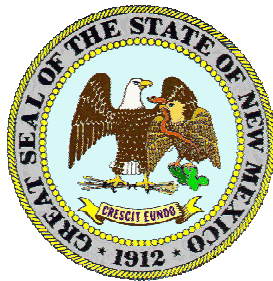

WATER QUALITY SURVEY SUMMARY
FOR THE
UPPER PECOS RIVER WATERSHED, PART III
(BETWEEN TECOLOTE CREEK AND SUMNER RESERVOIR)
2001



Prepared by

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1.0 EXECUTIVE SUMMARY

Water quality surveys and assessments are completed in fulfillment of Section 106 of the Clean Water Act (CWA), *Work Program for Water Quality Management*. The purpose of the water quality survey is to collect water quality data to identify and prioritize water quality problems within a watershed and to evaluate the effectiveness of water quality based controls. The data collected as part of the survey are compared to current United State Environmental Protection Agency (USEPA) approved water quality standards to determine if waterbodies throughout the watershed are supporting their designated uses, such as the fishable and swimmable goals set forth in the CWA §102(a).

Water Quality Survey Summary Reports focus on information and data collected by the New Mexico Environment Department's (NMED) Surface Water Quality Bureau (SWQB) pertaining to stream reaches that were identified as NOT meeting water quality standards. All data collected as part of a survey are available upon request to the SWQB and can be downloaded from USEPA's computerized environmental data system known as STORET (<http://www.epa.gov/storet/>). The data collected as part of this study are later combined with all other readily available or submitted data that meet state quality assurance/quality control requirements to form the basis of designated use attainment determinations summarized in the *Integrated CWA §303(d)/305(b) Water Quality Monitoring and Assessment Report*.

The water quality of the lower part of the Pecos Headwaters surveyed as part of this study was relatively good, with few exceedences of state water quality standards. The mainstem of the Pecos River from Sumner Reservoir to Tecolote Creek was impaired due to stream bottom deposits; however, additional data analyses will be conducted to further assess this impairment. This portion of the Pecos also had exceedences of the ammonia criterion, however, the exceedences were not detected often enough to conclude impairment due to ammonia. The only other water quality problems detected in the study area were on the Gallinas River from the mainstem of the Pecos River to San Augustin. This reach had chloride, sulfate, and total dissolved solids exceedences, however, the samples were collected during a time when the flow was below 10 cfs, and the standards do not apply at such low flows. Additionally, due to the fact that this reach goes dry, the classification of Coldwater Fishery is likely not an existing or attainable designated use.

2.0 INTRODUCTION

Between March 28 and November 1 of 2001, the Surface Water Quality Bureau (SWQB) of the New Mexico Environment Department (NMED) conducted a series of multiple-day intensive water quality surveys of the upper Pecos River watershed. The survey included the main stem of the Pecos River from the headwaters to the inflow of Sumner Reservoir, and most perennial tributaries that enter the Pecos River in that reach. Because of the large size of the watershed, the study was divided into three parts. This report addresses the lower portion of the study, the Pecos River from Sumner Reservoir to the confluence with Tecolote Creek, as well as one site on the lower Gallinas River and sites on El Rito Creek bracketing and including the Santa Rosa WWTP. This portion of the survey will be referred to as Part II of the upper Pecos River watershed study. Historic and current land uses in the Pecos River watershed include agriculture (range, pasture, and croplands), silviculture, recreation, and mining. Land ownership in the surveyed portion of the watershed includes the Santa Fe National Forest, Pecos National Historical Park, Villanueva State Park, Bureau of Land Management, State Land Office, and private property.

3.0 NM WATER QUALITY STANDARDS

General standards and standards applicable to attainable or designated uses for portions of the upper Pecos River watershed, Part III that were surveyed in this study are set forth in sections 20.6.4.12 and 20.6.4.900, of *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC, October 11, 2002). Segment specific standards for the upper Pecos River watershed are set forth in 20.6.4.211, 20.6.4.212, 20.6.4.216, and 20.6.4.217 and read as follows:

20.6.4.211 PECOS RIVER BASIN - The main stem of the Pecos river from the headwaters of Sumner reservoir upstream to Anton Chico.

A. Designated Uses: fish culture, irrigation, limited warmwater fishery, livestock watering, wildlife habitat, and secondary contact.

B. Standards:

(1) In any single sample: pH shall be within the range of 6.6 to 9.0 and temperature shall not exceed 32.2°C (90°F). The use-specific numeric standards set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of fecal coliform bacteria shall not exceed 200/100 mL; no single sample shall exceed 400/100 mL (see Subsection B of 20.6.4.13 NMAC).

(3) At all flows above 50 cfs: TDS shall not exceed 3,000 mg/L, sulfate shall not exceed 2,000 mg/L, and chloride shall not exceed 400 mg/L.

[20.6.4.211 NMAC – Rp 20 NMAC 6.1.2211, 10-12-00]

20.6.4.212 PECOS RIVER BASIN - Perennial tributaries to the main stem of the Pecos river from the headwaters of Sumner reservoir upstream to Santa Rosa dam.

A. Designated Uses: irrigation, coldwater fishery, livestock watering, wildlife habitat, and primary contact.

B. Standards:

(1) In any single sample: pH shall be within the range of 6.6 to 8.8 and temperature shall not exceed 25°C (77°F). The use-specific numeric standards set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of fecal coliform bacteria shall not exceed 200/100 mL; no single sample shall exceed 400/100 mL (see Subsection B of 20.6.4.13 NMAC).

[20.6.4.212 NMAC – Rp 20 NMAC 6.1.2211.1, 10-12-00]

20.6.4.216 PECOS RIVER BASIN - The main stem of the Pecos river from Anton Chico upstream to the southern boundary of the Pecos national historical park, and perennial reaches of the Gallinas river from its mouth upstream to the diversion for the Las Vegas municipal reservoir.

A. Designated Uses: irrigation, livestock watering, wildlife habitat, marginal coldwater fishery, and secondary contact.

B. Standards:

(1) In any single sample: pH shall be within the range of 6.6 to 9.0 and temperature shall not exceed 30°C (86°F). The use-specific numeric standards set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of fecal coliform bacteria shall not exceed 1,000/100 mL; no single sample shall exceed 2,000/100 mL (see Subsection B of 20.6.4.13 NMAC).

(3) At all flows above 10 cfs: TDS shall not exceed 250 mg/L, sulfate shall not exceed 25 mg/L, and chloride shall not exceed 5 mg/L.

[20.6.4.216 NMAC – Rp 20 NMAC 6.1.2213, 10-12-00]

20.6.4.217 PECOS RIVER BASIN - Cow creek and all its tributaries and the main stem of the Pecos river from the southern boundary of the Pecos national historical park upstream to its headwaters, including all tributaries thereto.

A. Designated Uses: domestic water supply, fish culture, high quality coldwater fishery, irrigation, livestock watering, wildlife habitat, and secondary contact.

B. Standards:

(1) In any single sample: conductivity shall not exceed 300 µmhos, pH shall be within the range of 6.6 to 8.8, temperature shall not exceed 20°C (68°F), and turbidity shall not exceed 10 NTU. The use-specific numeric standards set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of fecal coliform bacteria shall not exceed 100/100 mL; no single sample shall exceed 200/100 mL (see Subsection B of 20.6.4.13 NMAC).

[20.6.4.217 NMAC – Rp 20 NMAC 6.1.2214, 10-12-00]

4.0 METHODS

Water quality sampling methods were in accordance with the approved Quality Assurance Project Plan for Water Pollution Control Programs (QAPP) (NMED 2001). Benthic macroinvertebrate and fish sampling methods conformed to protocols in United States Environmental Protection Agency's (EPA) *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (Barbour *et al.*, 1999) and the SWQB QAPP (NMED 2001). Fluvial geomorphologic measurements were in accordance with protocols for the SWQB QAPP (NMED 2001).

Water chemistry samples were collected primarily on three consecutive days in spring (5-7 June) and fall (16-18 October), and two consecutive days in summer (24-25 July).

Fecal coliform and *E. coli* samples were collected on 25 July 2001.

5.0 SAMPLING SUMMARY

A map of the study area is presented in Figure 1. The STORET identification codes (where available) and location descriptions of sampling stations selected for this survey are provided in Table 1.

Figure 1. Upper Pecos River Watershed and Sampling Stations

Upper Pecos River, Part III
Sumner Reservoir to Tecolote Creek
2001 Survey

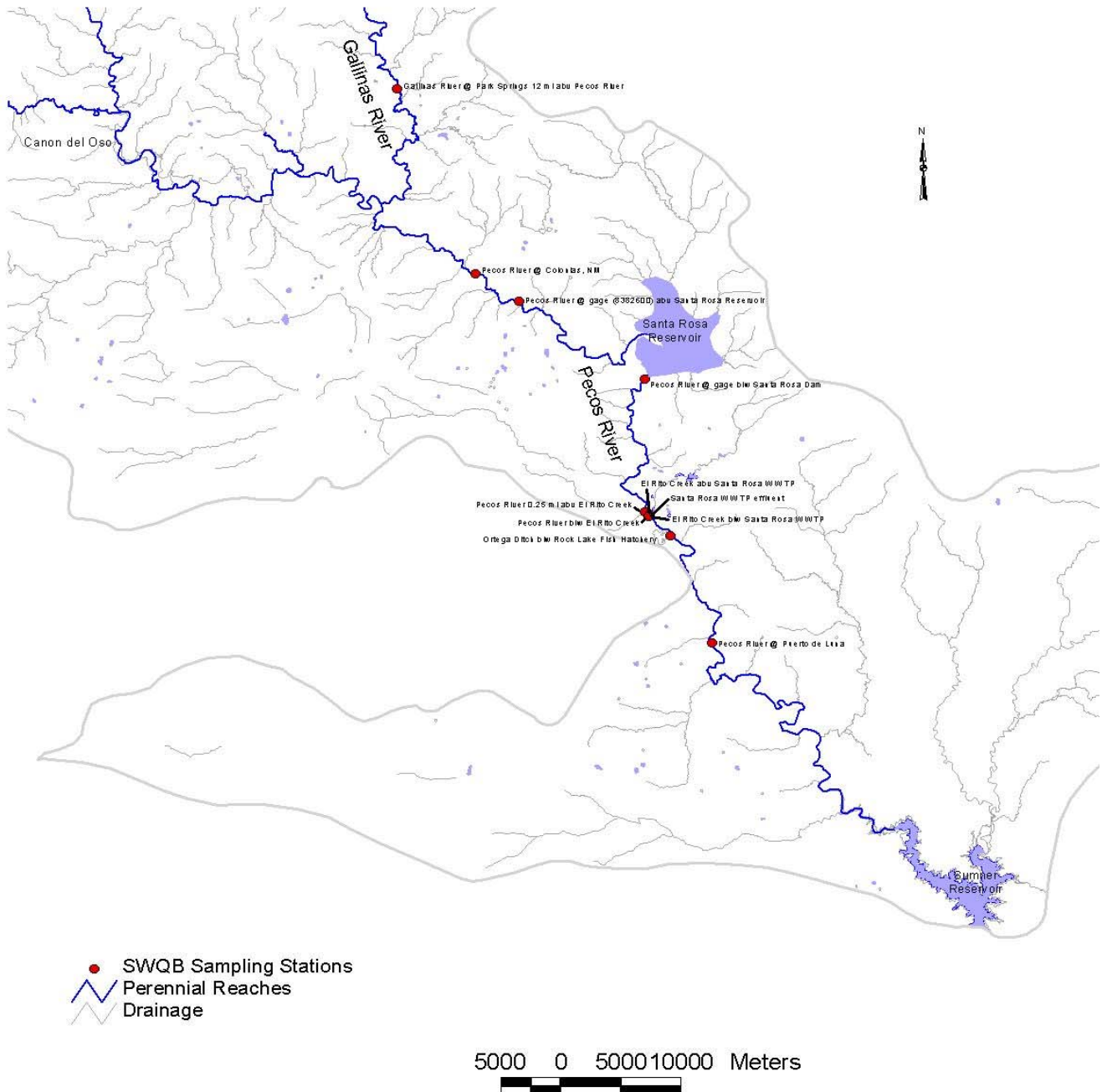


Table 1. Sampling Stations

Station Code	Location description
50ElRito000.2	El Rito creek below the Santa Rosa WWTP
	Santa Rosa WWTP effluent
50ElRito000.3	El Rito Creek above Santa Rosa WWTP
50Gallin001.6	Gallinas River at Park Springs 12 mi above Pecos River
50PecosR512.6	Pecos River at Puerto de Luna, NM
50PecosR529.1	Pecos River below El Rito Creek
50PecosR529.2	Pecos River above El Rito Creek
50PecosR575.0	Pecos River at gage below Santa Rosa Dam
50PecosR593.1	Pecos River at gage above Santa Rosa Reservoir
50PecosR601.2	Pecos River near Colonias, NM
50Ortega000.1	Ortega Ditch below Rock Lake Fish Hatchery

The rationale for selecting each sample station is listed below:

El Rito creek below the Santa Rosa WWTP -El Rito Creek is a spring fed tributary to the Pecos River. It is the receiving water for the Santa Rosa WWTP effluent.

This station was sampled in order to determine the influence of the effluent on El Rito Creek.

Santa Rosa WWTP was sampled to examine the quality of the Santa Rosa WWTP effluent and its potential impact on El Rito Creek and the Pecos River.

El Rito Creek above Santa Rosa WWTP was sampled in order to characterize El Rito Creek upstream of the WWTP effluent.

Gallinas River at Park Springs 12 mi above Pecos River was sampled to assess the lower reaches of the Gallinas River in order to characterize this assessment unit.

Pecos River at Puerto de Luna was sampled to assess the Pecos River below Santa Rosa and above Sumner Reservoir to characterize this reach and examine changes from upstream stations and from historic surveys.

Pecos River below El Rito Creek was sampled in order to evaluate the contributions of this tributary that receives flow from the Blue Hole and the Santa Rosa WWTP effluent.

Pecos River above El Rito Creek was sampled to assess the Pecos River below Santa Rosa Reservoir and above El Rito Creek in order to characterize this reach and evaluate the contributions of El Rito Creek and changes from upstream stations.

Pecos River at gage below Santa Rosa Dam was sampled to assess the Pecos River below Santa Rosa Reservoir in order to evaluate the influence of the impoundment.

Pecos River at gage above Santa Rosa Reservoir was sampled to assess the Pecos River below the Gallinas River and the water going into Santa Rosa Reservoir. The site near Colonias frequently goes dry during the summer months but this site is on a perennial reach and near a USGS gage.

Pecos River near Colonias, NM was sampled to assess the Pecos River above Santa Rosa Reservoir and below the Gallinas River. However, this station was dry after

the spring and samples were collected at the USGS Gage above Santa Rosa Reservoir approximately 3 miles down stream of Colonias.

Ortega Ditch below Rock Lake Fish was sampled to evaluate the discharge from the fish hatchery and potential influence on the Pecos River to which this ditch discharges when not used for irrigation.

Table 2 summarizes data collected in each assessment unit and at each station. The number of times each parameter (or suite of parameters) was sampled for is indicated. Thermograph data, benthic macroinvertebrate, fish, and fluvial geomorphology sampling are indicated by an X. Field data include temperature, specific conductance, pH, dissolved oxygen, and turbidity.

Table 2. Sampling Summary

Assessment Unit	Station	Stream Discharge	Field Data	Ions (full suite)	TDS/STSS (only)	Nutrients	Total Metals (full suite)	Total Hg/Se (only)	Dissolved Metals (full suite)	Fecal Coliform	Cyanide	Radionuclides	Organics	Antibiotics	Thermograph	Benthic Macroinvertebrates	Fish	Geomorphology
El Rito (Pecos River to headwaters)																		
	50ElRito000.2	0	8	4	4	8	3	5	8	1	0	1	1	0	X	X		
		0	8	4	4	8	3	5	8	1	0	0	0	1				
	50ElRito000.3	3	8	4	4	8	3	5	8	1	0	0	0	0		X		
Gallinas River (Pecos River to San Augustin)																		
	50Gallin001.6	0	3	3	0	3	0	3	3	0	0	0	1	0				
Pecos River (Sumner Reservoir to Canon del Oso)**																		
	50PecosR512.6	0	8	4	4	8	3	5	8	1	1	1	1	0	X	X	X	X
	50PecosR529.1	0	8	4	4	8	3	5	8	1	0	0	0	0				
	50PecosR529.2	0	8	4	4	8	2	1	3	1	0	0	0	0		X		
	50PecosR575.0	0	8	4	4	8	3	5	8	0	1	1	1	0				
	50PecosR593.1	0	4	1	3	4	1	3	4	0	0	0	0	0				
	50PecosR601.2	0	3	1	2	3	1	2	3	0	0	0	0	0				
	50Ortega000.1	0	1	1	0	1	0	1	1	0	0	0	0	0				

**This assessment unit has since been reclassified into the following assessment units:
 Pecos River (Sumner Reservoir to Santa Rosa Reservoir)
 Pecos River (Santa Rosa Reservoir to Tecolote Creek)

6.0 WATER QUALITY ASSESSMENT (RESULTS AND DISCUSSION)

6.1 Stream Discharge

This section of river (Figure 1) is complex, containing the main stem impoundment of Santa Rosa Reservoir as well as seasonally dry reaches, and receiving significant flow from sinkhole springs in the Santa Rosa area. For the survey period, the discharge below Santa Rosa reservoir was less than 1 cubic feet per second (cfs), with the exception of July 9–19. During this time, the reservoir released the majority of its volume with a maximum discharge of 1880 cfs. The average flow downstream of Santa Rosa at Puerto de Luna was 73 cfs, excluding the July reservoir release. The increase in discharge between Santa Rosa Reservoir and Puerto de Luna is due to springs near Santa Rosa. An unknown length of the Pecos River above Santa Rosa Reservoir, near Colonias, went dry during the summer months. Residents said that this is a common occurrence.

6.2 Water Quality Standards Exceedences

For many water quality parameters, the State of New Mexico maintains numeric water quality standards. However, for several parameters (e.g., plant nutrients, stream bottom deposits), only narrative standards exist. Data are assessed for designated use attainment status for both numeric and narrative water quality standards by application of the *Assessment Protocol* and associated appendices (NMED/SWQB, 2004a).

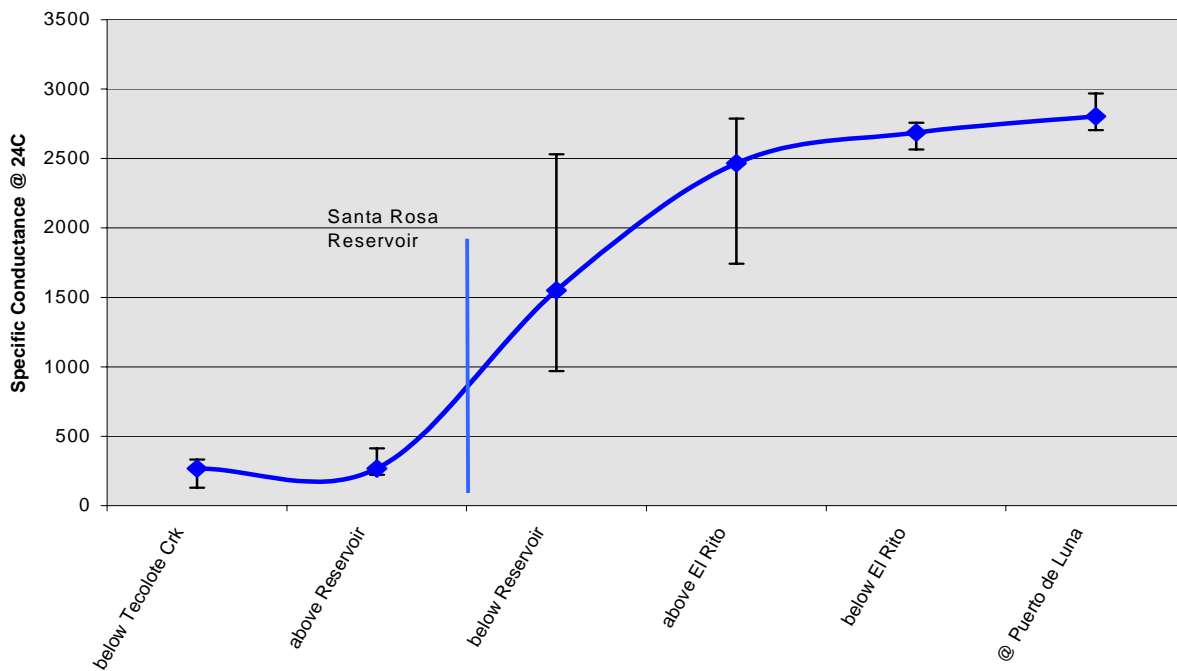
The following discussion includes information pertaining to all exceedences of water quality standards found during the intensive watershed survey. The purpose of this section of the report is to provide the reader with information on where current water quality standards are being exceeded within the watershed. These exceedences are used to determine designated use impairment status. Final assessment determinations as to whether or not a stream reach is considered to be meeting its designated uses depend on the overall amount and type of data available during the assessment process (Refer to NMED/SWQB's *Assessment Protocol* for additional information on the assessment process, NMED/SWQB 2004a). When available, outside sources of data that meet quality assurance requirements are combined with data collected by SWQB during intensive watershed survey to determine final impairment status. Final designated use impairment status is housed in the Assessment Database (ADB) and is reported in *Appendix B* of the *Integrated Clean Water Act §303(d)/ §305(b) Report* (NMED/SWQB, 2004b).

During this survey 34 samples were collected from this section of river and analyzed for total and dissolved metals content. Of these 34 samples none exceeded the water quality standard for any metal including aluminum.

Thermographs were deployed in El Rito Creek and the Pecos River at Puerto de Luna. The thermographs took hourly temperature readings between May and October and no exceedences of the segment specific standard occurred. The maximum temperatures for El Rito Creek and the Pecos River at Puerto de Luna were 23.5°C and 29.9°C respectively.

The conductivity increases significantly from the confluence with Tecolote Creek downstream to Puerto de Luna (Figure 2). The increase in conductivity begins below Santa Rosa Reservoir and continues to El Rito Creek. This is probably due to evaporation from the reservoir and flow from the sinkhole springs. El Rito Creek, which flows from Blue Hole, has an average conductivity of 2650 microsiemens per centimeter ($\mu\text{S}/\text{cm}$). In the Santa Rosa area, the Pecos River has conductivity similar to the spring water (average of 2696 $\mu\text{S}/\text{cm}$ average). This reach of the river receives significant flow from these springs. When there was no flow below Santa Rosa Dam the river had an average discharge of 73 cfs below the town of Santa Rosa.

Figure 2. Average Specific Conductance of the Pecos River from Tecolote Creek to Sumner Reservoir



Ambient water quality criteria exceedences are provided in Table 3, which is the “exceedences only” report generated from the SWQB’s in-house water quality database. This report does not include data from continuous monitoring devices, such as sondes and thermographs. These data are organized by assessment unit, designated use, analyte, and station, in that order. Those persons requiring a complete data set should contact the SWQB.

Table 3. Ambient Water Quality Standards Exceedences

Gallinas River (Pecos River to San Augustin)							
20.6.4.216. Perennial reaches of the Gallinas River from its mouth upstream to the diversion for the Las Vegas municipal reservoir. The upper Gallinas River is described in 20.6.4.215. There are no use-specific numeric criteria for secondary contact (20.6.4.900.I).							
segment specific criteria							
Chloride, Q > 10 cfs							
GALLINAS RIVER ABOVE PECOS AT PARK SPRINGS							
Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling date:	
Yes	Chloride	No	59.4	5	mg/L	07/25/2001	
Sulfate, Q > 10 cfs							
GALLINAS RIVER ABOVE PECOS AT PARK SPRINGS							
Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling date:	
Yes	Sulfate	No	321	25	mg/L	07/25/2001	
TDS, Q > 10 cfs							
GALLINAS RIVER ABOVE PECOS AT PARK SPRINGS							
Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling date:	
Yes	Total Dissolved Solids	No	748	250	mg/L	06/06/2001	
Yes	Total Dissolved Solids	No	528	250	mg/L	07/25/2001	
Yes	Total Dissolved Solids	No	790	250	mg/L	10/17/2001	
Pecos River (Sumner Reservoir to Canon del Oso)							
20.6.4.211. The main stem of the Pecos River from the headwaters of Sumner Reservoir upstream to Anton Chico. There are no use-specific numeric criteria for fish culture or secondary contact (20.6.4.900.I).							
cold fishery (chronic)							
Ammonia							
PECOS RIVER UPSTREAM OF EL RITO CREEK							
Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling date:	
Yes	Ammonia	No	0.713	0.5293	mg/L	07/24/2001	

The water quality standards for Chloride, TDS, and Sulfate for the Gallinas River above the Pecos River at Park Springs Ranch states that the standard shall not be exceeded “at all flows above 10 cfs”. The flow of the Gallinas River was well below 10 cfs during sampling so these data points do not constitute an exceedence of the States Water Quality Standards. The criteria for ammonia is exceeded at the Pecos River upstream of El Rito Creek on July 24, 2001.

7.0 CONCLUSIONS

The water quality of the lower part of the Pecos Headwaters surveyed as part of this study was relatively good, with few exceedences of state water quality standards. The mainstem of the Pecos River from Sumner Reservoir to Tecolote Creek was impaired due to stream bottom deposits; however, additional data analyses will be conducted to further assess this impairment. This portion of the Pecos also had exceedences of the ammonia criterion, however, the exceedences were not detected often enough to conclude impairment due to ammonia. The only other water quality problems detected in the study area were on the Gallinas River from the mainstem of the Pecos River to San Augustin. This reach had chloride, sulfate, and total dissolved solids exceedences, however, the samples were collected during a time when the flow

was below 10 cfs, and the standards do not apply at such low flows. Additionally, due to the fact that this reach goes dry, the classification of Coldwater Fishery is likely not an existing or attainable designated use.

8.0 REFERENCES

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