

Clean Water and Total Maximum Daily Load Development



MT Dept of Environmental Quality
Water Quality Planning Bureau

<http://www.deq.state.mt.us/wqinfo/TMDL/index.asp>



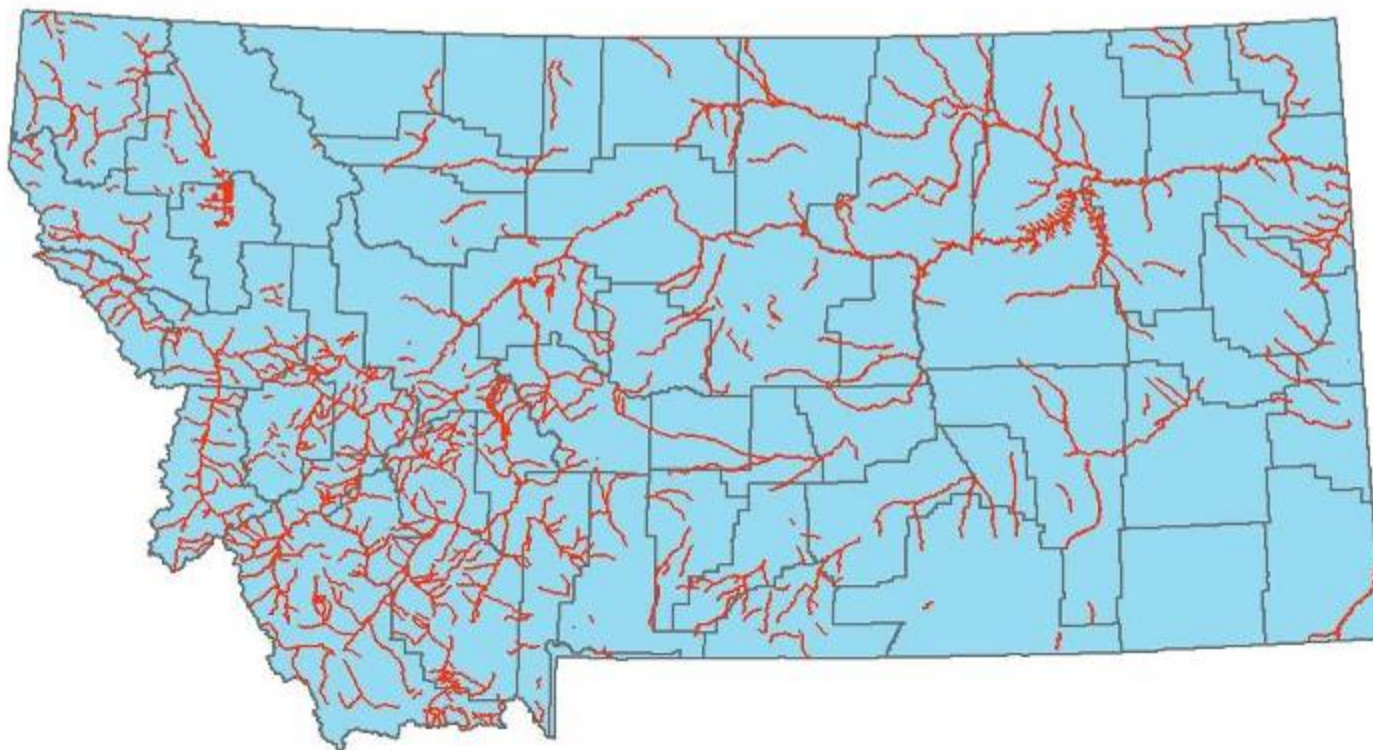
Total Maximum Daily Load Overview

- What is a TMDL?
- What are water quality standards and why do they matter?
- What is the TMDL development process in the Boulder-Elkhorn?

What is a TMDL?

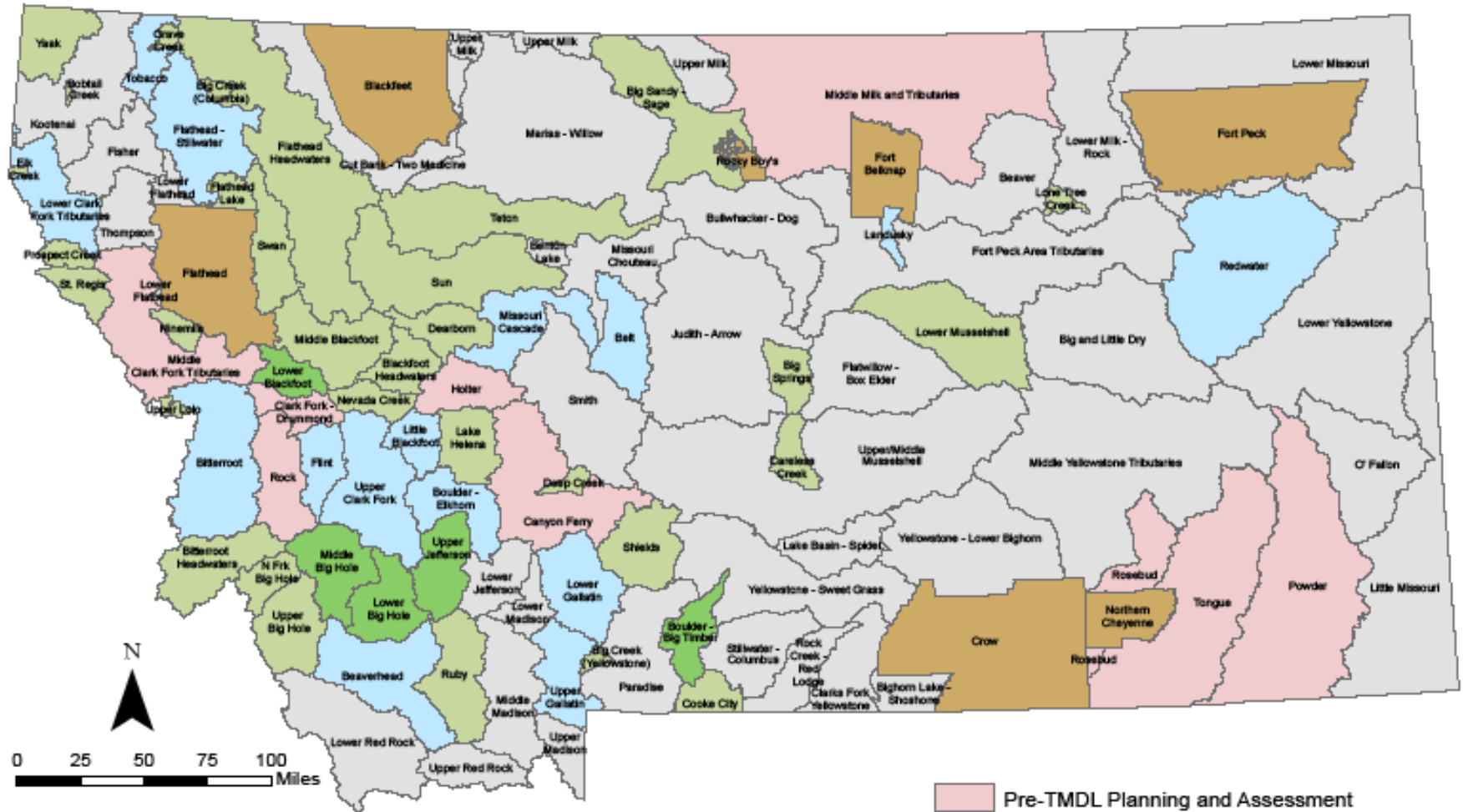
- **T**otal **M**aximum **D**aily **L**oad is the amount of pollutant that a water body can receive from all sources & still meet water quality standards.
- Expressed as a load per a given time period (16 lbs/day; 120 tons/year)

Does Montana Have a Water Quality Problem?



About 800 Montana waters
do not meet water quality standards

Montana TMDL Development Status (8-4-09)



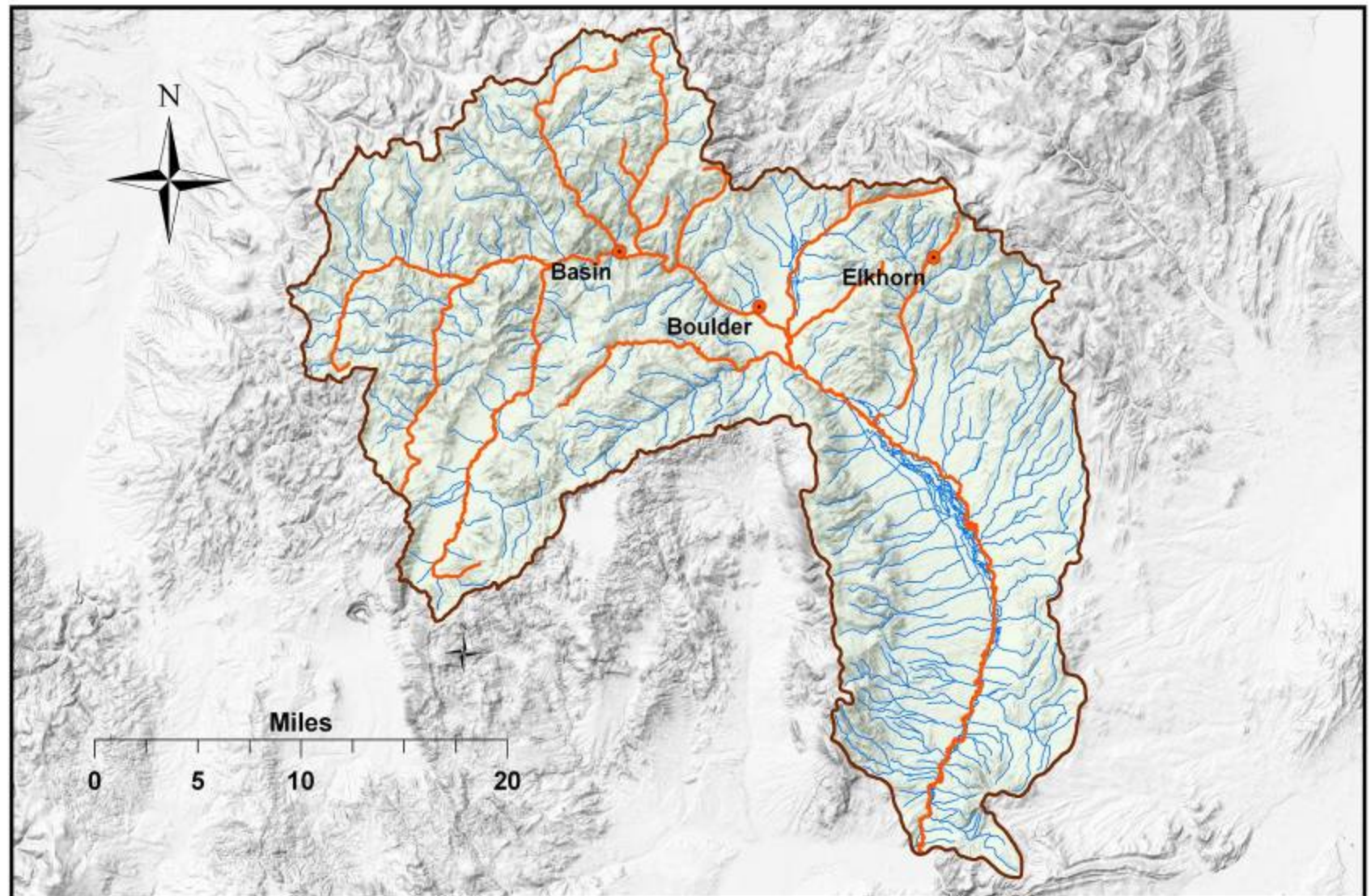
* TMDL's are specific to a water body - pollutant combination. Some planning areas with completed TMDL's may still require TMDL development for additional water body - pollutant combinations.

**Not under state jurisdiction

In addition to the TPA's shown on this map, large rivers and their associated reservoir systems represent separate TMDL development projects. These include the Clark Fork River, the Upper Missouri River, the Lower Missouri River, and the Yellowstone River. Some TMDL development support work is underway in the Yellowstone River, and nutrient TMDL's have been completed for the Clark Fork River. A second phase of nutrient TMDL development will be necessary for the Clark Fork River.

- Pre-TMDL Planning and Assessment
- TMDL in Progress
- Submitted to EPA
- *Approved TMDL or Watershed Plan
- No Significant TMDL Activity
- **Tribal

The Boulder-Elkhorn Planning Area



Pollutants: Heavy Metals



Pollutants: Excess Nutrients



Pollutants: Excess Sediment



Pollutants: Excess Thermal Loading



Pollutant Sources:

➤ Point Sources



➤ Non-Point Sources

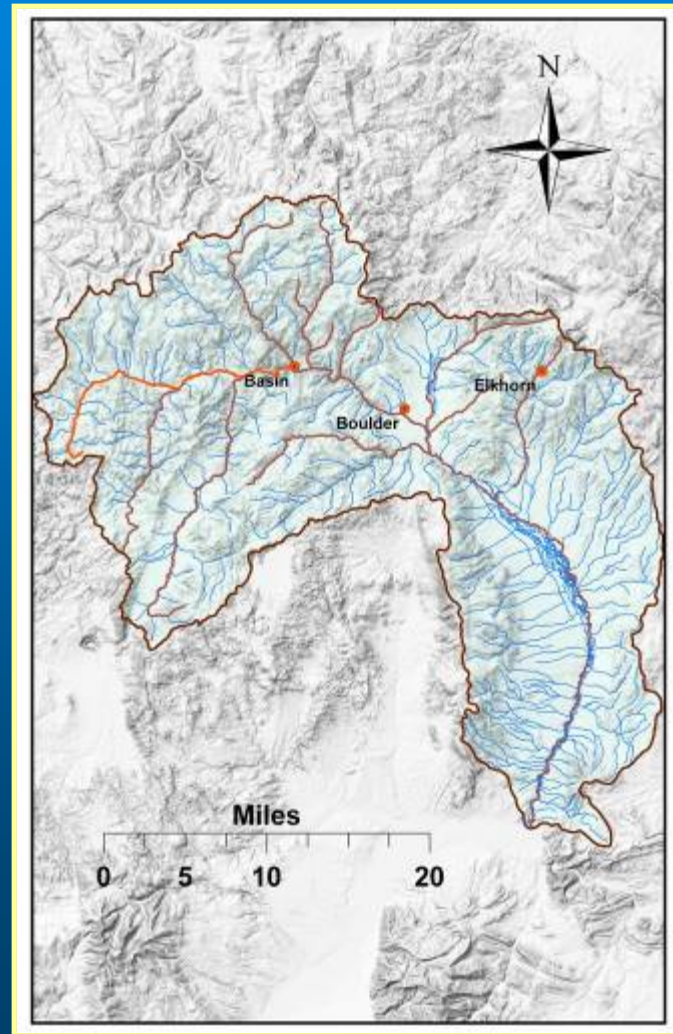


➤ Natural Sources



Boulder River (Headwaters to Basin Creek)

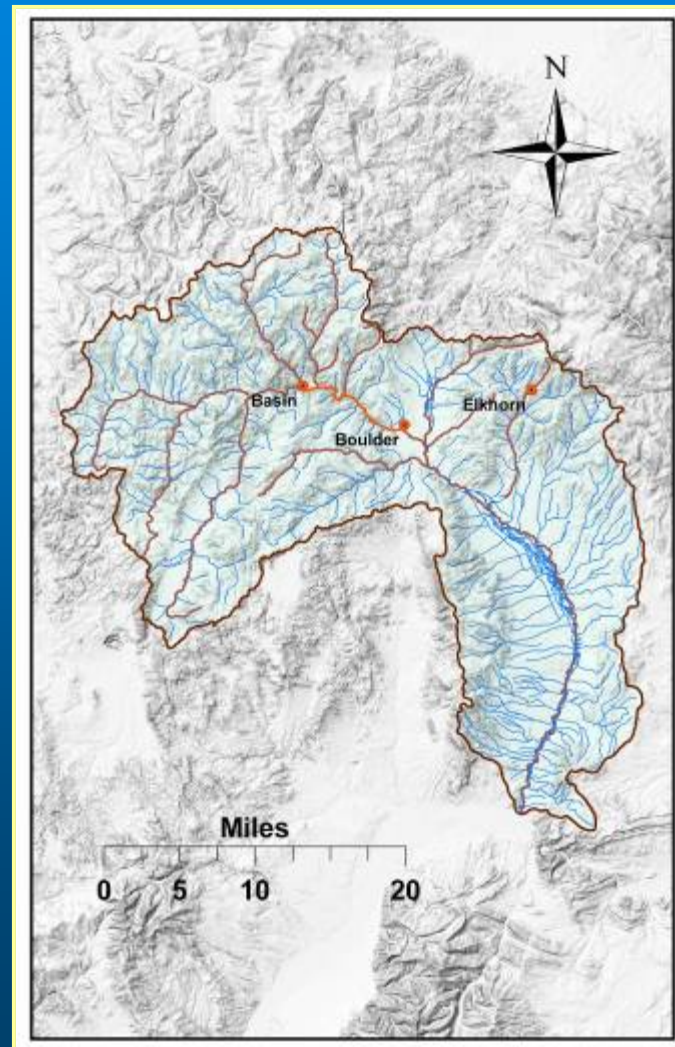
- Cadmium
- Copper
- Iron
- Lead
- Zinc



Boulder River

(Basin Creek to Town of Boulder)

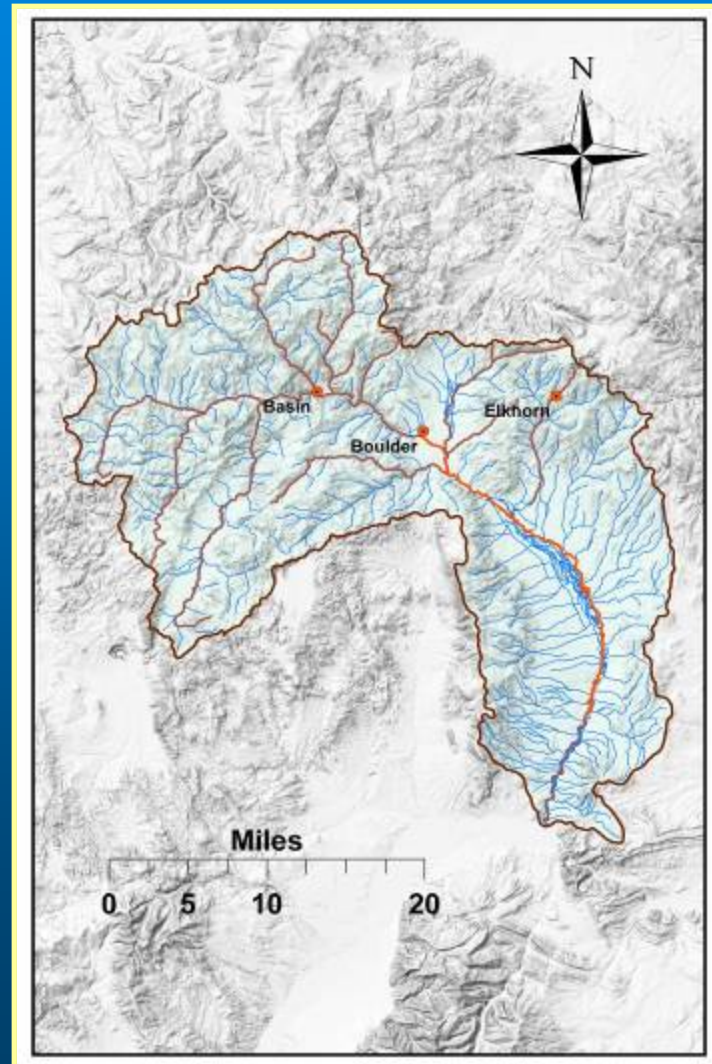
- Cadmium
- Copper
- Iron
- Lead
- Silver
- Zinc
- Stream-side
Vegetation
Alteration



Boulder River

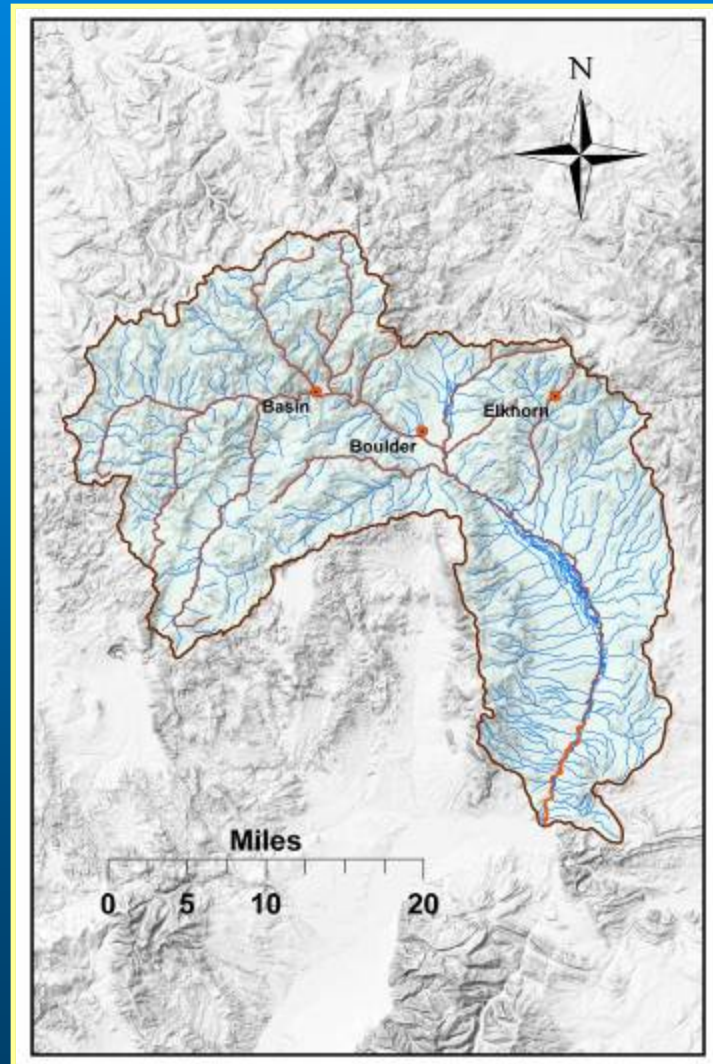
(Town of Boulder to Cottonwood Creek)

- Copper
- Iron
- Lead
- Silver
- Zinc
- Sediment
- Temperature
- Stream-side
Vegetation
Alteration
- Low Flow
Alteration



Boulder River (Cottonwood Creek to Mouth)

- Arsenic
- Cadmium
- Copper
- Lead
- Zinc
- Sediment
- Temperature
- Stream-side Vegetation Alteration
- Low Flow Alteration



Water Quality Standards

1. Use Classifications

(e.g., aquatic life, irrigation, drinking water, recreation)

2. Numeric Standards

e.g. Arsenic: 340 $\mu\text{g/L}$ Aquatic Life, Acute
150 $\mu\text{g/L}$ Aquatic Life, Chronic
10 $\mu\text{g/L}$ Human Health

3. Narrative Standards

(e.g., "State surface waters must be free from ...")
ARM 17.30.637(1)

4. Antidegradation Provisions

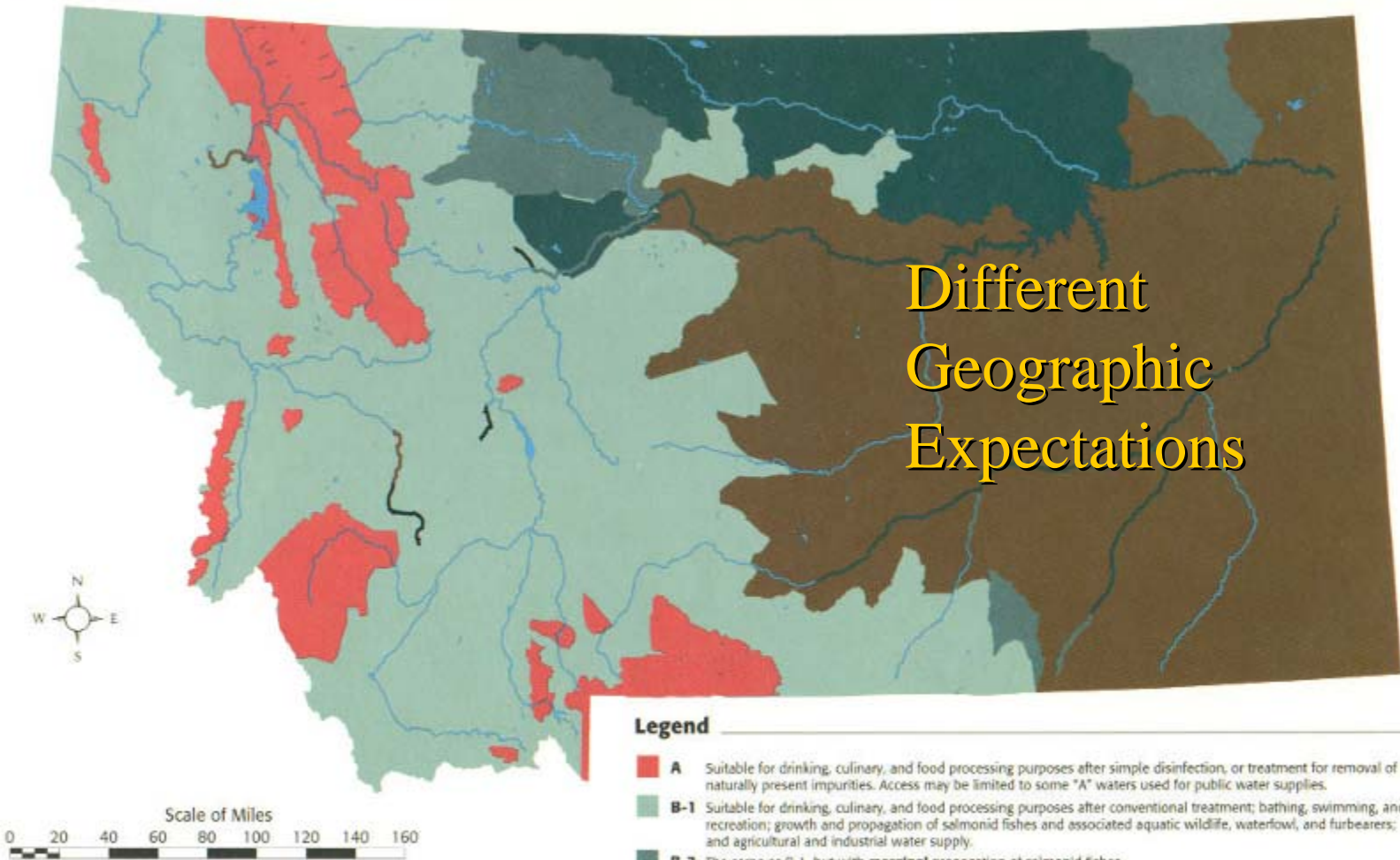
Water Use Classification



Different ecosystems and stream types are suitable for different uses and classified in different categories

Montana Surface Water Quality Classifications*

Different
Geographic
Expectations



Legend

- **A** Suitable for drinking, culinary, and food processing purposes after simple disinfection, or treatment for removal of naturally present impurities. Access may be limited to some "A" waters used for public water supplies.
- **B-1** Suitable for drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic wildlife, waterfowl, and furbearers; and agricultural and industrial water supply.
- **B-2** The same as B-1, but with **marginal** propagation of salmonid fishes.
- **B-3** The same as B-1, but with growth and propagation of **non-salmonid** fishes.
- **C** Suitable for bathing, swimming, and recreation; growth and propagation of salmonid or non-salmonid fishes and associated aquatic wildlife, waterfowl, and furbearers; and agricultural and industrial water supply.
- **I** Greatly impacted streams not currently supporting the uses listed above. They include reaches of Prickly Pear, Silver Bow, and Muddy Creeks.

*Exceptions to these use classifications exist. Complete identification of a waterbody's use classification can be found in Montana A.R.M. 16.20.604 through 16.20.612.
Map composed by the Natural Resource Information System, State Library, with data provided by the Montana Department of Environmental Quality.

So What's a TMDL?

Water Quality
Standards → 303(d) List

- Numeric Criteria
 - Narrative
 - Beneficial Uses
- List of impaired waters in need of TMDLs

So What's a TMDL?

Water Quality Standards



303(d) List



Water Quality Restoration Plan

- Numeric Criteria
- Narrative
- Beneficial Uses

- List of impaired waters in need of TMDLs

- Watershed Characterization
- Problem Description
- Source Assessment
- Targets
- TMDL
- Allocation
- Margin of Safety
- Monitoring Strategy
- Restoration Strategy

Put the subject water bodies into context with the watershed in which they occur.

Describes the physical, chemical, biological, and socioeconomic characteristics of the watershed (e.g., climate, land use, soils, land ownership, population, topography, etc.).

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DEFINE THE WATER QUALITY PROBLEMS

Compile and evaluate all available data to verify 303(d) listings and develop a comprehensive understanding of the water quality problem. May also require the collection of additional field data.

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Water Quality Restoration Plan

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Find the source of the problem.

Use available data, collect additional field data, employ models to identify and quantify loads from all significant sources.

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303(d) List

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Establish water quality goals or endpoints.

Targets represent compliance with standards and full support of beneficial uses. Targets for pollutants with numeric criteria = the numeric criteria. Targets for pollutants with narrative standards require a measurable translator.

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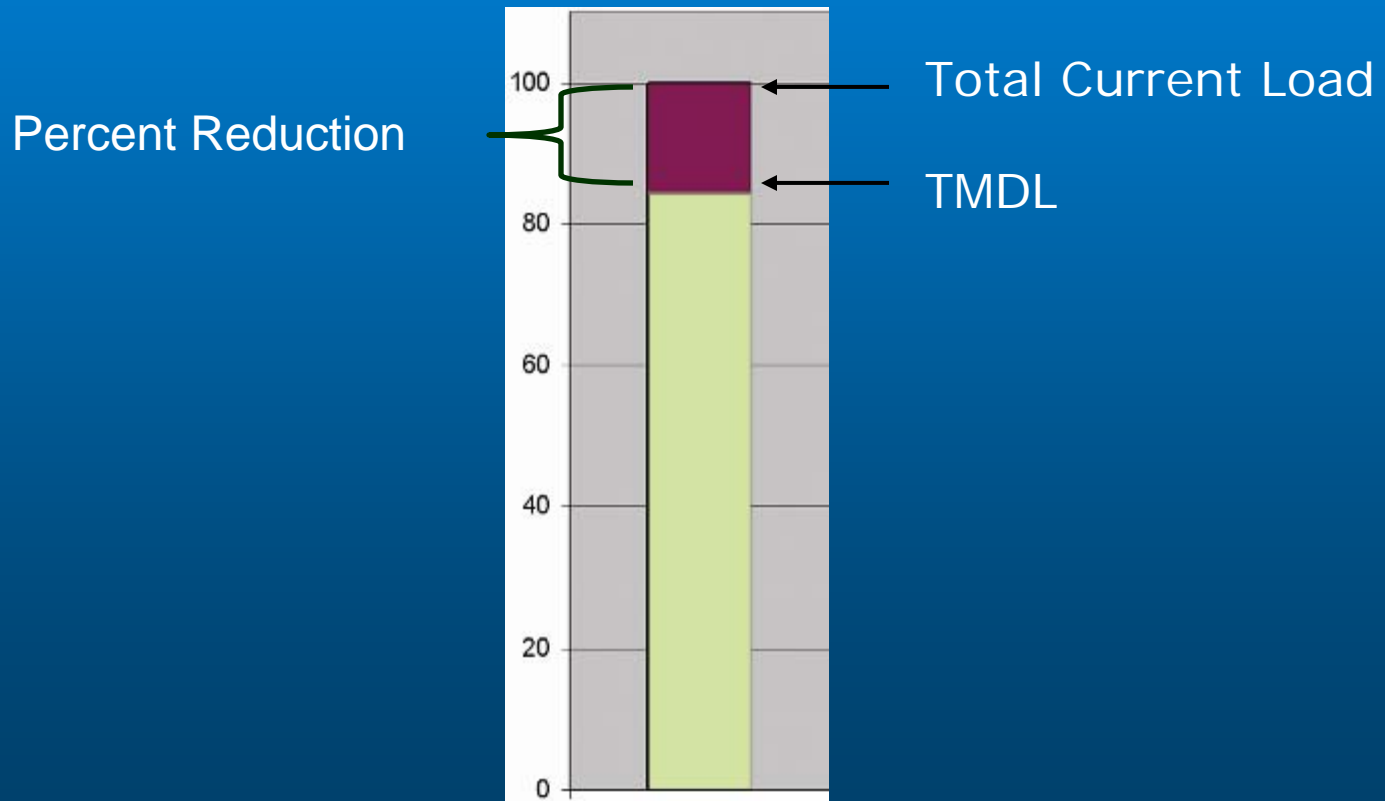


The calculated amount of a pollutant that a water can receive from combined point, nonpoint, and natural sources without exceeding water quality standards.

A reduction in pollutant loading to achieve water quality standards.

Setting a Total Maximum Daily Load (TMDL)

- Maximum amount of a pollutant/day to maintain all beneficial uses.



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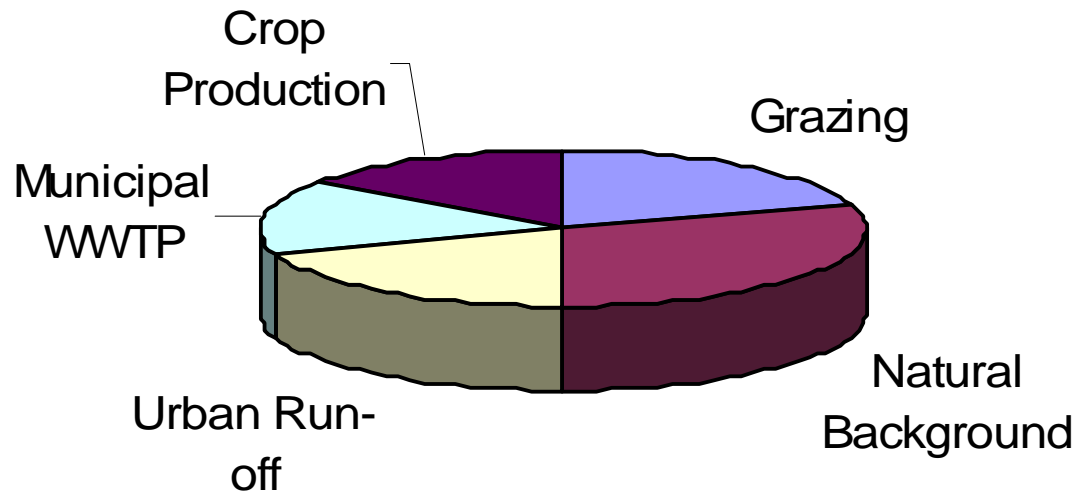
Assigning Allowable Loading and Reduction Responsibilities to Sources.

The TMDL defines the total allowable load and load reduction needed to meet standards.

The allowable load and needed reduction is then divided among the significant sources.

Allocating Loads to Meet the TMDL

The TMDL is the pie. The allocations are the pieces



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Required element to account for uncertainty in the target and TMDL components.

“MOS” may be implicit in conservative loading assumptions or explicit as a percentage of a numeric standard.

So What's a TMDL?

Water Quality
Standards →

303(d) List →

Water Quality
Restoration Plan

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Road map for water quality restoration.

This component of the WQRP lays out a strategy to reduce pollutant loading from all of the significant sources in an effort to meet the targets.

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Water Quality Restoration Plan

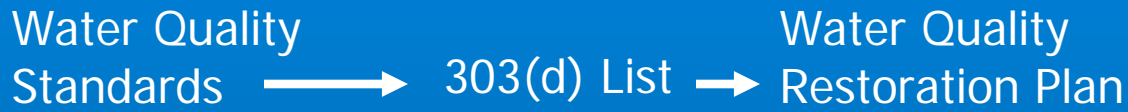
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Determine if the WQRP is working.

Component of the WQRP in which a trend and effectiveness monitoring plan is presented. May also include a strategy for collecting additional data to address uncertainties in the various components of the WQRP.

So What's a TMDL

Ideally, three or more years are required to complete the process.



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- Narrative
- Beneficial Uses

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■ Year 1 – watershed char., draft targets, draft problem description, ID data gaps, prepare SAP to fill data gaps.

■ Year 2 – Implement SAP, finalize targets, finalize problem description, preliminary source assessment/TMDLs/allocation.

■ Year 3 – Follow-up source monitoring, finalize source assessment/TMDLs/allocation, prepare monitoring & restoration strategy, internal/external document reviews, formal approval process.

TMDL Development, Implementation and Review

Determine sources of the problem and the amount each source contributes

Set a pollutant level (TMDL) that will solve the problem

Allocate responsibility for the problem

Outline a strategy for solving the problem

Local watershed groups implement the strategy through voluntary measures

Reassess water quality status after 5 years

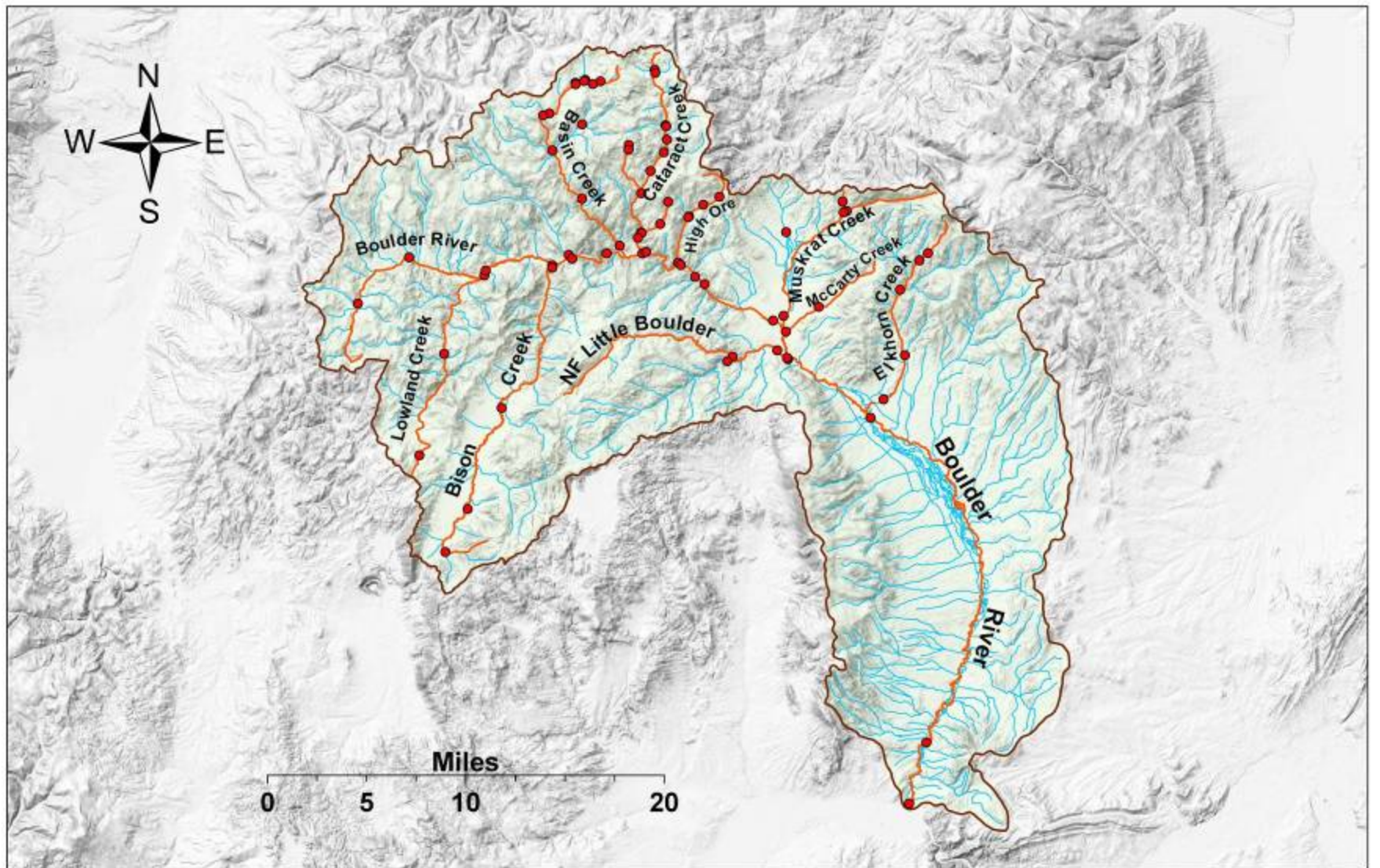
Adaptive Management

Further Information

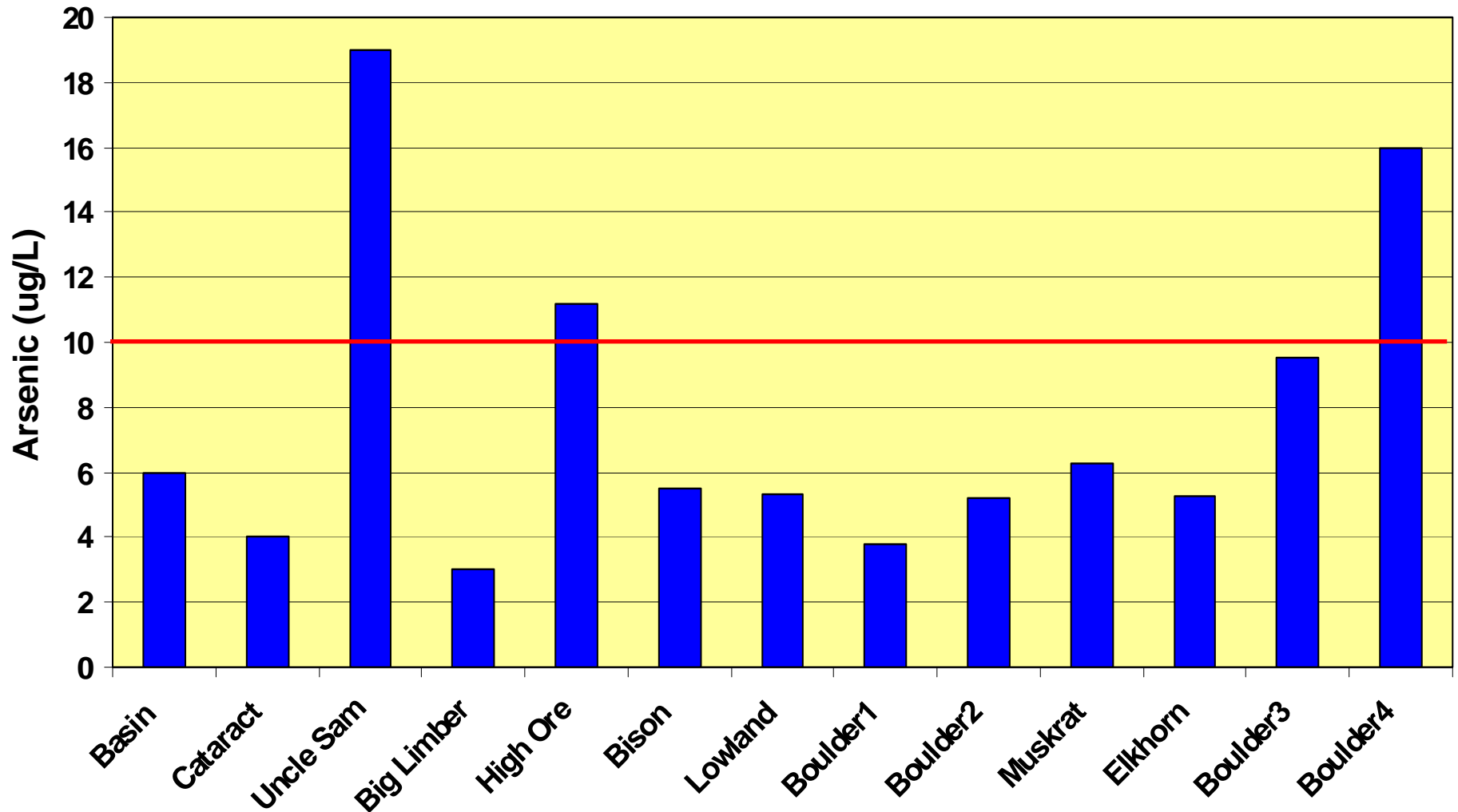
- DEQ TMDL Web Site:
www.deq.state.mt.us/wqinfo/TMDL/index.asp
- DEQ TMDL Wiki
<http://montanatmdlflathead.pbworks.com/>
- Tim Byron
Senior Water Quality Planner
Department of Environmental Quality
tbyron@mt.gov 406-444-5341



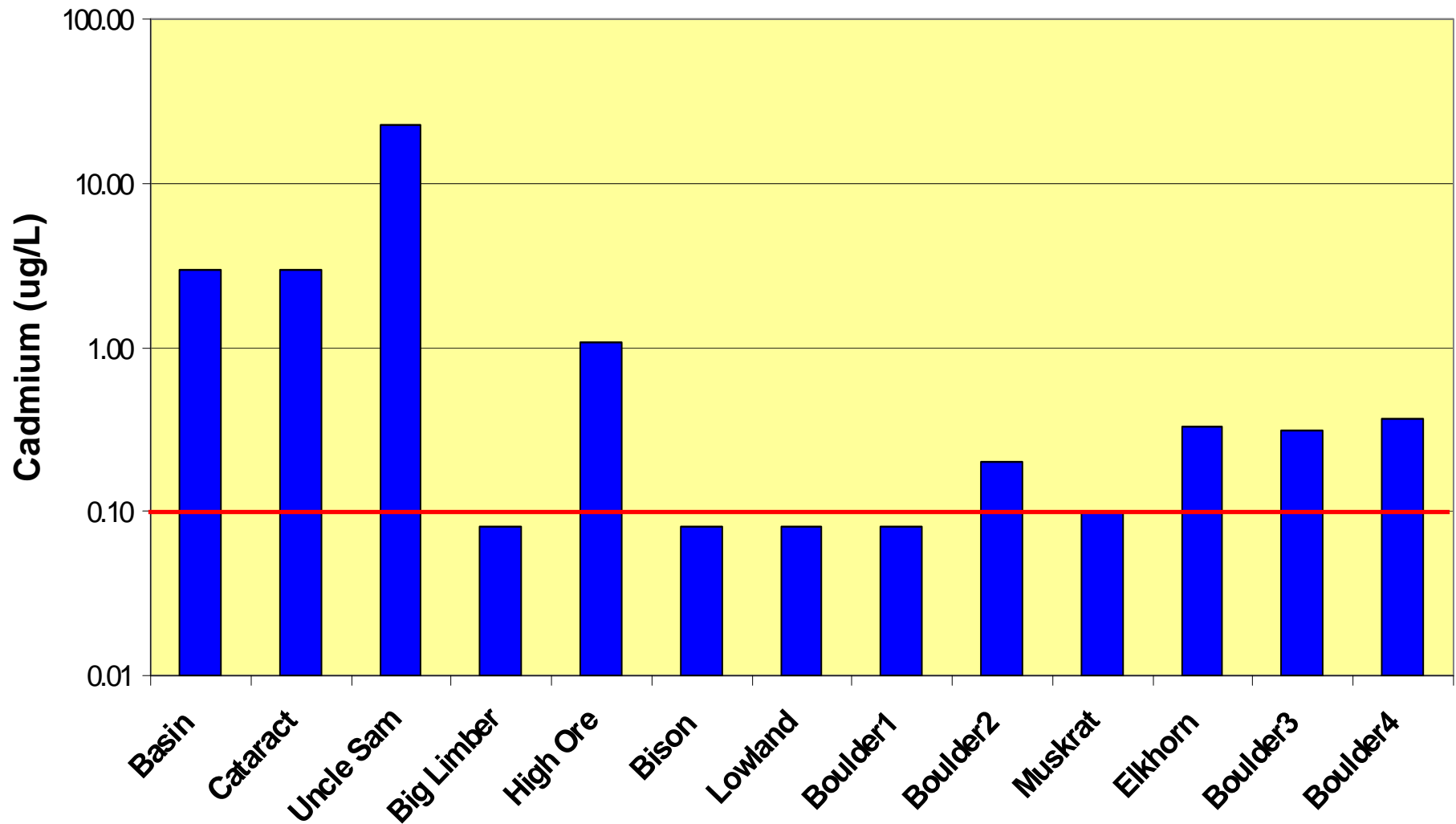
2009 High-Flow Sampling



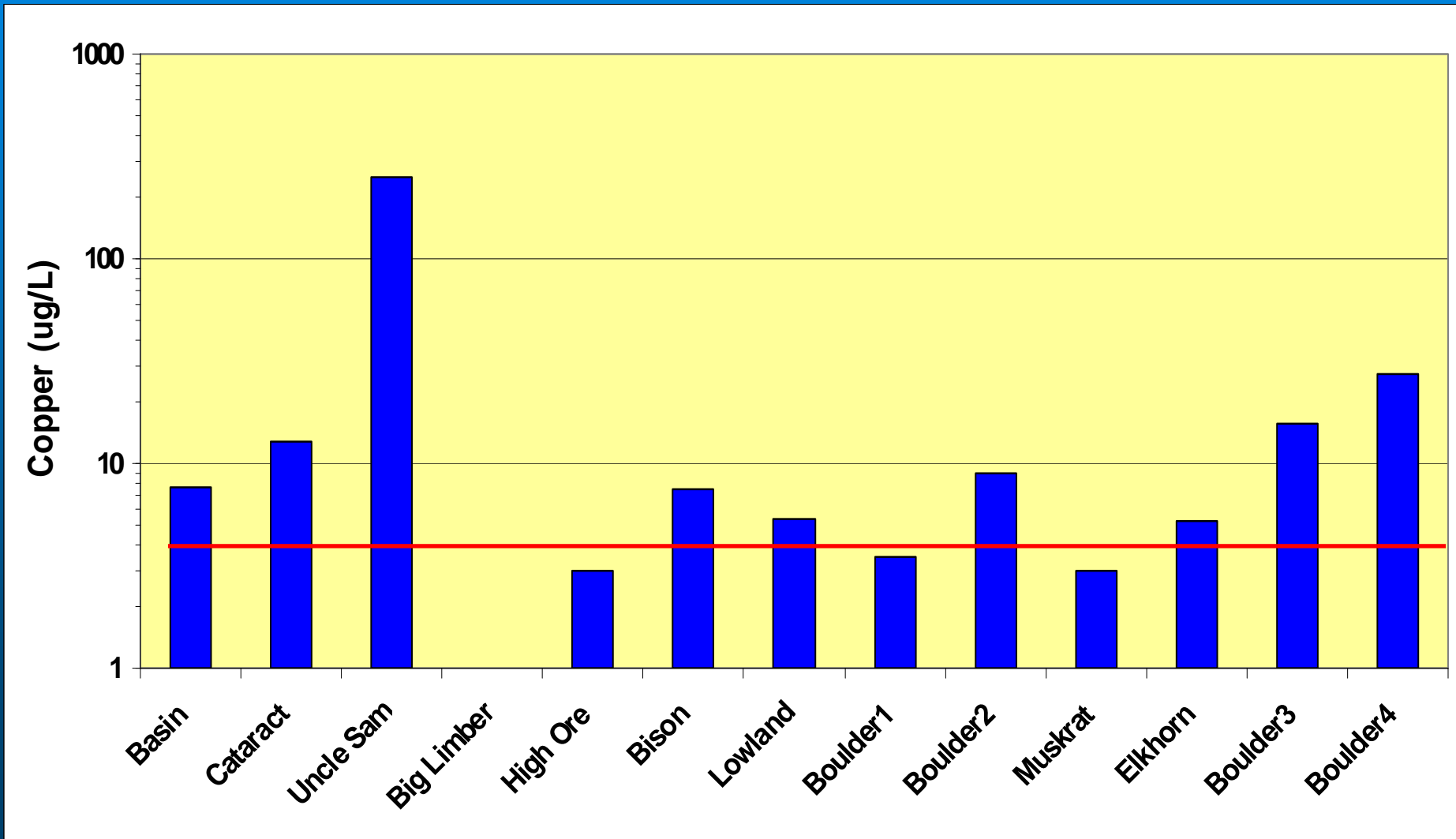
Arsenic ($10\mu\text{g}/\text{L}$)



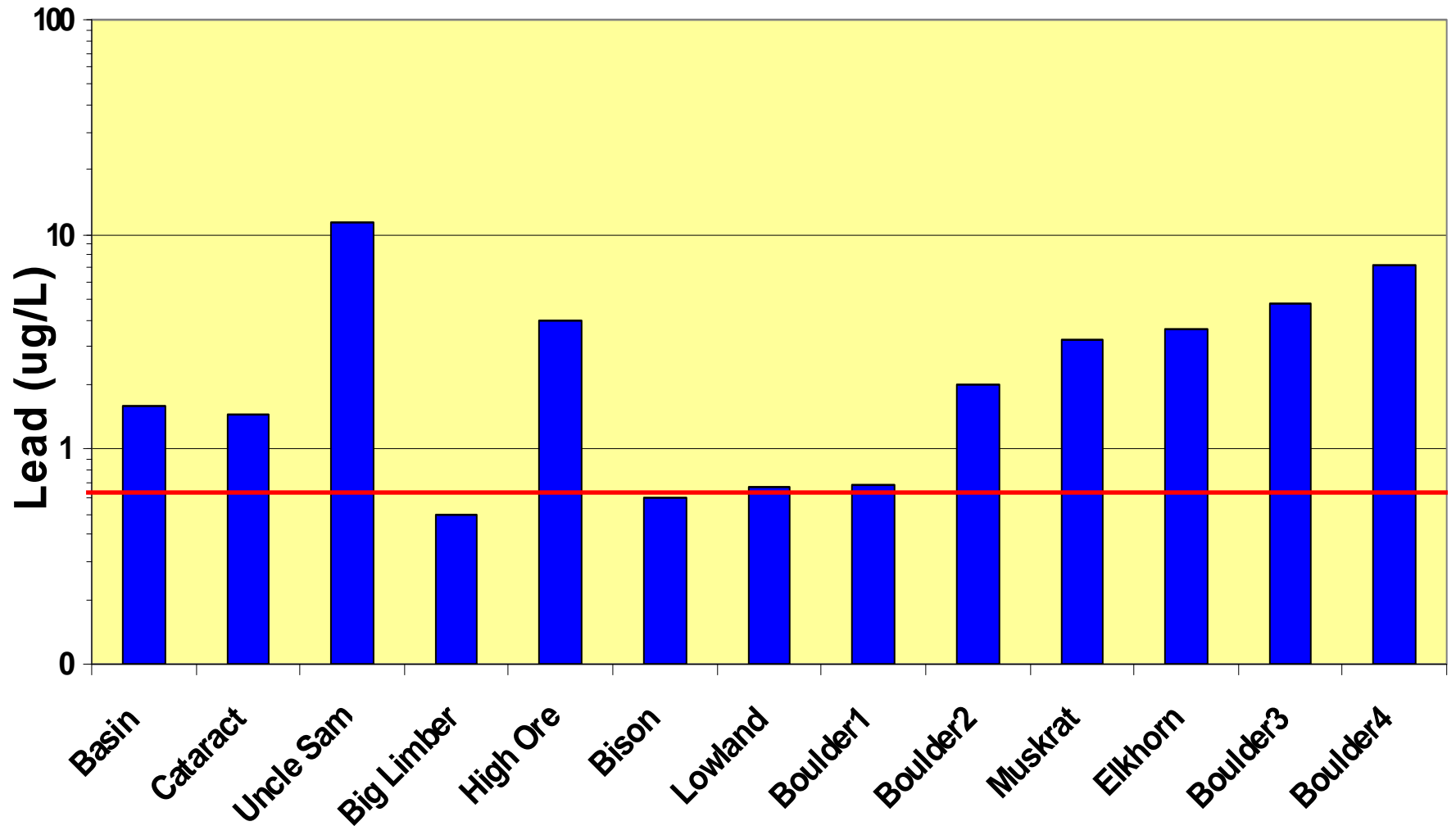
Cadmium ($0.1 \mu\text{g}/\text{L}$)



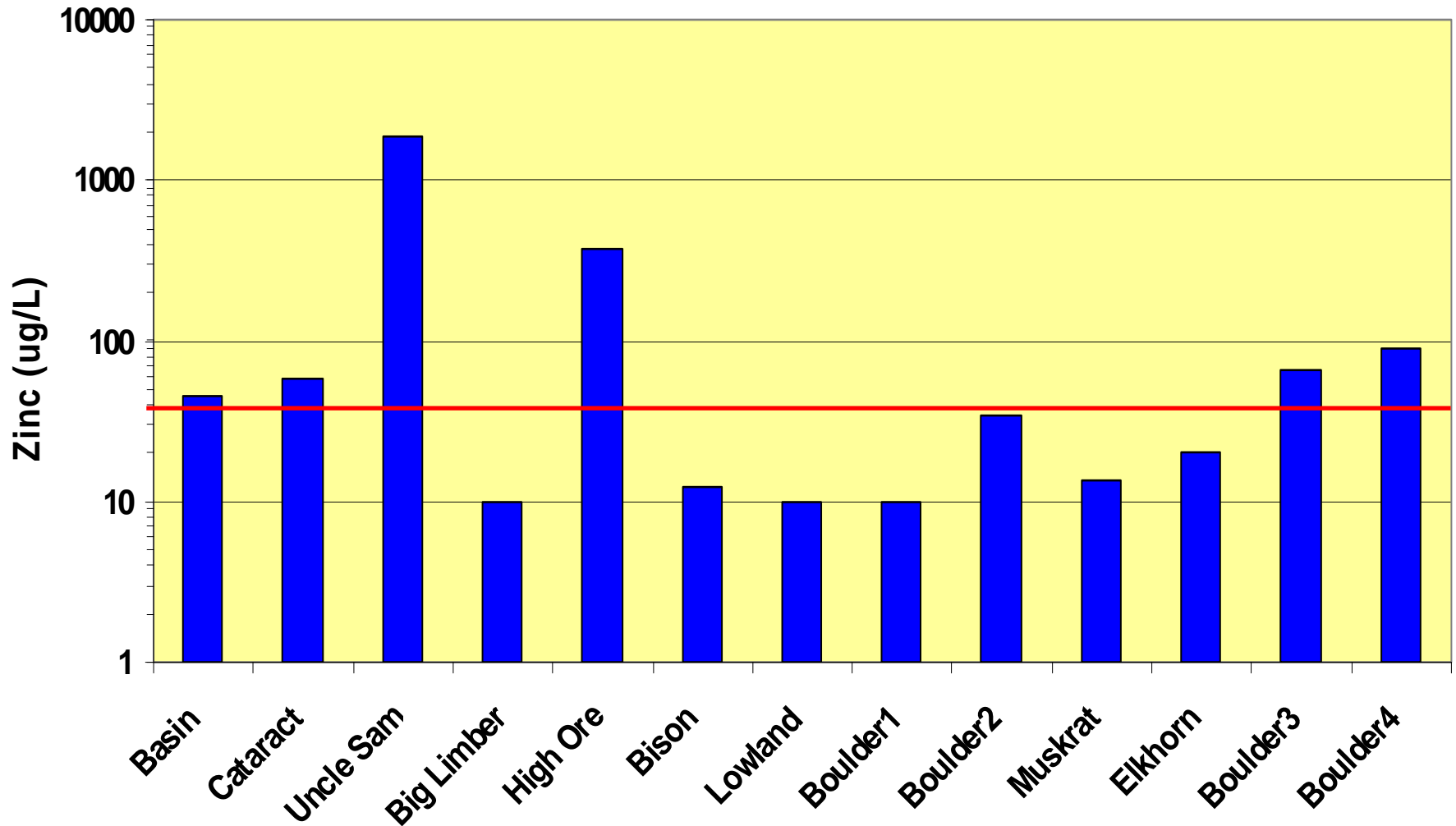
Copper ($2.85 \mu\text{g/L}$)



Lead ($0.54 \mu\text{g/L}$)



Zinc ($37 \mu\text{g/L}$)



Questions?

