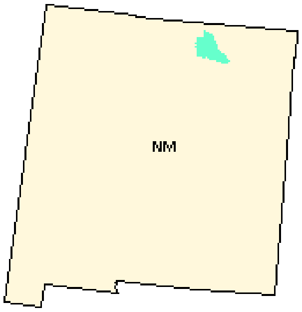
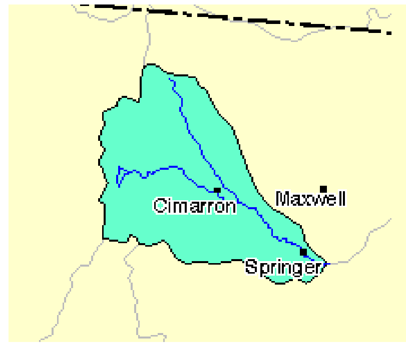
TOTAL MAXIMUM DAILY LOAD FOR STREAM BOTTOM DEPOSITS IN RAYADO CREEK AND METALS (CHRONIC ALUMINUM) IN THE CIMARRON RIVER





Summary Table

New Mexico Standards Segment	Canadian River, 2306
Waterbody Identifier	•Cimarron River from the mouth on the Canadian River to Turkey Creek (CR2-10000) 35.3mi. •Rayado Creek from the mouth on the Cimarron River to Miami Lake diversion (CR2-10100) 16.5mi.
Parameters of Concern	Cimarron - Metals (Chronic Aluminum) Rayado - Stream Bottom Deposits
Uses Affected	Cimarron – Limited Warmwater Fishery Rayado - Marginal Quality Coldwater Fishery and Warmwater Fishery
Geographic Location	Canadian River Basin (Cimarron)
Scope/size of Watershed	1032 mi^2 (entire Cimarron) TMDL reaches: Cimarron 423 mi^2 and Rayado 230 mi^2
Land Type	Ecoregions: Southern Rockies (210, 211) Southwestern Tablelands (260, 261)
Land Use/Cover	Forest (51%), Rangeland (38%), Agriculture (9%), Urban (1.4%), Water (0.6%)
Identified Sources	Cimarron and Rayado - Streambank Modification/Destabilization, Removal of Riparian Vegetation, Rangeland, and Natural
Watershed Ownership	Private (89%), Forest Service (9%), State (2%)
Priority Ranking	8
Threatened and Endangered Species	None
TMDL for: Metals (Aluminum) Cimarron River	WLA(0) + LA(4.25) + MOS(0.75)= **5.0 lbs/day**
Stream Bottom Deposits Rayado Creek	WLA(0) + LA(15) + MOS(5)= **20 % fines (51% Reduction)**

Table of Contents

EXECUTIVE SUMMARY

Section 303(d) of the Federal Clean Water Act requires states to develop 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.

The Cimarron River Basin is a sub-basin of the Canadian River Basin, located in northeastern New Mexico. Stations were located throughout the basin to evaluate the impact of tributary streams and to establish background conditions. As a result of this monitoring effort, several exceedances of New Mexico water quality standards for metals (chronic aluminum) were documented on the Cimarron River from the mouth on the Canadian River to Turkey Creek (35.3 mi.). Some level of impairment due to embeddedness was seen on the reach listed for stream bottom deposits, Rayado Creek from the mouth on the Cimarron River to Miami Lake diversion (16.5 mi.). This Total Maximum Daily Load (TMDL) document addresses these three constituents.

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 collected. 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.

List of Abbreviations

BMP	**Best Management Practice**
CFS	**Cubic Feet per Second**
CWA	**Clean Water Act**
CWAP	**Clean Water Action Plan**
CWF	**Coldwater Fishery**
EPA	**Environmental Protection Agency**
FS	**United States Department of Agriculture Forest Service**
ISI	**Interstitial Space Index**
LA	**Load Allocation**
LWWF	**Limited Warmwater Fishery**
MGD	**Million Gallons per Day**
mg/L	**Milligrams per Liter**
MOS	**Margin of Safety**
MOU	**Memorandum of Understanding**
NMED	**New Mexico Environment Department**
NMSHD	**New Mexico State Highway and Transportation Department**
NPDES	**National Pollutant Discharge Elimination System**
NPS	**Nonpoint Source**
NTU	**Nephelometric Turbidity Units**
SBD	**Stream Bottom Deposits**
SWQB	**Surface Water Quality Bureau**
TMDL	**Total Maximum Daily Load**
TSS	**Total Suspended Solids**
UWA	**Unified Watershed Assessment**
WLA	**Waste Load Allocation**
WQLS	**Water Quality Limited Segment**
WQCC	**New Mexico Water Quality Control Commission**
WQS	**Water Quality Standards**

Background Information

The Cimarron River Basin is a sub-basin of the Canadian River Basin, located in northeastern New Mexico. This 1032 $mi.^2$ watershed is dominated by both forest and rangeland (Figure 1) on mostly private land. In the areas around the Cimarron River and Rayado Creek, the watershed is dominated by rangeland and agriculture on entirely private lands. The Cimarron River flows through the towns of Cimarron and Springer with a sub-watershed size of 423 mi^2. Only the portion of the Cimarron River from the mouth on the Canadian River to Turkey Creek (35.3 miles is included in this TMDL. The Rayado Creek sub-watershed is 230 mi^2. The entire reach of Rayado Creek from the mouth on the Cimarron River to Miami Lake diversion (16.5 miles) is included in this TMDL.

Surface water quality monitoring stations were used to characterize the water quality of the stream reaches (see Figure 2). Stations were located to evaluate the impact of tributary streams and to establish background conditions. As a result of monitoring efforts, several exceedances of New Mexico water quality standards for metals (chronic aluminum) were documented on the Cimarron River. On Rayado Creek, stream bottom deposits (SBD) were assessed using techniques in the draft New Mexico Sediment Protocol (NMED 1999b). Some level of impairment due to embeddedness was documented on Rayado Creek.

Endpoint Identification

Target Loading Capacity

Overall, the target values for both TMDLs will be determined based on 1) the presence of numeric criteria, 2) the degree of experience in applying the indicator and 3) the ability to easily monitor and produce quantifiable and reproducible results. For this TMDL document target values for metals (chronic aluminum) are based on numeric criteria. Target values for plant nutrients and stream bottom deposits are based on assessment protocols that interpret narrative criteria.

Metals (chronic aluminum)

The State's standard leading to an assessment of use impairment is the numeric criteria for dissolved aluminum (chronic) of 87 *ug*/L for a limited warmwater fishery (LWWF). There were no exceedances of the acute standard for aluminum.

Stream Bottom Deposits

Surface Water Quality Bureau (SWQB) has combined techniques to measure the level of embeddedness of a stream bottom in a SWQB/NMED draft Protocol for the Assessment of Stream Bottom Deposits (SWQB/NMED 1999a) in order to address the narrative criteria for stream bottom deposits (SBD). The purpose of the protocol is to provide a reproducible quantification of the narrative criteria for stream bottom deposits (SBD).

Figure 1

Figure 2

The impact of fine sediment deposits in streams is well documented in the literature. USEPA (1991) states that "An increased sediment load is often the most important adverse effect of ....activities on streams." This impact is mediated through the reduction in available habitat for macroinvertebrates and fish species which utilize the streambed in various life stages. An increase in suspended sediment concentration will reduce the penetration of light, decreases the ability of fish on fingerlings to capture prey, and reduce primary production (US EPA 1991). The SWQB Sediment Workgroup evaluated a number of methods described in the literature that would provide information allowing a direct assessment of the impacts to the stream bottom substrate. A final list of monitoring procedures was implemented at a wide variety of sites statewide during the 1998 monitoring season. These procedures included conducting pebble counts (a measurement of % fines), stream bottom cobble embeddedness, Rosgen (1996) geomorphology, and various biological measures.

The methodology used to estimate target levels involved the examination of developed relationships between embeddedness, fines, and biological score. Evaluation of data collected at various locations in New Mexico showed a relationship (R^2=0.7511) between embeddedness and the biological score results from the SWQB/NMED draft Protocol for the Assessment of Stream Bottom Deposits (SWQB/NMED 1999a) sampling from 1998 (Appendix B). A correlation (R^2= 0.7199) was also found between embeddedness and percent fines (Appendix B). These relationships show that at the desired biological score (at least 70, per the SWQB Assessment Protocol, 1998) the target maximum embeddedness (for fully supporting a designated use) would be 45%, and the target fines would be 20%. Since this relationship is based on New Mexico streams, 20% was chosen for the target value for percent fines.

Results from biological sampling can be used to support the SWQB/NMED draft Protocol for the Assessment of Stream Bottom Deposits (SWQB/NMED 1999a) results**.** In this case, biological sampling was not done on the Cimarron River from the mouth on the Canadian River to Turkey Creek or on Rayado Creek from the mouth on the Cimarron River to Miami Lane diversion. However, Rayado Creek above the Miami Lane diversion was used as a reference reach for other biological sampling in the watershed. It was found that the reference site on Rayado, above this TMDL reach, had a good habitat assessment and good diversity. It is anticipated that additional biological sampling will be taken on these TMDL reaches in the future.

Flow

Sediment movement in a stream varies as a function of flow. As flow increases the concentration of sediment increases. Metals and plant nutrients, on the other hand, have a tendency to concentrate as flows decrease. These TMDLs are calculated for each reach at a specific flow. When available, US Geologic Survey gages are used to estimate flow. Where gages are absent, geomorphological cross sectional information is taken at each site and the flows are modeled. It is important to remember that the TMDL is a planning tool to be used to achieve water quality standards. Since flows vary throughout the year in these systems the target load will vary based on the changing flow. Management of the load should set a goal at water quality standards attainment, not meeting the calculated target load.

*Calculation*s

A target load for metals (chronic aluminum) is calculated based on a flow, the current water quality standards, and a unit less conversion factor, 8.34 that is a used to convert mg/L units to lbs/day (see Appendix B for Conversion Factor Derivation). The target loading capacity is calculated using Equation 1.

Equation 1. critical flow (mgd) x standard (mg/L) x 8.34 (conversion factor) = target loading capacity

The target loads (TMDLs) predicted to attain standards were calculated using Equation 1 and are shown in Table 1.

Table 1: Calculation of Target Loads

Location	Flow	Standards		Conversion	Target
□	(mgd) □	Metals□(mg/L)	Stream Bottom Deposits *□(%fines)	Factor	Load Capacity
Cimarron	6.92+	.087	□	8.34□	5.0 (lbs/day)□
Rayado	50.4‡		20□	□	20 % fines

+Flow is the lowest monthly mean flow form USGS station #07211000 from 1908-1993 (USGS 1994).
‡Flow is the greatest monthly mean flow From USGS station #07208500 from 1912-1993 (USGS 1994). This flow value is informational and not used in any calculations.
*The standard for stream bottom deposits were taken from the NMED Draft Sediment Protocol for the Assessment of Stream Bottom Deposits (1999b).

The measured loads were calculated using Equation 1. The flows used were either taken directly from a USGS gage or from field measurements. The geometric mean of the data that exceeded the standards from the data collected at each site for metals and was substituted for the standard in Equation 1. The same conversion factor of 8.34 was used. Results are presented in Table 2.

Background loads were not possible to calculate in this watershed. A reference reach, having similar stream channel morphology and flow, was not found. It is assumed that a portion of the load allocation is made up of natural background loads. In future water quality surveys, finding a suitable reference reach will be a priority.

Table 2: Calculation of Measured Loads

Location	Flow	Field Measurements		Conversion Factor	Measured Load
□	(mgd)□	Metals (mg/L)	SBD (% fines)	□	
Cimarron	6.92	.15†		8.34	8.7 (lbs/day)
Rayado	50.4*		30.4		30.4 % fines

*Flow is not used in the calculation of the TMDL. It is for informational purposes only.
†This is the geometric mean of metals values that exceeded the numeric standard.

Waste Load Allocations and Load Allocations

•*Waste Load Allocation*

There are no point source contributions associated with this TMDL. The waste load allocation is zero.

•*Load Allocation*
In order to calculate the Load Allocation (LA) the waste load allocation, background, and margin of safety (MOS) were subtracted from the target capacity (TMDL) following Equation 2.

Equation 2. $WLA + LA + MOS = TMDL$

Results are presented in Table 3a (Calculation of TMDLs for Metals (Chronic Aluminum)) and Table 3b (Calculation of TMDLs for Stream Bottom Deposits).

Table 3a: Calculation of TMDL for Metals (Chronic Aluminum)

Location	WLA (lbs/day)	LA (lbs/day)	MOS (15%) (lbs/day)	TMDL (lbs/day)
Cimarron	0	4.25	0.75	5.0

Table 3b: Calculation of TMDL for Stream Bottom Deposits

Location	WLA (% fines)	LA (% fines)	MOS (25%) (% fines)	TMDL (% fines)
Rayado	0	15	5	20

The load reductions that would be necessary to meet the target loads were calculated to be the difference between the target load (Table 1) and the measured load (Table 2), and are shown in Table 4 (Calculation of Load Reductions). Achieving the target load of 5.0 lbs/day metals (chronic aluminum) would require a load reduction of 3.7 lbs/day. Achieving the target load for SBD would require a load reduction of about 51%. Using the measured percent fines values of 30.4% and a target of 15% fines (TMDL – MOS) a 51% overall reduction in sediment load can be calculated as necessary to achieve the target.

Table 4: Calculation of Load Reductions

Location	Target Load		Measured Load		Load Reduction	
	Metals (lbs/day)	SBD (% fines)	Metals (lbs/day)	SBD (% fines)	Metals (lbs/day)	SBD (% reduction)
Cimarron	5.0		8.7		3.7	
Rayado		20		30.4		51

<u>Identification and Description of pollutant source(s)</u>

Table 5: Pollutant Source Summary

Pollutant Sources	**Magnitude** (WLA + LA + MOS)	**Location**	**Potential Sources** (% from each)

Point: None	0	--------	0
Nonpoint: •Metals (chronic aluminum) •Stream Bottom Deposits (% fines)		Cimarron Rayado	100% Streambank Modification/Destabilization , Removal of Riparian Vegetation, Rangeland, and Natural Streambank Modification/Destabilization, Removal of Riparian Vegetation, Rangeland

Linkage of Water Quality and Pollutant Sources

Where available data are incomplete or where the level of uncertainty in the characterization of sources is large, the recommended approach to TMDLs requires the development of allocations based on estimates utilizing the best available information.

SWQB fieldwork includes an assessment of the potential sources of impairment (SWQB/NMED 1999b). The Pollutant Source(s) Documentation Protocol, shown as Appendix C, provides an approach for a visual analysis of a pollutant source along an impaired reach. Although this procedure is subjective, SWQB feels that it provides the best available information for the identification of potential sources of impairment in this watershed. Table 5 (Pollutant Source Summary) identifies and quantifies potential sources of nonpoint source impairments along each reach as determined by field reconnaissance and assessment. A further explanation of the sources follows.

Cimarron River

The primary sources of impairment along this reach are streambank destabilization and removal of riparian vegetation. This reach has been historically impacted by agriculture, rangeland, roads, and natural aluminum sources.

The natural sources of aluminum in the Cimarron River referred to in Table 5 are the predominant minerals composing the earth's crust. Aluminum in these minerals is mobilized naturally by percolating water and by surface runoff. The mobilization may be accelerated by surface disturbing activities that constitute the remaining sources in Table 5. That aluminum concentrations were highest in the spring, TSS and turbidity were relatively low for the same samples, and most of the detected aluminum was dissolved, suggests the aluminum that is mobilized by percolating water appears to be more important than the component resulting from surface disturbing activities.

The slightly acidic nature of rain and snow (and the increased solubility of aluminum at lower pH), the residence time of frozen or melting snow on the weathered portion of aluminum bearing minerals, and the acidic pulse that can occur with the first spring snowmelt are frequently observed to result in the highest concentrations of dissolved metals from a given area.

In many New Mexico streams, aluminum is seen at elevated levels in the spring due to higher than normal suspended solids in the stream. In general, increased metals in the water column can be commonly linked to sediment transport and accumulation, where metals are a constituent part of the sediment. The geochemical examination of the watershed area bedrock and surface geology may suggest sources of increased aluminum values. Unfortunately, the state of New Mexico standards do not presently recognized naturally high background levels of aluminum in the state. Therefore, a TMDL must be written. In the future, the SWQB will develop a protocol to evaluate specific areas in the state where dissolved aluminum concentrations can be linked to naturally occurring background levels.

Rayado Creek

The primary sources of impairment along this reach are streambank destabilization and removal of riparian vegetation. This reach has been historically impacted by irrigated agriculture, rangeland, and runoff from roads. The land surrounding this creek is privately owned.

Margin of Safety (MOS)

TMDLs should reflect a margin of safety based on the uncertainty or variability in the data, the point and nonpoint source load estimates, and the modeling analysis. For this TMDL, there will be no margin of safety for point sources, since there are none. However, for the nonpoint sources the margin of safety is estimated to be an addition of **15%** for metals (SWQB/NMED 1999c) and **25%** for SBD of the TMDL, excluding the background. This margin of safety incorporates several factors:

- *Errors in calculating NPS loads*

  A level of uncertainty exists in sampling nonpoint sources of pollution. Techniques used for measuring metals concentrations in stream water are 15% accurate. Accordingly, a conservative margin of safety for aluminum increases the TMDL by 15%.

  A level of uncertainty does exist in the measurement of stream bottom deposits. There is also a potential to have errors in measurements of nonpoint source loads due to equipment accuracy, time of sampling, etc. Accordingly, a conservative margin of safety for SBD increases the TMDL by 25%.

- *Errors in calculating flow*

  Flow estimates were based on USGS gages. Conservative values were used to calculate loads and do not warrant additional MOS.

Consideration of seasonal variation

Data used in the calculation of this TMDL were collected during spring, summer, and fall in order to ensure coverage of any potential seasonal variation in the system. Critical condition is set to the highest flows for stream bottom deposits and low flow for metals. Data where exceedances were seen (primarily during high or low flows) were used in the calculation of the measured loads.

Future Growth

Estimations of future growth are not anticipated to lead to a significant increase for metals or SBD that cannot be controlled with best management practice implementation in this watershed. Rayado Creek is on private land. The Cimarron River is located on both private and public lands.

Monitoring Plan

Pursuant to Section 106(e)(1) of the Federal Clean Water Act, the SWQB has established appropriate monitoring methods, systems and procedures in order to compile and analyze data on the quality of the surface waters of New Mexico. In accordance with the New Mexico Water Quality Act, the SWQB has developed and implemented a comprehensive water quality monitoring strategy for the surface waters of the State. The monitoring strategy establishes the methods of identifying and prioritizing water quality data needs, specifies procedures for acquiring and managing water quality data, and describes how these data are used to progress toward three basic monitoring objectives: to develop water quality-based controls, to evaluate the effectiveness of such controls and to conduct water quality assessments.

The SWQB utilizes a rotating basin system approach to water quality monitoring. In this system, a select number of watersheds are intensively monitored each year with an established return frequency of every five years.

The SWQB maintains current quality assurance and quality control plans to cover all monitoring activities. This document, "Quality Assurance Project Plan for Water Quality Management Programs" (QAPP) is updated annually. Current priorities for monitoring in the SWQB are driven by the 303(d) list of streams requiring TMDLs. Short-term efforts will be directed toward those waters which are on the EPA TMDL consent decree (Forest Guardians and Southwest Environmental Center v. Carol Browner, Administrator, US EPA, Civil Action 96-0826 LH/LFG, 1997) list and which are due within the first two years of the monitoring schedule. Once assessment monitoring is completed those reaches showing impacts and requiring a TMDL will be targeted for more intensive monitoring. The methods of data acquisition include fixed-station monitoring, intensive surveys of priority water bodies, including biological assessments, and compliance monitoring of industrial, federal and municipal dischargers, and are specified in the SWQB Assessment Protocol (SWQB/NMED 1998).

Pebble counts are used to develop a particle size distribution curve of the bed surface material. The measurement method described by Wolman (1954) was selected for inclusion in the parameter suite evaluated during the sample season.evaluation during the 1998 sample season. The advantage of this procedure is relatively quick to perform and is reproducible. In streams dominated by fine sediments, coarser particles that provide beneficial habitat tend to become surrounded or buried in fines leading to a loss of suitable habitat. Cobble embeddedness is a measure of the extent to which these coarser particles are buried by the finer sediments and has both biological and physical significance (USEPA 1991). The sampling procedure chosen for New Mexico streams is that devised by Skille and King (1989). This technique uses 60-cm diameter hoops as the basic sampling unit. The use of hoops rather than individual particles as the basic unit of measure reduces the variability of the sample. Software obtained from the Idaho Bureau of Reclamation allows for the evaluation of the data (Burton 1990). Values calculated and reported by the software are percent embeddedness, the Interstitial Space Index (ISI), and percent free matrix cobble. Also available in the software is a sample size evaluator that helps in determinations of whether sufficient sample size has been collected to statistically define the population. The advantage of this procedure is that it is quantifiable. The major disadvantage is in the substantial effort required to complete the data collection.

Long term monitoring for assessments will be accomplished through the establishment of sampling sites that are representative of the waterbody and which can be revisited every five years. This gives an unbiased assessment of the waterbody and establishes a long term monitoring record for simple trend analyses. This information will provide time relevant information for use in 305(b) assessments and to support the need for developing TMDLs.

The approach provides:

- a systematic, detailed review of water quality data, allowing for a more efficient use of valuable monitoring resources.
- information at a scale where implementation of corrective activities is feasible.
- an established order of rotation and predictable sampling in each basin which allows for enhanced coordinated efforts with other programs.
- program efficiency and improvements in the basis for management decisions.

It should be noted that a basin will not be ignored during its four year sampling hiatus. The rotating basin program will be supplemented with other data collection efforts. Data will be analyzed, field studies will be conducted, to further characterize identified problems, and TMDLs will be developed and implement. Both long term and field studies can contribute to the 305(b) report and 303(d) listing processes.

The following schedule is a draft for the sampling seasons through 2002 and will be followed in a consistent manner to support the New Mexico Unified Watershed Assessment (UWA) and the Nonpoint Source Management Program. This sampling regime allows characterization of seasonal variation and through sampling in spring, summer, and fall for each of the watersheds.

1998 - Jemez, Chama (above El Vado), Cimarron (above Springer), Santa Fe, San Francisco
1999 - Chama (below El Vado), middle Rio Grande, Gila, Red River
2000 - Mimbres, Dry Cimarron, upper Rio Grande (part1)
2001 - Upper Rio Grande (part 2), upper Pecos (headwaters to Ft. Sumner), lower Pecos (Roswell south), Closed Basins, Zuni
2002 - Canadian Basin, lower Rio Grande, San Juan, Rio Puerco

Implementation Plan

<u>Management Measures</u>

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) will be used to implement this TMDL.

For this watershed, a primary focus will be on addressing sediment control. It is believed that, in the case of the Cimarron River, this will also address some aluminum impairment. In addition, if the source of any of the aluminum impairment is from natural sources and therefore carried by overland flows, improvements in riparian buffers particularly grasses, sedges,etc. will help filter the contaminant. The NPS Section has worked with one of the primary landowners in the area. The landowner has implemented significant changes in grazing management that have greatly improved both watershed conditions and riparian conditions along both of the reaches. In addition, beaver have been encouraged by the landowner to move into these systems to further improve conditions including increased riparian vegetation and stabilization of streambanks. Such efforts for good grazing management and riparian restoration will be encouraged to continue and will be utilized as a large and successful demonstration project in addressing streambank destabilization and lack of riparian vegetation.

Staff will meet with other landowners and encourage similar changes in management along the reaches. An outreach effort will be made for the agencies involved with the diversion structures that provide water from the Cimarron River to the Town of Springer so as to assure that riparian vegetation and river morphology are not compromised by their activities. Landowners will be encouraged to implement BMPs to address the problems associated with improperly designed roads and river crossings. Other landowners will be encouraged to implement river restoration activities in areas that have been channelized. One landowner has already expressed interest in such an endeavor. There is already some coordination in place by landowners to develop a 319 watershed restoration project that addresses some of the upper watershed areas that have been impacted by historic overgrazing. A thinning and burning project to bring back grasses and remove pinyon/juniper woodlands will be implemented. In addition, grazing management, and road maintenance BMPs will be implemented. Stakeholders in this process will include SWQB, local governments, and private landowners. Stakeholder participation will include choosing and installing BMPs, as well as potential volunteer monitoring.

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

Assurances

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 Control Commission to "promulgate and publish regulations to prevent or abate water pollution in the state" and to require permits. The Water Quality Act (20 NMAC 6.2) (NMWQCC 1995a) 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.***

Nonpoint source water quality improvement work utilizes the voluntary approach. This provides technical support and grant money for the implementation of best management practices and other NPS prevention mechanisms through §319 of the Clean Water Act. Since this TMDL will be implemented through NPS control mechanisms the New Mexico Nonpoint Source Program is targeting efforts to this and other watersheds with TMDLs. The Nonpoint Source 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 Section 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 Section 319 proposals.

In order to ensure reasonable assurances for implementation in watersheds with multiple landowners, including Federal, State and private, NMED has established MOUs with several 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 Highway 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. The cooperation of private landowners and federal agencies, particularly the USDA Forest Service, will be pivotal in the implementation of this TMDL.

<u>Milestones</u>
Milestones will be used to determine if control actions are being implemented and standards attained. For this TMDL several milestones will be established that will vary based on the BMPs implemented at each site. Examples of milestones include a percentage reduction in stream bottom deposits within a certain time frame, update or develop MOUs with other state and federal agencies by 2001 to ensure protection and restoration in this watershed, and to increase education and outreach activities regarding sediment erosion in this watershed, particularly for private landowners.

Milestones will be reevaluated periodically, depending on what BMP was implemented. Further implementation of this TMDL will be revised based on this reevaluation. The process will involve: monitoring pollutant loading, tracking implementation and effectiveness of controls, assessing water quality trends in the waterbody, and reevaluating the TMDL for attainment of water quality standards.

Public Participation

Public participation was solicited in development of these TMDLs. See Appendix D for flow chart of the public participation process. The draft TMDLs were made available for a 30-day comment period starting **October 10, 2000**. Response to comments is attached as Appendix E of this document. The draft document notice of availability was extensively advertised via newsletters, email distribution lists, webpage postings (http://www.nmenv.state.nm.us/) and press releases to area newspapers.

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Appendices

Appendix A SWQB/NMED draft Protocol for the Assessment of Stream Bottom Deposits (SWQB/NMED 1999a) Relationships

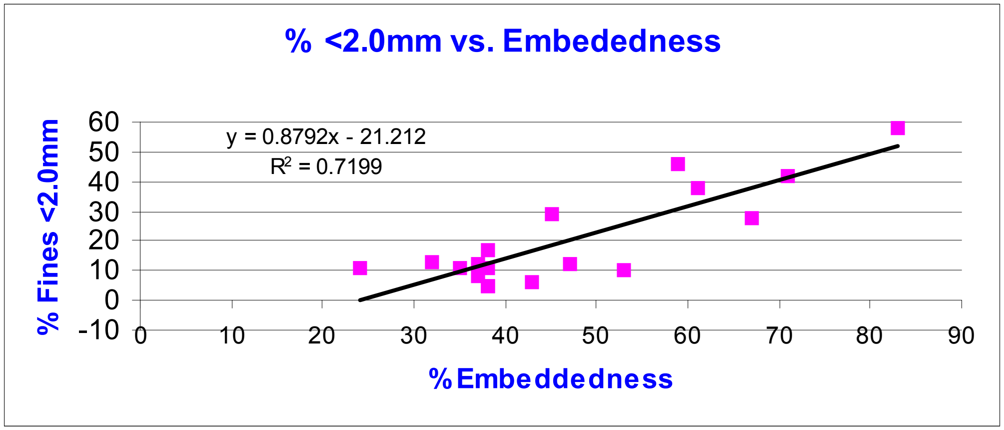
Appendix B: Conversion Factor Derivation

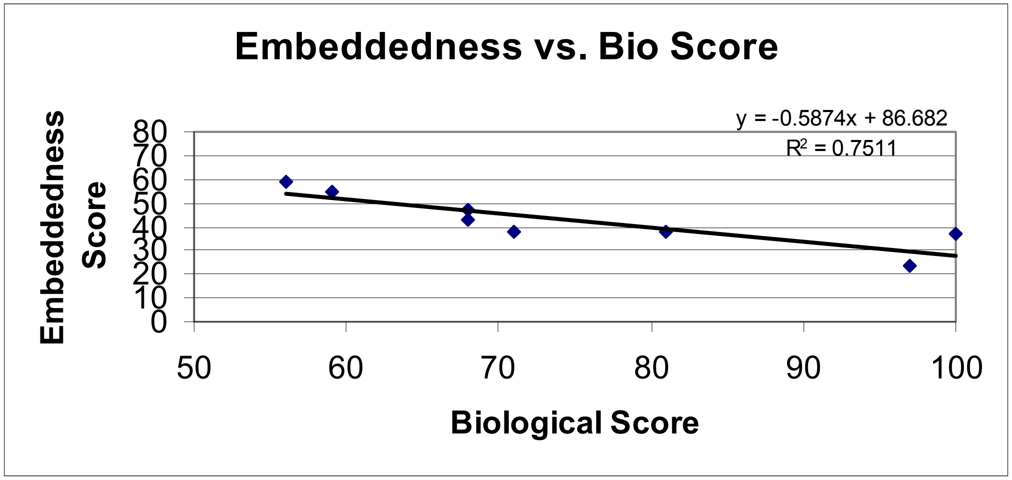
Appendix C: Pollutant Source(s) Documentation Protocol

Appendix D: Public Participation Process Flowchart

Appendix E: Response to Comments

Appendix A: SWQB/NMED draft Protocol for the Assessment of Stream Bottom Deposits (SWQB/NMED 1999a) Relationships





8.34 Conversion Factor Derivation

Million gallons/day **x** Milligrams/liter **x** 8.34 = pounds/day

10^6~~gallons~~/day **x** 3.7854 liters/~~1 gallon~~ **x** 10^{-3}gram/liter **x** 1 pound/454 ~~grams~~ = pounds/day

$10^6 (10^{-3}) (3.7854)/454 = 3785.4/454$

= 8.3379
= **8.34**

POLLUTANT SOURCE(S) DOCUMENTATION PROTOCOL

This protocol was designed to support federal regulations and guidance requiring states to document and include probable source(s) of pollutant(s) in their §303(d) Lists as well as the States §305(b) Report to Congress.

The following procedure should be used when sampling crews are in the field conducting water quality surveys or at any other time field staff are collecting data.

Pollutant Source Documentation Steps:

1). Obtain a copy of the most current §303(d) List.

2). Obtain copies of the ***Field Sheet for Assessing Designated Uses and Nonpoint Sources of Pollution***.

3). Obtain 35mm camera that has time/date photo stamp on it. **DO NOT USE A DIGITAL CAMERA FOR THIS PHOTODOCUMENTATION**

4). Identify the reach(s) and probable source(s) of pollutant in the §303(d) List associated with the project that you will be working on.

5). Verify if current source(s) listed in the §303(d) List are accurate.

6). Check the appropriate box(s) on the field sheet for source(s) of nonsupport and estimate percent contribution of each source.

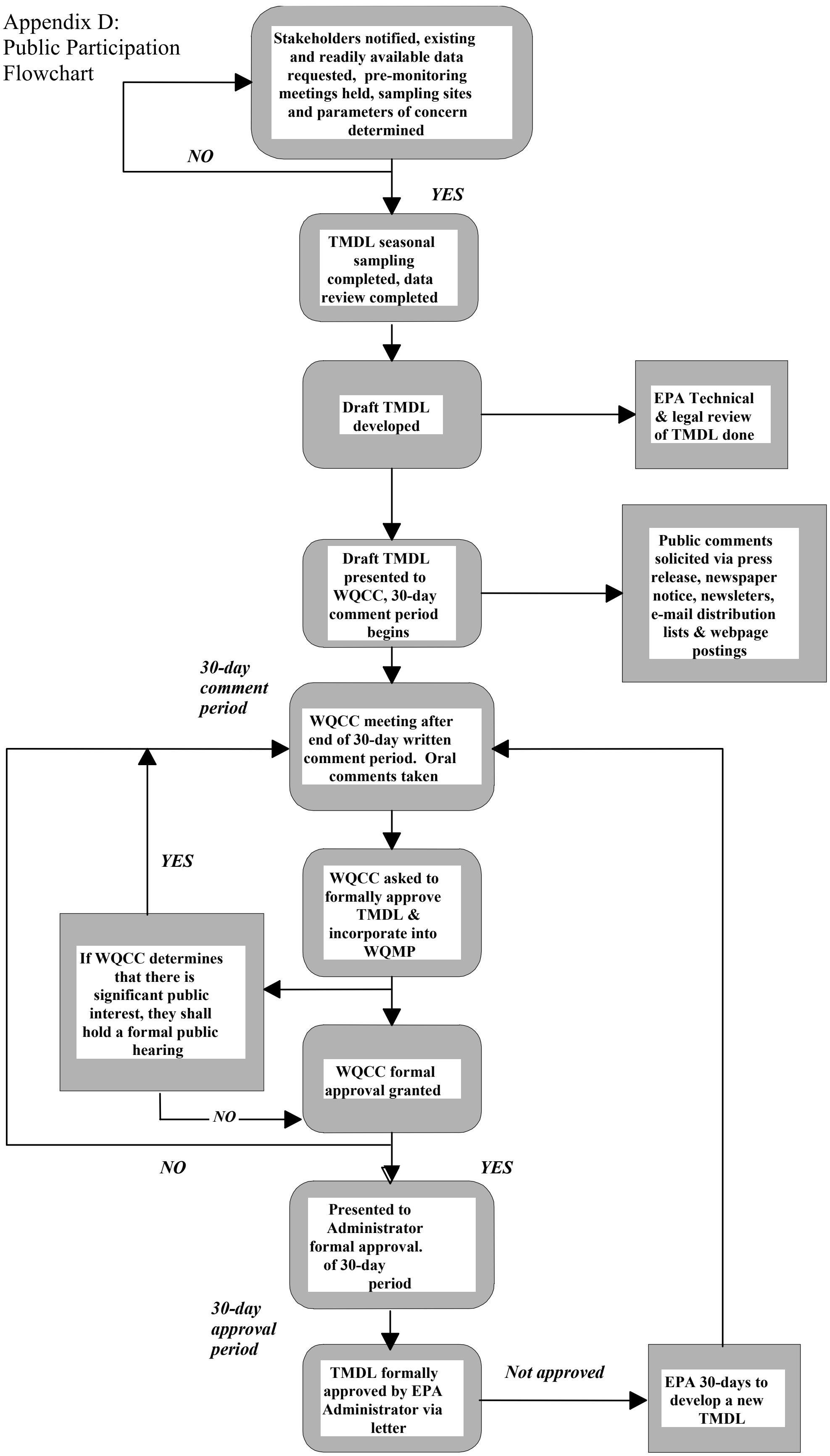
7). Photodocument probable source(s) of pollutant.

8). Create a folder for the TMDL files, insert field sheet and photodocumentation into the file.

This information will be used to update §303(d) Lists and the States §305(b) Report to Congress.

Appendix C: Cont.

Appendix D:
Public Participation
Flowchart



Appendix E: Response to Comments

No public comments were received.