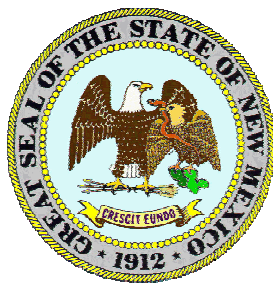# WATER QUALITY SURVEY SUMMARY
FOR THE
MIDDLE RIO GRANDE
(FROM ANGOSTURA DIVERSION NEAR ALGODONES
TO ISLETA DIVERSION NEAR ISLETA PUEBLO)
1999

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, *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 USEPA-approved water quality standards to determine if waterbodies throughout the watershed are supporting their designated uses, such as swimming and fishing.

This particular survey was conducted primarily to support the development of total maximum daily loads (TMDLs) for previously identified water quality impairments due to fecal coliform bacteria, total ammonia, and chlorine. 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/).

Due to the fact that this study was conducted to support the development of TMDLs and data collection efforts were limited to the parameters of interest (fecal coliform bacteria, total ammonia, and chlorine) no general statements about the overall water quality of this stretch of the Rio Grande can be made based on this survey. The data that were collected as part of this study indicate that total ammonia, previously identified as a problem, is no longer exceeding water quality standards. Chlorine continues to exceed the applicable water quality standard below the Bernalillo Wastewater Treatment Facility Outfall and the Albuquerque Wastewater Treatment Plant Outfall. Fecal coliform bacteria continue to cause water quality impairments throughout this stretch of the middle Rio Grande.

2.0   INTRODUCTION

During the period from 14 June to 4 November 1999 the Surface Water Quality Bureau (SWQB) of the New Mexico Environment Department (NMED) conducted a series of a multiple-day intensive water quality surveys of a 40-mile reach of the Rio Grande from the Angostura Diversion Dam near Algodones, New Mexico to the Isleta Diversion Dam near Isleta Pueblo, New Mexico. The primary land uses in this reach are municipal and urban with some recreational uses. Previous studies on this stretch of the Rio Grande identified water quality impairments due to fecal coliform bacteria, total ammonia, and chlorine (NMED/SWQB, 1998). The purpose of this survey is to collect data to support the development of total maximum daily loads to establish pollutant loadings of each of these parameters in order to calculate the load reductions necessary to improve the water quality of the study area.

3.0   NM WATER QUALITY STANDARDS

General standards and standards applicable to attainable or designated uses for portions of the middle Rio Grande watershed 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 middle Rio Grande watershed are set forth in Sections 20.6.4.105, 20.6.4.106 and read as follows:

> **20.6.4.105   RIO GRANDE BASIN - The main stem of the Rio Grande from the headwaters of Elephant Butte reservoir upstream to Alameda bridge (Corrales bridge), the Jemez river from the Jemez pueblo boundary upstream to the Rio Guadalupe, and intermittent flow below the perennial reaches of the Rio Puerco and Jemez river which enters the main stem of the Rio Grande.**
>
> A.   Designated Uses: 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 l,000/100 mL; no single sample shall exceed 2,000/100 mL (see Subsection B of 20.6.4.13 NMAC).
(3)   At mean monthly flows above 100 cfs, the monthly average concentration for: TDS shall not exceed l,500 mg/L, sulfate shall not exceed 500 mg/L, and chloride shall not exceed 250 mg/L.
[20.6.4.105 NMAC – Rp 20 NMAC 6.1.2105, 10-12-00]

20.6.4.106   RIO GRANDE BASIN - The main stem of the Rio Grande from Alameda bridge (Corrales bridge) upstream to the Angostura diversion works.
        A.   Designated Uses: irrigation, limited warmwater fishery, livestock watering, wildlife habitat, and secondary contact.
        B.   Standards:
        (1)   In any single sample: dissolved oxygen shall be greater than 5.0 mg/L, pH shall be within the range of 6.6 to 9.0, and temperature shall be less than 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 mean monthly flows above 100 cfs, the monthly average concentration for: TDS shall be less than 1,500 mg/L, sulfate shall be less than 500 mg/L, and chloride shall be less than 250 mg/L.
[20.6.4.106 NMAC – Rp 20 NMAC 6.1.2105.1, 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, 1999).

Water chemistry samples were collected throughout the summer (see Table 2 for specific dates).

5.0   SAMPLING SUMMARY

The station numbers, STORET identification codes (where available), and location descriptions of sampling stations selected for this survey are provided in Table 1. Due to the fact that this survey was conducted primarily to support the development of TMDLs, sampling was confined to the parameters of interest (fecal coliform, total ammonia, and chlorine) along with physical measurements of temperature and pH.

Table 1. Sampling Stations

Station	STORET Code	Location Description
1	MRG105005770	Rio Grande at Angostura Diversion Works
2	MRG105005765	Rio Grande at Highway 44 Bridge near Bernalillo
3	MRG105005760	Bernalillo Waste Water Treatment Facility Outfall
4	MRG105005755	Rio Grande above Rio Rancho WWTF #3 Outfall
5	MRG105005750	Rio Rancho Waste Water Treatment Facility #3 Outfall
6	MRG105005749	Rio Grande above Rio Rancho WWTF #2Outfall
7	MRG105005747	Rio Rancho Treatment Facility #2 Outfall
8	MRG105005745	Rio Grande above the Alameda Bridge
9	MRG105005740	Rio Grande above the Rio Bravo Bridge
10	MRG105005735	Albuquerque Waste Water Treatment Facility Outfall
11	MRG105005730	Rio Grande at the I-25 Bridge
12	MRG61C	Rio Grande at the Isleta Pueblo Diversion Works

6.0   WATER QUALITY ASSESSMENT (RESULTS AND DISCUSSION)

6.1   Stream Discharge

Stream flows for the Rio Grande in this reach are measured at the United States Geological Survey (USGS) gaging station at San Felipe and the USGS gaging station near Albuquerque. Flow data are provided for the sampling dates in Table 2 and are presented graphically for the entire year in Figures 1 and 2.

Table 2. Stream Discharge (ft^3/sec)

Date	USGS Gage at San Felipe (08319000)	USGS Gage at Albuquerque (08330000)
06/14/99	3420	2850
06/15/99	3340	2770
06/16/99	3390	2830
06/17/99	3550	3170
06/28/99	2820	2410
07/06/99	1650	1180
07/12/99	1510	1080
07/19/99	1360	1060
07/26/99	1240	825
07/29/99	1330	709
08/02/99	1680	977

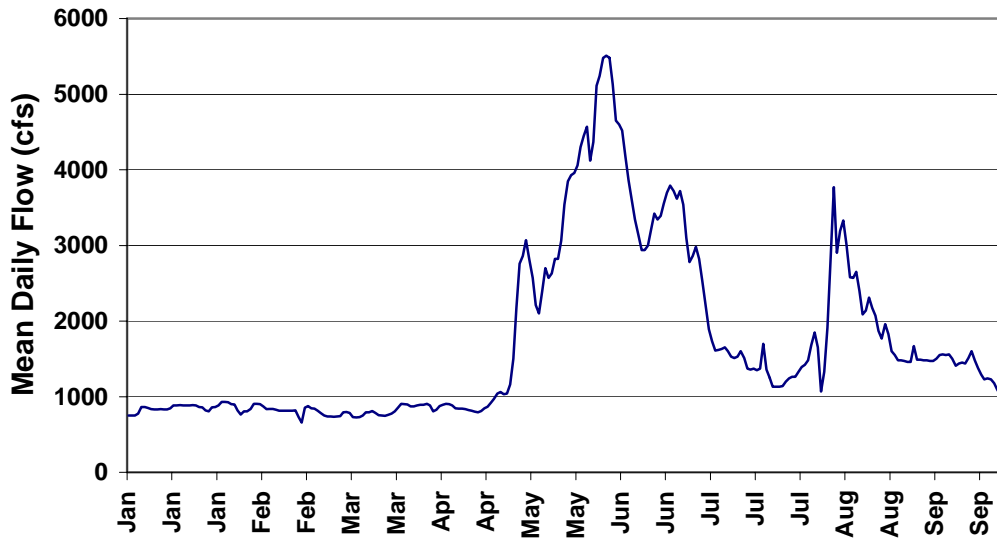**Figure 1. Rio Grande Flow at USGS Gage at San Felipe**

Figure 2. Rio Grande Flow at USGS Gage at Albuquerque
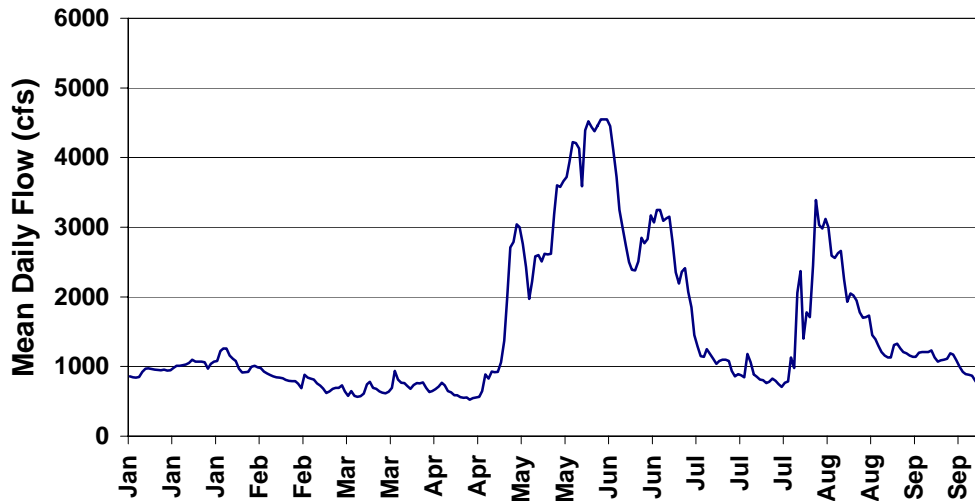
6.2   Discussion of Exceedences of Water Quality Standards

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).

6.2.1 *Station 1, Rio Grande below the Angostura Diversion Works*

Station 1, the Rio Grande below the Angostura Diversion Works, was cold to warm, slightly alkaline and had low levels of the parameters of interest. There were no exceedences of standards at this station and all designated uses were being attained.

6.2.2 *Station 2, Rio Grande at Highway 44 Bridge near Bernalillo*

Station 2, the Rio Grande at the Highway 44 Bridge near Bernalillo was cold to warm, slightly alkaline and had low levels of the parameters of interest. There was one exceedence of the single sample numeric standard for fecal coliform bacteria, and the monthly geometric mean standard of 200 colonies/100ml was exceeded, indicating that the secondary contact use was impaired.

Station 2

6.2.3 *Station 3, Bernalillo Wastewater Treatment Facility*

Station 3, the Bernalillo Wastewater Treatment Facility Outfall was warm, clear, and slightly alkaline with low levels of the parameters of interest except chlorine. The total chlorine residual exceeded the acute standard all four days of the survey, constituting a violation of that standard and impairment to the warm water fishery use.

6.2.4 *Station 4, Rio Grande above Rio Rancho Wastewater Treatment Facility #3*

Station 4, the Rio Grande above Rio Rancho Wastewater Treatment Facility #3 was cool to warm, slightly alkaline, with low levels of the parameters of interest. There were two

exceedences of the single sample numeric standard for fecal coliform bacteria although the geometric mean standard was not exceeded. These exceedences indicate an impairment of the secondary contact use.

6.2.5   *Station 5, Rio Rancho Wastewater Treatment Facility # 3 Outfall*

Station 5, the Rio Rancho Wastewater Treatment Facility #3 Outfall was warm, slightly alkaline, clear with low levels of the parameters of interest. There was one exceedence of the single sample numeric standard for fecal coliform bacteria, although the monthly geometric mean standard was not exceeded. This exceedence indicates a slight impairment of the secondary contact and irrigation uses.

6.2.6   *Station 6, Rio Grande above Rio Rancho Wastewater Treatment Facility #2*

Station 6, the Rio Grande above Rio Rancho Wastewater Treatment Facility #2 was cool to warm, slightly alkaline, with low levels of the parameters of interest. There were 4 exceedences of the single sample numeric standard for fecal coliform bacteria, and the monthly geometric mean standard was exceeded as well, indicating an impairment of the secondary contact and irrigation uses.

6.2.7   *Station 7, Rio Rancho Wastewater Treatment Facility #2 Outfall*

Station 7, the Rio Rancho Wastewater Treatment Facility #2 Outfall was warm, clear, and slightly alkaline, with low levels of the parameters of interest, with the exception of fecal coliform bacteria. Six of the 8 fecal coliform bacteria samples were above the single sample standard of 400 colonies per 100ml by at least one order of magnitude and one other sample was above the single sample standard. The monthly geometric mean standard was exceeded as well, indicating impairment to the secondary contact and irrigation uses.

6.2.8   *Station 8, Rio Grande above Alameda Bridge (Corrales Bridge)*

Station 8, the Rio Grande above the Alameda Bridge (Corrales Bridge) was cool to warm, slightly alkaline, with low levels of the parameters of interest. There were 4 exceedences of the single sample standard for fecal coliform bacteria and the monthly geometric mean standard was exceeded as well, indicating impairment to the secondary contact and irrigation uses.

6.2.9   *Station 9, Rio Grande above Rio Bravo Bridge*

Station 9, the Rio Grande above Rio Bravo Bridge was cool to warm, slightly alkaline, and had low concentrations of the parameters of interest. The monthly geometric mean standard was not exceeded, however, there were 2 exceedences of the single sample standard for fecal coliform bacteria indicating impairment to the secondary contact and irrigation uses.

6.2.10 *Station 10, Albuquerque Wastewater Treatment Plant Outfall*

Station 10, the Albuquerque Wastewater Treatment Plant Outfall was warm, clear, and acidic to slightly alkaline with low concentrations of the parameters of interest. There were 4 exceedences of the acute standard for total chlorine residual constituting a violation of the standard and impairment to the warm water fishery use.

Station 10

6.2.11 *Station 11, Rio Grande above the I-25*

Station 11, the Rio Grande above the I-25 Bridge was cool to warm, slightly alkaline, with low concentrations of the parameters of interest. There were 2 exceedences of the single sample standard for fecal coliform bacteria and the monthly geometric mean standard was exceeded, indicating an impairment of the secondary contact and irrigation uses.

6.2.12 *Station 12, Rio Grande above Isleta Pueblo Diversion*

Station 12, the Rio Grande above the Isleta Pueblo Diversion was cool to warm, slightly alkaline, with low concentrations of the parameters of interest. There was one exceedence of the single sample standard for fecal coliform bacteria indicating the secondary contact and irrigation uses were impaired.

Although previous studies indicated impairment due to total ammonia for this section of the Rio Grande (NMED/SWQB, 1998), no exceedences of the water quality standards for total ammonia were observed during this study at any of the sampling stations.

The two stations that encompassed wastewater treatment plant, Stations 3 and 10, both had exceedences of the chlorine standard. Wastewater treatment facilities require permits to discharge into a stream and are monitored through the National Pollutant Discharge Elimination System (NPDES) Program. Enforcement of the applicable chlorine standards for wastewater treatment plant discharges are addressed through the NPDES program and therefore no TMDL will be required.

The numerous fecal coliform bacteria exceedences will require a TMDL to be written. The sources of the fecal coliform bacteria in this reach of the Rio Grande are many and varied. While there may be some contribution from wastewater treatment plants, there are contributions from livestock, wildlife, septic systems, and runoff from urban areas particularly during and after storm events, such as those of the 16th of July, 19th of July and the 2nd of August.

7.0   CONCLUSIONS

Due to the fact that this study was conducted to support the development of TMDLs and data collection efforts were limited to the parameters of interest (fecal coliform bacteria, total ammonia, and chlorine) no general statements about the overall water quality of this stretch of the Rio Grande can be made based on this survey. The data that were collected as part of this study indicate that total ammonia, previously identified as a problem, is no longer exceeding water quality standards. Chlorine continues to exceed the applicable water quality standard below the Bernalillo Wastewater Treatment Facility Outfall and the Albuquerque Wastewater Treatment Plant Outfall. Fecal coliform bacteria continue to cause water quality impairments throughout this stretch of the middle Rio Grande.

8.0   REFERENCES

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