

Total Maximum Daily Load 101

May 25, 2022

Overview

- Colorado Department of Public Health and Environment
- Review E. coli TMDLs
- TMDL Development
- Ongoing Development Process

Introductions

Colorado Department of Public Health and Environment

Water Quality Control Division

- Watershed Section
 - Restoration and Protection Unit
 - WAIS (TMDL) WG
 - Nonpoint Source (NPS) WG
 - Water quality planning



E. coli TMDLs Past, Present and Future

Water Quality and *E. coli*

- One of the most common causes of impairments in the 2022 listing cycle
 - South Platte
 - Arkansas
- Approximately 2,429 river and stream miles affected
- Primary cause for non-attainment of the recreation classified use

Approved *E. coli* TMDLs

- South Platte Segment 14 - 2007
- Boulder Creek - 2011
- South Platte Segment 15 - 2016
- Big Dry Creek - 2016
- Wildhorse Creek - 2018

E. coli TMDLs currently under development

Lower Colorado - Adobe and Leach Creeks (2022)

South Platte - Lower Bear Creek and Poudre, Spring and Fossil Creeks (2023)

E. coli TMDLs beyond 2023

SOUTH PLATTE

Cherry Creek

Dry, Harvard, Lakewood Gulches

Coal, Boulder Creeks

Little Thompson

Sand, Westerly and Dry Creeks

Clear and Ralston Creeks

Middle South Platte

ARKANSAS

Fountain Creek

GUNNISON

Gunnison River



INTRODUCTION TO TMDLS

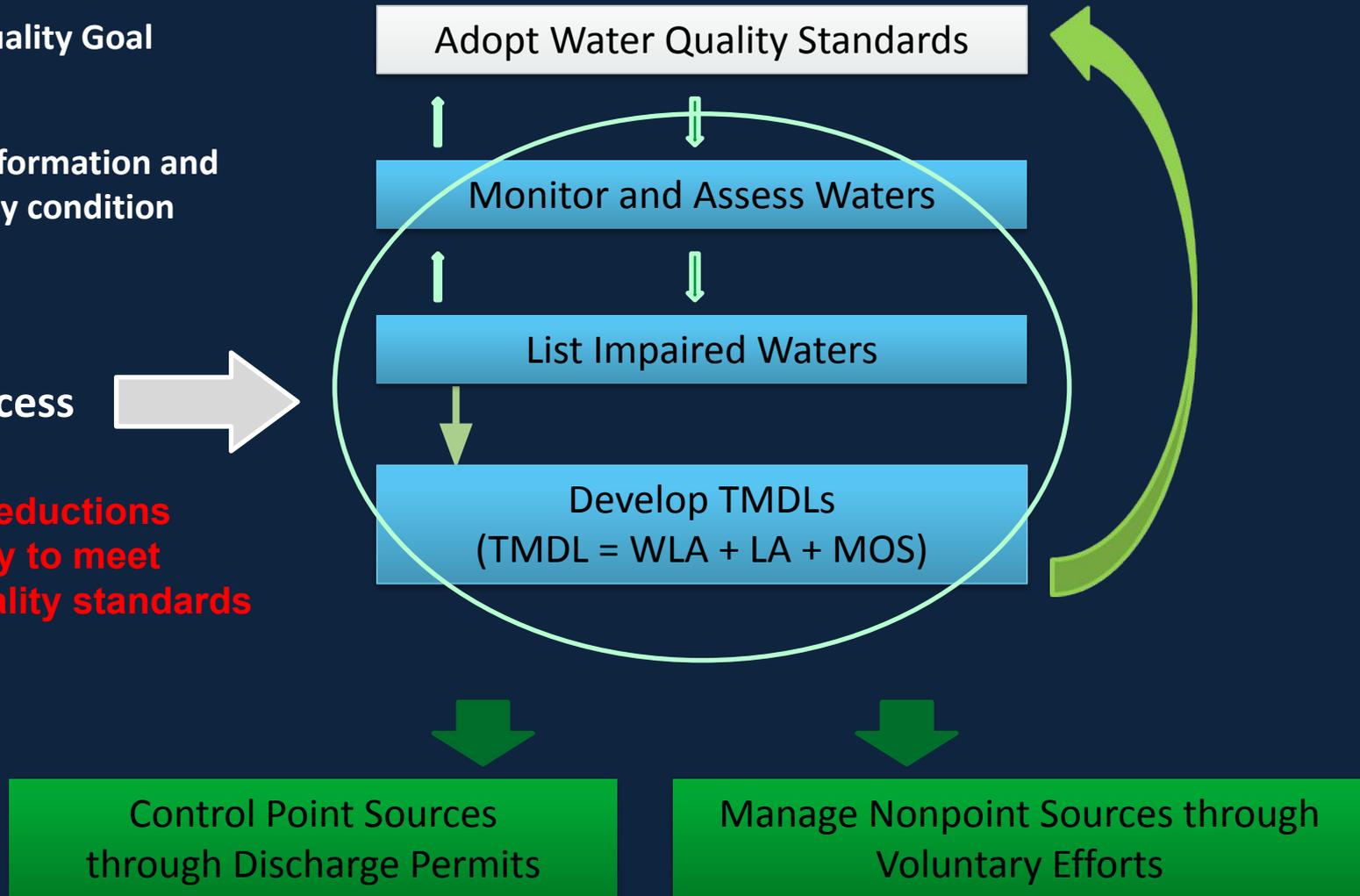
Water Quality Management

Define Water Quality Goal

Compile data/information and assess waterbody condition

303(d) Process

Identify reductions necessary to meet water quality standards



What is a Total Maximum Daily Load (TMDL)?

- The maximum amount of a pollutant that a waterbody can receive and still meet water quality standards
- Defines a pollution budget that takes into account all potential sources of a pollutant
- Formula to express a TMDL:

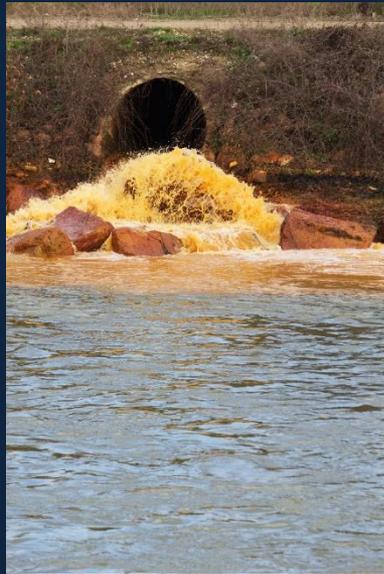
$$\text{TMDL} = \text{WLA} + \text{LA} + \text{MOS}$$

- WLA = Wasteload Allocation = point source discharges and reserve capacity
- LA = Load Allocation = nonpoint source discharges and natural background
- MOS = Margin Of Safety = variability, seasonality, uncertainty

TMDL Development Highlights

- Determine data period of record and fill data gaps
- Identify critical conditions
- Calculate loading
 - $\text{TMDL} = \text{median flow} \times \text{water quality standard}$
 - $\text{Existing pollutant load} = \text{median flow} \times \text{pollutant concentration}$
 - $\text{Allowable load} = \text{TMDL} - \text{MOS}$
- Allocate the TMDL
 - WLA based on facility design capacity and WQS

Source identification



Data Analysis

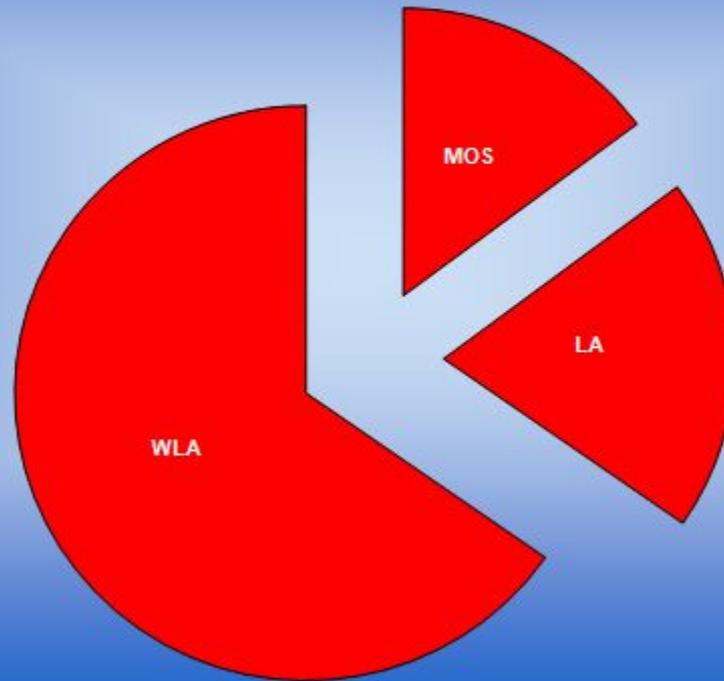
- Determine critical conditions, data period of record
- Quantify sources
- Work through unique solutions to TMDL-specific barriers
- Calculate loading using consistent approach
- Draft TMDL document

Data Analysis-Load Calculations

- TMDL
 - Median flow ft^3/s X WQS ug/L X CF= lbs/D
- Observed Pollutant Load
 - Median flow ft^3/s X Pollutant ug/L X CF= lbs/D
- Allowable Load = TMDL - MOS

How it's allocated...

$$WLA + LA + MOS = TMDL$$



Data Analysis-Allocating the TMDL

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

- WLA based on facility design capacity and WQS, remainder assigned to LA
- Use relative contributions: if observed load is 60% point source, then assign 60% of the Allowable Load (TMDL-MOS) to WLA.

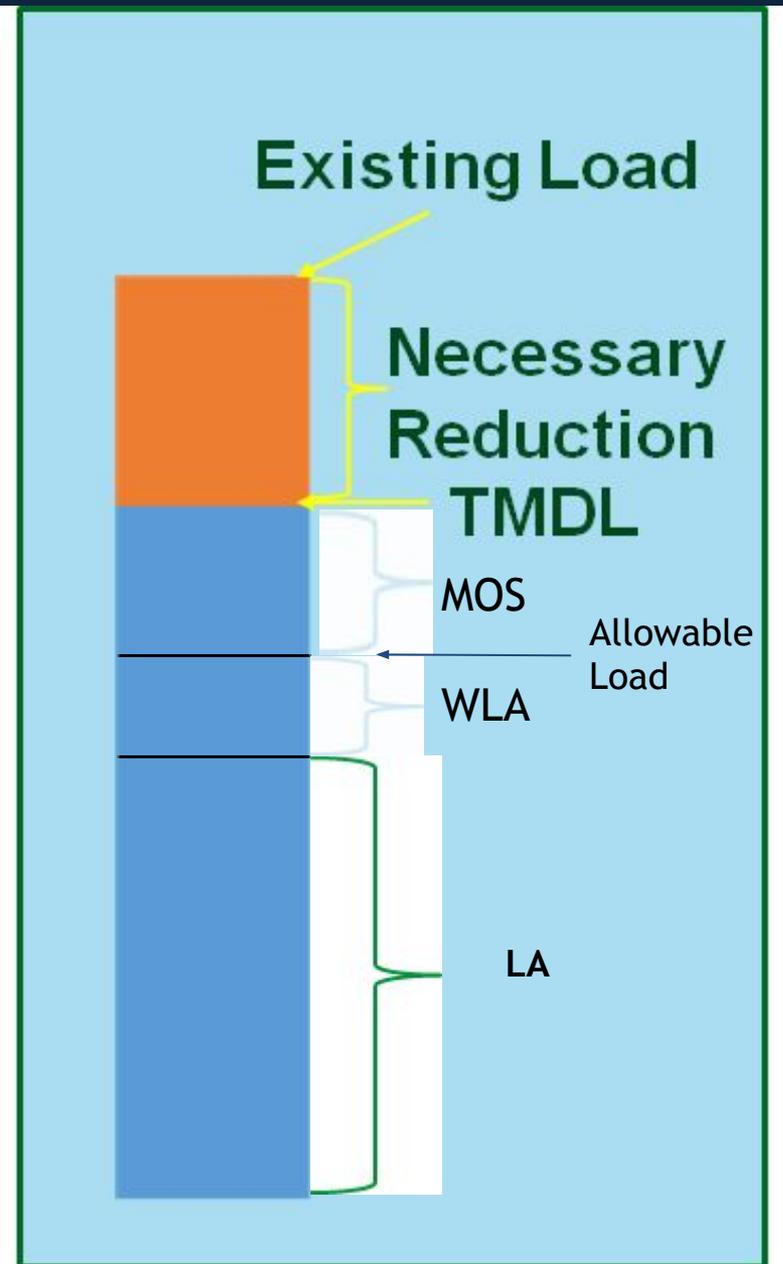
Estimating the “current load” for MS4 discharges

MS4 “current conditions” are harder to accurately estimate than effluent from treatment plants. Loading from stormwater outfalls is highly variable by location and storm event.

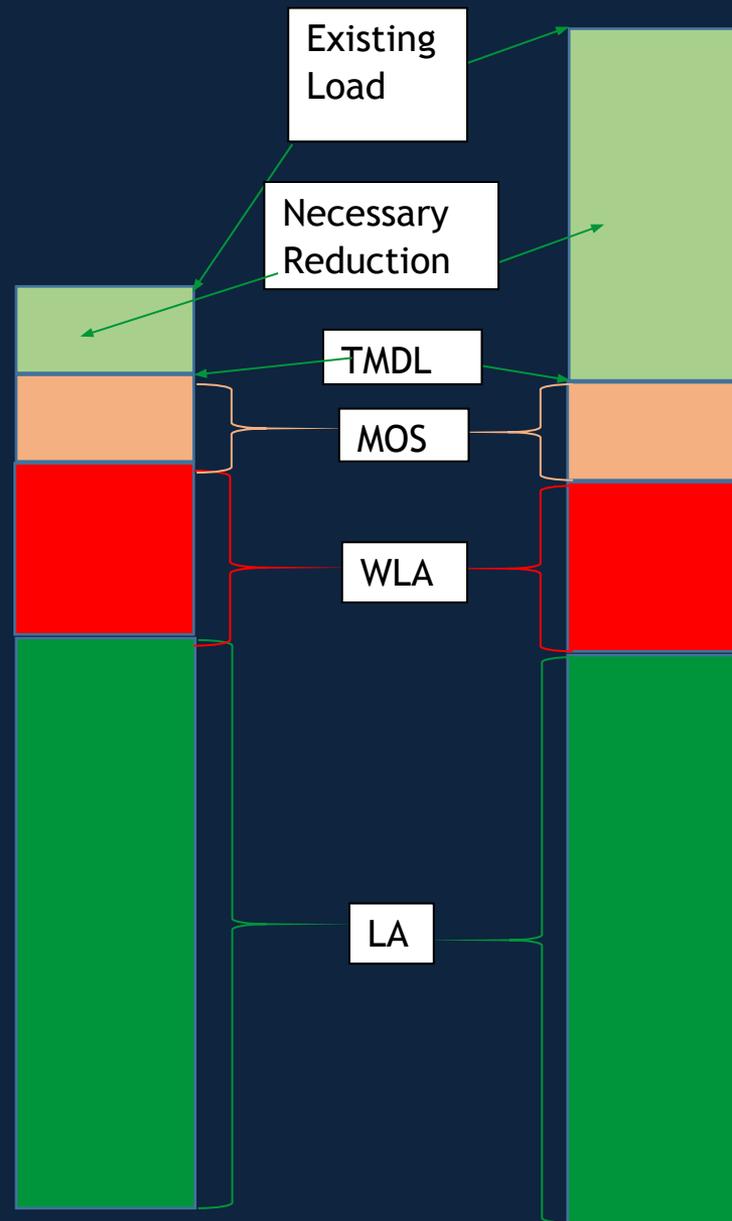
Some considerations to inform MS4 Loads:

- Hydrology
- GIS spatial analysis on developed land use area
- In-stream trends in pollutant concentrations (spatial, seasonal or wet/vs dry weather)
- Load duration curves
- Outfall data (if available)
- National data on urban stormwater quality
- Special studies (e.g. USGS studies) if available
- Process of elimination (absence of other sources or known magnitude of other sources)

Total Maximum Daily Load

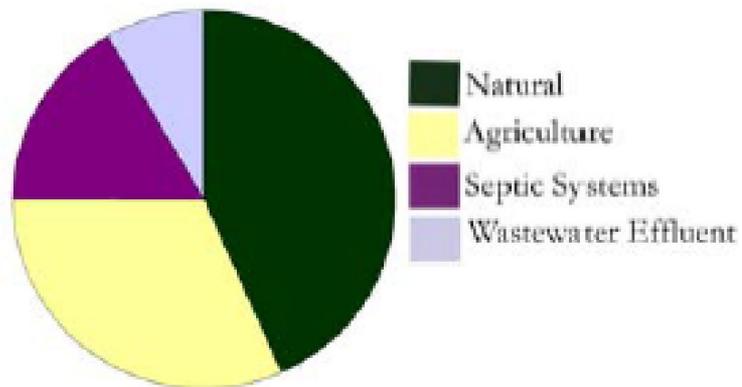


Degree of Impairment

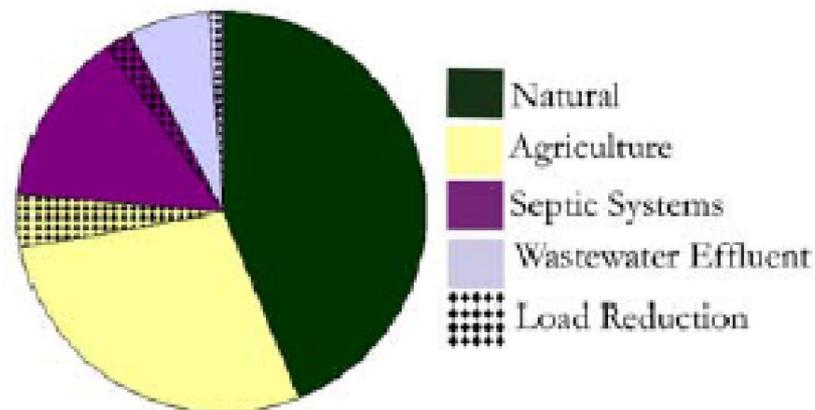


Allocating the TMDL

Example of Contributions to Pollutant Loads



Allocation of Load Reductions



How Are TMDLs Used?

- TMDLs inform implementation (not self-implementing)
 - WLAs are implemented through discharge permits
 - LAs are implemented through voluntary, nonpoint source reduction activities
- TMDLs are not regulations and do not require compliance
- TMDLs are not water quality standards but can be used to inform site-specific standards development

How Can You Participate?

- Share your expertise with us about your watershed
 - Provide water quality data
 - Provide information about hydrology and potential sources
- Give feedback during stakeholder meetings
- Submit comments on draft TMDL reports during public notice

Frequently Asked Questions

- What do TMDLs Mean
- Why are Total Maximum Daily Loads Important?
- Why develop a TMDL?
- What might happen without a TMDL?
- Do TMDLs mean more regulation?

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