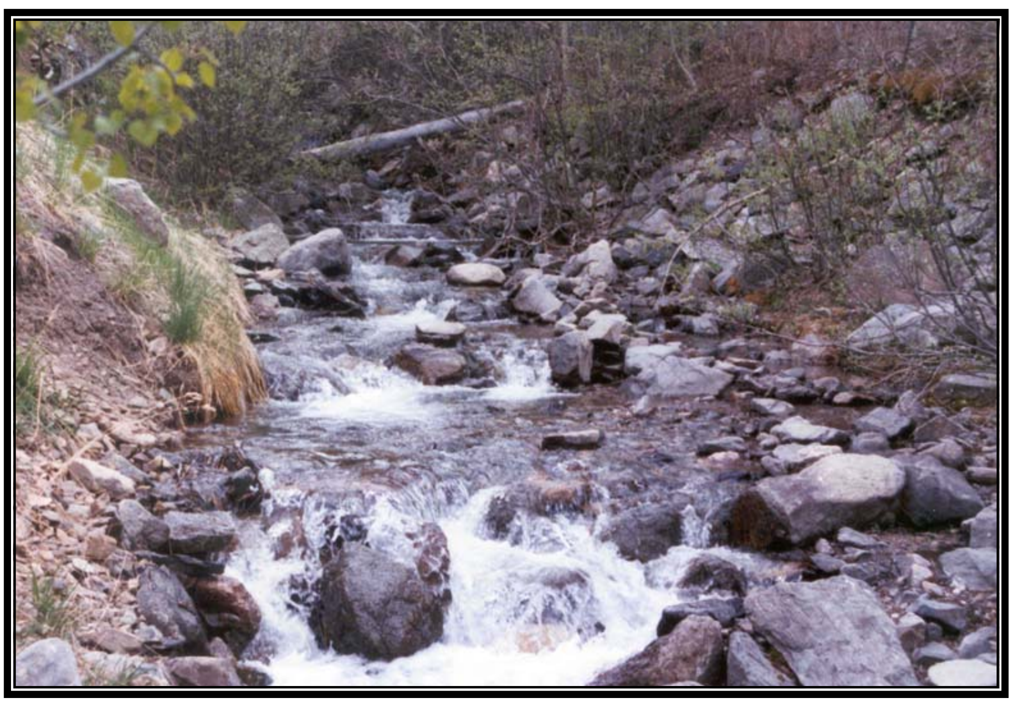
FINAL APPROVED

TOTAL MAXIMUM DAILY LOAD (TMDL)

FOR THE

RIO HONDO

(SOUTH FORK OF RIO HONDO TO LAKE FORK CREEK)



JUNE 14, 2005

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4Q3	4-day, 3-year low-flow frequency
AU	Assessment Unit
BLM	Bureau of Land Management
BMPs	Best Management Practices
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CGP	Construction General Storm Water Permit
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund
DMRs	Discharge Monitoring Reports
EID	Environmental Improvement Division
GIS	Geographic Information Systems
GPS	Global Positioning System
HQCWF	High quality cold water fishery
HUC	Hydrologic Unit Code
LA	Load Allocation
lbs/day	Pounds per Day
mg/L	Milligrams per Liter
MGD	Million Gallons per Day
mi^2	Square Miles
mL	Milliliters
MOS	Margin of Safety
MOU	Memoranda of Understanding
MQL	Minimum Quantification Limit
MS4	Municipal Separate Storm Sewer System
MSGP	Multi Sector General Storm Water Permit
NM	New Mexico
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMEID	New Mexico Environmental Improvement Division
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
^oC	Degrees Celcius
^oF	Degrees Farenheit
QAPP	Quality Assurance Project Plan
PSRS	Point Source Regulation Section
SEE	Standard Error of the Estimate
STORET	Storage and Retrieval database
SWPPP	Storm Water Pollution Prevention Plan
SWQB	Surface Water Quality Bureau
SWSTAT	Surface Water Statistics
TMDL	Total Maximum Daily Load
TWSD	Twining Water and Sanitation District
USEPA	U.S. Environmental Protection Agency

USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WLA	Waste Load Allocation
WQCC	Water Quality Control Commission
WQS	Water Quality Standards (NMAC 20.6.4 as amended through October 11, 2002)
WRAS	Watershed Restoration Action Strategy
WWTF	Waste Water Treatment Facility
WWTP	Waste Water Treatment Plant

EXECUTIVE SUMMARY

The Rio Hondo Basin, located in northern New Mexico, is a sub-basin of the Upper Rio Grande. The river's headwaters lie in the Sangre de Cristo Mountains above Taos Ski Valley. The confluence of the North and Lake Forks forms the Rio Hondo within the ski valley. The upper Rio Hondo watershed encompasses 20.9 square miles and is primarily forest land, with 90% of the watershed undeveloped. The Rio Hondo provides essential habitat for a variety of terrestrial and aquatic organisms. Designated uses include domestic water supply, fish culture, high quality coldwater fishery, irrigation, livestock watering, wildlife habitat, and secondary contact. The region also has numerous trails frequented by hikers and bicyclists as well as a world-class ski resort situated near its headwaters.

Water Quality Impairments

The New Mexico Administrative Code (NMAC) defines the Rio Hondo in standards segment 20.6.4.123 of the Rio Grande Basin. Segment 20.6.4.123 includes all perennial reaches of tributaries to the Rio Grande in Taos County unless the specified reach was included in another segment. A waste load allocation for nutrients was previously completed for the Rio Hondo (New Mexico Environmental Improvement Division [NMEID], 1981). Recent stream surveys (2000-2004) have found that the Rio Hondo near the Village of Taos Ski Valley fully supports its designated uses defined by the state of New Mexico. Nevertheless, the Village of Taos Ski Valley (VTSV) wants to increase their capacity and effluent discharge into the river so the New Mexico Environment Department/Surface Water Quality Bureau implemented a special study in 2004. This document provides a revised nutrient Total Maximum Daily Load (TMDL) for the assessment unit within the Rio Hondo using the data from the special survey and defines a waste load allocation for the Village of Taos Ski Valley such that increased discharge from the waste water treatment plant will not cause violations of the water quality standards protecting the Rio Hondo.

Clean Water Act Section 303(d) List and TMDLs

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 Code of Federal Regulations Part 130 as the sum of the individual Waste Load Allocations for point sources and Load Allocations for nonpoint sources, including a margin of safety and natural background conditions.

Nutrient Sources

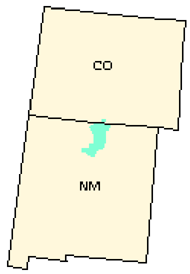
The only point source discharge of nutrients in the Rio Hondo is from the VTSV's Wastewater Treatment Plant. The primary nonpoint discharge of nutrients is from residential and urban areas, septic tank disposal systems, construction sites, recreational activities, ski slope runoff, and atmospheric deposition. Nutrients enter the stream by way of overland surface runoff during spring snowmelt and storm events, through groundwater that contains elevated levels of nutrients from septic tank wastewater, via atmospheric deposition (i.e. dust), and from background, or natural, sources.

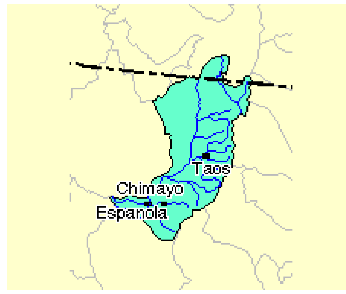
TMDL Implementation

Revision of VTSV's National Pollution Discharge Elimination System (NPDES) permit will be part of the implementation of this TMDL. A general implementation plan for activities to be established related to nonpoint sources is included in this document. The Surface Water Quality Bureau's Watershed Protection Section (SWQB/WPS) will further develop the details of this plan. Implementations of recommendations in this document will be done with full participation of all interested and affected parties. During implementation, additional water quality data may be generated. As a result, targets will be re-examined and potentially revised. Thus, 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 inappropriate or if new standards are adopted, the load capacity will be adjusted accordingly.

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.

TOTAL MAXIMUM DAILY LOAD FOR NUTRIENTS
RIO HONDO (SOUTH FORK OF RIO HONDO TO LAKE FORK CREEK)





New Mexico Standards Segment	Rio Grande 20.6.4.123
Assessment Unit Identifier	Rio Hondo (South Fork of Rio Hondo to Lake Fork Creek) NM-2120.A_602 (formerly NM-URG1-Hondo)
Assessment Unit Length	3.88 miles
Parameters of Concern	Total Phosphorus, Total Nitrogen
Uses Affected*	High Quality Coldwater Fishery
Geographic Location	Rio Grande USGS Hydrologic Unit Code 13020101
Scope/size of Watershed	72 mi^2
Land Type	Southern Rocky Mountains (Subecoregion 21)
Land Use/Cover	Shrubland (7%), Forest (78%), Grassland (10%), Urban (3%), Barren/Tundra (2%)
Identified Sources*	Municipal Point Source, Construction, Urban Runoff, Onsite Wastewater Systems, Recreational Activities, Ski Slope Runoff
Land Management	U.S. Forest Service (61%), Private (38%), Tribal lands (1%)
Priority Ranking	High
TMDL for: Total Phosphorus Total Nitrogen	WLA + LA + GA + MOS = TMDL 1.00 + 1.50 + 0.06 + 0.63 = 3.19 lbs/day 11.0 + 18.6 + 0.63 + 1.60 = 31.9 lbs/day

* This assessment unit is **<u>not</u>** listed as an impaired reach in the *2004-2006 State of New Mexico Integrated Clean Water Act §303(d)/ §305(b) Report*. This TMDL document was written as a precautionary measure to help mitigate the expansion of the Village of Taos Ski Valley's Wastewater Treatment Plant and to prevent or reduce the probability of any future nutrient impairment.

1.0 BACKGROUND INFORMATION

1.1 History of TWSD

The Twining Water and Sanitation District (TWSD) was the state-designed waste management agency for sewage generated in Taos Ski Valley. Although TWSD is on record as the current permit holder, the District has been dissolved. The Village of Taos Ski Valley is the current owner and operator of the wastewater treatment plant that accepts a large portion of the ski valley's sewage and discharges the effluent directly into the Rio Hondo, a high quality coldwater tributary of the Rio Grande. Application for a new permit has been made in the name of the Village of Taos Ski Valley.

During the 1970s, TWSD regularly violated effluent limitations defined by its National Pollutant Discharge Elimination System (NPDES) permit causing violations of stream standards and damage to the aquatic habitat within the Rio Hondo. In 1979, the New Mexico Environment Department (NMED), formerly known as the Environmental Improvement Division (EID), developed and implemented a new enforcement posture based on persistent application of the state's Water Quality Control Commission (WQCC) Regulations. Between 1979 and 1981, the Water Pollution Control Bureau of EID used eight surface-water sampling stations on the Rio Hondo to characterize the water quality and establish background conditions. As a result of the monitoring efforts during this time period, EID developed a revised NPDES permit (NM0022101) that defined effluent limitations such that the discharge from the Twining plant would not cause violations of the water quality standards protecting the Rio Hondo. In conjunction with NM0022101, new management took over plant operations in the late 1980s. With this new management, a new philosophy emerged at Twining, which resulted in a spirit of cooperation with NMED. Operational and physical changes also were made to the treatment plant resulting in an improved effluent over time. Operational changes included improving training and laboratory techniques to ensure that the data reported on the Discharge Monitoring Reports (DMRs) would be accurate. The physical improvements included slip-lining the collection system for infiltration and inflow removal, replacing old equipment with new equipment, and installing equipment to prevent possible spill situations. NMED and TWSD continue to have a good working relationship and a cooperative environment exists between the two organizations today.

The Compliance Evaluation and Sampling Inspection reports from 1993 to the present indicate that plant operations, maintenance, and effluents are meeting current NPDES permit requirements. The most recent Compliance Evaluation Inspection of VTSV's WWTP by NMED was conducted on March 4, 2002. This inspection included a review of DMRs for the years 2000, 2001, and 2002. During this time period, there were no exceedances of any effluent discharge limits.

The VTSV's present NPDES permit (NM0022101) expires in November 2005 and has a design capacity of 0.1 million gallons per day (MGD). Due to the age of the treatment facility, and current and future demands, many of the unit processes of the WWTP need to be upgraded and renovated to meet future effluent quality criteria and standards, and to provide for more efficient operations. The Village has applied for a Clean Water State Revolving Fund (CWSRF) loan funded by the EPA and administered by NMED, for upgrade and renovation of the wastewater treatment plant. The Village plans to replace the headworks, modify the aeration basins and clarifiers, and relocate the chemical treatment process, pending approval of the CWSRF grant. The proposed project would accommodate a wastewater flow of about 0.2 MGD averaged over a seven-day period during peak winter season. The VTSV's WWTP is the only point source discharge into the Rio Hondo, however there are numerous natural and anthropogenic nonpoint sources of pollution in the upper Rio Hondo watershed.

1.2 Watershed Description

The Rio Hondo is a perennial tributary of the Rio Grande. The Rio Hondo watershed is part of the US Geological Survey (USGS) Hydrologic Unit Code (HUC) 13020101. The Village of Taos Ski Valley is situated near the headwaters of the Rio Hondo in the Sangre de Cristo Mountains of north central New Mexico in Taos County. From an elevation of 9,300 feet in the ski valley, the river flows for eight miles in a narrow steep-sided canyon until it reaches the forest service boundary where the elevation is 7,650 feet. The Rio Hondo then flows for nine miles through a broad, sloping piedmont valley and enters the Rio Grande at John Dunn Bridge. The elevation at the mouth of the Rio Hondo is 5,500 feet. The Rio Hondo watershed drains 21 square miles (mi^2) at the outlet of the assessment unit at the confluence with the South Fork, 36 mi^2 at the USGS gaging station near Valdez, NM, and roughly 72 mi^2 at John Dunn Bridge. The annual average discharge of the Rio Hondo at the USGS gaging station is 35.4 cubic feet per second (cfs) (USGS, http://nwis.waterdata.usgs.gov/).

The upper mountain watershed of the Rio Hondo is forested by aspen, spruce, and fir, and is devoted to recreational activities, mainly skiing, and to livestock grazing by the Forest Service permittees. The lower piedmont valley supports traditional family agriculture. As shown in Figure 1-1 land use in this watershed is predominately forest (78%), but also includes grasslands (10%), shrubland (7%), urban areas (3%), and barren land (2%). Land ownership is 61% U.S. Forest Service (USFS), 38% private, and 1% tribal land (Figure 1-2). Designated uses include domestic water supply, fish culture, high quality coldwater fishery (HQCWF), irrigation, livestock watering, wildlife habitat, and secondary contact.

1.3 Survey Design

Four sampling stations used to develop this TMDL were established in the Rio Hondo watershed during the 2004 survey. Monthly surface-water grab samples were collected from all of the stations beginning in February and ending in September 2004 (see Appendix A for data). Samples were analyzed for a variety of chemical and biological parameters. The locations of sampling stations along the TMDL stream reach are shown in Figures l-1 and 1-2 and are listed below:

STORET No.	Station Location
28RHondo026.9	Rio Hondo 50 feet above WWTP
NM0022101	Twining WWTP effluent discharge to the Rio Hondo
28RHondo026.7	Rio Hondo 300 yards below WWTP
28RHondo022.4	Rio Hondo 2.4 miles below WWTP

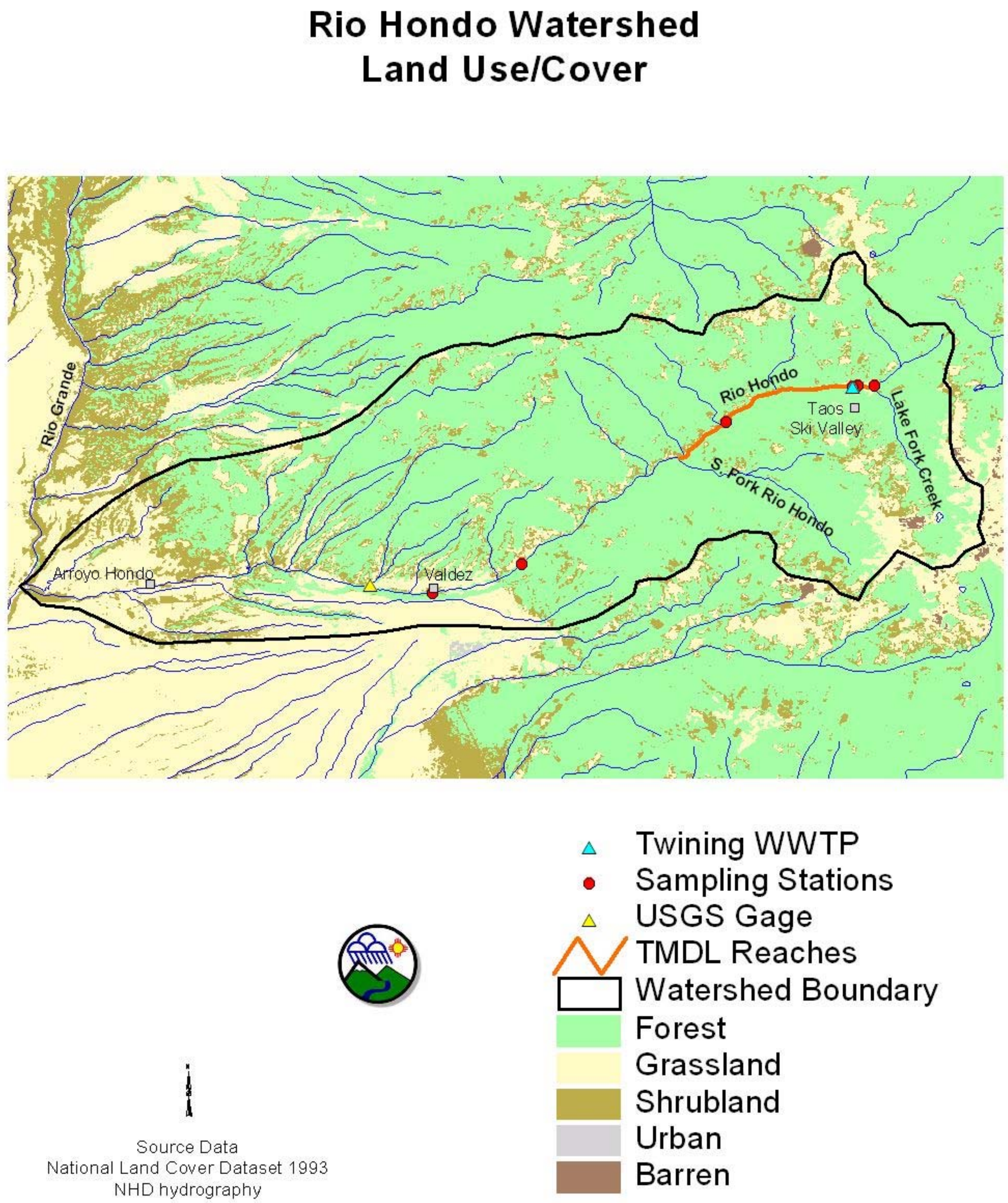

Rio Hondo Watershed
Land Use/Cover
Rio Grande
Arroyo Hondo
Valdez
Rio Hondo
Taos
Ski Valley
S. Fork Rio Hondo
Lake Fork Creek
Twining WWTP
Sampling Stations
USGS Gage
TMDL Reaches
Watershed Boundary
Forest
Grassland
Shrubland
Urban
Barren
Source Data
National Land Cover Dataset 1993
NHD hydrography

Figure 1-1.

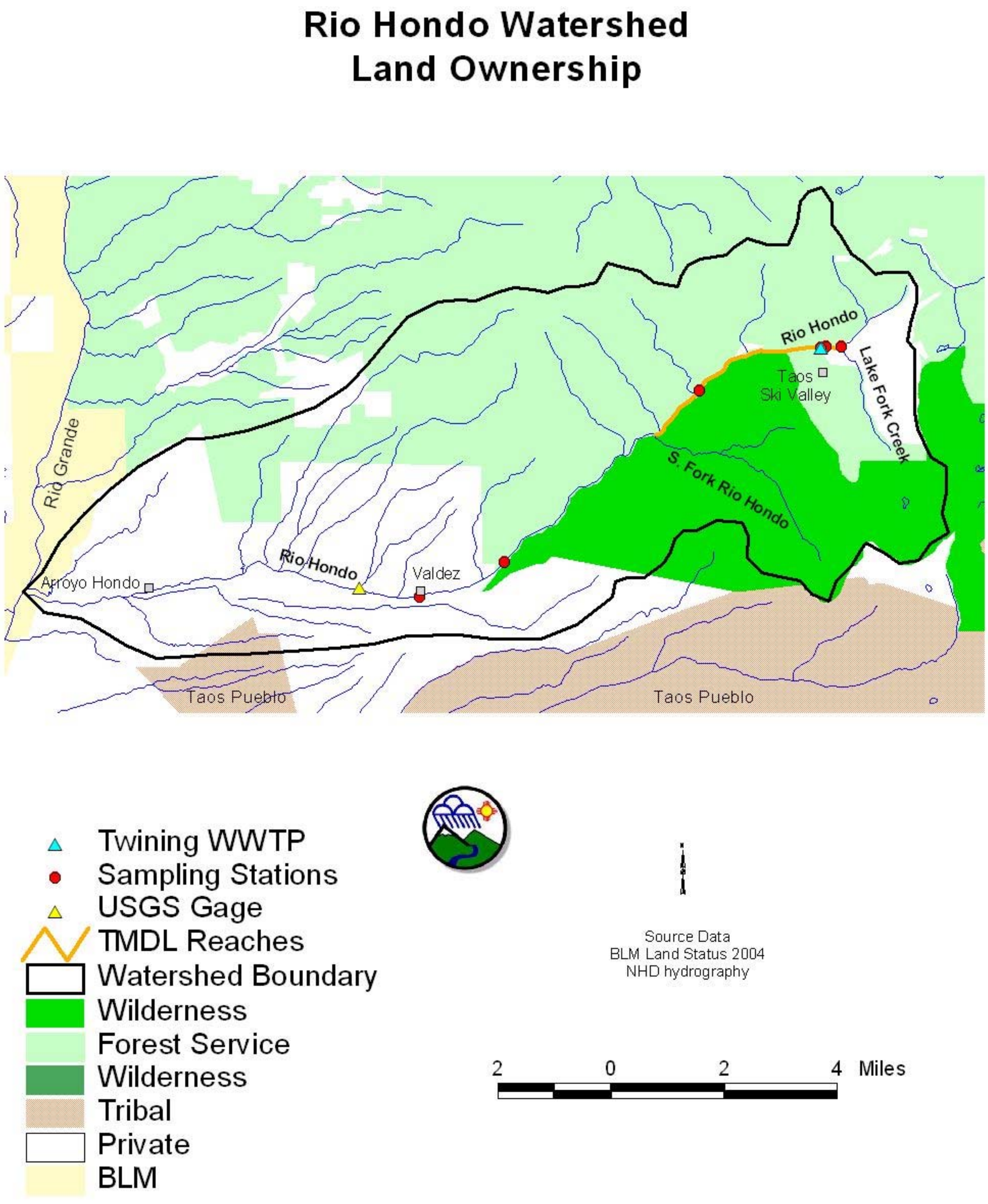

Rio Hondo Watershed
Land Ownership
Rio Grande
Rio Hondo
Taos
Ski Valley
Lake Fork Creek
S. Fork Rio Hondo
Arroyo Hondo
Valdez
Taos Pueblo
Taos Pueblo
Twining WWTP
Sampling Stations
USGS Gage
TMDL Reaches
Watershed Boundary
Wilderness
Forest Service
Wilderness
Tribal
Private
BLM
Source Data
BLM Land Status 2004
NHD hydrography
2 0 2 4 Miles

Figure 1-2.

1.4 Nutrient Cycling

Phosphorus and nitrogen generally drive the productivity of algae and macrophytes in aquatic ecosystems, therefore they are regarded as the primary limiting nutrients in freshwaters. The main reservoirs of natural phosphorus are rocks and natural phosphate deposits. Weathering, leaching, and erosion are all processes that breakdown rock and mineral deposits allowing phosphorus to be transported to aquatic systems via water or wind. The breakdown of mineral phosphorus produces inorganic phosphate ions ($H_2PO_4^-$, HPO_4^{2-}, and PO_4^{3-}) that can be absorbed by plants from soil or water (USEPA, 1999). Phosphorus primarily moves through the food web as organic phosphorus (after it has been incorporated into plant or algal tissue) where it may be released as phosphate in urine or other waste by heterotrophic consumers and reabsorbed by plants or algae to start another cycle (Nebel and Wright, 2000).

The largest reservoir of nitrogen is the atmosphere. About 80 percent of the atmosphere by volume consists of nitrogen gas (N_2). Although nitrogen is plentiful in the environment, it is not readily available for biological uptake. Nitrogen gas must be converted to other forms, such as ammonia (NH_3 and NH_4^+), nitrate (NO_3^-), or nitrite (NO_2^-) before plants and animals can use it. Conversion of gaseous nitrogen into usable mineral forms occurs through three biologically mediated processes of the nitrogen cycle: nitrogen fixation, nitrification, and ammonification (USEPA, 1999). Mineral forms of nitrogen can be taken up by plants and algae and incorporated into plant or algal tissue. Nitrogen follows the same pattern of food web incorporation as phosphorus and is released in waste primarily as ammonium compounds. The ammonium compounds are usually converted to nitrates by nitrifying bacteria, making it available again for uptake, starting the cycle anew (Nebel and Wright, 2000).

Rain, overland runoff, groundwater, drainage networks, and industrial and residential waste effluents transport nutrients to receiving waterbodies. Once nutrients have been transported into a waterbody they can be taken up by algae, macrophytes, and microorganisms either in the water column or in the benthos; they can sorb to organic or inorganic particles in the water column and/or sediment; they can accumulate or be recycled in the sediment; or they can be transformed and released as a gas from the waterbody (Figure 1-3).

As noted above, phosphorus and nitrogen are essential for proper functioning of ecosystems. However, excess nutrients cause conditions unfavorable for the proper functioning of aquatic ecosystems. Nuisance levels of algae and other aquatic vegetation (macrophytes) can develop rapidly in response to nutrient enrichment when other factors (e.g., light, temperature, substrate, etc.) are not limiting (Figure 1-3). The relationship between nuisance algal growth and nutrient enrichment in stream systems has been well documented in the literature (Welch, 1992; Van Nieuwenhuyse and Jones, 1996; Dodds et al., 1997; Chetelat et al., 1999). Unfortunately, the magnitude of nutrient concentration that constitutes an “excess” is difficult to determine and varies by ecoregion.

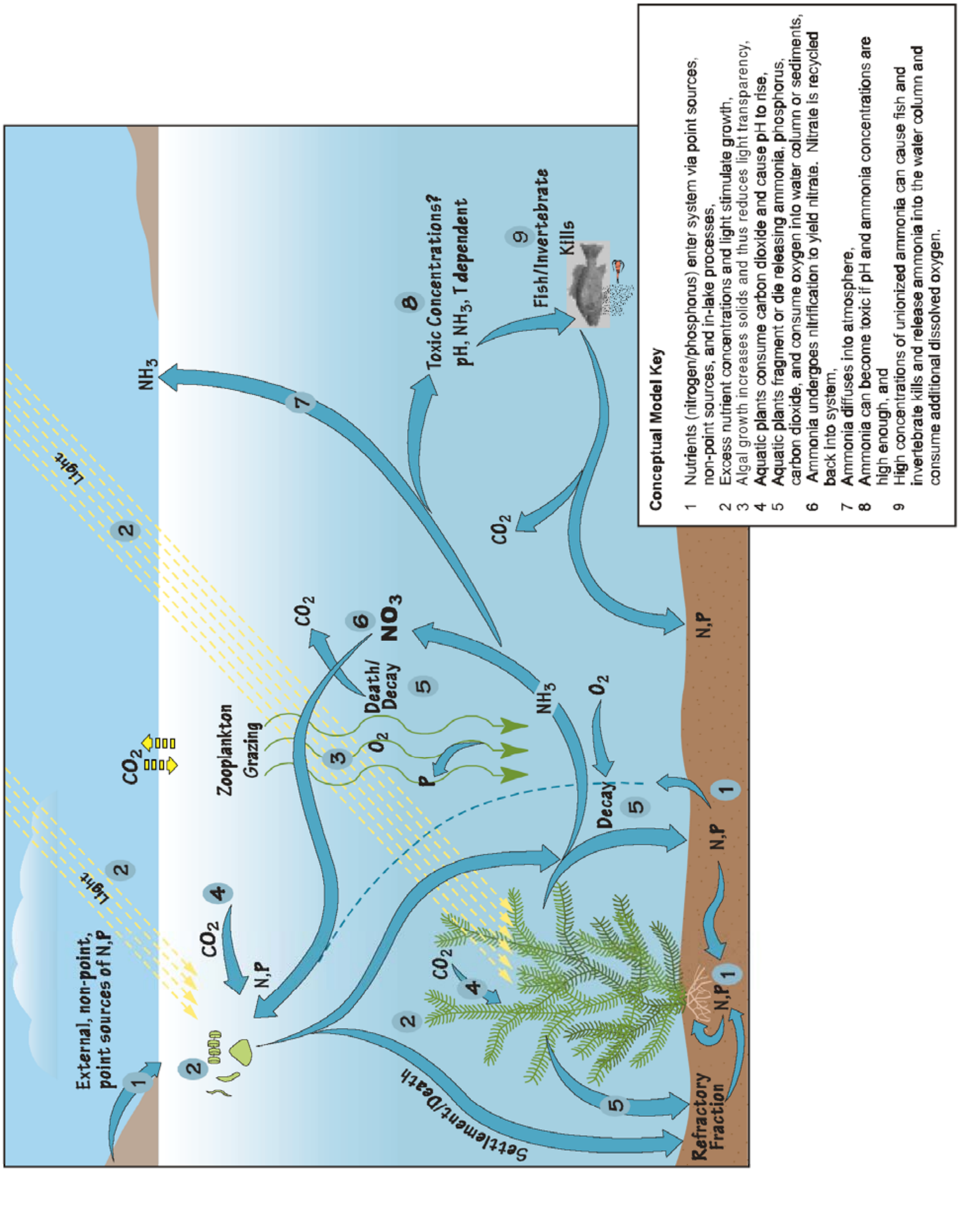


Figure 1-3. Nutrient Conceptual Model (USEPA, 1999)

2.0 ENDPOINT IDENTIFICATION

2.1 USEPA's Recommended Ecoregional Nutrient Criteria

The U.S. Environmental Protection Agency (USEPA, 2000) has published recommended nutrient criteria for causal (total nitrogen and total phosphorus) and response (chlorophyll a and turbidity) variables associated with the prevention and assessment of eutrophic conditions. The criteria are empirically derived from data in USEPA's Storage and Retrieval database (STORET) to represent conditions of surface waters that are minimally impacted by human activities and protective of aquatic life and recreational uses. Ideally, USEPA wanted to base these criteria on actual reference conditions. The criteria would have been based on the 75th percentile of reference condition data. However, much of USEPA's data could not be considered to be reference conditions. Consequently, USEPA performed a statistical analysis of the entire body of non-reference data. The 25th percentile of each season (winter, spring, summer, fall) was calculated, and then the median of these four values was calculated. This approach assumes that the lower 25th percentile of all data overlaps with the 75th percentile of reference condition data, so therefore the 25th percentile data can be used to represent reference conditions.

The upper Rio Hondo watershed is located in subecoregion 21, the Southern Rocky Mountains of the Western Forested Mountains Ecoregion (Ecoregion II). USEPA's recommended criteria for total nitrogen and total phosphorus in streams in this subecoregion are presented in Table 2-1 below.

Table 2-1. USEPA's Recommended Nutrient Criteria for Ecoregion II, Subecoregion 21 (Western Forested Mountains)

Nutrient Parameter	Recommended Value	
	Ecoregion II	Subecoregion 21
Total Nitrogen	0.12 mg N/L	0.09 mg N/L
Total Phosphorus	0.01 mg P/L	0.006 mg P/L

The State of New Mexico has the option to adopt USEPA's recommended values or to develop alternative criteria based on another scientifically defensible approach in establishing numeric nutrient water quality objectives for the different ecoregions in the state. In 2004, the Monitoring and Assessment Section of the Surface Water Quality Bureau (SWQB) started conducting research on reference streams throughout the state in order to develop scientifically defensible and applicable numeric standards for nitrogen and phosphorus in the diverse ecoregions of New Mexico.

2.2 Target Loading Capacity

The target values for nutrient loads are determined based on 1) the presence of numeric and narrative 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 the target value for plant nutrients is based on both narrative and numeric criteria. This TMDL is consistent with the New Mexico State antidegradation policy.

2.3 Plant Nutrients

The New Mexico WQCC has adopted narrative water quality standards for plant nutrients to sustain and protect existing or attainable uses of the surface waters of the state. This general standard applies to surface waters of the state at all times unless a specified standard is provided elsewhere. These water quality standards have been set at a level to protect cold-water aquatic life.

The HQCWF use designation requires that a stream have water quality, streambed characteristics, and other attributes of habitat sufficient to protect and maintain a HQCWF. The plant nutrient standard leading to an assessment of use impairment is as follows (NMAC 20.6.4.12.E):

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

There are two potential contributors to nutrient enrichment in a given stream: excessive nitrogen and/or phosphorus. The reason for controlling plant growth is to preserve aesthetic and ecologic characteristics along the waterway. The intent of numeric standards for nitrogen and phosphorus is to control the excessive growth of attached algae and higher aquatic plants that can result from the introduction of these plant nutrients into high quality coldwater streams. In 1981, algal bioassays and laboratory analysis of ambient waters determined that the Rio Hondo was a phosphorus-limited system (NMEID, 1981b). In 2004, algal bioassays and laboratory analysis of waters sampled above and below the WWTP showed varied results (Appendix B). The Rio Hondo above the WWTP is limited by nitrogen, meaning phosphorus addition did not stimulate algal growth either by itself or in combination with nitrogen addition. On the other hand, the Rio Hondo below the WWTP was stimulated by the addition of both nitrogen and phosphorus indicating that both elements are limiting algal growth. These results indicate that both nitrogen and phosphorus are driving the productivity of algae and macrophytes in the stream below the treatment plant. Therefore, to ensure that the narrative water quality standards are met, management procedures should avoid any increase in both nitrogen and phosphorus inputs.

Currently, there are no numeric standards applicable to the Rio Hondo for total phosphorus (TP) and total nitrogen (TN). Numeric standards are necessary to control the amount of nutrients in the stream, to prevent excessive plant growth, to provide WWTFs with target loads, and to support designated uses within the Rio Hondo. This TMDL document is adopting the philosophy and target concentrations suggested in the 1981 Waste Load Allocation (WLA) for Twining Water and Sanitation District (NMEID, 1981) because the numeric targets in the 1981 document are segment specific criteria that have proven effective at maintaining water quality standards and fully support the designated uses along the upper Rio Hondo. The 1981 WLA suggests an in-stream TP concentration of less than 0.10 mg/L and an in-stream TN concentration of less than 1.0 mg/L (Table 2-2). Total Nitrogen is defined as the sum of Nitrate-N, Nitrite-N, and Total Kjeldahl Nitrogen. At the present time, there is no EPA-approved method to test for Total Nitrogen, however a combination of EPA method 351.2 (Total Kjeldahl Nitrogen) and EPA method 353.2 (Nitrate + Nitrite) may be appropriate for monitoring Total Nitrogen.

Table 2-2. Numeric Targets

Constituent or Factor	TMDL Target Concentrations
Total Phosphorus	0.1 mg P/L
Total Nitrogen	1.0 mg N/L

2.4 Critical Low-Flow Criterion

The **critical condition** can be thought of as the "worst case" scenario of environmental conditions in the waterbody in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that results in attaining and maintaining the water quality criterion and has an acceptably low frequency of occurrence. The flow is used in calculation of point source (NPDES) permit waste load allocations (WLA) and in the development of TMDLs.

The presence of plant nutrients in a stream can vary as a function of flow. As flow decreases, the stream cannot effectively dilute its constituents, which causes the concentration of plant nutrients to increase. Thus, a TMDL is calculated for each reach at a specific flow. The critical flow conditions for this TMDL occur when the ratio of effluent to stream flow is the greatest and was obtained using 4-day, 3-year low-flow frequency (4Q3) regression models (Appendix C). The 4Q3 is the minimum average four consecutive day flow that occurs with a frequency of at least once every 3 years. The 4Q3 flow for this report was estimated through application of USGS gage data to a log Pearson Type III distribution using "*Input and Output for Watershed Data Management*" (IOWDM) software, Version 4.1 (USGS, 2002a) and "*Surface-Water Statistics*" (SWSTAT) software, Version 4.1 (USGS, 2002b). It is assumed that 4Q3 flows will be the critical periods for aquatic life.

It is often necessary to calculate a critical flow for a portion of a watershed where there is no stage gage. This can be accomplished by applying one of two formulas developed by the USGS. One formula (USGS, 1993) is recommended when the ratio between the gaged and ungaged watershed areas is between 0.5 and 1.5. The other formula, to be used when the watershed ratio is outside this range, is a regression formula developed by James P. Borland (USGS, 1970). These methods of estimating low flows are currently used by the NMED to establish TMDLs for watersheds and to administer water-quality standards through the NPDES program. The basin and climatic characteristics used to derive the critical low flows are listed in Table 2-3.

Table 2-3. Basin and climatic characteristics used to derive the critical low-flow (4Q3) at the bottom of the assessment unit (ungaged station)

USGS gaging-station number	Station Name	Drainage Area (mi^2)	Annual 4Q3 (cfs)	Av. Basin $Precip_w$ (inches)	Av. Basin Slope (percent)	Basin Aspect (degrees from N)	Av Basin Elevation (ft above sea level)	Av. Basin $Precip_a$ (inches)
08267500	Rio Hondo 1.5 miles above Valdez, NM	36.2	7.87	13.90	0.517	225	10,500	25.93
-----	Rio Hondo 2.4 miles below WWTP	20.9	5.77	14.15	0.497	270	10,768	26.27

In 1981, the NMEID determined that computation and application of the critical low-flow criterion on a seasonal basis might significantly reduce operational costs for the TWSD while still protecting stream standards. The ability of the Rio Hondo to dilute wastewater is least during the winter months (Figure 2-1). Winter is also the period during which the District's wastewater discharges are greatest. At other times, stream standards are attainable with less stringent wastewater treatment. Significant savings in treatment plant operation could thereby be achieved by applying seasonal 4Q3s to the WWTP waste load allocation (Appendix C; Tables 7-1 and 8-1).

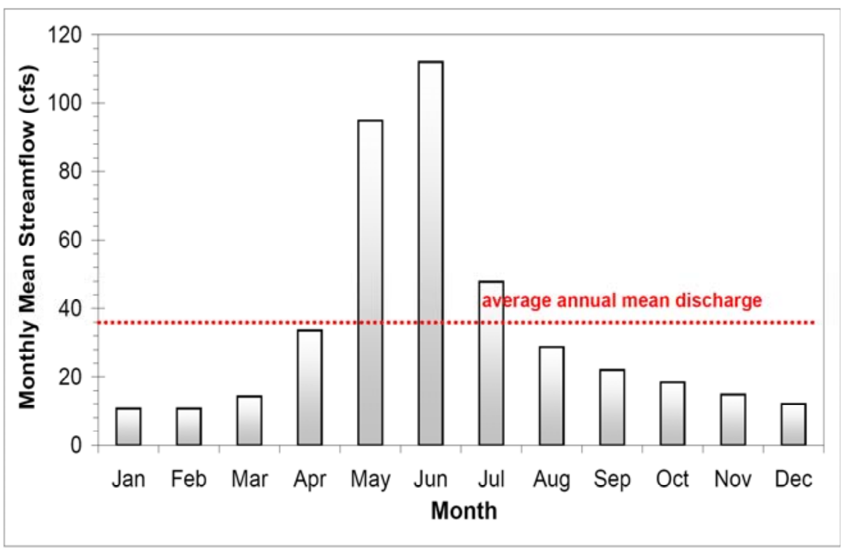


Figure 2-1. Monthly Mean Streamflow at USGS Stream Gage 08267500 (1934-2002)

3.0 SOURCE ASSESSMENT

The source assessment phase of TMDL development identifies all known sources of nutrients that may contribute to both elevated nutrient concentrations and the stimulation of algal growth in the Rio Hondo. The source assessment also determines nutrient inputs, measured as loads that will consider magnitude and support the formulation of the load allocation and wasteload allocation of the TMDLs (USEPA, 1999). Where available data are incomplete or where the level of uncertainty in the characterization of sources is large, the recommended approach to TMDL assignments requires the development of allocations based on estimates utilizing the best available information.

SWQB fieldwork includes an assessment of the potential sources of impairment. The completed Pollutant Source(s) Documentation Protocol form in Appendix D provides documentation of a visual analysis of probable sources along the assessed 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. The following load estimates are determined using the best available methods that were known at the time of calculation and may be revised in the future. Potential nutrient sources in the upper Rio Hondo watershed are:

- Municipal wastewater treatment plant
- Construction sites and urban development
- Recreational Activities
    - Ski slope runoff
    - Hiking and mountain biking trail system
    - Parking lots (impervious areas)
- Residential areas
    - Landscape maintenance
    - Septic tank- leach field disposal systems
    - Backyard livestock/pets
- Atmospheric deposition
- Undeveloped land (background/natural conditions)

Construction and urban development contribute nutrients by disturbing the land and consequently increasing soil erosion, and by increasing the impervious area within the watershed. Recreational activities such as hiking, biking, and skiing can also contribute nutrients to the stream by reducing plant cover and increasing soil erosion (e.g. trail network), direct application of human waste, campfires and/or wildfires, and dumping trash near the riparian corridor. Residential areas contribute nutrients from septic tank disposal systems, landscape maintenance, and/or backyard livestock (e.g. horses) and pet wastes. Atmospheric deposition adds nutrients directly to the waterbody through dryfall and rainfall. Undeveloped land delivers nutrients from decaying plant material, soil erosion, air deposition, and wild animal waste. The contributions from undeveloped land are small and generally considered to represent background, or natural levels.

Nutrients from these sources reach the Rio Hondo primarily by two routes: directly in overland flow (stormwater runoff and spring snowmelt) and indirectly in ground water. Nutrients applied directly to land (e.g. fertilizers, pet wastes) can be carried overland in storm water runoff or can dissolve and percolate through the soil to reach ground water. Septic tank disposal systems contribute nutrients primarily into ground water, which may eventually discharge into the stream.

It is important to consider not only the land directly adjacent to the stream, which is predominantly privately held, but also to consider upland and upstream areas in a more holistic watershed approach to implementing this TMDL. Analyses presented in these TMDLs demonstrate that defined loading capacities will ensure attainment of New Mexico water quality standards.

Nutrient Export Coefficients

Nutrient export coefficients are the amounts of nitrogen or phosphorus exported from an area over a specific time period and are generally applied to a specific land use. They are typically expressed as grams of phosphorus per square meter per year, or pounds of nitrogen per acre per month, or some other mass-area-time unit.

The simplifying assumptions regarding nutrient transport and cycling limit the export coefficient approach because diverse physical, biological, and chemical processes are lumped into one parameter, an average nutrient generation rate. Another limitation is that export coefficients for this study are based on literature values, not on site-specific data. This approach yields an estimate of total nutrient loads to surface waters in the watershed, but does not estimate loading at any particular point in the watershed. Despite these limitations, the use of export coefficients to estimate nutrient loads is the best available method given the minimal data requirements and given that detailed watershed models have not been developed for the upper Rio Hondo watershed. The results will provide a rough approximation of the loading to the upper Rio Hondo watershed and will indicate the general sources of that loading. Future applications of the nutrient export methods will be enhanced by more intensive surface water surveys that collect and analyze actual nutrient export data from the region as well as by more recent and detailed land use/land cover data.

Numerous studies have derived land use based loading coefficients characteristic of various watershed conditions for estimating nonpoint source pollutant yields (e.g. Reckhow, et al., 1980; Rast and Lee, 1983; Frink, 1991; McFarland and Hauck, 2001). Nutrient loads from both runoff and ground water have been evaluated for all of the identified nutrient sources in the Rio Hondo. Surface runoff pollutant loads from various land uses were calculated by applying appropriate nutrient export coefficients from published literature to the corresponding land use areas.

Nutrient export coefficients for this study were obtained from literature values since no site-specific values existed for the Rio Hondo. Efforts were made to select export coefficients that most appropriately represented the land use types within the upper Rio Hondo watershed, and that best represented the environmental conditions in Northern New Mexico. Best professional estimates of probable values for nutrient export coefficients were determined for each pollutant using a hierarchical approach. First, coefficients from a variety of studies and publications were accumulated. From these, values from western states were selected. In the absence of western data, median national values from various sources were selected.

Natural or undeveloped lands contribute surface water loads through natural processes (e.g., leaf litter decay or soil erosion). Background loads were estimated using reference water quality concentration data and streamflow data from water quality stations located above the WWTP. Ground water loads were estimated using per capita septic disposal system nutrient load calculations. Air deposition load was calculated using a literature value deposition rate, which accounts for the amount of nutrients that deposit on the surface of the water. These source-specific load estimates account for the differences in magnitudes between sources and provide a basis for allocating loads.

There will be situations where the annual export coefficient is not appropriate, such as for waterbodies with short (a few weeks to a few months) hydraulic residence times. Under these conditions, seasonal export coefficients should be used, where attention is given to the sources of those nutrients that are responsible for excessive algal growth that impairs the waterbody's water quality and impedes the designated uses of the watershed.

3.1 Total Phosphorus

3.1.1 Surface Water Loads

Land use and natural sources were identified as potential sources of phosphorus to the Rio Hondo. This section provides discussion and estimates of the surface water loads from each of these sources.

Land Uses

The upper Rio Hondo watershed has four main land uses that were identified as potential sources of phosphorus (Table 3-1, Figure 1-1): built-up (urban), forest, shrubland, and grasslands. Nutrients generally reach the Rio Hondo from land uses that are in close proximity to the stream because the hydrological pathways are shorter and have fewer obstacles than land uses located away from the riparian corridor. However, during spring snowmelt and in storm water runoff, those distant land uses can become hydrologically connected to the stream, transporting nutrients from the hillslopes to the stream during these time periods.

For this analysis, the Export Coefficient Model (Reckhow, et al., 1980) was modified to generate phosphorus loads from specific land uses by incorporating a distance-decay component in the export coefficient similar to the methods used by Johnes and Heathwaite (1997) and Endreny and Wood (2003). Phosphorus export weighting was based on distance from the stream with 50 m, 500 m, and 5000 m buffer zones. The largest unit-area load was assigned to the 50 m buffer zone and the smallest unit-area load was assigned to the 5000 m buffer zone. This approach assumes that the export coefficient values undergo a step-wise decay when originating from beyond the 50 m distance cutoff and that nutrient loading is somehow buffered beyond this distance.

The load was calculated by multiplying the land use area in each buffer zone by the modified export coefficient values. The phosphorus load from each buffer zone was added to obtain an overall loading from the landscape. Table 3-1 and 3-2 contain the modified phosphorus export coefficients and the corresponding annual phosphorus loads for the various land uses in the watershed.

Table 3-1. Modified Total Phosphorus Export Coefficients for the Rio Hondo

LAND USE	50 m Buffer (kg/ha/yr)	500 m Buffer (kg/ha/yr)	5000 m Buffer (kg/ha/yr)
Urban	0.55[1]	0.28	0.14
Forest	0.07[2]	0.04	0.02
Shrubland	0.20[3]	0.10	0.05
Grasslands	0.10[4]	0.05	0.03

1. Source: Haith and Shoemaker 1987
2. Source: Rast and Lee 1983
3. Source: McFarland and Hauck 2001
4. Source: Johnes 1996

Table 3-2. Calculated Annual Total Phosphorus Loads to the Rio Hondo from Various Land Uses

LAND USE	AREA mi^2 (hectares)			DISTANCE –WEIGHTED TP Load lbs/day (kg/yr)		
	50 m Buffer	**500 m Buffer**	**5 km Buffer**	**50 m Buffer**	**500 m Buffer**	**5 km Buffer**
Urban	0.05 (14)	0.16 (40)	---	0.05 (7.5)	0.07 (11)	---
Forest	0.40 (96)	3.4 (875)	13 (3441)	0.04 (6.7)	0.19 (31)	0.36 (60)
Shrubland	0.02 (5.7)	0.28 (74)	1.3 (338)	0.01 (1.1)	0.04 (7.4)	0.10 (17)
Grasslands	0.01 (2.4)	0.13 (32)	2.4 (624)	0.001 (0.2)	0.01 (1.6)	0.09 (16)
TOTAL	**21.4[1] (5540)[1]**			**0.96[1] (159)[1]**		

1. Values rounded to three significant figures.

Natural Background Sources

Soil erosion and the decay of plant material and wild animal waste contribute background phosphorus loads from undeveloped land to the Rio Hondo. Available water quality concentrations from local streams similar to the Rio Hondo are used to determine background concentrations. Reference sites are relatively undisturbed by human influences. The definition of a reference condition ranges from a pristine, undisturbed state of a stream, to merely the "best available" or "best attainable" conditions. In the case of the Northern New Mexico streams used in this study, least and minimally impacted sites have been identified and used to determine background water quality. A value of one-half the detection limit was used when reference site TP concentrations were below the detection limit (Gilbert, 1987).

The background load to the Rio Hondo is calculated by multiplying the representative flow volume (in MGD) determined in Appendix C using USGS flow gage data and the background concentration (in mg P/L). A unit-less conversion factor of 8.34 is used to convert units to pounds per day (Appendix E). The total phosphorus background load for the assessment unit is summarized in Table 3-3.

Table 3-3. Calculated Total Phosphorus Background Load to the Rio Hondo

Time Interval	Representative 4Q3 Flow Volume (mgd)	Background Concentration (mg P/L)	Unit-less Conversion Factor	Estimated Annual TP Load (lbs/day)
Annual	3.73	0.017	8.34	**0.53**

3.1.2 Groundwater Loads

Septic tank disposal systems are not considered to be significant total phosphorus sources in ground water. Phosphates readily sorb to soil particles; consequently, phosphates do not travel far with ground water. Existing data for total phosphorus concentrations in soil below leach fields demonstrate this phenomenon. Phosphate concentrations 1 ft below a leach field were 10 mg P/L, while at 3 ft below the leach field they were 1 mg P/L (Oakley, 1999). Infiltration of phosphate from land applications is not considered significant for the same reason. Therefore, ground water loads of total phosphorus are not considered significant in the Rio Hondo.

3.1.3 Atmospheric Deposition

Atmospheric phosphorus can be found in both organic and inorganic dust particles. Particles of organic origin, such as pollen, will contain phosphorus, as do all living organisms. Mineral dust will contain varying levels of phosphorus depending on its source. Atmospheric deposition is only applied to stream surface areas; applying it to land areas would result in a double count of exported nutrient loads. The general atmospheric deposition rate for total phosphorus is 0.6 kg

P/ha/yr (USEPA, 1994a). With a creek surface area of 1.6 hectares (average of 8 feet wide and approximately 4 miles long), this source would contribute almost 1 kg/year, or roughly 0.006 lbs/day.

3.1.4 Summary of Current Annual Phosphorus Nonpoint Load by Source

The current annual load based on the calculations from the identified sources described in this section is 247 kg P/yr (1.49 lbs/day) and is summarized below in Table 3-4 and Figure 3-1.

Table 3-4. Summary of *Annual* Total Phosphorus Nonpoint Source Load

Source Type	Estimated Annual TP Load (lbs/day)
Land Uses (surface runoff)	0.96
Background (surface runoff)	0.53
Septic Tank Disposal Systems (ground water)	0
Air Deposition (surface water)	0.006
Total	**1.496**

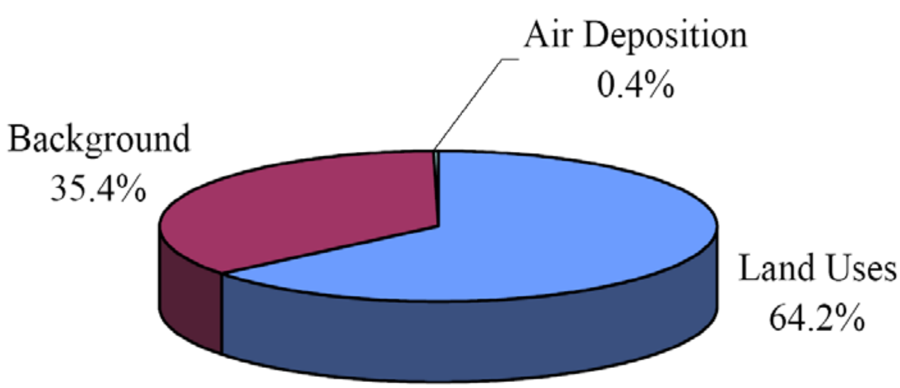


Figure 3-1. Annual Total Phosphorus Nonpoint Source Load by Source Type

3.2 Total Nitrogen

3.2.1 Surface Water Loads

Land use and natural sources were identified as potential sources of nitrogen to the Rio Hondo. This section provides discussion and estimates of the surface water loads from each of these sources.

Land Uses

It is assumed that the sources of total nitrogen in runoff from various land uses are the same as those identified for total phosphorus. To estimate total nitrogen loads from different land uses, nitrogen export coefficients can be used. Nitrogen generally reaches the Rio Hondo from land uses that are in close proximity to the stream because the hydrological pathways are shorter and have fewer obstacles than land uses located away from the riparian corridor. However, during spring snowmelt and in storm water runoff, those distant land uses can become hydrologically connected to the stream, transporting nutrients from the hillslopes to the stream during these time periods.

For this analysis, the Export Coefficient Model (Reckhow, et al., 1980) was modified to generate nitrogen loads from specific land uses by incorporating a distance-decay component in the export coefficient similar to the methods used by Johnes and Heathwaite (1997) and Endreny and Wood (2003). Nitrogen export weighting was based on distance from the stream with 50 m, 500 m, and 5000 m buffer zones. The largest unit-area load was assigned to the 50 m buffer zone and the smallest unit-area load was assigned to the 5000 m buffer zone. This approach assumes that the export coefficient values undergo a step-wise decay when originating from beyond the 50 m distance cutoff and that nutrient loading is somehow buffered beyond this distance.

The load was calculated by multiplying the land use area in each buffer zone by the modified export coefficient values. The nitrogen load from each buffer zone was added to obtain an overall loading from the landscape. Tables 3-5 and 3-6 contain modified nitrogen export coefficients and the corresponding annual nitrogen loads for the various land uses in the watershed.

Table 3-5. Modified Total Nitrogen Export Coefficients for the Rio Hondo

LAND USE	50 m Buffer (kg/ha/yr)	500 m Buffer (kg/ha/yr)	5000 m Buffer (kg/ha/yr)
Urban	2.5[1]	1.3	0.25
Forest	1.0[1]	0.50	0.10
Shrubland	0.60[2]	0.30	0.06
Grasslands	0.95[2]	0.48	0.10

1. Source: Rast and Lee 1983
2. Source: McFarland and Hauck 2001

Table 3-6. Calculated Annual Total Nitrogen Surface Water Loads to the Rio Hondo from Various Land Uses

LAND USE	AREA mi^2 (hectares)			DISTANCE –WEIGHTED TN Load lbs/day (kg/yr)		
	50 m Buffer	500 m Buffer	5 km Buffer	50 m Buffer	500 m Buffer	5 km Buffer
Urban	0.05 (14)	0.16 (40)	---	0.21 (34.0)	0.31 (50.1)	---
Forest	0.40 (96)	3.4 (875)	13 (3441)	0.58 (95.6)	2.64 (440)	2.08 (344)
Shrubland	0.02 (5.7)	0.28 (74)	1.3 (338)	0.02 (3.40)	0.13 (22.1)	0.12 (20.3)
Grasslands	0.01 (2.4)	0.13 (32)	2.4 (624)	0.01 (2.31)	0.09 (15.4)	0.36 (59.3)
TOTAL	**21.4[1] (5540)[1]**			**6.55[1] (1040)[1]**		

1. Values rounded to three significant figures.

Natural Background Sources

Soil erosion and the decay of plant material and wild animal waste contribute background nitrogen loads from undeveloped land to the Rio Hondo. Available water quality concentrations from local streams similar to the Rio Hondo are used to determine background concentrations. Reference sites are relatively undisturbed by human influences. The definition of a reference condition ranges from a pristine, undisturbed state of a stream, to merely the “best available” or “best attainable” conditions. In the case of the Northern New Mexico streams used in this study, least and minimally impacted sites have been identified and used to determine background water quality. A value of one-half the detection limit was used when reference site TN concentrations were below the detection limit (Gilbert, 1987).

As with phosphorus, the background load to the Rio Hondo is calculated by multiplying the representative flow volume (in MGD) determined in Appendix C using USGS flow gage data and the background concentration (in mg N/L). A unit-less conversion factor of 8.34 is used to convert units to pounds per day (Appendix E). The total nitrogen background load for the assessment unit is summarized in Table 3-7.

Table 3-7. Calculated Total Nitrogen Background Load to the Rio Hondo

Time Interval	Representative 4Q3 Flow Volume (mgd)	Background Concentration (mg N/L)	Unit-less Conversion Factor	Estimated Annual TN Load (lbs/day)
Annual	3.73	0.22	8.34	**6.84**

3.2.2 Ground Water Loads

Ground water that surfaces in the Rio Hondo also contributes to the nitrogen load. Septic tank disposal systems are considered to be a significant total nitrogen source in ground water. There are a total of 77 Liquid Waste Disposal Permits issued for on-site wastewater systems (i.e. septic tanks) in the Village of Taos Ski Valley (VTSV). Liquid Waste Disposal Permits are issued by NMED and are designed to accommodate septic systems that discharge less than 2,000 gallons of wastewater per day. An average yearly loading potential from septic tanks is 10.66 kg N per year (Marsh, 1998). The total annual nitrogen load to ground water from smaller on-site septic systems in the watershed therefore would be:

10.66 kg N/year * 77 units = 821 kg N/yr (4.96 lbs N/day).

There are also two NMED Ground Water Discharge Permits for on-site septic systems in the VTSV. One is issued to Austing Haus Bed and Breakfast and has a design capacity to discharge up to 4,000 gallons of wastewater per day. The other permit is issued to the Inn at TSV and has a design capacity to discharge up to 2,600 gallons of wastewater per day. The yearly loading potential from Marsh (1998) was weighted to accommodate the increase in wastewater using the following equations:

Austing Haus: 10.66 kg N/yr * (4,000 gal / 2,000 gal) = 21.3 kg N/yr (0.13 lbs N/day)
Inn at TSV: 10.66 kg N/yr * (2,600 gal / 2,000 gal) = 13.9 kg N/yr (0.08 lbs N/day)

Based on these calculations, the total annual nitrogen load to ground water from Austing Haus and the Inn at TSV is estimated to be 0.13 and 0.08 lbs N/day, respectively. The total annual nitrogen load to ground water from larger on-site septic systems in the watershed therefore would be 0.21 lbs N/day (35.2 kg N/year).

The total annual nitrogen load to ground water from on-site wastewater systems in the Village of TSV is the sum of the annual load from smaller septic systems and larger septic systems, or 5.17 lbs N/day (856 kg N/yr). Some of the nitrogen load will be removed through plant uptake, but site-specific uptake rates are not known and were not accounted for in the groundwater load estimate.

The current annual ground water load based on the calculations from the identified sources described in this section is summarized below in Table 3-8.

Table 3-8. Calculated Annual Total Nitrogen Load to the Rio Hondo from Ground Water Contributions

On-Site Septic Systems	Design Capacity (gal/day)	Nitrogen Export Coefficient (kg/system/yr)	Estimated Annual TN Load (kg N/yr)	Estimated Annual TN Load (lbs N/day)
L.W.D.P.[1]	<2000	11[3]	821	4.96
Austing Haus[2]	4000	21[4]	21.3	0.13
Inn @ TSV[2]	2600	14[4]	13.9	0.08
Total Nitrogen Load Attributable to Ground Water Sources				***5.17***

1. Liquid Waste Disposal Permits—a total of 77 are issued in the Village of TSV.
2. Groundwater Discharge Permits issued by NMED to Austing Haus and the Inn at TSV.
3. Source: Marsh 1998.
4. Source: Marsh 1998 (weighted for increased design capacities of 4000 and 2600 gallons/day).

3.2.3 Atmospheric Deposition

Atmospheric nitrogen can be found in both organic and inorganic dust particles. Particles of organic origin, such as pollen, will contain nitrogen, as do all living organisms. Mineral dust will contain varying levels of nitrogen depending on its source. Atmospheric deposition is only applied to stream surface areas; applying it to land areas would result in a double count of exported nutrient loads. The general atmospheric deposition rate for total nitrogen is 10 kg N per hectare per year (USEPA, 1994a). With a creek surface area of 1.6 hectares (average of 8 feet wide and approximately 4 miles long), this source would contribute almost 16 kg/year, or approximately 0.10 lbs/day.

3.2.4 Summary of Current Annual Nitrogen Nonpoint Source Load by Source

The current annual load based on the calculations from the identified sources described in this section is 3,046 kg N/yr (18.66 lbs/day) and is summarized below in Table 3-9 and Figure 3-2.

Table 3-9. Summary of *Annual* Total Nitrogen Nonpoint Source Load

Source Type	Estimated Annual TN Load (lbs/day)
Land Uses (surface runoff)	6.55
Background (surface runoff)	6.84
Septic Tank Disposal Systems (ground water)	5.17
Air Deposition (surface water)	0.097
Total	**18.66**

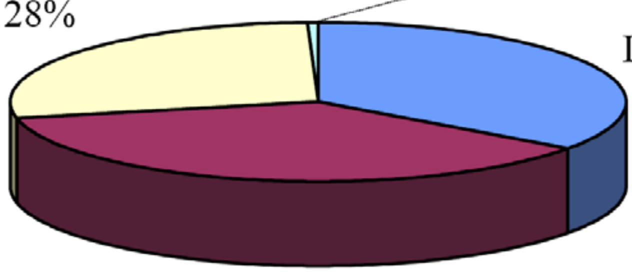


Figure 3-2. *Annual* Total Nitrogen Nonpoint Source Load by Source Type

4.0 TARGET LOADING CAPACITY

This section describes the relationship between the numeric target and the allowable pollutant-level by determining the waterbody's total assimilative capacity, or loading capacity, for the pollutant. The loading capacity is the maximum amount of pollutant loading that a waterbody can receive while meeting its water quality objectives. The Linkage Analysis therefore represents the critical quantitative link between the TMDL and attainment of the water quality standards.

As the Rio Hondo flows past the Village of Taos Ski Valley, it has a specific carrying capacity for nutrients. This carrying capacity, or TMDL, is defined as the mass of pollutant that can be carried under critical low-flow conditions without violating the numerical stream standard (i.e. concentration) for that constituent. This TMDL was developed based on simple dilution calculations using 4Q3 flow (Appendix C) and the narrative and numeric criteria defined by the State of New Mexico in the Standards for Interstate and Intrastate Surface Waters. The specific carrying capacity of a receiving water for a given pollutant, defined by numeric criterion, may be estimated as:

Combined flow (in MGD) x numeric target (in mg/L) x 8.34 = TMDL

The combined flow is calculated by adding the critical low-flow (4Q3) and the proposed additional effluent discharge from the VTSV's WWTP. A unit-less conversion factor of 8.34 is used to convert units to pounds per day (Appendix E). By applying Equation 1 to total phosphorus, it is determined that the Rio Hondo can transport approximately 3.19 lbs/day of total phosphorus during critical low-flow conditions and in-stream concentrations will not exceed 0.10 mg/L. Similarly, applying Equation 1 to total nitrogen results in an approximate annual carrying capacity of 31.9 lbs/day. The annual target loads are summarized in Table 4-1.

Table 4-1. Estimates of *Annual* Target Loading for the Assessment Unit: Rio Hondo (South Fork to Lake Fork Creek)

Parameter	Combined Flow (mgd)	Numeric Target (mg/L)	Conversion Factor	Estimate of Target Loading (lbs/day)
Total Phosphorus	3.83[1]	0.10	8.34	3.19
Total Nitrogen	3.83[1]	1.0	8.34	31.9

1. Critical low-flow (4Q3) for "combined flow" calculation determined using Thomas equation (Appendix C). Effluent flow was assumed to be the proposed *additional* discharge from the WWTP (0.10 million gallons/day).

5.0 WASTE LOAD ALLOCATIONS AND LOAD ALLOCATIONS

5.1 Total Phosphorus

The Target Capacity Loading Analysis (see Table 4-1) determined that the allowable total phosphorus mass load in the Rio Hondo is 3.19 lbs/day. In determining the load allocation for the total phosphorus TMDL, the allowable pollutant load of 3.19 lbs/day is divided between the MOS, background, point and nonpoint source discharges. As described in Section 6.0, an explicit MOS of 5% is reserved to account for uncertainties. In addition, because of New Mexico's antidegradation policy (see Section 5.1.3), another 15% of the TMDL will be set aside to protect and maintain existing water quality. Therefore, the MOS is 0.63 lbs/day.

5.1.1 Load Allocation

Analysis of existing water quality data has shown that natural sources of phosphorus (chemical weathering of geological materials and breakdown of natural biological materials) contribute a minimum of 0.08 lbs/day near the WWTP; maximum natural contributions may occasionally be as high as 1.45 lbs/day. Background loads of phosphorus occur naturally through soil erosion, the decay of plant material, and wild animal waste. The annual background load was estimated in Section 3.1.1 to be 0.53 lbs P/day and is based on reference stream concentrations and annual 4Q3 critical low-flow conditions.

Numerous anthropogenic nonpoint sources of phosphorus also exist in the upper Rio Hondo watershed. The most important are thought to be runoff from parking lots and recreational areas. Application of phosphorus export coefficients suggests that these diffuse sources contribute about 0.96 lbs/day of phosphorus annually to the Rio Hondo (Section 3.1.1). A phosphorus export coefficient was also applied to approximate the contribution from air deposition. Air deposition was estimated to supply 0.006 lbs/day of phosphorus to the system. Thus, that portion of the total phosphorus TMDL assigned to nonpoint and atmospheric sources is 0.966 lbs/day, or 30 percent of the total stream carrying capacity.

The sum of natural and nonpoint phosphorus sources is estimated to be 1.50 lbs/day; this load is equivalent to 47 percent of the TMDL and would cause in-stream total phosphorus levels to be approximately 0.05 mg/L.

5.1.2 Growth Allocation

All calculations in development of this TMDL used a plant design capacity of 0.200 MGD. Consequently, all flow calculations in this TMDL estimate treatment capacity in the future scenario, which accommodates projected growth through 2020 (see Section 8.0)**.** Future projections also indicate that nonpoint sources of phosphorus will more than likely increase as the Village of Taos Ski Valley continues to grow and develop. Therefore, in addition to the projected growth that was integrated into the TMDL calculations, two percent of the TMDL, or 0.06 lbs/day, will be set aside for a growth allocation (GA), as a placeholder for unknown or future sources of phosphorus.

5.1.3 Waste Load Allocation

After 54 percent of the annual total phosphorus TMDL is apportioned to the load allocation, growth allocation, and MOS, only 46 percent, or 1.47 lbs/day, remains for point sources. However, the current annual waste load allocation for total phosphorus is only 1.00 lbs/day. The state of New Mexico's antidegradation policy (NMAC 20.6.4.8, 2002) states:

> *…Existing instream 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… Where the quality of a surface water of the state is meeting some or all applicable water quality criteria* ***the existing quality shall be maintained and protected*** *unless the commission finds… 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.*

The SWQB and the VTSV would like to maintain the current load in the new NPDES permit even though this TMDL document calculated a higher TP waste load allocation than the current limit because of the antidegradation policy noted above (Straebel, 2005). The SWQB and the VTSV will not increase phosphorus loading into the Rio Hondo watershed since the state cannot "assure that water quality adequate to protect existing uses fully" will be met with increased phosphorus loading. Therefore, 1.00 lbs/day, or 31%, of the TMDL will be set aside for the waste load allocation (WLA) and the remaining 15%, or 0.47 lbs/day, will be set aside as part of the Margin of Safety.
The only existing point source on this assessment unit is the NPDES-permitted wastewater treatment plant owned and operated by the Village. There are no individually permitted Municipal Separate Storm Sewer System (MS4) storm water permits in this assessment unit. Excess nutrient levels may be a component of some (primarily construction) storm water discharges so these discharges should be addressed.

In contrast to discharges from other industrial storm water and individual process wastewater permitted facilities, storm water discharges from construction activities are transient because they occur mainly during the construction itself, and then only during storm events. Coverage under the NPDES construction general storm water permit (CGP) requires preparation of a Storm Water Pollution Prevention Plan (SWPPP) that includes identification and control of all pollutants associated with the construction activities to minimize impacts to water quality. In addition, the current CGP also includes state specific requirements to implement best management practices that are designed to prevent to the maximum extent practicable, an increase in sediment, or a parameter that addresses sediment (e.g., total suspended solids, turbidity, siltation, stream bottom deposits, etc.) and flow velocity during and after construction compared to pre-construction conditions. In this case, compliance with a SWPPP that meets the requirements of the CGP is generally assumed to be consistent with this TMDL.

Other industrial storm water facilities are generally covered under the current NPDES Multi Sector General Storm Water Permit (MSGP). This permit also requires preparation of an SWPPP that includes identification and control of all pollutants associated with the industrial activities to minimize impacts to water quality. In addition, the current MSGP also includes state specific requirements to further limit (or eliminate) pollutant loading to water quality impaired/water quality limited waters from facilities where there is a reasonable potential to contain pollutants for which the receiving water is impaired. In this case, compliance with a SWPPP that meets the requirements of the MSGP is generally assumed to be consistent with this TMDL.

Therefore, this TMDL does not include a specific WLA for storm water discharges for this assessment unit, nor does it exclude these discharges. However, because the Village of Taos Ski Valley owns and operates an NPDES-permitted wastewater treatment plant a WLA for the WWTP is included in this TMDL.

Table 5-1. Calculation of Annual TMDL for Total Phosphorus

Parameter	WLA (lbs/day)	LA (lbs/day)	GA (lbs/day)	Background (lbs/day)	MOS (20%) (lbs/day)	TMDL (lbs/day)
Total Phosphorus	1.00	0.97	0.06	0.53	0.63	**3.19**

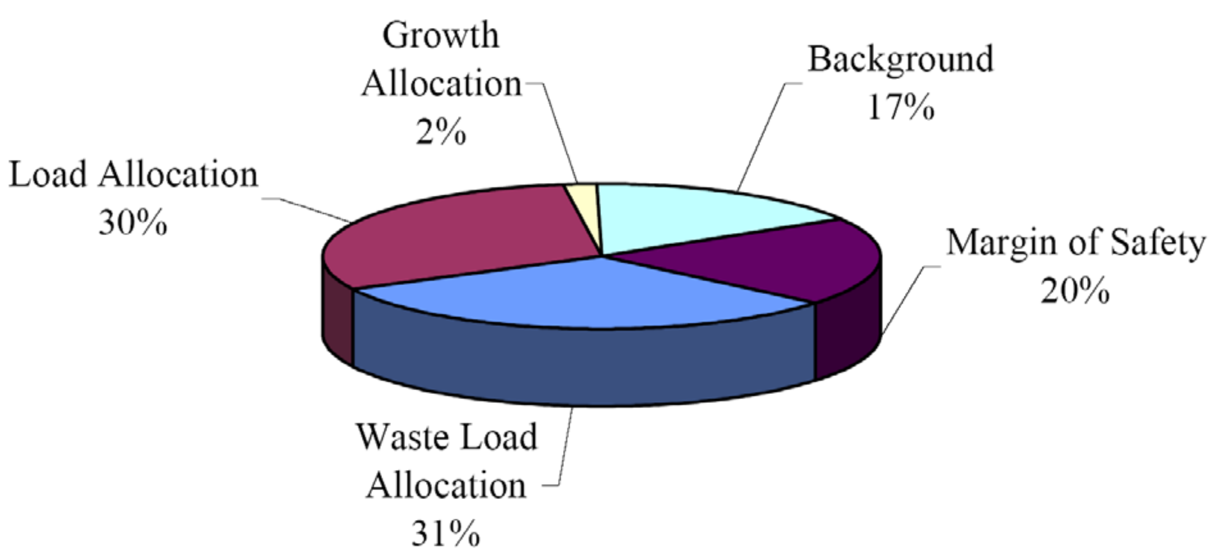


Figure 5-1. *Annual* TMDL for Total Phosphorus

5.2 Total Nitrogen

The Target Capacity Loading Analysis (see Table 4-1) determined that the allowable total nitrogen mass load in the Rio Hondo is 31.9 lbs/day. In determining the load allocation for the total nitrogen TMDL, the allowable pollutant load of 31.9 lbs/day is divided between the MOS, background, point and nonpoint source discharges. As described in Section 6.0, an explicit MOS of 5% is reserved to account for uncertainties. Therefore, the MOS is 1.60 lbs/day.

5.2.1 Load Allocation

Analysis of existing water quality data has shown that natural sources of nitrogen contribute a minimum of 2.94 lbs/day near the WWTP, whereas maximum natural contributions may occasionally be as high as 18.7 lbs/day. Background loads of nitrogen occur naturally through decaying plant material (such as leaf litter), soil erosion, and wild animal waste. The annual background load was estimated in Section 3.2.1 to be 6.84 lbs N/day and is based on reference stream concentrations and annual 4Q3 critical low-flow conditions.

Numerous anthropogenic nonpoint sources of nitrogen also exist in the upper Rio Hondo watershed. The most important are thought to be runoff from parking lots and recreational areas, and seepage from overloaded or malfunctioning on-site sewage disposal systems located near the stream. Application of nitrogen export coefficients suggests that these diffuse sources contribute about 11.7 lbs/day of nitrogen annually to the Rio Hondo (Section 3.2.1). A nitrogen export coefficient was also applied to approximate the contribution from air deposition. Air deposition was estimated to supply 0.097 lbs/day of nitrogen to the system. Thus, that portion of the total nitrogen TMDL assigned to nonpoint and atmospheric sources is 11.8 lbs/day, or 37 percent of the total stream carrying capacity.

The sum of natural and nonpoint nitrogen sources is estimated to be 18.7 lbs/day. This load is equivalent to 58 percent of the TMDL and would cause in-stream total nitrogen levels to be approximately 0.60 mg/L.

5.2.2 Growth Allocation

All calculations in development of this TMDL used a plant design capacity of 0.200 MGD. Consequently, all flow calculations in this TMDL estimate treatment capacity in the future scenario, which accommodates projected growth through 2020 (see Section 8.0)**.** Future projections also indicate that nonpoint sources of nitrogen will more than likely increase as the Village of Taos Ski Valley continues to grow and develop. Therefore, in addition to the projected growth that was integrated into the TMDL calculations, two percent of the TMDL, or 0.63 lbs/day, will be set aside for a growth allocation (GA), as a placeholder for unknown or future nitrogen sources.

5.2.3 Waste Load Allocation

After 65 percent of the annual total nitrogen TMDL is apportioned to the load allocation, growth allocation, and the MOS, 35 percent, or 11.0 lbs/day, remains for point sources. The only existing point source on this assessment unit is the NPDES-permitted wastewater treatment plant owned and operated by the VTSV. There are no individually permitted MS4 storm water permits in this assessment unit. Excess nutrient levels may be a component of some (primarily construction) storm water discharges so these discharges should be addressed.

In contrast to discharges from other industrial storm water and individual process wastewater permitted facilities, storm water discharges from construction activities are transient because they occur mainly during the construction itself, and then only during storm events. Coverage under the NPDES CGP requires preparation of a SWPPP that includes identification and control of all pollutants associated with the construction activities to minimize impacts to water quality. In addition, the current CGP also includes state specific requirements to implement best management practices that are designed to prevent to the maximum extent practicable, an increase in sediment, or a parameter that addresses sediment (e.g., total suspended solids, turbidity, siltation, stream bottom deposits, etc.) and flow velocity during and after construction compared to pre-construction conditions. In this case, compliance with a SWPPP that meets the requirements of the CGP is generally assumed to be consistent with this TMDL.

Other industrial storm water facilities are generally covered under the current NPDES MSGP. This permit also requires preparation of an SWPPP that includes identification and control of all pollutants associated with the industrial activities to minimize impacts to water quality. In addition, the current MSGP also includes state specific requirements to further limit (or eliminate) pollutant loading to water quality impaired/water quality limited waters from facilities where there is a reasonable potential to contain pollutants for which the receiving water is impaired. In this case, compliance with a SWPPP that meets the requirements of the MSGP is generally assumed to be consistent with this TMDL.

Therefore, this TMDL does not include a specific WLA for storm water discharges for this assessment unit, nor does it exclude these discharges. However, because the Village of Taos Ski Valley owns and operates an NPDES-permitted wastewater treatment plant a waste load allocation for the WWTP is included in this TMDL.

In addition, the Village has developed a phased plan for a community-wide sewer line extension project. The objective of this phased project is to convert all on-site septic systems in the community to the wastewater treatment facility (WWTF). The city council and public works department are incorporating this plan to help reduce nonpoint source pollution contributed by septic systems in Taos Ski Valley. If the Village succeeds in converting all septic systems to the WWTF, then the portion of the total nitrogen LA that is associated with septic systems (e.g. 5.17 lbs/day) can become a WLA. If the WWTF does not pull in the septic systems, it will not proceed on to Phases II-V and would be bound to the WLA at Phase I, with the LA still reflecting the original septic load. Table 5-2 summarizes the results for this phased approach and includes the LAs, GAs, WLAs and maximum allowable effluent concentrations (see Appendix F for spreadsheets). However, because Taos County and Taos Valley Ski Basin have been growing rapidly over the last few decades, it is imperative that best management practices (BMPs) continue to be utilized and improved upon in this watershed.

Table 5-2. Calculation of *Phased* Annual TMDL for Total Nitrogen based on percent capture of septic systems in Taos Ski Valley

% Conversion	WLA (lbs/day)	LA (lbs/day)	GA (lbs/day)	Background (lbs/day)	MOS (5%) (lbs/day)	TMDL (lbs/day)	*Allowable 30-day Av. Conc.[1] (mg/L)*
Phase I – 0% capture	11.0	11.8	0.63	6.84	1.60	31.9	*6.5*
Phase II – 25% capture	12.3	10.5	0.63	6.84	1.60	31.9	*7.0*
Phase III – 50% capture	13.6	9.24	0.63	6.84	1.60	31.9	*8.0*
Phase IV – 75% capture	14.9	7.94	0.63	6.84	1.60	31.9	*9.0*
Phase V – 100% capture	16.2	6.65	0.63	6.84	1.60	31.9	*10.0*

1. Maximum allowable effluent concentration to be protective of the river within this assessment unit given the annual waste load allocation and proposed design capacity for the WWTP. Value rounded to the nearest tenth.

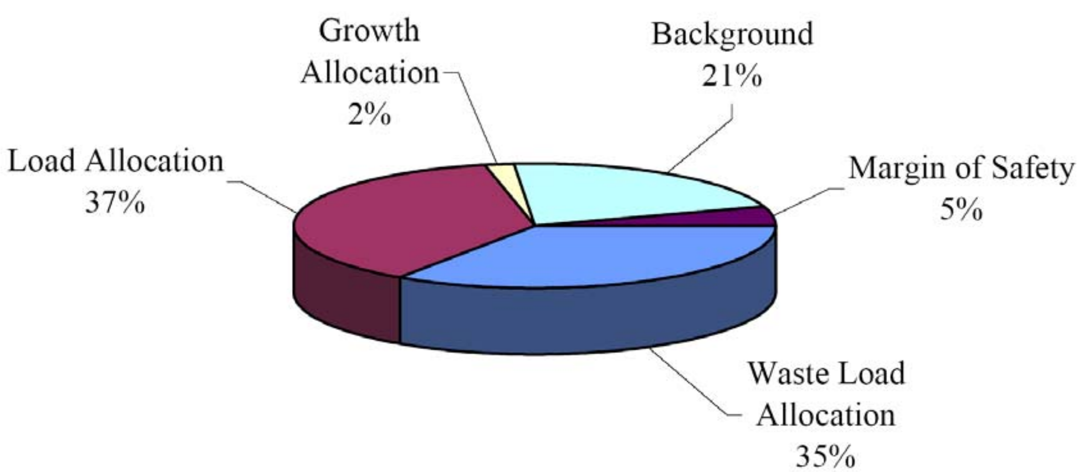


Figure 5-2. *Annual* TMDL for Total Nitrogen

6.0 MARGIN OF SAFETY

A TMDL is less than or equivalent to the loading capacity after taking into account the allocations for all sources and a margin of safety (MOS). A TMDL can be divided into a wasteload allocation (WLA) for point sources subject to an NPDES permit, and a load allocation (LA) for all other sources including nonpoint and natural background. The TMDL is represented by the following equation:

$$TMDL = \Sigma\ WLA + \Sigma\ LA + MOS.$$

TMDLs are required to include an MOS that accounts for variability in the data, uncertainty in the point and nonpoint source load estimates, and limitations in the accuracy of the modeling analysis. The MOS can be expressed either implicitly or explicitly. An implicit MOS is incorporated by making conservative assumptions in the TMDL analysis, such as allocating a conservative load to background sources. An explicit MOS is applied by reserving a portion of the TMDL and not allocating it to any other sources.

For these nutrient TMDLs, the margin of safety was developed using a combination of conservative assumptions and explicit recognition of potential errors in flow calculations. Therefore, this margin of safety is the sum of the following two elements:

- *Conservative Assumptions*

  Treating phosphorus and nitrogen as conservative pollutants, that is a pollutant that does not readily degrade in the environment, was used as a conservative assumption in developing these loading limits.

  Using the 4-day, 3-year (4Q3) critical low flow to calculate the allowable load.

  Using the proposed treatment plant design capacity (200,000 gallons per day) for calculating the point source loading when, under most conditions, the treatment plant will not be operating at this projected capacity.

  A more conservative limit of the geometric mean value, rather than the current and proposed standards which allow for higher concentrations in individual grab samples, was used to calculate loading values.

- *Errors in calculating flow*

  4Q3 low flow values were determined based on USGS gaging data. There is inherent error in all flow measurements. A conservative, explicit MOS for this element is 5 percent.

7.0 CONSIDERATION OF SEASONAL VARIATION

Section 303(d)(1) of the CWA requires TMDLs to be "established at a level necessary to implement the applicable WQS with seasonal variation." Sampling for this stream was conducted during three seasons representative of different expected hydrological conditions. Calculations made at the critical low-flow (4Q3), in addition to using other conservative assumptions as described in the previous section on MOS, are protective of the water quality standards designed to preserve aquatic life in the stream.

Critical low-flow criterion on a seasonal basis can also reduce operational costs for the VTSV while still protecting stream standards. The ability of the Rio Hondo to dilute wastewater is least during the winter months (November through April) because precipitation is in the form of snowfall, thus reducing streamflow. Winter is also the period during which the Village's wastewater discharges are greatest because of the influx of skiers into the valley. Seasonally high receiving water flows associated with snowmelt (May through June) and monsoon storms (July through August) can accommodate a higher effluent discharge concentration without exceeding water quality standards because the ratio of effluent discharge to streamflow is minimal during spring and summer. Similarly, during the fall (September and October) the Village typically releases less wastewater into the Rio Hondo because of fewer tourists, which results in a smaller effluent discharge to streamflow ratio and a higher allowable effluent concentration. Application of a seasonal limit is appropriate because of the large variability in critical low-flows and effluent discharge during different seasons.

As noted above, stream standards could be attainable with less stringent wastewater treatment during high flow months or during the non-tourist season(s). Applying seasonal 4Q3s (Appendix C) and an explicit MOS of 5% to account for uncertainties in flow calculations will determine the maximum allowable loads and effluent concentrations that could be utilized for NPDES permit limitations. This will create a more flexible approach to wastewater treatment, which will ultimately reduce operational costs on a yearly basis.

The WLA was calculated by subtracting the load allocation, growth allocation, and MOS from the target capacity, or TMDL (see Appendix F). Results for total phosphorus and total nitrogen NPDES permit limitations are presented in Table 7-1 (For effluent concentration estimates of ammonia-N refer to Appendix G).

Table 7-1. Seasonal Waste Load Allocations for the Village of Taos Ski Valley (NPDES Permit No. NM0022101), Taos County, New Mexico

Parameter	Time Interval	Streamflow 4Q3[1] (mgd)	Proposed Effluent Volume[2] (mgd)	Seasonal WLA[3] (lbs/day)	Calculated Effluent Conc.[4] (mg/L)	Allowable 30-day Av. Conc.[5] (mg/L)	Allowable 7-day Av. Conc.[6] (mg/L)
Total Phosphorus	January	3.693	0.200	1.46	0.87	0.8	1.0
	February	3.693	0.200	1.46	0.87	0.8	1.0
	March	3.693	0.200	1.46	0.87	0.8	1.0
	April	3.693	0.200	1.46	0.87	0.8	1.0
	May	14.97	0.200	5.80	3.48	3.0	4.5
	June	14.97	0.200	5.80	3.48	3.0	4.5
	July	8.559	0.100	3.32	3.98	4.0	6.0
	August	8.559	0.100	3.32	3.98	4.0	6.0
	September	6.321	0.040	2.44	7.32	7.0	10
	October	6.321	0.040	2.44	7.32	7.0	10
	November	3.693	0.200	1.46	0.87	0.8	1.0
	December	3.693	0.200	1.46	0.87	0.8	1.0
Total Nitrogen	January	3.693	0.200	11.1	6.64	6.5	9.5
	February	3.693	0.200	11.1	6.64	6.5	9.5
	March	3.693	0.200	11.1	6.64	6.5	9.5
	April	3.693	0.200	11.1	6.64	6.5	9.5
	May	14.97	0.200	44.0	26.4	26	39
	June	14.97	0.200	44.0	26.4	26	39
	July	8.559	0.100	25.1	30.1	30	45
	August	8.559	0.100	25.1	30.1	30	45
	September	6.321	0.040	18.5	55.5	55	82
	October	6.321	0.040	18.5	55.5	55	82
	November	3.693	0.200	11.1	6.64	6.5	9.5
	December	3.693	0.200	11.1	6.64	6.5	9.5

1 The critical low flow condition in the Rio Hondo is the average low-flow that persists for four consecutive days once every three years, on average (4Q3). (Appendix C)

2 Effluent volume is the proposed design capacity and/or seasonal effluent volume of Twining WWTP (in mgd).

3 Seasonal waste load allocations (in lbs/day) allotted to Twining Water and Sanitation District. (Appendix F)

4 Maximum allowable effluent concentrations to be protective of the river within this assessment unit. (Appendix F)

5 The allowable 30-day average was determined by rounding the calculated effluent concentration.

6 The allowable 7-day average is defined as 1.5 times the allowable 30-day average.

8.0 FUTURE GROWTH

Growth in the Village of Taos Ski Valley has historically been slow and sporadic. Ultimately, growth is limited by the topography of the narrow valley and its steep mountain slopes. Both near term and long term increases in flow to the WWTP were considered from projected growth. The near-term plan includes the connection of hotels, commercial properties, and additional residential units in the Amizette area, downstream from the WWTP, as well as unsewered properties in the Village proper, plus some new commercial development. Longer term growth projections include expansion of existing commercial properties, new commercial development, and new residential development on existing vacant lots. Near and long-term development is expected to add an additional 0.047 and 0.068 MGD to the wastewater treatment plant, respectively. As a result, peak daily wastewater flows are projected to increase from the existing peak of 0.095 MGD to 0.200 MGD by the year 2020. Peak flows currently only occur during the winter ski season. Flows in the off-season average 0.060 MGD. **For all calculations in development of this TMDL, a plant design capacity of 0.200 MGD was used. Consequently, all flow calculations in this TMDL estimate treatment capacity in the future scenario, which accommodates projected growth through 2020.**

The Village of Taos Ski Valley has developed a phased plan for a community-wide sewer line extension project. The objective of this phased project is to convert all on-site septic systems in the community to the WWTF. The city council and public works department are incorporating this plan to help reduce nonpoint source pollution contributed by septic systems in Taos Ski Valley. If the Village succeeds in converting all septic systems to the wastewater treatment facility, then the portion of the total nitrogen load allocation that is associated with septic systems (e.g. 5.17 lbs/day) can become a WLA. Results for this future scenario, which include the WLA and maximum allowable effluent concentrations, are presented in Table 8-1 (see Appendix F for spreadsheets).

In addition, growth estimates by county are available from the New Mexico Bureau of Business and Economic Research. These estimates project growth to the year 2030. Growth estimates for Taos County project a 40% growth rate through 2030. **Since future projections indicate that nonpoint sources of nutrients will more than likely increase as Taos Ski Valley continues to grow and develop, two percent of the TMDL was set aside as a placeholder for unknown or future nutrient sources not already accounted for in the TMDL calculations.** However, because Taos County and Taos Valley Ski Basin have been growing rapidly over the last few decades, it is imperative that BMPs continue to be utilized and improved upon in this watershed.

Table 8-1. Seasonal Total Nitrogen Waste Load Allocations for the VTSV if 100% of the septic systems in Taos Ski Valley are converted to the WWTF (Phase V)

Parameter	Time Interval	Streamflow 4Q3[1] (mgd)	Proposed Effluent Volume[2] (mgd)	Seasonal WLA[3] (lbs/day)	Calculated Effluent Conc.[4] (mg/L)	Allowable 30-day Av. Conc.[5] (mg/L)	Allowable 7-day Av. Conc.[6] (mg/L)
Total Nitrogen	January	3.693	0.200	16.2	9.7	10	15
	February	3.693	0.200	16.2	9.7	10	15
	March	3.693	0.200	16.2	9.7	10	15
	April	3.693	0.200	16.2	9.7	10	15
	May	14.97	0.200	49.1	29.5	29	45
	June	14.97	0.200	49.1	29.5	29	45
	July	8.559	0.100	30.3	36.3	36	55
	August	8.559	0.100	30.3	36.3	36	55
	September	6.321	0.040	23.7	71.0	71	110
	October	6.321	0.040	23.7	71.0	71	110
	November	3.693	0.200	16.2	9.7	10	15
	December	3.693	0.200	16.2	9.7	10	15

1 The critical low flow condition in the Rio Hondo is the average low-flow that persists for four consecutive days once every three years, on average (4Q3). (Appendix C)

2 Effluent volume is the proposed design capacity and/or seasonal effluent volume of Twining WWTP (in mgd).

3 Seasonal waste load allocations (in lbs/day) allotted to Twining Water and Sanitation District. (Appendix F)

4 Maximum allowable effluent concentrations to be protective of the river within this assessment unit. (Appendix F)

5 The allowable 30-day average was determined by rounding the calculated effluent concentration.

6 The allowable 7-day average is defined as 1.5 times the allowable 30-day average.

9.0 MONITORING PLAN

Pursuant to Section 106(e)(1) of the Federal CWA, 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 NM. In accordance with the NM 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 approximately every seven years. The next scheduled monitoring date for the Upper Rio Grande watershed is 2008. The SWQB maintains current quality assurance and quality control plans to cover all monitoring activities. This document, called the QAPP, is updated and certified annually by USEPA Region 6 (NMED/SWQB, 2000). In addition, the SWQB identifies the data quality objectives required to provide information of sufficient quality to meet the established goals of the program. Current priorities for monitoring in the SWQB are driven by the CWA Section 303(d) list of streams requiring TMDLs. Short-term efforts will be directed toward those waters that are on the USEPA TMDL consent decree list (U.S. District Court for the District of New Mexico, 1997).

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 assessment units (including biological assessments), and compliance monitoring of industrial, federal, and municipal dischargers, as specified in the SWQB Assessment Protocols (NMED/SWQB, 2004).

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 approximately every seven years. This information will provide time relevant information for use in CWA Section 303(d) listing and 305(b) report assessments and to support the need for developing TMDLs. The approach provides:

- a systematic, detailed review of water quality data which allows 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; and
- program efficiency and improvements in the basis for management decisions.

SWQB recently developed a 10-year monitoring strategy submitted to USEPA on September 30, 2004. Once the 10-year monitoring plan is approved by the USEPA, it will be available at the SWQB website: http://www.nmenv.state.nm.us/swqb/swqb.html. The strategy will detail both the extent of monitoring that can be accomplished with existing resources plus expanded monitoring strategies that could be implemented given additional resources. According to the draft proposed 8-year rotational cycle, which assumes the existing level of resources, the next time SWQB will intensive sample the Upper Rio Grande watershed is the year 2008.

It should be noted that a watershed would not be ignored during the years in between intensive sampling. The rotating basin program will be supplemented with other data collection efforts such as the funding of long-term USGS water quality gaging stations for long-term trend data. Data will be analyzed and field studies will be conducted to further characterize acknowledged problems and TMDLs will be developed and implemented accordingly. Both long-term and intensive field studies can contribute to the State's Integrated §303(d)/§305(b) listing process for waters requiring TMDLs.

10.0 IMPLEMENTATION OF TMDLS

10.1 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 long-range 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. The WRAS is essentially the Implementation Plan, or Phase Two of the TMDL process.

NMED staff will help with any technical assistance such as planning for and utilizing new wastewater treatment technologies that will be necessary to meet the revised NPDES permit limitations defined in Tables 7-1 and 8-1. NMED staff will also assist in the 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 WRAS.

Implementation of BMPs within the watershed to reduce pollutant loading from NPSs will be encouraged. Reductions from point sources will be addressed in revisions to discharge permits.

10.2 Timeline

The following table details the proposed implementation timeline (Table 10-1).

10.3 Clean Water Act §319(h) Funding Opportunities

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 two times a year through a Request for Proposal (RFP) process and require a non-federal match of 40% of the total project cost consisting of funds and/or in-kind services. Funding is available for both watershed group formation (which includes WRAS development) and on-the-ground projects to improve surface water quality and associated habitat. Further information on funding from the CWA §319 (h) can be found at the NM Environment Department website: http://www.nmenv.state.nm.us.

Another financial resource that can be used to fund projects or activities that will implement a TMDL is the Clean Water State Revolving Fund (CWSRF), which is funded by the USEPA and administered by the state. The CWSRF is designed to make low interest rate loans for water quality improvement projects. Many of the projects or activities identified to meet a TMDL will be eligible to receive CWSRF funds including: renovating and upgrading municipal wastewater treatment systems; repair and replacement of septic systems; animal waste control systems; erosion and sediment control systems; and land acquisition to protect water resources. Many different parties are eligible to receive CWSRF loans. Recipients have included municipalities, utilities, community groups, private individuals, companies, conservation districts, and nonprofit organizations. Further information on funding from the CWSRF can be found at the USEPA website: http://www.epa.gov/owmitnet/cwfinance/cwsrf/index.htm.

Table 10-1. Proposed Implementation Timeline

Implementation Actions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Public Outreach and Involvement	X	X	X	X	X
Form watershed groups	X	X			
Revise NPDES permit	X				
Secure funding for WWTP improvements	X	X			
Complete improvements on WWTP		X	X		
Convert septic systems to WWTP	X	X	X	X	X
WRAS Development		X	X	X	
Establish Performance Targets		X			
Secure Funding for WRAS		X	X		
Implement Management Measures (BMPs)		X	X	X	
Monitor BMPs		X	X	X	
Determine BMP Effectiveness				X	X
Re-evaluate Performance Targets				X	X

11.0 ASSURANCES

New Mexico's Water Quality Act (Act) does authorize the Water Quality Control Commission (WQCC) 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 NPS 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 NMAC 20.6.4.10.C) (NMAC, 2002) 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 319 Program has been developed in a coordinated manner with the State's 303(d) process. All 319 watersheds that are targeted in the annual RFP process coincide with the State's biennial impaired waters list as approved by USEPA. The State has given a high priority for funding, assessment, and restoration activities to these watersheds.

As a constituent agency, NMED has the authority under Chapter 74, Article 6-10 NMSA 1978 to issue a compliance order or commence civil action in district court for appropriate relief if NMED determines that actions of a "person" (as defined in the Act) have resulted in a violation of a water quality standard including a violation caused by a NPS. The NMED NPS water quality management program has historically strived for and will continue to promote voluntary compliance to NPS water pollution concerns by utilizing a voluntary, cooperative 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.

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 NPS issues.

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 WRAS. The cooperation of watershed stakeholders will be pivotal in the implementation of these TMDLs as well.

12.0 PUBLIC PARTICIPATION

Public participation was solicited in development of this TMDL (see Appendix H). The draft TMDL was made available for a 45-day comment period on February 25, 2005. Response to comments will be attached as Appendix I 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.

Watershed stakeholders will have opportunities to provide input and to participate in the development of the implementation plan, which will also be supported by regional and local offices of NMED, SWQB, and other cooperating agencies.

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APPENDIX A
DATA COLLECTED DURING 2004 RIO HONDO ASSESSMENT

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Rio Hondo nr Taos TMDL (2004)

NUTRIENT DATA

Wednesday, November 24, 2004

Rio Hondo (South Fork Rio Hondo to Lake Fork Creek)

RIO HONDO 2.4 MILES BLW STP

2/11/2004 12:40:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.63	0.22	0.85	0.03	28.33	8.21	149	0.54	11.6	115.6	0
Less than:	No	No		Yes							
Qualifier codes:											

2/26/2004 12:30:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.87	0.1	0.97	0.03	32.33	8.17	193	1.78	10.08	100.7	0.8
Less than:	No	Yes		Yes							
Qualifier codes:											

3/10/2004 1:00:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.58	0.242	0.822	0.03	27.4	8.33	189	3.07	10.39	101.8	0
Less than:	No	No		Yes							
Qualifier codes:											

DO charge = 32.9

3/24/2004 4:00:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.48	0.156	0.636	0.03	21.2						
Less than:	No	No		Yes							
Qualifier codes:											

No field paramters measured as sondes were deployed for unattended sampling at other sites

4/6/2004 12:15:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.38	0.131	0.511	0.03	17.03	8.12	170	3.69	9.85	103.6	0.6
Less than:	No	No		Yes							
Qualifier codes:											

DO charge = 31.8

4/21/2004 1:20:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.29	0.117	0.407	0.03	13.56	8.41	155	5.58	9.03	99.2	3.6
Less than:	No	No		Yes							
Qualifier codes:											

DO charge = 40.0

5/19/2004 11:30:00 AM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.35	0.182	0.532	0.03	17.73	8.38	135	6.41	9.02	101	11.7
Less than:	No	No		Yes							
Qualifier codes:											

DO charge = 38.0

6/15/2004 11:20:00 AM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.36	0.1	0.46	0.03	15.33	7.71	144	8.03	8.71	98.2	0
Less than:	No	Yes		Yes							
Qualifier codes:											

DO ch = 49.2

7/21/2004 10:35:00 AM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.37	0.233	0.603	0.03	20.1	7.77	162	10.07	8.46	103.9	1.3
Less than:	No	No		Yes							
Qualifier codes:											

DO charge = 43.1

8/24/2004 12:30:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.28	0.1	0.38	0.03	12.66	7.9	166	7.81	9.91	117.7	
Less than:	No	Yes		Yes							
Qualifier codes:											

DO charge = 40.0

RIO HONDO 300 YDS BLW STP

2/11/2004 11:55:00 AM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.64	0.144	0.784	0.03	26.13	8.35	146.9	0.77	11.58	116.5	0
Less than:	No	No		Yes							
Qualifier codes:											

2/26/2004 1:40:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	1	0.157	1.157	0.03	38.56	8.15	189	2.42	10.47	103.2	1.5
Less than:	No	No		Yes							
Qualifier codes:											

3/10/2004 2:15:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.63	0.685	1.315	0.0493	26.67	8.38	196	3.8	9.67	106.5	46.3
Less than:	No	No		No							
Qualifier codes:											

DO charge = 33.9
2360023 = acidified
2360024 = unacidified

3/24/2004 3:30:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.68	0.188	0.868	0.03	28.93	8.14	185	5.67	9.77	109.4	10.3
Less than:	No	No		Yes							
Qualifier codes:											

DO charge = 35.9

4/6/2004 1:15:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.53	0.102	0.632	0.03	21.06	8.14	185	4.18	9.65	107.3	2.7
Less than:	No	No		Yes							
Qualifier codes:											

DO charge = 32.9

4/21/2004 2:40:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.34	0.1	0.44	0.03	14.66	8.34	171	5.13	9.44	107.6	5.8
Less than:	No	Yes		Yes							
Qualifier codes:											

DO charge = 40.0

6/15/2004 12:40:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.39	0.1	0.49	0.03	16.33	7.71	136	6.9	8.85	104	0
Less than:	No	Yes		Yes							
Qualifier codes:											

DO ch = 48.2

7/21/2004 12:00:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.54	0.1	0.64	0.03	21.33	8.03	159	8.51	8.56	104.4	2.9
Less than:	No	Yes		Yes							
Qualifier codes:											

DO charge = 42.0

8/24/2004 12:00:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.33	0.1	0.43	0.03	14.33	7.85	161	6.75	10.06	115.6	
Less than:	No	Yes		Yes							
Qualifier codes:											

DO charge = 38.0

RIO HONDO 50 FEET ABOVE WWTP

2/11/2004 10:45:00 AM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.38	0.294	0.674	0.03	22.46	8.22	134.1	0.49	11.32	111.4	0
Less than:	No	No		Yes							
Qualifier codes:											

2/26/2004 1:15:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.37	0.1	0.47	0.03	15.66	8.12	166	2.13	9.94	99.9	3
Less than:	No	Yes		Yes							
Qualifier codes:											

3/10/2004 1:40:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.34	0.172	0.512	0.0858	5.967	8.37	174	3.7	9.65	105.3	41.7
Less than:	No	No		No							
Qualifier codes:											

DO charge = 32.9
2360015 = acidified
2360016 = unacidified

3/24/2004 2:55:00 PM	bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
	0.33	0.1	0.43	0.03	14.33	8.09	170	5.56	9.39	104.6	5.9
Less than:	No	Yes		Yes							
Qualifier codes:											

DO charge = 35.9

Date		bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
4/6/2004 12:45:00 PM		0.32	0.113	0.433	0.03	14.43	8.24	172	3.84	9.72	107.1	3
	Less than:	No	No		Yes							
	Qualifier codes:											
= 31.8 DO charge												
4/21/2004 2:10:00 PM		0.33	0.115	0.445	0.03	14.83	8.49	165	4.9	9.24	104.7	7.2
	Less than:	No	No		Yes							
	Qualifier codes:											
DO charge = 40.0												
6/15/2004 12:20:00 PM		0.37	0.1	0.47	0.03	15.66	7.65	135	6.78	8.93	104.2	0
	Less than:	No	Yes		Yes							
	Qualifier codes:											
DO ch = 50.2												
7/21/2004 11:35:00 AM		0.1	0.1	0.2	0.03	6.666	7.98	152	8.26	7.88	99.5	3.2
	Less than:	Yes	Yes		Yes							
	Qualifier codes:											
DO charge = 43.1												
8/24/2004 11:45:00 AM		0.31	0.1	0.41	0.03	13.66	7.81	157	6.47	9.85	112.8	
	Less than:	No	Yes		Yes							
	Qualifier codes:											
DO charge = 39.0												

TWINING WWTP EFFLUENT @ TAOS SKI VALLEY

Date		bioavailable	Other N:	total N:	total P:	N/P:	pH:	EC:	Temp:	DO	DO	Turb:
2/11/2004 11:30:00 AM		28	1.14	29.14	0.0572	509.4	7.93	788	10.79	6.32	83.7	0
	Less than:	No	No		No							
	Qualifier codes:											
sample and measurments taken from effluent inside the plant as the outside pipe was iced over												
2/26/2004 2:00:00 PM		22	4.76	26.76	0.11	243.2	7.61	835	11.23	5.11	65.4	0
	Less than:	No	No		No							
	Qualifier codes:											
3/10/2004 2:00:00 PM		13	27	40	0.252	158.7	7.54	928	11.47	3.16	41.4	0
	Less than:	No	No		No							
	Qualifier codes:											
DO charge = 32.9												
3/24/2004 2:40:00 PM		20	7.12	27.12	0.126	215.2	7.41	823	14.45	2.45	30.3	0.01
	Less than:	No	No		No							
	Qualifier codes:											
DO ch = 31.8												
4/6/2004 1:00:00 PM		17	1.1	18.1	0.0592	305.7	7.69	812	10.7	3.73	48.7	0
	Less than:	No	No		No							
	Qualifier codes:											
DO charge = 29.8												
4/21/2004 3:05:00 PM		19	1.34	20.34	0.0576	353.1	7.78	635	8.94	5.71	71.7	2.5
	Less than:	No	No		No							
	Qualifier codes:											
DO charge = 40.0												
8/24/2004 12:10:00 PM		27	0.343	27.343	0.958	28.54						
	Less than:	No	No		No							
	Qualifier codes:											
No sonde readings taken.												

"Bioavailable" nitrogen is nitrate/nitrite. "Other" nitrogen is TKN. "Total" nitrogen is the sum. "N/P" is total nitrogen divided by total

Data Qualifier Codes:

Bench chemistry analyses:

A - Insufficient sample to analyze or verify results.
B - Sample holding time exceeded at laboratory.
C - Sample submitted past holding time.
D - Inconsistent results, data unusable, suggest
E - Matrix interference suspected.
F - Ion balance criteria exceeded.
G - Result equals 50% or more of EPA MCL.
H - Result equals or exceeds EPA MCL for this analyte.
I - Spike recovery <80% or >120%.
J - Estimated quantity only.
K - Sample rejected.
L - Sample voided at laboratory.
M - Daily control value <80% or >120% of theoretical value.
N - External control value <80% or >120% of theoretical

Rio Hondo near Taos TMDL (2004)

SLD Ammonia Nitrogen data

Rio Hondo (South Fork Rio Hondo to Lake Fork Creek)

SITE DESCRIPTION	***Date/Time***	**Analyte**	**Results**
RIO HONDO 2.4 MILES BLW STP	2/11/2004 12:40	Ammonia	0.1 mg/L
RIO HONDO 2.4 MILES BLW STP	2/26/2004 12:30	Ammonia	0.1 mg/L
RIO HONDO 2.4 MILES BLW STP	3/10/2004 13:00	Ammonia	0.129 mg/L
RIO HONDO 2.4 MILES BLW STP	3/24/2004 16:00	Ammonia	0.1 mg/L
RIO HONDO 2.4 MILES BLW STP	4/6/2004 12:15	Ammonia	0.1 mg/L
RIO HONDO 2.4 MILES BLW STP	4/21/2004 13:20	Ammonia	0.1 mg/L
RIO HONDO 2.4 MILES BLW STP	5/19/2004 11:30	Ammonia	0.1 mg/L
RIO HONDO 2.4 MILES BLW STP	6/15/2004 11:20	Ammonia	0.1 mg/L
RIO HONDO 2.4 MILES BLW STP	7/21/2004 10:35	Ammonia	0.1 mg/L
RIO HONDO 2.4 MILES BLW STP	8/24/2004 12:30	Ammonia	0.1 mg/L
RIO HONDO 300 YDS BLW STP	2/11/2004 11:55	Ammonia	0.1 mg/L
RIO HONDO 300 YDS BLW STP	2/26/2004 13:40	Ammonia	0.1 mg/L
RIO HONDO 300 YDS BLW STP	3/10/2004 14:15	Ammonia	0.449 mg/L
RIO HONDO 300 YDS BLW STP	3/24/2004 15:30	Ammonia	0.1 mg/L
RIO HONDO 300 YDS BLW STP	4/6/2004 13:15	Ammonia	0.1 mg/L
RIO HONDO 300 YDS BLW STP	4/21/2004 14:40	Ammonia	0.1 mg/L
RIO HONDO 300 YDS BLW STP	5/19/2004 13:10	Ammonia	0.1 mg/L
RIO HONDO 300 YDS BLW STP	6/15/2004 12:40	Ammonia	0.1 mg/L
RIO HONDO 300 YDS BLW STP	7/21/2004 12:00	Ammonia	0.1 mg/L
RIO HONDO 300 YDS BLW STP	8/24/2004 12:00	Ammonia	0.1 mg/L
Rio Hondo 50 feet above WWTP	2/11/2004 10:45	Ammonia	0.1 mg/L
Rio Hondo 50 feet above WWTP	2/26/2004 13:15	Ammonia	0.1 mg/L
Rio Hondo 50 feet above WWTP	3/10/2004 13:40	Ammonia	0.1 mg/L
Rio Hondo 50 feet above WWTP	3/24/2004 14:55	Ammonia	0.1 mg/L
Rio Hondo 50 feet above WWTP	4/6/2004 12:45	Ammonia	0.1 mg/L
Rio Hondo 50 feet above WWTP	4/21/2004 14:10	Ammonia	0.1 mg/L
Rio Hondo 50 feet above WWTP	5/19/2004 13:20	Ammonia	0.1 mg/L
Rio Hondo 50 feet above WWTP	6/15/2004 12:20	Ammonia	0.1 mg/L
Rio Hondo 50 feet above WWTP	7/21/2004 11:35	Ammonia	0.1 mg/L
Rio Hondo 50 feet above WWTP	8/24/2004 11:45	Ammonia	0.1 mg/L
RHondo abv Lake Fork at Parking Lot	2/11/2004 10:20	Ammonia	0.1 mg/L
RHondo abv Lake Fork at Parking Lot	2/26/2004 13:00	Ammonia	0.1 mg/L
RHondo abv Lake Fork at Parking Lot	3/10/2004 13:25	Ammonia	0.1 mg/L
RHondo abv Lake Fork at Parking Lot	3/24/2004 14:00	Ammonia	0.1 mg/L
RHondo abv Lake Fork at Parking Lot	4/6/2004 12:30	Ammonia	0.1 mg/L
RHondo abv Lake Fork at Parking Lot	4/21/2004 13:40	Ammonia	0.1 mg/L
RHondo abv Lake Fork at Parking Lot	5/19/2004 11:45	Ammonia	0.1 mg/L

RHondo abv Lake Fork at Parking Lot	6/15/2004 11:35	Ammonia	0.1 mg/L
RHondo abv Lake Fork at Parking Lot	7/21/2004 11:15	Ammonia	0.1 mg/L
RHondo abv Lake Fork at Parking Lot	8/24/2004 11:30	Ammonia	0.1 mg/L
Lake Fork Creek above Ski Area	5/19/2004 12:10	Ammonia	0.1 mg/L
Twining WWTP effluent @ TSV	2/11/2004 11:30	Ammonia	0.1 mg/L
Twining WWTP effluent @ TSV	3/10/2004 14:00	Ammonia	26.4 mg/L
Twining WWTP effluent @ TSV	3/24/2004 14:40	Ammonia	5.99 mg/L
Twining WWTP effluent @ TSV	4/6/2004 13:00	Ammonia	0.1 mg/L
Twining WWTP effluent @ TSV	4/21/2004 15:05	Ammonia	0.1 mg/L
Twining WWTP effluent @ TSV	5/19/2004 13:00	Ammonia	0.1 mg/L
Twining WWTP effluent @ TSV	8/24/2004 12:10	Ammonia	0.1 mg/L

APPENDIX B
LIMITING NUTRIENT AND
ALGAL GROWTH POTENTIAL ASSAYS

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Algal Growth Potential (AGP) Assays

on

Water from the Rio Hondo

to

State Of New Mexico
Environment Department
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, New Mexico 87502

submitted to
Seva Joseph

May 28, 2004

by

Larry L. Barton and Gordon V. Johnson

Department of Biology, University of New Mexico
Albuquerque, NM 87131
Tel: 505-2772537
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Email: lbarton@unm.edu

Background:

The water was collected on March 31, 2004 and transported on ice to our laboratory. Water from each site was autoclaved and filtered, and used immediately. The initial tests for growth potential were initiated two days later and were terminated after 7 days of incubation under continuous illumination.

The procedures used for determining limiting nutrients and toxicity to algae was as established in the EPA-600/9-78-018 publication entitled "The *Selenastrum Capricornutum* Prinz Algal Assay Bottle Test" and EPA-660/3-75-034 publication entitled "Proceedings: Biostimulation/and/ Nutrient Assessment Workshop". The design is as follows:

Water from the creeks/rivers was autoclaved and passed through filters that had a pore diameter of 0.4 micrometers. The filtered water, 25 ml, was placed in 125 ml Erlenmeyer flasks which were covered with aluminum foil. Each assay was conducted in triplicate.

The design of the test for algal growth potential is as listed below:

1. Control (filtered river water with no additions)
2. Control + 0.05 mg P/liter
3. Control + 1.00 mg N/liter
4. Control + 1.00 mg N + 0.05 mg P /liter
5. Control + 1.00 mg Fe- EDTA/liter
6. Control + 1.00 mg Fe- EDTA + 0.05 mg P/liter
7. Control + 1.00 mg Fe- EDTA + 1.00 mg N/liter
8. Control + 1.00 mg Fe- EDTA + 1.00 mg N + 0.05 mg P/liter
9. Control + 0.0125 mg P/L
10. Control + 0.025 mg P/L
11. Control + 0.0375 mg P/L
12. Control + 0.100 mg P/L
13. Control + 0.25 mg N/L
14. Control + 0.50 mg N/L
15. Control + 0.75 mg N/L
16. Control + 2.00 mg N/L

At the end of 7 days of incubation, the amount of chlorophyll was determined using fluorescence measurements. The fluorescence values were converted to dry weight values using a standard that we had constructed under these conditions of growth. The results are given in dry weight measurements as is accordance with the EPA procedure.

The site of collection of the water samples was as designated below:

SITE	**DESIGNATION**
Taos Co. Rio Hondo above WWTP	I
Taos Co. Rio Hondo below WWTP	II
Taos Co. Rio Hondo at Rio Grande Confluence	III

Results:

The values for algal growth potential are given below as mg dry weight of algae/L.

Algal assays	Site of water collection		
	I	II	III
1. Control (filtered river water without additions)	0.603	0.922	0.826
2. Control + 0.05 mg P/liter	0.442	0.752	0.601
3. Control + 1.00 mg N/liter	1.515	0.861	1.078
4. Control + 1.00 mg N + 0.05 mg P /liter	1.527	1.644	1.462
5. Control + 1.00 mg Fe- EDTA/liter	0.517	0.996	0.773
6. Control + 1.00 mg Fe- EDTA + 0.05 mg P/liter	0.560	0.734	0.478
7. Control + 1.00 mg Fe- EDTA + 1.00 mg N/liter	1.581	0.662	0.863
8. Control + 1.00 mg Fe- EDTA + 1.00 mg N + 0.05 mg P/liter	1.507	1.789	1.754
9. Control + 0.0125 mg P/L	0.532	0.957	0.664
10. Control + 0.025 mg P/L	0.460	0.791	0.591
11. Control + 0.0375 mg P/L	0.329	0.943	0.552
12. Control + 0.10 mg P/L	0.429	0.578	0.525
13. Control + 0.25 mg N/L	1.118	0.941	1.153
14. Control + 0.50 mg N/L	1.249	0.986	1.174
15. Control + 0.75 mg N/L	1.411	0.892	1.135
16. Control + 2.00 mg N/L	1.411	0.997	1.028

A study concerning the effect of N and P additions on algal growth was conducted on appropriate creek/river waters. The growth values are presented below and as graphs for various additions of P and N alone.

Nutrients were added to the sterilized water and the amount of algal mass was determined after 7 days of incubation.

Productivity of algae as influenced by Nitrogen addition. Growth as mg dry weight/L.

Nitrogen added (mg N/L)	Site of water collection I	II	III
0	0.603	0.922	0.872
0.25	1.119	0.941	1.153
0.5	1.249	0.986	1.174
0.75	1.411	0.892	1.135
1.0	1.515	0.861	1.078
2.0	1.411	0.998	1.028

Productivity of algae as influenced by Phosphorus addition. Growth as mg dry weight/L.

Phosphorus added (mg P/L)	Site of water collection I	II	III
0	0.603	0.922	0.872
0.0125	0.532	0.957	0.664
0.025	0.460	0.791	0.591
0.0375	0.329	0.943	0.552
0.05	0.442	0.753	0.601
0.10	0.429	0.579	0.525

NOTE: Graphs of the N and P additions are in the attachment entitled graphs.

The following summary statements can be made concerning the water:

Rio Hondo above WWTP (Site I) has moderate algal productivity. Growth is increased by nitrogen addition indicating that nitrogen is the limiting nutrient. Phosphorus addition does not increase algal growth either by itself or in combination with nitrogen addition.

Rio Hondo below WWTP (Site II) has moderately high algal productivity. Growth is increased by the addition of both nitrogen and phosphorus indicating that both are limiting for algal growth. Neither N nor P alone stimulated growth.

Rio Hondo at the Rio Grande (Site III) has moderately high algal productivity. Growth is increased by the addition of both nitrogen and phosphorus indicating that both are limiting for algal growth.

Productivity

The basis for productivity classification of river water is standards established for lakes using the laboratory assay technique to assess biomass. (Reference: EPA-600/9-78-018 publication entitled "The *Selenastrum Capricornutum* Prinz Algal Assay Bottle Test" and EPA-660/3-75-034 publication entitled "Proceedings: Biostimulation/and/ Nutrient Assessment Workshop")

Classification	Algal cell density (algal dry weight)
Low productivity	0.00 - 0.10 mg/L
Moderate productivity	0.11 - 0.80 mg/L
Moderately high productivity	0.81 - 6.00 mg/L
High Productivity	6.10 - 20.00 mg/L

1. Status of water in Rio Hondo water at the site tested equivalent to trophic status of lakes.

Site I - Moderate productivity

Site II - Moderately high productivity

Site III - Moderately high productivity

2. Effect of N addition to Site I:

Water from this site is nitrogen limited. Each addition of nitrogen increased productivity. Addition of 2.0 mg N/L raises the productivity to the lower portion of the MODERATELY HIGH PRODUCTIVITY range.

N addition to Site II:
Water at this site is both nitrogen and phosphorus limited. The addition of nitrogen to 1 mg or 2 mg/L raises the productivity only slightly because the water is also phosphorous limited. Thus, even with the addition of nitrogen to water from this site, the productivity level remains at the lower portion of the MODERATELY HIGH PRODUCTIVITY.

N addition to Site III:
Water from this site is both nitrogen and phosphorous limited. The addition of 1 mg or 2 mg/L raises the productivity only slightly because of the phosphorous limitation. Even with the addition of nitrogen to water from this site, the productivity level remains at the lower portion of the MODERATELY HIGH PRODUCTIVITY.

3. Effect of P addition to Site I:
This site is nitrogen limited and the addition of phosphorous does not increase the cell yield. When N addition was 1.0 mg/L and phosphorus was 0.05 mg/L the cell yield was substantially increased; however, this was attributed to the addition of N and not due to P. Addition of P from 0.0125 mg/L to 0.1 mg/L without the addition of N did not increase growth but, in fact, growth was slightly inhibited.

P addition to Site II:
This site is both N and P limited. The addition of phosphorous from 0.0125 mg/L to 0.1 mg/L did not increase growth yield but growth was slightly inhibited.

P addition to Site III:
This site is both N and P limited. The addition of phosphorous from 0.0125 mg/L to 0.1 mg/L did not increase growth yield but growth was slightly inhibited.

4. General comments:

- Without nutrient additions, the Rio Hondo has MODERATE PRODUCTIVITY to MODERATELY HIGH PRODUCTIVITY. With nitrogen and phosphorus additions, productivity increases but never exceeds MODERATELY HIGH PRODUCTIVITY. Management procedures should avoid any increase in nitrogen and phosphorus inputs.
- At Site I, nitrogen is limiting algal growth and with the addition of nitrogen up to 1 mg/L there is no limitation of growth due to phosphorus. If the limiting nutrients (nitrogen and phosphorus) are added to sites II or III, there is an increase in algal productivity. This indicates that Rio Hondo is limited for nitrogen but at sites II and III phosphorus is also limiting.
- If phosphorus level is adequate to support algal growth but nitrogen is limiting as is the case with site I, the condition favors N_2 - fixing cyanobacterial growth.

Chlorophyll a: The following are Chlorophyll a analysis on filter samples provided to us. We have used the procedure you had recommended and the calculations were by the following formula:

Chlorophyll a (mg/sample) =
[Corrected absorbance $_{665}$ x 28.66 x sample vol. x extractant vol] / [filtered sub-sample volume]

The extractant volume we used was 15 ml and the filtered sum-sample volume was the number of ml listed on the samples. That volume listed was 237 ml for Rio Hondo above WWTP, 253 ml for Rio Hondo below WWTP and 350 ml for Rio Hondo @ Rio Grande.

	Readings		Readings after acidification	
Sample sites	OD-665	OD-750	OD-665	OD-750
Rio Hondo above WWTP	0.194	0.009	0.118	0.011
	0.158	0.011	0.096	0.011
	0.188	0.016	0.114	0.013
ave =	0.180	0.012	0.109	0.012
Rio Hondo below WWTP	0.254	0.016	0.167	0.013
	0.245	0.012	0.163	0.015
	0.237	0.013	0.150	0.010
ave =	0.245	0.014	0.160	0.013
Rio Hondo @ Rio Grande	0.472	0.011	0.299	0.010
	0.486	0.014	0.304	0.012
	0.399	0.078	0.252	0.078
ave =	0.452	0.034	0.285	0.033

Site	Date collected	Chlorophyll a (mg/sample)
Rio Hondo above WWTP	03/31/04	**32.15 mg**
Rio Hondo below WWTP	03/31/04	**40.61 mg**
Rio Hondo @ Rio Grande	03/31/04	**111.01 mg**

Ash Free Dry Mass (AFDM) Rio Hondo

Sample	Date	Sample vol.(ml)	Sub-sample vol (ml)	AFDM /Sample* (g /sample)
Rio Hondo above WWTP	03/31/04	237	15	0.0537
				0.0553
				0.0537
			Mean ± SD =	**0.0542 ± 0.0009**
Rio Hondo below WWTP	03/31/04	253	15	0.0776
				0.0658
				0.0590
			Mean ± SD =	**0.0675 ± 0.0094**
Rio Hondo @ Rio Grande	03/31/04	350	15	0.1423
				0.1586
				0.1446
			Mean ± SD =	**0.1485 ± 0.0088**

SD = Standard deviation from the means.
* Formula for calculation: Ash-free dry mass (g per sample) =
[{(weight of crucible + filter + sample after drying) - (weight of crucible + filter + sample after ashing)} x sample volume] **/** [volume of filtered sub-sample]

Volume of filtered sub-sample was taken from label on each sample.

Summary of Chlorophyll a and AFDM:

- The triplicate values obtained for chlorophyll a and AFDM were very close
- As Chlorophyll a values for the sample increased, the AFDM values increased proportionally.

APPENDIX C
ESTIMATED 4Q3 FLOW FOR THE RIO HONDO

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It is often necessary to calculate a critical flow for a portion of a watershed where there is no stage gage. This can be accomplished by applying one of two formulas developed by the USGS. One formula (Thomas, 1993) is recommended when the ratio between the two watershed areas is between 0.5 and 1.5. The other formula, to be used when the watershed ratio is outside this range, is a regression formula also developed by the USGS (Borland, 1970).

1. 4Q3 flow at USGS Streamflow Gage 08267500 (Rio Hondo near Valdez) in cubic feet per second

a. ***Annual*** 4Q3 Flow Using Log-Pearson Type III Statistics (SWSTAT 4.1)

(based on USGS Program A193)

08267500 Rio Hondo near Valdez, NM

April 1 - start of season
March 31 - end of season
1936 - 2002 - time period
4-day low – parameter

The following 7 statistics are based on non-zero values:

Mean (logs)	0.928
Variance (logs)	0.011
Standard Deviation (logs)	0.104
Skewness (logs)	-0.804
Standard Error of Skewness (logs)	0.293
Serial Correlation Coefficient (logs)	-0.010
Coefficient of Variation (logs)	0.112

Non-exceedance Probability	Recurrence Interval	Parameter Value
0.0100	100.00	4.243
0.0200	50.00	4.713
0.0500	20.00	5.460
0.1000	10.00	6.160
0.2000	5.00	7.038
0.3333	3.00	**7.865**
0.5000	2.00	8.755
0.8000	1.25	10.410
0.9000	1.11	11.209
0.9600	1.04	11.990
0.9800	1.02	12.450
0.9900	1.01	12.831

b. ***Winter*** 4Q3 Flow Using Log-Pearson Type III Statistics (SWSTAT 4.1)

(based on USGS Program A193)

08267500 Rio Hondo near Valdez, NM

November 1 - start of season
April 30 - end of season
1935 - 2002 - time period
4-day low – parameter

The following 7 statistics are based on non-zero values:

Mean (logs)	0.923
Variance (logs)	0.013
Standard Deviation (logs)	0.112
Skewness (logs)	-1.005
Standard Error of Skewness (logs)	0.291
Serial Correlation Coefficient (logs)	-0.027
Coefficient of Variation (logs)	0.122

Non-exceedance Probability	Recurrence Interval	Parameter Value
0.0100	100.00	3.835
0.0200	50.00	4.343
0.0500	20.00	5.158
0.1000	10.00	5.926
0.2000	5.00	6.890
0.3333	3.00	**7.788**
0.5000	2.00	8.742
0.8000	1.25	10.439
0.9000	1.11	11.208
0.9600	1.04	11.916
0.9800	1.02	12.308
0.9900	1.01	12.616

c. ***Spring*** **4Q3 Flow Using Log-Pearson Type III Statistics (SWSTAT 4.1)**

(based on USGS Program A193)

08267500 Rio Hondo near Valdez, NM

May 1 - start of season
June 30 - end of season
1935 - 2002 - time period
4-day low – parameter

The following 7 statistics are based on non-zero values:

Mean (logs)	1.602
Variance (logs)	0.061
Standard Deviation (logs)	0.248
Skewness (logs)	-0.149
Standard Error of Skewness (logs)	0.291
Serial Correlation Coefficient (logs)	-0.024
Coefficient of Variation (logs)	0.155

Non-exceedance Probability	Recurrence Interval	Parameter Value
0.0100	100.00	9.967
0.0200	50.00	11.844
0.0500	20.00	15.279
0.1000	10.00	19.080
0.2000	5.00	24.842
0.3333	3.00	**31.556**
0.5000	2.00	40.523
0.8000	1.25	64.794
0.9000	1.11	82.161
0.9600	1.04	105.219
0.9800	1.02	123.057
0.9900	1.01	141.371

d. ***Summer*** **4Q3 Flow Using Log-Pearson Type III Statistics (SWSTAT 4.1)**

(based on USGS Program A193)

08267500 Rio Hondo near Valdez, NM

July 1 - start of season
August 31 - end of season
1935 - 2002 - time period
4-day low – parameter

The following 7 statistics are based on non-zero values:

Mean (logs)	1.315
Variance (logs)	0.027
Standard Deviation (logs)	0.165
Skewness (logs)	-0.576
Standard Error of Skewness (logs)	0.291
Serial Correlation Coefficient (logs)	0.080
Coefficient of Variation (logs)	0.126

Non-exceedance Probability	Recurrence Interval	Parameter Value
0.0100	100.00	7.283
0.0200	50.00	8.450
0.0500	20.00	10.441
0.1000	10.00	12.457
0.2000	5.00	15.213
0.3333	3.00	**18.054**
0.5000	2.00	21.398
0.8000	1.25	28.584
0.9000	1.11	32.615
0.9600	1.04	37.025
0.9800	1.02	39.893
0.9900	1.01	42.461

e. ***Fall*** **4Q3 Flow Using Log-Pearson Type III Statistics (SWSTAT 4.1)**

(based on USGS Program A193)

08267500 Rio Hondo near Valdez, NM

September 1 - start of season
October 31 - end of season
1935 - 2001 - time period
4-day low – parameter

The following 7 statistics are based on non-zero values:

Mean (logs)	1.176
Variance (logs)	0.013
Standard Deviation (logs)	0.115
Skewness (logs)	0.074
Standard Error of Skewness (logs)	0.293
Serial Correlation Coefficient (logs)	0.089
Coefficient of Variation (logs)	0.098

Non-exceedance Probability	Recurrence Interval	Parameter Value
0.0100	100.00	8.225
0.0200	50.00	8.806
0.0500	20.00	9.763
0.1000	10.00	10.709
0.2000	5.00	11.993
0.3333	3.00	**13.334**
0.5000	2.00	14.944
0.8000	1.25	18.708
0.9000	1.11	21.077
0.9600	1.04	23.969
0.9800	1.02	26.065
0.9900	1.01	28.122

2. 4Q3 flow at South Fork (ungaged site)

1) The nearest gage to the point of interest (i.e. 2.4 miles below STP) is the Rio Hondo near Valdez (USGS Gage 08267500). The drainage area above this gage (A_g) is 36.2 mi^2. The watershed size above the point of interest (A_u) is 20.9 mi^2. The ratio of watershed size (20.9/36.2) is 0.58. Using the guidelines recommended by the USGS, when this value is between 0.5 and 1.5 we apply **Equation 1**. (*Latitude and longitude of the point of interest were input into GIS Weasel to determine the basin characteristics necessary for these computations*.)

Equation 1

$$4Q3_{(u)} = 4Q3_{(g)} * (A_u / A_g)^{0.566}$$ **(Reference: USGS, 1993)**

Where:

$4Q3_{(u)}$ = weighted 4Q3 flow estimate at ungaged site, in cubic feet per second
$4Q3_{(g)}$ = Log-Pearson Type III 4Q3 flow at gaged site, in cubic feet per second
A_g = Drainage area above the gage in question, in square miles
A_u = Drainage area above the ungaged site, in square miles

2) Multiplying the Log-Pearson Type III 4Q3 low flow at the gaged site (refer to seasonal tables in the beginning of Appendix C) by the ratio of watershed size (A_u/A_g) to the 0.566^{th} power, we get:

4Q3 CRITICAL LOW FLOW

	R.Hondo near Valdez (gage site) SWSTAT 4.1 (1935-2002) ***4Q3 in cfs***	R.Hondo @ S. Fork (ungaged site) USGS (1993) Method ***4Q3 in cfs***
January	7.79	5.71
February	7.79	5.71
March	7.79	5.71
April	7.79	5.71
May	31.6	23.2
June	31.6	23.2
July	18.1	13.2
August	18.1	13.2
September	13.3	9.78
October	13.3	9.78
November	7.79	5.71
December	7.79	5.71
Annual	**7.87**	**5.77**

3) Converting to million gallons per day:

	R.Hondo @ S. Fork (ungaged site) ***4Q3 in mgd***
January	3.69
February	3.69
March	3.69
April	3.69
May	15.0
June	15.0
July	8.56
August	8.56
September	6.32
October	6.32
November	3.69
December	3.69
Annual	**3.73**

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APPENDIX D
POLLUTANT SOURCE(S) DOCUMENTATION PROTOCOL

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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.

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FIELD SHEET FOR ASSESSING DESIGNATED USES AND NONPOINT SOURCES OF POLLUTION

REACH NAME: Rio Hondo (South Fork to Lake Fork Creek)

SEGMENT NUMBER: NM-2120.A_602
BASIN: Rio Grande
PARAMETER: **Nutrients**

STAFF MAKING ASSESSMENT: Lemon
DATE: 22 Sept 04

CODES FOR USES NOT FULLY SUPPORTED

☐	HQCWF	=	HIGH QUALITY COLDWATER FISHERY	☐	DWS	=	DOMESTIC WATER SUPPLY
☐	CWF	=	COLDWATER FISHERY	☐	PC	=	PRIMARY CONTACT
☐	MCWF	=	MARGINAL COLDWATER FISHERY	☐	IRR	=	IRRIGATION
☐	WWF	=	WARMWATER FISHERY	☐	LW	=	LIVESTOCK WATERING
☐	LWWF	=	LIMITED WARMWATER FISHERY	☐	WH	=	WILDLIFE HABITAT

Fish culture, secondary contact and municipal and industrial water supply and storage are also designated in particular stream reaches where these uses are actually being realized. However, no numeric standards apply uniquely to these uses.

CODES FOR SOURCES OF NONSUPPORT (CHECK ALL THAT APPLY)

☐	0100	INDUSTRIAL POINT SOURCES
X	0200	MUNICIPAL POINT SOURCES
☐	0201	DOMESTIC POINT SOURCES
☐	0400	COMBINED SEWER OVERFLOWS
☐	1000	AGRICULTURE
☐	1100	NONIRRIGATED CROP PRODUCTION
☐	1200	IRRIGATED CROP PRODUCTION
☐	1201	IRRIGATED RETURN FLOWS
☐	1300	SPECIALTY CROP PRODUCTION (e.g., truck farming and orchards)
☐	1400	PASTURELAND
☐	1500	RANGELAND
☐	1600	FEEDLOTS - ALL TYPES
☐	1700	AQUACULTURE
☐	1800	ANIMAL HOLDING/MANAGEMENT AREAS
☐	1900	MANURE LAGOONS
☐	2000	SILVICULTURE
☐	2100	HARVESTING, RESTORATION, RESIDUE MANAGEMENT
☐	2200	FOREST MANAGEMENT
☐	2300	ROAD CONSTRUCTION or MAINTENANCE
☐	3000	CONSTRUCTION
X	3100	HIGHWAY/ROAD/BRIDGE
☐	3200	LAND DEVELOPMENT
X	3201	RESORT DEVELOPMENT
☐	3300	HYDROELECTRIC
X	4000	URBAN RUNOFF/STORM SEWERS
☐	5000	RESOURCES EXTRACTION
☐	5100	SURFACE MINING
☐	5200	SUBSURFACE MINING
☐	5300	PLACER MINING
☐	5400	DREDGE MINING
☐	5500	PETROLEUM ACTIVITIES
☐	5501	PIPELINES
☐	5600	MILL TAILINGS
☐	5700	MINE TAILINGS
☐	5800	ROAD CONSTRUCTION/MAINTENANCE
☐	5900	SPILLS
☐	6000	LAND DISPOSAL
☐	6100	SLUDGE
☐	6200	WASTEWATER
☐	6300	LANDFILLS
☐	6400	INDUSTRIAL LAND TREATMENT
X	6500	ONSITE WASTEWATER SYSTEMS (septic tanks, etc.)
☐	6600	HAZARDOUS WASTE
☐	6700	SEPTAGE DISPOSAL
☐	6800	UST LEAKS
☐	7000	HYDROMODIFICATION
☐	7100	CHANNELIZATION
☐	7200	DREDGING
☐	7300	DAM CONSTRUCTION/REPAIR
☐	7400	FLOW REGULATION/MODIFICATION
☐	7500	BRIDGE CONSTRUCTION
X	7600	REMOVAL OF RIPARIAN VEGETATION
☐	7700	STREAMBANK MODIFICATION OR DESTABILIZATION
☐	7800	DRAINING/FILLING OF WETLANDS
☐	8000	OTHER
☐	8010	VECTOR CONTROL ACTIVITIES
☐	8100	ATMOSPHERIC DEPOSITION
☐	8200	WASTE STORAGE/STORAGE TANK LEAKS
☐	8300	ROAD MAINTENANCE or RUNOFF
☐	8400	SPILLS
☐	8500	IN-PLACE CONTAMINANTS
☐	8600	NATURAL
☐	8700	RECREATIONAL ACTIVITIES
X	8701	ROAD/PARKING LOT RUNOFF
☐	8702	OFF-ROAD VEHICLES
☐	8703	REFUSE DISPOSAL
☐	8704	WILDLIFE IMPACTS
X	8705	SKI SLOPE RUNOFF
☐	8800	UPSTREAM IMPOUNDMENT
☐	8900	SALT STORAGE SITES
☐	9000	SOURCE UNKNOWN

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APPENDIX E
CONVERSION FACTOR DERIVATION

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Flow (as million gallons per day [MGD]) and concentration values (milligrams per liter [mg/L]) must be multiplied by a conversion factor in order to express the load in units "pounds per day." The following expressions detail how the conversion factor was determined:

TMDL Calculation:

$$Flow\,(MGD) \times Concentration\left(\frac{mg}{L}\right) \times CF\left(\frac{L-lb}{gal-mg}\right) = Load\left(\frac{lb}{day}\right)$$

Conversion Factor Derivation:

$$CF = 10^{6} \times \frac{3.785\,L}{gal} \times \frac{1\,lb}{454{,}000\,mg} = 8.34\,\frac{L-lb}{gal-mg}$$

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APPENDIX F
TARGET LOADING SPREADSHEETS

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F-1. Seasonal Nutrient Target Loads

Cs=		
	TN	TP
	1.0	**0.1**

Annual TMDLs		
	TN	TP
	31.9	**3.19**

				Total Phosphorus				**Total Nitrogen**			
Month	**Qa 4Q3 (mgd)**	**Addn'l Qe (mgd)**	**Combined Flow (mgd)**	**LA + GA (lbs/day)**	**MOS (lbs/day)**	**WLA (lbs/day)**	**Target Load (lbs/day)**	**LA + GA (lbs/day)**	**MOS (lbs/day)**	**WLA (lbs/day)**	**Target Load (lbs/day)**
January	3.693	0.100	3.793	1.54	0.16	1.46	3.16	19.0	1.58	11.1	31.6
February	3.693	0.100	3.793	1.54	0.16	1.46	3.16	19.0	1.58	11.1	31.6
March	3.693	0.100	3.793	1.54	0.16	1.46	3.16	19.0	1.58	11.1	31.6
April	3.693	0.100	3.793	1.54	0.16	1.46	3.16	19.0	1.58	11.1	31.6
May	14.97	0.100	15.07	6.13	0.63	5.80	12.56	75.4	6.28	44.0	126
June	14.97	0.100	15.07	6.13	0.63	5.80	12.56	75.4	6.28	44.0	126
July	8.559	0.050	8.609	3.50	0.36	3.32	7.18	43.1	3.59	25.1	71.8
August	8.559	0.050	8.609	3.50	0.36	3.32	7.18	43.1	3.59	25.1	71.8
September	6.321	0.020	6.341	2.58	0.26	2.44	5.29	31.7	2.64	18.5	52.9
October	6.321	0.020	6.341	2.58	0.26	2.44	5.29	31.7	2.64	18.5	52.9
November	3.693	0.100	3.793	1.54	0.16	1.46	3.16	19.0	1.58	11.1	31.6
December	3.693	0.100	3.793	1.54	0.16	1.46	3.16	19.0	1.58	11.1	31.6
Annual	**3.729**	**0.100**	**3.829**	**1.56**	**0.16**	**1.47**	**3.19**	**19.3**	**1.60**	**11.0**	**31.9**
			%TMDL	49%	5%	46%	100%	60%	5%	35%	100%
			LA=	1.49				18.7			
								Septic =	5.17		

****Seasonal allocations are based on ANNUAL percentages specified in Section 5.0 (and Appendix G)**

Target Load (TMDL) = Combined Flow (mgd) * C_s (mg/L) * 8.34; C_s = *numeric target*

Target Load (TMDL) = LA + GA + MOS + WLA

F-2. Seasonal WLAs and Effluent Concentration Limitations

		TP		TN: Phase 1	
Month	**Proposed Qe (mgd)**	**WLA (lbs/day)**	**Ce (TP) (mg/L)**	**WLA (lbs/day)**	**Ce (TN) (mg/L)**
January	0.200	1.46	0.87	11.1	6.64
February	0.200	1.46	0.87	11.1	6.64
March	0.200	1.46	0.87	11.1	6.64
April	0.200	1.46	0.87	11.1	6.64
May	0.200	5.80	3.48	44.0	26.4
June	0.200	5.80	3.48	44.0	26.4
July	0.100	3.32	3.98	25.1	30.1
August	0.100	3.32	3.98	25.1	30.1
September	0.040	2.44	7.32	18.5	55.5
October	0.040	2.44	7.32	18.5	55.5
November	0.200	1.46	0.87	11.1	6.64
December	0.200	1.46	0.87	11.1	6.64
Annual	**0.200**	**1.47**	**0.88**	**11.0**	**6.61**

Ce = (WLA/Qe) * 0.1199

Qe = Effluent Discharge (mgd)
Ce = Effluent Concentration (mg/L)
WLA = Waste Load Allocation (based on %TMDL)

F-3. Seasonal TN WLAs and effluent concentration limitations using a phased approach dependent on the percent septic capture in TSV

Month	Phase 2[a]: 25% Capture		Phase 3: 50% Capture		Phase 4: 75% Capture		Phase 5: 100% Capture	
	WLA (lbs/day)	Ce (TN) (mg/L)	WLA (lbs/day)	Ce (TN) (mg/L)	WLA (lbs/day)	Ce (TN) (mg/L)	WLA (lbs/day)	Ce (TN) (mg/L)
January	12.4	7.4	13.7	8.2	15.0	9.0	16.2	9.7
February	12.4	7.4	13.7	8.2	15.0	9.0	16.2	9.7
March	12.4	7.4	13.7	8.2	15.0	9.0	16.2	9.7
April	12.4	7.4	13.7	8.2	15.0	9.0	16.2	9.7
May	45.3	27	46.6	28	47.9	29	49.1	29.5
June	45.3	27	46.6	28	47.9	29	49.1	29.5
July	26.4	32	27.7	33	29.0	35	30.3	36.3
August	26.4	32	27.7	33	29.0	35	30.3	36.3
September	19.8	59	21.1	63	22.4	67	23.7	71.0
October	19.8	59	21.1	63	22.4	67	23.7	71.0
November	12.4	7.4	13.7	8.2	15.0	9.0	16.2	9.7
December	12.4	7.4	13.7	8.2	15.0	9.0	16.2	9.7
Annual	**12.3**	**7.4**	**13.6**	**8.2**	**14.9**	**8.9**	**16.2**	**9.7**

[a] Phase 1 (0% capture) presented in Table F-2.
TSV = Taos Ski Valley
WLA = Waste Load Allocation (based on %TMDL)
Ce = Effluent Concentration (mg/L)

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APPENDIX G
AMMONIA NITROGEN

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Overview

Ammonia exists in water in either the ionic state (NH_4^+) or the un-ionized state (NH_3). The percentage of measured total ammonia present in the toxic un-ionized state is a function of pH and temperature. As pH and temperature rise so does the relative percentage of total ammonia in the un-ionized state (USEPA, 1999). Established SWQB protocols state that the ammonia criterion shall be calculated based on the 75th percentile of sample pH measurements and the maximum temperature allowed by the designated use. The 75th percentile for pH is 8.34 (n=35). The maximum temperature for the HQCWF designation is 20 ºC. Using Subsection O, Table 2 of Standards Section 20.6.4.900 (NMAC, 2002), and applying the above values, an annual target criterion of 0.52 mg-N/L was established. These temperature and pH levels are worst-case conditions for ammonia toxicity and are rarely observed during the year in the upper Rio Hondo; the target value for the indicator therefore implicitly accounts for a margin of safety.

Table G-1. Numeric Target

Constituent or Factor	TMDL Target
Ammonia Nitrogen	0.52 mg N/L

The Target Capacity Loading Analysis (see Table G-2) determined that the allowable ammonia nitrogen mass load in the Rio Hondo is 16.6 lbs/day.

Table G-2. Estimates of *Annual* Target Loading for the Assessment Unit: Rio Hondo (South Fork to Lake Fork Creek)

Parameter	Combined Flow (mgd)	Numeric Target (mg/L)	Estimate of Target Loading (lbs/day)
Ammonia Nitrogen	3.83[1]	0.52	16.6

1. Critical low-flow (4Q3) for "combined flow" calculation determined using Thomas equation (Appendix C). Effluent flow was assumed to be the proposed *additional* discharge from the WWTP (0.10 million gallons/day).

In determining the load and waste load allocations for the ammonia nitrogen TMDL, the allowable pollutant load of 16.6 lbs/day is divided between the MOS, background, point and nonpoint source discharges. An explicit MOS of 5% is reserved to account for uncertainties. Therefore, the MOS is 0.83 lbs/day.

Load Allocation

All measures for ammonia nitrogen above the wastewater treatment plant and at the bottom of the assessment unit were reported as less than detection limit at a minimum quantification limit (MQL) of 0.1 mg-N/L. In accordance with implementation guidelines developed for New Mexico (USEPA, 1994b), concentration values for nonpoint sources of ammonia nitrogen are assumed to be zero. Thus, for the purposes of this calculation, there is no upstream ammonia load allocation for nonpoint sources.

Waste Load Allocation

The WLA was calculated by subtracting the load allocation, background, and MOS from the target capacity (TMDL). Results are presented in Table G-3.

The only existing point source in the upper Rio Hondo watershed is the NPDES-permitted wastewater treatment plant owned and operated by the Twining Water and Sanitation District. The TWSD has the authority and the responsibility to manage all wastewaters generated within its boundaries; those boundaries encompass virtually all private, developable land around Twining. Based on these considerations, the entire TMDL available to point sources of ammonia is allocated to the TWSD. No other discharges of ammonia are permissible in the affected stream reach in this TMDL scenario.

Table G-3. Calculation of *Annual* TMDL for Ammonia Nitrogen

Parameter	WLA (lbs/day)	LA (lbs/day)	Background (lbs/day)	MOS (5%) (lbs/day)	TMDL (lbs/day)
Ammonia Nitrogen	15.8	0	0	0.83	16.6

Margin of Safety

The ammonia nitrogen TMDL utilizes both an implicit and an explicit MOS. An implicit MOS has been incorporated through conservative assumptions in the analysis by treating nutrients as conservative pollutants (i.e., did not consider nutrient cycling within the environment). An explicit MOS of 5% is reserved to account for uncertainties. Uncertainties in the source analysis and linkage analysis of this nutrient TMDL are:

- ✓ Actual loading from overland surface runoff during snowmelt and storm events
- ✓ Actual critical low-flow of stream reach
- ✓ Actual condition and maintenance status of septic tank disposal systems
- ✓ Actual data on ground water contributions to surface water
- ✓ The relationship between nutrient loads and corresponding creek concentrations
- ✓ Future watershed development

Consideration of Seasonal Variation

Stream standards could be attainable with less stringent wastewater treatment during high flow months or during the non-tourist season(s). Applying seasonal 4Q3s (Appendix C) and an explicit MOS of 5% to account for uncertainties in flow calculations will determine the maximum allowable loads and effluent concentrations that could be utilized for NPDES permit limitations. This will create a more flexible approach to wastewater treatment, which will ultimately reduce operational costs on a yearly basis.

The WLA was calculated by subtracting the load allocation and MOS from the target capacity (TMDL). Results for ammonia nitrogen NPDES permit limitations are presented in Table G-4.

Table G-4. Seasonal Waste Load Allocations for the Twining Water and Sanitation District (NPDES Permit No. NM0022101), Taos County, New Mexico

Parameter	Time Interval	Streamflow 4Q3[1] (mgd)	Proposed Effluent Volume[2] (mgd)	Seasonal WLA[3] (lbs/day)	Calculated Effluent Conc.[4] (mg/L)	Allowable 30-day Av. Conc.[5] (mg/L)	Allowable 7-day Av. Conc.[6] (mg/L)
Ammonia Nitrogen	January	3.693	0.200	15.6	9.37[a]	3.2[b]	3.2[b]
	February	3.693	0.200	15.6	9.37[a]	3.2[b]	3.2[b]
	March	3.693	0.200	15.6	9.37[a]	3.2[b]	3.2[b]
	April	3.693	0.200	15.6	9.37[a]	3.2[b]	3.2[b]
	May	14.97	0.200	62.1	37.2[a]	3.2[b]	3.2[b]
	June	14.97	0.200	62.1	37.2[a]	3.2[b]	3.2[b]
	July	8.559	0.100	35.5	42.5[a]	3.2[b]	3.2[b]
	August	8.559	0.100	35.5	42.5[a]	3.2[b]	3.2[b]
	September	6.321	0.040	26.1	78.3[a]	3.2[b]	3.2[b]
	October	6.321	0.040	26.1	78.3[a]	3.2[b]	3.2[b]
	November	3.693	0.200	15.6	9.37[a]	3.2[b]	3.2[b]
	December	3.693	0.200	15.6	9.37[a]	3.2[b]	3.2[b]

1 The critical low flow condition in the Rio Hondo is the average low-flow that persists for four consecutive days once every three years, on average (Appendix C).

2 Effluent volume is the proposed design capacity and/or seasonal effluent volume of Twining WWTP (in mgd).

3 Seasonal waste load allocations (in lbs/day) allotted to Twining Water and Sanitation District.

4 Maximum allowable effluent concentrations to be protective of the river within this assessment unit (Appendix F).

5 The allowable 30-day average was determined by rounding the value in column 6.

6 The allowable 7-day average is defined as 1.5 times the allowable 30-day average.

a Maximum allowable effluent concentration for ammonia nitrogen as a *NUTRIENT*, based on seasonal WLA calculated in Appendix F and chronic standard defined in NMAC 20.6.4.900 O(2).

b Maximum allowable effluent concentration for ammonia nitrogen as a *TOXIN*, based on acute standard at a temperature of 20°C and pH = 8.25 (NMAC 20.6.4.123 O(1)).

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APPENDIX H
PUBLIC PARTICIPATION PROCESS FLOWCHART

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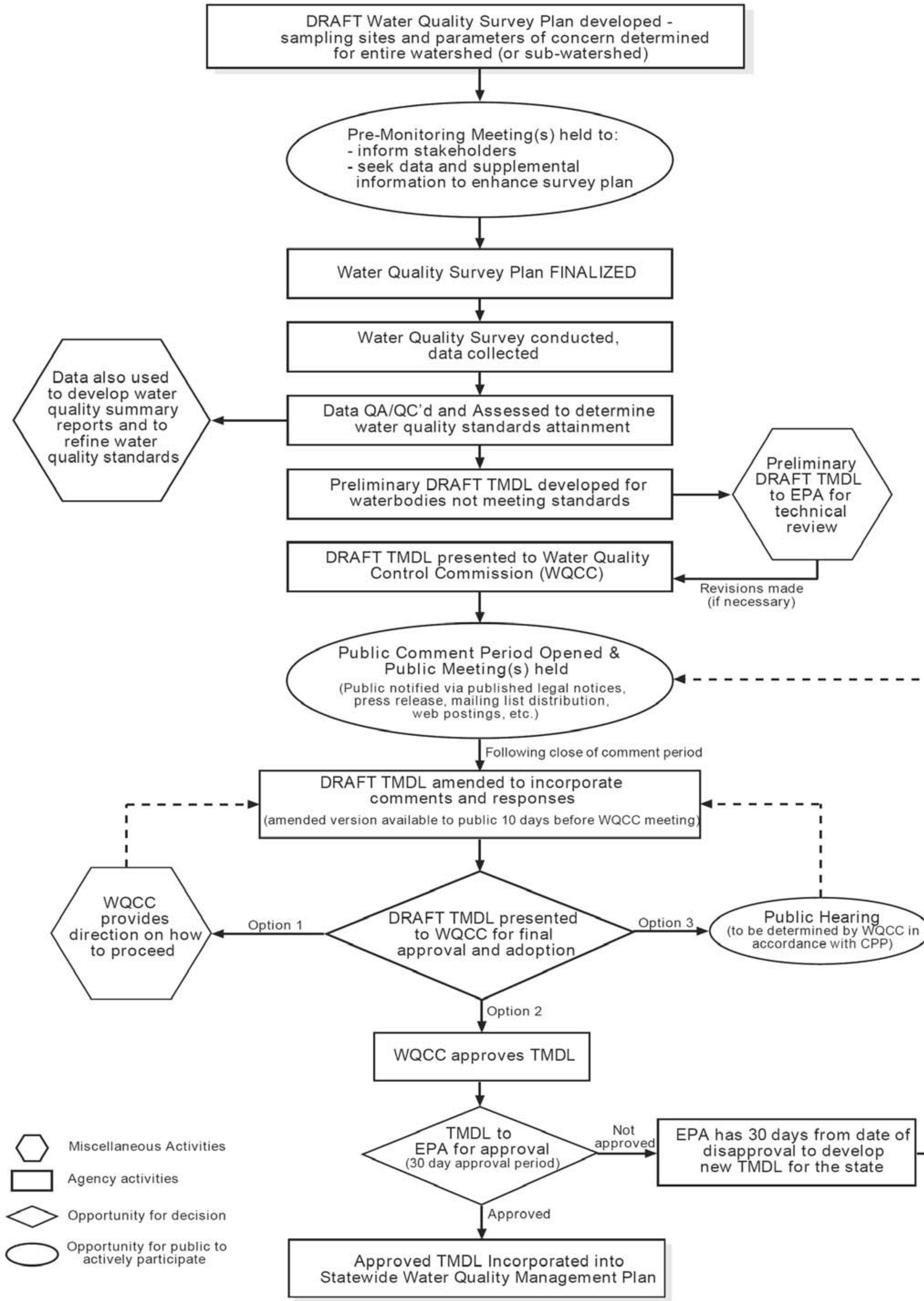
DRAFT Water Quality Survey Plan developed - sampling sites and parameters of concern determined for entire watershed (or sub-watershed)
Pre-Monitoring Meeting(s) held to:
- inform stakeholders
- seek data and supplemental information to enhance survey plan
Water Quality Survey Plan FINALIZED
Water Quality Survey conducted, data collected
Data QA/QC'd and Assessed to determine water quality standards attainment
Data also used to develop water quality summary reports and to refine water quality standards
Preliminary DRAFT TMDL developed for waterbodies not meeting standards
Preliminary DRAFT TMDL to EPA for technical review
DRAFT TMDL presented to Water Quality Control Commission (WQCC)
Revisions made (if necessary)
Public Comment Period Opened & Public Meeting(s) held
(Public notified via published legal notices, press release, mailing list distribution, web postings, etc.)
Following close of comment period
DRAFT TMDL amended to incorporate comments and responses
(amended version available to public 10 days before WQCC meeting)
WQCC provides direction on how to proceed
Option 1
DRAFT TMDL presented to WQCC for final approval and adoption
Option 3
Public Hearing
(to be determined by WQCC in accordance with CPP)
Option 2
WQCC approves TMDL
TMDL to EPA for approval
(30 day approval period)
Not approved
EPA has 30 days from date of disapproval to develop new TMDL for the state
Approved
Approved TMDL Incorporated into Statewide Water Quality Management Plan
Miscellaneous Activities
Agency activities
Opportunity for decision
Opportunity for public to actively participate

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APPENDIX I
RESPONSE TO COMMENTS

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Comments on Rio Hondo TMDL

Received at the Rio Hondo, March 17, 2005 Public Meeting

Jai Cross
P.O. Box 612
Arroyo Hondo, NM 87513

COMMENT: The families on the Atalaya Acequia (and the other eight acequias on the Rio Hondo) use water from the Rio Hondo to recharge wells, water animals, and irrigate crops. The cumulative effects of even small nutrient excesses could damage their health, livestock, food, and traditional life styles.

NMED/SWQB Response: The current designated uses for the perennial reaches of the Rio Hondo Watershed include domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, and secondary contact (NMAC 20.6.4.124). The total phosphorus and total nitrogen TMDLs have been calculated using the current New Mexico standard for plant nutrients and segment–specific, numeric criteria that have proven to be protective of the stream by maintaining water quality standards and fully supporting the designated uses along the Rio Hondo.

Received at the Rio Hondo, March 17, 2005 Public Meeting

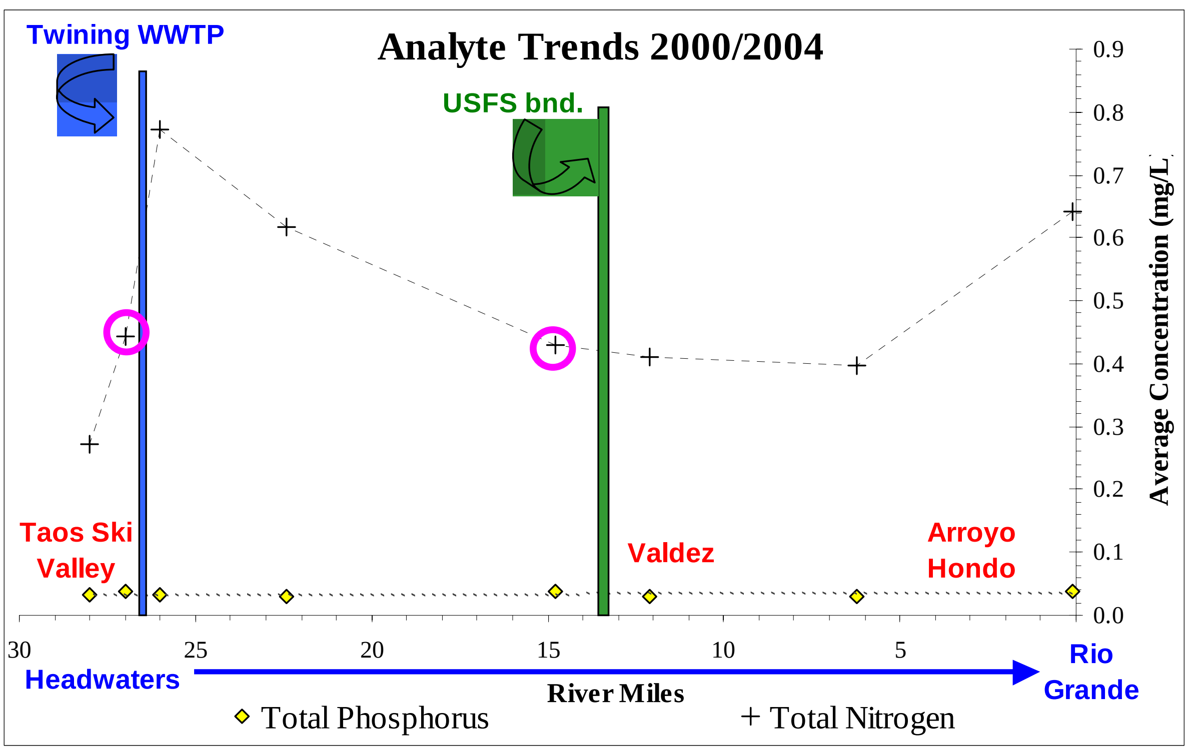
Phaedra Greenwood
P.O. Box 388
Arroyo Hondo, NM 87513

COMMENT: Dear Shelly, I am one of the downstream users of the Rio Hondo who depends on this water for domestic use. I have lived in the upper Hondo since 1971 and watched the river deteriorate. Yes, I do think it is cleaner than it was in 1981, but <u>at Hondo 16</u> I am observing algal growth that indicates eutrophication. The last time I ate a trout from the river in Nov. 2004, the fish was slimy. I am not saying all this is coming from Taos Ski Valley, but since they already use 46%, to give them a plant double the size of the present one will preclude any growth downstream and use up your allocated 2% growth allocation. I agree there is much nonpoint pollution, but I am concerned that such a leap in growth at Taos Ski Valley will endanger the Rio Hondo. Please keep me informed. Thanks. Phaedra Greenwood

NMED/SWQB Response: Current design capacity for the WWTP is 0.95 million gallons per day (MGD). All calculations in development of these TMDLs used the proposed WWTP design capacity of 0.200 MGD. Since load is a function of concentration <u>and</u> discharge, all load calculations in the TMDL estimate treatment capacity in the future scenario, which accommodates projected growth through 2020 (see Section 8.0).

There are two potential contributors to nutrient enrichment in a given stream: excessive phosphorus and/or nitrogen. . Regarding phosphorus, the existing annual waste load allocation (WLA) for total phosphorus (TP) for this stream segment is 1.00 lbs/day as stated in the existing WWTP permit based on the 1981 analysis. The new WLA for TP, based on nutrient export calculations and background concentrations, is 1.47 lbs/day. Even though this draft TMDL calculated a higher TP waste load allocation than the current limit, the Village of Taos Ski Valley Wastewater Treatment Plant (WWTP) would like to maintain the current load (1.0 lbs/day) in their new NPDES permit. Clarification was added to the TMDL document (see page 27, Section 5.1.3). The Village of Taos Ski Valley WWTP will not increase phosphorus loading into the Rio Hondo watershed. The new WLA for total phosphorus will be 1.00 lbs/day, or 31% of the TMDL. The remaining 0.47 lbs/day will be set aside as part of the Margin of Safety.

Regarding nitrogen, data collected by the SWQB in 2000 and 2004 (graph shown below) reveal a spike in total nitrogen associated with the WWTP, but nitrogen concentrations decrease as the river flows downstream and the nutrients are assimilated into plant materials. By the time the water reaches the Forest Service boundary, TN concentrations are similar to those found above the WWTP (highlighted by pink circles). As the water flows past Arroyo Hondo, nitrogen concentrations increase again indicating an additional source of nitrogen entering the stream along this reach. In New Mexico, nonpoint sources are the most significant contributor to water quality exceedences; therefore, the best avenue to restore watershed health is to focus community efforts on a holistic approach to watershed protection.



The current average winter WWTP nitrogen loading is 14.23 lbs/day (average winter WWTP effluent concentration is 26.91 mg/L) based on effluent concentrations from the 2004 sampling survey conducted by the SWQB and the WWTP discharge flow reports. Given the proposed expansion and increase in discharge, the TMDL allocated 11.0 lbs/day total nitrogen to the WWTP. This is less than the current loading and will result in a maximum allowable effluent concentration of 6.5mg/L during the winter months (November through April). This is approximately four times lower than current effluent concentrations.

Received via U.S. Postal Service, March 21, 2005

Kathy Schlosser, P.E.
Taos Ski Valley WWTP
Design Engineer
The **Engineering** Company

COMMENT: This comment letter is written on behalf of the Village of Taos Ski Valley and The Engineering Co. The following comments are being submitted to the State of New Mexico after review of the Draft Total Maximum Daily Load (TMDL) for the Rio Hondo.

The Village of Taos Ski Valley is the current owner and operator of the wastewater treatment plant. Although Twining Water and Sanitation District is on record as the current permit holder, the District has been dissolved. Application for a new permit has been made in the name of the Village of Taos Ski Valley. The references in the TMDL document should be changed to reflect the change in ownership.

NMED/SWQB Response: References to Twining Water and Sanitation District (TWSD) in the TMDL document have been changed to the Village of Taos Ski Valley (VTSV) to reflect the change of ownership.

COMMENT: According to the TMDL document, stream data was collected from the Rio Hondo for a period of nine months in 2004. However, it is not clear from the document how that data was analyzed and used to evaluate acceptable stream loadings. According to the TMDL, numeric targets have been adopted from the 1981 evaluation because they "have proven effective". I would like to have more explanation of how that decision was made and how the new stream data supports that decision. It is not evident that the current condition of the river has been considered in the evaluation of the load calculations.

NMED/SWQB Response: The data were assessed using the Surface Water Quality Bureau's Assessment Protocol, which can be found on the New Mexico Environment Department's – SWQB website (http://www.nmenv.state.nm.us/swqb/Library/index.html).

Based on this assessment, the Rio Hondo (South Fork to Lake Fork Creek) was not listed as an impaired reach in the 2004-2006 State of New Mexico Integrated Clean Water Act §303(d)/ §305(b) Report. Since historical records show that this assessment unit was impaired for plant

nutrients and current analysis indicates it is not impaired, it can be concluded that the TP effluent limits that were enacted in the 1981 WLA were effective at reducing phosphorus pollution and improving stream water quality.

Nevertheless, there are two potential contributors to nutrient enrichment in a given stream: excessive phosphorus and/or nitrogen. In 1981, algal bioassays and laboratory analysis of ambient waters determined that the Rio Hondo was a phosphorus-limited system, which is why only a TP effluent limit was required in the NPDES permit. In 2004, algal bioassays and laboratory analysis indicated that under current conditions both nitrogen and phosphorus are driving the productivity of algae and macrophytes in the stream below the treatment plant (Appendix B). Therefore, to ensure that the narrative water quality standards are met along this stream reach, the SWQB staff wrote TMDLs for both TP and TN.

For this TMDL document the target concentrations for plant nutrients were determined based on 1) the presence of numeric and narrative criteria, 2) the degree of experience in applying the indicator, and 3) the ability to easily monitor and produce quantifiable and reproducible results. Specifically, the target values for plant nutrients were based a narrative criterion with numeric translators. The target concentrations were chosen because they are forthcoming segment-specific criterion for phosphorus and numeric translators for nitrogen based on recommendations in the 1981 Rio Hondo WLA, as opposed to EPA-recommended ecoregional criteria, and because they were consistent with the New Mexico State antidegradation policy.

COMMENT: The Rio Hondo is currently in attainment and according to the TMDL current limits have proven effective. That fact is not consistent with the extremely low total nitrogen limits that have been proposed. Again since the stream is currently in attainment and current nitrogen loadings in the river are acceptable, I propose an alternative methodology for determining the future waste load allocation for the WWTP and the stream's "numeric target".

The calculations for this approach would be as follows.

Non-point:	11.8 lbs/day (TMDL Table 5-2)
Background:	6.84 lbs/day (TMDL Table 5-2)
MOS:	1.6 lbs/day (TMDL Table 5-2)
WWTP:	14.23 lbs/day (calculated by TEC)
TMDL:	34.47 lbs/day

The growth factor would not be included in this calculation, because we are determining the present day loading on the river.

The current WWTP loading was calculated based on the total nitrogen concentrations determined by NMED in their 2004 sampling program coupled with the WWTP discharge flow reports. The attached spreadsheet details the calculations [see tables below].

To determine the future nitrogen load that should be allocated to the WWTP, subtract all other loads from the numeric target of 34.47 lbs/day, including the growth factor of 0.63 lbs/day. This leaves 13.6 lbs/day total nitrogen to be allocated to the WWTP. At 0.2 million gallons per day, an allowable 30-day average concentration is 8.15 mg/L, assuming 0-percent capture of septic systems.

Village of Taos Ski Valley Wastewater Treatment Plant
Total Nitrogen Discharged

Samples collected by NMED from TMDL Appendix A

Date	nitrate & nitrite	TKN	Total N
	mg/L	mg/L	mg/L
2/11/2004	28	1.14	29.14
2/26/2004	22	4.76	26.76
3/10/2004	13	27	40
3/24/2004	20	7.12	27.12
4/06/2004	17	1.1	18.1
4/21/2004	19	1.34	20.34
8/24/2004	27	0.343	27.343

VTSV WWTP flow records

Date	Total Daily Flow		Total N
	GPD	MGD	lbs/day
2/11/2004	42000	0.042	10.21
2/26/2004	91000	0.091	20.31
3/10/2004	66000	0.066	22.02
3/24/2004	72000	0.072	16.29
4/06/2004	57000	0.057	8.60
4/21/2004	47000	0.047	7.97
8/24/2004	16000	0.016	
Winter Average			**14.23**

NMED/SWQB Response:* *An approach similar to this was considered, but given the cultural importance of the Rio Hondo and the fact that bioassay results have shown a changing dynamic in the river over the past 20 years the SWQB felt a more conservative approach was warranted.

I look forward to NMED's response to these concerns.

Sincerely,

Kathy Schlosser, P.E.
Design Engineer
The **Engineering** Company

Received via U.S. Postal Service, March 24, 2005

Jim Levy
P.O. Box 1602
El Prado, NM 87529

COMMENT: I think that the presentation made by Ms. Lemon and Ms. Turner was too limited in scope to be of use to the public. It informed us of current levels of nitrogen and phosphorus in the Rio Hondo and potential future levels if the Taos Ski Valley is allowed to build a sewage treatment plant of 200,000 gallons of water usage a day. It did not address the question of the Ski Valley's poor record in operating their plant and what effects of poor operation might have on the river. Nor did it address the effects of the new plant on the Ski Valley's ability to grow, and thus to potentially outgrow the new plant, and the subsequent effects on down-stream users.

When asked about these issues, the presenters said that those are not their jobs; their jobs is to only assess the water. Each NM department takes this narrow view of its responsibilities in order to avoid addressing the larger and more realistic consequences of a new, larger plant and the growth that is sure to follow.

This situation requires a full Environmental Impact Statement that takes into account complex factors that NM Water Quality is not able to access.

NMED/SWQB Response: The mission of the SWQB is to preserve, protect and improve New Mexico's surface water quality for present and future generations. According data collected during the 2000 and 2004 water quality surveys, the Rio Hondo is currently meeting state standards for plant nutrients and was <u>not</u> listed on the 2004-2006 STATE OF NEW MEXICO INTEGRATED CLEAN WATER ACT §303(D)/ §305(B) REPORT for plant nutrients.

The NPDES permit program is responsible for the protection of surface water quality throughout the State by regulating point source discharges of pollutants to surface watercourses. Since the program's inception, EPA Region 6 based in Dallas, TX, has administered the program in New Mexico with assistance and oversight by the SWQB Point Source Regulation Section. New Mexico is currently pursuing state authorization for the program.

Federal laws provide the EPA with various methods of taking enforcement actions against violators of permit requirements. Equally important is how the general public can enforce permit conditions. The facility monitoring reports are public documents, and the general public can review them. If any member of the general public finds that a facility is violating its NPDES permit that a member can independently start a legal action.

The SWQB is not the ultimate decision-making authority with regards to whether or not the WWTP will expand or how the Village of Taos Ski Valley or private land owners choose to develop their land, but the SWQB can provide maximum allowable effluent concentrations

that will continue to be protective of the river and ensure the river's designated uses continue to be supported.

Sent via Email, March 24, 2005 4:56 PM

Tom Harris
P.O. Box 313
Arroyo Hondo NM 87513

COMMENT: If non point sources of water pollution on the Rio Hondo are more significant than the point source of the Twining sewerage treatment plant, then the reason for the existence of those non point sources should be examined. (Runoff from ski trails, urban development , backyard use of fertilization/landscaping, parking lots, traffic, etc) and septic tanks of all those developments that have been built as a result of the existence of the ski resort.
During the irrigation season of 2004, the growth of filamentous algae in acequia Madre del Llano has become more apparent. This plant is an indicator of dissolve nutrients in the water of the Rio Hondo. Acequias are becoming " vegetated swales "

NMED/SWQB Response: The SWQB agrees with this comment. As stated in the TMDL, individual wasteload allocations for construction activities covered under general permits were not possible to calculate at this time using available data and analysis tools. <u>Loads that are in compliance with the general permits are therefore currently calculated as part of the load allocation</u>. At this time, the SWQB does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies to be able to accurately determine waste load allocations from construction activities covered under general permits.

The SWQB has previously discussed this issue with EPA Region 6, and both parties performed research to determine if there are any examples from other states on how to approach this issue with construction activities covered under general permits. There are no good examples at this time, but several states are developing methods of including stormwater runoff from construction activities in their TMDLs, but they are still in the early stages of development. Storm water discharges from construction activities are transient because they occur mainly during the construction itself, and often only during storm events. Therefore, protection of the receiving water is best addressed through individual Storm Water Pollution Prevention Plans that are required as part of the construction process.

In New Mexico, nonpoint sources are the most significant contributor to water quality exceedences; therefore, the best avenue to restore watershed health is to focus community efforts on a holistic approach to watershed protection. The Rio Hondo/Upper Rio Grande Watershed Group will be addressing various nonpoint sources when they develop a Watershed Restoration Action Strategy (WRAS). In addition, the SWQB will be conducting another intensive survey of the Rio Hondo watershed in 2008 to monitor and assess multiple biological, chemical, and physical water quality parameters of the perennial surface waters in this watershed. If the data from this survey indicate impairments then new TMDLs will be written accordingly.

COMMENT: There are documented occurrences of untreated sewage entering the Rio Hondo from the ski valley area. If ski valley sewage is under an EPA waste water permit, And untreated sewage enters the Rio Hondo, There appears to be a violation of the Permit.

NMED/SWQB Response: There are various methods used to monitor NPDES permit conditions. The permit requires the facility to sample its discharges and notify EPA and the state regulatory agency of these results. In addition, the permit will require the facility to notify EPA and the state regulatory agency when the facility determines it is not in compliance with the requirements of a permit. EPA and state regulatory agencies also will send inspectors to companies in order to determine if they are in compliance with the conditions imposed under their permits.

Federal laws provide EPA and authorized state regulatory agencies with various methods of taking enforcement actions against violators of permit requirements, whether or not those violations were accidental or intentional. For example, EPA and state regulatory agencies may issue administrative orders, which require facilities to correct violations and that assess monetary penalties. The laws also allow EPA and state agencies to pursue civil and criminal actions that may include mandatory injunctions or penalties, as well as jail sentences for persons found willfully violating requirements and endangering the health and welfare of the public or environment. Equally important is how the general public can enforce permit conditions. The facility monitoring reports are public documents, and the general public can review them. If any member of the general public finds that a facility is violating its NPDES permit, that member can independently start a legal action unless EPA or the state regulatory agency has already taken an enforcement action.

COMMENT: It is suggested that there is a serious need for comprehensive evaluation of the resource defined by the Rio Hondo and the associated drainage system. The Rio Hondo, certainly is not an unlimited resource. It is suggested that this limit has already been exceeded.

Historically, the cultural use of the waters of the Rio Hondo has been for Domestic and Agricultural purposes.
The State has subverted the use granted and authenticated by Treaty.

NMED/SWQB Response: Comments regarding water rights need to be directed to Office of the State Engineer (OSE) and the Interstate Stream Commission (ISC). The OSE and the ISC are separate but companion agencies charged with administering the state's water resources. The agencies have jurisdiction over the supervision, measurement, appropriation and distribution of essentially all surface and ground water in New Mexico, including streams and rivers that cross state boundaries.

The New Mexico Acequia Commission is comprised of a group of local acequia members appointed by the Governor to advise the state on matters affecting the acequia and ditch associations throughout New Mexico. Many acequias are in litigation for deciding water rights in their areas. The Commission makes recommendations to the committee assigned with

reviewing applications for Acequia and Community Ditch funds, which are utilized by acequias for their adjudications.

Sent via FAX, March 25, 2005 9:15 AM

Mickey Blake
Taos Ski Valley, Inc.
P.O. Box 24603
El Prado, NM 87529

COMMENT: Very well run and informative meeting. I attended the first session. Draft TMDL is very thorough.

NMED/SWQB Response: Thank you for your comments and support.

Sent via Email and U.S. Postal Service, April 5, 2005 9:18 AM

Peter A. Vigil, District Manager
Taos Soil and Water Conservation District
P.O. Box 2787
Ranchos de Taos, NM 87557

COMMENT: The following comments are submitted on behalf of the Taos Soil and Water Conservation District. The comments refer to the version of the TMDL document that was available on the NMED web site on March 7, 2005 and includes information and clarifications from the public meeting in Taos on March 17, 2005. The general concern of the District is that the watersheds or stream segments be listed based on the best scientific data and that impairment decisions and eventual TMDL implementation actions be based on clear links between data and the causes of impairments. This relates to the specific concern that any proposed TMDL implementation actions that affect District actions or policies be in the overall best interest of the health of the target watershed.

The TMDL documents that were reviewed focus on nutrient impairment for the Rio Hondo segment in Taos County, New Mexico, from the confluence with the Rio Hondo South Fork, upstream to Lake Fork Creek. This segment is not currently listed as impaired on the New Mexico 303(d) list as reported to USEPA. The Department and the Surface Water Quality Bureau should be complimented on taking the extra step of reviewing the nutrient loading on a steam segment that is not listed and providing an improved scientific basis for any future permitting action that might impact this stream segment, specifically potential changes at the Twining Sanitation Plant in the Taos Ski Valley. However, the linkage between the existing waste load allocation for phosphorous for this stream segment and the TMDL should be explained in more detail in the document. Also, inclusion of a comparison between the current conditions in the Rio Hondo, expected future conditions and current loads from the treatment plant in comparison to possible future loads, with the proposed waste load allocation, would be helpful.

***NMED/SWQB Response:** Thank you for recognizing the SWQB's initiative in writing a TMDL for an unimpaired stream segment. The existing annual waste load allocation (WLA) for total phosphorus (TP) for this stream segment is 1.00 lbs/day. The new WLA for TP, based on nutrient export calculations and background concentrations, is 1.47 lbs/day. Even though this TMDL calculated a higher TP waste load allocation than the current limit, the Village of Taos Ski Valley Wastewater Treatment Plant (WWTP) would like to maintain the current load (1.00 lbs/day) in their new NPDES permit. Clarification was added to the TMDL document (see page 27, Section 5.1.3). The Village of Taos Ski Valley WWTP will not increase phosphorus loading into the Rio Hondo watershed. The following tables are the current and proposed TP effluent limitations for the Village's WWTP:*

CURRENT WWTP Effluent Limitations

Total Phosphorus

Month	***Current*** **Q_e (mgd)**	***Current*** **WLA (lbs/day)**	***Current*** **C_e (mg/L)**
January	0.095	0.79	1.0
February	0.095	0.79	1.0
March	0.095	0.79	1.0
April	0.095	0.79	1.0
May	0.095	1.59	2.0
June	0.095	1.59	2.0
July	0.048	1.21	3.0
August	0.048	1.21	3.0
September	0.019	0.79	5.0
October	0.019	0.79	5.0
November	0.095	0.79	1.0
December	0.095	0.79	1.0
Annual	**0.095**	**1.00**	**1.2**

PROPOSED WWTP Effluent Limitations

Total Phosphorus

Month	**Proposed Q_e (mgd)**	***Current*** **WLA (lbs/day)**	**NEW C_e (mg/L)**
January	0.200	0.79	**0.5**
February	0.200	0.79	**0.5**
March	0.200	0.79	**0.5**
April	0.200	0.79	**0.5**
May	0.200	1.59	**1.0**
June	0.200	1.59	**1.0**
July	0.100	1.21	**1.5**
August	0.100	1.21	**1.5**
September	0.040	0.79	**2.5**
October	0.040	0.79	**2.5**
November	0.200	0.79	**0.5**
December	0.200	0.79	**0.5**
Annual	**0.200**	**1.00**	**0.6**

where Q_e is the WWTP effluent discharge in million gallons per day (mgd), WLA is the 1981 waste load allocation, and C_e is the WWTP effluent limit in milligrams per liter (mg/L).

COMMENT: It is understood that the estimates of non-point source contributions to the nutrient load entering the Rio Hondo are based on export coefficients from published literature and that the most conservative coefficients were selected. This process most likely results in an overestimate of the contributions from these sources. However, the District remains uncomfortable with the small (5%) margin of safety assigned to the loading estimates. The documents that provide details of the export coefficients should be provided to allow consideration of all factors that were not considered (i.e. slope) and to allow a determination, if in fact these coefficients would remain conservative under all conditions. Additionally, since the margin of safety is based on a protocol (verbal communication, March 17, 2005), that protocol should also be included in the document for review.

NMED/SWQB Response: The SWQB believes that the combination of relatively conservative numeric targets and source estimates creates an overall Margin of Safety that is adequate to account for uncertainty in this analysis. The Margin of Safety (page 32, Section 6.0) was reworded to explain, in more detail, the conservative assumptions and explicit uncertainties that were fundamental in this analysis. A TMDL is generally divided into a Load Allocation for nonpoint sources, a Waste Load Allocation for point sources, and a Margin of Safety for uncertainties. This analysis went one step further and also allocated the load to background and future sources. The background allocation amounted to 17% for total phosphorus and 21% for total nitrogen. This allotment was set aside for current, ambient conditions and was <u>not</u> lumped into the LA, as was done in the past when suitable reference reaches were not known and background conditions could not be established. The separation of background load from the LA gives added reassurance that nonpoint source loads are more appropriate for the system and that applicable water quality standards will continue to be attained.

The documents that provide details on the export coefficients were footnoted under the respective tables and were listed in the references (Section 13.0).

COMMENT: Specifically, the District has concerns about the manner in which the nitrogen load from septic systems was estimated. It is unclear if the chosen export coefficients would apply in a linear manner to the larger systems included in the nitrogen loading estimates. Also it is not clear if the chosen export coefficient is appropriate and conservative for steep slopes and highly transmissive soils of Taos Ski Valley. Furthermore, not all systems are discussed, specifically the status of contributions from the Taos East Condominiums, located just upstream of the Rio Hondo South Fork are not discussed.

NMED/SWQB Response: The SWQB consulted with both the NMED Field Office in Taos and the Ground Water Quality Bureau when researching the number of septic systems in the valley. According to this research, there are a total of 77 Liquid Waste Disposal Permits and 2 Ground Water Discharge Permits issued by NMED for septic systems in this assessment unit. As stated in the text of the draft TMDL, the Liquid Waste Disposal Permits are issued to on-site systems that discharge less than 2000 gallons per day, whereas the Ground Water Discharge Permits are for on-site systems that discharge greater than 2000 gallons per day. The only permittees that were identified by name were the Austing Haus and the Inn at Taos Ski Valley.

The use of export coefficients to estimate septic loads was the best available method given the available dataset and given that detailed watershed models have not been developed for the Rio Hondo watershed. The export coefficient selected for septic systems assumes that all septic tanks are operating properly and that all tanks discharge periodically. In addition, it was assumed that all permitted tanks were within 100 yards of the stream. The results provided an approximation of the loading to the Rio Hondo watershed. However, the SWQB concedes that there may be households, businesses, or multifamily housing units that have illegal, undocumented, or malfunctioning septic systems. Unfortunately, the SWQB currently does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies

to be able to accurately determine all groundwater contributions from septic systems in the valley.

COMMENT: However, even with these concerns the District supports the concept of trading non-point loads from septic systems to point source loads for the treatment plant, especially the phased approach proposed to allow time for the infrastructure installation and verification of transfer of the loads. However, it seems that the treatment plant should not be given credit for the full load. This position is based on three facts, (1) the load estimates from the non-point sources is assumed to be conservative, (2) overestimating the actual nitrogen load particularly from residential septic systems, the treatment plant should be capable of providing more efficient removal of the nitrogen than septic systems, and (3) the complete load for nitrogen to the stream, with the 5% margin of safety and 2% growth allowance has been completely allocated. This transfer from non-point to point source discharge, if allowed with some fixed percentage allocated for the transfer of septic systems loads to the treatment plant would increase the buffer in the receiving water and potentially result in a net improvement to the water quality as opposed to the status quo.

Also, the District would encourage the Bureau and The Village to explore other opportunities for trades that would result in a net benefit to the receiving water body. For example, improvements to the existing parking facilities could be proposed by the Village for approval by NMED staff, which would result in additional waste load being eliminated that could be transferred to the point source discharge category. This could again, be at some reduced allocation to preserve the assimilative capacity and health of the receiving water. This would also likely reduce loading in other categories, such as sediment and some organic pollutants that are not currently of concern for the Rio Hondo, but which should always be considered in non-point discharges.

NMED/SWQB Response: The SWQB agrees with these comments. The Draft TMDL includes a section on trading to encourage creative, alternative solutions to maintaining water quality standards given the current growth projections. Water quality trading in the Rio Hondo watershed should be discussed by key parties, such as dischargers in the watershed, federal, tribal, state, and local governments, local businesses, as well as local citizen and interest groups. It is up to the individual trading committees to determine the nature of the trading activity, identify the environmental problem associated with the trading, establish the types of trading that will occur (ex: point/point, point/nonpoint), and agree on the trading ratios that will apply. Water quality trading is voluntary, however all sources that choose to participate in trading will have to adhere to accountability mechanisms established by the trading program to ensure that promised pollutant reductions are generated.

In conclusion the District is supportive of this effort to maintain the Rio Hondo as a high quality water body and looks forward to working with you and other staff from the Environment Department on this and other projects on Taos County.

Sincerely,

Peter A. Vigil, District Manager
Taos SWCD

Received via U.S. Postal Service, April 6, 2005

Joanie Berde
Carson Forest Watch
P.O. Box 15
Llano, NM 87543

COMMENT: On behalf of the Carson Forest Watch citizen's group, the following comments on the Draft TMDL for the Rio Hondo at Taos Ski Valley and Village –

1) While we strongly support getting TMDL limits for all stream systems in New Mexico, we are concerned that the limits being proposed may not be adequate to protect water quality in the Rio Hondo – especially downstream water quality.

2) The cumulative effects of all users that could impair water quality were not adequately addressed in the Draft TMDL. Direct and indirect uses including future development in TSV were not adequately addressed.

3) The resulting effluent from future TSV growth and new treatment plant were not adequately addressed in the Draft. The Draft failed to analyze how sewage treatment plants work at such high altitudes such as Taos Ski Valley. We are concerned regarding the effectiveness of sewage treatment in such extreme weather conditions as 10,000' altitude. There was no data in the Draft TMDL to support statements that the TMDL limits being proposed will be adequate for the Rio Hondo – esp. since effluent levels will likely double in the future.

NMED/SWQB Response: As stated in the TMDL, individual waste load allocations for construction activities covered under general permits were not possible to calculate at this time using available data and analysis tools. Loads that are in compliance with the general permits are therefore currently calculated as part of the load allocation. The SWQB does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies to be able to accurately determine waste load allocations from construction activities covered under general permits.

The SWQB has previously discussed this issue with EPA Region 6, and both parties performed research to determine if there are any examples from other states on how to approach this issue with construction activities covered under general permits. There are no good examples at this time, but several states are developing methods of including stormwater runoff from construction activities in their TMDLs, but they are still in the early stages of development. Storm water discharges from construction activities are transient because they occur mainly during the construction itself, and often only during storm events. Therefore, protection of the receiving water is best addressed through individual Storm Water Pollution Prevention Plans that are required as part of the construction process.

Furthermore, all calculations in development of this TMDL used the <u>projected</u> plant design capacity of 0.200 MGD, instead of the current design capacity of 0.095 MGD. Consequently, all flow calculations in this TMDL estimate treatment capacity in the future scenario, which accommodates projected growth through 2020 (see Section 8.0). Future projections also indicate that nonpoint sources of phosphorus will more than likely increase as the Village of Taos Ski Valley continues to grow and develop. Therefore, <u>in addition to the projected growth that was integrated into the TMDL calculations</u>, two percent of the TMDL was set aside for a growth allocation (GA), as a placeholder for unknown or future sources of nutrients.

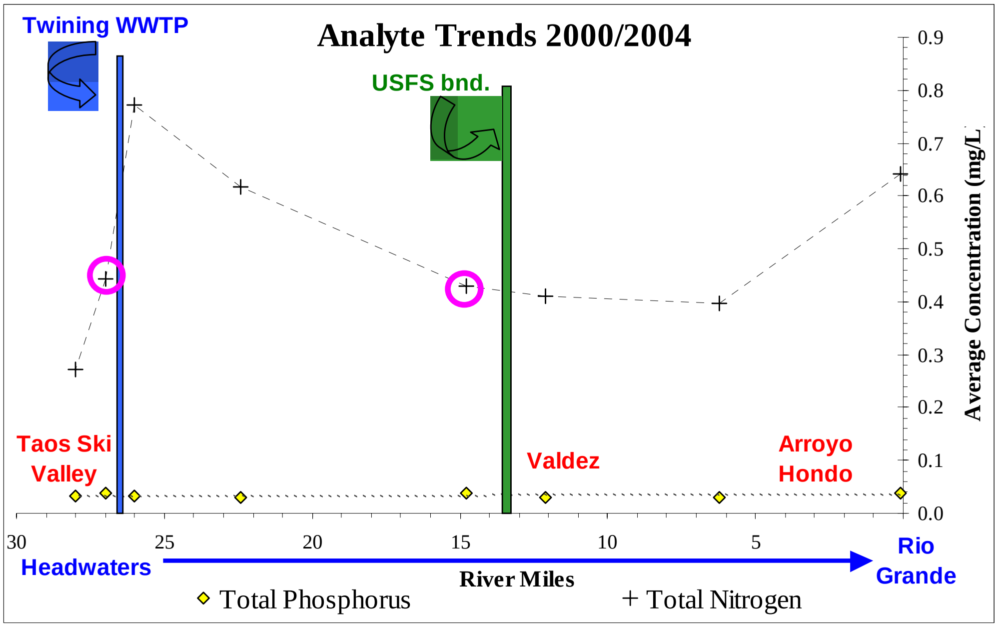
COMMENT:

4) The Draft TMDL did not adequately address Taos Pueblo usage concerns – esp. ceremonial and traditional cultural use. This stream is critical for the ongoing practice of Taos Pueblo spiritual and cultural life and the strictest TMDL limits should be imposed for the Rio Hondo.

5) Finally – downstream water users and uses were not adequately provided for in the Draft TMDL. Acequia use, community agricultural use, and recreational use were not adequately analyzed. This was an important public concern, and the TMDL needs to address how the limits being proposed will impact downstream water quality.

NMED/SWQB Response: The current applicable designated uses for the perennial reaches of the Rio Hondo Watershed include domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, and secondary contact (NMAC 20.6.4.124). Target nutrient loads for the Rio Hondo were calculated based on the critical 4Q3 low flow values, forthcoming segment-specific numeric criteria for phosphorus, numeric translators for nitrogen based on recommendations in the 1981 Rio Hondo WLA, and a conversion factor that is used to convert to lbs/day. These TMDLs were calculated for the upper Rio Hondo and are designed to protect the stream by maintaining water quality standards and fully supporting the designated uses.

Regarding nitrogen, data collected by the SWQB in 2000 and 2004 (graph shown below) reveal a spike in total nitrogen associated with the WWTP, but nitrogen concentrations decrease as the river flows downstream and the nutrients are assimilated into plant materials. By the time the water reaches the Forest Service boundary, TN concentrations are similar to those found above the WWTP (highlighted by pink circles). As the water flows past Arroyo Hondo, nitrogen concentrations increase again indicating an additional source of nitrogen entering the stream along this reach. Since water flows downstream, if water quality standards are being maintained in the upper reaches of the Rio Hondo then they should also be maintained in the lower reaches of the Rio Hondo unless there are additional nonpoint source inputs of nutrients to the stream and/or environmental factors (i.e. water diversions, temperature increases, etc.) that encourage the growth of nuisance algae.



COMMENT:

6) Also, much more needs to be done regarding the monitoring of the Rio Hondo in the future – to ensure compliance with TMDL limits.

NMED/SWQB Response: The SWQB will be conducting another intensive survey of the Rio Hondo watershed in 2008 to monitor and assess multiple biological, chemical, and physical water quality parameters of the perennial surface waters in this watershed. If the data from this survey indicate impairments then new TMDLs will be written accordingly.

In addition, the NPDES permit program is responsible for the protection of surface water quality throughout the State by regulating point source discharges of pollutants to surface watercourses. Since the program's inception, the EPA has administered the program in New Mexico with assistance and oversight by the SWQB Point Source Regulation Section. Congress provided a process and encouraged the states to develop and implement the program [CWA §101(b)]. New Mexico is now pursuing state authorization for the program.

Federal laws provide EPA with various methods of taking enforcement actions against violators of permit requirements. Equally important is how the general public can enforce permit conditions. The facility monitoring reports are public documents, and the general public can review them. If any member of the general public finds that a facility is violating its NPDES permit, that member can independently start a legal action.

Thank you.
Sincerely,
Joanie Berde
Carson Forest Watch

Sent via Email, April 11, 2005 9:41 AM, 12:29 PM
Sent via FAX, April 11, 2005, 9:57 AM
Received via U.S. Postal Service, April 11, 2005
Sent via Email, April 12, 2005, 9:47 AM

NMED/SWQB Response NOTE: Several Arroyo Hondo residents, Amigos Bravos, and the Rio Pueblo/Rio Embudo Watershed Protection Coalition submitted the following comments in multiple formats. The bodies of these comments were the same and will be addressed at the same time. The introductions are as follows:

Larry Frank
Resident of the Rio Hondo Watershed
P.O. Box 290
Arroyo Hondo, NM 87513

Mark Schiller & Kay Mathews
Rio Pueblo/Rio Embudo Watershed
Protection Coalition
Box 6 El Valle Rt.
Chamisal, NM 87521

INTRODUCTION: As a resident of the Rio Hondo Watershed, [*As members of the Rio Pueblo/Rio Embudo Watershed Protection Coalition,*] I would like to communicate a number of concerns about the draft TMDL document for the Rio Hondo. The Rio Hondo has significant cultural, economic, and ecological value to residents of the Watershed and New Mexico. Good water quality is integral to all of these values and therefore it must be restored and protected. I urge the New Mexico Environment Department to consider the following issues when finalizing the TMDL.

The entire process of accessing potential impacts to the river is flawed by only looking at a portion of the river. All too often government regulatory agencies fragment their evaluation of potential impacts in order to avoid looking at the cumulative impacts of their decisions. The only way to access the full range of impacts to the river is to look at the river as a whole.

The downstream communities not only predate the Village of Taos Ski Valley, they predate the sovereignty of the United States Government. As such, their pre-existing uses of the river, irrigating crops, watering domestic stock and, in the case of Taos Pueblo, ceremonial practices, must be given special consideration when formulating TMDLs for upstream areas.

NMED/SWQB Response: The SWQB agrees that the monitoring, assessment, TMDL development, and watershed protection activities should be in the best interest of the target watershed. The mission of the SWQB is to preserve, protect and improve New Mexico's surface water quality for present and future generations. SWQB works collaboratively with stakeholders, such as federal, tribal, state, and local governments, local businesses, and point source dischargers in the watershed, as well as local citizen and interest groups to help protect and improve the biological, chemical, and physical integrity of surface waters in the State of New Mexico.

According data collected during the 2000 and 2004 water quality surveys, the Rio Hondo is currently meeting state standards for plant nutrients and was <u>not</u> listed on the 2004-2006

State of New Mexico Integrated Clean Water Act §303(d)/ §305(b) Report for plant nutrients. Since water flows downstream, if water quality standards are being attained in the upper reaches of the Rio Hondo, as indicated by this data, then they should also be attained in the lower reaches of the Rio Hondo unless there are additional nonpoint source inputs of nutrients to the stream and/or environmental factors (i.e. water diversions, temperature increases, etc.) that encourage the growth of nuisance algae.

The current applicable designated uses for the perennial reaches of the Rio Hondo Watershed include domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, and secondary contact (NMAC 20.6.4.124). Target nutrient loads for the Rio Hondo were calculated based on the critical 4Q3 low flow values, segment-specific numeric criteria for phosphorus, numeric translators for nitrogen based on suggestions in the 1981 Rio Hondo WLA, and a conversion factor that is used to convert to lbs/day. These TMDLs were calculated for the upper Rio Hondo and are designed to protect the stream by maintaining water quality standards and fully supporting the designated uses throughout this reach.

Rachel Conn
Amigos Bravos
P.O. Box 238
Taos, NM 87571

INTRODUCTION: As a statewide river conservation organization based in Taos, Amigos Bravos, Friends of the Wild Rivers, would like to submit the following comments on the draft TMDL document for the Rio Hondo. In New Mexico, issues of water quality and quantity are integral to all aspects of life. The cultural and ecological survival of the communities of New Mexico is intricately tied to our rivers, acequias and other water bodies and we strongly support efforts to curb pollution to our waters through strong TMDL documents with enforceable implementation plants. We have organized our comments into a number of general topic areas:

NMED/SWQB Response: The SWQB understands your concern and appreciates your commitment to improving the health of watersheds statewide. The SWQB agrees that the monitoring, assessment, TMDL development, and watershed protection activities should be in the best interest of the target watershed. The mission of the SWQB is to preserve, protect and improve New Mexico's surface water quality for present and future generations. SWQB works collaboratively with stakeholders, such as federal, tribal, state, and local governments, local businesses, and point source dischargers in the watershed, as well as local citizen and interest groups to help protect and improve the biological, chemical, and physical integrity of surface waters in the State of New Mexico.

IMPLEMENTATION PLAN

Where are the guarantees that this TMDL document is not merely a paper exercise? Amigos Bravos holds that TMDLS, including their implementation plans, should be written as enforceable documents. On page 38 the TMDL states “Implementation of BMPs within the watershed to reduce pollutant loading from NPS will be encouraged.” How will the Environment

Department encourage BMPs? The implementation plan should include detailed plans as to what types of BMPs will be encouraged, and ideally required, to meet water quality standards. TMDLs, should be written with equal focus on presenting data on current conditions *and* implementing plans to clean up the river. Most TMDL documents are heavy on data on the current conditions and the target conditions but lack detail on how to get to that target. Two pages out of forty-five is not giving TMDL implementation adequate attention.

NMED/SWQB Response: The SWQB concurs that TMDLs may be more effective if they could be written as 100% enforceable documents. The final "TMDL Rule" published in the Federal Register July 13, 2000, would have given states the authority to regulate nonpoint source discharge under the TMDL program. This rule was subsequently withdrawn due to intense pressure from the regulated community. As such, SWQB does not have the authority other than those noted in the Assurances section of the document to regulate nonpoint sources.

Even so, SWQB believes TMDLs are not merely paper exercises. There are several required elements in TMDLs, per EPA guidance, which is why the TMDL itself is heavy on current conditions and target conditions. TMDLs are the guiding document for development of Watershed Restoration Action Strategies (WRAS) by local stakeholders with assistance from the SWQB Watershed Protection Section (WPS). The WRAS is in essence the TMDL Implementation Plan, or phase 2 of the TMDL process. The WRAS provides details on the type and location of BMPs based on local stakeholder knowledge, individual stakeholder interest, and the technical restoration expertise of WPS staff that will best address the impairments detailed in the TMDL. Development of the TMDL and WRAS opens up funding opportunities through the Clean Water Act 319 program to implement these BMPs in the watershed. SWQB has and will continue to encourage BMP implementation through technical assistance during the development of the WRAS, as well as technical assistance during development, implementation, and monitoring of CWA 319 projects.

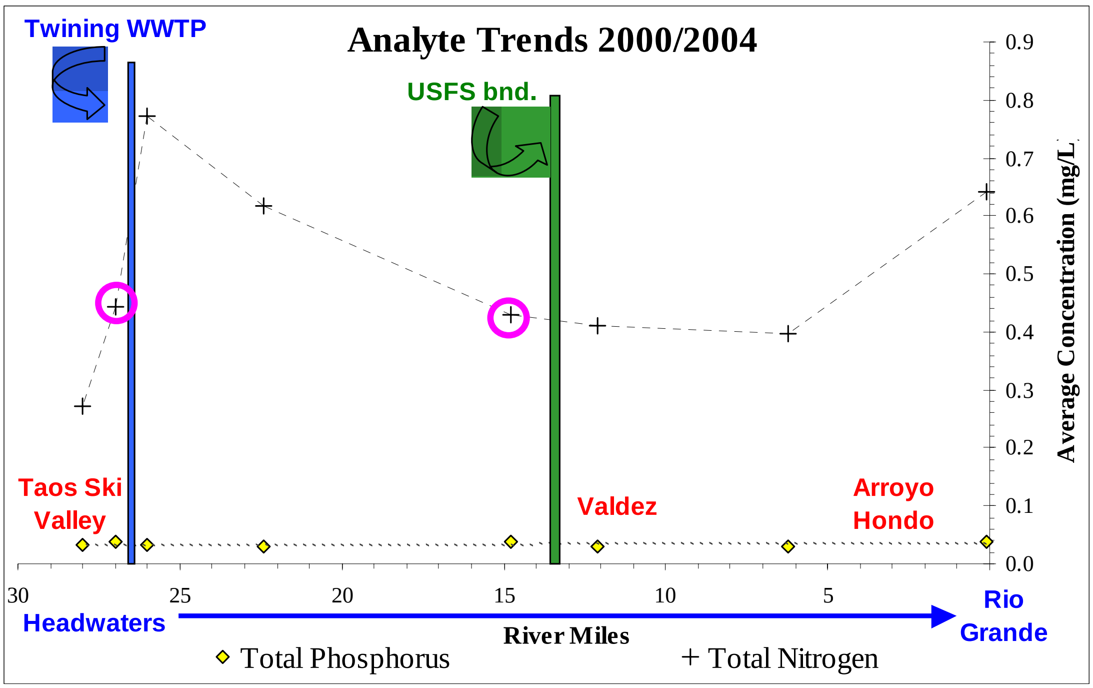
ALGAL GROWTH

Numerous community members have commented on the increase of algal growth in Rio Hondo, both in their acequias and in the Rio Hondo right at the Forest Service boundary. Because they have observed this algal growth at the Forest Boundary, before it flows through downstream communities, it is believed that the increased growth is due to nutrient loading upstream. Perhaps nutrients are being transported during storm events and are not being monitored since most, if not all, monitoring takes place during non-storm conditions. The issue of algal growth needs to be further examined.

NMED/SWQB Response: According data collected during the 2000 and 2004 water quality surveys, the Rio Hondo is currently meeting state standards for plant nutrients and was not listed on the 2004-2006 STATE OF NEW MEXICO INTEGRATED CLEAN WATER ACT §303(D)/ §305(B) REPORT for plant nutrients.

Regarding nitrogen, data collected by the SWQB in 2000 and 2004 (graph shown below) reveal a spike in total nitrogen associated with the WWTP, but nitrogen concentrations decrease as the river flows downstream and the nutrients are assimilated into plant materials.

By the time the water reaches the Forest Service boundary, TN concentrations are similar to those found above the WWTP (highlighted by pink circles). As the water flows past Arroyo Hondo, nitrogen concentrations increase again indicating an additional source of nitrogen entering the stream along this reach. Since water flows downstream, if water quality standards are being maintained in the upper reaches of the Rio Hondo then they should also be maintained in the lower reaches of the Rio Hondo unless there are additional nonpoint source inputs of nutrients to the stream and/or environmental factors (i.e. water diversions, temperature increases, etc.) that encourage the growth of nuisance algae.



The SWQB agrees that the issue of algal growth needs to be further examined. The SWQB applied for an EPA 104(b)(3) Grant for FY 2004 to identify all dischargers and their respective contributions of nutrients within the Rio Hondo watershed, to determine the overall potential impact of these dischargers, and to revise/develop total maximum daily load (TMDL) planning documents for nutrients. The EPA did not select SWQB's proposal for funding. Unfortunately, the SWQB currently does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies to be able to accurately determine site-specific nutrient loading from storm events. However, the SWQB is in the process of developing a more appropriate ecoregional approach to nutrient criteria. In addition, the monitoring and assessment section of the SWQB has also devised an intensive, integrated, weight-of-evidence approach to nutrient assessment that is still in draft form.

The SWQB will be conducting another intensive survey of the Rio Hondo watershed in 2008 to monitor and assess multiple biological, chemical, and physical water quality parameters of the perennial surface waters in this watershed. By 2008, the nutrient criteria development should be completed and the weight-of-evidence nutrient assessment should be approved. If the data from this survey indicate nutrient impairments then new TMDLs will be written accordingly.

RESIDENTS OF ARROYO HONDO:

Tom Harris
Cliff Baine
Charlie Rendon
Isabelle Rendon
Elena Rendon
Leonardo A. Ortiz
Mark Kramer
Fernando Martin
and Robert Fies

NOTE: There were 18 other signatures on the document that could not be listed because they were illegible.

INTRODUCTION: As a resident of the Rio Hondo Watershed, I would like to communicate a number of concerns about the draft TMDL document for the Rio Hondo. The Rio Hondo has significant cultural, economic, and ecological value to residents of the Watershed and New Mexico. Good water quality is integral to all of these values and therefore it must be restored and protected. I urge the New Mexico Environment Department to consider the following issues when finalizing the TMDL.

NMED/SWQB Response: The SWQB agrees that the monitoring, assessment, TMDL development, and watershed protection activities should be in the best interest of the target watershed. The mission of the SWQB is to preserve, protect and improve New Mexico's surface water quality for present and future generations. SWQB works collaboratively with stakeholders, such as federal, tribal, state, and local governments, local businesses, and point source dischargers in the watershed, as well as local citizen and interest groups to help protect and improve the biological, chemical, and physical integrity of surface waters in the State of New Mexico.

According data collected during the 2000 and 2004 water quality surveys, the Rio Hondo is currently meeting state standards for plant nutrients and was not listed on the 2004-2006 STATE OF NEW MEXICO INTEGRATED CLEAN WATER ACT §303(D)/ §305(B) REPORT for plant nutrients.

GENERAL COMMENTS SUBMITTED BY RESIDENTS OF ARROYO HONDO, AMIGOS BRAVOS, AND THE RIO PUEBLO/RIO EMBUDO WATERSHED PROTECTION COALITION:

I [We] have organized our comments into a number of general topic areas:

LOCATION OF PUBLIC MEETING

Many residents in the Rio Hondo Watershed were not able to make it to the public meeting at the Juan I. Gonzales Agricultural Center in Taos. Time and time again, public meetings are held in locations outside of the affected community. I [Amigos Bravos] urge[s] you to plan all future meetings either at the Arroyo Hondo Community Center or at the Arroyos del Norte School. It takes approximately half and hour to get from Arroyo Hondo to the Agricultural Center and many residents who are interested in water quality in the Rio Hondo but too busy to spare an hour of driving time were not able to attend the meeting.

NMED/SWQB Response: Considering the cultural, ecological, and economical concerns regarding this TMDL and considering that multiple communities from throughout the watershed (and beyond) were interested in this Draft TMDL document, the SWQB decided to hold the meeting in a central, unbiased location that would be able to accommodate the number of people that we had anticipated to come to the meeting. Individuals from Santa Fe, Chamisal, Taos Ski Valley, El Prado, Arroyo Hondo, Questa, Taos, and Ranchos de Taos attended the public meetings. In addition, to accommodate a scheduling conflict that arose at the last minute due to weather, SWQB held two back-to-back 2-hour meetings to discuss the draft TMDLs with as many stakeholders as possible.

<u>IMPACT ON INFRASTRUCTURE IMPROVEMENTS IN DOWNSTREAM COMMUNITIES</u>

I [Amigos Bravos] am [is] concerned about the impact this TMDL will have on the ability of downstream communities to build wastewater treatment facilities. This is an environmental justice issue that needs to be addressed. Because of the restriction on installing new septic tanks on land that is less than an acre, many members of the community are forced to pay to have their sewage hauled. This is an unreasonable economic burden on an already economically strapped community that could be alleviated by a publicly funded wastewater treatment facility. In the current TMDL, it is unclear what waste load allocation is saved for potential downstream activities like new point sources.

NMED/SWQB Response: The Draft TMDL was written for the Rio Hondo (South Fork to Lake Fork Creek). All nutrient allocations associated with this document apply only to this assessment unit. If the downstream communities in other assessment units, such as Valdez and Arroyo Hondo, wish to install a wastewater treatment plant(s) then they will have the option to do so given that they have followed the appropriate procedures for obtaining a National Pollutant Discharge Elimination System (NPDES) permit for said plant(s).

<u>VILLAGE OF TAOS SKI VALLEY'S WASTE LOAD ALLOCATION</u>

It is unreasonable that the Village of Taos Ski Valley receives the entire waste load allocation (pollution from point sources) for the upper Rio Hondo. This amounts to 46% of *all* nutrient pollution (non-point, background and point sources) in the river. Why should one entity be allowed to create 46% of all allowable pollution in the river?

NMED/SWQB Response: The only existing point source on this assessment unit is the NPDES-permitted wastewater treatment plant owned and operated by the Village of Taos Ski Valley. If there were multiple point source dischargers in this assessment unit, the waste load allocation (WLA) would have been divided accordingly. However, because there is only one point source discharger, it receives the entire WLA.

Regarding phosphorus, the total phosphorus WLA and MOS were adjusted to reflect the state of New Mexico's antidegradation policy. The <u>existing</u> annual waste load allocation (WLA) for total phosphorus (TP) for this stream segment is 1.00 lbs/day. The <u>new</u> WLA for TP, based on nutrient export calculations and background concentrations, is 1.47 lbs/day. Even though the Draft TMDL calculated a higher TP waste load allocation than the current limit, the Village of Taos Ski Valley Wastewater Treatment Plant (WWTP) would like to maintain the current

load in their new NPDES permit (1.00 lbs/day). Therefore, the Village of Taos Ski Valley WWTP <u>will not increase phosphorus loading</u> into the Rio Hondo watershed, consistent with the State of New Mexico's antidegradation policy. The <u>new</u> WLA for total phosphorus will be 1.00 lbs/day, or 31% of the TMDL. The maximum allowable WWTP effluent concentration will decrease from 1.0 mg/L to 0.5 mg/L during the most stringent winter months (November through April). The remaining 0.47 lbs/day will be set aside as part of the Margin of Safety.

Regarding nitrogen, the total nitrogen loading from the Village of Taos Ski Valley WWTP will actually decrease as a result of this Draft TMDL. The current average winter WWTP nitrogen loading is 14.23 lbs/day (average winter WWTP effluent concentration is 26.91 mg/L) based on effluent concentrations from the 2004 sampling survey conducted by the SWQB and the WWTP discharge flow reports. Given the proposed expansion and subsequent increase in discharge, the Draft TMDL allocated 11.0 lbs/day total nitrogen to the WWTP. This is less than the current loading and will result in a maximum allowable effluent concentration of 6.5mg/L during the most stringent winter months. This is approximately four times lower than current effluent concentrations.

<u>POLLUTION FROM CONSTRUCTION SITES</u>

The TMDL does not account for the potentially substantial impacts from stormwater running off of construction sites. The upper Rio Hondo is experiencing a drastic increase in development that will potentially be increased more if the attempts of the wastewater treatment facility to double its capacity are successful. Storm Water Pollution Prevention Plans (SWPPPs) developed under the General Storm Water Construction permit and referred to in the TMDL are *not*, as suggested by the TMDL, adequate for controlling all pollution from construction sites. The TMDL itself states that the Storm Water Pollution Prevention Plans (SWPPPs) developed under the General Storm Water Construction Permits (CGP) "minimize" impacts to water quality. Coverage under the CGP and the related SWPPPs do not *eliminate* impacts to water quality. Therefore, the TMDL should allocate at least some waste load allocation to pollution from stormwater running off construction sites that are covered under the General Construction Storm Water Permit, and some load allocation to construction sites not covered under the general permit.

NMED/SWQB Response: The SWQB agrees with this comment. As stated in the TMDL, individual wasteload allocations for construction activities covered under general permits were not possible to calculate at this time using available data and analysis tools. <u>Loads that are in compliance with the general permits are therefore currently calculated as part of the load allocation</u>. The SWQB does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies to be able to accurately determine waste load allocations from construction activities covered under general permits.

The SWQB has previously discussed this issue with EPA Region 6, and both parties performed research to determine if there are any examples from other states on how to approach this issue with construction activities covered under general permits. There are no good examples at this time, but several states are developing methods of including stormwater runoff from construction activities in their TMDLs, but they are still in the early stages of development. Storm water discharges from construction activities are transient because they occur mainly during the construction itself, and often only during storm events. Therefore, protection of the

receiving water is best addressed through individual Storm Water Pollution Prevention Plans that are required as part of the construction process.

In New Mexico, nonpoint sources are the most significant contributor to water quality exceedences; therefore, the best avenue to restore watershed health is to focus community efforts on a holistic approach to watershed protection. The Rio Hondo/Upper Rio Grande Watershed Group will be addressing various nonpoint sources when they develop a Watershed Restoration Action Strategy (WRAS). In addition, the SWQB will be conducting another intensive survey of the Rio Hondo watershed in 2008 to monitor and assess multiple biological, chemical, and physical water quality parameters of the perennial surface waters in this watershed. If the data from this survey indicate impairments then new TMDLs will be written accordingly.

SEPTIC TANKS

Under the draft TMDL, when septic tanks are transferred over to the treatment plant, their whole load transfers as well, even though the treatment facility treats the sewage better then the septic tanks. This means that the treatment facility will be getting a net gain of load for every septic tank that goes online. This net gain could then be used either to not treat the sewage as efficiently or to discharge more volume of sewage (if the NPDES permit allows additional capacity). I [Amigos Bravos] recommend[s] that NMED develop a formula to calculate an accurate percentage of pollution load assigned to septic tanks that will then be added to the wastewater treatment facility. The present one-to-one exchange does not make sense.

NMED/SWQB Response: The Draft TMDL includes a section on trading to encourage creative, alternative solutions to maintaining water quality standards given the current growth projections. Water quality trading in the Rio Hondo watershed should be discussed by key parties, such as dischargers in the watershed, federal, tribal, state, and local governments, local businesses, as well as local citizen and interest groups. It is up to the individual trading committees to determine the nature of the trading activity, identify the environmental problem associated with the trading, establish the types of trading that will occur (ex: point/point, point/nonpoint), and agree on the trading ratios that will apply. Water quality trading is voluntary, however all sources that choose to participate in trading will have to adhere to accountability mechanisms established by the trading program to ensure that promised pollutant reductions are generated.

Thank you for the opportunity to comment on the draft TMDL. Amigos Bravos also appreciates the flexibility of the Surface Water Quality Bureau in hosting two back-to-back meetings to accommodate the public. We look forward to your response to our comments.

Thank you for your consideration.

Sent via Email, April 12, 2005 9:37 AM

Pamela D. Harris
POB 313
Arroyo Hondo, NM 87513
(505) 776-1482

COMMENT: I have lived at 109 Hondo Seco Road in Arroyo Hondo, NM for five years. My family has lived in the Taos valley for thirty years. Upon our retirement we moved to Taos in 1998 and purchased our home in Arroyo Hondo on March of 2000. We have a home on the placita as well as a small twelve acre farm with cattle and sheep about a mile down valley from our home. This is the place we chose to live and stay until our death. The agrarian life style in the valley, the culture, and the closeness of its' community are the main reasons for our choice. We love our home and community. I have two major concerns as a land owner and ground water or acaquia water rights holder I would like to address in this letter.

The first concern is the expansion of the Taos Ski Valley Sewer Treatment Plant. I agree that the treatment plant needs to be updated because it is no longer serving the purpose of not polluting the Rio Hondo and our valley. We have lived in Arroyo Hondo for five summers and the summer of 2004 was the first time we experienced a major pollution problem in the form of large amounts of Filamentous Algy in the Acaquia Madra del Llano which runs behind our house. We live in upper Arroyo Hondo not far from the comporta or intake for the acaquia. The first four summers we lived here children from the placita swam and fished in the acaquia off of our bridge all summer long. Last summer the acaquia was so thick with Algy no one wanted to touch it and when the water was switched to another part of the ditch the sun caused the Algy to smell so strongly that I was unable to sit out in our yard. It stunk like an polluted lagoon. I called the Taos Acaquia Association and made a complaint and also called one of our commissioners, Al Kaplan. I also went up to the part of the river before it enters agricultural land at the bottom of Taos Ski Valley to see if there was any Algy to be found there. It was heavy in that area as well. I reported this information as part of my phone conversations with Taos Acaquia Association and Al Kaplan. .

I can not understand how the nutrient levels at Taos Ski Valley can be so reportedly low under the circumstances. Under your current permit , my understanding is that you are not testing for nitrogen or fecal matter. Can this be the reason? Your nutrient levels are very low. How can this be? It takes nutrients to make the Algy grow. This summer was the first one in the five years since we have been here where we had sufficient water flow to satisfy almost all the water users. Before that the water was lower and ran much slower which should have been more conducive to Algy growth.

Does Ski Valley know when you are taking the samples? How can you account for the changes? Ski Valley will be using the new system to develop more land. The higher density will make the situation worse both because of the effluence from the treatment system and because of the parking and land cover density. Can't more study be done before it is irreversible?

NMED/SWQB Response: The SWQB understands your concern and appreciates your commitment to improving the health of the watershed in your community. The mission of the SWQB is to preserve, protect and improve New Mexico's surface water quality for present and future generations. The SWQB works collaboratively with stakeholders, such as federal, tribal, state, and local governments, local businesses, and point source dischargers in the watershed, as well as local citizen and interest groups to help protect and improve the biological, chemical, and physical integrity of surface waters in the State of New Mexico.

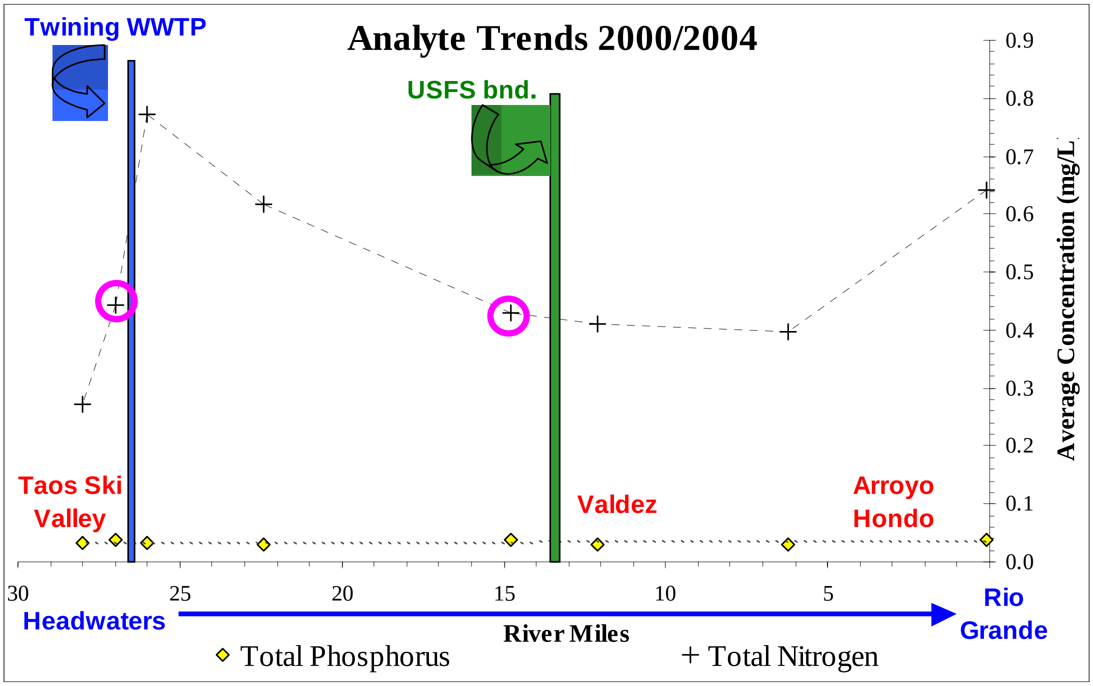
To address your specific concerns, current design capacity for the WWTP is 0.095 million gallons per day (MGD). All calculations in development of the Draft TMDLs used the proposed WWTP design capacity of 0.200 MGD. Since load is a function of concentration <u>and</u> discharge, all load calculations in the TMDL estimate treatment capacity in the future scenario, which accommodates projected growth through 2020 (see Section 8.0).

There are two potential contributors to nutrient enrichment in a given stream: excessive phosphorus and/or nitrogen. Regarding phosphorus, the <u>existing</u> annual waste load allocation (WLA) for total phosphorus (TP) for this stream segment is 1.00 lbs/day. The <u>new</u> WLA for TP, based on nutrient export calculations and background concentrations, is 1.47 lbs/day. Even though the Draft TMDL calculated a higher TP waste load allocation than the current limit, the Village of Taos Ski Valley Wastewater Treatment Plant (WWTP) would like to maintain the current load in their new NPDES permit (1.00 lbs/day). The Village of Taos Ski Valley WWTP <u>will not increase phosphorus loading</u> into the Rio Hondo watershed, consistent with the State of New Mexico's antidegradation policy. The <u>new</u> WLA for total phosphorus will be 1.00 lbs/day, or 31% of the TMDL. The maximum allowable WWTP effluent concentration will decrease from 1.0 mg/L to 0.5 mg/L during the most stringent winter months (November through April). The remaining 0.47 lbs/day will be set aside as part of the Margin of Safety.

Regarding nitrogen, the total nitrogen loading from the Village of Taos Ski Valley WWTP will actually decrease as a result of this Draft TMDL. The current average winter WWTP nitrogen loading is 14.23 lbs/day (average winter WWTP effluent concentration is 26.91 mg/L) based on effluent concentrations from the 2004 sampling survey conducted by the SWQB and the WWTP discharge flow reports. Given the proposed expansion and subsequent increase in discharge, the Draft TMDL allocated 11.0 lbs/day total nitrogen to the WWTP. This is less than the current loading and will result in a maximum allowable effluent concentration of 6.5mg/L during the most stringent winter months. This is approximately four times lower than current effluent concentrations.

Finally, data collected by the SWQB in 2000 and 2004 (graph shown below) reveal a spike in total nitrogen associated with the WWTP, but nitrogen concentrations decrease as the river flows downstream and the nutrients are assimilated into plant materials. By the time the water reaches the Forest Service boundary, TN concentrations are similar to those found above the WWTP (highlighted by pink circles). As the water flows past Arroyo Hondo, nitrogen concentrations increase again indicating an additional source of nitrogen entering the stream along this reach.

Since water flows downstream, if water quality standards are being maintained in the upper reaches of the Rio Hondo then they should also be maintained in the lower reaches of the Rio Hondo unless there are additional nonpoint source inputs of nutrients to the stream and/or environmental factors (i.e. water diversions, temperature increases, etc.) that encourage the growth of nuisance algae.



In New Mexico, nonpoint sources are the most significant contributor to water quality exceedences; therefore, the best avenue to restore watershed health is to focus community efforts on a holistic approach to watershed protection. The Rio Hondo/Upper Rio Grande Watershed Group can choose to focus on various nonpoint sources of nutrients in the lower Rio Hondo when they develop a Watershed Restoration Action Strategy (WRAS). In addition, the SWQB will be conducting another intensive survey of the Rio Hondo watershed in 2008 to monitor and assess multiple biological, chemical, and physical water quality parameters, such as total phosphorus, total nitrogen, bacteria, temperature, pH, and dissolved oxygen. If the data from this future survey indicate impairments then new TMDLs will be written accordingly.

In contrast to voluntary nonpoint source control measures, the National Pollutant Discharge Elimination System (NPDES) permit program is responsible for regulating point source discharges of pollutants in order to protect surface water quality throughout the State. Since the program's inception, the EPA has administered the program in New Mexico with assistance and oversight by the SWQB Point Source Regulation Program. Congress provided a process and encouraged the states to develop and implement the program [CWA §101(b)]. New Mexico is now pursuing state authorization for the program.

Federal laws provide EPA with various methods of taking enforcement actions against violators of permit requirements. Equally important is how the general public can enforce permit conditions. The facility monitoring reports are public documents, and the general public can review them. If any member of the general public finds that a facility is violating its NPDES permit, that member can independently start a legal action.

COMMENT: My second concerns has to do with the water rights that are being used to develop the new system. Attached is a print out of the agreement developed between the three main users of the Rio Hondo Acaquia systems. You will note that Taos Ski Valley is not listed. It is my understanding that they purchased part of the Acaquia water rights to run their system. I am under the impression that the total amount is less than fifty acres. The other systems are agreeing to meter their water use. Is Taos Ski Valley willing to meter theirs? Surface water rights are measured by amount taken out not by the effluent water put back in to the river.

NMED/SWQB Response: Concerns regarding water rights and the metering of Taos Ski Valley's water use need to be directed to Office of the State Engineer (OSE) and the Interstate Stream Commission (ISC). The OSE and the ISC are separate but companion agencies charged with administering the state's water resources. The agencies have jurisdiction over the supervision, measurement, appropriation and distribution of essentially all surface and ground water in New Mexico, including streams and rivers that cross state boundaries.

The Construction Programs Bureau in the New Mexico Environment Department conducted an Environmental Assessment (EA) on the Village of Taos Ski Valley's Wastewater Treatment Plant Renovation/Expansion through the National Environmental Policy Act according to Federal law. The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. The EPA reviews and comments on documents prepared by other agencies and assures that its own actions comply with NEPA. Based on consultation with the OSE, the Construction Programs Bureau concluded that both current and projected diversion and consumptive use of water are below the Village's water rights on file at the OSE.

I love this valley, it's people, and the Rio Hondo. Please don't rush into something that can not be reversed! Thank you for your assistance in this matter.

Sincerely,

Pam Harris

CC:
Governor Richardson
Lieutenant Governor Diane Denish
Senator Jeff Bingaman
Representative Tom Udall
Representative James Magdalena
House Standing Committee for Agriculture & Water Resource

Sent via FAX, April 12, 2005, 2:12 PM and U.S. Postal Service, April 13, 2005

Martin D. Chavez
Forest Supervisor
208 Cruz Alta Road
Taos, NM 87571

COMMENT: This letter transmits comment of the Carson National Forest to the Rio Hondo Draft TMDL, prepared by the Department in response to the potential increase in discharge at the Twining Water and Sanitation District wastewater treatment plant, located in Taos Ski Valley. In reviewing the document, we found the analysis and explanation of the load determination to be well thought out and documented. We offer the following comments:

Margin of Safety (MOS): As outlined in the Draft TMDL, the MOS is intended to address the uncertainty of load allocations used in calculating the total pollutant load that can be assimilated by a water body while still attaining water quality standards. NMED staff has adopted an approach utilizing an implicit and explicit MOS (5 percent) to the potential rate and proximity of future development along and near the Rio Hondo and its tributaries? The land ownership pattern that exists within the study area includes a large area (approximately 2000 acres) of private land along the Lake Fork of the Rio Hondo. Most, if not all of this land area would fall within the 50 m to 500 m buffer area in which the rate of delivery of natural sources of N and P would be highest, especially as that land use is converted from the forest to built up land. Given the close proximity and the uncertainty of future development, we would suggest a larger margin of safety for both the implicit and explicit cases being considered.

NMED/SWQB Response: The SWQB believes that the combination of relatively conservative numeric targets and source estimates creates an overall Margin of Safety that is adequate to account for uncertainty in this analysis. The Margin of Safety (page 32, Section 6.0) was reworded to explain, in more detail, the conservative assumptions and explicit uncertainties that were fundamental in this analysis. For further explanation, a TMDL is generally divided into a Load Allocation for nonpoint sources, a Waste Load Allocation for point sources, and a Margin of Safety for uncertainties. This analysis went one step further and also allocated the load to background and future sources. The background allocation amounted to 17% for total phosphorus and 21% for total nitrogen. This allotment was set aside for current, ambient conditions and was <u>not</u> lumped into the load allocation, as was done in the past when suitable reference reaches were not known and background conditions could not be established. The separation of background load from the load allocation gives added reassurance that nonpoint source loads are more appropriate for the system and that applicable water quality standards will continue to be attained.

As stated in the TMDL, individual wasteload allocations for construction activities (current or future) covered under general permits were not possible to calculate at this time using available data and analysis tools. Loads that are in compliance with the general permits are therefore currently calculated as part of the load allocation. The SWQB does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies to be able to accurately determine waste load allocations from construction activities covered under general permits.

The SWQB has previously discussed this issue with EPA Region 6, and both parties performed research to determine if there are any examples from other states on how to approach this issue with construction activities covered under general permits. There are no good examples at this time, but several states are developing methods of including stormwater runoff from construction activities in their TMDLs, but they are still in the early stages of development. Storm water discharges from construction activities are transient because they occur mainly during the construction itself, and often only during storm events. Therefore, protection of the receiving water is best addressed through individual Storm Water Pollution Prevention Plans that are required as part of the construction process.

COMMENT: Growth Factor: This comment is related to the Margin of Safety comment above. A factor of 2 percent is assigned currently to account for unforeseen non point loading sources related to future growth and development. Does NMED feel the assigned growth factor is adequate, again given the large amount of private land as described above? While the calculations in the TMDL estimate full treatment capacity of the loading associated with the point source (ie – the wastewater treatment facility), the non point loading associated with potential future growth and development of these private lands seems inadequate given the changes that would occur as this land area is developed, again within close proximity to the Lake Fork and the Rio Hondo.

NMED/SWQB Response: The SWQB agrees that the issue of future growth and development needs to be further examined. The SWQB applied for an EPA 104(b)(3) Grant for FY 2004 to identify all dischargers and their respective contributions of nutrients within the Rio Hondo watershed, to determine the overall potential impact of these dischargers, and to revise/develop total maximum daily load (TMDL) planning documents for nutrients. The EPA did not select SWQB's proposal for funding. Unfortunately, the SWQB currently does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies to be able to develop detailed watershed models for the Rio Hondo watershed that accurately predict site-specific nutrient loading from future growth and development scenarios.

The SWQB believes that the Growth Allocation coupled with the Background Load, and implicit and explicit MOS is adequate to accommodate future growth and development through 2020 (see Section 8.0).

COMMENT: Stream Temperature: At the proposed level of discharge (200,000 gallons per day) do you anticipate any effect in stream temperature in the Rio Hondo from the point of discharge downstream? If so, what might the increase in temperature be?

NMED/SWQB Response: The SWQB does not anticipate any temperature exceedences associated with the increase in discharge from the Village of Taos Ski Valley WWTP. The WWTP is using cold water to treat its wastewater and it is discharging into a coldwater stream. During the winter critical low-flow period, the WWTP effluent will account for approximately 5% of the total discharge in the river, if the WWTP is discharging at capacity. At other times of the year when natural flows are higher, the effluent contribution to stream flow will be much lower. Additionally, the average WWTP effluent temperature based on data collected by the SWQB in 2004 was 11.1°C (maximum = 14.5°C). The average temperature above and below the WWTP was 5.0°C and 5.2°C, respectively, and the average at the bottom of the assessment unit just above the South Fork of the Rio Hondo was 5.4°C. Both the effluent discharge and the Rio Hondo are meeting the applicable state standard for temperature, which is 20°C for the perennial reaches of the Rio Hondo (NMAC 20.6.4.123).

Thank you for the opportunity to comment on this document.

Sincerely,

MARTIN D. CHAVEZ
Forest Supervisor

Received via U.S. Postal Service, April 15, 2005

Robert Fies
P.O. Box 581
Arroyo Hondo, NM 87513

COMMENT: I attended the above meeting. While it seems the approved wastewater treatment plan for Taos Ski Valley would improve existing sewage treatment effluent, the proposed doubling of capacity and desire for growth in a confined steep-slope valley raises huge possibilities for contaminated runoff from asphalt, home and commercial chemicals, etc. I want to see a first-class and real (capable of being executed and with funds and intent to perform) mitigation plan to minimize nonpoint source pollution.

NMED/SWQB Response: Current design capacity for the WWTP is 0.95 million gallons per day (MGD). All calculations in development of these TMDLs used the proposed WWTP design capacity of 0.200 MGD. Since load is a function of concentration <u>and</u> discharge, all load calculations in the TMDL estimate treatment capacity in the future scenario, which accommodates projected growth through 2020 (see Section 8.0).

As stated in the TMDL, individual wasteload allocations for construction activities covered under general permits were not possible to calculate at this time using available data and analysis tools. <u>Loads that are in compliance with the general permits are therefore currently</u>

***calculated as part of the load allocation*. The SWQB does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies to be able to accurately determine waste load allocations from construction activities covered under general permits.**

The SWQB has previously discussed this issue with EPA Region 6, and both parties performed research to determine if there are any examples from other states on how to approach this issue with construction activities covered under general permits. There are no good examples at this time, but several states are developing methods of including stormwater runoff from construction activities in their TMDLs, but they are still in the early stages of development. Storm water discharges from construction activities are transient because they occur mainly during the construction itself, and often only during storm events. Therefore, protection of the receiving water is best addressed through individual Storm Water Pollution Prevention Plans that are required as part of the construction process.

Received via U.S. Postal Service, April 19, 2005

Robert Gomez
Director of Taos Pueblo Environment Department
P.O. Box 1846
Taos, NM 87571

COMMENT: The following comments are provided by the Sovereign Nation of Taos Pueblo regarding the draft Total Maximum Daily Load (TMDL) documents for the Rio Hondo Watershed, defined as the South Fork of the Rio Hondo to the Lake Fork of the Rio Hondo.

Taos Pueblo's ancestral lands included the Rio Hondo Watershed. Moreover, Taos Pueblo has always used the Rio Hondo Watershed for such traditional and cultural activities as: fishing; hunting; plant gathering; other traditional and cultural activities involving water immersion and ingestion; and water supply. These cultural uses continue into the present day as they have for thousands of years, and therefore should be protected by the TMDL for the Rio Hondo Watershed. It is the Pueblo's position that any cultural uses for the Rio Hondo are protected under the National Historic Preservation Act, and the Rio Hondo TMDL should take into account the Pueblo's Water Quality Standards that are designed to protect the traditional and cultural uses of Taos Pueblo.

Pursuant to its sovereign authority, the Tribal Council of the Pueblo of Taos, a federally recognized Indian tribe, enacted Water Quality Standards (Standards) for the Pueblo. In so doing, the Tribal Council recognized that the Pueblo's clean waters are an extraordinary resource which must be protected so that traditional and cultural uses of those waters may continue for generations to come. The Tribal Council enacted its Standards in order to prevent, reduce, and eliminate pollution of Pueblo waters and to plan the development and use, *including restoration and enhancement*, of land and water resources within the Pueblo's jurisdiction.

I. Taos Pueblo's Interest in Commenting on the TMDL for the Rio Hondo Watershed

Taos Pueblo has adopted Water Quality Standards designed to keep water quality at levels protective of human health and compatible with traditional uses. In the interest of preserving Taos Pueblo's traditional uses of Rio Hondo waters and protecting the health of those engaged in these practices, Taos Pueblo strongly suggests that the proposed TMDL consider Taos Pueblo Water Quality Standards as a guideline for water quality goals in the Rio Hondo. Since the Pueblo's Water Quality Standards are designed to protect traditional uses, using the Taos Water Quality Standards as guidelines for the Rio Hondo TMDL would help to preserve the Pueblo's cultural and religious heritage.

II. The Proposed TMDL does not Meet the Pueblo of Taos' Tribal Water Quality Standards

The Pueblo of Taos' Water Quality Standards Antidegradation Policy states;

Existing water uses and the level of water quality necessary to protect existing uses shall be maintained.

The Pueblo shall require the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable management practices for nonpoint source control.

A. The Proposed TMDL Fails to Recognize that Water Quality Standards are Comprised of Numeric ***and*** Narrative Criteria, Beneficial Use Support, and an Antidegradation Policy.

The development of a TMDL is the appropriate time for a definitive assessment of a waterbody's impairment to be conducted, to ensure that *all* parameters for which the waterbody is impaired are identified -- or at least those that have similar impacts, or additive or synergistic effects so that they may be analyzed concurrently -- and that *all* components of water quality standards have been applied. The draft Rio Hondo TMDL fails to adequately recognize that the legal definition of a water quality standard includes numeric *and* narrative criteria, beneficial use support, and an antidegradation policy.

The analytical work of a TMDL should begin with a thorough evaluation of water quality standards and data reflective of current reality. The proposed TMDL relies primarily on more than twenty-year-old numeric data modeled on *non Rio Grande Watershed* rivers and streams, thereby imposing surrogate measures on the Rio Hondo. Not only is this approach flawed because of the age of the data used, it fails to adequately take into account narrative criteria, beneficial support and antidegradation policies as required by law and the Pueblo's Water Quality Standards.

While the TMDL states that "target values for nutrient loads are determined based on 1) the presence of numeric and narrative criteria…" (2.2), the document fails to address the kind of narrative criteria included in the Pueblo's Water Quality Standards. Nor does it mention the requirement to support beneficial uses or apply narrative criteria, in addition to the application of numeric criteria, *as 'gap fillers*.' Such gap fillers do not exist as a legal fiction; they exist in order to be applied and there is no better time for applying them than the development of a quantitative plan to attain the water quality standards, namely a TMDL. This omitted step is critical in order for this draft TMDL to evaluate what it means to meet water quality standards in the Rio Hondo Watershed.

The Pueblo's Water Quality Standards specifically state that Pueblo Waters shall be free from pollution so as "*not to injure or otherwise adversely affect the habitation, growth, or propagation of indigenous aquatic plant life and animal communities or any member of those communities…." (Section III. A.)* The TMDL does not address the populations of fishes in the Rio Hondo traditionally relied upon by the Pueblo, or adequately address the issues of *temperature* and *minerals* as required by the Pueblo's Standards.

1. **Fishes**. The Pueblo has always relied upon the Rio Hondo Watershed to support populations of fishes for Pueblo uses. This includes the endangered Rio Grande Cutthroat Trout. In order to apply the narrative criteria and beneficial use support components of water quality standards, the Department must identify all species of fish that may have water quality requirements that are more protective than the existing numeric criterion. The TMDL fails to do this. Moreover, the TMDL must also take into consideration the status of those species. The development of each numeric criterion is built upon assumptions of acceptable risk regarding the magnitude of concentrations, duration of the exceedances, and the frequency with which exceedances occur to allow for recovery to the aquatic communities. In determining the applicable site-specific criteria to protect these uses, the Department must take into account the depleted state of species. The criteria must be designed to restore their populations. In other words, the risks to the species must be decreased to a greater extent in order to meet the goals of the standards and the Clean Water Act. Therefore, in writing the TMDL, the Department must interpret and apply its narrative criteria and requirement to support beneficial uses to fill these gaps, not ignore them. To do any less than this is to reject the legal fact that beneficial use support is a stand-alone component of water quality standards the attainment of which is the required goal of the TMDL. 40 CFR 130.7(c) (1).

2. **Temperature and Indigenous Aquatic plant life**. In addressing impacts to indigenous aquatic plant life the TMDL relies mostly on seasonal dilutions. It makes no mention of temperature, as required by both the Pueblo's Water Quality Standards and the laws governing the use of narrative and antidegradation criteria.

   The Pueblo's Water Quality Standards require that: "Normal seasonal variations of temperature in surface waters shall be maintained…" (II.B). The Section goes on to specify that; "*the introduction of heat by other than natural causes shall not increase the temperature, as measured upstream from the point of introduction, by more than 5 degrees F (2.7 degrees C) in a stream*…" (*Id*.) While the TMDL addresses plant nutrients (2.3), it does not address the impact of artificially induced temperature rises from the point and non-point source discharges identified in the draft document. Thus, for temperature, the TMDL must establish whether the Pueblo's established criterion of plus 5 degrees C will be violated by point and nonpoint discharges impacting the watershed. The draft TMDL makes no reference to this issue.

3. **Minerals**. Pueblo Standards state: "*Existing mineral content of the Pueblo's waters shall not be altered by municipal, industrial, or in-stream activities or other waste discharges so as to interfere with the designated uses. In all cases, increases exceeding 1/3 over naturally occurring levels will not be allowed. Numeric values for chlorides at 230 mg/L, for sulfates at 250 mg/L, and for total dissolved solids at 500 mg/L* shall not be exceeded" (II.C). In concentrating on the total loads of nitrogen and phosphorus discharged into the Rio Hondo, the draft TMDL does not use or refer to the Pueblo's *1/3 over naturally occurring levels* standard; nor does it address Pueblo requirements for chlorides, sulfates, or total dissolved solids.

4. **Sampling and Biological Criteria**. The Pueblo's Standards require that: *"Biological integrity, the protection of aquatic communities in their most natural condition, shall be protected and maintained [through the enforcement of narrative criteria]." (II. D.)* In establishing this standard, the Pueblo specifically requires that: *"The conditions at reference and other locations will be assessed by **consistent sampling** and reliable measure of selected measures indicative of aquatic communities…" (Id.)*

The draft TMDL's proposed monitoring plan does not conform to Pueblo or federal standards. Section 9.0 states: "*Long-term monitoring for assessments will be accomplished through the establishment of sampling sites…which can be revisited approximately every seven years…"* It is the Pueblo's position that a time span of approximately every seven years violates both the Pueblo's standard of consistent sampling and the requirements of Sections 303 (d) and 305 (b) of the Clean Water Act, which require *"a systematic, detailed review of water quality data…"*

NMED/SWQB Response: While the SWQB respects the Pueblo's traditional and cultural activities in the Rio Hondo watershed, the applicable surface water quality standards for the Rio Hondo are found in 20.6.4.123 New Mexico Administrative Code (NMAC). The USEPA and the New Mexico Water Quality Control Commission (WQCC) have approved these standards. Protected designated uses as stated in 20.6.4.123 NMAC include domestic water supply, fish culture, high quality coldwater fishery, irrigation, livestock watering, wildlife habitat, and secondary contact. General standards found under 20.6.4.12 NMAC also apply.

Pursuant to Section 106(e)(1) of the Federal CWA, 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 NM. The SWQB monitoring strategies are developed with assistance from USEPA Region 6. Similar to most states, New Mexico has developed and utilizes a rotational watershed-based monitoring plan because we do not have staff or financial resources to intensively monitoring all surface waters in the state every year.

The SWQB recently developed a draft 10-year monitoring strategy submitted to USEPA on September 30, 2004, according to federal guidelines. Once the 10-year monitoring plan is approved by the USEPA, it will be available at the SWQB website: http://www.nmenv.state.nm.us/swqb/swqb.html. The strategy will detail both the extent of monitoring that can be accomplished with existing resources plus expanded monitoring strategies that could be implemented given additional resources.

5. **Mixing Zones**. The proposed TMDL identifies the Twining Water and Sanitation District (TWSD) as the only point source discharge impacting the Rio Hondo. It also identifies: "*Numerous anthropogenic nonpoint sources of phosphorus [which] also exist in the upper Rio Hondo watershed. The most important are thought to be runoff from parking lots and recreational areas." (5.1.1.)* In addressing these sources of pollution, the TMDL draft relies heavily on seasonal dilutions. In so doing the draft points out that during the winter months that dilution will be comprised exclusively of runoff: "*The ability of the Rio Hondo to dilute wastewater is least during the winter months. Winter is also the period during which the District's wastewater discharges are the greatest" (2.4).* The TMDL's reliance on dilution to achieve water quality standards is flawed.

First, the TMDL's reliance on dilution to achieve water quality goals is flawed as it relates to native fisheries. The discharge from the wastewater treatment plant should stand alone as meeting or exceeding water quality standards. By relying on dilution to assimilate nutrients into the river during the winter low flow, the TMDL is creating a mixing zone that is potentially dangerous to fish that must migrate past this zone. It also encourages localized algae growths that in turn have their own negative effects on water quality. According to Pueblo Standards, "*In any perennial waters receiving waste discharge, a continuous zone must be maintained where the water is of adequate quality to allow the migration of wildlife and which meets all water quality standards.*

In addition, in referring to the wastewater treatment plant operated by TWSD, the TMDL states: "*this TMDL does not include a specific WLA for storm water discharges for this assessment unit…" (5.2.3).* By avoiding development of a Waste Load Allocation (WLA), the TMDL is negligent in truly assessing the cumulative effects of land use immediately surrounding the Wastewater Treatment Plant. Specific consideration for toxicants and sedimentation from parking lots is deliberately avoided. Due to the proximity of parking lots and the wastewater discharge, a much more localized assessment that considers these factors should be provided. Heavy metals from parking lots and industrial building associated with the ski area need to be honestly addressed by a specific WLA, if not a full-blown EIS.

The TMDL is also deficient regarding nonpoint pollution sources identified in the draft. In so doing, the draft assumes that dilution will also be used to mitigate these nonpoint discharges. The draft document identifies the Ski Valley's parking lots and recreational areas as well as seepage from overload or malfunctioning on-site sewage disposal systems located near the stream as contributing sources of nonpoint pollution yet fails to offer a solution to the pollution, other than dilution.

NMED/SWQB Response: The SWQB disagrees with this comment. Data from the 2000 intensive survey and the 2004 special survey of the Rio Hondo indicate that the Rio Hondo (South Fork to Lake Fork Creek) is currently meeting and maintaining the applicable New Mexico state standards for this stream segment. Based on this assessment, the Rio Hondo (South Fork to Lake Fork Creek) was <u>not</u> listed as an impaired reach in the 2004-2006 STATE OF NEW MEXICO INTEGRATED CLEAN WATER ACT §303(D)/ §305(B) REPORT.

To address the Pueblo's specific concerns, the Village of Taos Ski Valley WWTP <u>will not increase phosphorus loading</u> into the Rio Hondo watershed, which is consistent with the State of New Mexico's antidegradation policy. The maximum allowable WWTP effluent concentration will decrease from 1.0 mg/L to 0.5 mg/L during the most stringent winter months (November through April). Clarification was added to the TMDL document (see page 27, Section 5.1.3). In addition, nitrogen loading from the Village of Taos Ski Valley WWTP <u>will actually decrease by approximately 30%</u> as a result of this Draft TMDL, which will result in a maximum allowable effluent concentration of 6.5mg/L during the most stringent winter months. This is approximately four times lower than current effluent concentrations.

As stated in the TMDL, individual waste load allocations for construction activities covered under general permits were not possible to calculate at this time using available data and analysis tools. <u>Loads that are in compliance with the general permits are therefore currently calculated as part of the load allocation</u>. The SWQB does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies to be able to accurately determine waste load allocations from construction activities covered under general permits.

The SWQB has previously discussed this issue with USEPA Region 6, and both parties performed research to determine if there are any examples from other states on how to approach this issue with construction activities covered under general permits. There are no good examples at this time, but several states are developing methods of including stormwater runoff from construction activities in their TMDLs, but they are still in the early stages of development. Storm water discharges from construction activities are transient because they occur mainly during the construction itself, and often only during storm events. Therefore, protection of the receiving water is best addressed through individual Storm Water Pollution Prevention Plans that are required as part of the construction process.

B. The TMDL is Flawed because it Fails to Consider Pollution in lieu of Pollutants

Pueblo of Taos water quality standards include various narrative criteria related to pollution, rather than being limited to control of pollutants. Beneficial uses requiring support in the standards likewise require physical and biological quality, not just chemical parameters in the ambient water column. This trio of needs corresponds to the goal of the Clean Water Act: "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." CWA 101(a). While the Pueblo is aware that the portion of the statute that requires the development of TMDLs makes reference to "pollutants," not "pollution," the intent of a TMDL using surrogate measures is presumably to avoid a narrow approach utilizing pollutant loadings in lieu of a more holistic and useful analysis that will address all the interrelated parameters for which the waterbody is impaired. CWA 303(d) (1). Under Pueblo of Taos Standards such a holistic approach is required. Moreover, it is the Pueblo's position that to create a viable TMDL, toxicants as well as nutrients must be considered in developing the standard. The proposed TMDL makes no explicit mention of toxicants (from parking lot runoff and other sources) impacting the watershed.

NMED/SWQB Response: The applicable surface water quality standards for the Rio Hondo are found in 20.6.4.123 New Mexico Administrative Code (NMAC). The USEPA and the New Mexico Water Quality Control Commission (WQCC) have approved these standards. Protected designated uses as stated in 20.6.4.123 NMAC include domestic water supply, fish culture, high quality coldwater fishery, irrigation, livestock watering, wildlife habitat, and secondary contact. General standards found under 20.6.4.12 NMAC also apply.

As stated in the TMDL and at the public meeting, SWQB performed an extensive water quality survey for the Rio Hondo in 2000, with follow up monitoring in 2004. This survey included measurements of various chemical (including toxicants), biological, and physical parameters. The only documented impairment for the Rio Hondo was excessive temperature in the lower reaches. This nutrient TMDL was developed as a preventative measure to ensure continued protection of the Rio Hondo in the event of a plant expansion at the Village of Taos Ski Valley.

III. Projected Growth Rates are not Consistent with a 2% Set Aside

Section 8.0 of the draft states that: " *Growth estimates for Taos County project a 40% growth rate through 2030. Since future projections indicate that nonpoint sources of nutrients will more than likely increase as Taos Ski Valley continues to grow and develop, two percent of the TMDL will be set aside as a placeholder for unknown or future nutrient source."* The Pueblo of Taos takes exception to a 2% set aside. Conservatively, growth rate for the county is projected at 40%. The Taos Ski Valley is a large part of that projected growth. The TMDL offers no rational basis for imposing a 2% set aside. Rather, the number is arbitrarily inserted. The Pueblo asserts that a rational set aside formula be developed in a government-to-government consultation with the Pueblo which more realistically accounts for the projected growth.

Furthermore, the 2% set aside does not account for anticipated infrastructure development that will likely follow build-out of the higher portions of Taos Ski Valley (a.k.a. "the Backside"). Road construction, parking lots, nutrient loads from landscapes and additional vehicle traffic are virtually ignored. This set aside also does nothing to address potential private development outside the village boundaries (i.e. Pattison Land Trust).

Taos Pueblo believes that the set aside for unknown and future nutrient source should be at least 7%-10%, with a place holder as high as 20% not being unreasonable.

NMED/SWQB Response: The SWQB agrees that the issue of future growth and development needs to be further examined. The SWQB applied for an EPA 104(b)(3) Grant for FY 2004 to identify all dischargers and their respective contributions of nutrients within the Rio Hondo watershed, to determine the overall potential impact of these dischargers, and to revise/develop total maximum daily load (TMDL) planning documents for nutrients. The EPA did not select SWQB's proposal for funding. Unfortunately, the SWQB currently does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies to be able to develop detailed watershed models for the Rio Hondo watershed that accurately predict site-specific nutrient loading from future growth and development scenarios.

However, The Construction Programs Bureau of the NMED did conduct an Environmental Assessment (EA) on the Village of Taos Ski Valley's Wastewater Treatment Plant Renovation/Expansion through the National Environmental Policy Act according to Federal law. The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. The EPA reviews and comments on documents prepared by other agencies and assures that its own actions comply with NEPA. The final determination of the EA was that there would be no significant environmental impact to the Rio Hondo watershed as a result of the WWTP renovation and expansion.

Finally, all calculations in development of this TMDL used the <u>projected</u> plant design capacity of 0.200 MGD, instead of the current design capacity of 0.095 MGD. Consequently, all flow calculations in this TMDL estimate treatment capacity in the future scenario, which accommodates projected growth through 2020 (see Section 8.0). <u>In addition to the projected growth that was integrated into the TMDL calculations</u>, two percent of the TMDL was set aside for a growth allocation (GA), as a placeholder for unknown or future sources of nutrients. The SWQB believes that the Growth Allocation coupled with the Background Load, and implicit and explicit MOS is adequate to accommodate future growth and development through 2020.

IV. The Margin of Safety is Inadequate

Section 6.0 of the TMDL allocates an explicit 5% margin of safety to accommodate uncertainties in accuracy. It also claims to be providing an implicit margin of safety by providing conservative estimates in the TMDL analysis. The Pueblo of Taos asserts that the proposed margin of safety is inadequate, for the reasons explained below.

A. The Explicit Margin of Safety is Too Small to Account for Uncertainties

In calculating nitrogen and phosphorus exports into the Rio Hondo, the TMDL relies heavily on nutrient export coefficients to come up with waste load allocations of both nutrients.

In the words of the TMDL, these coefficients provide a "rough approximation" since "no site-specific values exist for the Rio Hondo". Since no source data from the Rio Hondo exists, a hierarchical "best professional estimates" approach is employed utilizing surrogate data that is over 20 years old. Not only does this surrogate data not adequately represent the Rio Hondo, it makes no mention of present day realities associated with long-term drought that is well-known to be of historic significance.

The obvious problem with this approach is that it has no real connection to the Rio Hondo, and instead relies on values available for "western states." It also fails to recognize on-the-ground truths that a meaningful environmental evaluation would not ignore. Nowhere does the TMDL account for relative density or health of native vegetation, frequency and intensity of storm events, compaction of soils on the banks of the Rio Hondo, or any number of environmental factors that would be quite obvious if NMED actually did fieldwork to verify their assumptions, *i.e.*, "best professional estimates". The reality of the Upper Rio Hondo watershed is that summer monsoons bring very intense rains for short periods of time, and transport of sediments over parking lots and other disturbed areas are quite common. The cumulative effects of driveways, rooftops, sidewalks, and roads magnify these events in the form of non-point source pollution. This TMDL makes no attempt to look at this local phenomenon of summer monsoons, but rather inserts surrogate data assigned to an "eco-region" of the "western states."

Perhaps the greatest oversight on the part of NMED would be effects of slope on nutrient transport. Since the immediate area is indeed a *ski area*, and recognized worldwide by skiers for *steepness*, Taos Pueblo finds it hard to believe that *slope* is never once accounted for in the nutrient export coefficients nor the margin of safety. This glaring omission is a serious dereliction of duty by the State of New Mexico in protection of the waters of the United States.

B. The Implicit Margin of Safety Unjustified

Due to oversights in nutrient transport calculations, inadequate allocations for future growth projections, and many other factors discussed throughout this document, Taos Pueblo has no choice but to challenge the assertion that the methods employed in this TMDL are in any way "conservative." The cumulative effect of oversights and assumptions on behalf of the NMED leads Taos Pueblo to conclude that any reference to implicit margin of safety is unsubstantiated and thereby void. If the TMDL document wishes to rely on these stated "conservative assumptions," clear and thorough explanations of these assumptions should be included throughout the TMDL. While we respect the stated effort to err on the side of caution, many aspects of this draft TMDL lend themselves to skepticism, and justify a more thorough inquiry and explanation.

The margin of safety allocated for the Rio Hondo TMDL should be increased to accommodate the many weaknesses in analysis contained therein. The combined effects of steep slope, soil compaction near the river, forest health that has been adversely affected by drought, and under-represented growth allocations all contribute to a margin of error that needs to be accounted for in the margin of safety. The TMDL's reliance on surrogate data, derived from regional "best professional estimates," is an inherent weakness. Taos Pueblo believes that the 5% margin of safety should be increased to at least 20% to account for these shortfalls. The 5%

margin of safety would hardly cover the oversight of slope in the equation of nutrient transport, much less the other factors mentioned above. Standing alone as the single-most obvious and grievous oversight within this TMDL is the complete disregard for slope related to nutrient transport.

Oversight of monsoon storm events is surely worth 5% on its own as well. Likewise, weak representation within the TMDL of growing sources of non-point source pollution is worthy of 5% margin of safety. Forest health, cumulative effects of growth, increased traffic associated with growth, and a general disregard for traditional native uses of the Rio Hondo all contribute to the remaining 5% margin of safety. Overall, this draft TMDL for the Rio Hondo has too many shortcomings to grant it the confidence implied by a 5% margin of safety. Taos Pueblo recommends the margin of safety be increased to at least 20% to offset weaknesses described above.

NMED/SWQB Response: The SWQB disagrees with this comment and believes that the combination of relatively conservative numeric targets and source estimates creates an overall Margin of Safety (MOS) that is adequate to account for uncertainty in this analysis. The MOS (page 32, Section 6.0) was reworded to explain, in more detail, the conservative assumptions and explicit uncertainties that were fundamental in this analysis. For further explanation, a TMDL is generally divided into a Load Allocation (LA) for nonpoint sources, a Waste Load Allocation (WLA) for point sources, and a Margin of Safety for uncertainties. This analysis went one step further and also allocated the load to background and future sources. The background, or ambient, allocation amounted to 17% for total phosphorus and 21% for total nitrogen. This allotment was set aside for current, ambient conditions and was <u>not</u> lumped into the LA, as was done in the past when suitable reference reaches were not known and background conditions could not be established. The separation of background load from the LA gives added reassurance that nonpoint source loads are more appropriate for the system and that applicable water quality standards will continue to be attained.

Also, it is not clear what is meant by the statement "…utilizing surrogate data that is over 20 years old…" The calculations in this TMDL were developed with monitoring data from 2000 and 2004, as well as recent peer-reviewed literature. The SWQB recognized and took the initiative to revise the 20-year old WLA (developed in 1981) even though the Rio Hondo is not currently impaired for nutrients to ensure that the plant expansion would not result in nutrient impairment to the Rio Hondo.

V. Waste Load Allocations From Taos Ski Valley Development are not Adequately Addressed in the TMDL.

At the heart of the proposed TMDL is the future growth and development of Taos Ski Valley. In numerous places the document states: "*Future projections indicate that nonpoint sources of nitrogen will more than likely increase as the Village of Taos Ski Valley continues to grow and develop" (5.2.2).* However, the document concludes: "*this TMDL does not include a specific WLA for stormwater discharges…" (5.2.3).* In reading the document, it appears that the TMDL justifies its lack of WLA on the possibility that the Village of Taos Ski Valley will develop a community wide sewer line extension project (5.2.3).

As the document points out, the TMDL is a planning document. To wait to see if the Ski Valley develops a community wide sewer line is bad planning. The development of such a sewer line extension is conservatively years away. In the meantime, nonpoint pollution continues to negatively impact the Rio Hondo Watershed, requiring the development of a WLA based upon specifically analyzed BMPs in the current document.

NMED/SWQB Response: The intent of this comment is unclear. According to the title of this comment section, the WLA is not adequately addressed. The WLA refers to point source discharges, not nonpoint sources.

As stated in the TMDL, individual waste load allocations for construction activities covered under general permits were not possible to calculate at this time using available data and analysis tools. Loads that are in compliance with the general permits are therefore currently calculated as part of the load allocation. The SWQB does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies to be able to accurately determine waste load allocations from construction activities covered under general permits.

The SWQB has previously discussed this issue with USEPA Region 6, and both parties performed research to determine if there are any examples from other states on how to approach this issue with construction activities covered under general permits. There are no good examples at this time, but several states are developing methods of including stormwater runoff from construction activities in their TMDLs, but they are still in the early stages of development. Storm water discharges from construction activities are transient because they occur mainly during the construction itself, and often only during storm events. Therefore, protection of the receiving water is best addressed through individual Storm Water Pollution Prevention Plans that are required as part of the construction process.

The SWQB agrees that in New Mexico, nonpoint sources are a significant contributor to water quality exceedences; therefore, the best avenue to maintain and/or improve watershed health is to focus community efforts on a holistic approach to watershed protection. A general implementation plan for activities to be established related to nonpoint sources is included in this document. The Surface Water Quality Bureau's Watershed Protection Section (SWQB/WPS) will further develop the details of this plan, known as a Watershed Restoration Action Strategy (WRAS), in full cooperation with stakeholders, such as the Rio Hondo/Upper Rio Grande Watershed Group, local and tribal governments, including Taos Pueblo, local businesses, and point source dischargers in the watershed. It is up to these participants to come to an agreement on their objectives, define the goals of the WRAS, and provide implementation strategies that will work for the various stakeholders in the community.

VI. The TMDL Fails to Consider Deficiencies in Other Parameters that Have an Additive or Synergistic Effect Combined with the Identified Impairment and Therefore Fails to Be Conservative and Adequately Protect Beneficial Uses

As the draft document points out, the watershed addressed by this TMDL suffers from excessive nitrogen and phosphorous loads. In addressing these loads the document fails, however, to account for the additive and/or synergistic effects of these pollutants and other identified stressors or "pollution" (e.g., “instream habitat availability, streambank erosion, low summer flows"), making the analysis in the TMDL significantly less conservative than the document acknowledges. For example, the draft specifically notes that while “phosphorus *and nitrogen are essential for proper functioning of ecosystems…excess nutrients cause conditions unfavorable for the proper functioning of aquatic ecosystems.*” (1.4.) Nowhere in the document is there analysis which includes the synergistic effects of projected nitrogen and phosphorous releases combined with other known bacteria, minerals, toxicants and/or chemicals found in the Rio Hondo. Not only does this kind of fragmented approach lack conservatism, it weighs against a finding that this TMDL will lead to attainment of viable standards. It also undercuts the proposed margin of safety in the draft TMDL which proposes to take credit for various conservative assumptions. Those assumptions are simply of less value when they fail to include analysis of related parameters that have similar negative impacts on the beneficial uses. The development of the TMDL is the time to have a thorough and definitive assessment of *all* standards that are currently or in imminent likelihood of violation. For a TMDL, such as this, which purports to address the issues of the watershed as a whole, to overlook other related parameters is a serious error.

NMED/SWQB Response: Nowhere in the Draft document does it say that the watershed addressed by this TMDL suffers from excessive nutrients. According data collected during the 2000 and 2004 water quality surveys, the Rio Hondo (South Fork to Lake Fork Creek) fully supports its designated uses defined by the state of New Mexico and was not listed on the 2004-2006 STATE OF NEW MEXICO INTEGRATED CLEAN WATER ACT §303(D)/ §305(B) REPORT.

Section 1.4, entitled “Nutrient Cycling”, was written to give general background information for readers who are not familiar with the interactions and complexities of nutrient cycling in aquatic ecosystems.

VII. The Use of Site Specific Data in a Quantitative Analysis is a Necessary Prerequisite to Making a Determination that this TMDL will Lead to Attainment of Standards

As explained below, one of the Pueblo’s primary objections to the TMDL is the lack of any site-specific data and the prescriptions that are necessary to achieve the allocations. The result of this approach is a TMDL that could be applied to a variety of geographic areas in Northern New Mexico where there is impairment caused by excessive nutrient releases. As such, the TMDL is not a TMDL but rather an analytical restatement of water quality standards in surrogate form. While this is a very important first step, it is nonetheless just a first step and is not sufficient to constitute a TMDL.

A. Site-Specific Information is a Requirement of any TMDL, Regardless of the Use of Surrogate Measures

The quantitative analysis in the TMDL is an explanation of how some -- but not all, as discussed above -- of the applicable criteria contained in New Mexico water quality standards can be translated into surrogate measures that provide greater utility than loads to devising appropriate pollution control measures for non-point sources. The TMDL states: "*Currently, there are no numeric standards applicable to the Rio Hondo for total phosphorus (TP) and total Nitrogen (TN)…This TMDL document is adopting the philosophy and target concentrations suggested in the 1981 Waste Load Allocation for Twining Water Sanitation District…because the numeric targets in the 1981 document have proven effective." (2.3.) Nutrient export coefficients for this study were obtained from literature values since no site-specific values existed for the Rio Hondo…From these, values from western states were selected." (3.0.)* This approach is seriously flawed.

Instead of developing holistic site-specific standards, the TMDL, as pointed out above, relies on outdated surrogate measures – namely 24-year-old water quality standards not developed for the Rio Hondo. Nowhere in controlling statutes or regulations is a TMDL defined as merely being a restatement of historic water quality standards. Instead, a TMDL is a quantitative analysis of the standards as applied to a particular water body. In contrast, the Rio Hondo TMDL does not go beyond reiterating the rationale behind the surrogate measures and noting various goals and objectives. Neither constitutes a complete TMDL, nor do they constitute one together.

NMED/SWQB Response: According data collected during the 2000 and 2004 water quality surveys, the Rio Hondo (South Fork to Lake Fork Creek) fully supports its designated uses defined by the state of New Mexico and was not listed on the 2004-2006 STATE OF NEW MEXICO INTEGRATED CLEAN WATER ACT §303(D)/ §305(B) REPORT. Since historical records show that this assessment unit was impaired for plant nutrients and current analysis indicates it is not impaired, it can be concluded that the in-stream target concentrations that were suggested in the 1981 WLA were effective at reducing nutrient pollution and improving stream water quality.

The use of export coefficients to estimate nonpoint source loading was the best available method given the available dataset and given that detailed watershed models have not been developed for the Rio Hondo watershed. The results provided an approximation of the loading to the Rio Hondo watershed. The SWQB applied for an EPA 104(b)(3) Grant for FY 2004 to identify all dischargers (point and nonpoint sources) and their respective contributions of nutrients within the Rio Hondo watershed, to determine the overall potential impact of these dischargers, and to revise/develop total maximum daily load (TMDL) planning documents for nutrients. The EPA did not select SWQB's proposal for funding. Unfortunately, the SWQB currently does not have the tools, site-specific data, and/or resources to conduct the necessary detailed studies to be able to develop detailed watershed models for the Rio Hondo watershed that accurately predict site-specific nutrient loading.

VIII. Taos Pueblo would be interested in a Cooperative Agreement with New Mexico to Protect the Rio Hondo Watershed

Because of the predicted growth in Taos County adjacent to the Pueblo of Taos, the Pueblo would be interested in entering into a cooperative Agreement with New Mexico to develop appropriate standards for the Rio Hondo Watershed.

In Section 10.1 the document refers to *"opportunities for private landowners and public agencies in reducing and preventing water quality,"* without specifically naming the Pueblo of Taos. As a sovereign Nation, the Pueblo of Taos would consider working with the State of New Mexico to secure Clean Water Act Section 319 funding for the watershed. Indeed, it is the Tribe's position that such a joint venture, involving the Pueblo, would prioritize the funding coming to New Mexico. In this regard, the Pueblo would be interested in watershed planning; consistent timely monitoring; and developing a holistic approach to protecting the water quality standards of the Rio Hondo Watershed.

NMED/SWQB Response: The SWQB understands Taos Pueblo's concern and appreciates the Pueblo's commitment to improving the health of the Rio Hondo watershed. The SWQB agrees that the monitoring, assessment, TMDL development, and watershed protection activities should be in the best interest of the target watershed. SWQB intends to continue working collaboratively with interested stakeholders, such as Taos Pueblo, local governments, local businesses, Taos Ski Valley WWTP, and the Rio Hondo/Upper Rio Grande Watershed Group to help protect and improve the biological, chemical, and physical integrity of Rio Hondo watershed. The SWQB Watershed Protection Section will be working with interested stakeholders, including Taos Pueblo, on the development of Watershed Restoration Action Strategies (WRAS), which will lead to CWA 319 proposals for subsequent restoration projects for the entire Upper Rio Grande watershed.

Sincerely,

Robert Gomez, Director
Taos Pueblo Environment Department