2010 Taos Water Quality Sampling Report – Rio Hondo, Rio Fernando and Rio Pueblo de Taos

Lead: Sentinels-Rios de Taos
Support: Amigos Bravos

Abstract: Surface water quality sampling was conducted in the Taos NM area in May, July, and October 2010. Samples were collected from 4 sites in the Rio Hondo, 3 sites in the Rio Pueblo de Taos, and 5 sites in the Rio Fernando de Taos. All Samples in the Rio Hondo met water quality standards for all tested constituents on all sampling events. In May, the most upstream site on the Rio Fernando did not meet dissolved oxygen standards. In July one site in the Rio Pueblo de Taos (P1A) had very high *E. coli* levels, that were well above standards and two sites on the Rio Fernando, the most upstream site above Shady Brook and the most downstream location at Fred Baca Park, had *E. coli* levels above standards. In addition, during the July sampling event the Fred Baca site on the Rio Fernando had a very high conductivity reading that was well above standards. In October the Fred Baca Park site on the Rio Fernando had slightly high *E.coli* levels and high conductivity readings. All other samples met water quality standards for all tested constituents. The Rio Pueblo de Taos site with the very high levels of *E.coli* in July continued to have *E.coli* levels above water quality standards. Based on these results, it is recommended that the Rio Fernando de Taos be listed as impaired for conductivity. In addition, 2009 sampling confirms the recommendation from previous sampling reports sampling report to list the Rio Fernando and the Rio Pueblo de Taos as impaired for *E. coli.*

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. Sentinels-Rios de Taos contacted Rivers and Birds in Arroyo Seco to invite them and the youth that they work with to participate in the project. National representatives from Sierra Club's Water Sentinels program traveled to Taos and gave several trainings to the Sentinels-Rios de Taos' volunteers. Sampling was initiated first in February of 2007 by Sentinels- Rios de Taos with assistance from Amigos Bravos and Rivers and Birds. Three previous sampling reports have been prepared for sampling that occurred in 2007, 2008, and 2009 respectively. This report covers the sampling that occurred in 2010.

Methods: Surface water quality samples were collected from 4 sites in the Rio Hondo, 3 sites in the Rio Pueblo de Taos and 5 sites in the Rio Fernando de Taos (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 nitrates, biological oxygen demand, *E. coli,* and phosphate. All laboratory samples were collected and processed within a 8hr holding time (Appendix D). 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 (Appendix B).

Results:

Rio Hondo:

May 26, 2010: Laboratory samples were collected from 3 sites in the Rio Hondo. These samples were analyzed for *E. coli,* nitrate, and TDS. Field readings for temperature, pH, conductivity, and dissolved oxygen were also taken at these three locations. No water quality standard exceedences were recorded during this period (Appendix C)

July 1, 2010: Laboratory samples were collected from 3 sites in the Rio Hondo. These samples were analyzed for *E. coli,* nitrate, and TDS. Field readings for temperature, pH, conductivity, and dissolved oxygen were also taken at these three locations. No water quality standard exceedences were recorded during this period (Appendix C)

October 20, 2010: Laboratory samples were collected from 4 sites in the Rio Hondo. These samples were analyzed for *E. coli* and TDS. Field readings for temperature, pH, conductivity, and dissolved oxygen were also taken at these four locations. No water quality standard exceedences were recorded during this period (Appendix C)

Rio Pueblo:

May 26, 2010: Three laboratory samples were collected in the Rio Pueblo de Taos and analyzed for *E. coli*, nitrate, and TDS. Field readings for temperature, pH, DO, and conductivity were also taken. No water quality standard exceedences were recorded during this period (Appendix C)

July 1, 2010: Three laboratory samples were collected in the Rio Pueblo de Taos and analyzed for *E. coli*, nitrate, and TDS. Field readings for temperature, pH, DO, and conductivity were also taken. At P1A, which is a small perennial spring that feeds into the Rio Pueblo near the intersection of Upper Ranchitos and Ranchito Rds. *E.coli* was measured at levels that were too numerous to count. No other tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C).

October 20, 2010: Two laboratory samples were collected in the Rio Pueblo de Taos and analyzed for *E. coli* and TDS. Field readings for temperature, pH, DO, and conductivity were also taken. At P1A, which is a small perennial spring that feeds into the Rio Pueblo near the intersection of Upper Ranchitos and Ranchito Rds. *E.coli* was measured at 312 colonies/100ml, which is above 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).

Rio Fernando:

May 26, 2010: Five laboratory samples were collected in the Rio Fernando and analyzed for *E. coli*, nitrate, and TDS. Field readings for temperature, pH, DO, and conductivity were also taken. Dissolved oxygen was measured at 5 mg/L at F1, which located near the Divisidero trailhead in Taos Canyon. The applicable water quality standard is >=6 mg/L. No other tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C).

July 1, 2010: Four laboratory samples were collected in the Rio Fernando and analyzed for *E. coli*, nitrate and TDS. Field readings for temperature, pH, DO, and conductivity were also taken. Two of the sites F1A (near Valle Escondido), and F4 (in Fred Baca Park) had *E.coli* levels that were above water quality standards. *E.coli* at F1A was measured at 318 colonies/100ml, which is above the standard of 235 colonies/100ml. *E.coli* at F4 was measured at 420 colonies/100ml, which is above the standard of 235 colonies/100ml. The conductivity level at F4 of 930 microsiemens/cm exceeded the applicable water quality standard of <=500. No other tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C).

October 20, 2010: Two samples were collected in the Rio Fernando and analyzed for *E. coli* and TDS. Field readings for temperature, pH, DO, and conductivity were also taken. *E.coli* at F4 was measured at 264 colonies/100ml, which is above the standard of 235 colonies/100ml. The conductivity level at F4 (Rio Fernando at Fred Baca Park) of 750 microsiemens/cm exceeded the applicable water quality standard of <=500. Dissolved oxygen was measured at 5 mg/L at F1, which located near the Divisidero trailhead in Taos Canyon. The applicable water quality standard is >=6 mg/L. No other tested parameters, either in the laboratory samples or field samples, were above water quality standards (Appendix C).

Discussion:

The Rio Fernando had multiple exceedances of the applicable conductivity standard at F4. This confirms sampling results from previous years. The conductivity levels at the lowest Rio Pueblo de Taos site (near the confluence with the Rio Grande) had levels that were right up to the upper limit of the standard. In previous years conductivity levels were above standards in several Rio Pueblo de Taos sampling locations.

Levels of *E. coli* above the applicable water quality standard were found in both the most upstream reach and the most downstream reach of the Rio Fernando. The high levels at F4 (Fred Baca Park) were found in the summer and fall sampling events which is different from sampling results from previous years where the high levels were found in the spring and summer. Over the 4 years of sampling, F4 has had the most consistent problems with *E.coli* exceedances, which is a concern since the site is located about 20 yards from a public children's playground area. Sampling done by the U.S. Forest Service and by the New Mexico Environment Department in the upper Rio Fernando, above F1A have found very high levels of *E.coli.* Both livestock and wildlife have been

identified as possible sources of this contamination and there are local landowners that are very concerned about the range management in the upper portions of the watershed. Sampling was conducted at P1A for the first time this year after concerns were raised about septic problems related to a nearby home. Raw sewage emptying into this spring was observed in early spring 2010. While the first sampling event in 2010 did not detect high *E.coli* levels the second sampling event recorded levels that were too numerous to count. It was hypothesized that the first sampling event which was collected later in the day was conducted after residents had gone to work and thus were not using the plumbing during this period. The second and third sampling events at P1A were planned for earlier in the morning and on both occasions levels of *E.coli* were found above the applicable water quality standard of 235 colonies/100ml. The New Mexico Environment Department (NMED) has been notified about this septic problem and while they have some steps steps to address the illegal discharge, the problem had not yet been adequately addressed by the end of the sampling season in October. NMED has indicated that landowner is having a problem finding a contractor to the work. It is important to note that we are considering the applicable water quality standard for P1A to be 20.6.4.123 since the stream is not the mainstem of the Rio Pueblo de Taos, but rather a perennial tributary to the Rio Pueblo de Taos. No other *E.coli* exceedances were detected during the sampling in 2010, which is different from previous years where high *E.coli* levels were found in the mainstem of the Rio Pueblo and at times in the mainstem of the Rio Hondo. This may be due to the fact that fewer sites were sampled in both of these streams during this sampling season.

There were two instances where dissolved oxygen levels did not meet water quality standards in the Rio Fernando de Taos. The first instance was at F1 (Rio Fernando at Divisidero Trail) during the spring sampling event and the second was at F4 (Rio Fernando at Fred Baca Park). It is concerning that DO was found at low levels during the spring at F1 which is above the major diversions for the stream. This is a time when water levels should be high and moving quickly with high DO levels. Low levels of DO have been found at F4 during previous years sampling and further confirm that this location has some serious water quality issues.

Conclusion:

- Levels of *E. coli* above the applicable water quality standard were found in both the most upstream reach and the most downstream reach of the Rio Fernando. Over the 4 years of sampling, F4 has had the most consistent problems with *E.coli* exceedances, which is a concern since the site is located about 20 yards from a public children's playground area. Further study should be conducted to determine the source of the water quality problems at F4. Combined with data from 2007, 2008, and 2009 all three streams (Rio Hondo, Rio Fernando, and Rio Pueblo de Taos) should be listed on the state's 303d list as impaired for *E. coli.*
- It is important to note that the sampling done in the Rio Hondo for the past two years has not shown any 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.

- Conductivity in the lower Rio Fernando was measured above water quality standards on 2 of the 3 sampling events. The lower Rio Pueblo site had conductivity readings that were high (although not above standards) on 2 of the 3 sampling events. Combined with monitoring data from previous years where conductivity in both the Rio Pueblo de Taos and Rio Fernando were found above standards in multiple locations, these two streams should be listed on the state's 303d list as impaired for conductivity.
- In 2009 all water quality exceedances occurred in the lower portions of the watershed. Yet in 2010 two upper sites in the Rio Fernando had a water quality problems. Notably the upper most site, located near Valle Escondido had high levels of E.coli. These results, combined 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.
- Results from the small spring that feeds into the Rio Pueblo near the intersection of Ranchitos and Upper Ranchitos indicate that there is an ongoing E.coli contamination source. Further investigation should be done to determine if the identified septic issue has been fixed and if not, why not. If it has been fixed an investigation into the ongoing source should be conducted.

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 Boundarytrailhead. 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 Cordovos 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 Pueble 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	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	Perrennial 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 yeards 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”.

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 thoses 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)

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

F1A	Above Shadybrook Development, about 5 miles east of Taos, by bridge on road to Valle Escondido
F1B	About 200 meters downstream from Shadybrook, by NF La Sombra campground.

F 1	About 10 yards downstream from the west bridge by the USFS parking lot at the Divisidero/South Boundarytrailhead. On the north bank.
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.
F3	About 25 yards downstream for Paseo del Pueblo Sur, by ABC Lock. On the south bank, by a concrete bar.
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"

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	N36 25' 08.4" W 105 34' 45.7"
P1B	Ranchitos Rd. Near bridge by Callegon Rd and SR 240 (near Hacienda de los Martinez). Mile Marker 4.
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 at Ranchitos Road and Culebra Road. On north side of stream by survey sign.
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.

ON THE RIO HONDO

H 1	Above Phoenix Restaurant, which is upstream from the Bavarian Inn
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.
H2B	Branch coming from Bavarian Inn just before it empties into the main Rio Hondo.

H 2C	About 10 yards upstream from the bridge near the day care center in the Ski Village. On the north bank.
H2C2	Directly above Taos Ski Valley Effluent Pipe
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.
H2E	Rio Hondo directly downstream of effluent pipe N36 35' 47" W105 27' 43"
H2F	Taos Ski Valley effluent pipe
H 3	Cuchilla Campground, just downstream from entrance road. North bank.
H 4	Kaufman Property. About 20 yeards 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 bank. N 36 32' 59.1" W 105 40' 55.3
H 6	About 10 yards upstream from confluence with Rio Grande.
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".

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 data base.

Project Organization

Project Coordinator Contact information:

Eric E. Patterson
Box 334
Valdez, NM 87580
505-776-2833
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	
Roberta Salazar	Flowers Espinosa	

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 Clean Water Circuit Rider and Policy Analyst
Box 238
Taos, NM 87571
505-758-3874
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 data base.

Quality Assurance of Field Analysis

Measurements will be made using the following equipment:

- CHEMets Dissolved Oxygen Kit, Model K-7512
- Fisher Alcohol Thermometer, Model 15021B
- Oakton Conductivity ECTester Meter, Model 5-0082
- LaMotte Wide Range pH Test Kit Model P-5985 Code 2119

PARAMETER	DETECTION LIMIT	ACCURACY
Dissolved Oxygen	1 to 12 mg/L	+/- 1 ppm
Temperature	-10^{o} to 110^{o} C	+/- 1^{o} C
Conductivity	0 to 1990 µS/cm	+/-10 µS/cm
pH	5.0 to 8.5 ph units	+/-0.3 pH units

Field instruments will be calibrated according to manufacturers' instructions <24 hours prior to each sampling event. The conductivity meter will be calibrated using a known standard solution. Chemicals used for dissolved oxygen and pH analysis 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 10029
Nonpotable water	BOD	SM 5210B

Containers, Volumes, Preservatives, and Holding Times

Parameter	Optimum Volume	Container Type	Perservation Method	Holding Time
Total Nitrogen (Calculation: TKN + (NO2 + NO3 as N)	250 mL	Plastic, Glass	Cool	**48 Hours**
Total Phosphorus	250 mL	Plastic, Glass	Cool	**24 Hours**
Total Suspended Solids (also called Non Filterable Residue)	500 mL	Plastic, Glass	Cool	**24 Hours**
E. coli or Fecal Coliform	150 mL	Sterile Bottle	Cool	**8 Hours**
Dissolved Oxygen	Determined On-Site			**None**
Temperature	Determined On-Site			**None**
Conductivity	Determined On-Site			**None**
	Determined On-Site			**None**

APPENDIX C 2010

SAMPLE #	DATE	COLLECTION TIME	REC'D BY LAB TIME	TEMP, C.	pH	DISSOLVED OXYGEN	ELECTRICAL CONDUCTIVITY	NITRATE mg/L	TOTAL DISS SOLIDS	E. COLI COLONIES/100ML
						ppm			mg/L	
STANDARD				**<=20**	**6.6-8.8**	**>=6**	**<=500**			**235**
F1	5/26/10	9:50 AM	3:10 PM	10	8	5	320	ND	249	1
F1A	5/26/10	9:05 AM	3:11 PM	8	7.5	6	220	ND	214	0
F1B	5/26/10	9:25 AM	3:11 PM	9	7.5	6	280	ND	272	6
F3	5/26/10	9:32 AM	3:09 PM	9	7.5	8	430	ND	212	4
F4	5/26/10	10:15 AM	3:10 PM	10	7.5	8	460	ND	85	4
STANDARD				**<=25**	**6.6-8.8**	**>=6**	**300-500**			**410**
H3	5/26/10	10:02	3:14 PM	8	7.5	9	100	ND	68	0
H5	5/26/10	10:37	3:11 PM	10	7.5	8.5	140	ND	98	1
H6	5/26/10	11:05	3:12 PM	10	7.5	8	170	ND	107	1
STANDARD				**<=20**	**6.6-8.8**	**>=6**	**<=400**			**235**
P1	5/26/10	11:05	3:08 PM	6	7.5	8	140	ND	145	1
P1A	5/26/10	10:40 AM	3:09 PM	12	7.5	6	350	ND	240	0
P3	5/26/10	11:00	3:10 PM	10	7.5	8	190	ND	166	14
STANDARD				**<=20**	**6.6-8.8**	**>=6**	**<=500**			**235**
F1A	7/1/10	10:57 AM	2:06 PM	15	7.5	8	350	0.24	241	318
F1B	7/1/10	10:44 AM	2:06 PM	11	7.5	8	430	0.23	300	56
F3	7/1/10	10:25	2:07 PM	12	7.7	8	470	<0.21	333	10
F4	7/1/10	10:00	2:06	12	7.5	6	930	0.24	556	420
STANDARD				**<=25**	**6.6-8.8**	**>=6**	**300-500**			**410**
H3	7/1/10	10:30 AM	2:06	9	7.5	7.5	130	0.31	85	0
H5	7/1/10	9:17 AM	2:06 PM	14	7.5	8	310	0.42	201	21
H6	7/1/10	9:45	2:05 PM	15	8	7.5	300	0.43	191	118
STANDARD				**<=20**	**6.6-8.8**	**>=6**	**<=400**			**235**
P1	7/1/10	9:40	2:07 PM	11	7.5	6	230	0.21	138	2

P1A	7/1/10	9:07	2:07	13	7.5	7	320	0.22	190	TNTC
P3	7/1/10	9:35 AM	2:07 PM	15	7.8	8	390	0.33	278	10
STANDARD				**<=20**	**6.6-8.8**	**>=6**	**<=500**			**235**
F1	10/20/10	9:25 AM	2:55 PM		8	8	480			12
F4	10/20/10	10:00 AM	2:55 PM		7.5	4	750			264
STANDARD				**<=20**	**6.6-8.8**	**>=6**	**<=400**			**235**
P1A	10/20/10	8:55 AM	2:55 PM	7	7.5	8	340			312
P3	10/20/10	10:40 AM	2:55 PM		8	8	400			2
STANDARD				**<=25**	**6.6-8.8**	**>=6**	**300-500**			**410**
H3	10/20/10	9:30 AM	2:55 PM	4	7.5	7	130			0
HVB	10/20/10	9:50 AM	2:55 PM	7	7.5	8	180			30
H5	10/20/10	10:13 AM	2:55 PM	9	8	9	360			61
H6	10/20/10	10:35 AM	2:55 PM	8	8	10	360			18