



New Mexico Environment Department

Gila River/Lower Rio Grande Total Maximum Daily Loads

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AGENDA

- Monitoring and Assessment Overview
- TMDL Overview
- Gila River/Lower Rio Grande TMDLs
- Question and Answer plus Discussion



MONITORING AND ASSESSMENT OVERVIEW



2004 10 25



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:

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 Advanced Restoration Plan) development
 - Review and revise water quality standards if warranted

TMDL OVERVIEW





Total Maximum Daily Loads

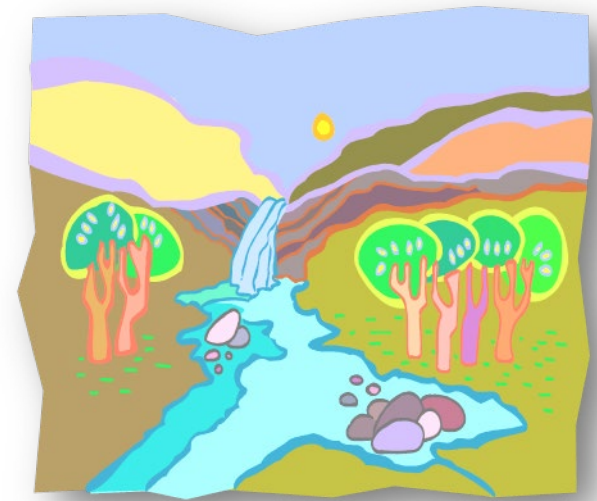
- A TMDL document is a water quality plan that establishes specific goals to meet water quality standards. It includes:
 - Target loading capacities; and
 - Information potentially leading to 1) permit revisions and implementation, and 2) the development of Watershed Based Plans, which discuss measures 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** = $WQS \times \text{Critical Flow} \times CF$
 - **WQS** = Water Quality Standard
 - **Flow** = based on critical conditions
 - **CF** = Conversion Factor





TMDL Allocations

$$\text{TMDL} = \Sigma \text{LA} + \Sigma \text{WLA} + \text{MOS}$$

(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)

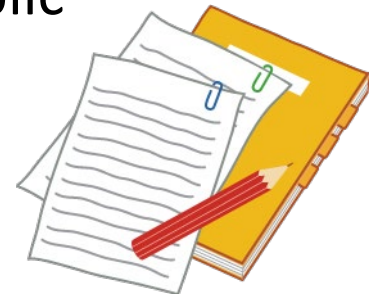
Waste Load Allocation (WLA) is from a known point source and is controlled through NPDES permits





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 may be presented to the New Mexico 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:
www.env.nm.gov/surface-water-quality/tmdl/





GILA/LOWER RIO GRANDE WATERSHED TMDLs





2023 GILA/LOWER RIO GRANDE TMDLs

DISSOLVED BORON

Rio Grande (International Mexico bnd to TX border)

E. COLI

Mangas Creek (Gila River to Mangas Springs)

San Francisco River (Box Canyon to Whitewater Creek)

PLANT NUTRIENTS

Mule Creek (San Francisco R to Mule Springs)



2023 GILA/LOWER RIO GRANDE TMDLs

SEDIMENTATION

San Francisco River (Centerfire Creek to AZ border)

TEMPERATURE

Gilita Creek (Middle Fork Gila R to Willow Creek)

Las Animas Ck (perennial prt R Grande to Animas Gulch)

Mangas Creek (Gila River to Mangas Springs)

Mimbres R (Perennial reaches Cooney Cyn to headwaters)

San Francisco River (NM 12 at Reserve to Centerfire Creek)

Whitewater Creek (Whitewater Campgrd to headwaters)

Willow Creek (Gilita Creek to headwaters)



What is Boron?

Boron is:

- A naturally occurring element widely distributed in the earth's crust
- An essential micronutrient for plants
- Boron also occurs in soils contaminated by human activities, such as releases from sewage outfalls



Elevated boron concentrations in water bodies may:

- Cause excess boron uptake leading to plant toxicity



Boron Probable Source Summary

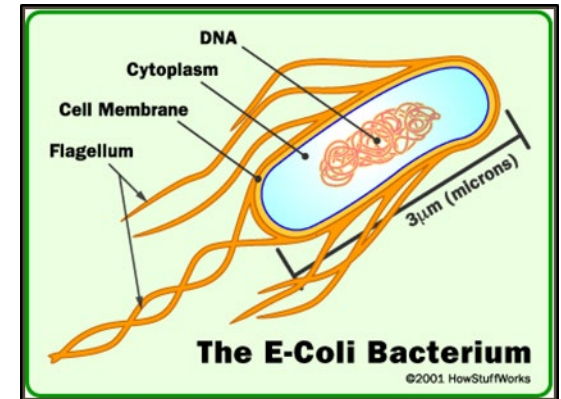
Assessment Unit	Probable Sources	
Rio Grande (International Mexico bnd to TX border)	Animal shows and racetracks Channelization Crop Production Golf courses Highway/Road/Bridge runoff Inappropriate waste disposal	Industrial point source discharge Municipal point source discharge Natural Sources Off-road vehicles Pavement/impervious surface Urban runoff/storm sewers Urbanized 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.



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





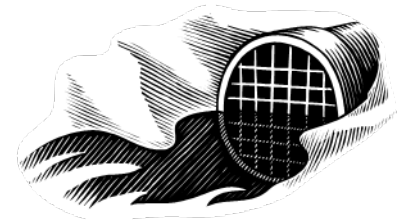
Why is *E. coli* a concern?

- 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
Mangas Creek (Gila River to Mangas Springs)	Crop production; Dam/impoundment; Highway/Road/Bridge runoff; Low water crossing; Rangeland grazing
San Francisco River (Box Canyon to Whitewater Creek)	Crop production; Forest fire; Highway/Road/Bridge runoff; On-site treatment systems; Other recreation (hot springs soaking); Rangeland grazing; Rural residential 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.



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	
Mule Creek (San Francisco R to Mule Springs)	Grazing in the riparian zone Loss of riparian habitat On-site treatment systems	Rangeland grazing Rural residential area Wildlife other than waterfowl



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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

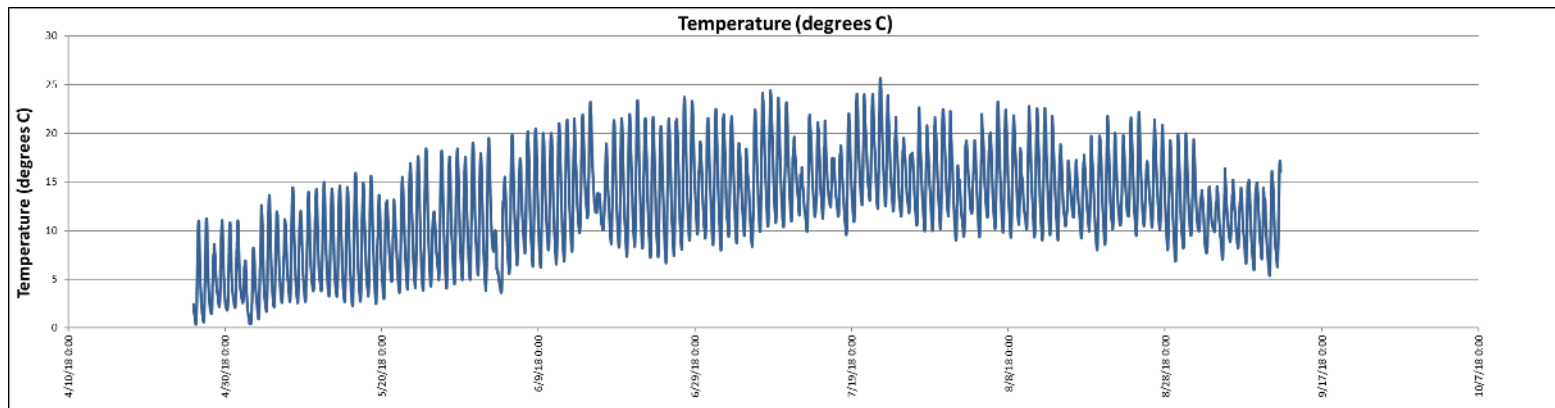
Assessment Unit	Probable Sources	
San Francisco River (Centerfire Creek to AZ border)	Forest fire Grazing in the riparian zone Highway/Road/Bridge runoff Low water crossing Other recreation (campground)	Rangeland grazing Rural residential area Silviculture Water diversions

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:
 - the amount of oxygen that can be dissolved in water,
 - the rate of photosynthesis of algae and other aquatic plants,
 - the rates of growth, reproduction and decomposition of aquatic life, and
 - 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
Gilita Creek (Middle Fork Gila R to Willow Creek)	Dam/impoundment; Forest fire; Other recreation (hiking trails)
Las Animas Ck (perennial prt R Grande to Animas Gulch)	Crop production; Dam/impoundment; Forest fire; Highway/Road/Bridge runoff; Low water crossing; Rural residential area; Water diversion
Mangas Creek (Gila River to Mangas Springs)	Crop production; Dam/impoundment; Highway/Road/Bridge runoff; Low water crossing; Natural sources; Rangeland grazing
Mimbres R (Perennial reaches Cooney Cyn to headwaters)	Forest fire; Highway/Road/Bridge runoff; Low water crossing
San Francisco River (NM 12 at Reserve to Centerfire Creek)	Crop production (irrigated); Dam/impoundment; Forest fire; Grazing in the riparian zone; Highway/Road/Bridge runoff; Low water crossing; Natural sources; Rangeland grazing
Whitewater Creek (Whitewater Campgrd to headwaters)	Forest fire; Other recreation (hiking trails)
Willow Creek (Gilita Creek to headwaters)	Forest fire; Highway/Road/Bridge runoff; Low water crossing; Other recreation (angling, campgrounds, 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.



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:
September 8, 2023
- Written comments can be submitted via the NMED public comment portal:
<https://nmed.commentinput.com/comment/search>
or alternately:

<u>E-mail:</u> Rachel.Jankowitz@env.nm.gov	<u>Mail:</u> NMED-SWQB 1190 South St. Francis Drive P.O. Box 5469 Santa Fe, New Mexico 87502	<u>Fax:</u> 505-827-0160
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Next Steps

- SWQB will respond to written comments in the Final Draft TMDL
- SWQB plans to present the Final Draft TMDL to the WQCC at the next available opportunity.
- 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?

