New Mexico Environment Department

Upper Rio Grande Total Maximum Daily Loads

Rachel Jankowitz
Surface Water Quality Bureau
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AGENDA

- NMED-SWQB staff introductions
- Monitoring and Assessment Overview
- TMDL Overview
- Upper Rio Grande TMDLs
- Question and Answer plus Discussion

MONITORING AND ASSESSMENT OVERVIEW

Federal Clean Water Act

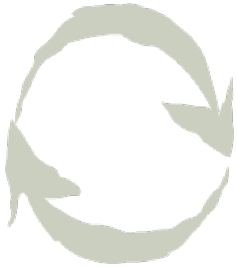
- “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters”

- In order to reach a level of water quality that "provides for the protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water"

- Section 303(d) of the Federal Clean Water Act (CWA) requires states to develop TMDL documents for impaired waters

Framework for Restoring Polluted Waters

Problem Identification



Problem Solving

Develop Water Quality Standards

Monitor and Assess Waterbodies

List Impaired Waters (303d list)

Develop TMDL

Minimize Non-Point Sources (Best Management Practices)

Issue/Revise Point Source Permits

(National Pollutant Discharge Elimination System)

Purposes of Water Quality Standards

Per 40 CFR 131.2:

- Protect public health and welfare
- Enhance the quality of water
- Serve the purposes of the Clean Water Act

Monitoring Surface Water Quality

Biological

- *Escherichia coli (E. coli)*
- Fish Assemblages
- Insect Assemblages

Chemical

- pH, DO, SC
- Ions, metals, organics
- Nutrients

Physical

- Channel morphology, substrate
- Flow measurements
- Temperature

Assessment of Water Quality Data

- The Comprehensive Assessment and Listing Methodology (CALM) details the process used to determine if designated uses are being met
- The CALM is reviewed and revised as needed every odd-numbered year
- All submitted data that meet SWQB QA/QC quality requirements are assessed

Information about data submittal:
https://www.env.nm.gov/surface-water-quality/data-submittals/

CWA 303(d)/305(b) Reporting

- When a water body meets water quality standards:
  - It is listed as Fully Supporting on 303(d)/305(b) List
  - It is delisted, if previously listed as impaired

- When a water body does not meet water quality standards:
  - The impairment is added or remains on the 303(d)/305(b) List, and SWQB:
    - Collect additional data as needed to confirm
    - Prioritize TMDL (or TMDL Alternative) development
    - Review and revise water quality standards if warranted

TMDL OVERVIEW

Total Maximum Daily Loads

- A TMDL document is a water quality plan that establishes specific goals to meet water quality standards. It includes:

  - Target loading capacities; and
  - Information potentially leading to 1) permit revisions and implementation, and 2) the development of Watershed Based Plans, which discuss measures to restore the chemical, physical, and biological integrity of the waterbody.

TMDL Calculation

- A **TMDL** is the maximum amount of a pollutant that can enter a water body without causing an impairment (exceedance of the Water Quality Standard)

- **TMDL** = WQS x Critical Flow x CF
  - **WQS** = Water Quality Standard
  - **Flow** = based on critical conditions
  - **CF** = Conversion Factor

TMDL Allocations

TMDL = LA + WLA + MOS

(MOS is a Margin of Safety to account for uncertainty)

Load Allocation (LA) is pollution from any non-point source(s) and is addressed through Best Management Practices (BMP)

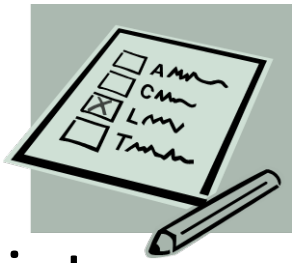
Waste Load Allocation (WLA) is from a known point source and is controlled through NPDES permits

Draft TMDL Review Process

- Reviewed by SWQB and EPA Region 6 staff prior to release of the public comment draft
- Released for a 30-day public comment period
- Stakeholders are notified of the draft TMDL and public meeting via GovDelivery (email list)
- SWQB hosts a public meeting
- Stakeholders can submit written comments
- SWQB responds to written comments in the Response to Comments appendix of the Final Draft TMDL

Final TMDL Approval Process

- Final Draft TMDL is presented to the NM Water Quality Control Commission (WQCC)



- The WQCC-approved TMDL is incorporated into the NM Water Quality Management Plan and submitted to EPA Region 6 for final approval

- The EPA-approved TMDL is then posted to the SWQB TMDL website at:

  https://www.env.nm.gov/surface-water-quality/tmdl/

UPPER RIO GRANDE WATERSHED TMDLs

2022 UPPER RIO GRANDE TMDLs

TOTAL RECOVERABLE ALUMINUM
Costilla Creek (Diversion above Costilla to Comanche Creek)
LaBelle Creek (Comanche Creek to headwaters)
North Fork Tesuque Creek (Tesuque Creek to headwaters)
Rio Medio (Rio Frijoles to headwaters)
Rio Quemado (Rio Arriba County boundary to headwaters)
Rio Quemado (Santa Cruz River to Rio Arriba County boundary)
Santa Cruz River (Santa Clara Pueblo boundary to Santa Cruz Dam)
Santa Cruz River (Santa Cruz Reservoir to Rio en Medio)
Vidal Creek (Comanche Creek to headwaters)

2022 UPPER RIO GRANDE TMDLs

E. COLI
Grassy Creek (Comanche Creek to headwaters)
LaBelle Creek (Comanche Creek to headwaters)
Rio Quemado (Rio Arriba County boundary to headwaters)
Ute Creek (Costilla Creek to headwaters)
Vidal Creek (Comanche Creek to headwaters)
PLANT NUTRIENTS
Fernandez Creek (Comanche Creek to headwaters)
Rio Pueblo de Taos (Arroyo del Alamo to Rio Grande del Rancho)

2022 UPPER RIO GRANDE TMDLs

SEDIMENTATION
LaBelle Creek (Comanche Creek to headwaters)
Rio Chupadero (USFS boundary to headwaters)
Rio en Medio (Aspen Ranch to headwaters)
SPECIFIC CONDUCTANCE
Rio Fernando de Taos (Tienditas Creek to headwaters)
Rio Fernando de Taos (UFSF boundary at Canyon to Tienditas Creek)
Rio Fernando de Taos (Rio Pueblo d Taos to USFS Boundary at Canyon)

2022 UPPER RIO GRANDE TMDLs

TEMPERATURE
Grassy Creek (Comanche Creek to headwaters)
Rio Grande (Ohkay Owingeh boundary to Embudo Creek)
Rio Grande (Santa Clara Pueblo boundary to Ohkay Owingeh boundary)
Rio Medio (Rio Frijoles to headwaters)
Rio Nambe (Nambe Pueblo boundary to headwaters)
Santa Cruz River (Santa Cruz Reservoir to Rio en Medio)

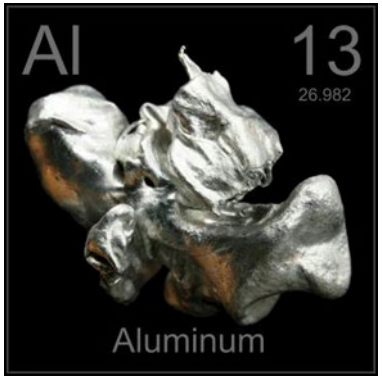
2022 UPPER RIO GRANDE TMDLs

TURBIDITY
Chuckwagon Creek (Comanche Creek to headwaters)
Placer Creek (Red River to headwaters)
Red River (Rio Grande to Placer Creek)
Rio Frijoles (Rio Medio to Pecos Wilderness)
Rio Medio (Rio Frijoles to headwaters)
Rio Pueblo de Taos (Rio Grande to Arroyo del Alamo)
Sanchez Canyon (Costilla Creek to headwaters)

What is Aluminum?

Aluminum is:

- An abundant element in the earth's crust
- Concentrations vary according to local geology and human activities



Elevated aluminum concentrations in water bodies may:

- Increase mortality and retard growth and egg production of fish, by binding with and impairing the function of the gills
- Chronic high levels are also toxic to benthic invertebrates and some single-celled plants

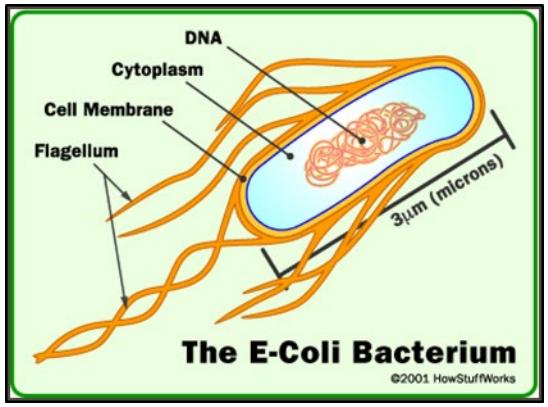
Aluminum Probable Source Summary

Assessment Unit	Probable Sources
Costilla Creek (Diversion abv Costilla to Comanche Creek)	Crop production; Highway/road/bridge runoff; Other recreation (angling, campgrounds); Pavement/impervious surfaces; Rangeland grazing; Rural residential area; Sand/gravel/rock mining or quarries; Site clearance; Water diversion
LaBelle Creek (Comanche Creek to headwaters)	Grazing in riparian zone; Loss of riparian habitat;
North Fork Tesuque Creek (Tesuque Creek to headwaters)	Highway/road/bridge runoff; Other recreation (campground, hiking trails); Pavement/impervious surfaces; Rangeland grazing;
Rio Medio (Rio Frijoles to headwaters)	Crop production; Drought; Forest fire (2002, 2013); Grazing in riparian zone; Habitat modification (Exotic species); Loss of riparian habitat; Rural residential area; Site clearance; Water diversion
Rio Quemado (Santa Cruz River to headwaters)	Crop production; Forest fire (2002); Grazing in riparian zone; Habitat modification (Exotic species); Highway/road/bridge runoff; Inappropriate waste disposal; Loss of riparian habitat; Rangeland grazing; Rural residential area; Site clearance; Water diversion
Santa Cruz River (Santa Clara Pueblo bnd to Santa Cruz Dam)	Crop production; Dams/impoundments; Grazing in riparian zone; Highway/road/bridge runoff; Inappropriate waste disposal; Loss of riparian habitat; Off-road vehicles; Rural residential area; Site clearance; Water diversion
Santa Cruz River (Santa Cruz Reservoir to Rio en Medio)	Highway/road/bridge runoff; Inappropriate waste disposal; Other recreation (angling, hiking trails);
Vidal Creek (Comanche Creek to headwaters)	Grazing in riparian zone; Loss of riparian habitat;

This list is based on staff observation and known land use activities in the watershed. These sources are **not confirmed nor quantified** at this time.

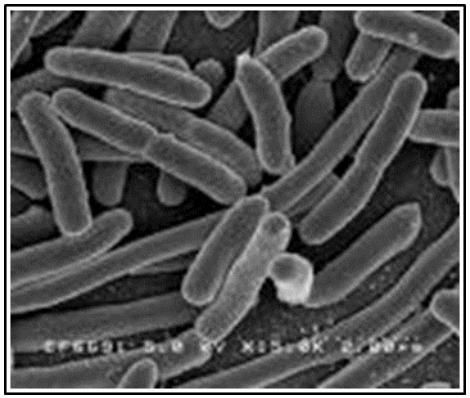
What is *E. coli*?

- Coliform bacteria are a group of functionally related organisms that are common in the environment
- Fecal coliform bacteria live in the intestines of humans and other warm-blooded animals, and may aid in the digestion of food
- The species *Escherichia coli* (*E. coli*) is used as an indicator of the presence of fecal coliforms



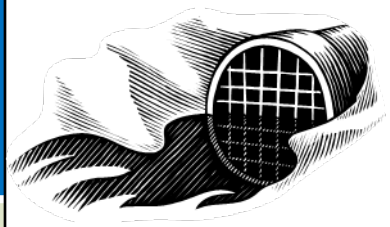
Why is *E. coli* a concern?

- Fecal coliform indicates that the water has been contaminated with fecal material
- The water may be contaminated by disease-producing bacteria, viruses, or protozoans, which also exist in fecal material
- Some waterborne pathogenic diseases are typhoid fever, viral and bacterial gastroenteritis, and hepatitis A



E. coli Probable Source Summary

Assessment Unit	Probable Sources
Grassy Creek (Comanche Creek to headwaters)	Grazing in riparian zone;
LaBelle Creek (Comanche Creek to headwaters)	Grazing in riparian zone;
Rio Quemado (Santa Cruz R to headwaters)	Crop production; Forest fire (2002); Grazing in riparian zone; Habitat modification (Exotic species); Inappropriate waste disposal; Loss of riparian habitat; Rangeland grazing; Rural residential area; Site clearance; Water diversion
Ute Creek (Costilla Creek to headwaters)	Crop production; Highway/road/bridge runoff; Livestock feeding operation; Rangeland grazing; Rural residential area; Site clearance;
Vidal Creek (Comanche Creek to headwaters)	Grazing in riparian zone;



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What are plant nutrients? Why are nutrients a concern?

- The nutrients that limit plant growth are usually nitrogen (N) and phosphorus (P)
- Dissolved oxygen (DO) is correlated with nutrient levels
- Aquatic life communities are affected by low DO, light limitation, changes in species composition, and mobility obstruction
- Excess algae also cause nuisance odors and an unsightly appearance
- High concentrations of nutrients can lead to algal blooms, which can produce toxins

Probable Sources of Plant Nutrients

Assessment Unit	Probable Sources
Fernandez Creek (Comanche Creek to headwaters)	Grazing in riparian zone
Rio Pueblo de Taos (Arroyo del Alamo to Rio Grande del Rancho)	Highway/road/bridge runoff; Municipal point source discharge; Other recreation (angling); Rural residential area; Site clearance

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What is sedimentation? Why is it a concern?

- Sedimentation is:
  - Fine sediment filling the spaces between rocks on the stream bottom

- Excess sedimentation can:
  - Lead to accelerated channel widening and streambank erosion
  - Reduce or eliminate habitat for fish, macroinvertebrates, and algae
  - Reduce habitat diversity (pools, riffles, etc.)

Probable Sources of Sediment

Assessment Unit	Probable Sources
LaBelle Creek (Comanche Creek to headwaters)	Grazing in riparian zone; Loss of riparian habitat
Rio Chupadero (USFS boundary to headwaters)	Highway/road/bridge runoff; Other recreation (dispersed camping); Rangeland grazing
Rio en Medio (Aspen Ranch to headwaters)	Highway/road/bridge runoff; Other recreation (camping, hiking trails, ski area); Rangeland grazing; Waste from pets

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What is Specific Conductance? Why is it a concern?

- The electrical conductivity of water is directly related to the concentration of dissolved solids.
- Specific conductance (SC) is conductivity corrected to 25°C.
- Streams supporting good mixed fisheries have a range between 150 and 500 µS/cm.
- Conductivity outside this range could indicate that the water is not suitable for certain species of fish or macroinvertebrates.

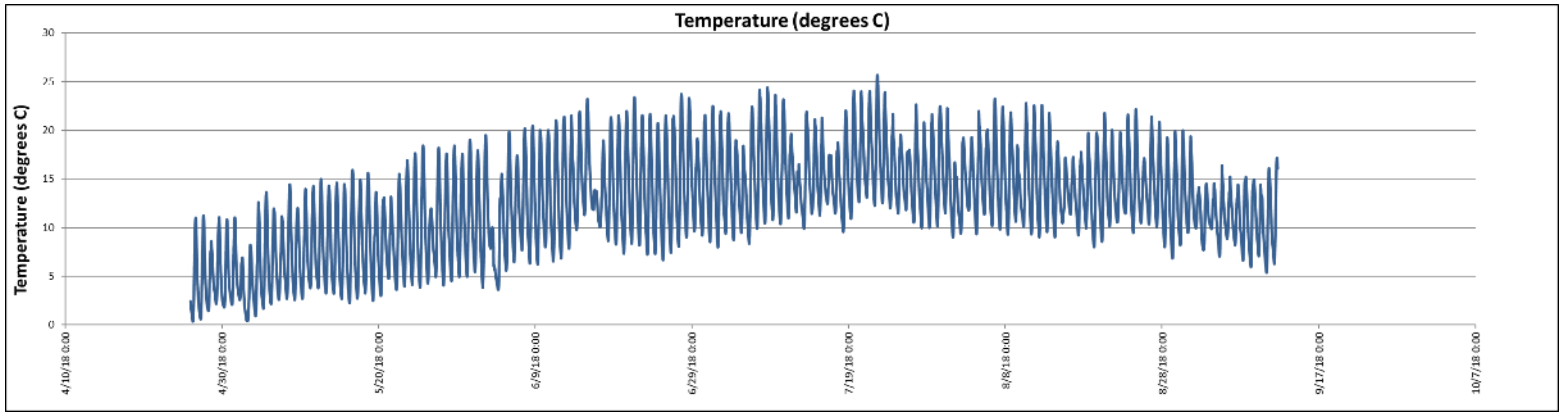
Probable Sources of SC

Assessment Unit	Probable Sources
Rio Fernando de Taos (Rio Pueblo de Taos to headwaters)	Forest fire; Grazing in riparian zone; Habitat modification (Exotic species); Highway/road/bridge runoff; Loss of riparian habitat; On-site treatment systems; Other recreation (angling); Rangeland grazing; Rural residential area; Sand/gravel/rock quarry; Urban municipal area; Water diversion

This list is based on staff observation and known land use activities in the watershed. These sources are **not confirmed nor quantified** at this time.

Why is temperature a concern?

- Water temperature varies both seasonally and throughout the day.
- Temperature affects aquatic life by influencing:
  1. the amount of oxygen that can be dissolved in water,
  2. the rate of photosynthesis of algae and other aquatic plants,
  3. the rates of growth, reproduction and decomposition of aquatic life, and
  4. the sensitivity of organisms to toxic wastes, parasites, and diseases.



Temperature TMDLs

- The load for temperature is expressed as kilojoules (kJ) per day
- The TMDL equation is:
  Load Capacity (kJ/day) =
  Critical Flow (cfs) x Numeric Target (°C) x 1.023×10^7

Temperature Probable Source Summary

Assessment Unit	Probable Sources
Grassy Creek (Comanche Creek to headwaters)	Grazing in riparian zone; Loss of riparian habitat
Rio Grande (Ohkay Owingeh boundary to Embudo Creek)	Crop production; Dams/impoundments; Drought; Highway/road/bridge runoff; Loss of riparian habitat; Rural residential area; Site clearance; Streambank modification; Water diversion
Rio Grande (Santa Clara Pueblo boundary to Ohkay Owingeh boundary)	Crop production; Dams/impoundments; Inappropriate waste disposal; Loss of riparian habitat; Pavement/impervious surfaces; Rural residential area; Sand/gravel/rock mining or quarries; Site clearance; Streambank modification; Water diversion
Rio Medio (Rio Frijoles to headwaters)	Crop production; Dam/impoundment; Drought; Forest fire (2002, 2013); Grazing in riparian zone; Habitat modification (Exotic species); Loss of riparian habitat; Rural residential area; Site clearance; Water diversion
Rio Nambe (Nambe Pueblo boundary to headwaters)	Drought; Fire suppression; Forest fire (2003, 2011); Other recreation (hiking trails); Rangeland grazing
Santa Cruz River (Santa Cruz Reservoir to Rio en Medio)	Drought; Highway/road/bridge runoff; Other recreation (angling, hiking trails)

This list is based on staff observation and known land use activities in the watershed. These sources **are not confirmed nor quantified** at this time.

What is Turbidity?
Why is it a concern?

- Turbidity is the optical property in water that causes light to be scattered and absorbed rather than transmitted. It results from suspended solids in the water, including silts, clays, and plankton.

- The solid particles absorb heat, thus raising water temperature, which in turn lowers dissolved oxygen levels.
- Excess turbidity will reduce the penetration of light, decreasing the ability of fish or fingerlings to capture prey, and reducing primary production.

Probable Sources of Turbidity

Assessment Unit	Probable Sources
Chuckwagon Creek (Comanche Creek to headwaters)	Grazing in riparian zone; Loss of riparian habitat
Placer Creek (Red River to headwaters)	Abandoned mine lands; Highway/road/bridge runoff; Urban runoff
Red River (Rio Grande to Placer Creek)	Abandoned mine lands; Dams/impoundments; Habitat modification (Exotic species); Flow alteration; Highway/road/bridge runoff; Industrial point source discharge; Mine tailings; Municipal point source discharge; Off-road vehicles; Other recreation (angling, campgrounds, hiking trails); Permitted aquaculture; Rangeland grazing; Rural residential area; Water diversion; Wildlife other than waterfowl
Rio Frijoles (Rio Medio to Pecos Wilderness)	Forest fire (2000, 2011, 2013); Grazing in riparian zone; Habitat modification (Exotic species); Highway/road/bridge runoff; Rangeland grazing; Rural residential area; Water diversion
Rio Medio (Rio Frijoles to headwaters)	Crop production; Forest fire (2002, 2013); Grazing in riparian zone; Habitat modification (Exotic species); Loss of riparian habitat; Rural residential area; Site clearance; Water diversion
Rio Pueblo de Taos (Rio Grande to Arroyo del Alamo)	Habitat modification (Exotic species); Highway/road/bridge runoff; Inappropriate waste disposal; Rural residential area
Sanchez Canyon (Costilla Creek to headwaters)	Grazing in riparian zone; Habitat modification (Exotic species); Highway/road/bridge runoff; Rangeland grazing; Rural residential area

This list is based on staff observation and known land use activities in the watershed. These sources are **not confirmed nor quantified** at this time.

TMDL Implementation

A TMDL is not a regulatory document, however, the loading calculations are used for the following:

1. Regulatory programs, such as the National Pollutant Discharge Elimination System (NPDES) permitting program administered for NM by EPA Region 6

2. Non-regulatory programs, such as Watershed Protection Programs (WPS) and Water Quality Improvement Projects (WQIP) using CWA §319(h) and §104(b)(3) grants and Clean Water State Revolving Fund loans

TMDL Implementation

- Revise NPDES permits to meet TMDL loading requirements

- Develop a Watershed Based Plan:
  - Outline appropriate steps to achieve the loading defined in the TMDL, including potential solutions, such as Best Management Practices
  - Focus on nonpoint sources of pollution and provide an opportunity for stakeholders to participate in community-based solutions towards improved water quality
  - Implement on-the-ground projects to restore water quality

Current TMDL Public Comment Period

- The TMDL is available online at: https://www.env.nm.gov/surface-water-quality/tmdl/
- The comment period for the Draft TMDL closes: July 13, 2022
- Written comments can be submitted via the NMED public comment portal: https://nmed.commentinput.com/comment/search or alternately:

E-mail:	Mail:	Fax:
rjankowitz@ state.nm.us	NMED-SWQB 1190 South St. Francis Drive P.O. Box 5469 Santa Fe, New Mexico 87502	505-827-0160

Next Steps

- SWQB will respond to written comments in the Final Draft TMDL
- SWQB plans to present the Final Draft TMDL to the WQCC in September or October of 2022
- SWQB will send the Final Draft TMDL to all commenters, as well as post it to the SWQB web site, at least 10 days prior to the WQCC meeting

Questions?