Appendix 7 - Water Quality

What is the Clean Water Act and Total Maximum Daily Loads?

A good synpsis of the Clean Water Act and Total Maximum Daily Loads can be found in a technical report published by New Mexico State University. Relevant sections are set out below, omitting citations:

The Clean Water Act and Total Maximum Daily Loads in New Mexico: Frequently Asked Questions
Technical Report 39

Agricultural Experiment Station • Cooperative Extension Service College of Agriculture and Home Economics, New Mexico State University
Rhonda Skaggs and Maryfrances Decker
June 2002

The 1972 Water Pollution Control Act (33 U.S.C. §§ 1251 et seq.), commonly called the Clean Water Act (CWA), is the primary federal law responsible for limiting

pollution in U.S. waters. The law includes provisions for standards and financial assistance to address water pollution of all types with the objective of improving water quality in impaired areas. The Clean Water Act evolved through a series of legislative actions in response to declining water quality and increasing environmental awareness from the 1940s to the 1970s. The Clean Water Act, administered by the U.S. Environmental Protection Agency (USEPA), applies to lakes, rivers, aquifer and coastal areas.

A permit system is the principal mechanism used by the Clean Water Act to reach its objective of reducing and eventually eliminating water pollution. Anyone engaged in point-source polluting activities is required to obtain a permit from the USEPA. The permit contains detailed limitations on the amount and type of pollutants that may be discharged. It also details the manner in which those pollutants will be discharged. This permitting system is called the National Pollutant Discharge Elimination System (NPDES).

The Clean Water Act also required states to establish total maximum daily loads (TMDLs) for pollutants in their waters. States were directed to develop best available technology standards for each industry. In addition, the act required an upgrade of municipal wastewater facilities from primary to secondary treatment, created a national pretreatment program and authorized grants for municipal wastewater treatment infrastructure.

How is point-source pollution different from nonpoint-source pollution? Point-source pollution occurs at identifiable discharge points, such as at a factory. Nonpoint-source pollution is pollution that cannot be traced to the end of an outlet, such as runoff from forest logging, sheet flows from pastures or movement of soil and fertilizer from cropped lands into waterways. Nonpoint-source pollution is much more difficult to deal with than point-source pollution for several reasons.

The exact source is impossible to establish. For example, excess sedimentation, or turbidity, is one of the most common pollutants in New Mexico. This pollution can be attributed to many sources, such as shifts in vegetative communities, wildlife grazing and livestock grazing. It also is difficult to quantify amounts of nonpoint-source pollution. Using the turbidity example, it is difficult to ascertain how much sediment is natural and how much has been added by a polluter. Furthermore, an individual field's or pasture's contribution to nonpoint-source pollution may be small, but the total amount of runoff from all fields or pastures can be extremely large. Because of these issues and others, there is great debate about how to manage, regulate or even quantify nonpoint-source pollution.

What is a total maximum daily load (TMDL)? Individual states are required by Section 303(d) of the Clean Water Act to identify water bodies that do not meet water quality standards. Such a water body is referred to as a water quality limited segment, or WQLS. Once the state identifies water quality limited segments, it is required to develop TMDLs according to a priority ranking. TMDLs set the

maximum amount of pollution from all sources that a water body can receive without violating water quality standards. In practice, a TMDL is a planning document that establishes a budget for types of water contaminants by source. A TMDL also develops water quality management strategies.

Federal regulations dictate that once the allowable level of pollutants is determined, some slack must be left in the budget for a margin of safety (MOS), which accounts for uncertainties in calculations of safe pollutant levels. The MOS takes into account the availability and strength of data and may vary from stream to stream. Nonpoint pollution sources are grouped into a load allocation (LA), and point pollution sources are grouped into a waste load allocation (WLA). Total maximum daily loads are described by the following equation:

> TMDL = sum of nonpoint pollution sources (LA) + sum of point pollution sources (WLA) + margin of safety (MOS).

Who is responsible for total maximum daily loads? Under the federal Clean Water Act, states have the first right to establish TMDLs. The New Mexico Water Quality Control Commission (NMWQCC) has the authority to set water quality standards and create TMDLs in the state. The commission includes representatives from the Environment Department, the State Engineer/ Interstate Stream Commission, Oil Conservation Division, Game and Fish Department, the State Park and Recreation Division, the Soil and Water Conservation Commission, the Bureau of Mines and Minerals, and the Department of Agriculture. Three members at large are appointed by the governor to represent the public. In practice, the Environment Department does most of the research and submits TMDL proposals to the commission for approval. Establishment of the commission was authorized by the New Mexico Water Quality Act (Chapter 74, Article 6 NMSA) in 1978.

In addition to involvement by the NMWQCC, the U.S. Environmental Protection Agency and the New Mexico Environment Department, any citizen can participate in developing the TMDLs. Both federal and state statutes require the opportunity for public participation.

What happens once a total maximum daily load is developed? TMDL implementation is different for point-source and nonpoint-source pollutants. For point sources, National Pollutant Discharge Elimination System (NPDES) permits are issued by the U.S. Environmental Protection Agency. The National Pollutant Discharge Elimination System permits are based on the limits established in a TMDL for the pollutants of concern. The Point Source Regulation Section of the New Mexico Environment Department's Surface Water Quality Bureau is responsible for administering the state's NPDES program.

Nonpoint-source polluted water bodies are not regulated by the federal Clean Water Act. There is no federal or New Mexico discharge permitting process for nonpoint-source pollution. Abatement of nonpointsource pollution in New Mexico employs a

voluntary approach that involves best management practices (BMPs) that should be used to meet TMDL standards in a polluted water body. In New Mexico, BMP guidelines are available from the Environment Department's Surface Water Quality Bureau.

What is the status of total maximum daily loads in New Mexico? Under the federal Clean Water Act, states are required to develop TMDLs for pollutants that cause nonattainment of state water quality standards. If a state does not establish TMDLs for impaired waters, then the federal Environmental Protection Agency is required to develop the TMDLs in lieu of the state.

There was very limited TMDL development in New Mexico until the late 1990s. In June 1996, environmental groups brought suit against the U.S. Environmental Protection Agency to force TMDL development and implementation. As a result of the case, *Forest Guardians and Southwest Environmental Center v. Browner (Civ. No. 96-0826 LH)*, the plaintiffs and the U.S. Environmental Protection Agency signed a consent decree that defined a 10-year schedule for establishing TMDLs for 61 specified water bodies that weren't meeting water quality standards. These water quality limited segments are on what is called the state's §303(d) list of waters in need of TMDLs.

According to the consent decree, if the state does not create the TMDLs within the established time frame, then the U.S. Environmental Protection Agency will be responsible for their development. There also was a companion settlement agreement that directs that the remaining water quality limited segments on the 1996 §303(d) list will have TMDLs developed within 20 years. Again, according to the settlement, the state has the right to develop them. But if it fails to do so, then the U.S. Environmental Protection Agency is responsible for their development.

The §303(d) list is named for the Clean Water Act section that requires each state to identify surface waters within its boundaries that are not meeting or not expected to meet water quality standards (NMED, 2000). TMDL development and implementation has been underway in New Mexico since 1998. A list of water quality limited segments having or needing TMDLs is available online. Completed TMDLs in the state also are available online, as are TMDL delistings for the state.

Several creeks and watered areas have been removed from New Mexico's §303(d) list, because investigation by the Surface Water Quality Bureau indicated that TMDLs were not required. For example, some watered areas originally designated as fisheries (thus subject to fishery water quality standards) were placed on the original §303(d) list. However, it was determined later that these watered areas were not fisheries (due to the existence of extended dry periods) and, thus, not subject to fishery water quality standards. Further evaluation of water conditions in these areas led to their removal from the §303(d) list.

What are designated uses of watered areas in New Mexico? The NMWQC issues New Mexico interstate and intrastate water quality standards. These standards specify designated uses for the waters, which include warm-water and cold-water fisheries, livestock watering, wildlife habitat, fish culture, irrigation water stor- age, irrigation, primary and secondary contact, domestic water supply, and municipal and industrial water supply. Primary contact includes recreational uses, such as swimming and water skiing, in which a human has prolonged and intimate contact with water. Secondary contact refers to recreational uses, such as fishing, wading, and boating. A water body is considered impaired or polluted if the existing water quality is not sufficiently high to support the designated use. In designating uses for a water body, states and tribes examine the suitability of a water body for the uses based on its physical, chemical and biological characteristics. Other factors that must be taken into account include a water body's geographic setting, scenic qualities, as well as the socioeconomic and cultural characteristics of the surrounding area.

What water quality standards are relevant to total maximum daily loads in New Mexico? Water quality standards in New Mexico include general standards, use designation for specific water bodies and the subsequent standards related to use. Contaminants affecting designated uses in New Mexico include stream bottom deposits, temperature, turbidity, fecal coliform, phosphorus, ammonia and aluminum. New Mexico interstate and intrastate standards for these and other contaminants are available from the NMWQCC and the Internet.

What are the sources of the water contaminants? Stream bottom deposits are particulate matter resulting from weathering and erosion. The erosion that results in stream bottom deposits can be caused by numerous factors, ranging from natural causes (wind, sheet wash, gully erosion and drought) to man-made causes (excavation, road construction, improper grazing practices and recreation). Sediments are transferred to waterways via runoff. Following high flow events (strong rains or flooding), the sediment settles in the stream bottoms as the water flow decreases. When deposits accumulate in streams, the available habitat for fish species and macroinvertebrates is reduced. Macroinvertebrates make up a large category of animals that do not have backbones and can be seen with the naked eye, including worms, snails, spiders, insects and crayfish.

New Mexico water quality standards have established 68°F as the maximum temperature for cold-water fisheries. The maximum temperature for warm-water fisheries is set at 90°F. New Mexico water quality standards do not allow the introduction of heat into fishery waters by anything other than natural causes. Three factors can affect stream water temperatures: heat added by a point source or by the sun; the amount of shade along a stream resulting from vegetation or landforms; and stream characteristics, including temperature of tributaries, geothermal effects, width and depth of a stream. Reduced riparian vegetation, including species like willow and alder, leads to reduced shade and increased temperatures. Wider, more shallow streams resulting from stream bank destabilization also are subject to increased warming by the sun. Improper grazing practices along stream banks or in riparian

areas often are blamed for increased temperatures in streambeds throughout New Mexico.

According to New Mexico water quality standards, any turbidity created by humans cannot reduce light transmission to the point that common, desirable aquatic life is inhibited. Nonnatural turbidity also should not be obviously visible to the naked eye. Turbidity is assessed by measuring total suspended sediment concentrations. Increased total suspended sediment concentrations, which result from the same causes as described for stream bank deposits, usually are related to natural and man-made erosion and increased sediment loads. Increased turbidity (and later sediment movement to stream bottoms) reduces the habitat for macroinvertebrates and fish. The reduced light penetration in turbid waters also decreases the ability of fish to capture prey and reduces total fish production.

Fecal coliform bacteria are present naturally in the guts of warm-blooded animals. Fecal coliform can be found in New Mexico waters, resulting from human waste contamination or the waste of wild or domesticated warm-blooded animals. The presence of coliform bacteria often indicates the presence of other pathogens that can pose human health hazards. Diseases caused by waterborne pathogens include ear infections, dysentery, typhoid, gastroenteritis and hepatitis. During rainy periods, storm water can pick up and move the feces of mammals and birds from parks, areas where livestock are produced and areas inhabited by wild game. Septic tanks, outhouses and inadequately treated sewage also can be sources of the bacteria.

Total phosphorus levels in natural waters usually are low because phosphorus tends to be absorbed by soil particles or algae and other aquatic plants. Depending on soil characteristics in a watershed, soil erosion can be a significant contributor to high total phosphorus levels in streams. Animal wastes, including wildlife and domestic livestock, also can contribute to high total phosphorus levels in streams when the feces are washed into watercourses. High phosphorus concentrations can result in high levels of algae growth, which can impair fish habitat and reduce fish production.

In some forms, ammonia can be toxic to fish. Ammonia is excreted by fish, birds and mammals. It also results from decomposing organic materials, including plants, manure and dead animals. Ammonia can be released from wastewater treatment plants (a point source) or washed into streams from lands grazed by wildlife and domestic livestock. Home septic systems also can discharge ammonia.

Aluminum often is present in New Mexico waters at levels exceeding state standards. High levels of aluminum often are linked to increased turbidity, especially when aluminum is naturally present in soils and rocks. Weathering of soils and rock leads to the release of aluminum that ends up in streams and lakes. Rangeland grazing, mining, forestry activities, recreation and road maintenance are all activities that can increase erosion and lead to increased aluminum levels in streams. High levels of aluminum are toxic to fish and macroinvertebrates.

What does a typical total maximum daily load look like? There is no typical TMDL, since it is a planning document specific to a geographic location. The sources of water impairment and other factors vary greatly between the areas for which TMDLs have been developed. In most New Mexico watershed areas, several TMDLs (or contaminant budgets) are required to address the various sources of water quality impairment.

Based on extensive monitoring and sampling, TMDLs were established by the New Mexico Environment Department's Surface Water Quality Bureau. These are the amounts of pollutants that may be discharged into the affected streams without exceeding water quality standards.

Plans to implement these TMDLs focus on a combination of best management practices to control sediment. Best management practices listed in the TMDL document may include riparian restoration. Good range management is encouraged along the river reaches. Culvert repair and maintenance, erosion control, stream bank stabilization, and improved road maintenance might be listed in the final TMDL document as practices that will be promoted by the Surface Water Quality Bureau. Federal funding is made available through provisions of the Clean Water Act.

Much information about the Clean Water Act, TMDLs and water quality in general in New Mexico is available from the New Mexico State Environment Department. The New Mexico Surface Water Quality Bureau has extensive information available at its Web site. Information about the topics discussed in this report also is available from other online sources, including the U.S. Environmental Protection Agency. NMSU's Cooperative Extension Service staff can help you locate information about these topics.

2003 State Water Plan

Adopted by the New Mexico
Interstate Stream Commission
December 17, 2003

Section C.3: Include an inventory of the quantity and quality of the state's water resources, population projections and other water resource demands under a range of conditions.

Policy Statements

The State of New Mexico shall coordinate and expand on existing efforts by its various agencies and institutions to collect, integrate, and disseminate data regarding current and future water supply, water uses, and water quality to facilitate informed and
responsible decision-making.

To ensure that water is available for the continued and future economic vitality of the State, we must understand the quantity and quality of our water supply and the current and future demands on that supply. To do so, the State must continually support the collection and compilation of data related to the State's water resources and population. The Office of the State Engineer and the Environment Department, often in coordination with other State and federal agencies should spearhead the effort to collect and periodically update quantitative water quantity and quality data.
...

Water Quality

The New Mexico Environment Department (NMED) maintains a number of sources of water quality data for both ground and surface water. The U.S. Environmental Protection Agency (USEPA) and the U.S. Geological Survey (USGS) also maintain long-term databases of water quality measurements. Pursuant to Section 305(b) of the federal Clean Water Act, New Mexico, through the NMED and the Water Quality Control Commission, prepares and submits to Congress biennial Water Quality and Pollution Control in New Mexico reports that summarize where designated uses of water are being attained and provide a comprehensive overview of the quality of the State's waters.

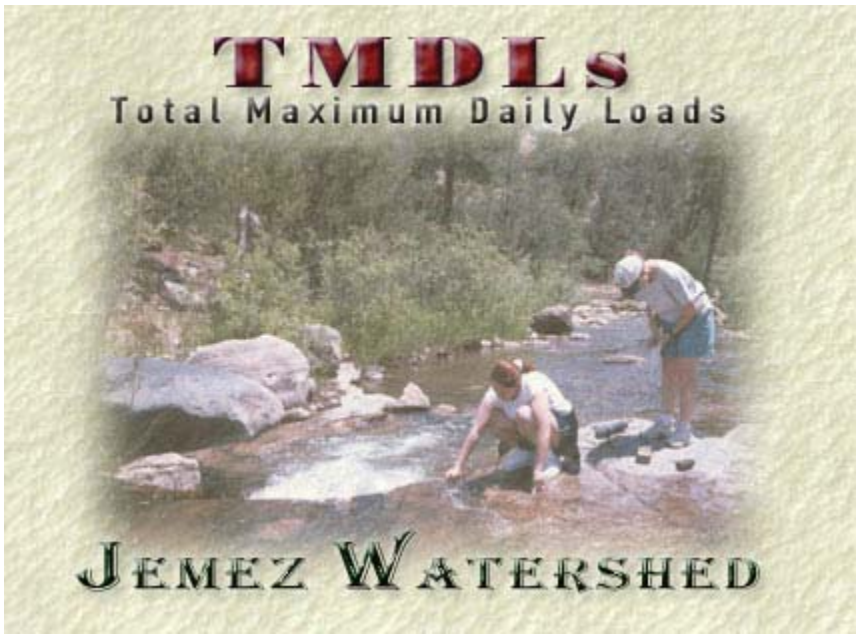
According to the latest report, almost 3,080 miles, or 52% of New Mexico's more than 5,875 perennial stream miles, have some level of impairment with respect to designated or attainable uses, and 124,140 out of a total of 148,883 lake acres, or 83%, do not fully support designated uses. Information provided in the report regarding ground water quality indicated that at least 1,200 cases of ground water contamination have been identified in New Mexico since 1927, with 188 public and nearly 2,000 private water supply wells impacted.

The quality of the State's ground water resources has been inventoried in the New Mexico Environment Department's *Ground Water Quality Atlas*, available online at http://www.nmenv.state.nm.us/gwb/GWQ%20Atlas/GWQ_Atlas.html. Ground water quality data in the atlas is listed by county and, where available, by public water supply system within the county. Public drinking water quality reports are already available online in the atlas for 23 municipal and public water supply systems in New Mexico's 33 counties.

About 90 percent of New Mexico's population depends on ground water for drinking, and it is the only source of potable water in many areas of the state. Therefore, protection of ground water is important for public health and welfare. The quality of ground water in New Mexico varies widely. Mountain aquifers, recharged by recent rain and snow melt, often yield high quality water. A tremendous amount of fresh water occurs in the basin-fill aquifers along the Rio Grande, stretching from Colorado to Texas. But ground water in New Mexico often contains naturally occurring minerals that dissolve from the soil and rock that it has flowed through. Some ground water in the southern part of the state is too salty to be used for drinking. High levels of natural uranium, fluoride, and arsenic occur in various areas around the state. Because all water eventually moves through the entire water cycle, pollutants in the air, on land, or in surface water can reach any other part of the cycle, including ground water. The shallow sand-and-gravel aquifers of the river valleys are most vulnerable to contamination. Currently a major source of contamination in these aquifers is septic tanks.

http://www.nmenv.state.nm.us/swqb/Jemez_Watershed_TMDLs/Index.html

SURFACE WATER QUALITY BUREAU



The Jemez Watershed requires seven separate TMDL planning documents on nine individual reaches:

- **Clear Creek:** Turbidity & Total Organic Carbon;
- **East Fork of the Jemez River:** Turbidity;
- **Jemez River:** Metals (Chronic aluminum);
- **Lower Rio Cebolla:** Stream Bottom Deposits;
- **Redondo Creek:** Temperature & Turbidity;
- **Rio de las Vacas:** Temperature & Total Organic Carbon;
- **Rio Guadalupe:** Metals (Chronic aluminum);
- **Rito Peñas Negras:** Stream Bottom Deposits, Temperature & Total Organic Carbon;
- **San Antonio Creek:** Temperature & Turbidity;
- **Sulphur Creek:** pH & Conductivity; and
- **Upper Rio Cebolla:** Stream Bottom Deposits & Temperature;

- **Jemez Watershed TMDLs (30.6 MB total)**:
  - Cover Page and Preface **(481 kb)**;
  - Section 1 - Table of Contents **(360 kb)**;
  - Section 2 - List of Abbreviations **(292 kb)**;
  - Section 3 - TMDL Summary Tables **(604 kb)**;
  - Section 4 - Background Information **(1.6 MB)**;
  - Section 5 - Individual Watershed Descriptions:
    - Sulphur Creek **(817 kb)**;
    - Redondo Creek **(693 kb)**;
    - San Antonio Creek **(818 kb)**;
    - East Fork, Jemez River **(843 kb)**;
    - Jemez River **(1 MB)**;
    - Rio Cebolla, Upper & Lower Segments **(880 kb)**;
    - Rio de las Vacas **(1 MB)**;
    - Clear Creek **(696 kb)**;
    - Rito Peñas Negras **(1.2 MB)**; and the
    - Rio Guadalupe **(1 MB)**;
  - Section 6 - pH **(2.1 MB)**;
  - Section 7 - Conductivity **(555 kb)**;
  - Section 8 - Metals (Aluminum) **(918 kb)**;
  - Section 9 - Total Organic Carbon **(854 kb)**;
  - Section 10 - Turbidity **(2.7 MB)**;
  - Section 11 - Stream Bottom Deposits **(398 kb)**;
  - Section 12 - Temperature **(449 kb)**;
    - Redondo Creek Model Run **(693 kb)**;
    - Lower San Antonio Creek Model Run **(770 kb)**;
    - Middle San Antonio Creek Model Run **(662 kb)**;
    - Upper San Antonio Creek Model Run **(697 kb)**;
    - Rio Cebolla (2) Model Run **(892 kb)**;
    - Lower Rio de las Vacas Model Run **(484 kb)**;
    - Upper Rio de las Vacas Model Run **(596 kb)**;
    - Lower Rito Peñas Negras Model Run **(609 kb)**;
    - Upper Rito Peñas Negras Model Run **(830 kb)**;
  - Section 13 - Monitoring Plan **(330 kb)**;
  - Section 14 - Implementation Plans **(677 kb)**;
  - Section 15 - Other Implementation Items **(370 kb)**; and
  - Section 16 - Public Participation **(328 kb)**.

- **Appendices:**
  - Appendix A - Conversion Factor Derivation **(296 kb)**;
  - Appendix B - Pollutant Source(s) Documentation Protocol **(490 kb)**;
  - Appendix C - Protocol for the Assessment of Stream Bottom Deposits **(520 kb)**;
  - Appendix D - SSTEMP Program Output **(482 kb)**;
  - Appendix E - Thermograph Summary Data **(996 kb)**; and
  - Appendix F - Response to Public Comment **(291 kb)**.

USEPA Approval Letter **(257 kb)**

Jemez Watershed TMDLs report

http://www.nmenv.state.nm.us/swqb/Jemez_Watershed_TMDLs/Index.html
(accessed March 23, 2004)

The Jemez Watershed requires seven separate TMDL planning documents on nine individual reaches:

- Clear Creek: Turbidity & Total Organic Carbon;
- East Fork of the Jemez River: Turbidity;
- Jemez River: Metals (Chronic aluminum);
- Lower Rio Cebolla: Stream Bottom Deposits;
- Redondo Creek: Temperature & Turbidity;
- Rio de las Vacas: Temperature & Total Organic Carbon;
- Rio Guadalupe: Metals (Chronic aluminum);
- Rito Peñas Negras: Stream Bottom Deposits, Temperature & Total Organic Carbon;
- San Antonio Creek: Temperature & Turbidity;
- Sulphur Creek: pH & Conductivity; and
- Upper Rio Cebolla: Stream Bottom Deposits & Temperature;

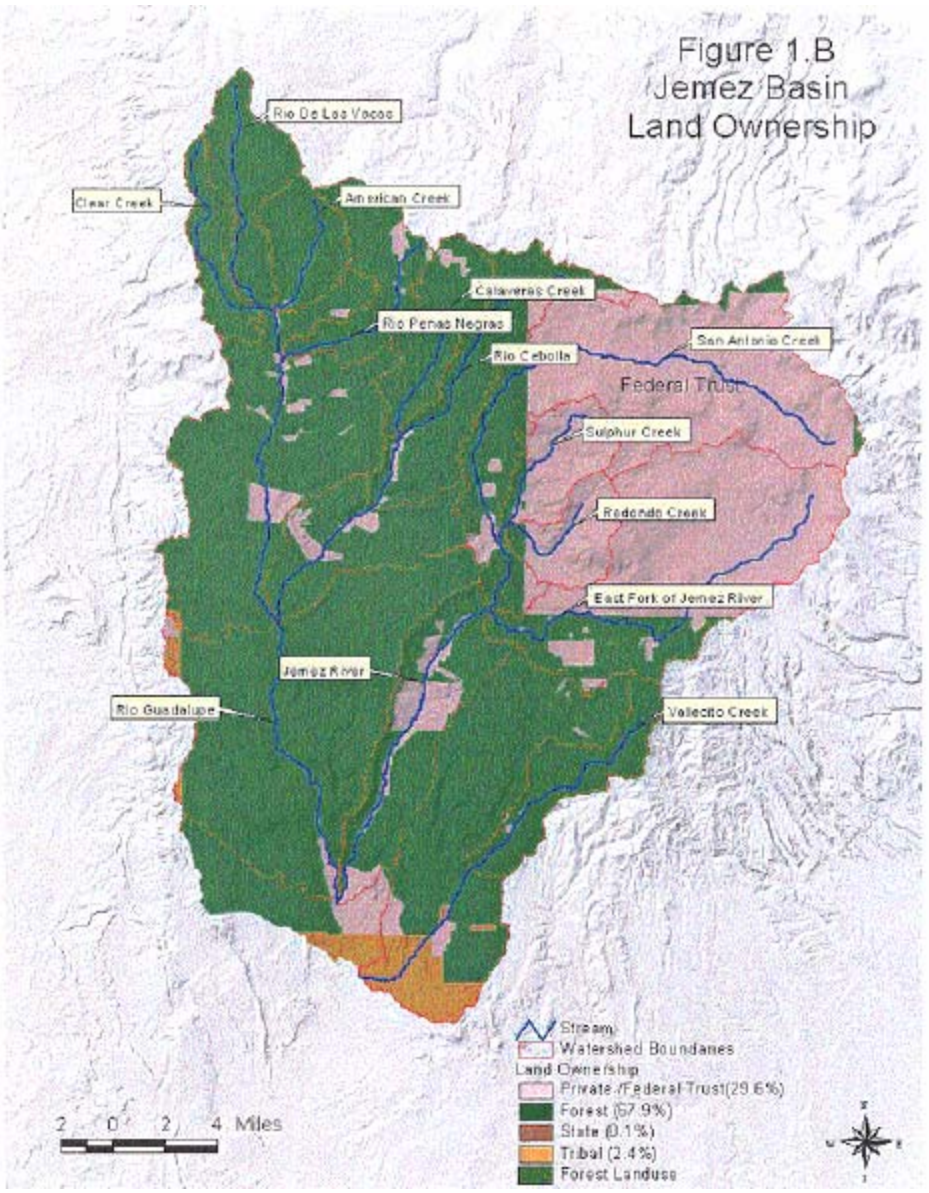


Figure 1.B
Jemez Basin
Land Ownership
Rio De Los Vacos
Clear Creek
American Creek
Calaveras Creek
Rio Penas Negras
Rio Cebolla
San Antonio Creek
Federal Trust
Sulphur Creek
Redondo Creek
East Fork of Jemez River
Jemez River
Rio Guadalupe
Vallecito Creek
Stream
Watershed Boundaries
Land Ownership
Private /Federal Trust(29.6%)
Forest (67.9%)
State (0.1%)
Tribal (2.4%)
Forest Landuse
2 0 2 4 Miles

SECTION 3 - TMDL SUMMARY TABLES

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR SULPHUR CREEK

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
Waterbody Identifier	Sulphur Creek above Redondo Creek to the headwaters NM-2106.A_22 (formerly NM-MRG2-40100)
Parameters of Concern	Conductivity and pH
Uses Affected	High Quality Coldwater Fishery
Total Length Affected	6.8 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	25.4 mi^2 (Study Reach Watershed 13.7 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211) Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Urban (1%), Forest (93%), Range Land (5%), Water (<1%), Barren (<1%)
Identified Sources	Unknown, Natural
Study Reach Watershed Ownership	Federal Trust (88%), Forest Service (12%)
Priority Ranking	4
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	
Conductivity	WLA (0) + LA (2,668.1) + MOS (470.9) = **3,139 lb/day**
pH	WLA (0) + LA (0.0012) + MOS (0.0004) = **0.0016 lb/day**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR REDONDO CREEK

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
Waterbody Identifier	Redondo Creek from mouth on Sulphur Creek to the headwaters NM-2106.A_21
Parameters of Concern	Temperature and Turbidity
Uses Affected	High Quality Coldwater Fishery
Total Length Affected	5.2 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	11.7 mi^2 (Study Reach Watershed 11.7 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211) Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Urban (<1%), Range Land (1.7%), Barren (<1%), Forest (97%), Water (<1%)
Identified Sources	Removal of Riparian Vegetation, Rangeland
Study Reach Watershed Ownership	Federal Trust (93%), Forest Service (7%)
Priority Ranking	4
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	
Temperature	WLA (0) + LA (241.9) + MOS (26.9) = **268.8 joules/meter2/second/day**
Turbidity	WLA (0) + LA (72.1) + MOS (24.0) = **96.1 lb/day**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR SAN ANTONIO CREEK

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
Waterbody Identifier	San Antonio Creek from the confluence with the East Fork of the Jemez River to the headwaters; NM-2106.A_20 (formerly MRG2-40000)
Parameters of Concern	Temperature and Turbidity

Uses Affected	High Quality Coldwater Fishery
Total Length Affected	23.6 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	105 mi^2 (Study Reach Watershed 79.3 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211) Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Urban (<1%), Range Land (15%), Forest (84%), Water (<1%)
Identified Sources	Recreation; Removal of Riparian Vegetation; Streambank Modification/Destabilization; Natural; Siviculture, Land development
Study Reach Watershed Ownership	Federal Trust (80%), Forest Service (20%)
Priority Ranking	4
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	
Temperature	(lower) WLA (0) + LA (234.5) + MOS (26.4) = **263.9 joules/meter2/second/day**
	(middle) WLA (0) + LA (247.1) + MOS (27.5) = **274.6 joules/meter2/second/day**
	(upper) WLA (0) + LA (245.2) + MOS (27.2) = **272.4 joules/meter2/second/day**
Turbidity	WLA (0) + LA (2,663.8) + MOS (888) = **3,551.8 lb/day**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR EAST FORK OF THE JEMEZ RIVER

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
	East Fork of the Jemez River from the confluence with San Antonio Creek to the Waterbody Identifier headwaters; NM-2106.A_10 (formerly MRG2-30000)
Parameters of Concern	Turbidity
Uses Affected	High Quality Coldwater Fishery
Total Length Affected	16.3 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	67.7 mi^2 (Study Reach Watershed 67.7 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211) Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Urban (<1%), RangeLand (24%), Forest (75%), Water (<1%), Barren (<1%)
Identified Sources	Rangeland, Siviculture, Recreation, Streambank Modification/Destabilization
Study Reach Watershed Ownership	Federal Trust (79%), Forest Service (21%)
Priority Ranking	4
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	
Turbidity	WLA (0) + LA (1,771.4) + MOS (590.5) = **2,361.9 lb/day**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR THE JEMEZ RIVER

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
Waterbody Identifier	Jemez River from Rio Guadalupe to the confluence of the East Fork of the Jemez River and San Antonio Creek; NM-2105.5_10 (formerly MRG2-20000)
Parameters of Concern	Metals (Chronic Aluminum)
Uses Affected	High Quality Coldwater Fishery, Coldwater Fishery, Livestock Watering
Total Length Affected	13.4 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	560 mi^2 (Study Reach Watershed 29.3 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211)

	Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Urban (2%), Forest (97%), Agriculture (<1%), Barren (<1%)
Identified Sources	Natural, Unknown
Study Reach Watershed Ownership	Private (28%), Forest Service (72%)
Priority Ranking	1
Number of NPDES Permits on the Reach	2 – Jemez Springs WWTP (NM0028011); Jemez Springs Municipal Schools (NM0028479)
Threatened and Endangered Species	None
TMDL for:	
Metals (Chronic Aluminum)	WLA (0) + LA (93.2) + MOS (16.4) = **109.6 lb/day**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR RIO CEBOLLA (1)

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
Waterbody Identifier	Rio Cebolla (1) from confluence with the Rio de las Vacas to Fenton Lake NM-2106.A_50 (formerly MRG2-20300)
Parameters of Concern	Stream Bottom Deposits
Uses Affected	High Quality Coldwater Fishery
Total Length Affected	9.1 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	65.8 mi^2 (Study Reach Watershed 22.4 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211) Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Forest (99%), Agriculture (<1%), Urban/Water (<1%), Barren (<1%)
Identified Sources	Road Maintenance Runoff, Rangeland
Study Reach Watershed Ownership	Forest Service (89%), Private (11%)
Priority Ranking	4
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	
Stream Bottom Deposits	WLA (0) + LA (15) + MOS (5) = **20% fines (8% Reduction)**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR RIO CEBOLLA (2)

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
Waterbody Identifier	Rio Cebolla (2) from inflow to Fenton Lake to the headwaters, NM 2106.A_52 (formerly MRG2-20400)
Parameters of Concern	Temperature and Stream Bottom Deposits
Uses Affected	High Quality Coldwater Fishery
Total Length Affected	7.0 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	65.8 mi^2 (Study Reach Watershed 27.0 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211) Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Forest (99%), Agriculture (<1%), Urban/Water (<1%), Barren (<1%)
Identified Sources	Agriculture, Road Maintenance Runoff, Removal of Riparian Vegetation
Study Reach Watershed Ownership	Forest Service (89%), Private (3%), Federal Trust (8%)
Priority Ranking	2
Number of NPDES Permits on the	1 – Seven Springs Fish Hatchery (NM0030112)

Reach	
Threatened and Endangered Species	None
TMDL for:	
Stream Bottom Deposits	WLA (0) + LA (15) + MOS (5) = **20% fines (21% Reduction)**
Temperature	WLA (0) + LA (218.2) + MOS (24.2) = **242.4 joules/meter2/second/day**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR RIO DE LAS VACAS

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
Waterbody Identifier	Rio de las Vacas from the confluence with Rio Cebolla to Rito de las Palomas, NM 2106.A_40 (formerly MRG2-20200)
Parameters of Concern	Temperature and Total Organic Carbon (TOC)
Uses Affected	High Quality Coldwater Fishery
Total Length Affected	14 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	122.3 mi^2 (Study Reach Watershed 82.2 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211) Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Forest (99%), Agriculture (<1%), Urban/Water (<1%), Range Land (<1%)
Identified Sources	Removal of Riparian Vegetation, Rangeland, natural, unknown
Study Reach Watershed Ownership	Forest Service (95%), Private (5%)
Priority Ranking	4
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	
TOC	WLA (0) + LA (129.0) + MOS (22.8) = **151.8 lb/day**
Temperature	(lower) WLA (0) + LA (243.01) + MOS (27.0) = **270.01 joules/meter2/second/day**
	(upper) WLA (0) + LA (223.7) + MOS (24.9) = **248.6 joules/meter2/second/day**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR CLEAR CREEK

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
Waterbody Identifier	Clear Creek from the confluence with the Rio de las Vacas to San Gregorio Reservoir; NM-2106.A_54
Parameters of Concern	Turbidity and Total Organic Carbon (TOC)
Uses Affected	High Quality Coldwater Fishery
Total Length Affected	4.6 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	10.6 mi^2 (Study Reach Watershed 10.6 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211) Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Forest (99%), Agriculture (<1%), Urban/Water (<1%)
Identified Sources	Streambank Modification/Destabilization, Natural, Unknown
Study Reach Watershed Ownership	Forest Service (100%)
Priority Ranking	4
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	
Turbidity	WLA (0) + LA (953.9) + MOS (318.0) = **1,271.9 lb/day**
TOC	WLA (0) + LA (31.9) + MOS (6.0) = **37.9 lb/day**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR RITO PEÑAS NEGRAS

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
Waterbody Identifier	Rito Peñas Negras from the mouth on the Rio de las Vacas to the headwaters, NM 2106.A_42 (formerly MRG2-20230)
Parameters of Concern	Stream Bottom Deposits, Temperature, Total Organic Carbon (TOC)
Uses Affected	High Quality Coldwater Fishery
Total Length Affected	11.6 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	17.2 mi^2 (Study Reach Watershed 17.2 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211) Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Forest (96%), Urban/Water (1%), Range Land (3%)
Identified Sources	Road Maintenance/Runoff, Removal of Riparian Vegetation, Streambank Modification/Destabilization, Natural, Rangeland, Unknown
Study Reach Watershed Ownership	Forest Service (94%), Private (6%)
Priority Ranking	4
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	
Stream Bottom Deposits	WLA (0) + LA (15) + MOS (5) = **20% fines (7% Reduction)**
Temperature	(lower) WLA (0) + LA (248.6) + MOS (27.6) = **276.2 joules/meter2/second/day**
	(middle) WLA (0) + LA (246.4) + MOS (27.4) = **273.8 joules/meter2/second/day**
TOC	WLA (0) + LA (41.6) + MOS (7.4) = **49.0 lb/day**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR RIO GUADALUPE

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
Waterbody Identifier	Rio Guadalupe from the mouth on the Jemez River to the confluence of the Rio de las Vacas and Rio Cebolla, NM-2106.A_30 (formerly MRG2-20100)
Parameters of Concern	Metals (Chronic Aluminum)
Uses Affected	High Quality Coldwater Fishery
Total Length Affected	12.4 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	267.7 mi^2 (Study Reach Watershed 79.6 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211), Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Forest (99%), Agriculture (4%), Urban/Water (<1%), Barren (<1%)
Identified Sources	Natural
Study Reach Watershed Ownership	Forest Service (97%), Tribal (2%), Private (1%)
Priority Ranking	3
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	Metals (Chronic Aluminum) WLA (0) + LA (72.2) + MOS (12.7)= **84.9 lb/day**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR AMERICAN CREEK

New Mexico Standards Segment	Rio Grande 20.6.4.108 (formerly 2106)
Waterbody Identifier	American Creek from the mouth of the Rito de las Palomas to the headwaters, NM 2106.A_44 (formerly MRG2-20241)
Parameters of Concern	Turbidity, Temperature, and Stream Bottom Deposits
Uses Affected	High Quality Coldwater Fishery
Total Length Affected	3.8 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	12.3 mi^2 (Study Reach Watershed 12.3 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211), Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Forest (99%), Urban/Range Land/Water/Barren (1%)
Identified Sources	Removal of Riparian Vegetation, Streambank Modification/Destabilization, Rangeland
Study Reach Watershed Ownership	Forest Service (99%), Private (1%)
Priority Ranking	4
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	
Stream Bottom Deposits	WLA+LA+MOS = **lb/day N/A**
Temperature	WLA+LA+MOS = **lb/day N/A**
Turbidity	WLA+LA+MOS = **lb/day N/A**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR UPPER VALLECITO (PALIZA) CREEK

New Mexico Standards Segment	Rio Grande 20.6.4.107 (formerly 2105.5)
Waterbody Identifier	Paliza Creek from Paliza Campground to the headwaters; NM-2105.5_21
Parameters of Concern	Temperature
Uses Affected	High Quality Coldwater Fishery
Total Length Affected	4.5 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	16.2 mi^2 (Study Reach Watershed 16.2 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211) Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Forest (99.5%), Agriculture (<1%), Urban/Water (<1%), Barren (<1%)
Identified Sources	Removal of Riparian Vegetation
Study Reach Watershed Ownership	Forest Service (99%), Private (1%)
Priority Ranking	4
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	
Temperature	WLA+LA+MOS = **lb/day N/A**

TOTAL MAXIMUM DAILY LOAD SUMMARY FOR LOWER VALLECITO CREEK

New Mexico Standards Segment	Rio Grande 20.6.4.107 (formerly 2105.5)
Waterbody Identifier	Vallecito Creek from the eastern Jemez Pueblo boundary to the Village of Ponderosa; NM-2105.5_20 (formerly MRG2-10200)
Parameters of Concern	Temperature, Turbidity, Stream Bottom Deposits
Uses Affected	Coldwater Fishery Secondary Contact
Total Length Affected	5.7 miles
Geographic Location	Rio Grande Basin (Jemez)
Scope/size of Watershed	73.4 mi^2 (Study Reach Watershed 57.2 mi^2)
Land Type	Ecoregions: Southern Rockies (210, 211) Arizona-New Mexico Plateau (220, 221)
Study Reach Land Use/Cover	Forest (98%), Agriculture (<1%), Urban/Water (<1%)
Identified Sources	Recreation, Removal of Riparian Vegetation, Streambank Modification/Destabilization, Rangeland, Hydromodification
Study Reach Watershed Ownership	Forest Service (80%), Private (4%), Tribal (15%), State (1%)
Priority Ranking	4
Number of NPDES Permits on the Reach	0
Threatened and Endangered Species	None
TMDL for:	
Temperature	WLA+LA+MOS = **lb/day N/A**
Turbidity	WLA+LA+MOS = **lb/day N/A**
Stream Bottom Deposits	WLA+LA+MOS = **lb/day N/A**

SECTION 4 – BACKGROUND INFORMATION

A. INTRODUCTION

Section 303(d) of the Federal Clean Water Act requires states to develop Total Maximum Daily Load (TMDL) management plans for water bodies determined to be water quality limited. A TMDL documents the amount of a pollutant a water body can assimilate without violating a state's water quality standards. It also allocates that load capacity to known point sources and nonpoint sources at a given flow. TMDLs are defined in 40 CFR Part 130 as the sum of the individual Waste Load Allocations (WLA) for point sources and Load Allocations (LA) for nonpoint sources, including a margin of safety and natural background conditions.

B. JEMEZ RIVER BASIN DESCRIPTION

The Jemez River Basin is a sub-basin of the Rio Grande Basin, located in northcentral New Mexico. Land uses in the approximately 560-square-mile Jemez River Basin include ranching, irrigated and dry-land agriculture, silviculture, recreation, mining and some urban development (Figure 1.A). One mine was developed for the extraction of copper ore, but has been abandoned. This mine, the Spanish Queen, is located between Jemez Springs and the Pueblo of Jemez and is not known to impact the Jemez River.

Several open-pit pumice mines are located in the basin: the Las Conchas Mine is closed and is in the process of remediation; and the El Cajete Mine is currently operating at the head of Mistletoe Canyon, an ephemeral tributary to the East Fork of the Jemez River. There has been historic exploratory activity in the Gilman area on the lower Rio Guadalupe, although no commercially viable ore was discovered there.

There are three permitted point source discharges in the basin: the Village of Jemez Springs (NPDES Permit No. NM0028011), the Jemez Valley Schools campus (NPDES Permit No. NM0028479), and the New Mexico Department of Game and Fish Seven Springs Fish Hatchery (NPDES Permit No. NM0030112).

Approximately sixty-eight percent of the watershed is managed by the Forest Service, twenty-five percent belongs to a Federal Trust, four percent is private land, two percent is Tribal land, and less than one percent is owned by the state (Figure 1.B).

Streams in the Jemez River basin arise in two distinct geologic settings. In the western region of the basin, Clear Creek, the Rio de las Vacas, and the Rito Peñas Negras originate in Precambrian metamorphic and Permian sedimentary rocks. Streams in the central and eastern regions of the watershed, Calaveras Creek, Rio Cebolla, San Antonio Creek, Sulphur Creek, Redondo Creek, and the East Fork of the Jemez River, originate in volcanic rocks, principally Bandelier tuffs, associated with the Valles Caldera. These differences in geologic provenience account for at least some of the water chemistry differences observed.

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The boundary of the Valles Caldera National Preserve is shown on Figure 1.B and is labeled as Federal Trust. Several stream segments in this TMDL study are located in this vicinity. These streams are impacted by the geologic characteristics and formations of the Caldera, and are specifically mentioned in the following subsections of the report.

C. NEW MEXICO WATER QUALITY STANDARDS

Water quality standards for the areas sampled in the watershed are set forth in sections 20.6.4.107 and 20.6.4.108 (formerly 2105.5 and 2106, respectively) of the New Mexico Water Quality Standards (20.6.4 NMAC, 2000). Designated uses for segment 20.6.4.107, which includes the Jemez River from its confluence with the Rio Guadalupe upstream to State Highway 4 near the town of Jemez Springs and perennial reaches of Vallecito Creek, include coldwater fishery, primary contact, irrigation, livestock watering and wildlife habitat. The standards are as follows:

> 1. In any single sample: temperature shall not exceed 25°C (77°F), pH shall be within the range of 6.6 to 8.8, and turbidity shall not exceed 25 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 200/100 mL; no single sample shall exceed 400/100 mL (see Subsection B of 20.6.4.13 NMAC).

Designated uses for segment 20.6.4.108, which includes the Jemez River and all its tributaries above State Highway 4 near the town of Jemez Springs and the Guadalupe River and all its tributaries, include domestic water supply, fish culture, high quality coldwater fishery, irrigation, livestock watering, wildlife habitat, and secondary contact. The standards are as follows:

> 1. In any single sample: conductivity shall not exceed 400 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 25 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 Section B of 20.6.4.13 NMAC).

D. METHODS

Water quality and benthic macroinvertebrate sampling methods were in accordance with the EPA-approved Quality Assurance Project Plan for Water Pollution Control Programs (NMED, 1998). Fluvial geomorphological surveys were conducted using classification schemes of streams based on geographic region (ecoregion) and stream type (Rosgen, 1996), the methods of Rosgen (Rosgen, 1996). Thermograph procedures were in accordance with the EPA-approved Quality Assurance Project Plan for Water Quality Management Programs (SWQB, 2001) and include documenting instrument accuracy, testing for proper functioning during the deployment

period, and setting criteria for data acceptance.

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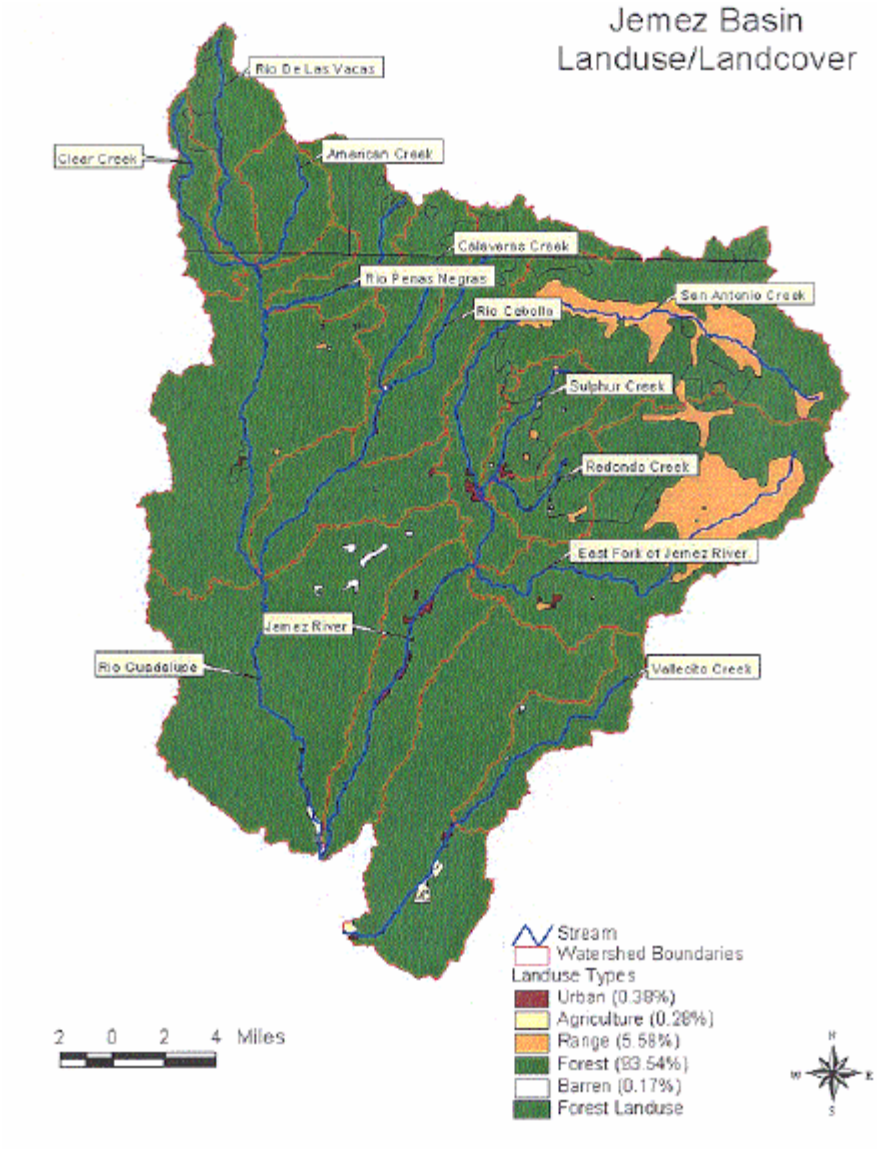
During the period from April 20, 1998, to March 25, 1999, staff of the Surface Water Quality Bureau (SWQB) of the New Mexico Environment Department (NMED) conducted an intensive water quality survey of the Jemez River and its tributaries from the Jemez Pueblo to the headwaters. Sampled tributary streams included the East Fork of the Jemez River, San Antonio Creek, the Rio de las Vacas, the Rito Peñas Negras, the Rio Cebolla, Calaveras Creek, Clear Creek, the Rio Guadalupe, Sulphur Creek, Redondo Creek and Vallecito Creek. This survey was conducted in cooperation with the Pueblo of Jemez and the USGS. Data generated during the survey are being used, in part, in the development of a number of TMDL calculations for streams in the Jemez River Basin that are included in this document.

Surface water quality monitoring stations were established by NMED throughout the basin and were used to characterize the water quality of the stream reaches. As a result of this monitoring effort, exceedances of New Mexico water quality standards for several streams were documented. This TMDL document addresses each stream or stream reach according to constituent (or pollutant) whose standard(s) has been exceeded.


Jemez Basin
Landuse/Landcover
Rio De Las Vacas
Clear Creek
American Creek
Calaveras Creek
Rio Penas Negras
Rio Cebolla
San Antonio Creek
Sulphur Creek
Redondo Creek
East Fork of Jemez River
Jemez River
Rio Guadalupe
Vallecito Creek
2 0 2 4 Miles
Stream
Watershed Boundaries
Landuse Types
Urban (0.38%)
Agriculture (0.28%)
Range (5.58%)
Forest (93.54%)
Barren (0.17%)
Forest Landuse
N
W
E
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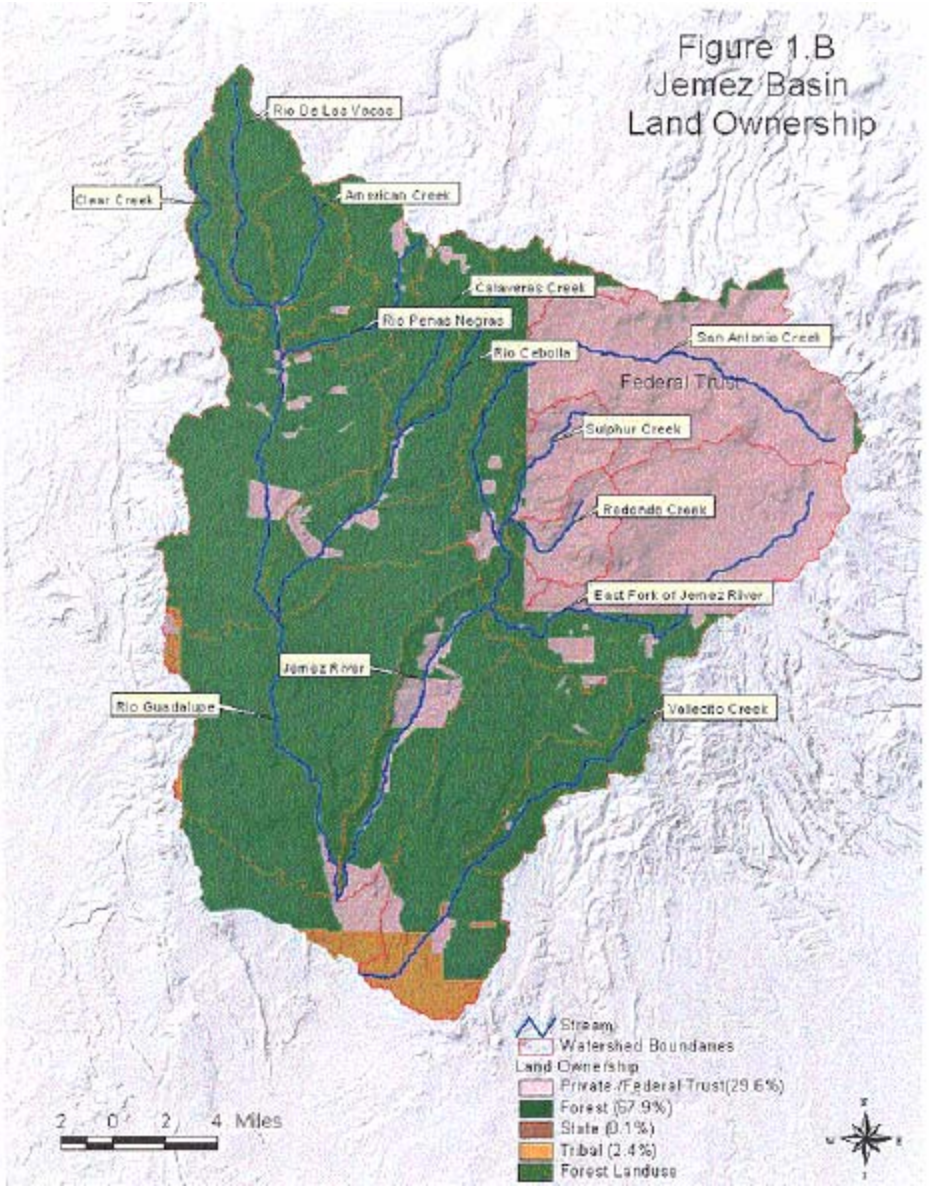


SECTION 5 - INDIVIDUAL WATERSHED DESCRIPTIONS

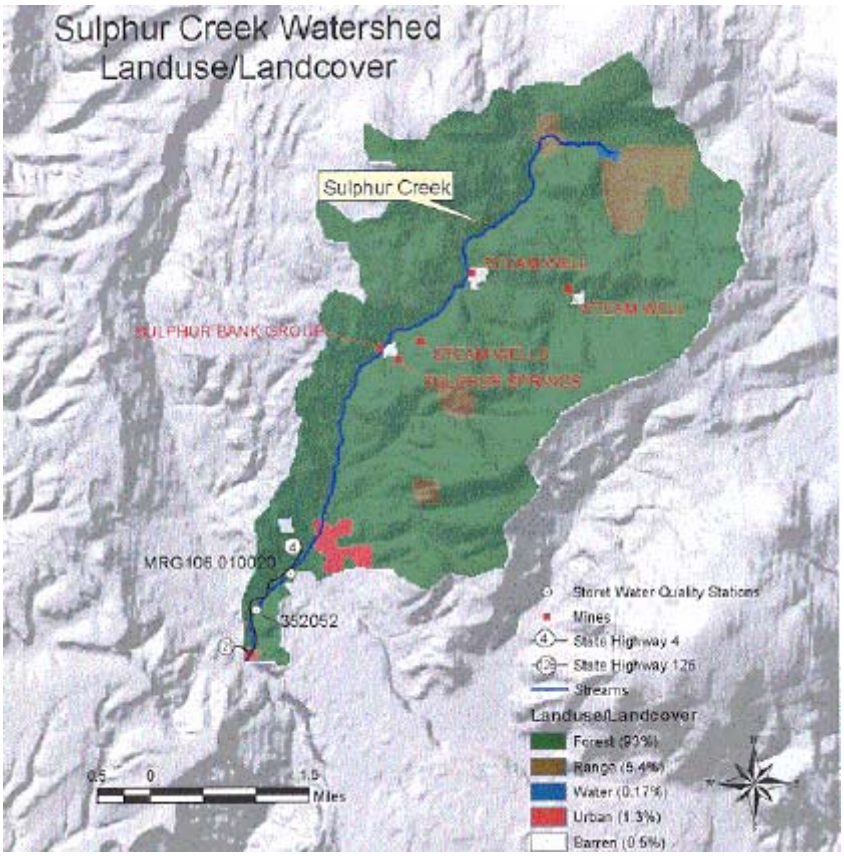
The following subsections describe each individual stream requiring a TMDL within the Jemez River Basin. A total of twelve stream reaches are described as well as the constituent(s) involved in the study. Provided with each subsection are two maps displaying the individual segments' watershed area and the corresponding land cover/use and land ownership, respectively.

5.4 SULPHUR CREEK

The Sulphur Creek Watershed is a sub-basin of the Jemez River Basin, located in northcentral New Mexico. The Jemez River Basin (Figure 1.A), approximately 1043 mi^2, is dominated by both forest and rangeland on mostly U.S. Forest Service, Tribal, and private land. Sulphur Creek from above the confluence with Redondo Creek to the headwaters is a 25.4 mi^2 watershed. The

Jemez River Basin is located primarily on U.S. Forest Service land while approximately ninety percent of the Sulphur Creek watershed is on Federal Trust land (Valles Caldera).

Stations were located throughout the Jemez River Basin to evaluate the impact of tributary streams. As a result of this monitoring effort, several exceedances of New Mexico water quality standards for pH and conductivity were documented on Sulphur Creek. This creek is the only segment in the Jemez River Basin listed in the 2000-2002 §303(d) list of impaired waters for these constituents; and TMDL calculations for pH and conductivity can be found in Sections 6 and 7 of this report, respectively.

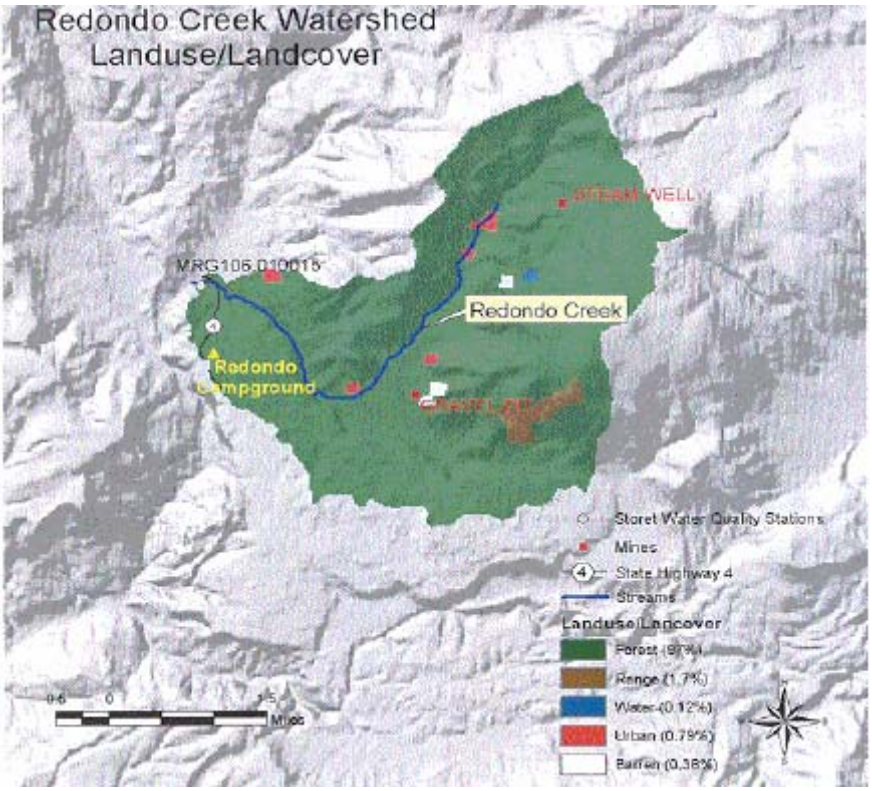


Sulphur Creek rises in the Valle Seco (Dry Valley) within the Valles Caldera. Flow is not perennial above Sulphur Springs, a developed complex of geothermal springs near the western boundary of the caldera. Discharge from these springs is characterized by elevated concentrations of a number of ionic constituents, notably sulfate, as well as carbon dioxide and certain metals. These characteristics are reflected in pH levels regularly below the specified range of 6.6-8.8, depressed alkalinity values, and increased levels of some dissolved constituents relative to adjacent Redondo Creek. Six out of seven pH measurements are below the pH range specified for this stream. There was an exceedance of the turbidity criterion on one of the four days during the spring sampling effort.

5. B REDONDO CREEK

The Redondo Creek Watershed is a sub-basin of the Jemez River Basin, located in northcentral New Mexico. The Jemez River Basin, approximately 1043 mi^2, is dominated by both forest and rangeland (Figure 1.A) on mostly U.S. Forest Service, Tribal, and private land. Redondo Creek from Sulphur Creek to its headwaters is an 11.7 mi^2 watershed. Both the study watershed and the Jemez River Basin are located primarily on U.S. Forest Service Land.

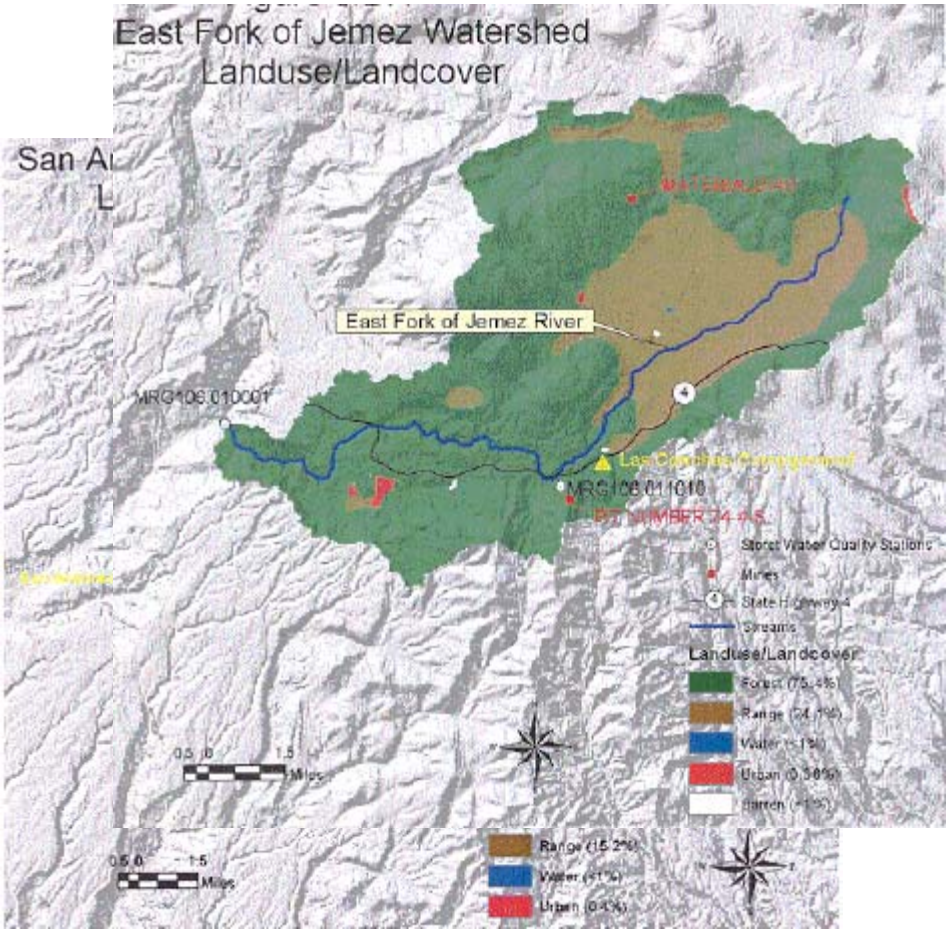
Stations were located throughout the basin to evaluate the impact of tributary streams. As a result of this monitoring effort, several exceedances of New Mexico water quality standards for temperature and turbidity were documented on this segment of Redondo Creek. This creek is listed in the 2000-2002 §303(d) list of impaired waters for these constituents only; and TMDL calculations are in Sections 10 and 12 for turbidity and temperature, respectively.



5.C SAN ANTONIO CREEK

The San Antonio Creek Watershed is a sub-basin of the Jemez River Basin, located in northcentral New Mexico. The Jemez River Basin, approximately 1043 mi^2, is dominated by both forest and rangeland (Figure 1.A) on mostly U.S. Forest Service, Tribal, and private land. The San Antonio Creek from its confluence with the East Fork of the Jemez River to the headwaters (approximately 23.6 miles) is a 105 mi^2 watershed. Both the study watershed and the Jemez River Basin are located primarily on U.S. Forest Service land.

Sampling stations were located throughout the basin to evaluate the impact of tributary streams. As a result of this monitoring effort, several exceedances of New Mexico water quality standards for temperature and turbidity were documented on San Antonio Creek. This creek is listed in the



2000-2002 §303(d) list of impaired waters for these constituents; and TMDL calculations are in Sections 10 and 12 for turbidity and temperature, respectively.

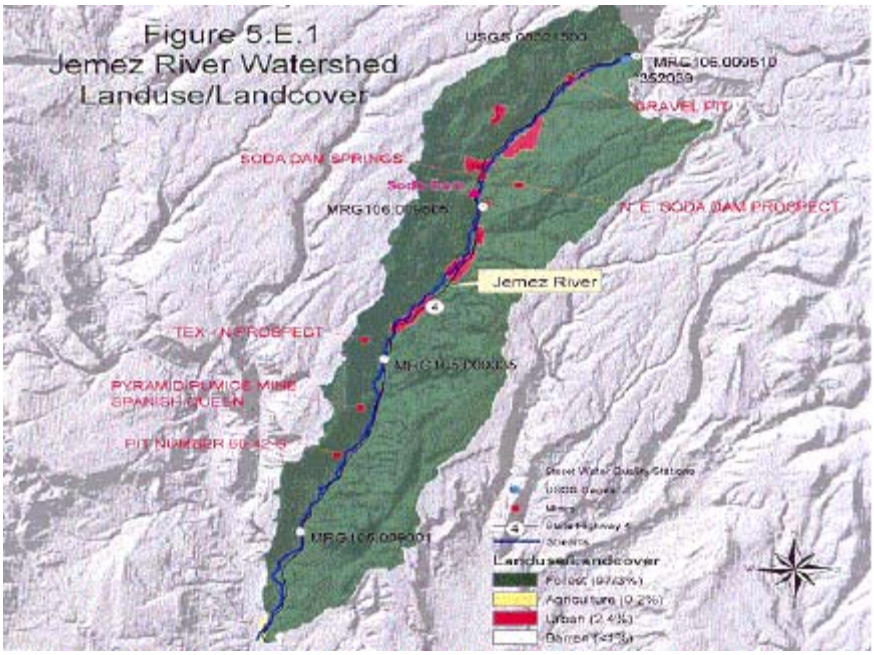
5.D ***EAST FORK OF THE JEMEZ RIVER***

The East Fork of the Jemez River Watershed is a sub-basin of the Jemez River Basin, located in northcentral New Mexico. The Jemez River Basin, approximately 1043 mi^2, is dominated by both forest and rangeland (Figure 1.A) on mostly U.S. Forest Service, Tribal, and private land. The East Fork of the Jemez River from its confluence with San Antonio Creek to its headwaters has a 67.7 mi^2 watershed. Both the study watershed and the Jemez River Basin are located primarily on U.S. Forest Service land.

Sampling stations were located throughout the basin to evaluate the impact of tributary streams. As a result of this monitoring effort, two exceedances of New Mexico water quality standards for turbidity were documented on this 16.3 mile segment of East Fork of the Jemez River. This stream is listed in the 2000-2002 §303(d) list of impaired waters for this constituent only and TMDL calculations for turbidity can be found in Section 10.

5.E ***JEMEZ RIVER***

The Jemez River Watershed is a sub-basin of the Jemez River Basin and is located in northcentral New Mexico. This 1043 mi^2 watershed is dominated by both forest and rangeland (Figure 1.A) on mostly U.S. Forest Service, Tribal, and private land. The Jemez River from Rio Guadalupe to the confluence of the East Fork of the Jemez River and San Antonio Creek is a 45 mi^2 watershed. Both the study watershed and the Jemez River Basin are located primarily on



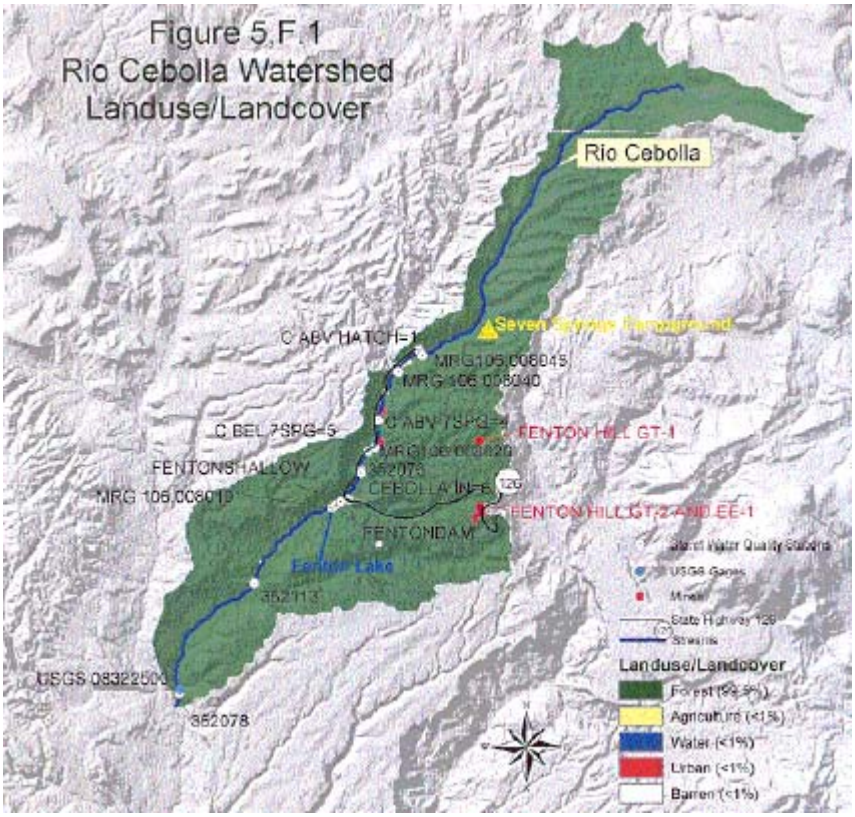
U.S. Forest Service land.

Sampling stations were located throughout the basin to evaluate the impact of tributary streams. As a result of this monitoring effort, several exceedances of New Mexico water quality standards for aluminum (chronic) were documented on this segment of the Jemez River. The Jemez River is listed in the 2000-2002 §303(d) list for assessed stream and river reaches for this constituent only, and TMDL calculations can be found in Section 8 of this document.

5.F ***RIO CEBOLLA (1) & (2) - UPPER & LOWER SEGMENTS***

The Rio Cebolla Watershed is a sub-basin of the Jemez River Basin, located in northcentral New Mexico. The Jemez River Basin, approximately 1043 mi^2, is dominated by both forest and rangeland (Figure 1.A) on mostly U.S. Forest Service, Tribal, and private land. The Rio Cebolla from its confluence with the Rio de las Vacas to the headwaters has a 65.8 mi^2 watershed. Both the study watershed and the Jemez River Basin are located primarily on U.S. Forest Service land.

Sampling stations were located throughout the basin to evaluate the impact of tributary streams. As a result of this monitoring effort, several exceedances of New Mexico water quality standards for temperature and stream bottom deposits were documented on the Rio Cebolla. The Rio Cebolla is divided into two separate segments in the §303(d) list of impaired waters. Throughout this TMDL document each segment of this stream will be discussed individually and can be distinguished by the following: (1) Rio Cebolla from the confluence with the Rio de las Vacas to Fenton Lake, and (2) Rio Cebolla from the inflow to Fenton Lake to the headwaters. The Rio Cebolla (1) segment is approximately 9.1 miles and is listed in the §303(d) list of impaired waters for stream bottom deposits. The Rio Cebolla (2) is approximately 7 miles and is listed for temperature and stream bottom deposits. Both segments of the Rio Cebolla are listed

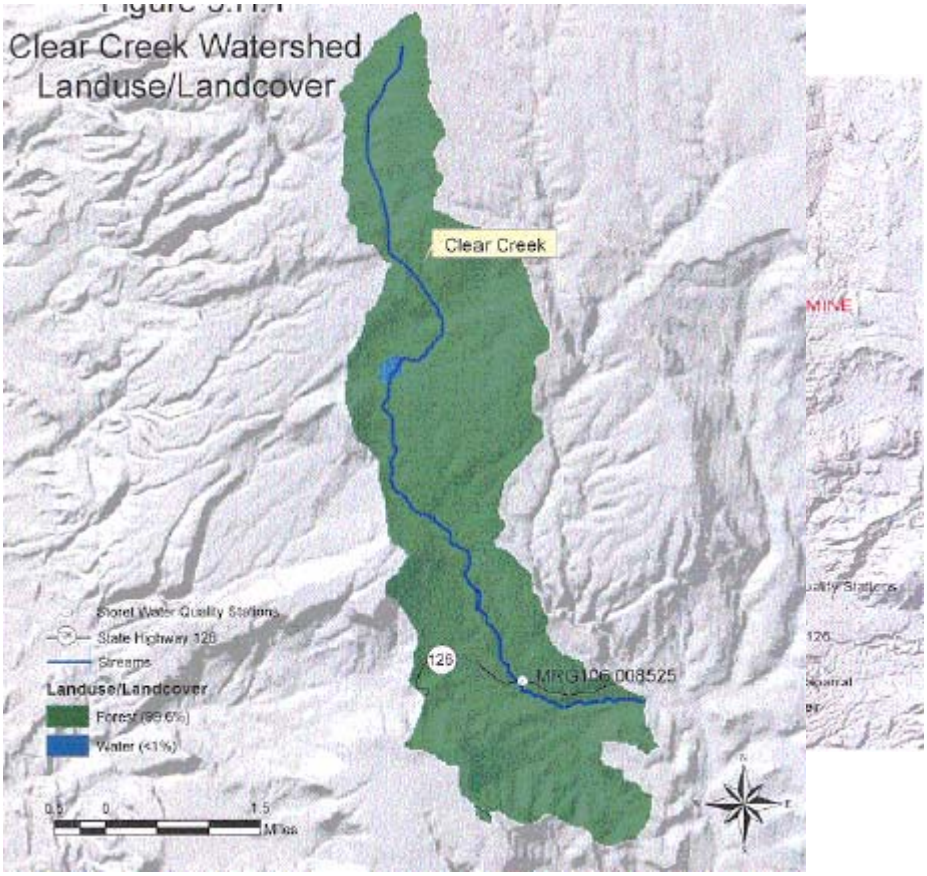


in the 2000-2002 §303(d) list of impaired waters for these constituents only and TMDL calculations can be found in Sections 11 and 12 for stream bottom deposits and temperature, respectively.

5.G ***RIO DE LAS VACAS***

The Rio de las Vacas watershed is a sub-basin of the Jemez River Basin, located in northcentral New Mexico. The Jemez River Basin, approximately 1043 mi^2, is dominated by both forest and rangeland (Figure 1.A) on mostly U.S. Forest Service, Tribal, and private land. The Rio de las Vacas from its confluence with the Rio Cebolla to the confluence with the Rito de las Palomas, is a 123 mi^2 watershed. Both the study watershed and the Jemez River Basin are located primarily on U.S. Forest Service land.

Stations were located throughout the basin to evaluate the impact of tributary streams. As a result of this monitoring effort, several exceedances of New Mexico water quality standards for total organic carbon (TOC) and temperature were documented on this segment of the Rio de las Vacas. The Rio de las Vacas is listed in the 2000-2002 §303(d) list for of impaired waters for

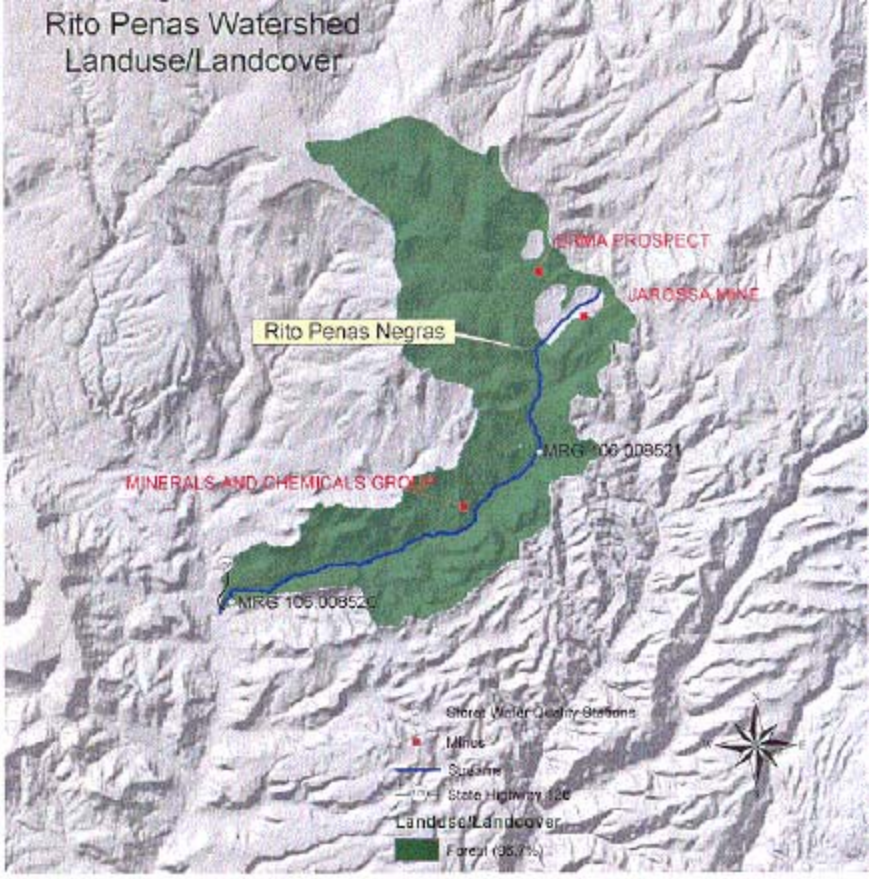


these two constituents only, and TMDL calculations can be found in Sections 9 and 12 of this document.

5.H CLEAR CREEK

The Clear Creek watershed is a sub-basin of the Jemez River Basin, located in northcentral New Mexico. The Jemez River Basin, approximately 1043 mi^2, is dominated by both forest and rangeland (Figure 1.A) on mostly U.S. Forest Service, Tribal, and private land. Clear Creek from its confluence with the Rio de las Vacas to San Gregorio Reservoir is a 10.6 mi^2 watershed. Both the study watershed and the Jemez River Basin are located primarily on U.S. Forest Service land.

Stations were located throughout the Jemez River Basin to evaluate the impact of tributary streams. As a result of this monitoring effort, several exceedances of New Mexico water quality standards for total organic carbon (TOC) and turbidity were documented on this segment of Clear Creek. This creek is listed in the 2000-2002 §303(d) list of impaired waters for these constituents only, and TMDL calculations for TOC and turbidity can be found in Sections 9 and 10, respectively.



5.1 RITO PEÑAS NEGRAS

The Rito Peñas Negras watershed is a sub-basin of the Jemez River Basin, located in northcentral New Mexico. The Jemez River Basin, approximately 1043 mi^2, is dominated by both forest and rangeland (Figure 1) on mostly U.S. Forest Service, Tribal, and private land. The Rito Peñas Negras from the mouth of the Rio de las Vacas to the headwaters is a 24 mi^2 watershed. Both the study watershed and the Jemez River Basin are located primarily on U.S. Forest Service land.

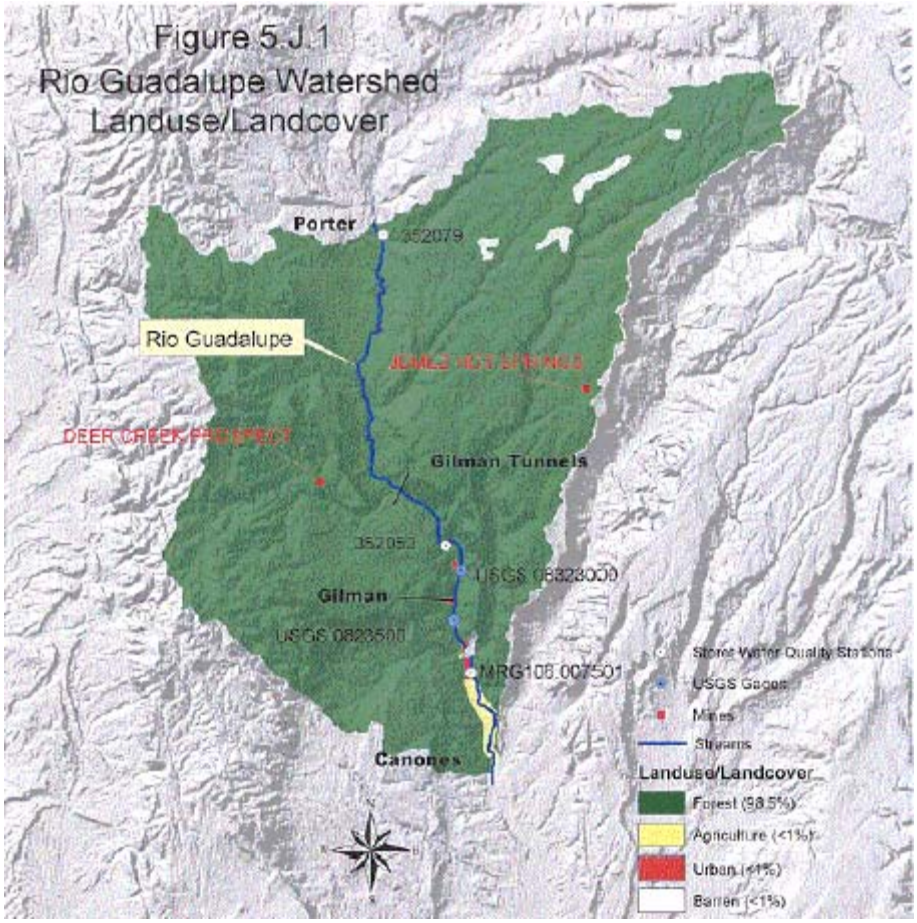
Stations were located throughout the basin to evaluate the impact of tributary streams. As a result of this monitoring effort, several exceedances of New Mexico water quality standards for total organic carbon (TOC), stream bottom deposits and temperature were documented on this segment of Rito Peñas Negras. The Rito Peñas Negras is listed in the 2000-2002 §303(d) list of impaired waters for these three constituents only, and TMDL calculations can be found in Sections 9, 11 and 12, respectively.

5.J RIO GUADALUPE

The Rio Guadalupe Basin is a sub-basin of the Jemez River Basin, located in northcentral New Mexico. The Jemez River Basin, approximately 1043 mi^2, is dominated by both forest and rangeland (Figure 1) on mostly U.S. Forest Service, Tribal, and private land. The Rio Guadalupe from its mouth at the Jemez River to the confluence of the Rio de las Vacas and Rio Cebolla is a 52 mi^2 watershed. Both the study watershed and the Jemez River Basin are located primarily on U.S. Forest Service land.

Stations were located throughout the basin to evaluate the impact of tributary streams. As a result of this monitoring effort, several exceedances of New Mexico water quality standards for metals (dissolved aluminum) were documented on this segment of the Rio Guadalupe. The Rio

Guadalupe is listed in the 2000-2002 §303(d) list of impaired waters for this constituent only and TMDL calculations can be found in Sections 7 of this document.



SECTION 14 – IMPLEMENTATION PLANS

MANAGEMENT MEASURES

Management measures are "economically achievable measures for the control of the addition of pollutants from existing and new categories and classes of nonpoint sources of pollution, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives" (USEPA, 1993). A combination of best management practices (BMPs) and public education will be used to implement this TMDL.

A general implementation plan for activities to be established in the watershed is included in this document. The Surface Water Quality Bureau's Nonpoint Source Pollution Section will further develop the details of this plan. Implementation of recommendations in this document will be

done with full participation of all interested and affected parties. During implementation, additional water quality data will be generated.

As a result, targets will be re-examined and potentially revised; this document is considered to be an evolving management plan. In the event that new data indicate that the targets used in this analysis are not appropriate or if new standards are adopted, the load capacity will be adjusted accordingly. When water quality standards have been achieved, the reach will be removed from the TMDL list.

A. pH

Introduction

The pH scale is a series of numbers that express the degree of acidity (or alkalinity) of a solution. For example, a solution of pH 1 is said to be 10 times as acidic as a solution of pH 2, because the hydrogen ion concentration at pH 1 is ten times the hydrogen ion concentration at pH 2, (Sorenson, 1909; Clark, 1920). Typically, pH ranges from 1 to 14, with a pH of 1 most acidic and pH of 14 least acidic or alkaline. The measure of pH in water is important as aquatic life has evolved around a narrow margin of pH. The suitability of an aquatic environment for fish and plant life is critically dependent on this narrow margin, usually between pH 6 and pH 9.

High/low pH and fluctuations in pH can stress aquatic organisms by affecting their osmotic balance. The pH scale is a series of numbers that express the degree of acidity (or alkalinity) of a solution.

Sources contributing to low or high pH include:

- the composition of soils, surficial deposits, and bedrock,
- excessive algal growths in waterbodies can cause pH to fluctuate,
- resource extraction processes that make highly acidic soils available, and
- surface water runoff in urban areas that can carry waste residue, for example, battery acid or cleaning solvents.

<u>Actions to be Taken</u>

For the Jemez River Basin, one of the issues for primary focus will be control of pH. During the TMDL process in this watershed, point sources have been reviewed and will be addressed through the permit process. The nonpoint source contributions will need to address pH exceedances through BMP implementation.

BMPs can be implemented to address pH exceedances. They include but are not limited to:

1) The use of filter strips or vegetated buffers to decrease nutrient loading. This is a good method to minimize runoff from agricultural fields and storm water drains. This BMP would also prevent sediment loading and turbidity in the river system because the vegetation filters

and slows runoff. (*Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, USEPA, 1993).

2) Detention basins are effective techniques for the control of pollutant discharges from storm water runoff. The catchment basins prevent runoff into a stream by isolating and containing storm water runoff (*Urban Targeting and BMP Selection*, USEPA, 1990).

3) Using a wetland to filter runoff water and sediment from sources on the watershed. Wetlands have been effective in slowing down runoff, and in filtering out sediments, including acidic soils or materials. (*The Use of Wetlands for Improving Water Quality to Meet Established Standards*, Filas, B., and T. Wildeman, 1992.)

Additional sources of information for BMPs to address pH are listed below. Some of these documents are available for viewing at the New Mexico Environment Department, Surface Water Quality Bureau, Watershed Protection Section Library, 1190 St. Francis Drive, Santa Fe, New Mexico.

- Agriculture
- Mining
- Riparian and Streambank
- Stabilization
- Stormwater/Urban
- Miscellaneous
- Construction Sites

Milestones

Milestones will be used to determine if control actions are being implemented and standards attained. For this TMDL, several milestones will be established which will vary and will be determined by the BMPs implemented. Examples of milestones for pH include:

- increase the miles of vegetative buffers between resource extraction activities and the stream.
- percentage of restored riparian buffers in the watershed
- percentage of installation of detention ponds for stormwater runoff.
- percentage reduction in nutrient sources to the watershed.

Milestones will be coordinated by SWQB staff and will be re-evaluated periodically, depending on which BMPs were implemented. Further implementation of this TMDL will be revised based on this reevaluation. As additional information becomes available during the implementation of the TMDL, the targets, load capacity, and allocations may need to be changed. In the event that new data or information show that changes are warranted, TMDL revisions will be made with assistance of watershed stakeholders. The re-examination process will involve: monitoring pollutant loading, tracking implementation and effectiveness of controls, assessing water quality trends in the waterbody, and re-evaluating the TMDL for attainment of water quality standards. Although specific targets and allocations are identified in the TMDL, the ultimate success of the TMDL is not whether these targets and allocations are met, but whether beneficial uses and water quality standards are achieved.

B. CONDUCTIVITY

Introduction

Conductivity is an indication of the number of inorganic dissolved ions in the water column. Conductivity is affected by temperature; warmer water will measure relatively higher conductivity results.

Conductivity is used as a measure of stream water quality as this measure tends to have a relatively constant range within a stream. Significant changes from baseline data can indicate that a discharge or an activity resulting in nonpoint source discharge has entered the stream system. For example, a return flow from an irrigated field may contribute a dissolved salt load from groundwater sources or from the soil. A system impacted with higher than normal conductivity levels can have a detrimental affect on the biota of a natural system. Just as an excess of soil salinity damages agricultural crops, salts in streams can be detrimental to aquatic flora and fauna.

Under natural conditions, the conductivity of the stream is generally based on the geology of the watershed. Water coming in contact with soils and erodible source rock material will dissolve salts especially when soil drainage is poor. As mentioned earlier, temperature factors in the process of dissolving salts. Naturally occurring geothermal activity can contribute to high conductivity levels. All these factors determine baseline data. Additional sources, such as point sources from failing septic systems, or drainage from confined animal operations, will change the conductivity, depending the constituents of the runoff.

Examples of sources that can cause excessive conductivity levels include but are not limited to:

- nonpoint source contributions of additional salts including agricultural field runoff or irrigation return,
- extensive use of deicing salts or dust reduction compounds on roads,
- and mining activities.

<u>Actions to be Taken</u>

For the Jemez River Basin, one of the issues for primary focus will be the control of specific conductance or the conductivity of water.

During the TMDL process in this watershed, the point sources have been reviewed and will be addressed through the permit process. The nonpoint source contributions will need to address conductivity exceedances through BMP implementation.

BMPs can be implemented to address and remediate conductivity exceedances. They include but are not limited to:

1. The use of a filter strip or vegetated buffer. This is particularly advantageous for runoff from agricultural fields, road de-icing, road erosion, stormdrains and resource extraction activities

by filtering and reducing the temperature of the water. This BMP would also prevent sediment loading and turbidity in the river system. (Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, USEPA, 1993.)

2. The management of the application of fertilizers or any other field additive and the application of road salts. An over-supply of applied material in crops not used by plants will dissolve in rainwater and will become mobilized in runoff, or will be carried in irrigation return flow. In road maintenance, management of road deicers, including sodium and magnesium chlorides, is economically advantageous. Education on the application of road salts, to minimize extensive runoff should be approached immediately, especially in areas where highways and roads are adjacent to river systems. (Field Agricultural Runoff Monitoring (FARM) Manual, USEPA, 1985, and Highway Deicing, Comparing Salt & Calcium Magnesium Acetate, Transportation Research Board, National Research Council, 1991).

3. Address the placement of mine tailings and holding ponds away from potential runoff if conductivity is contributed through a resource extraction activity. Segregating easily erodible tailings and holding ponds can reduce the impacts to a river system by keeping sediments out of the runoff to a stream. (Technical Manual for the Design and Operation of a Passive Mine Drainage Treatment System, Cohen, R.R.H., and S. W. Staub, 1992.)

Additional sources of information for BMPs to address conductivity are listed below. Some of these documents are available for viewing at the New Mexico Environment Department, Surface Water Quality Bureau, Watershed Protection Section Library, 1190 St. Francis Drive, Santa Fe, New Mexico.

- Agriculture
- Mining
- Riparian and Streambank Stabilization
- Roads and Construction
- Stormwater
- Miscellaneous
- Construction Sites

Milestones

Milestones will be used to determine if control actions are being implemented and standards attained. For this TMDL, several milestones will be established which will vary and will be determined by the BMPs implemented. Examples of milestones for metals include:

- percentage reduction of sediment into the stream.
- increased educational efforts to agencies that manage roads to promote better management of road salt dispersal.
- reduction of salts in return flow irrigation systems.

Milestones will be coordinated by SWQB staff and will be re-evaluated periodically, depending on which BMPs were implemented. Further implementation of this TMDL will be revised based

on this reevaluation. As additional information becomes available during the implementation of the TMDL, the targets, load capacity, and allocations may need to be changed. In the event that new data or information show that changes are warranted, TMDL revisions will be made with assistance of Jemez River Basin stakeholders. The re-examination process will involve: monitoring pollutant loading, tracking implementation and effectiveness of controls, assessing water quality trends in the waterbody, and re-evaluating the TMDL for attainment of water quality standards. Although specific targets and allocations are identified in the TMDL, the ultimate success of the TMDL is not whether these targets and allocations are met, but whether beneficial uses and water quality standards are achieved.

C. METALS

Introduction

The uptake and transport of metals in surface waters can pose a considerable nonpoint source pollution problem. Metals such as aluminum, lead, copper, iron, zinc and others can occur naturally in watersheds in amounts ranging from trace to highly mineralized deposits. Some metals are essential to life at low concentrations but are toxic at higher concentrations. Metals such as cadmium, lead, mercury, nickel, and beryllium represent known hazards to human health. The metals are continually released into the aquatic environment through natural processes, including weathering of rocks, landscape erosion, geothermal or volcanic activity.

The metals may be introduced into a waterway via headcuts, gullies or roads. Depending on the characteristics of the metal, it can be dissolved in water, deposited in the sediments or both. Metals become dissolved metals in water as a function of the pH of a water system. In urban settings, stormwater runoff can increase the mobilization of many metals into streams.

Examples of sources that can cause metals contamination:

• Activities such as resource extraction, recreation, some agricultural activities and erosion can contribute to nonpoint source pollution of surface water by metals.
• Stormwater runoff in industrial areas may have elevated metals in both sediments and the water column.

<u>Actions to be Taken</u>

For the Jemez River Basin, one of the primary focuses will be on the control of aluminum. During the TMDL process in this watershed, point sources have been reviewed and will be addressed through the permit process. The nonpoint source contributions will need to address aluminum exceedances through BMP implementation.

BMPs can be implemented to address and remediate metal contamination. They include, but are not limited to:

1. Improving the pH in a stream. Neutral to alkaline pH waters will generally not pose a metal exceedance problem. An acidic pH will dissolve available metals. In such a case, a remedy

for metals contamination could be an adjustment of the pH of runoff before it enters the water body. An approach may be the construction of an anoxic alkaline drain to raise the pH and precipitate the contained metals. An anoxic alkaline drain is constructed by placing a high pH material in a trench between runoff and the stream to be used as a buffer (Red River Groundwater Investigation- NMED-SWQB-Nonpoint Source Pollution Section, D. Slifer, 1996).

2. Wetlands are used to filter runoff water and sediment from source areas in the watershed. Metals may be bound up in the root systems of wetlands vegetation, preventing them from entering a waterway. (The Use of Wetlands for Improving Water Quality to Meet Established Standards, Filas and Wildeman, 1992.)

3. A method for reducing metals used in controlled situations includes the use of sulfate and sulfate reducing bacteria. The sulfate, (if not already present), and the sulfate reducing bacteria are applied into the water column. This provides a mechanism for some metals to precipitate out of solution. (A Treatment of Acid Mine Water Using Sulfate-Reducing Bacteria, Wakao, Saurai, and Shiota, 1979).

4. Stormwater and construction BMPs can be used to divert flows off metal-producing areas directing them away from streams into areas where the flows may infiltrate, evaporate, or accumulate in sediment retention basins. (Conservation Design for Stormwater Management: A Design Approach to Reduce Stormwater Impacts from Land Development and Achieve Multiple Objectives Related to Land Use, Delaware Department of Natural Resources and Environmental Control, Sediment and Stormwater Program & the Environment Management Center, Brandywine Conservancy, 1997.

Additional sources of information for BMPs to address metals are listed below. Some of these documents are available for viewing at the New Mexico Environment Department, Surface Water Quality Bureau, Watershed Protection Section Library, 1190 St. Francis Drive, Santa Fe, New Mexico.

- Mining
- Riparian and Streambank Stabilization
- Stormwater / Urban
- Miscellaneous
- Construction Sites

Milestones

Milestones will be coordinated by SWQB staff and will be re-evaluated periodically, depending on which BMPs were implemented. Further implementation of this TMDL will be revised based on this reevaluation. As additional information becomes available during the implementation of the TMDL, the targets, load capacity, and allocations may need to be changed. In the event that new data or information show that changes are warranted, TMDL revisions will be made with assistance of Jemez River Basin stakeholders. The re-examination process will involve: monitoring pollutant loading, tracking implementation and effectiveness of controls, assessing water quality trends in the waterbody, and re-evaluating the TMDL for attainment of water

quality standards. Although specific targets and allocations are identified in the TMDL, the ultimate success of the TMDL is not whether these targets and allocations are met, but whether beneficial uses and water quality standards are achieved.

D. TOTAL ORGANIC CARBON

Introduction

Most organic carbon in water occurs as partly degraded plant and animal materials, some of which are resistant to microbial degradation. Biochemical Oxygen Demand (BOD or BOD5) is an indirect measure of biodegradable organic compounds in water. The BOD of wastewater is a common indicator of the fraction of organic matter that may be degraded by microbial action, in a given time period, at a temperature of 20 degrees Centigrade. The test is related to the oxygen that would be required to stabilize the quantity of organic material capable of being oxidized, after discharging to a receiving body of water.

TOC measurements have been used as a method for determining pollution levels of wastewater for many years. Total organic carbon consists of two fractions: dissolved organic carbon and particulate organic carbon. TOC provides an indications of the total organic material present. It is often used as an indicator (but not a measure) of the amount of waste available for biodegradation. TOC includes the carbon both from naturally occurring organic material and organic chemical contaminants. By using TOC measurements, the number of carbon-containing compounds in a source can be determined. This is important because knowing the amount of carbon in a freshwater stream is an indicator of the organic character of the stream (Federal Remediation Technology Roundtable, 1998).

The aquatic life guidelines (HQCWF standard) is expressed in terms of total TOC concentrations.

Changes in the concentrations of TOC, and its dissolved organic carbon fraction (DOC), can cause reductions in primary productivity, system metabolism, while increasing susceptibility to toxic metals and acidifications. Increases in organic carbon concentrations can increase bacterial metabolism to the point of causing anoxic conditions. This generates a by-product of over enrichment of a receiving water body.

The production of haloforms in drinking source water, as a result of the reaction between organic carbon compounds and hypochlorous acid (chlorine disinfection), is a serious drinking water quality issue. A study with drinking water supplies in the US has shown that the probability of exceeding the trihalomethane concentration of 100 micrograms/L, following chlorination, is minimal for the finished drinking water containing total organic carbon levels of less than or equal to 2 mg/L.

The recently issued Disinfectants and Disinfection By-Products Rule by the US Environmental Protection Agency specifies maximum total organic carbon levels of 2 mg/L in treated water and 4 mg/L in source water to ensure acceptable levels of disinfection byproducts.

Through source water treatment technology, a positive correlation has been shown, that t reduction in source water turbidity produces a reduction in TOC. Turbidity removal, along with the color of the water, are key features or raw surface waters that influence the application of coagulation in treating water for drinking water purposes. For example, the flocculent dose needed in treating source water for drinking, is strongly determined by the sum of the negative surface charges of inorganic particles (clay and loam), organic particles (algal cells) and naturally occurring dissolved macromolecular organics (all potential components of a TOC measurement). The reduction in turbidity, with coagulant dosing, contrasts changes in levels/concentrations or other parameters such as TOC/DOC, UV absorbance and color. (J. van Leeuwen, et al., 1998).

The State of New Mexico has not established a drinking water quality guideline for dissolved to total organic carbon. However, it has recommended guidelines for parameters that are related to dissolved and total organic carbon. Many drinking water quality issues associated with high levels of organic carbon may be addressed through total dissolved solids standards and turbidity (maximum acceptable concentration: 10 NTU) restrictions.

Wildlife can be directly or indirectly affected by changes in organic carbon levels in aquatic systems. Studies have also shown that total organic carbon is strongly correlated with water color. For instance, abundance of loons in aquatic environments in Canada, which require clear water to sight their prey, have been negatively correlated with TOC and DOC levels which render aquatic systems highly colored. Organic carbon forms complexes with some metals (e.g., cadmium, copper, etc.), thus reducing their availability and toxicity to aquatic organisms. Conversely, mercury availability, bioaccumulation in fish and hence toxicity tend to increase in the presence of organic carbon. Indirect effects arise because organic carbon plays an important role in the productivity of aquatic systems and response of the aquatic systems to factors such as acid inputs (Water Management Branch, Environmental and Resource Management, Ministry of Environment, Lands and Parks, Canada).

Appropriate considerations must be given to these aspects when the existing water quality is assessed in an aquatic environment. Effects of organic carbon content in the aquatic environment should be assessed together with actual production of trihalomethanes after chlorination in drinking water, metal concentrations and their bioavailability, and compliance with related water quality guidelines (e.g., THM, color, turbidity, etc, in drinking and ambient waters)(Water Management Branch, Environmental and Resource Management, Ministry of Environment, Lands and Parks, Canada).

Actions to be Taken

For the Jemez River Basin, one issue of primary focus will be control of TOC.

During the TMDL process in this watershed, point sources have been reviewed and will be addressed through the permit process. The nonpoint source contributions will need to address total organic carbon exceedences through BMP implementation.

There are a number of BMPs that can be utilized to address TOC, depending on the source. Such BMPs include:

1. Protection and/or development of healthy riparian buffer strips to serve as filers for soils and potential contaminants that are transported during surface runoff. This runoff could be the result of activities in the watershed that disturb soils or cause a loss of vegetative ground cover. The riparian vegetation also helps to stabilize riverbanks with root structure which prevents excessive bank erosion and helps maintain the stability and natural morphology of the stream system. (Stream Corridor Restoration – Principles, Processes and Practices, The Federal Interagency Stream Restoration Working Group, 1998);

2. Placement of silt fences between roads and watercourses to prevent soils and contaminants, that are disturbed during road and other construction activities, from being carried into watercourses. Silt fences act as a filter to trap sediment that is carried during runoff events. When maintained properly, these silt fences are an effective erosion control measure that can be used throughout the State. (Erosion and Sediment Control Manual, Environment Department, Surface Water Quality Bureau, 1993);

3. Placement of straw mulch on soils that have lost cover from vegetative groundcover during severe forest fires. The straw mulch helps prevent erosion during rainstorms and snowmelt by holding the bare topsoil and ash in place. The mulch can also aid in the infiltration of water and replace ground litter. This method works well on gentle slopes where there is not wind. (Cerro Grande Fire Burned Area Emergency Rehabilitation (BAER) Plan, Interagency Baer Team, 2000).

Additional sources of information for possible BMPs to address TOC, as resulting from organic carbon contributions, are listed below. Some of these documents are available for viewing at the New Mexico Environment Department, Surface Water Quality Bureau, Watershed Protection Section Library, 1190 St. Francis Drive, Santa Fe, New Mexico.

- Agriculture
- Forestry
- Riparian and Streambank Stabilization
- Roads
- Stormwater
- Miscellaneous
- Construction Sites

Milestones

Milestones will be used to determine if control actions are being implemented and standards attained. For these TMDLs, several milestones will be established which will vary and will be determined by the BMPs implemented. Examples of milestones for TOC include a decrease in total organic carbon measurements, erosion from streambanks, an increase in established riparian vegetation, or an increase in the miles of properly maintained roads.

Milestones will be coordinated by SWQB staff and will be re-evaluated periodically, depending on which BMPs were implemented. Further implementation of this TMDL will be revised based on this reevaluation. As additional information becomes available during the implementation of

the TMDL, the targets, load capacity, and allocations may need to be changed. In the event that new data or information show that changes are warranted, TMDL revisions will be made with assistance of watershed stakeholders. The re-examination process will involve: monitoring pollutant loading, tracking implementation and effectiveness of controls, assessing water quality trends in the waterbody, and re-evaluating the TMDL for attainment of water quality standards. Although specific targets and allocations are identified in the TMDL, the ultimate success of the TMDL is not whether these targets and allocations are met, but whether beneficial uses and water quality standards are achieved.

E. TURBIDITY

Introduction

Turbidity is a measurement of the reduction of the penetration of light through natural waters and is caused by the presence of suspended particles. Turbidity is a qualitative measure of water clarity or opacity and is reported in Nephelometric turbidity units (NTU).

The turbidity standard addresses excessive sedimentation, which can lead to the formation of bottom deposits that can impact the aquatic ecosystem. Suspended solids such as clay, silt, ash, plankton, and organic materials generally cause turbidity. Some level of turbidity is a function of a stream's natural process of moving water and sediment.

Examples of sources that can cause excessive turbidity include:

- Runoff from exposed soil (such as construction sites),
- Improperly maintained roads,
- Eroded streambanks,
- Activities that occur within a stream channel (such as runoff events),
- Removal of riparian vegetation, and
- In some cases, naturally occurring situations such as runoff events.

<u>Actions to be Taken</u>

A combination of best management practices (BMPs) will be used to implement this TMDL. For this watershed the focus will be on sediment control. BMPs in this area will include proper road maintenance practices and drainage controls, improved grazing management practices, relocation of established recreation sites away from riparian areas, the development of defined roads, parking, and camping areas to discourage uncontrolled dispersed camping and the creation of new roads, riparian plantings, and hydrogeomorphic river restoration. The SWQB will work with the New Mexico State Highway and Transportation Department (NMSHD), the USDA Forest Service (FS), Jemez Pueblo, and private landowners in implementing these BMPs throughout the watershed.

Presently, the FS is addressing several sources of NPS pollution that originate on properties managed by the FS in this watershed. Such activities and proposals include: timber thinning and prescribed fire to prevent catastrophic wildfires and to improve groundcover and watershed

conditions, improved grazing management, road closures, relocation of roads out of riparian areas, improvements to existing recreation sites to protect riparian areas, and fencing of riparian areas to exclude livestock and vehicles. The SWQB will continue coordination with the FS in implementing BMPs in this watershed.

Stakeholder and public outreach and involvement in the implementation of this TMDL will be ongoing. Stakeholder participation will include choosing and installing BMPs, as well as potential volunteer monitoring. Stakeholders in this process will include: SWQB, FS, NMSHD, local government, private landowners, tribes, environmental groups, and the general public. Additional sources of information for BMPs to address turbidity are listed below. Some of these documents are available for viewing at the New Mexico Environment Department, Surface Water Quality Bureau, Watershed Protection Section Library, 1190 St. Francis Drive, Santa Fe, New Mexico.

- Agriculture
- Forestry
- Riparian and Streambank Stabilization
- Roads
- Stormwater
- Miscellaneous
- Construction Sites

Milestones

Milestones will be used to determine if control actions are being implemented and standards attained. For these TMDLs, several milestones will be established which will vary and will be determined by the BMPs implemented. Examples of milestones for turbidity include a decrease in total organic carbon measurements, erosion from streambanks, an increase in established riparian vegetation, or an increase in the miles of properly maintained roads.

Milestones will be coordinated by SWQB staff and will be re-evaluated periodically, depending on which BMPs were implemented. Further implementation of this TMDL will be revised based on this reevaluation. As additional information becomes available during the implementation of the TMDL, the targets, load capacity, and allocations may need to be changed. In the event that new data or information show that changes are warranted, TMDL revisions will be made with assistance of watershed stakeholders. The re-examination process will involve: monitoring pollutant loading, tracking implementation and effectiveness of controls, assessing water quality trends in the waterbody, and re-evaluating the TMDL for attainment of water quality standards. Although specific targets and allocations are identified in the TMDL, the ultimate success of the TMDL is not whether these targets and allocations are met, but whether beneficial uses and water quality standards are achieved.

F. STREAM BOTTOM DEPOSITS

Introduction

Stream bottom deposits in rivers are the result of excessive sediment carried either from erosion from the watershed or from eroding riverbanks. Clean stream bottom substrates are essential for optimum habitat for many fish and aquatic insect communities. Excessive sediment deposits can negatively affect aquatic life. Bottom deposits can smother eggs, choke spawning habitats, and alter invertebrate species composition. Macroinvertebrates can be affected by habitat reduction, and changes resulting in increased drift, and decreased respiration.

The following are examples of sources of sedimentation that result in stream bottom deposits:

- runoff from construction activities within floodplain and riparian areas,
- poorly constructed or maintained roads especially those located in riparian areas,
- road and trail river crossings that act as direct conduits of sediment into the river,
- removal of riparian vegetation,
- recreation areas located alongside rivers, and
- runoff from agricultural activities

Actions to be Taken

For the Jemez River Basin, one of the issues for primary focus will be control of stream bottom deposits.

During the TMDL process in this watershed, point sources have been reviewed and will be addressed through the permit process. The nonpoint source contributions will need to address stream bottom deposits through BMP implementation.

There are a number of BMPs that can be utilized to address stream bottom deposits, depending on the source of the sediment. Such BMPs include:

1. Closure of sensitive areas such as riparian areas to Off Road Vehicle (ORV) use. Vehicles in riparian areas can tear up protective ground cover and expose soils to erosion. Ruts from vehicles also channelize the flow of water causing gully formation and increased erosion and sedimentation into the adjacent river. (Soil and Water Conservation Practices Handbook, USDA Forest Service, Southwestern Region.).

2. Construction of roads away from watercourses and assurance of an adequate buffer strip of vegetation between roads and watercourses. Buffer strips are an easy and effective BMP for water quality protection. In addition to the benefits of riparian areas for shading and bank stabilization, sufficiently wide buffers act as filters to prevent sediment from reaching watercourses during runoff events. (Water Quality Protection Guidelines for Forestry Operations in New Mexico, 1983, New Mexico Natural Resources Department, Forestry Division, 1983).

3. Removal of Pinon and Juniper overgrowth in watersheds allows for the regeneration of a healthy groundcover of grasses. Without these healthy grasslands to provide a surface for water to infiltrate, watersheds can contribute large amounts of sediment that is washed from the land surface or scoured from eroding gullies into the rivers that drain the watercourses

(Watershed Restoration Through Integrated Resource Management on Public and Private Rangelands, Goodloe, Sid. and Alexander, Susan).

Additional sources of information for possible BMPs to address stream bottom deposits are listed below. Some of these documents are available for viewing at the New Mexico Environment Department, Surface Water Quality Bureau, Watershed Protection Section Library, 1190 St Francis Drive, Santa Fe, New Mexico.

- Agriculture
- Forestry
- Riparian and Streambank Stabilization
- Roads
- Stormwater
- Miscellaneous
- Construction Sites

Milestones

Milestones will be used to determine if control actions are being implemented and standards attained. For this TMDL, several milestones will be established which will vary and will be determined by the BMPs implemented. Examples of milestones for stream bottom deposits include:

- a measured decrease in the percent of the bed surface covered by fines,
- a decrease in cobble embeddedness,
- removal of a poorly constructed dirt road from a riparian area,
- successful riparian plantings in a given reach of river.

Milestones will be coordinated by SWQB staff and will be re-evaluated periodically, depending on which BMPs were implemented. Further implementation of this TMDL will be revised based on this reevaluation. As additional information becomes available during the implementation of the TMDL, the targets, load capacity, and allocations may need to be changed. In the event that new data or information shows that changes are warranted, TMDL revisions will be made with assistance of watershed stakeholders. The re-examination process will involve: monitoring pollutant loading, tracking implementation and effectiveness of controls, assessing water quality trends in the waterbody, and re-evaluating the TMDL for attainment of water quality standards. Although specific targets and allocations are identified in the TMDL, the ultimate success of the TMDL is not whether these targets and allocations are met, but whether beneficial uses and water quality standards are achieved.

G. TEMPERATURE

Introduction

Water temperature influences the metabolism, behavior, and mortality of fish and other aquatic organisms that affect fish. Natural temperatures of a waterbody fluctuate daily and seasonally. These natural fluctuations do not eliminate indigenous populations, but may affect existing

community structure and geographical distribution of species. Anthropogenic impacts can lead to modifications of these natural temperature cycles, often leading to deleterious impacts on the fishery.

The following are examples of sources that can cause temperature exceedances:

- Lack of shading caused by removal of riparian vegetation,
- Streambank destabilization,
- Reduced base flows caused by such activities as removal of riparian vegetation and manipulation of flows by dams,
- Excessive turbidity,
- Alterations in stream geomorphology. This can occur when the natural scouring process leads to degradation, or excessive sediment deposition results in aggradation. Both of these processes can lead to a high width/depth ratio (wider, shallower streams)

Actions to be Taken

For the Jemez River Basin, one issue of primary focus will be control of temperature. During the TMDL process in this watershed, point sources have been reviewed and will be addressed through the permit process. The nonpoint source contributions will need to address temperature exceedances through BMP implementation.

There are a number of BMPs that can be utilized to address temperature, depending on the source of the problem. Such BMPs include:

- The planting of woody riparian species applicable to the affected area provides canopy cover and shading for temperature control and helps prevent streambank destabilization. The woody vegetation provides structure to the bank and reduces stream velocities thereby preventing excessive streambank erosion. (A Streambank Stabilization and Management Guide for Pennsylvania Landowners, State of Pennsylvania, 1986);

- River restoration involving such actions as reconfiguration of the river's sinuosity, installation of root wads to stabilize cut banks, and riparian plantings aid in halting bank erosion and the processes of degradation and aggradation and facilitate the return of the river to a natural and stable morphology which incorporates a lower width to depth ratio. This lowered ratio means that the stream has become narrower and deeper. Thus, the stream can maintain cooler temperatures with the increased channel depth and reduced water surface exposed to solar radiation. (A Geomorphological Approach to Restoration of Incised Rivers, Rosgen, David, 1997);

- The relocation of recreation sites out of riparian areas as well as the closure and rehabilitation of former recreation sites located in riparian areas will help restore riparian vegetation for shading and will eliminate a source of sediment, (Stream Corridor Restoration – Principles, Processes, and Practices, The Federal Interagency Stream Restoration Working Group, 1998).

Additional sources of information for possible BMPs to address temperature are listed below. Some of these documents are available for viewing at the New Mexico Environment Department, Surface Water Quality Bureau, Watershed Protection Section Library, 1190 St Francis Drive, Santa Fe, New Mexico.

- Agriculture
- Forestry
- Riparian and Streambank Stabilization
- Roads
- Stormwater
- Miscellaneous
- Construction Sites

Milestones

Milestones will be used to determine if control actions are being implemented and standards attained. For this TMDL, several milestones will be established which will vary and will be determined by the BMPs implemented. Examples of milestones for temperature control include:

- percent success of riparian plantings,
- an increase in the percentage of stream canopy cover,
- a decrease in the width to depth ratio of the stream.

Milestones will be coordinated by SWQB staff and will be re-evaluated periodically, depending on which BMPs were implemented. Further implementation of this TMDL will be revised based on this reevaluation. As additional information becomes available during the implementation of the TMDL, the targets, load capacity, and allocations may need to be changed. In the event that new data or information shows that changes are warranted, TMDL revisions will be made with assistance of watershed stakeholders.

The re-examination process will involve: monitoring pollutant loading, tracking implementation and effectiveness of controls, assessing water quality trends in the waterbody, and re-evaluating the TMDL for attainment of water quality standards. Although specific targets and allocations are identified in the TMDL, the ultimate success of the TMDL is not whether these targets and allocations are met, but whether beneficial uses and water quality standards are achieved.

SECTION 15 – OTHER IMPLEMENTATION ITEMS

A. COORDINATION

In this watershed public awareness and involvement will be crucial to the successful implementation of these plans and improved water quality. Staff from the SWQB will work with stakeholders to provide the guidance in developing the Watershed Restoration Action Strategy (WRAS). The WRAS is a written plan intended to provide a long-range vision for various activities and management of resources in a watershed. It includes opportunities for private landowners and public agencies in reducing and preventing impacts to water quality. This

longrange strategy will become instrumental in coordinating and achieving constituent levels consistent with the New Mexico State Standards, and will be used to prevent water quality impacts in the watershed.

SWQB staff will assist with any technical assistance such as selection and application of BMPs needed to meet WRAS goals. Stakeholder public outreach and involvement in the implementation of this TMDL will be ongoing. Stakeholders in this process will include SWQB, and other members of the Watershed Restoration Action Strategy.

Implementation of BMPs within the watershed to reduce pollutant loading from nonpoint sources will be on a voluntary basis. Reductions from point sources will be addressed in revisions to discharge permits.

B. TIME LINE

Implementation Actions	Year 1	Year 2	Year 3	Year 4	Year 5
Public Outreach and Involvement	X	X	X	X	X
Establish Milestones	X				
Secure Funding	X		X		
Implement Management Measures (BMPs)		X	X		
Monitor BMPs		X	X	X	
Determine BMP Effectiveness				X	X
Re-evaluate Milestones				X	X

C. §319(h) FUNDING OPTIONS

The Watershed Protection Section of the SWQB provides USEPA §319(h) funding to assist in implementation of BMPs to address water quality problems on reaches listed on the §303(d) list or which are located within Category I Watersheds as identified under the Unified Watershed Assessment of the Clean Water Action Plan. These monies are available to all private, for profit and nonprofit organizations that are authenticated legal entities, or governmental jurisdictions including: cities, counties, tribal entities, Federal agencies, or agencies of the State. Proposals are submitted by applicants through a Request for Proposal (RFP) process and require a nonfederal
match of 40% of the total project cost consisting of funds and/or in-kind services. Further information on funding from the Clean Water Act §319 (h) can be found at the New Mexico Environment Department website: http://www.nmenv.state.nm.us.

D. ASSURANCES

New Mexico's Water Quality Act (Act) does authorize the Water Quality Control Commission to "promulgate and publish regulation to prevent or abate water pollution in the state" and to require permits. The Act authorizes a constituent agency to take enforcement action against any person who violates a water quality standard. Several statutory provisions on nuisance law could also be applied to nonpoint source water pollution. The Water Quality Act also states in §74-6-

12(a):

The Water Quality Act (this article) does not grant to the commission or to any other entity the power to take away or modify the property rights in water, nor is it the intention of the Water Quality Act to take away or modify such rights.

In addition, the State of New Mexico Surface Water Quality Standards (see Section 1100E and Section 1105C) (NMWQCC 1995b) states:

These water quality standards do not grant the Commission or any other entity the power to create, take away or modify property rights in water.

New Mexico policies are in accordance with the federal Clean Water Act §101(g):

It is the policy of Congress that the authority of each State to allocate quantities of water within its jurisdiction shall not be superseded, abrogated or otherwise impaired by this Act. It is the further policy of Congress that nothing in this Act shall be construed to supersede or abrogate rights to quantities of water which have been established by any State.

Federal agencies shall co-operate with State and local agencies to develop comprehensive solutions to prevent, reduce and eliminate pollution in concert with programs for managing water resources.

New Mexico's Clean Water Action Plan has been developed in a coordinated manner with the State's 303(d) process. All Category I watersheds identified in New Mexico's Unified Watershed Assessment process are totally coincidental with the impaired waters lists for 1996 and 1998 as approved by EPA. The State has given a high priority for funding, assessment, and restoration activities to these watersheds.

The description of legal authorities for regulatory controls/management measures in New Mexico's Water Quality Act does not contain enforceable prohibitions directly applicable to nonpoint sources of pollution. The Act does authorize the Water Quality Commission to "promulgate and publish regulations to prevent or abate water pollution in the state" and to require permits. Several statutory provisions on nuisance law could also be applied to nonpoint source water pollution. NMED nonpoint source water quality management utilizes a voluntary approach. The State provides technical support and grant monies for implementation of BMPs and other NPS prevention mechanisms through §319 of the Clean Water Act. Since portions of this TMDL will be implemented through NPS control mechanisms, the New Mexico Watershed Protection Program will target efforts to this and other watersheds with TMDLs. The Watershed Protection Program coordinates with the Nonpoint Source Taskforce. The Nonpoint Source Taskforce is the New Mexico statewide focus group representing Federal and State agencies, local governments, tribes and pueblos, soil and water conservation districts, environmental organizations, industry, and the public. This group meets on a quarterly basis to provide input on the §319 program process, to disseminate information to other stakeholders and the public regarding nonpoint source issues, to identify complementary programs and sources of funding, and to help review and rank §319 proposals.

In order to obtain reasonable assurances for implementation in watersheds with multiple landowners, including Federal, State and private land, NMED has established Memoranda of Understanding (MOUs) with various Federal agencies, in particular the Forest Service and the Bureau of Land Management. MOUs have also been developed with other State agencies, such as the New Mexico State Highway and Transportation Department. These MOUs provide for coordination and consistency in dealing with nonpoint source issues.

New Mexico's Clean Water Action Plan has been developed in a coordinated manner with the State's 303(d) process. All Category I watersheds identified in New Mexico's Unified Watershed Assessment process are totally coincident with the impaired waters list for 1996 and 1998 approved by EPA. The State has given a high priority for funding assessment and restoration activities to these watersheds.

The time required to attain standards for all reaches is estimated to be approximately 10-20 years. This estimate is based on a five-year time frame implementing several watershed projects that may not be starting immediately or may be in response to earlier projects. Stakeholders in this process will include SWQB, and other members of the Watershed Restoration Action Strategy. The cooperation of the Jemez River Basin stakeholders will be pivotal in the implementation of these TMDLs as well.

SECTION 16 – PUBLIC PARTICIPATION

A. PUBLIC PARTICIPATION

Public participation was solicited in development of this TMDL. The following page displays a flow chart of the public participation process. The draft TMDL was made available for a 60-day comment period starting August 13 and ending October 11, 2002. Response to comments is included in the following sub-section. The draft document notice of availability was extensively advertised via newsletters, email distribution lists, web page postings (http://www.nmenv.state.nm.us/) and press releases to area newspapers.

APPENDIX F

Response to Comments for the Jemez River Watershed TMDLs

No comments were submitted.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

DEC 0 2 1999

Mr. James H. Davis, Ph.D., Chief
Surface Water Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502

Dear Mr. Davis:

The Environmental Protection Agency (EPA) is pleased to approve the following TMDLs as updates to work element six of the New Mexico Water Quality Management Plan:

1. Turbidity TMDL for the lower 6.4 miles of the Jemez River
2. Stream bottom deposits TMDL for the lower 6.4 miles of the Jemez River
3. Turbidity TMDL for the lower 2.4 miles of the Rio Guadalupe
4. Stream bottom deposits TMDL for the lower 2.4 miles of the Rio Guadalupe

EPA received the final TMDLs on October 26, 1999, accompanied by your letter dated October 13, 1999. This letter also referenced a total phosphorous TMDL which was not included in your submittal. From communications with your staff we understand that the reference to the total phosphorous TMDL was an error and there was no submittal for total phosphorous. Approval for a total phosphorous TMDL is not included in this letter. We commend your staff for the considerable effort that went into developing and establishing these TMDLs.

Based on our review, detailed in the enclosed document, we conclude that the TMDLs listed above meet the requirements found in Section 303 of the Clean Water Act and the implementing regulations at 40 CFR 130.7. If you would like to discuss these approvals, please contact me or Willie Lane of my staff at (214) 665-8460.

Sincerely yours,

William B. Hathaway
Director
Water Quality Protection Division

Enclosure

www.nmenv.state.nm.us/ swqb/2000-2002_New_Mexico_303d_List.pdf

2002-2004 State of New Mexico 303(d) List

APPROVED

2002-2004 STATE OF NEW MEXICO §303(d)
LIST FOR ASSESSED RIVER/STREAM
REACHES REQUIRING TOTAL MAXIMUM
DAILY LOADS (TMDLs)

New Mexico Environment Department
Surface Water Quality Bureau
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, New Mexico 87502
JUNE 2003

HUC: 13020202 Jemez

1. Calaveras Creek (Rio Cebolla to headwaters)
2. Clear Creek (Rio de las Vacas to San Gregorio Lake)
3. Fenton Lake
4. Jemez River (East fork)
5. Jemez River (HWY 4 near Jemez Springs to East Fork)
6. Jemez River (Rio Guadalupe to HWY4 nr Jemez Springs)
7. Redondo Creek (Sulpher Creek to headwaters)
8. Rio Cebolla (Fenton Lake to headwaters)
9. Rio Cebolla (Rio de las Vacas to Fenton Lake)
10. Rio de las Vacas (Rio Cebolla to Rito de las Palomas)
11. Rio Guadalupe (Jemez River to confl with Rio Cebolla)
12. Rito Peñas Negras (Rio de las Vacas to headwaters)
13. San Antonio Creek (East Fork Jemez R to headwaters)
14. Sulphur Creek (Redondo Creek to headwaters)

Calaveras Creek (Rio Cebolla to headwaters) Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_53	9.2	20.6.4.108	4	31-Dec-02 Proposed	No

Impaired Designated Use (s):
high quality coldwater fishery

Attainment status:
Not supporting

Assessment information:

Probable Causes of Impairment:
Stream Bottom Deposits

Magnitude:
Moderate

Probable Sources of Impairment:
Highway Maintenance and Runoff

Individual Active NPDES Permits:
TMDL (s) Completed:

Clear Creek (Rio de las Vacas to San Gregorio Lake)

Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_54	8.92	20.6.4.108	4	31-Dec-02 Proposed	No

Impaired Designated Use (s):
high quality coldwater fishery

Attainment status:
Not supporting

Assessment information:

Probable Causes of Impairment:
Turbidity

Magnitude:
Moderate

Probable Sources of Impairment:
Source Unknown
Natural Sources
Habitat Modification (other than Hydromodification)
Bank or Shoreline Modification/Destabilization

Individual Active NPDES Permits:
TMDL (s) Completed: TMDL for turbidity and TOC

Fenton Lake

Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.B_00	23.81	20.6.4.108	8	31-Dec-17	No

Impaired Designated Use (s):
high quality coldwater fishery

Attainment status:
Not supporting

Assessment information:

Probable Causes of Impairment:
Plant Nutrients
Bottom Deposits

Magnitude:
Moderate
Moderate

Probable Sources of Impairment:
Removal of Riparian Vegetation
Recreation and Tourism Activities (other than Boating - see 7900)
Range grazing - Riparian and/or Upland
Onsite Wastewater Systems (Septic Tanks)
Land Disposal
Highway Maintenance and Runoff
Habitat Modification (other than Hydromodification)
Grazing related Sources
Agriculture

Individual Active NPDES Permits:
TMDL (s) Completed:

Jemez River (East fork)

Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_10	19.03	20.6.4.108	4	31-Dec-02	No

Impaired Designated Use (s):
high quality coldwater fishery

Attainment status:
Partially supporting

Assessment information:

Probable Causes of Impairment: **Magnitude:**
Turbidity — Moderate

Probable Sources of Impairment:
Silviculture
Recreation and Tourism Activities (other than Boating - see 7900)
Range grazing - Riparian and/or Upland
Harvesting, Restoration, Residue Management
Habitat Modification (other than Hydromodification)
Grazing related Sources
Bank or Shoreline Modification/Destabilization
Agriculture

Individual Active NPDES Permits:
TMDL (s) Completed: TMDL for turbidity

Jemez River (HWY 4 near Jemez Springs to East Fork) Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_00	3.4	20.6.4.108	1	31-Dec-02	No

Impaired Designated Use (s):
livestock watering
high quality coldwater fishery
fish culture

Attainment status:
Partially supporting
Partially supporting
Partially supporting

Assessment information:

Probable Causes of Impairment: **Magnitude:**
Turbidity — Moderate
Stream Bottom Deposits — Moderate
Aluminum - acute — Moderate

Probable Sources of Impairment:
Removal of Riparian Vegetation
Recreation and Tourism Activities (other than Boating - see 7900)
Range grazing - Riparian and/or Upland
Natural Sources
Land Development
Highway Maintenance and Runoff
Habitat Modification (other than Hydromodification)
Grazing related Sources
Construction
Bank or Shoreline Modification/Destabilization
Agriculture

Individual Active NPDES Permits:
TMDL (s) Completed: TMDL for Al acute, turbidity, and SBD; de-list letter for plant nutrients

Jemez River (Rio Guadalupe to HWY4 nr Jemez Springs) Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2105.5_10	9.67	20.6.4.107	1	31-Dec-02	No

Impaired Designated Use (s):
livestock watering
coldwater fishery

Attainment status:
Partially supporting
Partially supporting

Assessment information:

Probable Causes of Impairment: / **Magnitude:**
Turbidity — Moderate
Stream Bottom Deposits — Moderate
Aluminum - acute — Moderate

Probable Sources of Impairment:
Source Unknown
Removal of Riparian Vegetation
Recreation and Tourism Activities (other than Boating - see 7900)
Range grazing - Riparian and/or Upland
Natural Sources
Land Development
Highway Maintenance and Runoff
Habitat Modification (other than Hydromodification)
Grazing related Sources
Construction
Bank or Shoreline Modification/Destabilization
Agriculture

Individual Active NPDES Permits: **Permit No:** NM0028011 **Permit Facility Name:** Jemez Springs, Village of/WWTP

TMDL (s) Completed: TMDL for Al acute, turbidity, and SBD; de-list letter for plant nutrients

Redondo Creek (Sulpher Creek to headwaters) Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_21	6.2	20.6.4.108	4	31-Dec-02	No

Impaired Designated Use (s):
high quality coldwater fishery

Attainment status:
Not supporting

Assessment information:

Probable Causes of Impairment: / **Magnitude:**
Turbidity — Moderate
Temperature — Moderate

Probable Sources of Impairment:
Road Maintenance and Runoff
Removal of Riparian Vegetation
Range grazing - Riparian and/or Upland
Habitat Modification (other than Hydromodification)
Grazing related Sources
Agriculture

Individual Active NPDES Permits:
TMDL (s) Completed: TMDL for turbidity, total phosphorus, and temperature; de-list letter for total phosphorus

Rio Cebolla (Fenton Lake to headwaters)

Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_52	14.63	20.6.4.108	2	31-Dec-02	No

Attainment status:
high quality coldwater fishery

Impaired Designated Use (s):
Not supporting

Assessment information:

Probable Causes of Impairment: / **Magnitude:**
Temperature — Moderate
Stream Bottom Deposits — Moderate

Probable Sources of Impairment:
Removal of Riparian Vegetation
Recreation and Tourism Activities (other than Boating - see 7900)
Range grazing - Riparian and/or Upland
Intensive Animal Feeding Operations
Highway Maintenance and Runoff
Habitat Modification (other than Hydromodification)
Grazing related Sources
Aquaculture
Agriculture

Individual Active NPDES Permits:

TMDL (s) Completed: TMDL for temperature and SBD

Rio Cebolla (Rio de las Vacas to Fenton Lake)

Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_50	6.07	20.6.4.108	4	31-Dec-02	No

Impaired Designated Use (s):
high quality coldwater fishery

Attainment status:
Not supporting

Assessment information:

Probable Causes of Impairment: / **Magnitude:**
Stream Bottom Deposits — Moderate

Probable Sources of Impairment:
Recreation and Tourism Activities (other than Boating - see 7900)
Range grazing - Riparian and/or Upland
Highway Maintenance and Runoff
Grazing related Sources
Agriculture

Individual Active NPDES Permits:

Permit No:	Permit Facility Name:
NM0030112	NMG&FD/Seven Springs Fish Hatchery

TMDL (s) Completed: TMDL for SBD

Rio de las Vacas (Rio Cebolla to Rito de las Palomas) Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_40	13.42	20.6.4.108	3	31-Dec-02	No

Impaired Designated Use (s):
high quality coldwater fishery

Attainment status:
Not supporting

Assessment information:

Probable Causes of Impairment:
Temperature

Magnitude:
Moderate

Probable Sources of Impairment:
Removal of Riparian Vegetation
Range grazing - Riparian and/or Upland
Habitat Modification (other than Hydromodification)
Grazing related Sources
Bank or Shoreline Modification/Destabilization
Agriculture

Individual Active NPDES Permits:
TMDL (s) Completed: TMDL for temperature and TOC

Rio Guadalupe (Jemez River to confl with Rio Cebolla) Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_30	12.65	20.6.4.108	3	31-Dec-02	No

Impaired Designated Use (s):
high quality coldwater fishery

Attainment status:
Partially supporting

Assessment information:

Probable Causes of Impairment:
Turbidity
Aluminum - chronic

Magnitude:
Moderate
Moderate

Probable Sources of Impairment:
Removal of Riparian Vegetation
Recreation and Tourism Activities (other than Boating - see 7900)
Range grazing - Riparian and/or Upland
Natural Sources
Habitat Modification (other than Hydromodification)
Grazing related Sources
Bank or Shoreline Modification/Destabilization
Agriculture

Individual Active NPDES Permits:
TMDL (s) Completed: TMDL for Al chronic, turbidity, and SBD; de-list letter for total phosphorus

Rito Peñas Negras (Rio de las Vacas to headwaters) Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_42	11.78	20.6.4.108	4	31-Dec-02	No

Impaired Designated Use (s):
high quality coldwater fishery

Attainment status:
Partially supporting

Assessment information:

Probable Causes of Impairment: / **Magnitude:**
Temperature — Moderate
Stream Bottom Deposits — Moderate

Probable Sources of Impairment:
Removal of Riparian Vegetation
Range grazing - Riparian and/or Upland
Highway Maintenance and Runoff
Habitat Modification (other than Hydromodification)
Grazing related Sources
Bank or Shoreline Modification/Destabilization
Agriculture

Individual Active NPDES Permits:
TMDL (s) Completed: TMDL for temperature, TOC, and SBD

San Antonio Creek (East Fork Jemez R to headwaters)

Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_20	24.75	20.6.4.108	4	31-Dec-02	No

Impaired Designated Use (s):
high quality coldwater fishery

Attainment status:
Partially supporting

Assessment information:

Probable Causes of Impairment: / **Magnitude:**
Turbidity — Moderate
Temperature — Moderate

Probable Sources of Impairment:
Silviculture
Removal of Riparian Vegetation
Recreation and Tourism Activities (other than Boating - see 7900)
Range grazing - Riparian and/or Upland
Natural Sources
Logging Road Construction/Maintenance
Land Development
Habitat Modification (other than Hydromodification)
Grazing related Sources
Construction
Bank or Shoreline Modification/Destabilization
Agriculture

Individual Active NPDES Permits:
TMDL (s) Completed: TMDL for turbidity and temperature

Sulphur Creek (Redondo Creek to headwaters)

Jemez

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2106.A_22	6.1	20.6.4.108	4	31-Dec-02	No

Impaired Designated Use (s):
high quality coldwater fishery

Attainment status:
Not supporting

Assessment information:

Probable Causes of Impairment:
pH Moderate
Conductivity Moderate

Magnitude:

Probable Sources of Impairment:
Source Unknown
Range grazing - Riparian and/or Upland
Natural Sources
Grazing related Sources
Agriculture

Individual Active NPDES Permits:

TMDL (s) Completed: TMDL for pH and conductivity

www.nmenv.state.nm.us/ swqb/2000-2002_New_Mexico_303d_List.pdf

2002-2004 State of New Mexico 303(d) List

APPROVED

2002-2004 STATE OF NEW MEXICO §303(d)
LIST FOR ASSESSED RIVER/STREAM
REACHES REQUIRING TOTAL MAXIMUM
DAILY LOADS (TMDLs)

New Mexico Environment Department
Surface Water Quality Bureau
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, New Mexico 87502
JUNE 2003

HUC: 13020204 Rio Puerco

1. Nacimiento Creek (USFS bnd to San Gregorio Reservoir)
2. Rio Puerco (Rito Olguin to headwaters)
3. Rito Leche (Perennial reaches above Rio Puerco)
4. San Pablo Canyon (Rio Puerco to headwaters)

Nacimiento Creek (USFS bnd to San Gregorio Reservoir) Rio Puerco

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2107.A_42	4.6	20.6.4.109	4	31-Dec-17	No

Impaired Designated Use (s):
coldwater fishery

Attainment status:
Partially supporting

Assessment information:

Probable Causes of Impairment: **Magnitude:**
Stream Bottom Deposits Moderate
Plant Nutrients Moderate

Probable Sources of Impairment:
Removal of Riparian Vegetation
Range grazing - Riparian and/or Upland
Habitat Modification (other than Hydromodification)
Grazing related Sources
Bank or Shoreline Modification/Destabilization
Agriculture

Individual Active NPDES Permits:
TMDL (s) Completed:

Rio Puerco (Rito Olguin to headwaters)

Rio Puerco

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2107.A_40	39.6	20.6.4.109	4	31-Dec-06	No

Impaired Designated Use (s):
coldwater fishery

Attainment status:
Partially supporting

Assessment information:

Probable Causes of Impairment: **Magnitude:**
Temperature — Moderate
Stream Bottom Deposits — Moderate

Probable Sources of Impairment:
Removal of Riparian Vegetation
Range grazing - Riparian and/or Upland
Highway Maintenance and Runoff
Habitat Modification (other than Hydromodification)
Grazing related Sources
Bank or Shoreline Modification/Destabilization
Agriculture

Individual Active NPDES Permits:

Permit No:	Permit Facility Name:
NM0024848	Cuba, Village of/WWTP

TMDL (s) Completed:

Rito Leche (Perennial reaches above Rio Puerco)

Rio Puerco

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2107.A_43	2.9	20.6.4.109	4	31-Dec-17	No

Impaired Designated Use (s):
coldwater fishery

Attainment status:
Partially supporting

Assessment information:

Probable Causes of Impairment: **Magnitude:**
Stream Bottom Deposits — Moderate

Probable Sources of Impairment:
Removal of Riparian Vegetation
Range grazing - Riparian and/or Upland
Habitat Modification (other than Hydromodification)
Grazing related Sources
Bank or Shoreline Modification/Destabilization
Agriculture

Individual Active NPDES Permits:
TMDL (s) Completed:

San Pablo Canyon (Rio Puerco to headwaters)

Rio Puerco

Assessment Unit ID:	Size (mi or ac):	WQS reference:	Priority:	TMDL due:	Federal aquatic T/E species:
NM-2107.A_41	11.5	20.6.4.109	4	31-Dec-06	No

Impaired Designated Use (s):
coldwater fishery

Attainment status:
Partially supporting

Assessment information:

Probable Causes of Impairment: **Magnitude:**
Stream Bottom Deposits — Moderate
Plant Nutrients — Moderate

Probable Sources of Impairment:
Surface Mining
Resource Extraction
Removal of Riparian Vegetation
Range grazing - Riparian and/or Upland
Habitat Modification (other than Hydromodification)
Grazing related Sources
Bank or Shoreline Modification/Destabilization
Agriculture

Individual Active NPDES Permits:
TMDL (s) Completed:

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http://www.nmenv.state.nm.us/swqb/psrlist.html

NEW MEXICO ENVIRONMENT DEPARTMENT
SURFACE WATER QUALITY BUREAU
NPDES PERMITS

NPDES No:	MUNICIPALITIES:	STATUS:	COUNTY:
NM0028169	Uranium King, Rio Puerco Mine	Major	Sandoval

List of Impaired Waters

http://oaspub.epa.gov/waters/waters_list.control?p_impairment=STREAM%20BOTTOM%20DEPOSITS

Parent Impairment = STREAM BOTTOM DEPOSITS

http://oaspub.epa.gov/pls/tmdl/waters_list.control?state=NM&huc=13020202

Watershed = 13020202

NOTE: Click on the underlined Waterbody Name for a detailed Listed Water Report. Click on the underlined "MAP 303(d)" literal for a map of the Listed Water.

State	Waterbody Name	Map of Listed Water	State Basin Name	Location	Cycle
NM	CALAVERAS CREEK	MAP 303(d)	RIO GRANDE	CALAVERAS CREEK FROM THE CONFLUENCE WITH RIO CEBOLLA TO THE HEADWATERS	2002
NM	CLEAR CREEK	MAP 303(d)	RIO GRANDE	CLEAR CREEK FROM MOUTH ON RIO GALLINA TO HEADWATERS	2002
NM	JEMEZ RIVER, EAST FORK	MAP 303(d)	RIO GRANDE	EAST FORK OF THE JEMEZ RIVER FROM THE CONFLUENCE WITH SAN ANTONIO CREEK TO THE HEADWATERS	2002
NM	REDONDO CREEK	MAP 303(d)	RIO GRANDE	REDONDO CREEK FROM THE MOUTH ON SULPHUR CREEK TO THE HEADWATERS	2002
NM	RIO CEBOLLA	MAP 303(d)	RIO GRANDE	RIO CEBOLLA FROM CONFLUENCE WITH THE RIO DE LAS VACAS TO FENTON LAKE	2002
NM	RIO CEBOLLA	MAP 303(d)	RIO GRANDE	RIO CEBOLLA FROM INFLOW TO FENTON LAKE TO THE HEADWATERS	2002
NM	RIO DE LAS VACAS	MAP 303(d)	RIO GRANDE	RIO DE LAS VACAS FROM THE CONFLUENCE WITH RIO CEBOLLA TO RITO DE LAS PALOMAS	2002
NM	RIO GUADALUPE	MAP 303(d)	RIO GRANDE	RIO GUADALUPE FROM THE MOUTH ON THE JEMEZ RIVER TO THE CONFLUENCE OF THE RIO DE LAS VACAS AND RIO CEBOLLA	2002
NM	RITO PE?AS NEGRAS	MAP 303(d)	RIO GRANDE	RITO PEÑAS NEGRAS FROM THE MOUTH ON THE RIO DE LAS VACAS TO THE HEADWATERS	2002
NM	SAN ANTONIO CREEK	MAP 303(d)	RIO GRANDE	SAN ANTONIO CREEK FROM THE CONFLUENCE WITH THE EAST FORK OF THE JEMEZ RIVER TO HEADWATERS	2002
NM	SULPHUR CREEK	MAP 303(d)	RIO GRANDE	SULPHUR CREEK ABOVE REDONDO CREEK TO THE HEADWATERS	2002

State = NM
Watershed = 13020204

NOTE: Click on the underlined Waterbody Name for a detailed Listed Water Report. Click on the underlined "MAP 303(d)" literal for a map of the Listed Water.					
State	**Waterbody Name**	**Map of Listed Water**	**State Basin Name**	**Location**	**Cycle**
NM	NACIMIENTO CREEK	MAP 303(d)	RIO GRANDE	NACIMIENTO CREEK FROM USFS BOUNDRY TO SAN GREGORIO RESERVOIR	2002
NM	RIO PUERCO	MAP 303(d)	RIO GRANDE	RIO PUERCO FROM RITO OLGUIN TO THE HEADWATERS	2002
NM	RITO LECHE	MAP 303(d)	RIO GRANDE	RITO LECHE PERENNIAL PORTIONS	2002
NM	SAN PABLO CREEK	MAP 303(d)	RIO GRANDE	SAN PABLO CREEK FROM THE MOUTH ON THE RIO PUERCO TO THE HEADWATERS	2002

NPDES Permit Program Results for New Mexico

New Mexico Contacts | New Mexico Links | New Mexico Authorization Status

Authorization Status for New Mexico

This list specifies the date that the state became authorized to implement the NPDES permit program. If there is no date listed, the state is not authorized to implement that portion of the NPDES permit program. Click here for more information on State and Tribal Program Authorization Status.

State	Approved State NPDES Permit Program	Approved to Regulate Federal Facilities	Approved State Pretreatment Program	Approved General Permits Program	Approved Biosolids (Sludge) Program
New Mexico					

http://www.epa.gov/ttnnaaqs/ozone/areas/tribal/tr_st.htm

1996 Tribal Point Source Emission Estimates

Reservation	State	VOC	NO_x	CO	SO_2	PM_{10}	Square Miles
			(tons/year)				
Jemez Pueblo	New Mexico	00001	57				

http://www.epa.gov/ttn/naaqs/pm/pm10_index.html

web DP list 1-23-04

NMED ID	Facility name	Discharge Permit #	Permit Name	Municipality	County	Facility Type	Waste Type	Activity Descrtiption	Permit Activity #	Activity Status	Activity Status Date
1114	Mid-america Pipeline - San Ysidro	DP-836	Mid-america Pipeline Company	San Ysidro	Sandoval	DIST-Bulk Fuel Storage	Industrial	Discharge Permit (Pre-Idea)	PRD20020001	Terminated	1/6/1999
2604	Native American Prep Sch	DP-357	Native American Prep Sch	South San Ysidro	No corresponding county	Lodging	Domestic	Discharge Permit (Pre-Idea)	PRD20020001	Issued	10/19/2001
3111	Canyon Lumber and Hardware	DP-1104	Ever Ready Canyon Lumber & Hardware	Canon	Sandoval	Hydrocarbon Remediation of Ground Water	Industrial	Discharge Permit (Pre-Idea)	PRD20020001	Terminated	11/12/2001
2987	Leaching Technology Nacimiento Copper Project	DP-296	Leaching Technology Nacimiento Copper Project	Cuba	Sandoval	Mining	Mining	Discharge Permit (Pre-Idea)	PRD20020001	Issued	8/18/1989
1118	Agronics Mine	DP-1247	Agronics Clod Buster Mine	Cuba	Sandoval	MINING-Mill Facility	Mining	Discharge Permit (Pre-Idea)	PRD20020001	Issued	5/12/2000
2559	Cuba (Village of) - WWTP	DP-483	Cuba (Village of) - WWTP	Cuba	Sandoval	UNINCORP-Wastewater	Domestic	DP-Ren/Mod	PRD20020002	Issued	3/17/2003
2559	Cuba (Village of) - WWTP	DP-483	Cuba (Village of) - WWTP	Cuba	Sandoval	UNINCORP-Wastewater	Domestic	DP-Ren/Mod	PRD20020002	Issued	3/17/2003
3022	Ojo Encino Sewage Lagoons	DP-982	Ojo Encino Sewage Lagoons	Cuba	Sandoval	UNINCORP-Wastewater	Domestic	Discharge Permit (Pre-Idea)	PRD20020001	Terminated	11/30/1995

Watershed Name	Watershed States
RIO SAN JOSE	NEW MEXICO

2768 Moquino Subdivision DP-180 Moquino Subdivision Moquino No corresponding county UNINCORP-Wastewater Domestic
Discharge Permit (Pre-Idea) PRD20020001 Issued 10/28/1980

(accessed March 23, 2004)

STATE OF NEW MEXICO
STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS

20.6.4 NMAC

As amended through October 11, 2002

New Mexico Water Quality Control Commission
Harold Runnels Building
1190 St. Francis Drive P.O. Box 26110
Santa Fe, New Mexico 87502
www.nmenv.state.nm.us/oots/wqcc.htm

STATE OF NEW MEXICO

STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS

20.6.4 NMAC

Filed with State Records Center
September 12, 2000
Effective October 11, 2002

New Mexico Water Quality Control Commission
Harold Runnels Building
1190 St. Francis Drive P.O. Box 26110
Santa Fe, New Mexico 87502
www.nmenv.state.nm.us/oots/wqcc.htm

Constituent Agencies:

Environment Department
State Engineer Office
Game and Fish Department
Oil Conservation Division
Department of Agriculture
State Parks Division
Soil and Water Conservation Commission
Bureau of Mines and Mineral Resources
Members-at-Large

STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS

Table of Contents

Section

TITLE 20 ENVIRONMENTAL PROTECTION
CHAPTER 6 WATER QUALITY
PART 4 STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS

20.6.4.1 ISSUING AGENCY: Water Quality Control Commission.
[20.6.4.1 NMAC – Rp 20 NMAC 6.1.1001, 10-12-00]

20.6.4.2 SCOPE: Except as otherwise provided by statute or regulation of the water quality control commission, this part governs all surface waters of the state of New Mexico which are subject to the New Mexico Water Quality Act, Sections 74-6-1 through 74-6-17 NMSA 1978.
[20.6.4.2 NMAC – Rp 20 NMAC 6.1.1002, 10-12-00]

20.6.4.3 STATUTORY AUTHORITY: This part is adopted by the water quality control commission pursuant to Subsection C of Section 74-6-4 NMSA 1978.
[20.6.4.3 NMAC – Rp 20 NMAC 6.1.1003, 10-12-00]

20.6.4.4 DURATION: Permanent.
[20.6.4.4 NMAC – Rp 20 NMAC 6.1.1004, 10-12-00]

20.6.4.5 EFFECTIVE DATE: October 12, 2000, unless a later date is indicated in the history note at the end of a section.
[20.6.4.5 NMAC – Rp 20 NMAC 6.1.1005, 10-12-00]

20.6.4.6 OBJECTIVE:

A. The purpose of this part is to establish water quality standards that consist of the designated use or uses of surface waters of the state, the water quality criteria necessary to protect the use or uses, and an antidegradation policy.

B. The state of New Mexico is required under the New Mexico Water Quality Act (Subsection C of Section 74-6-4 NMSA 1978) and the federal Clean Water Act, as amended (33 U.S.C. Section 1251 et seq.) to adopt water quality standards that protect the public health or welfare, enhance the quality of water, and are consistent with and serve the purposes of the New Mexico Water Quality Act and the federal Clean Water Act. It is the objective of the federal Clean Water Act to restore and maintain the chemical, physical, and biological integrity of the nation's waters, including those in New Mexico. This part is consistent with Section 101(a)(2) of the federal Clean Water Act, which declares that it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983. Agricultural, municipal, domestic and industrial water supply are other essential uses of New Mexico's surface water; however, water contaminants resulting from these activities will not be permitted to lower the quality of surface waters of the state below that which is required for recreation and maintenance of a fishery and protection of wildlife, where practicable.

C. Pursuant to Subsection A of Section 74-6-12 NMSA 1978, this part does not grant to the water quality control commission or to any other entity the power to take away or modify property rights in water.
[20.6.4.6 NMAC – Rp 20 NMAC 6.1.1006, 10-12-00]

20.6.4.7 DEFINITIONS: Terms defined in the New Mexico Water Quality Act, but not defined in this part will have the meaning given in the Water Quality Act.

A. "acute toxicity" means toxicity involving a stimulus severe enough to induce a response in 96 hours of exposure or less. Acute toxicity is not always measured in terms of lethality, but may include other toxic effects that occur within a short time period.

B. "best management practices or BMPs" means schedules of activities, prohibitions of certain practices, implementation of maintenance procedures, or other measures or practices selected by the state or a designated management agency to achieve control of sources of water pollutants.

C. "bioaccumulation" refers to the uptake and retention of a substance by an organism from its surrounding medium and food.

D. "bioaccumulation factor" is the ratio of a substance's concentration in tissue versus its concentration in ambient water, in situations where the organism and the food chain are exposed.

E. "biomonitoring" means the use of living organisms to test the suitability of

effluents
for discharge into receiving waters or to test the quality of surface waters of the state.

F. **"cfs"** means cubic feet per second.

G. **"chronic toxicity"** means toxicity involving a stimulus that lingers or continues
for a relatively long period relative to the life span of an organism. Chronic effects include, but are not limited to, lethality, growth impairment, behavioral modifications, disease and reduced reproduction.

H. **"classified water of the state"** means a surface water of the state, or reach of
a surface water of the state, for which the commission has adopted a segment description, and has designated a use or uses and applicable water quality standards. Segment descriptions, designated use or uses, and water quality standards for classified waters of the state are set forth in this part.

I. **"coldwater fishery"** means a surface water of the state where the water temperature and other characteristics are suitable for the support or propagation or both of coldwater fishes.

J. **"commission"** means the New Mexico water quality control commission.

K. **"criteria"** are elements of state water quality standards, expressed as constituent
concentrations, levels, or narrative statements, representing a quality of water that supports a use. When criteria are met, water quality will generally protect the designated use.

L. **"department"** means the New Mexico environment department.

M. **"designated use or uses"** means those uses specified in Sections 20.6.4.101 through 20.6.4.899 NMAC for each surface water of the state whether or not they are being attained.

N. **"dissolved"** means a constituent of a water sample which will pass through a 0.45-micrometer pore-size membrane filter under a pressure differential not exceeding one atmosphere. The "dissolved" fraction is also termed "filterable residue."

O. **"domestic water supply"** means a surface water of the state that may be used
for drinking or culinary purposes after disinfection.

P. **"ephemeral stream"** means a stream or reach of a stream that flows briefly only in direct response to precipitation or snowmelt in the immediate locality; its channel bed is always above the water table of the region adjoining the stream and does not support a self-sustaining population of fish.

Q. **"existing use"** means those uses actually attained in a surface water of the state on or after November 28, 1975, whether or not they are included in the water quality standards.

R. **"fecal coliform bacteria"** means the portion of the coliform group which is present in the gut or the feces of warmblooded animals. It generally includes organisms which are capable of producing gas from lactose broth in a suitable culture medium within 24 hours at 44.5 ± 0.2°C.

S. **"fish culture"** means production of coldwater or warmwater fishes in a hatchery or rearing station.

T. **"flow,"** relative to the four definitions of streams herein, means natural flow

ensuing from the earth's hydrologic cycle, i.e., atmospheric precipitation resulting in surface and/or ground-water runoff. Natural in-stream flow may be interrupted or eliminated by dams and diversions.

U. **"high quality coldwater fishery"** means a perennial surface water of the state in a minimally disturbed condition which has considerable aesthetic value and is a superior coldwater fishery habitat. A surface water of the state to be so categorized must have water quality, stream bed characteristics, and other attributes of habitat sufficient to protect and maintain a propagating coldwater fishery.

V. **"intermittent stream"** means a stream or reach of a stream that flows only at certain times of the year, such as when it receives flow from springs, melting snow, or localized precipitation.

W. **"interrupted stream"** means a stream that contains perennial reaches with intervening intermittent or ephemeral reaches.

X. **"interstate waters"** means all surface waters of the state which cross or form a part of the border between states.

Y. **"intrastate waters"** means all surface waters of the state which are not interstate waters.

Z. **"irrigation"** means a water of the state used as a supply of water for crops.

AA. **"LC-50"** means the concentration of a substance that is lethal to 50 percent of the test organisms within a defined time period. The length of the time period, which may vary from 24 hours to one week or more, depends on the test method selected to yield the information desired.

BB. **"limited warmwater fishery"** means a surface water of the state where intermittent flow may severely limit the ability of the reach to sustain a natural fish population on a continuous annual basis; or a surface water of the state where historical data indicate that water temperature may routinely exceed 32.2°C (90°F).

CC. **"livestock watering"** means a surface water of the state used as a supply of water for consumption by livestock.

DD. **"marginal coldwater fishery"** means a surface water of the state known to support a coldwater fish population during at least some portion of the year, even though historical data indicate that the maximum temperature in the surface water of the state may exceed 20°C (68°F).

EE. **"micrograms per liter (µg/L)"** means micrograms of solute per liter of solution; equivalent to parts per billion when the specific gravity of the solution = 1.000.

FF. **"milligrams per liter (mg/L)"** means milligrams of solute per liter of solution; equivalent to parts per million when the specific gravity of the solution = 1.000.

GG. **"minimum quantification level"** means the minimum quantification level for a constituent determined by official published documents of the United States environmental protection agency.

HH. **"natural causes"** means those causal agents which would affect water quality and the effect is not caused by human activity but is due to naturally occurring conditions.

II. **"nonpoint source"** means any source of pollutants not regulated as a point source which degrades the quality or adversely affects the biological, chemical, or physical integrity of surface waters of the state.

JJ. **"NTU"** means nephelometric turbidity units based on a standard method using formazin polymer or its equivalent as the standard reference suspension. Nephelometric turbidity measurements expressed in units of NTU are numerically identical to the same measurements expressed in units of FTU (formazin turbidity units).

KK. **"perennial stream"** means a stream or reach of a stream that flows continuously throughout the year in all years; its upper surface, generally, is lower than the water table of the region adjoining the stream.

LL. **"picocurie (pCi)"** means a measure of radioactivity equal to the quantity of a radioactive substancein which the rate of disintegrations is 2.22 per minute.

MM. **"point source"** means any discernible, confined, and discrete conveyance from which pollutants are or may be discharged into a surface water of the state, but does not include return flows from irrigated agriculture.

NN. **"primary contact"** means any recreational or other water use in which there is prolonged and intimate contact with the water, such as swimming and water skiing, involving considerable risk of ingesting water in quantities sufficient to pose a significant health hazard. Primary contact also means any use of surface waters of the state for native American traditional cultural, religious, or ceremonial purposes in which there is intimate contact with the water that involves considerable risk sufficient to pose a significant health risk. The contact may include but is not limited to ingestion or immersion.

OO. **"secondary contact"** means any recreational or other water use in which contact with the water may occur and in which the probability of ingesting appreciable quantities of water is minimal, such as fishing, wading, commercial and recreational boating and any limited seasonal contact.

PP. **"segment"** means a water quality standards segment, the surface waters of which have common hydrologic characteristics or flow regulation regimes, possess common natural physical, chemical, and biological characteristics, and exhibit common reactions to external stresses, such as the discharge of pollutants.

QQ. **"state"** means the state of New Mexico.

RR. **"surface water(s) of the state"** means all interstate waters including interstate wetlands, and all intrastate waters, such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, reservoirs or natural ponds the use, degradation, or destruction of which would affect interstate or foreign commerce. Surface waters of the state also means all tributaries of such waters, including adjacent wetlands, and any manmade bodies of water which were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state. Surface waters of the state does not include private waters that do not combine with other surface or subsurface water or any water under tribal regulatory jurisdiction pursuant to § 518 of the Clean Water Act. Waste treatment systems, including treatment ponds or lagoons designed to meet requirements of the Clean Water Act (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition), are not surface waters of the state, unless they were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state.

SS. **"TDS"** means total dissolved solids, also termed "total filterable residue."

TT. **"technology-based controls"** means the application of technology-based effluent limitations as required under Section 301(b) of the federal Clean Water Act.

UU. **"total"** means a constituent of a water sample which is analytically determined without filtration.

VV. **"toxic pollutant"** means those pollutants, or combination of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will cause death, disease, behavioral malfunctions or physical deformations in such organisms or their offspring.

WW. **"turbidity"** is an expression of the optical property in water that causes incident light to be scattered or absorbed rather than transmitted in straight lines.

XX. **"warmwater fishery"** means a surface water of the state where the water temperature and other characteristics are suitable for the support or propagation or both of warmwater fishes.

YY. **"water contaminant"** means any substance that could alter if discharged or spilled the physical, chemical, biological or radiological qualities of water. "Water contaminant" does not mean source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, but may include all other radioactive materials, including but not limited to radium and accelerator-produced isotopes.

ZZ. **"water pollutant"** means a water contaminant in such quantity and of such duration as may with reasonable probability injure human health, animal or plant life or property, or to unreasonably interfere with the public welfare or the use of property.

AAA. **"water quality-based controls"** means effluent limitations, as provided under Section 301(b)(1)(C) of the federal Clean Water Act, which are developed and imposed on point-source dischargers in order to protect and maintain applicable water quality standards. These controls are more stringent than the technology-based effluent limitations required under other paragraphs of Section 301(b).

BBB. **"wetlands"** means those areas which are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions in New Mexico. Constructed wetlands used for wastewater treatment purposes are not included in this definition.

CCC. **"wildlife habitat"** means a surface water of the state used by plants and animals not considered as pathogens, vectors for pathogens or intermediate hosts for pathogens for humans or domesticated livestock and plants.

[20.6.4.7 NMAC - Rp 20 NMAC 6.1.1007, 10-12-00; A, 7-19-01]

20.6.4.8 ANTIDEGRADATION POLICY AND IMPLEMENTATION PLAN:

A. Antidegradation Policy: This antidegradation policy applies to all surface waters of the state.

(1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected in all surface waters of the state.

(2) Where the quality of a surface water of the state exceeds levels necessary to support the propagation of fish, shellfish, and wildlife, and recreation in and on the water, that quality shall be maintained and protected unless the commission finds, after full satisfaction of

the intergovernmental coordination and public participation provisions of the state's continuing planning process, that allowing lower water quality is necessary to accommodate important economic and social development in the area in which the water is located. In allowing such degradation or lower water quality, the state shall assure water quality adequate to protect existing uses fully. Further, the state shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable BMPs for nonpoint source control. Additionally, the state shall encourage the use of watershed planning as a further means to protect surface waters of the state.

(3) No degradation shall be allowed in high quality waters designated by the commission as outstanding national resource waters (ONRWs). ONRWs may include, but are not limited to, surface waters of the state within national and state monuments, parks, wildlife refuges, waters of exceptional recreational or ecological significance, and waters identified under the Wild and Scenic Rivers Act.

(4) In those cases where potential water quality impairment associated with a thermal discharge is involved, this antidegradation policy and implementing method shall be consistent with Section 316 of the federal Clean Water Act.

(5) In implementing this section, the commission through the appropriate regional offices of the United States environmental protection agency will keep the administrator advised and provided with such information concerning the surface waters of the state as he or she will need to discharge his or her responsibilities under the federal Clean Water Act.

B. Procedures for nominating an ONRW: Any person may nominate a surface water of the state for designation as an ONRW by filing a petition with the commission pursuant to the Guidelines for water quality control commission regulation hearings. A petition to classify a surface water of the state as an ONRW shall include:

(1) a map of the surface water of the state, including the location and proposed upstream and downstream boundaries;

(2) a written statement based on scientific principles in support of the nomination, including specific reference to the applicable criteria for ONRW;

(3) supporting scientific evidence demonstrating that one or more of the applicable ONRW criteria listed in Subsection C of this section has been met;

(4) water quality data to establish a baseline for the proposed ONRW;

(5) a discussion of activities that might contribute to the reduction of water quality in the proposed ONRW;

(6) any additional evidence to substantiate such a designation, including an analysis of the economic impact of the designation on the local and regional economy within the state of New Mexico; and

(7) affidavit of publication of notice of the petition in a newspaper of general circulation in the affected counties and in a newspaper of general statewide circulation.

C. Pursuant to a petition filed under Subsection B of this section, the commission may classify a surface water of the state as an ONRW.

D. **Reserved:** This subsection is reserved for a list of waters classified as ONRWs.

E. Implementation Plan: The department, acting under authority delegated by the commission, implements the water quality standards, including the antidegradation policy, by describing specific methods and procedures in the continuing planning process and by establishing and maintaining controls on the discharge of pollutants to surface waters of the state. The steps summarized in the following paragraphs, which may not all be applicable in every water pollution control action, list the implementation activities of the department. These implementation activities are supplemented by detailed antidegradation review procedures developed under the state's continuing planning process. The department:

(1) obtains information pertinent to the impact of the effluent on the receiving water and advises the prospective discharger of requirements for obtaining a permit to discharge;

(2) reviews the adequacy of the existing data base, and if additional information is needed, conducts a water quality survey of the receiving water in accordance with an annually reviewed, ranked priority list of surface waters of the state requiring total maximum daily loads pursuant to Section 303(d) of the federal Clean Water Act;

(3) assesses the probable impact of the effluent on the receiving water relative to its attainable or designated uses and numeric and narrative standards;

(4) requires the highest and best degree of wastewater treatment practicable and commensurate with protecting and maintaining the designated uses and existing water quality of surface waters of the state;

(5) develops water quality based effluent limitations and comments on technology based effluent limitations, as appropriate, for inclusion in any federal permit issued to a discharger pursuant to Section 402 of the federal Clean Water Act;

(6) requires that these effluent limitations be included in any such permit as a condition for state certification pursuant to Section 401 of the federal Clean Water Act;

(7) coordinates its water pollution control activities with other constituent agencies of the commission, and with local, state and federal agencies, as appropriate;

(8) develops and pursues inspection and enforcement programs to ensure that dischargers comply with state regulations and standards, and complements EPA's enforcement of federal permits;

(9) ensures that the provisions for public participation required by the New Mexico Water Quality Act and the federal Clean Water Act are followed;

(10) provides continuing technical training for wastewater treatment facility operators through the utility operators training and certification programs;

(11) provides funds to assist the construction of publicly owned wastewater treatment facilities through the wastewater construction program authorized by Section 601 of the federal

Clean Water Act, and through funds appropriated by the New Mexico legislature;

(12) conducts water quality surveillance of the surface waters of the state to assess

the effectiveness of water pollution controls, determines whether water quality standards are being attained, and proposes amendments to improve water quality standards;

(13) encourages, in conjunction with other state agencies, voluntary implementation of

the best management practices set forth in the New Mexico statewide water quality management plan and the nonpoint source management program;

(14) evaluates the effectiveness of BMPs selected to prevent, reduce or abate sources

of water pollutants;

(15) develops procedures for assessing use attainment as required by 20.6.4.14 NMAC

and establishing site-specific standards; and

(16) develops list of surface waters of the state not attaining designated uses, pursuant to Sections 305(b) and 303(d) of the federal Clean Water Act.

[20.6.4.8 NMAC – Rp 20 NMAC 6.1.1101, 10-12-00]

20.6.4.9 REVIEW OF STANDARDS; NEED FOR ADDITIONAL STUDIES:

A. Section 303(c)(1) of the federal Clean Water Act requires that the state hold public hearings at least once every three years for the purpose of reviewing water quality standards and proposing, as appropriate, necessary revisions to water quality standards.

B. It is recognized that, in some cases, numeric standards have been adopted which reflect use designations rather than existing conditions of surface waters of the state. Narrative standards are required for many constituents because accurate data on background levels are lacking. More intensive water quality monitoring may identify surface waters of the state where existing quality is considerably better than the established standards. When justified by sufficient data and information, the water quality standards will be modified to protect the designated uses which are attainable.

C. It is also recognized that contributions of water contaminants by diffuse nonpoint sources of water pollution may make attainment of certain standards difficult. Revision of these standards may be required as new information is obtained on nonpoint sources and other problems unique to semi-arid regions.

[20.6.4.9 NMAC – Rp 20 NMAC 6.1.1102, 10-12-00]

20.6.4.10 APPLICABILITY OF WATER QUALITY STANDARDS:

A. Livestock Watering and Wildlife Habitat Uses:

(1) When a discharge creates a water which could be used by livestock and/or wildlife in a non-classified, otherwise ephemeral surface water of the state, such water shall be protected for the uses of livestock watering and/or wildlife habitat by the standards applicable to these uses as set forth in 20.6.4.900 NMAC.

(2) Designated uses of such water will be limited to livestock watering and/or wildlife

habitat only when such a water does not enter a classified surface water of the state with criteria which are more restrictive than those necessary to protect livestock watering and/or wildlife

habitat, except in direct response to precipitation or runoff. The commission shall adopt any additional designated uses for such surface waters of the state by rulemaking proceedings.

(3) When such a water, except in direct response to precipitation or runoff, enters a classified surface water of the state with criteria which are more restrictive than those necessary to protect livestock watering and/or wildlife habitat, the numeric standards established for the classified surface water of the state shall apply at the point such a water enters the classified surface water of the state. If discharge to such waters of the state ceases or is diverted elsewhere, all uses adopted under this section or subsequently under additional rulemaking proceedings for such waters of the state shall be deemed no longer designated, existing, or attainable.

B. Critical Low Flow: The numeric standards set under Subsection F of 20.6.4.12 NMAC, 20.6.4.101 through 20.6.4.899 NMAC and 20.6.4.900 NMAC may not be attainable when streamflow is less than the critical low flow of the stream in question. The critical low flow of a stream at a particular site shall be:

(1) for human health criteria, the harmonic mean flow. "Harmonic mean flow" is the number of daily flow measurements divided by the sum of the reciprocals of the flows. That is, it is the reciprocal of the mean of reciprocals. For ephemeral waters the calculation shall be based upon the nonzero flow intervals and modified by including a factor to adjust for the proportion of intervals with zero flow.

$$\text{Harmonic Mean} = \frac{n}{\sum {}^{1}/_{x}}$$

$$\text{Modified Harmonic Mean} = \left[\frac{\sum_{i=1}^{Nt-No} \frac{1}{Qi}}{Nt - No} \right]^{-1} x \left[\frac{Nt - No}{Nt} \right]$$

where, Qi = nonzero flow
Nt = total number of flow values
No = number of zero flow values

(2) for all other narrative and numeric criteria, the minimum average four consecutive day flow which occurs with a frequency of once in three years (4Q3). Critical low-flow numeric values may be determined on an annual, a seasonal or a monthly basis, as appropriate, after due consideration of site-specific conditions.

C. Guaranteed Minimum Flow: On a case-by-case basis and upon consultation with the interstate stream commission, the commission may allow the use of a contractually guaranteed minimum streamflow in lieu of a critical low flow determined under Subsection B of this section. Should drought, litigation or any other reason interrupt or interfere with minimum flows under a guaranteed minimum flow contract for a period of at least thirty consecutive days, such permission, at the sole discretion of the commission, may then be revoked. Any minimum flow specified under such revoked permission shall be superseded by a critical low flow determined under Subsection B of this section. A public notice of the request for a guaranteed

minimum flow shall be published in a newspaper of general circulation by the department at least 30 days prior to scheduled action by the commission. These water quality standards do not grant to the commission or any other entity the power to create, take away or modify property rights in water.

D. Mixing Zones: A limited mixing zone, contiguous to a point source wastewater discharge, may be allowed in any stream receiving such a discharge. Mixing zones serve as regions of initial dilution which allow the application of a dilution factor in calculations of effluent limitations. Effluent limitations shall be developed which will protect the most sensitive existing, designated or attainable use of the receiving water.

E. Mixing Zone Limitations: Wastewater mixing zones, in which the numeric standards set under Subsection F of 20.6.4.12 NMAC, 20.6.4.101 through 20.6.4.899 NMAC or 20.6.4.900 NMAC may be exceeded, shall be subject to the following limitations:

(1) Mixing zones are not allowed for discharges to publicly owned lakes, reservoirs, or playas; these effluents shall meet all applicable standards set under Subsection F of 20.6.4.12 NMAC, 20.6.4.101 through 20.6.4.899 NMAC and 20.6.4.900 NMAC at the point of discharge.

(2) The acute numeric standards, as set out in Paragraph (1) of Subsection J, Subsection M, Paragraph (1) of Subsection N, and Paragraph (1) of Subsection O of 20.6.4.900 NMAC, shall be attained at the point of discharge for any discharge to a surface water of the state with a designated fishery use.

(3) The general standards set out in Subsections A, B, C, D, E, G, H, J of 20.6.4.12 NMAC, and the provision set out in Subsection D of 20.6.4.13 NMAC are applicable within mixing zones.

(4) The areal extent and concentration isopleths of a particular mixing zone will depend on site-specific conditions including, but not limited to, wastewater flow, receiving water critical low flow, outfall design, channel characteristics and climatic conditions and, if needed, shall be determined on a case-by-case basis. When the physical boundaries or other characteristics of a particular mixing zone must be known, the methods presented in Section 4.4.5, "Ambient-induced mixing," in "Technical support document for water quality-based toxics control" (March 1991, EPA/505/2-90-001) shall be used.

(5) All applicable water quality standards set under Subsection F of 20.6.4.12 NMAC, 20.6.4.101 through 20.6.4.899 NMAC and 20.6.4.900 NMAC, except Paragraph (1) of Subsection J, acute aquatic life criteria of Subsection M, Paragraph (1) of Subsection N, and Paragraph (1) of Subsection O of 20.6.4.900 NMAC, shall be attained at the boundaries of mixing zones. A continuous zone of passage through or around the mixing zone shall be maintained in which the water quality meets all applicable standards and allows the migration of aquatic life presently common in surface waters of the state with no effect on their populations.

F. Multiple Uses: When a classified water of the state has more than a single designated use, the applicable numeric standards shall be the most stringent of those established for such classified water.

[20.6.4.10 NMAC – Rp 20 NMAC 6.1.1103, 10-12-00]

G. Human health standards shall apply to those waters with a designated, existing or attainable fishery use. The human health standards for persistent toxic pollutants, as identified in Subsection M of Section 20.6.4.900 NMAC, shall also apply to all tributaries of waters with a designated, existing or attainable fishery use.

[20.6.4.10 NMAC – Rp 20 NMAC 6.1.1103, 10-12-00; A, 10-11-02]

20.6.4.11 COMPLIANCE WITH WATER QUALITY STANDARDS:

A. Compliance with acute water quality standards shall be determined from the analytical results of a single grab sample. Acute standards shall not be exceeded.

B. Compliance with chronic water quality standards shall be determined from the arithmetic mean of the analytical results of samples collected using applicable protocols. Chronic standards shall not be exceeded more than once every three years.

C. Compliance with water quality standards for total ammonia shall be determined by performing the biomonitoring procedures set out in Subsections D and E of 20.6.4.13 NMAC, or by attainment of applicable ammonia standards set out in Subsections N and O of 20.6.4.900 NMAC.

D. Compliance with water quality standards for the protection of human health shall be determined from the analytical results of representative grab samples, as defined in the Water Quality Management Plan. Human health standards shall not be exceeded.

E. The commission may establish a numeric water quality standard at a concentration that is below the minimum quantification level. In such cases, the water quality standard is enforceable at the minimum quantification level.

F. In determining compliance with standards for chromium an analysis which measures both the trivalent and hexavalent ions shall be used.

G. For compliance with numeric standards dependent on hardness, hardness (as mg $CaCO_3$/L) shall be determined from a sample taken at the same time that the sample for the water contaminant is taken, or from available verifiable data sources including, but not limited to, the U.S. environmental protection agency's STORET water quality database.

H. The hardness-dependent formulae for metals shall be valid only for hardness values of 0-400 mg/L. For values above 400 mg/L, the value for 400 mg/L shall apply.

I. The total ammonia tables shall be valid only for temperatures of 0 to 30°C and for pH values of 6.5 to 9.0. For temperatures below 0°C, the total ammonia standards for 0°C shall apply; for temperatures above 30°C, the total ammonia standards for 30°C shall apply. For pH values below 6.5, the total ammonia standards for 6.5 shall apply; for pH values above 9.0, the total ammonia standards for 9.0 shall apply.

J. Compliance Schedules: It shall be the policy of the commission to allow on a case-by-case basis the inclusion of a schedule of compliance in a national pollutant discharge elimination system (NPDES) permit issued to an existing facility. Such schedule of compliance will be for the purpose of providing a permittee with adequate time to make treatment facility modifications necessary to comply with water quality based permit limitations determined to be necessary to implement new or revised water quality standards. Compliance schedules may be included in NPDES permits at the time of permit renewal or modification and shall be written to require compliance at the earliest practicable time. Compliance schedules shall also specify milestone dates so as to measure progress towards final project completion (e.g., design completion, construction start, construction completion, date of compliance).

[20.6.4.11 NMAC – Rp 20 NMAC 6.1.1104, 10-12-00; A, 10-11-02]

20.6.4.12 GENERAL STANDARDS: General standards are established to sustain and protect existing or attainable uses of surface waters of the state. These general standards apply to all surface waters of the state at all times, unless a specified standard is provided elsewhere in this part. Surface waters of the state shall be free of any water contaminant in such quantity and of such duration as may with reasonable probability injure human health, animal or plant life or property, or unreasonably interfere with the public welfare or the use of property. When changes in dissolved oxygen, temperature, dissolved solids, sediment or turbidity in a water of the state is attributable to natural causes or the reasonable operation of irrigation and flood control facilities that are not subject to federal or state water pollution control permitting, numerical standards for temperature, dissolved solids content, dissolved oxygen, sediment or turbidity adopted under the Water Quality Act do not apply. The foregoing provision does not include major reconstruction of storage dams or diversion dams except for emergency actions necessary to protect health and safety of the public, or discharges from municipal separate storm sewers.

A. Bottom Deposits: Surface waters of the state shall be free of water contaminants from other than natural causes that will settle and damage or impair the normal growth, function, or reproduction of aquatic life or significantly alter the physical or chemical properties of the bottom.

B. Floating Solids, Oil and Grease: Surface waters of the state shall be free of oils, scum, grease and other floating materials resulting from other than natural causes that would cause the formation of a visible sheen or visible deposits on the bottom or shoreline, or would damage or impair the normal growth, function or reproduction of human, animal, plant or aquatic life.

C. Color: Color-producing materials resulting from other than natural causes shall not create an aesthetically undesirable condition nor shall color impair the use of the water by desirable aquatic life presently common in surface waters of the state.

D. Odor and Taste of Fish: Water contaminants from other than natural causes shall be limited to concentrations that will not impart unpalatable flavor to fish, or result in offensive odor arising in a surface water of the state or otherwise interfere with the reasonable use of the water.

E. Plant Nutrients: Plant nutrients from other than natural causes shall not be present in concentrations which will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state.

F. Toxic Pollutants:

(1) Surface waters of the state shall be free of toxic pollutants from other than natural causes in amounts, concentrations or combinations which affect the propagation of fish or which are toxic to humans, livestock or other animals, fish or other aquatic organisms; wildlife using aquatic environments for habitation or aquatic organisms for food; or which will or can reasonably be expected to bioaccumulate in tissues of fish, shellfish and other aquatic organisms to levels which will impair the health of aquatic organisms or wildlife or result in unacceptable tastes, odors or health risks to human consumers of aquatic organisms.

(2) Pursuant to this section, the human health criteria shall be as set out in 20.6.4.900 NMAC. For a toxic pollutant for human health not listed in 20.6.4.900 NMAC, the following provisions shall be applied in accordance with 20.6.4.10, 20.6.4.11 and 20.6.4.13

NMAC.

(a) The human health criterion shall be the recommended human health criterion for "consumption of organisms only" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act. In determining such criterion for a cancer-causing toxic pollutant, a cancer risk of 10-5 (one cancer per 100,000 exposed persons) shall be used.

(b) When a numeric criterion for the protection of human health has not been published by the U.S. environmental protection agency, a quantifiable criterion may be derived from data available in the U.S. environmental protection agency's Integrated Risk Information System (IRIS).

(3) Pursuant to this section, the chronic aquatic life standard shall be as set out in 20.6.4.900 NMAC. For a toxic pollutant for aquatic life with no chronic standard listed in 20.6.4.900 NMAC, the following provisions shall be applied in sequential order in accordance with 20.6.4.10, 20.6.4.11 and 20.6.4.13 NMAC.

(a) The chronic aquatic life criterion shall be the "freshwater criterion continuous concentration" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act;

(b) If the U.S. environmental protection agency has not published a chronic aquatic life criterion, a geometric mean LC-50 value shall be calculated for the particular species, genus or group, which is representative of the form of life to be preserved, using the results of toxicological studies published in scientific journals.

(i) The chronic aquatic life criterion for a toxic pollutant which does not bioaccumulate shall be 10 percent of the calculated geometric mean LC-50 value; and

(ii) The chronic aquatic life criterion for a toxic pollutant which does bioaccumulate shall be: the calculated geometric mean LC-50 adjusted by a bioaccumulation factor for the particular species, genus or group representative of the form of life to be preserved, but when such bioaccumulation factor has not been published, the criterion shall be one percent of the calculated geometric mean LC-50 value.

(4) Pursuant to this section, the acute aquatic life criteria shall be as set out in 20.6.4.900 NMAC. For a toxic pollutant for aquatic life with no acute criterion listed in 20.6.4.900 NMAC, the acute aquatic life criterion shall be the "freshwater criterion maximum concentration" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act.

(5) Within 90 days of the issuance of a final NPDES permit containing a numeric criterion selected or calculated pursuant to Paragraph 2, Paragraph 3 or Paragraph 4 of Subsection F of this section, the Department shall petition the Commission to adopt such criterion into these standards.

(6) The use of a piscicide registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. Section 136 et seq., and under the New Mexico Pesticide Control Act (NMPCA), Section 76-4-1 et seq. NMSA 1978 (1973), shall not be a violation of Subsection F of this section when such use has been approved by the commission. Any person seeking commission approval of the use of a piscicide shall file a written petition with the commission. The petition shall contain, at a minimum, the following information: (1) petitioner's name and address; (2) identity of the piscicide; (3) documentation

of registration under FIFRA and NMPCA; (4) target and potential non-target species, including threatened or endangered species; (5) potential environmental consequences and protocols for limiting such impacts; (6) affected surface water of the state; (7) results of pre-treatment survey; (8) evaluation of available alternatives and justification for selecting piscicide use; (9) post-treatment assessment monitoring protocol; and (10) any other information required by the commission. The commission shall review the petition and require a public hearing in the locality affected by the proposed use in accordance with Adjudicatory Procedures, 20.1.3 NMAC. In addition to the public notice requirements in Adjudicatory Procedures, 20.1.3 NMAC, the petitioner shall provide written notice to (1) local political subdivisions; (2) local water planning entities; (3) local conservancy and irrigation districts; and (4) local media outlets, except that the petitioner shall only be required to publish notice in a newspaper of circulation in the locality affected by the proposed use. After a public hearing, the commission may grant the petition in whole or in part, may grant the petition subject to conditions, or may deny the petition. In granting any petition in whole or part or subject to conditions, the commission shall require the petitioner to implement post-treatment assessment monitoring.

G. Radioactivity: The radioactivity of surface waters of the state shall be maintained at the lowest practical level and shall in no case exceed the standards set forth in the New Mexico Radiation Protection Regulations, 20.3.1.400 through 20.3.1.499 NMAC (5-3-95).

H. Pathogens: Surface waters of the state shall be virtually free of pathogens. In particular, surface waters of the state used for irrigation of table crops such as lettuce shall be virtually free of Salmonella and Shigella species.

I. Temperature: Maximum temperatures for each classified water of the state have been specified in 20.6.4.101 through 20.6.4.899 NMAC. However, the introduction of heat by other than natural causes shall not increase the temperature, as measured from above the point of introduction, by more than 2.7°C (5°F) in a stream, or more than 1.7°C (3°F) in a lake or reservoir. In no case will the introduction of heat be permitted when the maximum temperature specified for the reach (generally 20°C (68°F) for coldwater fisheries and 32.2°C (90°F) for warmwater fisheries) would thereby be exceeded. These temperature standards shall not apply to impoundments constructed offstream for the purpose of heat disposal. High water temperatures caused by unusually high ambient air temperatures are not violations of these standards.

J. Turbidity: Turbidity attributable to other than natural causes shall not reduce light transmission to the point that the normal growth, function, or reproduction of aquatic life is impaired or that will cause substantial visible contrast with the natural appearance of the water.

K. Salinity: Where existing information is sufficient, numerical standards for TDS (or conductivity), chlorides and sulfates, have been adopted in 20.6.4.101 through 20.6.4.899 NMAC. The following standards apply at the downstream point of the reach in which they are set:

(1) For the tributaries of the Colorado river system, the state of New Mexico will cooperate with the Colorado river basin states and the federal government to support and implement the salinity policy and program outlined in the report "1999 Review, water quality standards for salinity, Colorado river system."

(2) Numeric criteria for salinity are established at three points in the Colorado river basin as follows: below Hoover dam, 723 mg/L; below Parker dam, 747 mg/L; and at Imperial dam, 879 mg/L.

(3) As a part of the program, objectives for New Mexico shall include the elimination of discharges of water containing solids in solution as a result of the use of water to control or convey fly ash from coal-fired electric generators, wherever practicable.

(4) In determining compliance with the numeric criteria hereby adopted, salinity (TDS) shall be determined by either the "calculation method" (sum of constituents) or the filterable residue method. Approved test procedures for these determinations are as set forth in 20.6.4.13 NMAC.

L. Dissolved Gases: Surface waters of the state shall be free of nitrogen and other dissolved gases at levels above 110 percent saturation when this supersaturation is attributable to municipal, industrial or other discharges.

[20.6.4.12 NMAC – Rp 20 NMAC 6.1.1105, 10-12-00; A, 10-11-02]

20.6.4.13 SAMPLING AND ANALYSIS:

A. All methods of sample collection, preservation and analysis used in determining water quality and maintenance of these standards shall be in accordance with approved or accepted test procedures published in "Guidelines establishing test procedures for the analysis of pollutants under the Clean Water Act," 40 CFR Part 136, or any test procedure approved or accepted by EPA using procedures provided in 40 CFR Parts 136.3(d), 136.4, and 136.5. Test procedures approved or accepted under 40 CFR Part 136 are published in the references cited herein and in other references.

(1) "Standard methods for the examination of water and wastewater," American public health association.

(2) "Methods for chemical analysis of water and wastes," U.S. environmental protection agency.

(3) "Methods for determination of inorganic substances in water and fluvial sediments," techniques of water-resource investigations of the U.S. geological survey.

(4) "Methods for the determination of organic substances in water and fluvial sediments," techniques of water-resource investigations of the U.S. geological survey.

B. Bacteriological Surveys: The monthly geometric mean shall be used in assessing attainment of standards when a minimum of five samples is collected in a 30-day period.

C. Sampling Procedures:

(1) Streams: Stream monitoring stations below waste discharges shall be located a sufficient distance downstream to ensure adequate vertical and lateral mixing.

(2) Lakes: Sampling stations in lakes shall be located at least 250 feet from a waste discharge.

(3) Lakes: Except for the restriction specified in Paragraph (2) of this subsection, lake sampling stations shall be located at any site where the attainment of a water quality standard is to be assessed. Water quality measurements taken at intervals in the entire water

column at a sampling station shall be averaged for the epilimnion, or in the absence of an epilimnion, for the upper one-third of the water column of the lake to determine attainment of standards, except that attainment of standards for toxic pollutants shall be assessed during periods of complete vertical mixing, e.g., during spring or fall turnover, or by taking depth-integrated composite samples of the water column.

D. Acute toxicity of effluent to aquatic life shall be determined using the procedures

specified in U.S. environmental protection agency "Methods for measuring the acute toxicity of effluents to freshwater and marine organisms" (4th Ed., 1991, EPA/600/4-90/027), or latest edition thereof, which is incorporated herein by reference. Acute toxicities of substances shall be determined using at least two species tested in whole effluent and a series of effluent dilutions. Acute toxicity due to discharges shall not occur within the wastewater mixing zone in any surface water of the state with an existing or designated fishery use.

E. Chronic toxicity of effluent or ambient surface waters of the state to aquatic life

shall be determined using the procedures specified in U.S. environmental protection agency "Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms" (2nd Ed., 1989, EPA 600/4-89/001), or latest edition thereof, which is incorporated herein by reference. Chronic toxicities of substances shall be determined using at least two species tested in ambient surface water or whole effluent and a series of effluent dilutions. Chronic toxicity due to discharges shall not occur at the critical low flow, or any flow greater than the critical low flow, in any surface water of the state with an existing or designated fishery use more than once every three years.

[20.6.4.13 NMAC – Rp 20 NMAC 6.1.1106, 10-12-00]

20.6.4.14 USE ATTAINABILITY ANALYSIS:

A. A use attainability analysis is a scientific study which shall be conducted only for the purpose of assessing the factors affecting the attainment of a use. Whenever a use attainability analysis is conducted, it shall be subject to the requirements and limitations set forth in 40 CFR Part 131, Water Quality Standards; specifically, Subsections 131.3(g), 131.10(g), 131.10(h) and 131.10(j) shall be applicable as follows:

(1) The department must conduct a use attainability analysis whenever it proposes

to classify a surface water of the state with designated uses which do not include the uses specified in Section 101(a)(2) of the federal Clean Water Act. Section 101(a)(2) uses are also specified in Subsection B of 20.6.4.6 NMAC.

(2) A designated use cannot be removed if it is an existing use.

(3) A use attainability analysis or an equivalent study approved by the department

and the regional administrator must be conducted to remove any non-existing designated use from any classified waters of the state.

B. Any person proposing to conduct a use attainability analysis or equivalent study

shall publish notice of this intent in a newspaper of local and statewide circulation. The cost of publication shall be the responsibility of the person proposing such action. The notice shall describe the surface water of the state and uses to be assessed, identify the persons to contact for

complete information, and describe how interested persons can participate in the use attainability analysis or equivalent study.

C. Any person may submit a petition to the department stating that they intend to conduct a use attainability analysis or equivalent study. At a minimum, the department, the New Mexico game and fish department, the state engineer and the U.S. fish and wildlife service shall be consulted during the development of a work plan for such analysis or equivalent study. The petitioner shall develop a work plan to conduct the use attainability analysis or equivalent study and shall submit the work plan to the department and the regional administrator of the EPA for review and approval. A copy of the petition and the work plan must be submitted concurrently to the commission. Upon approval of the work plan by the department and the regional administrator, the petitioner shall conduct the use attainability analysis or equivalent study in accordance with the approved work plan. The cost of such analysis or equivalent study shall be the responsibility of the petitioner.

D. Physical, chemical and biological evaluations of surface waters of the state other than lakes and reservoirs for purposes of use attainability analyses or equivalent studies shall be conducted according to the procedures outlined in the "Technical support manual: waterbody surveys and assessments for conducting use attainability analyses," United States environmental protection agency, office of water, regulations and standards, Washington, D.C., November 1983, or latest edition thereof, which is incorporated herein by reference, or an alternative equivalent study methodology approved by the department.

E. Physical, chemical and biological evaluations of lakes and reservoirs for purposes of use attainability analyses or equivalent studies shall be conducted according to the procedures outlined in the "Technical support manual: waterbody surveys and assessments for conducting use attainability analyses, volume III: lake systems," United States environmental protection agency, office of water, regulations and standards, Washington, D.C., November 1984, or latest edition thereof, which is incorporated herein by reference, or an alternative equivalent study methodology approved by the department.

F. A use attainability analysis or equivalent study should include any applicable information concerning the following:

(1) identification of existing uses of the surface water of the state to be reviewed which have existed since 1975;

(2) an evaluation of the best water quality attained in the surface water of the state to be reviewed which has existed since 1975;

(3) a technological analysis which identifies available treatment options for point and nonpoint sources to meet applicable water quality standards for the designated uses;

(4) an economic analysis which evaluates social and economic impacts associated with available treatment options;

(5) a physical and biological evaluation of the surface water of the state to be reviewed to identify any factors unrelated to water quality which impair attainment of designated uses and to determine which designated uses are feasible to attain in such surface water of the state given existing physical limitations;

(6) an evaluation of the water chemistry of the surface water of the state to be reviewed to identify chemical constituents which impair the designated uses which are feasible to attain in such water; and

(7) an evaluation of the aquatic and terrestrial biota utilizing the surface water of the state to determine resident species and which species could potentially exist in such water if physical and chemical factors impairing a designated use are corrected.

G. Upon completion of the use attainability analysis or equivalent study, the petitioner shall submit to the department and the commission the data and their findings and conclusions. If the department determines that the analysis or equivalent study was conducted in accordance with the approved work plan and the findings and conclusions are based upon sound scientific rationale, and demonstrates that it is not feasible to attain the designated use, the department shall request authority from the commission to initiate rulemaking proceedings to modify the designated use for the surface water of the state that was reviewed.
[20.6.4.14 NMAC – Rp 20 NMAC 6.1.1107, 10-12-00]

20.6.4.15 – 20.6.4.100: [RESERVED]

20.6.4.101 RIO GRANDE BASIN - The main stem of the Rio Grande from the international boundary and water commission sampling station above American dam upstream to one mile below Percha dam. (Sustained flow in the Rio Grande below Caballo reservoir is dependent on release from Caballo reservoir during the irrigation season; at other times of the year, there may be little or no flow.)

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 34°C (93.2°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 350 cfs, the monthly average concentration for: TDS shall not exceed 2,000 mg/L, sulfate shall not exceed 500 mg/L, and chlorides shall not exceed 400 mg/L.
[20.6.4.101 NMAC – Rp 20 NMAC 6.1.2101, 10-12-00, A, 12-15-01]

20.6.4.102 RIO GRANDE BASIN - The main stem of the Rio Grande from one mile below Percha dam upstream to the headwaters of Caballo reservoir including Caballo reservoir. (Sustained flow in the Rio Grande below Caballo reservoir is dependent on release from Caballo reservoir during the irrigation season; at other times of the year, there may be little or no flow.)

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

and warmwater fishery.

B. Standards:

(1) At any sampling site: pH shall be within the range of 6.6 to 9.0, temperature shall not exceed 32.2°C (90°F), and turbidity shall not exceed 50 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 1 00/100 mL; no single sample shall exceed 200/100 mL (see Subsection B of 20.6.4.13 NMAC).
[20.6.4.102 NMAC – Rp 20 NMAC 6.1.2102, 10-12-00]

20.6.4.103 RIO GRANDE BASIN - The main stem of the Rio Grande from the headwaters of Caballo lake upstream to Elephant Butte dam and perennial reaches of tributaries to the Rio Grande in Sierra and Socorro counties. (Flow in this reach of the Rio Grande main stem is dependent upon release from Elephant Butte dam.)

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

B. Standards:

(1) In any single sample: pH shall be within the range of 6.6 to 9.0, 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 l,000/100 mL; no single sample shall exceed 2,000/100 mL (see Subsection B of 20.6.4.13 NMAC).
[20.6.4.103 NMAC – Rp 20 NMAC 6.1.2103, 10-12-00]

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]

20.6.4.107 RIO GRANDE BASIN - The Jemez river from its confluence with the Rio Guadalupe upstream to state highway 4 near the town of Jemez Springs and perennial reaches of Vallecito creek.

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

B. Standards:

(1) In any single sample: temperature shall not exceed 25°C (77°F), pH shall be within the range of 6.6 to 8.8, and turbidity shall not exceed 25 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 200/100 mL; no single sample shall exceed 400/100 mL (see Subsection B of 20.6.4.13 NMAC).

[20.6.4.107 NMAC – Rp 20 NMAC 6.1.2105.5, 10-12-00]

20.6.4.108 RIO GRANDE BASIN - The Jemez river and all its tributaries above state highway 4 near the town of Jemez Springs, and the Guadalupe river and all its tributaries.

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 400 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 25 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).

[20.6.4.108 NMAC – Rp 20 NMAC 6.1.2106, 10-12-00]

20.6.4.109 RIO GRANDE BASIN - Perennial reaches of Bluewater creek, Rio Moquino, Seboyeta creek, Rio Paguate, the Rio Puerco within the Santa Fe national forest, and all other perennial reaches of tributaries to the Rio Puerco including the Rio San Jose in Cibola county from the USGS gaging station at Correo upstream to Horace springs.

A. Designated Uses: coldwater fishery, domestic water supply, fish culture, irrigation, 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, temperature shall not exceed 20°C (68°F), total phosphorus (as P) shall not exceed 0.1 mg/L, and turbidity shall not exceed 25 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).

[20.6.4.109 NMAC – Rp 20 NMAC 6.1.2107, 10-12-00]

20.6.4.110 RIO GRANDE BASIN - The main stem of the Rio Grande from Angostura diversion works upstream to Cochiti dam.

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

B. Standards:

(1) In any single sample: pH shall be within the range of 6.6 to 9.0, 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).

[20.6.4.110 NMAC – Rp 20 NMAC 6.1.2108, 10-12-00]

20.6.4.111 RIO GRANDE BASIN - Perennial reaches of Las Huertas and San Pedro creeks.

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

[20.6.4.111 NMAC - Rp 20 NMAC 6.1.2108.5, 10-12-00; A, 7-25-01]

20.6.4.112 RIO GRANDE BASIN - Cochiti reservoir.

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

B. Standards:

(l) At any sampling site: pH shall be within the range of 6.6 to 9.0, temperature shall not exceed 25°C (77°F), and turbidity shall not exceed 25 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).

[20.6.4.112 NMAC – Rp 20 NMAC 6.1.2109, 10-12-00]

<snip>

20.6.4.900 STANDARDS APPLICABLE TO ATTAINABLE OR DESIGNATED USES UNLESS OTHERWISE SPECIFIED IN 20.6.4.101 THROUGH 20.6.4.899 NMAC.

A. Coldwater Fishery: Dissolved oxygen shall not be less than 6.0 mg/L, temperature shall not exceed 20°C (68°F), and pH shall be within the range of 6.6 to 8.8. The acute and chronic aquatic life standards set out in subsections J and M of this section are applicable to this use. The total ammonia standards set out in Subsection O of this section and the human health standards listed in Subsection M of this section are applicable to this use.

B. Domestic Water Supply: Surface waters of the state designated for use as domestic water supplies shall not contain substances in concentrations that create a lifetime cancer risk of more than one cancer per 100,000 exposed persons. The following numeric standards and those standards listed under domestic water supply in Subsection M of this section shall not be exceeded:

(1)	dissolved nitrate (as N)	10.	mg/L
(2)	radium-226 + radium-228	5.	pCi/L
(3)	strontium-90	8	pCi/L
(4)	tritium	20,000	pCi/L
(5)	gross alpha (including radium-266, but excluding radon and uranium)	15	pCi/L

C. High Quality Coldwater Fishery: Dissolved oxygen shall not be less than 6.0 mg/L, temperature shall not exceed 20°C (68°F), pH shall be within the range of 6.6 to 8.8, turbidity shall not exceed 10 NTU (25 NTU in certain reaches where natural background prevents attainment of lower turbidity), and conductivity (at 25°C) shall not exceed a limit varying between 300 mmhos/cm and 1,500 mmhos/cm depending on the natural background in particular surface waters of the state (the intent of this standard is to prevent excessive increases in dissolved solids which would result in changes in community structure). The acute and chronic aquatic life standards set out in subsections J and M of this section are applicable to this use. The total ammonia standards set out in Subsection O of this section and the human health standards for pollutants listed in Subsection M of this section are applicable to this use.

D. Irrigation and Irrigation Storage: The monthly geometric mean of fecal

coliform bacteria
shall not exceed 1,000/100 mL; no single sample shall exceed 2,000/100 mL. The following numeric standards and those standards listed under irrigation in Subsection M of this section shall not be exceeded:

(1) dissolved selenium 0.13 mg/L

(2) dissolved selenium in presence of >500 mg/L SO_4 0.25 mg/L

E. Limited Warmwater Fishery: Dissolved oxygen shall not be less than 5 mg/L, pH shall be within the range of 6.6 to 9.0, and on a case by case basis maximum temperatures may exceed 32.2°C. The acute and chronic aquatic life standards set out in subsections J and M of this section are applicable to this use. The total ammonia standards set out in Subsection N of this section and the human health standards listed in Subsection M of this section are applicable to this use.

F. Marginal Coldwater Fishery: Dissolved oxygen shall not be less than 6 mg/L, on a case by case basis maximum temperatures may exceed 25°C and the pH may range from 6.6 to 9.0. The acute and chronic aquatic life standards set out in subsections J and M of this section are applicable to this use. The total ammonia standards set out in Subsection O of this section and the human health standards listed in Subsection M of this section are applicable to this use.

G. Primary Contact: The monthly geometric mean of fecal coliform bacteria shall not exceed 200/100 mL, no single sample shall exceed 400/100 mL and pH shall be within the range of 6.6 to 9.0.

H. Warmwater Fishery: Dissolved oxygen shall not be less than 5 mg/L, temperature shall not exceed 32.2°C (90°F), and pH shall be within the range of 6.6 to 9.0. The acute and chronic standards set out in Subsection J of this section are applicable to this use. The total ammonia standards set out in Subsection M of this section are applicable to this use.

H. Warmwater Fishery: Dissolved oxygen shall not be less than 5 mg/L, temperature shall not exceed 32.2°C (90°F), and pH shall be within the range of 6.6 to 9.0. The acute and chronic aquatic life standards set out in subsections J and M of this section are applicable to this use. The total ammonia standards set out in Subsection N of this section and the human health standards listed in Subsection M of this section are applicable to this use.

I. Fish culture, secondary contact, and municipal and industrial water supply and storage are also designated in particular classified waters of the state where these uses are actually being realized. However, no numeric standards apply uniquely to these uses. Water quality adequate for these uses is ensured by the general standards and numeric standards for bacterial quality, pH, and temperature which are established for all classified waters of the state listed in 20.6.4.101 through 20.6.4.899 NMAC.

J. The following schedule of equations for the determination of numeric standards for the substances listed and those standards listed in Subsection M for aquatic life shall apply to the subcategories of fisheries identified in this section:

(1) Acute Standards

(a) dissolved silver $e^{(1.72[\ln(\text{hardness})] - 6.6825)}$ ug/L

(b) dissolved cadmium $(e^{(1.128[\ln(\text{hardness})] - 3.6867)})\text{cf}$ ug/L

The hardness-dependent fomulae for cadmium must be multiplied by a conversion factor (cf) to be expressed as dissolved values. The acute factor for cadmium is cf = 1.136672 - [(ln hardness)(0.041838)].

(c) dissolved chromium $e^{(0.819[\ln(\text{hardness})] + 2.5736}$ ug/L

(d) dissolved copper $e^{(0.9422[\ln(\text{hardness})] - 1.7408)}$ ug/L

(e) dissolved lead $(e^{(1.273[\ln(\text{hardness})] - 1.46)})cf$ ug/L

The hardness-dependent fomulae for lead must be multiplied by a conversion factor (cf) to be expressed as dissolved values. The acute and chronic factor for lead is cf = 1.46203 - [(ln hardness)(0.145712)].

(f) dissolved nickel $e^{(0.8460[\ln(\text{hardness})]+2.253)}$ ug/L

(g) dissolved zinc $e^{(0.8473[\ln(\text{hardness})]+0.8618)}$ ug/L

(2) Chronic Standards

(a) dissolved cadmium $(e^{(0.7852[\ln(\text{hardness})] - 2.715)})cf$ ug/L

The hardness-dependent formulae for cadmium must be multiplied by a conversion factor (cf) to be expressed as dissolved values. The chronic factor for cadmium is cf = 1.101672 - [(ln hardness)(0.041838)].

(b) dissolved chromium $e^{(0.819[\ln(\text{hardness})] + 0.534)}$ ug/L

(c) dissolved copper $e^{(0.8545[\ln(\text{hardness})] - 1.7428)}$ ug/L

(d) dissolved lead $(e^{(1.273[\ln(\text{hardness})] - 4.705)})cf$ ug/L

The hardness-dependent formulae for lead must be multiplied by a conversion factor (cf) to be expressed as dissolved values. The acute and chronic factor for lead is cf = 1.46203 - [(ln hardness)(0.145712)].

(e) dissolved nickel $e^{(0.846[\ln(\text{hardness})] + 0.0554)}$ ug/L

(f) dissolved zinc $e^{(0.8473[\ln(\text{hardness})]+0.8699)}$ ug/L

K. Livestock Watering: The following numeric standards and those standards listed in Subsection M for livestock watering shall not be exceeded:

(1)	Radium-226 + radium-228	30.0	pCi/L
(2)	Tritium	20,000	pCi/L
(3)	Gross alpha	15	pCi/L

L. Wildlife Habitat: Wildlife habitat should be free from any substances at concentrations that are toxic to or will adversely affect plants and animals that use these environments for feeding, drinking, habitat or propagation, or can bioaccumulate and impair the community of animals in a watershed or the ecological integrity of surface waters of the state. In the absence of site-specific information, and subject to the following paragraph, the following chronic numeric standards listed in Subsection M for wildlife habitat shall not be exceeded. The discharge of substances which bioaccumulate, in excess of levels [specified above] listed in Subsection M for wildlife habitat is allowed if, and only to the extent that, the substances are present in the intake waters which are diverted and utilized prior to discharge, and then only if the discharger utilizes best available treatment technology to reduce the amount of bioaccumulating substances which are discharged.

M. Numeric criteria

The following table sets forth the numeric criteria adopted by the commission to protect existing, designated and attainable uses. Additional criteria that are not compatible with this table and are found in Subsections A through L of this section.

	Pollutant total, unless indicated	CAS Number	Domestic Water Supply µg/L	Irrigation µg/L	Livestock Watering µg/L	Wildlife Habitat µg/L	Aquatic Life		Human Health µg/L	Cancer Causing and/or Persistent
							Acute µg/L	Chronic µg/L		
1	Aluminum, dissolved	7429-90-5		5,000	5,000		750	87		
2	Antimony, dissolved	7440-36-0	6						4,300	P
3	Arsenic, dissolved	7440-38-2	50	100	200		340	150	24.2	C,P
4	Barium, dissolved	7440-39-3	2,000							
5	Beryllium, dissolved	7440-41-7	4				130	5.3		
6	Boron, dissolved	7440-42-8		750	5,000					
7	Cadmium, dissolved	7440-43-9	5	10	50		see 20.6.4.900.J	see 20.6.4.900.J		
8	Chlorine residual	7782-50-5				11	19	11		
9	Chromium, dissolved	18540-29-9	100	100	1,000		see 20.6.4.900.J	see 20.6.4.900.J		
10	Cobalt, dissolved	7440-48-4		50	1,000					
11	Copper, dissolved	7440-50-8		200	500		see 20.6.4.900.J	see 20.6.4.900.J		
12	Cyanide, dissolved	57-12-5	200							
13	Cyanide, weak acid dissociable	57-12-5				5.2	22.0	5.2	220,000	
14	Lead, dissolved	7439-92-1	50	5,000	100		see 20.6.4.900.J	see 20.6.4.900.J		
15	Mercury	7439-97-6	2		10	0.77	2.4	0.012		
16	Molybdenum, dissolved	7439-98-7		1,000						
17	Nickel, dissolved	7440-02-0	100				see 20.6.4.900.J	see 20.6.4.900.J	4,600	P
18	Selenium, dissolved	7782-49-2	50	see 20.6.4.900.D	50				11,000	P
19	Selenium, total recoverable	7782-49-2				5.0	20.0	5.0		
20	Silver, dissolved	7440-22-4					see 20.6.4.900.J			
21	Thallium, dissolved	7440-28-0	2						6.3	P
22	Uranium, dissolved	7440-61-1	5,000							
23	Vanadium, dissolved	7440-62-2		100	100					
24	Zinc, dissolved	7440-66-6		2,000	25,000		see 20.6.4.900.J	see 20.6.4.900.J	69,000	P
25	Acenaphthene	83-32-9							2,700	
26	Acrolein	107-02-8							780	

	Pollutant total, unless indicated	CAS Number	Domestic Water Supply µg/L	Irrigation µg/L	Livestock Watering µg/L	Wildlife Habitat µg/L	Aquatic Life		Human Health µg/L	Cancer Causing and/or Persistent
							Acute µg/L	Chronic µg/L		
27	Acrylonitrile	107-13-1							6.6	C
28	Aldrin	309-00-2					3.0		0.0014	C,P
29	Anthracene	120-12-7							110,000	
30	Benzene	71-43-2							710	C
31	Benzidine	92-87-5							0.0054	C
32	Benzo(a)anthracene	56-55-3							0.49	C
33	Benzo(a)pyrene	50-32-8							0.49	C,P
34	Benzo(b)fluoranthene	205-99-2							0.49	C
35	Benzo(k)fluoranthene	207-08-9							0.49	C
36	alpha-BHC	319-84-6							0.13	C
37	beta-BHC	319-85-7							0.46	C
38	Gamma-BHC (Lindane)	58-89-9					0.95		0.63	C
39	Bis(2-chloroethyl) ether	111-44-4							14	C
40	Bis(2-chloroisopropyl) ether	108-60-1							170,000	
41	Bis(2-ethylhexyl) phthalate	117817							59	C
42	Bromoform	75-25-2							3600	C
43	Butylbenzyl phthalate	85-68-7							5,200	
44	Carbon tetrachloride	56-23-5							44	C
45	Chlordane	57-74-9					2.4	0.0043	0.022	C,P
46	Chlorobenzene	108-90-7							21,000	
47	Chlorodibromomethane	124-48-1							340	C
48	Chloroform	67-66-3							4,700	C
49	2-Chloronaphthalene	91-58-7							4,300	
50	2-Chlorophenol	95-57-8							400	
51	Chrysene	218-01-9							0.49	C
52	4,4'-DDT and derivatives	50-29-3				0.001	1.1	0.001	0.0059	C,P
53	Dibenzo(a,h)anthracene	53-70-3							0.49	C

	Pollutant total, unless indicated	CAS Number	Domestic Water Supply µg/L	Irrigation µg/L	Livestock Watering µg/L	Wildlife Habitat µg/L	Aquatic Life		Human Health µg/L	Cancer Causing and/or Persistent
							Acute µg/L	Chronic µg/L		
54	Dibutyl phthalate	84-74-2							12,000	
55	1,2-Dichlorobenzene	95-50-1							17,000	
56	1,3-Dichlorobenzene	541-73-1							2,600	
57	1,4-Dichlorobenzene	106-46-7							2,600	
58	3,3'-Dichlorobenzidine	91-94-1							0.77	C
59	Dichlorobromomethane	75-27-4							460	C
60	1,2-Dichloroethane	107-06-2							990	C
61	1,1-Dichloroethylene	75-35-4							32	C
62	2,4-Dichlorophenol	120-83-2							790	
63	1,2-Dichloropropane	78-87-5							390	C
64	1,3-Dichloropropene	542-75-6							1,700	
65	Dieldrin	60-57-1					0.24	0.056	0.0014	C,P
66	Diethyl phthalate	84-66-2							120,000	
67	Dimethyl phthalate	131-11-3							2,900,000	
68	2,4-Dimethylphenol	105-67-9							2,300	
69	2,4-Dinitrophenol	51-28-5							14,000	
70	2,4-Dinitrotoluene	121-14-2							91	C
71	2,3,7,8-TCDD Dioxin	1746-01-6							1.4E-07	C,P
72	1,2-Diphenylhydrazine	122-66-7							5.4	C
73	alpha-Endosulfan	959-98-8					0.22	0.056	240	
74	beta-Endosulfan	33213-65-9					0.22	0.056	240	
75	Endosulfan sulfate	1031-07-8							240	
76	Endrin	72-20-8					0.086	0.036	0.81	
78	Endrin aldehyde	7421-93-4							0.81	
79	Ethylbenzene	100-41-4							29,000	
80	Fluoranthene	206-44-0							370	
81	Fluorene	86-73-7							14,000	

	Pollutant total, unless indicated	CAS Number	Domestic Water Supply µg/L	Irrigation µg/L	Livestock Watering µg/L	Wildlife Habitat µg/L	Aquatic Life		Human Health µg/L	Cancer Causing and/or Persistent
							Acute µg/L	Chronic µg/L		
82	Heptachlor	76-44-8					0.52	0.0038	0.0021	C
83	Heptachlor epoxide	1024-57-3					0.52	0.0038	0.0011	C
84	Hexachlorobenzene	118-74-1							0.0077	C,P
85	Hexachlorobutadiene	87-68-3							500	C
86	Hexachlorocyclopentadiene	77-47-4							17,000	
87	Hexachloroethane	67-72-1							89	C
88	Ideno(1,2,3-cd)pyrene	193-39-5							0.49	C
89	Isophorone	78-59-1							26,000	C
90	Methyl bromide	74-83-9							4000	
91	2-Methyl-4,6-dinitrophenol	534-52-1							765	
92	Methylene chloride	75-09-2							16,000	C
93	Nitrobenzene	98-95-3							1,900	
94	N-Nitrosodimethylamine	62-75-9							81	C
95	N-Nitrosodi-n-propylamine	621-64-7							14	C
96	N-Nitrosodiphenylamine	86-30-6							160	C
97	PCBs	1336-36-3				0.014		0.014	0.0017	C,P
98	Pentachlorophenol	87-86-5					19	15	82	C
99	Phenol	108-95-2							4,600,000	
100	Pyrene	129-00-0							11,000	
101	1,1,2,2-Tetrachloroethane	79-34-5							110	C
102	Tetrachloroethylene	127-18-4							88.5	C,P
103	Toluene	108-88-3							200,000	
104	Toxaphene	8001-35-2					0.73	0.0002	0.0075	C
105	1,2-Trans-dichloroethylene	156-60-5							140,000	
106	1,2,4-Trichlorobenzene	120-82-1							940	
107	1,1,2-Trichloroethane	79-00-5							420	C

	Pollutant total, unless indicated	CAS Number	Domestic Water Supply µg/L	Irrigation µg/L	Livestock Watering µg/L	Wildlife Habitat µg/L	Aquatic Life		Human Health µg/L	Cancer Causing and/or Persistent
							Acute µg/L	Chronic µg/L		
108	Trichloroethylene	79-01-6							810	C
109	2,4,6-Trichlorophenol	88-06-2							65	C
110	Vinyl chloride	75-01-4							5,250	C

N. Total Ammonia (mg/L as N), Warmwater Fisheries:

(1) acute standards

	pH										
Temp. ^{o}C	**6.50**	**6.75**	**7.00**	**7.25**	**7.50**	**7.75**	**8.00**	**8.25**	**8.50**	**8.75**	**9.00**
0	29	26	23	19	14	10	6.6	3.7	2.1	1.2	0.70
1	28	26	23	19	14	9.9	6.5	3.7	2.1	1.2	0.70
2	28	26	22	18	14	9.7	6.4	3.6	2.1	1.2	0.69
3	28	25	22	18	14	9.6	6.3	3.6	2.0	1.2	0.69
4	27	25	22	18	14	9.5	6.2	3.5	2.0	1.2	0.69
5	27	25	22	18	13	9.4	6.1	3.5	2.0	1.2	0.68
6	27	24	21	18	13	9.3	6.1	3.5	2.0	1.1	0.68
7	26	24	21	17	13	9.2	6.0	3.4	2.0	1.1	0.68
8	26	24	21	17	13	9.1	6.0	3.4	1.9	1.1	0.68
9	26	24	21	17	13	9.0	5.9	3.4	1.9	1.1	0.68
10	25	23	21	17	13	8.9	5.9	3.3	1.9	1.1	0.68
11	25	23	20	17	13	8.9	5.8	3.3	1.9	1.1	0.68
12	25	23	20	17	13	8.8	5.8	3.3	1.9	1.1	0.69
13	25	23	20	16	12	8.7	5.7	3.3	1.9	1.1	0.69
14	25	23	20	16	12	8.7	5.7	3.3	1.9	1.1	0.70
15	24	23	20	16	12	8.6	5.7	3.3	1.9	1.1	0.70
16	24	22	20	16	12	8.6	5.7	3.3	1.9	1.1	0.71
17	24	22	20	16	12	8.5	5.6	3.2	1.9	1.1	0.72
18	24	22	19	16	12	8.5	5.6	3.2	1.9	1.2	0.73
19	24	22	19	16	12	8.5	5.6	3.2	1.9	1.2	0.74
20	24	22	19	16	12	8.5	5.6	3.2	1.9	1.2	0.75
21	24	22	19	16	12	8.4	5.6	3.2	1.9	1.2	0.77
22	24	22	19	16	12	8.4	5.6	3.3	1.9	1.2	0.78
23	24	22	19	16	12	8.4	5.6	3.3	1.9	1.2	0.80
24	24	22	19	16	12	8.4	5.6	3.3	2.0	1.2	0.81
25	24	22	19	16	12	8.4	5.6	3.3	2.0	1.2	0.83
26	22	20	18	15	11	7.9	5.2	3.1	1.9	1.2	0.80
27	20	19	17	14	10	7.3	4.9	2.9	1.8	1.1	0.76
28	19	18	15	13	9.7	6.9	4.6	2.7	1.7	1.1	0.73
29	18	16	14	12	9.1	6.4	4.3	2.6	1.6	1.0	0.70
30	17	15	13	11	8.5	6.0	4.1	2.4	1.5	0.97	0.68

(2) chronic standards

	pH										
Temp. C	**6.50**	**6.75**	**7.00**	**7.25**	**7.50**	**7.75**	**8.00**	**8.25**	**8.50**	**8.75**	**9.00**

0	2.5	2.5	2.5	2.5	2.5	2.3	1.5	0.84	0.48	0.28	0.16
1	2.5	2.5	2.5	2.5	2.5	2.3	1.5	0.8	0.47	0.27	0.16
2	2.4	2.4	2.4	2.4	2.4	2.2	1.5	0.82	0.47	0.27	0.16
3	2.4	2.4	2.4	2.4	2.4	2.2	1.4	0.81	0.46	0.27	0.16
4	2.4	2.4	2.4	2.4	2.4	2.2	1.4	0.80	0.46	0.27	0.16
5	2.3	2.3	2.3	2.3	2.3	2.1	1.4	0.80	0.45	0.26	0.16
6	2.3	2.3	2.3	2.3	2.3	2.1	1.4	0.79	0.45	0.26	0.16
7	2.3	2.3	2.3	2.3	2.3	2.1	1.4	0.78	0.45	0.26	0.16
8	2.3	2.3	2.3	2.3	2.3	2.1	1.4	0.77	0.44	0.26	0.15
9	2.2	2.2	2.2	2.2	2.2	2.1	1.3	0.77	0.44	0.26	0.16
10	2.2	2.2	2.2	2.2	2.2	2.0	1.3	0.76	0.44	0.26	0.16
11	2.2	2.2	2.2	2.2	2.2	2.0	1.3	0.76	0.44	0.26	0.16
12	2.2	2.2	2.2	2.2	2.2	2.0	1.3	0.75	0.44	0.26	0.16
13	2.2	2.2	2.2	2.2	2.2	2.0	1.3	0.75	0.43	0.26	0.16
14	2.1	2.1	2.1	2.1	2.2	2.0	1.3	0.75	0.43	0.26	0.16
15	2.1	2.1	2.1	2.1	2.1	2.0	1.3	0.74	0.43	0.26	0.16
16	2.1	2.1	2.1	2.1	2.1	2.0	1.3	0.74	0.43	0.26	0.16
17	2.1	2.1	2.1	2.1	2.1	1.9	1.3	0.74	0.43	0.26	0.16
18	2.1	2.1	2.1	2.1	2.1	1.9	1.3	0.74	0.43	0.26	0.17
19	2.1	2.1	2.1	2.1	2.1	1.9	1.3	0.74	0.44	0.26	0.17
20	2.1	2.1	2.1	2.1	2.1	1.9	1.3	0.74	0.44	0.27	0.17
21	1.9	1.9	1.9	1.9	1.9	1.8	1.2	0.69	0.41	0.25	0.16
22	1.8	1.8	1.8	1.8	1.8	1.7	1.1	0.65	0.38	0.24	0.15
23	1.7	1.7	1.7	1.7	1.7	1.6	1.0	0.60	0.36	0.22	0.15
24	1.6	1.6	1.6	1.6	1.6	1.5	0.97	0.57	0.34	0.21	0.14
25	1.4	1.4	1.5	1.5	1.5	1.4	0.91	0.53	0.32	0.20	0.13
26	1.3	1.3	1.4	1.4	1.4	1.3	0.85	0.50	0.30	0.19	0.13
27	1.3	1.3	1.3	1.3	1.3	1.2	0.79	0.47	0.28	0.18	0.12
28	1.2	1.2	1.2	1.2	1.2	1.1	0.74	0.44	0.27	0.17	0.12
29	1.1	1.1	1.1	1.1	1.1	1.0	0.70	0.41	0.25	0.16	0.11
30	1.0	1.0	1.0	1.0	1.0	0.97	0.65	0.39	0.24	0.16	0.11

O. Total Ammonia (mg/l as N), Coldwater Fisheries:

(1) acute standards

					pH						
Temp. C	**6.50**	**6.75**	**7.00**	**7.25**	**7.50**	**7.75**	**8.00**	**8.25**	**8.50**	**8.75**	**9.00**
0	29	26	23	19	14	10	6.6	3.7	2.1	1.2	0.70
1	28	26	23	19	14	9.9	6.5	3.7	2.1	1.2	0.70
2	28	26	22	18	14	9.7	6.4	3.6	2.1	1.2	0.69

3	28	25	22	18	14	9.6	6.3	3.6	2.0	1.2	0.69
4	27	25	22	18	14	9.5	6.2	3.5	2.0	1.2	0.69
5	27	25	22	18	13	9.4	6.1	3.5	2.0	1.2	0.68
6	27	24	2	18	13	9.3	6.1	3.5	2.0	1.1	0.68
7	26	24	21	17	13	9.2	6.0	3.4	2.0	1.1	0.68
8	26	24	21	17	13	9.1	6.0	3.4	1.9	1.1	0.68
9	26	24	21	17	13	9.0	5.9	3.4	1.9	1.1	0.68
10	25	23	21	17	13	8.9	5.9	3.3	1.9	1.1	0.68
11	25	23	20	17	13	8.9	5.8	3.3	1.9	1.1	0.68
12	25	23	20	17	13	8.8	5.8	3.3	1.9	1.1	0.69
13	25	23	20	16	12	8.7	5.7	3.3	1.9	1.1	0.69
14	25	23	20	16	12	8.7	5.7	3.3	1.9	1.1	0.70
15	24	23	20	16	12	8.6	5.7	3.3	1.9	1.1	0.70
16	24	22	20	16	12	8.6	5.7	3.3	1.9	1.1	0.71
17	24	22	20	16	12	8.5	5.6	3.2	1.9	1.1	0.72
18	24	22	19	16	12	8.5	5.6	3.2	1.9	1.2	0.73
19	24	22	19	16	12	8.5	5.6	3.2	1.9	1.2	0.74
20	24	22	19	16	12	8.5	5.6	3.2	1.9	1.2	0.75
21	22	20	18	15	11	7.9	5.2	3.0	1.8	1.1	0.71
22	21	19	17	14	10	7.3	4.9	2.8	1.7	1.0	0.68
23	19	18	15	13	9.7	6.8	4.5	2.7	1.6	0.98	0.65
24	18	16	14	12	9.0	6.4	4.2	2.5	1.5	0.93	0.62
25	17	15	13	11	8.4	6.0	4.0	2.3	1.4	0.88	0.59
26	16	14	13	10	7.9	5.6	3.7	2.2	1.3	0.84	0.56
27	14	13	12	9.6	7.3	5.2	3.5	2.1	1.2	0.79	0.54
28	13	12	11	9.0	6.9	4.9	3.3	1.9	1.2	0.76	0.52
29	13	12	10	8.4	6.4	4.6	3.1	1.8	1.1	0.72	0.50
30	12	1	10	7.8	6.0	4.3	2.9	1.7	1.1	0.69	0.48

(2) chronic standards

					pH						
Temp. C	**6.50**	**6.75**	**7.00**	**7.25**	**7.50**	**7.75**	**8.00**	**8.25**	**8.50**	**8.75**	**9.00**
0	2.5	2.5	2.5	2.5	2.5	2.3	1.5	0.84	0.48	0.28	0.16
1	2.5	2.5	2.5	2.5	2.5	2.3	1.5	0.83	0.47	0.27	0.16
2	2.4	2.4	2.4	2.4	2.4	2.2	1.5	0.82	0.47	0.27	0.16
3	2.4	2.4	2.4	2.4	2.4	2.2	1.4	0.81	0.46	0.27	0.16
4	2.4	2.4	2.4	2.4	2.4	2.2	1.4	0.80	0.46	0.27	0.16
5	2.3	2.3	2.3	2.3	2.3	2.1	1.4	0.80	0.45	0.26	0.16
6	2.3	2.3	2.3	2.3	2.3	2.1	1.4	0.79	0.45	0.26	0.16

7	2.3	2.3	2.3	2.3	2.3	2.1	1.4	0.78	0.45	0.26	0.16
8	2.3	2.3	2.3	2.3	2.3	2.1	1.4	0.77	0.44	0.26	0.15
9	2.2	2.2	2.2	2.2	2.2	2.1	1.3	0.77	0.44	0.26	0.16
10	2.2	2.2	2.2	2.2	2.2	2.0	1.3	0.76	0.44	0.26	0.16
11	2.2	2.2	2.2	2.2	2.2	2.0	1.3	0.76	0.44	0.26	0.16
12	2.2	2.2	2.2	2.2	2.2	2.0	1.3	0.75	0.44	0.26	0.16
13	2.2	2.2	2.2	2.2	2.2	2.0	1.3	0.75	0.43	0.26	0.16
14	2.1	2.1	2.1	2.1	2.2	2.0	1.3	0.75	0.43	0.26	0.16
15	2.1	2.1	2.1	2.1	2.1	2.0	1.3	0.74	0.43	0.26	0.16
16	2.0	2.0	2.0	2.0	2.0	1.8	1.2	0.69	0.40	0.24	0.15
17	1.8	1.8	1.8	1.8	1.8	1.7	1.1	0.64	0.38	0.23	0.14
18	1.7	1.7	1.7	1.7	1.7	1.6	1.0	0.60	0.35	0.21	0.14
19	1.6	1.6	1.6	1.6	1.6	1.5	0.97	0.56	0.33	0.20	0.13
20	1.5	1.5	1.5	1.5	1.5	1.4	0.90	0.52	0.31	0.19	0.12
21	1.4	1.4	1.4	1.4	1.4	1.3	0.84	0.49	0.29	0.18	0.12
22	1.3	1.3	1.3	1.3	1.3	1.2	0.79	0.46	0.27	0.17	0.11
23	1.2	1.2	1.2	1.2	1.2	1.1	0.73	0.43	0.26	0.16	0.10
24	1.1	1.1	1.1	1.1	1.1	1.0	0.69	0.40	0.24	0.15	0.10
25	1.0	1.0	1.0	1.0	1.0	0.96	0.64	0.38	0.23	0.14	0.095
26	0.95	0.95	0.96	0.96	0.97	0.9	0.60	0.35	0.21	0.13	0.091
27	0.89	0.89	0.89	0.90	0.91	0.84	0.56	0.33	0.20	0.13	0.087
28	0.83	0.83	0.83	0.84	0.85	0.79	0.53	0.31	0.19	0.12	0.084
29	0.77	0.78	0.78	0.78	0.79	0.73	0.49	0.29	0.18	0.12	0.080
30	0.72	0.72	0.73	0.73	0.74	0.69	0.46	0.28	0.17	0.11	0.077

P. Dissolved oxygen saturation based on temperature and elevation.

Elevation (feet)

	0	**500**	**1,000**	**1,500**	**2,000**	**2,500**	**3,000**	**3,500**	**4,000**	**4,500**	**5,000**	**5,500**	**6,000**	**6,500**	**7,000**	**7,500**	**8,000**	**8,500**	**9.000**	**9,500**	**10,000**
°C																					
0	14.6	14.3	14.1	13.8	13.6	13.3	13.1	12.8	12.6	12.3	12.1	11.9	11.6	11.4	11.2	11.0	10.8	10.6	10.3	10.1	9.9
1	14.2	13.9	13.7	13.4	13.2	12.9	12.7	12.5	12.2	12.0	11.8	11.5	11.3	11.1	10.9	10.7	10.5	10.3	10.1	9.9	9.7
2	13.8	13.6	13.3	13.1	12.8	12.6	12.4	12.1	11.9	11.7	11.5	11.2	11.0	10.8	10.6	10.4	10.2	10.0	9.8	9.6	9.4
3	13.4	13.2	13.0	12.7	12.5	12.3	12.0	11.8	11.6	11.4	11.1	10.9	10.7	10.5	10.3	10.1	9.9	9.7	9.5	9.3	9.1
4	13.1	12.8	12.6	12.4	12.2	11.9	11.7	11.5	11.3	11.1	10.9	10.7	10.4	10.2	10.0	9.8	9.7	9.5	9.3	9.1	8.9
5	12.7	12.5	12.3	12.1	11.8	11.6	11.4	11.2	11.0	10.8	10.6	10.4	10.2	10.0	9.8	9.6	9.4	9.2	9.0	8.9	8.7
6	12.4	12.2	12.0	11.8	11.5	11.3	11.1	10.9	10.7	10.5	10.3	10.1	9.9	9.7	9.5	9.4	9.2	9.0	8.8	8.6	8.5
7	12.1	11.9	11.7	11.5	11.3	11.1	10.8	10.6	10.4	10.2	10.1	9.9	9.7	9.5	9.3	9.1	8.9	8.8	8.6	8.4	8.2
8	11.8	11.6	11.4	11.2	11.0	10.8	10.6	10.4	10.2	10.0	9.8	9.6	9.4	9.3	9.1	8.9	8.7	8.6	8.4	8.2	8.0
9	11.5	11.3	11.1	10.9	10.7	10.5	10.3	10.1	9.9	9.8	9.6	9.4	9.2	9.0	8.9	8.7	8.5	8.3	8.2	8.0	7.8
10	11.3	11.1	10.9	10.7	10.5	10.3	10.1	9.9	9.7	9.5	9.4	9.2	9.0	8.8	8.7	8.5	8.3	8.1	8.0	7.8	7.7
11	11.0	10.8	10.6	10.4	10.2	10.0	9.9	9.7	9.5	9.3	9.1	9.0	8.8	8.6	8.5	8.3	8.1	8.0	7.8	7.6	7.5
12	10.8	10.6	10.4	10.2	10.0	9.8	9.6	9.5	9.3	9.1	8.9	8.8	8.6	8.4	8.3	8.1	7.9	7.8	7.6	7.5	7.3

13	10.5	10.3	10.1	9.9	9.8	9.6	9.4	9.2	9.1	8.9	8.7	8.6	8.4	8.2	8.1	7.9	7.8	7.6	7.2	7.3	7.2
14	10.3	10.1	9.9	9.7	9.6	9.4	9.2	9.0	8.9	8.7	8.5	8.4	8.2	8.1	7.9	7.7	7.6	7.1	7.3	7.1	7.0
15	10.1	9.9	9.7	9.2	9.3	9.2	9.0	8.8	8.7	8.2	8.4	8.2	8.0	7.9	7.7	7.6	7.4	7.3	7.1	7.0	6.8
16	9.8	9.7	9.2	9.3	9.2	9.0	8.8	8.7	8.2	8.3	8.2	8.0	7.9	7.7	7.6	7.1	7.3	7.1	7.0	6.8	6.7
17	9.6	9.5	9.3	9.1	9.0	8.8	8.6	8.2	8.3	8.2	8.0	7.9	7.7	7.6	7.4	7.3	7.1	7.0	6.8	6.7	6.6
18	9.4	9.3	9.1	8.9	8.8	8.6	8.5	8.3	8.1	8.0	7.8	7.7	7.5	7.4	7.3	7.1	7.0	6.8	6.7	6.6	6.4
19	9.3	9.1	8.9	8.8	8.6	8.4	8.3	8.1	8.0	7.8	7.7	7.2	7.1	7.2	7.1	7.0	6.8	6.7	6.6	6.4	6.3
20	9.1	8.9	8.7	8.6	8.4	8.3	8.1	8.0	7.8	7.7	7.5	7.4	7.2	7.1	7.0	6.8	6.7	6.6	6.4	6.3	6.2
21	8.9	8.7	8.6	8.4	8.3	8.1	8.0	7.8	7.7	7.5	7.4	7.2	7.1	7.0	6.8	6.7	6.6	6.4	6.3	6.2	6.0
22	8.7	8.6	8.4	8.2	8.1	8.0	7.8	7.7	7.5	7.4	7.2	7.1	7.0	6.8	6.7	6.6	6.4	6.3	6.2	6.1	5.9
23	8.6	8.4	8.2	8.1	7.9	7.8	7.7	7.5	7.4	7.2	7.1	7.0	6.8	6.7	6.6	6.4	6.3	6.2	6.1	5.9	5.8
24	8.4	8.2	8.1	7.9	7.8	7.7	7.5	7.4	7.2	7.1	7.0	6.8	6.7	6.6	6.4	6.3	6.2	6.1	5.9	5.8	5.7
25	8.2	8.1	7.9	7.8	7.7	7.5	7.4	7.2	7.1	7.0	6.8	6.7	6.6	6.5	6.3	6.2	6.1	6.0	5.8	5.7	5.6
26	8.1	7.9	7.8	7.7	7.5	7.4	7.2	7.1	7.0	6.8	6.7	6.6	6.5	6.3	6.2	6.1	6.0	5.8	5.7	5.6	5.5
27	7.9	7.8	7.7	7.5	7.4	7.2	7.1	7.0	6.8	6.7	6.6	6.5	6.3	6.2	6.1	6.0	5.9	5.7	5.6	5.5	5.4
28	7.8	7.7	7.5	7.4	7.2	7.1	7.0	6.9	6.7	6.6	6.5	6.4	6.2	6.1	6.0	5.9	5.8	5.6	5.5	5.4	5.3
29	7.7	7.5	7.4	7.3	7.1	7.0	6.9	6.7	6.6	6.5	6.4	6.2	6.1	6.0	5.9	5.8	5.7	5.5	5.4	5.3	5.2
30	7.5	7.4	7.3	7.1	7.0	6.9	6.7	6.6	6.5	6.4	6.3	6.1	6.0	5.9	5.8	5.7	5.6	5.4	5.3	5.2	5.1

[20.6.4.900 NMAC - Rp 20 NMAC 6.1.3100, 10-12-00; A, 10-11-02]

20.6.4.901 PUBLICATION REFERENCES: These documents are intended as guidance and are available for public review during regular business hours at the offices of the surface water quality bureau and the New Mexico environment department public library. Copies of these documents have also been filed with the New Mexico state records center in order to provide greater access to this information.

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[20.6.4.901 NMAC – Rp 20 NMAC 6.1.4000, 10-12-00]

Region 6 Water Plan

http://epcog.org/nw/nw_prog.htm

WATER RESOURCE ASSESSMENT
PART B - WATER QUALITY

INTRODUCTION

Water quality refers to the physical, chemical, and biological characteristics of water. Attributes that describe the quality of water include levels of sediment, nutrients, heavy metals, toxic chemicals, pesticides, radioactivity, temperature, dissolved oxygen, and disease-causing organisms. Different uses have different requirements with regard to these attributes. What is an acceptable level of water quality for irrigation may not be an acceptable level of quality for drinking water, and what is an acceptable level of quality for livestock watering may not be an acceptable level of quality for a coldwater fishery. Specific standards for each use are set by the federal government, state, and tribes. For each use, the quality of the water that is available directly affects the supply that is effectively available.

Many participants at public meetings felt that the information on water quality that is available is not sufficient; it should be more precise with regard to well locations and should compare water bodies over time (Grants public meeting). Participants at the public meeting in Grants commented on the high incidence of cancer in the region, and implied a link to water quality.

Additional comments that surfaced in discussions of water quality addressed the role of government in preventing pollution and protecting water supplies. Some participants felt that water quality standards were too rigid, and should be made more locally relevant (Grants public meeting, Thoreau focus group 9-29). However, there was general agreement that the government should play a role in ensuring safe drinking water for all citizens (Thoreau focus group 9-29).

SURFACE WATER

Surface water uses may include public water supplies, domestic use, irrigated agriculture, and industrial, mining, and power uses. Major sources of demand in Cibola and McKinley counties are irrigated agriculture and reservoir evaporation, with a small demand for livestock uses.

Additional demands on surface water may include in-stream fish and wildlife requirements. In this region, requirements for instream flow have not yet been defined. This process is, however, taking place in the neighboring San Juan basin. Recreational uses are also an important demand on surface water.

Human activity has a strong impact on surface water quality in the region. Much of this impact is caused by non-point source pollution, which cannot be linked to a specific location (as compared to a point source, such as a waste treatment plant discharge pipe). Non-point source pollution is pervasive and difficult to monitor or control.

Region-wide, erosion is the biggest non-point source of pollution. This erosion may be due to inadequate range management, intensive logging, or improper road cuts. It could also be a result of human activity which occurred generations ago. These actions, if not mitigated, will lead to siltation of water storage facilities and degradation of water quality. Mitigation measures include increasing land cover and implementing programs with appropriate seasons of use and stream protection, and, if necessary, mechanical and structural treatments (e.g. gully check dams, retention reservoirs and contour furrowing).

Non-point source pollution is also evident in runoff into storm sewers. Runoff passing over city streets typically carries a wide variety of organic and toxic wastes, which may pass directly into receiving water bodies.

Salinization of surface water is another non-point source problem. Although salinity is caused naturally, it is concentrated by irrigation projects, coal-fired powerplants, surface mining operations, oil and gas fields, and refinery operations (US Department of Interior, 1991).

The effects of point source pollution have been dramatic in certain stream reaches and lakes. The City of Grants was required to stop discharging effluent into the Rio San Jose because of the impact on water quality for downstream users. A spill at a uranium mine near Churchrock polluted the Puerco River in McKinley County. Point sources have the potential to instantly cause severe damage, but they are also more easily monitored and controlled than non-point source pollution.

The federal government requires states and tribes to monitor surface water quality and to work to improve it in a number of ways. Section 305(b) of the Clean Water Act requires states (and tribes treated as states) to prepare a comprehensive report addressing whether or not bodies of water in the state meet their “designated uses” -- domestic water supply, primary human contact, secondary human contact, coldwater fishery, warmwater fishery, wildlife habitat, livestock watering, aquaculture, and irrigation. Different designated uses require different standards of water quality. The 1997 Navajo Nation 305(b) report and the tables from the upcoming State of New Mexico 305(b) report provided information for this plan. The Safe Drinking Water Act also requires EPA to develop standards for public drinking water supplies (from both surface and ground water); public drinking water supplies are monitored by states.

Reports prepared under Section 303(d) of the Clean Water Act require listing of “water quality limited” water bodies within the state, and prioritization of these water bodies for implementation of more stringent “total maximum daily loads” (TMDL’s) from point sources. Reports prepared under Section 319 require states to identify water bodies not meeting water quality standards due to nonpoint source pollution, to identify the activities responsible for the problem, and prepare management plans to address the problems. Section 402, which establishes the National Pollution Discharge Elimination System program, requires all point sources to have permits, and therefore provides documentation of all legal point sources.

Watershed Restoration Action Strategy

www.epa.gov/owow/watershed/initiative/ wi2003/rio_puerco.pdf

Rio Puerco Watershed Restoration Project

I. Characterization of the Watershed and the Overall Watershed Planning Effort

A. Description of the Rio Puerco Watershed

The Rio Puerco Watershed, in west central New Mexico, is the largest tributary to the Middle Rio Grande Basin. Originating along the eastern edge of the Continental Divide, the watershed encompasses approximately 7,350 square miles (4.7 million acres/over 1.9M hectares) that contribute flow to the Rio Grande at Bernardo, NM (see map, Appendix A). The Rio Puerco basin includes nine sub-basins, draining portions of seven counties, west of the greater Rio Grande Basin in northwest and west-central New Mexico. The geological setting involves relatively soft sedimentary strata, intruded and capped by younger volcanic rocks. The watershed has been studied in great detail by a variety of noted investigators including geologists, geomorphologists, habitat and range management specialists, social scientists, and others.

B. Problems and Threats to the Rio Puerco Watershed

The Rio Puerco, once the "breadbasket of New Mexico," has achieved worldwide notoriety as a severely impacted and degraded watershed, the poster child for accelerated erosion. The headwaters lie in the Nacimiento Mountains east of Cuba, NM. Traditional villages dotted its banks and extensive farm fields tapped its waters. Today, the Rio Puerco flows far beneath the historic floodplain, a victim of highly erodible soils, channelization, entrenchment, historically poor land management, and a complex mix of ownership.

Formerly productive agrarian communities are now abandoned. The Rio Puerco Watershed is the primary source of undesirable fine sediment to the Rio Grande. The Corps of Engineers has noted that soil erosion within the watershed surpasses that of any other watershed in the country, yielding 1.36 acre-feet per square mile per year. The Rio Puerco is listed as a Category 1 watershed (in need of restoration) in New Mexico's Unified Watershed Assessment (1998). Several reaches of the Rio Puerco and its tributaries are listed as impaired in "Water Quality and Water Pollution Control in New Mexico" (2000), in its Appendix B - the State's 305(b) Report, and in the "2000-2002 State of New Mexico CWA Section 303-D List for Assessed Stream and River Reaches." These documents list non- attained uses for individual perennial to intermittent reaches, including the Rio Puerco and the tributaries developing along the Nacimiento front.

C. Description of Rio Puerco Watershed Plan

The Rio Puerco Management Committee (RPMC) has developed a Watershed Restoration Action Strategy (WRAS, May 30, 2001), approved by the NMED and EPA Region 6, that identified the Upper Main Stem and the Torreon Wash sub-basins as priorities for restoration activities based on impairment and causes of pollution. The greatest opportunities to protect

water quality occur in the headwaters regions where perennial to intermittent streams are developed. The intention of this proposal is to implement the WRAS specifically in these sub-basins.

II. Description of Proposed Projects

A. Rio Puerco Watershed Projects Proposed for EPA Watershed Initiative Grant

The RPMC proposes to focus on the 303(d) listed stream segment of the Upper Main Stem and on the Torreon Wash sub-basin taking a holistic approach implementing a cross-section of complementary techniques targeting upland and in-channel restoration. Techniques originated by William Zeedyk, regionally recognized watershed restoration expert, will be employed. These techniques incorporate and expand on principals established by David Rosgen.

B. Relationship of Proposed Projects to Rio Puerco Watershed Plan and Goals

The overall goal related to the Watershed Plan is to eliminate the water quality impairment of the listed reaches of the Rio Puerco and its tributaries. The impairments of concern include temperature exceedances, stream bottom deposits, plant nutrients, metals, turbidity, dissolved oxygen, and pH. These effects are largely due to a lack of vegetative density and diversity in a region of high erosion potential and impacts resulting from habitat alteration, agriculture, rangeland impacts, resource extraction, reduction of riparian vegetation, stream bank destabilization, and road maintenance activities. The main strategies important in the WRAS and to this project are decreased sedimentation and erosion on the treated sub-basins.

Riparian and stream strategies include increasing desired vegetation, decreasing invasive species, and increasing stream sinuosity. In the upland areas strategies include increase in vegetational cover, and infiltration of precipitation with decreased runoff. The ultimate goal of these efforts will be to teach the next generation techniques that will result in improved water quality, increased quantity, and reduction of overall impairment.

C. Description of Proposed EPA Funded Projects

This RPMC project emphasizes the use of a number of the Zeedyk innovative techniques to restore watershed environments resulting in the goals mentioned above. A main Zeedyk technique is to rehabilitate down cut arroyos by increasing sinuosity and creating floodplains to establish riparian habitats. In first order channels water harvesting techniques use sustainable catchment structures taking advantage of readily available materials that trap sediment and promote the establishment of vegetation. Another water harvesting innovation comes from the opportunity of spreading water flow to create areas that promote increased vegetation. Included in this effort is the reduction of sagebrush, salt-cedar, and noxious weeds using alternative and innovative approaches that include intensive grazing using goats.

As an organizational step, a Project Coordinator will be hired to oversee all aspects of the following enumerated tasks.

Task 1: The New Mexico State Highway and Transportation Department (NMSHTD) will do pre-project aerial photography of the project areas. A Project Coordinator to be hired to compare previous watershed aerial photography and find project target areas along with identifying all sediment contributing dirt roads within the project areas. These aerials will help to identify straight eroded reaches where Zeedyk techniques to increase stream sinuosity may be employed. The pre- project aerial photography will also be used to create a baseline for evaluating the progress made by the restoration projects proposed.

After the projects are completed in the Upper Main Stem and the Torreon Wash another set of aerial photographs will be produced to evaluate the improvements in these sub-basins and information will be transferred to the Regional Water Plan.

Task 2: Along selected tributaries in the Upper Main Stem and the Torreon Wash water harvesting techniques such as one-rock dams, one rock in height, will be used to slow and modify runoff along with holding eroding soils. The performance target for this task is the construction of an estimated 10,000 structures over the grant period divided between the project sub-basins. Other preventative techniques to be used in the upland areas are sagebrush control, grazing management, and dirt road Best Management Practices (BMPs).

Task 3: Knowledge of improved grazing management will be increased in the project areas by running three workshops during the length of the project in selected local communities on innovative grazing techniques. In addition, one three day herding clinic will be taught as a demonstration of the techniques covered in the grazing management workshops. An experienced herder will then be hired on contract during the final year of the project to teach all techniques during a 6-month on-the-ground demonstration period to reinforce information from the workshop programs.

Task 4: Along the deeply incised channels occurring downstream from the upland restoration areas, techniques will be used to recreate appropriate meander patterns for each local stream type. Induced meanders restore floodplains, and establish desired vegetation to stabilize the channels. This project will treat an estimated 10 degraded reaches between the two sub-basins. Intensive goat grazing will be used to eradicate salt-cedar, Russian Olive and other undesirable species. Volunteers will be used to plant both cottonwood and willow poles to help stabilize the developing floodplains.

Task 5: Recent research in the Rio Puerco, Phippen 2000 M.A. Thesis, indicates that dirt roads are a major source of sediment. Dirt roads identified within the project sub-basins will be modified as needed to reduce sediment loss and erosion by implementing water harvesting and erosion control practices that divert and slow water runoff. Roads will be selected by the amount of erosion evident and proximity to project upland and channel locales.

Task 6: William Zeedyk's field manual, Rescate y Restauración de Los Rios, will be revised to reflect recent innovations and the conditions within the Rio Puerco Watershed. The project will publish 10,000 copies of the field manual in both Spanish and English so that it can be given to participants in workshops and volunteers helping to implement these techniques. The publication will then be available for use in other impaired watersheds throughout the western United States.

D. Task 7: Proposed Monitoring and Evaluation Methods

The monitoring plan involves the assignment of an RPMC compliance review team to the project to monitor compliance to the project proposal and goals. The compliance review team will set up a schedule of field reviews to monitor implementation and progress for the project. The Project Coordinator will submit quarterly reports describing actions, finances, and project progress. Monitoring efforts will be subcontracted and include the use of outreach volunteers to the communities.

1. In-stream monitoring: NMED will do water quality baseline measurements, cross-section and longitudinal profiles, and photo points.

2. Riparian monitoring: extent and character of vegetative communities by cross-section and bank edge transects following BLM protocol.

3. BLM with NMHTD Aerial Photography: monitor stream sinuosity, in-stream alterations, riparian changes, and upland vegetative communities at a broad level. Transects will be used to more closely identify any change in vegetational composition and cover.

4. We will utilize performance targets to evaluate outreach, education, and volunteer investment.

E. Rio Puerco Watershed Project Association with Federal, State, and Local Mandates

Federal : Rio Puerco Watershed Act of 1996, (PL104-333 established the RPMC and directed implementation of a Rio Puerco restoration plan)

State: 2000-2002 State of New Mexico CWA Section 303-D List for Assessed Stream and River Reaches, Section 303(d), New Mexico TMDL Program

Local: In 1993 local concern led to the formation of the Rio Puerco Watershed Committee, Cuba, NM (Pre-cursor to the RPMC, present subgroup)

F. Responsible Persons, Agencies and Organizations

- Rio Puerco Management Committee
- Steve Fischer, BLM Watershed Team Lead, Chair of the RPMC Executive Committee
- Project Coordinator, to be announced
- F. Leon Martinez, HUB Resource Conservation and Development, Fiscal Agent

III. Description of Project Management and Stakeholders

A. Management, Staff, Supporters and Stakeholders

The Rio Puerco Management Committee (RPMC) established through Public Law 104-333 has included the active partnership of forty private, local, tribal, state, and federal agencies. The

RPMC as the management group enjoys the full support and participation of all the major stakeholders in the Rio Puerco basin. (For full list see Appendix C)

B. Qualifications and Experience for Rio Puerco Watershed Plan and Projects

The Rio Puerco Management Committee contains members from the participating agencies listed above. The RPMC developed a WRAS for the Rio Puerco Watershed in May 2001. The committee consists of hydrologists, engineers, watershed experts, geologists, teachers, ranchers, directors of non-profits, county commissioners, and an outreach coordinator. This expertise has led to the initiation and completion of a number of restoration projects in impaired segments of the watershed. Many of these projects have utilized Zeedyk techniques from the field manual and have shown that the Zeedyk methods are effective in these situations. These projects establish a baseline for the implementation of the proposed tasks and a measure for the projects success.

The list of projects above provides evidence of the qualifications and experience garnered by the RPMC and its contributing agencies. The RPMC has been an active participant in the restoration efforts on the Rio Puerco Watershed since the inception of the committee in 1997 and has advanced innovative approaches toward the restoration of this impaired watershed. The projects proposed in this document will help to advance these techniques on a national and international level.

D. Technical Expertise

- William Zeedyk, regionally recognized watershed restoration expert
- Dave Love, NM Bureau of Geology and Mineral Resources
- Anthony Armijo, Dept. of Resource Protection, Pueblo of Jemez
- Amos Johnson, Water Resources Engineer, Navajo Nation
- Michael Coleman, NMED, Geologist/Environmental Specialist

E. Other Stakeholders

Private landowners and Indian allottees along the Rio Puerco Main Stem and Torreon Wash will be directly involved in the project.

IV. Description of Outreach Activities

A. Strategies for Transferring Knowledge from the Rio Puerco Watershed Project

The publication of the Zeedyk field manual and the training of tribal and community members in these techniques will be a primary focus in disseminating knowledge. A final report will be made available throughout this watershed and to all other interested parties.

Demonstration projects and monitoring will include youth from Jemez and the Navajo Nation along with students from area schools and colleges. Public involvement will continue throughout the life of the project. A research project will be carried out to compare the Zeedyk techniques

utilized in this project with other methods of restoration (e.g. check dams, detention features, and gabions) already employed in reaches of the Rio Puerco watershed.

The technical skills of members of the RPMC will be used in aiding student research fostering the interest of college students in careers associated with landscape restoration, conservation, and engineering. A video incorporating the grazing workshops and herding clinic along with demonstrations of upland and incised channel restoration techniques will be produced and available to any group or project dealing with watershed restoration. Results and information on Zeedyk techniques will also be available online at the BLM website.

B. Information and Outreach Components

The Public Participation Subcommittee of the RPMC plays a major role in developing public outreach activities. One of the purposes of the legislation that established the RPMC is to involve private citizens including students in the restoration of this watershed. Restoration work accomplished by this project will only be sustainable if this goal is met. Public involvement will be accomplished through a mix of personal contact, public meetings, workshops, and 20 community work projects over the length of the grant.

The Project

Coordinator can focus the efforts of local Forest Service, NRCS, and BLM offices, Tribal governments, and State agencies to accomplish even more. Ranchers, environmentalists, agency employees, students, and the general public will be invited to participate. Using demonstration, teaching and hands-on education this project will result in measurable behavioral change and understanding. Voluntary questionnaire and participation numbers will two ways to measure the success of these events.

C. Past Outreach Efforts

Torreon Chapter of the Navajo Nation initiated a restoration teaching and participation project in the Rio Puerco. Bill Zeedyk has run workshops for both the Torreon chapter and participants from Jemez Pueblo. A number of Listening Sessions were undertaken in communities within the greater Rio Puerco Watershed to determine the knowledge and ideas of participants regarding this impaired watershed. Working groups were used to help communities arrive at low cost and sustainable solutions to restoration problems. (See Table 1: Current Projects, Section III)

Table 1: Current Projects
RPMC FY2002

Project Name	Project Funding	Funding Source	Funding Agent	Project Contact
Ongoing Projects				
Rio Puerco Channel Restoration at La Ventana	$500,000	NMED(319)	NMED/BLM	Michael Coleman
Thompson Spring	$41,480	RPMC	Jemez Pueblo	Anthony Armijo
Gibson Ranch Holistic Demonstration	$30,000	RPMC	Tree New Mexico	Sue Probart

Torreon Youth Program	$20,000	RPMC	Quivira Coalition	Sam Sala
New Projects				
RPMC Coordinator	$19,600	RPMC	Cuba SWCD	Mike Chavez
Cuba Grade Stabilization	$15,000	RPMC	Cuba SWCD	Emmett Cart
Meander Cut-Off	$30,000	RPMC	Cuba SWCD	Steve Fischer
Ojo Encino Range Management	$89,540	RPMC	Quivira Coalition	Watson Castillo
BMP Workshops at Ojo Encino	$16,817	RPMC	Quivira Coalition	Ted Mace
Zeedyk Train the Trainer Workshop	$3,200	RPMC	Quivira Coalition	Barbara Johnson
Whitehorse Lake Chapter Workshops	$5,000	RPMC	Quivira Coalition	Bobby Tsosie
San Pablo Subwatershed	$179,500	NMED(319)	Cuba SWCD	Mike Chavez

http://www.epa.gov/owow/watershed/initiative/

Targeted Watershed Grants Program

Encouraging Successful Watershed Partnerships to Protect and Restore Water Resources

- 2004 Call for Nominations
- Training & Education
- 2003 Targeted Watersheds
- Frequently Asked Questions
- Background Materials
- Regional Contacts

NEW **List of Nominations for 2004**

NEW **Status of Appropriations** **(please scroll down to VA/HUD)** EXIT disclaimer

The Targeted Watershed Grants Program (formerly known as the Watershed Initiative) was conceived to encourage successful community-based approaches to restore, preserve, and protect the nation's watersheds. This new competitive grant program is a bold approach to watershed management in that it will provide needed resources to those watershed organizations whose restoration plans are ripe, and who are anxious to achieve quick, yet tangible environmental change.

Region VI – Louisiana, Texas, Oklahoma, Arkansas, New Mexico

- Contact: Brad Lamb, telephone 214-665-6683; e-mail lamb.brad@epa.gov.

http://www.dnr.state.md.us/watersheds/surf/proj/wras.html
(Maryland)

Watershed Restoration Action Strategies

Welcome to the WRAS documents page!

The icon links below will take you to both the final Watershed Restoration Action Strategies (WRAS) and their associated supporting documents. Local governments receiving WRAS Partnership Awards developed the Watershed Strategies. The associated supporting documents (**Characterization**, **Synoptic Survey**, and **Stream Corridor Assessment**) were developed by the Department of Natural Resources (DNR) during the assessment phase of WRAS development.

DNR provides technical and assessment services to local governments in order to assess the attributes of a watershed's landscape and streams. The services provided by DNR are summarized in the brief descriptions below.

- **Watershed Characterization Report** is a summary of all readily available natural resources and other data for a given watershed. Typically this is data that the State of Maryland has readily available at a broad-based state scale, but the Characterization Report can include local data as well. The Characterization Report includes information on water quality, land use and cover, living resources, and habitat. For more information on the Watershed Characterization Report, please contact Ken Shanks at DNR at 410-260-8786 or kshanks@dnr.state.md.us.

- **Synoptic Survey Report** is a water chemistry analysis (nutrients, temperature, conductivity, pH), and biological survey (macro invertebrates, fishes, habitat) on between 30 to 80 sites along stream corridors in the watershed. Local governments and DNR collaboratively choose the sites that DNR will sample. Please contact Niles Primrose at 410-260-8804 or nprimrose@dnr.state.md.us for more information.

- **Stream Corridor Assessment Report** are the results from a 100 mile stream corridor assessment survey using DNR's Stream Corridor Assessment Methodology. The local government chooses the streams that they want DNR to walk and assess for such problems as pipe outfalls, erosion sites,

lack of buffers, fish passage blockages, sewer outfalls, or unusual conditions. Each site is rated for accessibility, severity, and correctability. Local governments are given the geographically referenced information on compact disc. Reports accessed below are only summaries of the geographically referenced data. If you would like more information please contact Ken Yetman at 410-260-8812 or kyetman@dnr.state.md.us.

The information from the above technical assessment services, plus local knowledge from stakeholder involvement, combines to provide essential information to develop a watershed strategy aimed at protecting and restoring the watershed. The final strategy or WRAS is the plan that can then be "shopped around" to secure funding for implementation.

- **The Watershed Restoration Action Strategy** includes: a well-state, overarching goal aimed at protecting, preserving, and restoring habitat and water quality; habitat goals need to address streams, wetlands, and forest buffers; a summary of the assessments; a description of the stakeholder process; identified priorities, opportunities, concerns and challenges, potential mitigation, restoration, and protection opportunities; and most importantly, natural resource management objectives which are prioritized in order of importance, based on data, opportunities, and challenges, and described in detail. Each management objective must be quantified, have an associated monitoring component, describe the technical and financial assistance needed, identify who would carry out the objective, address TMDLs (Total Maximum Daily Loads) if present, involve the public, and include an implementation schedule. Local governments must also commit to the development of programmatic changes that will perpetuate the protection or restoration of their watersheds.

The documents are presented alphabetically by watershed.

wrri.nmsu.edu/publish/watcon/proc/proc46/davis.pdf

New Mexico Department of the Environment
Watershed Protection Program
Jim Davis
Surface Water Quality Bureau
NM Department of the Environment
PO Box 26110
Santa Fe, NM 87502-6110

New Mexico Watershed Management: Restoration, Utilization, And Protection
November 2001
New Mexico Water Resources Research Institute

Jim Davis is an Over-educated DWM, Ph.D. NMSU, M.S. U of U, B.S. UNM, all in Biology. Claims to be Responsible. Has held only two jobs in the last 22 years. Currently BC of SWQB, NMED. Enjoys public meetings. ISO interested audience to hear short presentation on Water Quality Issues in New Mexico.

Discussion Points

* What is the funding source and process?
* How are funds distributed?
* How are proposals evaluated and ranked?
* What type of work do we fund?
* How much funding is available?
* Examples of funding over the last few years, and highlights of a few specific projects in more detail.

This is an example of nonpoint source pollution. The East Fork of the Gila River (shown on the right) is carrying ash and sediments flushed into it as a result of a large forest fire in the watershed. The West Fork of the Gila was not affected. Projects funded under Section 319(h) of the federal Clean Water Act are the primary tool available to ad-dress such nonpoint sources of pollution.

Funding Source

* CWA §319(h) addresses nonpoint source pollution
* Federal grant administered by NMED Surface Water Quality Bureau
* Requires 40% match by grant recipient

The bureau administers this program for New Mexico. We are interested in both “dirt work” projects, such as fence building, tree planting etc., as well as public education and outreach projects. The 40% match requirement is met by the project proponent (for example, a watershed

group, soil and water conservation district etc.), which gives "ownership" of the project, and leads to a better outcome. The match requirement can be met with actual dollars, or by "in-kind" match of volunteer labor, etc.

Distribution of Funds

* "RFP" to distribute §319(h) monies
* Published once each year (July-August)
* Follows State procurement code
* All entities eligible (local governments, NGOs, private citizens)

This slide outlines the process we follow. In fact, we have an RFP out right now. It opened July 15 and will close September 15. We follow the State of New Mexico Procurement Code, and all entities are eligible.

RFP Requirements

Proposals shall describe:

* the impaired surface water body and preventive action(s) to be taken to sustain water quality and aquatic resources;
* relationship of project to a Watershed-wide Restoration Action Strategy;
* inclusion of water body in a UWA category I watershed, on CWA § 303(d) list or TMDL document, if applicable;
* the stressor(s) causing the impact(s);
* the project implementation plan;
* specific solutions to be implemented;
* details of how improvements will be measured;
* time required to demonstrate effectiveness or water quality improvement; and
* cooperating entities involved in the project.

Project Evaluation and Ranking

* Project proposals ranked by diverse review committee
* Final funding decision made by NMED and EPA

We have a review committee that helps us evaluate the proposals, and then the final funding decisions are made by the bureau and EPA.

* Cooperation between several stakeholders in watershed important
* Grant period is nominally 3 years; can be extended to 5 years
* Projects funded to implement TMDL load reductions

The involvement and cooperation of the stakeholders in the watershed is the most important aspect if we are going to achieve success. Implementation of these projects takes time, so the grant period runs for a minimum of three years, and usually is extended to five years.

Eligible Types of Projects

Both “dirt work” and outreach projects funded

* Implementation/demonstration of BMPs;
* Post wildfire rehabilitation;
* Prevention of catastrophic wildfires;
* Reduction of erosion/sedimentation from rural roads, agricultural practices;
* Rehabilitation of riparian vegetation;

There are 286 stream and river reaches listed as impaired on the 2000-2002 303(d) list. According to the National Water Quality Inventory, wind and water erosion annually generates an estimated 73 million tons of soil from farms, ranches, and urban areas. The subsequent loading to streams, rivers, and reservoirs is one of the primary pollutants associated with improper management in many areas of New Mexico. NMED has identified the principal sources of surface water non point source pollution as rangeland erosion, agriculture, construction activities, silviculture, resource extraction, waste disposal, unsurfaced roads, and recreation.

* Improved management of urban runoff;
* Improvements in livestock management;
* Restoration of floodplain function;
* Restoration of natural stream channel morphology;
* Streambank stabilization.

Amount of Funding

* FY02 20 proposals requested $3.3 m available approx. $2.1 m*
* FY01 51 proposals requested $7.5 m 17 projects funded for $1.9 m*
* FY00 10 projects funded for $1.6 m*
* FY99 18 projects funded for $1.6 m*
* FY98 10 projects funded for$1.3 m
*Five year total grant funds = $8.5 m
*$8.5 million is the grant total – when the 40% required match is added, the value of the projects totals
approximately $14.2 million

Specific Examples of Watershed Protection Projects

1. Spur Ranch Centerfire Creek
2. Valle Grande GRASSBANK™
3. Rio Puerco/Hwy 44

1. Spur Ranch/Centerfire Creek

* A main tributary to the San Francisco River

* Listed for Plant Nutrients and Conductivity Impairment (TMDLs)
* BMP implementation
* Sediment Retention Structure
* $232,000 in §319 funds and $180,000 match

Project Partners include:

- Landowner
- Ducks Unlimited
- National Wild Turkey Federation
- USDA Natural Resource Conservation Service, NM Forestry Division
- Rocky Mountain Elk Foundation
- San Francisco Soil & Water Conservation District
- Gila National Forest
- EPA and
- NMED SWQB

2. Valle Grande GRASSBANK™ Rowe Mesa

* 5 other §319 projects using Grassbank™
* $463,084 in §319 funds to The Conservation Fund (TCF), Santa Fe National Forest (SFNF) and Carson National Forest (CNF)
* $562,967 match provided by TCF, Ford Foundation, McCune Foundation, Thaw Charitable Trust, Santa Fe Community Foundation, Stokes Foundation, individual donors, donated labor and NM General Fund $
* At least $94,667 additional funding provided by TCF, USFS, NRCS,

Other partners include grazing permittees, Northern New Mexico Stockman's Association, NMSU Cooperative Extension Service, Santa Fe County, and BLM

Valle Grande GRASSBANK™ Accomplishments

* 6-8 participating USFS allotments in 4 watersheds (directly benefiting at least seven impaired streams) + statewide outreach by Quivira Coalition
* 2,891 acres piñon/juniper and ponderosa thinned (531 ac complete)
* 10,415 acres Rx burned (2,088 complete)
* 16150 AUM's of rest provided (4450 AUM's complete)
* 23 mile pipeline (18 miles complete)
* 6.25 miles fencing (0.25 mi complete)
* $20K flexible range restoration package including above elements
* 5 dirt watering tanks,4 round trips cattle shipping (3 complete), 9 mi trail improvements, one water gap, range rider (2 seasons), road improvements
* Monitoring & Watershed Restoration Action Strategy for Rowe Mesa
* 2 conferences, 2 newsletters, 10 outdoor workshops (by Quivira Coalition)

3. Rio Puerco/Highway 44 Project

* 1965 - Highway 44 Project constructed a straight 20’ X 20’ “ditch” to reroute Rio Puerco channel
* Accelerated erosion (incision, channel widening) moved a net 14.1 million cubic feet of soil downstream
* Extremely high sediment load and turbidity
* Lowering of local and regional water table
* Adjacent uplands erosion in response to base level lowering

§319 (h) grant has provided $$ for

* Environmental, Geomorphology and Engineering feasibility and design work
* Rio Puerco Implementation Construction Phase
* Monitoring and Enhancement

$660,000 has leveraged $4M+ in additional project expenditures

Consumer Confidence Reports for Year 2002

San Ysidro Consumer Confidence Report for Year 2002
Stuart McRae - 834-7337
obtain water from two infiltration galleries and one well.

*** 8 contaminants, 1 violation**

Contaminant	MCLG	MCL	Your Water	Violation
Inorganic				
Arsenic (ppb)	NA	50	140	Yes
Barium (ppm)	2	2	0.2	No
Fluoride (ppm)	4	4	3.78	No
Nitrate (measured as Nitrogen) (ppm)	10	10	0.12	No
Microbiological				
Total Coliform	0	1	1	No
Unregulated				
Bromodichloromethane (ppb)	NA	NA	0.2	No
Volatile Organic				
TTHMs (Total Trihalomethanes) (ppb)	NQA	80	1.1	No

MCLG - Maximum Contaminant Level Goal
MCL - Maximum Contaminant Level

*** RO Units - Village samples and maintains**

Village of Cuba 2002 Consumer Confidence Report
submitted on May 1, 2003
Water comes from three wells, located on USDA Forest Service property.
- each well is ~ 600 feet deep; pumping capacity is ~100 gallons a minute
- water is pumped to either of the reservoir tanks.

La Loma Alta Estates Water Reservoir - 500,000 gallons, 1979 in operation
Storage Tank on 550 - 425,000 gallon; 1996 in operation
= 7 day supply
NMED Drinking Water Bureau prepared a Sanitary Survey Report (WSS #090-23), June 16, 2002.
Village has an approved wellhead protection plan in place.

Inorganic Contaminant	MCLG	MCL	Your Water	Violation
Fluoride (ppm)	4	4	0.24	No
Nitrate + Nitrate	1	1	-0.1	No
Free Cyanide	1	1	-0.1	No
Arsenic (ppb)			-0.001	No