footbridge. South bank.
N 36 32' 14.8"
W 105 38' 43.4"
- H4A Just downstream from Route 522 Bridge, north bank.

N 36 32' 07.1"
W 105 40' 02.7"

H 5 About 20 yards upstream from bridge in Lower Arroyo Hondo, just before the road crosses the Rio Hondo and goes uphill towards New Buffalo. North ban
N 36 31' 58.62"
W 105 40' 55.43"

H 6 About 10 yards upstream from confluence with Rio Grande.
N 26 32' 02.12
W 105 42' 27.26" (GE)

HVB N 36 31' 58.5"
W 105 35' 04.0"

HVG 5 M downstream from bridge on lane to Jackie Garcia property
N 36 32' 07.6"
W 105 34' 12.2".

ON THE RED RIVER

RR1 Junebug Campground
RR2 Goat Hill Campground
RR3 By the bridge at hwy 522
RR4 Below hatchery

ON THE RIO GRANDE DEL RANCHO

RGDR1 Right above bridge on Partrick Larkin's property.

APPENDIX B

SENTINELS--RIOS de TAOS

QUALITY ASSURANCE PROJECT PLAN (QAPP)

Project Description

The goal of the Sentinels--Rios de Taos water monitoring project is to provide additional water quality data to local, state, and federal decision makers, as well as the public at large. This project was initiated due to a concern that inadequate data was available to accurately assess the health of the Rio Hondo, Rio Fernando, and Rio Pueblo de Taos watersheds. The cumulative impact of point and nonpoint sources of pollution will be characterized by collecting data on those parameters that are basic indicators of water quality and watershed health. Surface water samples collected by volunteer monitors will be analyzed for some or all of the following constituents:

- Nitrates
- Phosphorous
- Total Dissolved Solids
- E. Coli
- pH
- Conductivity
- Dissolved Oxygen
- Temperature
- Biological Oxygen Demand (BOD)
- Aluminum
- Hardness
- Residual Chlorine
- Ammonia

Sampling Locations

Sampling sites may change in attempt to identify sources of pollution. Some identified sampling sites include:

SENTINELS-RIOS de TAOS WATER SAMPLING SITES

ON THE RIO FERNANDO

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- F 1 About 10 yards downstream from the west bridge by the USFS parking lot at the Divisidero/South Boundary trailhead. On the north bank.
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- PS2 Perennial effluent dependent arroyo (town of Taos wastewater discharge). Turn right onto Thomas Romero Rd and then an immediate right onto Paintbrush Rd. Sample immediately after the gate (which is usually left open) in the arroyo.
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- PS3 Rio Pueblo de Taos about a quarter mile downstream from the confluence of the town of Taos wastewater arroyo and the Rio Pueblo. Drive on Thomas Romero Rd, past the open gravel pit on right until you reach the small subdivision. The road is usually gated past this point. Take a right at the subdivision and then your first right (on small dirt road) at the large map sign then take your first right again onto a small two track that crosses a couple of rough patches and then winds down to the river. Park on grassy open area upstream from the gazebo.
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N 36 31' 58.62"
W 105 40' 55.43"

H 6 About 10 yards upstream from confluence with Rio Grande.
N 26 32' 02.12
W 105 42' 27.26" (GE)

HVB N 36 31' 58.5"
W 105 35' 04.0"

HVG 5 M downstream from bridge on lane to Jackie Garcia property
N 36 32' 07.6"
W 105 34' 12.2".

ON THE RED RIVER

RR1 Junebug Campground

RR2 Goat Hill Campground

RR3 By the bridge at hwy 522

RR4 Below hatchery

ON THE RIO GRANDE DEL RANCHO

RGDR1 Right above bridge on Partrick Larkin's property.

Testing results will be sent to Region 6 of the Environmental Protection Agency (EPA), the State of New Mexico Environmental Department's Surface Water Quality Bureau, Amigos Bravos, and local newspapers and publications. Sampling results will be stored in the Sierra Club Sentinels--Rios de Taos database.

Project Organization

Project Coordinator Contact information:

Eric E. Patterson
Box 334
Valdez, NM 87580
575-776-2833
eepatt@gmail.com

The project coordinator ensures all components of the project identified by this QAPP are completed in an efficient and timely manner. This includes oversight on sample collection, delivery, analysis, and reporting.

Sample Collector Contact Information

Eric E. Patterson, contact person (see above)

Mary Pickett	Nora Patterson	Rachel Conn
Gary Grief	Dorothy Wells	Betsy Wolf
Annouk Ellis	Jeanne Green	Moira O’Hanlon
Roberta Salazar	Flowers Espinosa	Shannon Romeling

Sample collectors will conduct sample collection activities according to the methods identified by this QAPP. Responsibilities include:

- Calibration, maintenance and utilization of field equipment for analysis of dissolved oxygen (DO), temperature, pH, and conductivity.
- Obtaining needed sample containers and preservatives for sampling events.
- Following quality assurance procedures for sample collection identified by this QAPP.
- Filling out chain of custody (COC) forms.

Sample Transport Contact Information

Eric E. Patterson (see above)

Sample Transport will ensure that water samples are delivered to Sangre de Cristo Laboratory, Inc., Alamosa, CO, or another EPA certified laboratory, in a secure and timely manner. Responsibilities include:

- Keeping samples secure between sampling site and the laboratory.
- Maintaining COC document according to procedures identified.
- Delivering samples within specified holding times.

Sample Analysis/Laboratory Contact Information:

Sangre de Cristo Laboratory, Inc., an EPA certified laboratory
Tierra del Sol Industrial Park
2329 Lava Lane
Alamosa, CO 81101

Sample Analysis Staff will ensure that samples are analyzed in a manner that provides the most accurate data possible. Responsibilities include:

- Analyzing samples according the methods identified in Standard Operating Procedures (SOPs).
- Analyzing samples within established holding times.
- Reporting results to Project Coordinator

Data Reporting Contact Information

Rachel Conn, Amigos Bravos Projects Director
Box 238
Taos, NM 87571
575-758-3874
rconn@amigosbravos.org

Data reporting will ensure the data collected by the project is stored appropriately and disseminated to interested parties. Responsibilities include:

- Organization of final report on data collected by the project.
- Dissemination of report to specified local, state and federal agencies.
- Dissemination of report to newspapers and other local news media and presentation of project information to the public upon request.
- Entering data into Sierra Club's Water Sentinel database.

Quality Assurance of Field Analysis

Measurements will be made using the following equipment:

- CHEMets Dissolved Oxygen Kit, Model K-7512 – tested dissolved oxygen
- Euteck Instruments PCTestr 35 from Oakton – tested pH, temperature, and electrical conductivity
- Hach Model 5-EP MG/L #1454-01 test kit – tests hardness (calcium carbonate)

PARAMETER	DETECTION LIMIT	ACCURACY
Dissolved Oxygen	1 to 12 mg/L	+/- 1 ppm
Temperature	0° to 50° C	+/- 0.5° C
Conductivity	0 to 1999 µS/cm	+/-10 µS/cm
pH	0.00 to 14.00 ph units	+/- .001 pH units
Hardness	0 to 400 mg/L calcium carbonate	+/- 20 mg/L

Field instruments will be calibrated according to manufacturers' instructions <24 hours prior to each sampling event. Chemicals used for dissolved oxygen will be replaced according to expiration dates provided by the manufacturer. Samples will be collected using the containers, preservatives, volumes and holding times identified in Appendix A.

Field Sample Collection Procedures

Samples will be collected:

- Midstream just below the water's surface.
- Facing upstream to avoid disturbances caused by the sample collector.
- Upstream of minor temporal or spatial impacts, such as bridges and campsites.
- Free of floating debris.
- Using appropriate sample containers and preservatives specified in Appendix A.

Samples will be tagged appropriately with identifying number/information and delivered to appropriate laboratory personnel accompanied by appropriately completed and signed Chain of Custody (COC) forms.

Quality Assurance of Laboratory Analysis

Quality assurance of laboratory methods is the sole responsibility of the sample analysis/laboratory coordinator previously identified. Samples will be analyzed using methods contained in the laboratory's Standard Operating Procedures. These are located at Sangre de Cristo Laboratory, Inc. and can be obtained from the sample analysis coordinator upon request.

METHODS FOR LABORATORY ANALYSIS

MATRIX	PARAMETER	METHOD
Nonpotable water	Total Dissolved Solids	EPA 160.1
Nonpotable water	Nitrates	EPA 300.0
Nonpotable water	Total Phosphorus	EPA 365.2
Nonpotable water	E. Coli	EPA 10030
Nonpotable water	BOD	SM 5210B
Nonpotable water	Ammonia	4500NH3D
Nonpotable water	Residual Chlorine	300.5
Nonpotable water	Phosphate	420.1
Nonpotable water	Aluminum	200.9

APPENDIX C.
2013 DATA

SAMPLE #	DATE	COLLECTION TIME	REC'D BY LAB TIME	TEMP, C.	pH	DISSOLVED	ELECTRICAL	PHOSPHATE	E. COLI	NITRATE	AMMONIA	Hardness	Aluminum(total)
						OXYGEN	CONDUCTIVITY	mg/L	COLONIES/100ML	mg/L	mg/L	ppm	ug/L
						ppm	microsiemens/cm						
STANDARD					<=23	6.6-8.8	>=6	<=500	<0.1	235			
F1	6/12/13	11:33 AM	2:05 PM	15.1	8.37	7	625		0				
F4	6/12/13	11:10 AM	2:05 PM	20.2	7.65	3	755		6				
STANDARD					<=23	6.6-8.8	>=6	<=400	<0.1	235			
P1	6/12/13	11:05 AM	2:05 PM	18	8.3	7	229		0				
P2	6/12/13	11:03 AM	2:05 PM	19.1	8.61	9	498		0				
STANDARD					<=24	6.6-8.8	>=6	No Standard	No Standard	235			
PS2	6/12/13	10:39 AM	2:05 PM	19.1	8.88	8	325	5.14	0		<.02		
PS3	6/12/13	10:20 AM	2:05 PM	20	9.02	10	509	ND	0		<.02		
STANDARD					<=23	6.6-8.8	>=6	<=400	<0.1	410			
H3	6/12/13	9:47 AM	2:05 PM	10.9	8.46	8	144		0				
H5	6/12/13	10:20 AM	2:05 PM	17.3	8.5	8	344		0				
H6	6/12/13	10:30 AM	2:05 PM	17.5	8.8	8	350		0				
STANDARD					<=23	6.6-8.8	>=6	<=400	<0.1	235			
RR1	6/12/13	9:43 AM	2:05 PM	12	8.3	9	207		1		120	24	
RR2	6/12/13	10:12 AM	2:05 PM	12.3	8.21	7	243				140	199	
RR3	6/12/13	10:34 AM	2:05 PM	13.8	7.88	7	270				140	<10	
RR4	6/12/13	11:05 AM	2:05 PM	16.1	8.23	7	346		0		160	<10	
STANDARD					<=24	6.6-8.8	>=6	<=400	<0.1	235			
RGDR1	6/12/13	9:35 AM	2:05 PM	17.4	8.5	7.5	611		0				
STANDARD					<=23	6.6-8.8	>=6	<=500	<0.1	235			
F1	8/14/13	11:41 AM	2:30 PM	18.4	8.46	7	630		232				
F1A	8/14/13	12:03 PM	2:30 PM	21.6	8.69	6	358		382				
F4	8/14/13	11:13 AM	2:30 PM	18.4	7.6	3	535		1				
STANDARD					<=23	6.6-8.8	>=6	<=400	<0.1	235			
P1	8/14/13	11:17 AM	2:30 PM	20	8.17	7	250		83				
STANDARD					<=24	6.6-8.8	>=6	No Standard	No Standard	235			
PS2	8/14/13	10:17 AM	2:30 PM	21.1	8.3	5	730	1.59	19		0.03		
PS3	8/14/13	10:15 AM	2:30 PM	19	8.6	6	510	0.24	62		0.02		
STANDARD					<=23	6.6-8.8	>=6	<=400	<0.1	410			
H3	8/14/13	10:00 AM	2:30 PM	9	8.5	7	158		98				
H5	8/14/13	10:32 AM	2:30 PM	17	8.27	6	354		21				
H6	8/14/13	10:45 AM	2:30 PM	20	8.6	7	347		0				
STANDARD					<=24	6.6-8.8	>=6	<=400	<0.1	235			
RR1	8/14/13	9:41 AM	2:30 PM	11.4	8.29	8	260		3		160	1924	
RR2	8/14/13	10:18 AM	2:30 PM	13.3	8.21	8	280	ND	6		<.02	160	2247
RR3	8/14/13	10:46 AM	2:30 PM	15.3	7.84	9	306				180	2306	
RR4	8/14/13	11:30 AM	2:30 PM	17.3	8.34	9	395		19		160	1781	
STANDARD					<=24	6.6-8.8	>=6	<=400	<0.1	235			
RGDR1	8/14/13	9:40 AM	2:30 PM	17.3	8.4	9	612		57				

APPENDIX C.
2013 DATA

SAMPLE #	DATE	COLLECTION	REC'D BY LAB	TEMP, C.	pH	DISSOLVED	ELECTRICAL	PHOSPHATE	E. COLI	NITRATE	AMMONIA	Hardness	Aluminum(total)
STANDARD					<=23	6.6-8.8	>=6	<=500	<0.1	235			
F1	9/26/13	11:10 AM	3:34 PM	16.2	8.55	6	661		18				
F1A	9/26/13	11:32 AM	3:34 PM	19.1	8.55	8	457		192				
F4	9/26/13	9:20 AM	3:34 PM	12	7.75	1	646		89				
STANDARD					<=24	6.6-8.8	>=6	No Standard	No Standard	235			
PS2	9/26/13	10:40 AM	3:34 PM	19.1	8.1	7	800	1.98	7		ND		
PS3	9/26/13	10:58 AM	3:34 PM	14.1	8.5	9	432	<.5	61	0.33			
STANDARD					<=23	6.6-8.8	>=6	<=400	<0.1	410			
H5	9/26/13	10:15 AM	3:34 PM	15.1	8.22	11	272		119				
H6	9/26/13	10:30 AM	3:34 PM	19.8	8.65	11	303		98				
STANDARD					<=24	6.6-8.8	>=6	<=400	<0.1	235			
RR1	9/26/13	9:49 AM	3:34 PM	8.8	8.54	8	249		26				239
RR2	9/26/13	10:18 AM	3:34 PM	9.9	8.55	9	260		4				268
RR3	9/26/13	10:42 AM	3:34 PM	12	8.51	9	273		5				289
RR4	9/26/13	11:03 AM	3:34 PM	14.4	8.39	9	350		16				259
STANDARD					<=24	6.6-8.8	>=6	<=400	<0.1	235			
STANDARD					<=24	6.6-8.8	>=6	<=400	235				
RGDR1	9/26/13	10:00 AM	3:34 AM	11.8	8.3	9	616		57				