

**T
M
D
L**



**Boulder-Elkhorn
Planning Area**

Montana Department of Environmental Quality
Water Quality Planning Bureau



Total Maximum Daily Load Overview

- What is a TMDL?
- Relation of TMDLs to water quality standards
- The TMDL development process
- Water quality in the Boulder-Elkhorn planning area

What is a TMDL?

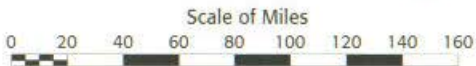
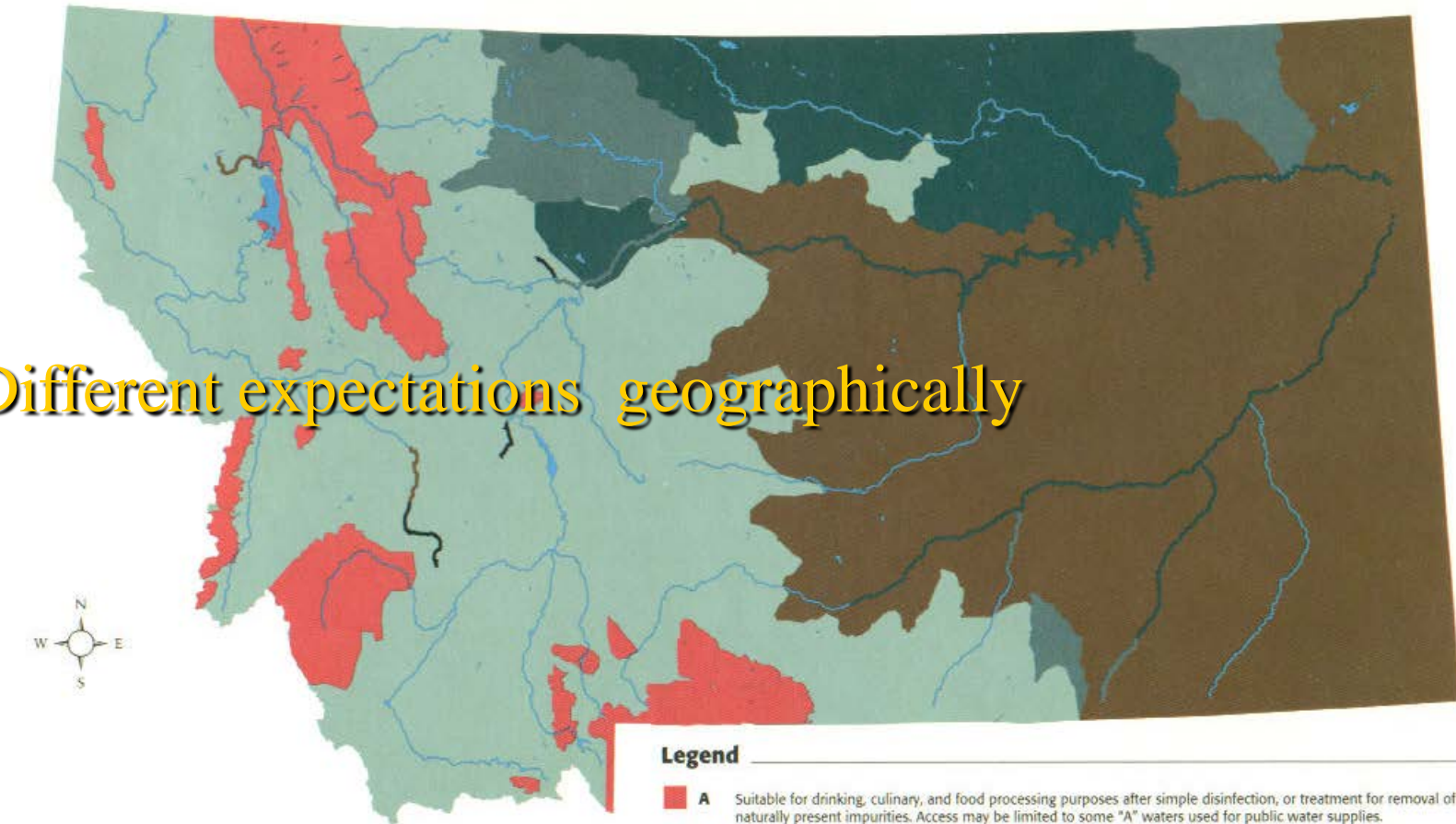
- **T**otal **M**aximum **D**aily **L**oad is the amount of pollutant that a water body can receive from all sources & still meet water quality standards.
- Expressed as a load per a given time period (16 lbs/day; 120 tons/year)

Components of Surface Water Quality Standards:

- 1. Water Body Classifications:
Variable Beneficial Uses,**
- 2. Numeric and Narrative Standards:
Protective values or described
conditions,**
- 3. Non-Degradation: Prevent high
quality water from getting worse.**

Montana Surface Water Quality Classifications*

Different expectations geographically



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.

Numeric Water Quality Standards

➤ Copper Example

- Fixed Numeric: Human Health: 1,300 $\mu\text{g/l}$
- Variable Numeric

Aquatic Life: (varies with hardness)

At 25 mg/L hardness-

- Acute: 3.79 $\mu\text{g/l}$ (do not exceed)
- Chronic: 2.85 $\mu\text{g/l}$ (96 hour mean)

At 100 mg/L hardness-

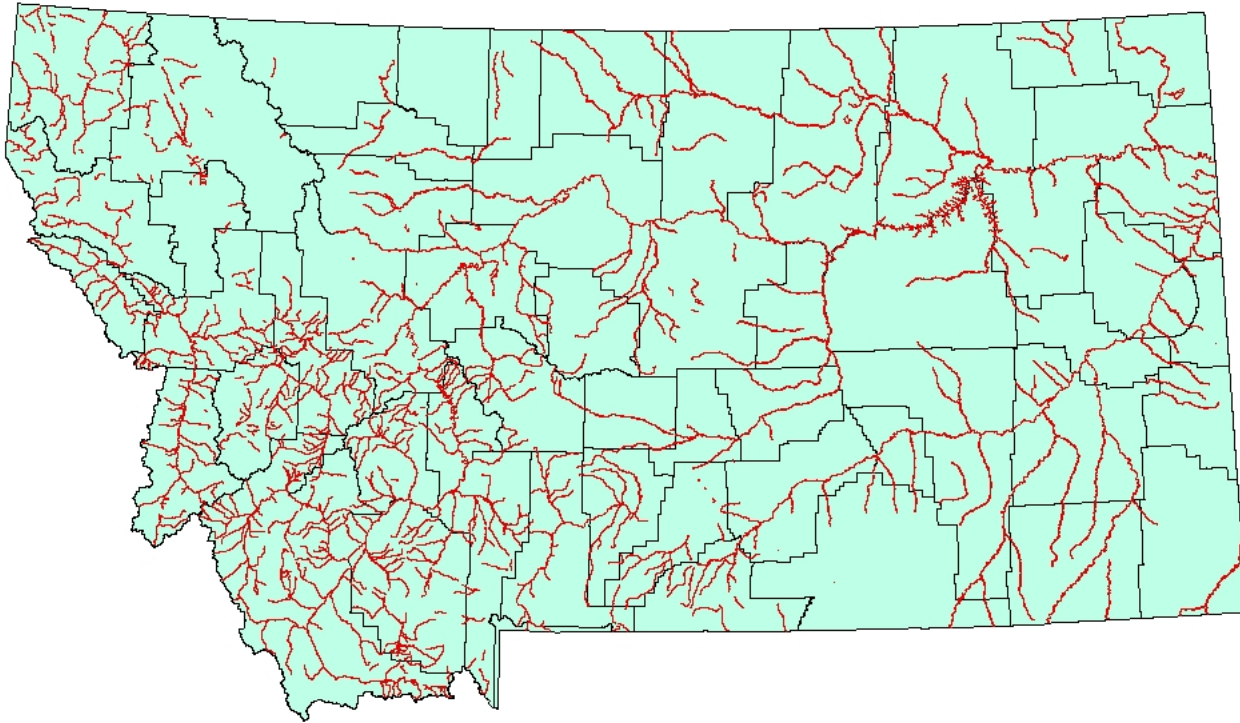
- Acute: 14.0 $\mu\text{g/l}$ (do not exceed)
- Chronic: 9.33 $\mu\text{g/l}$ (96 hour mean)

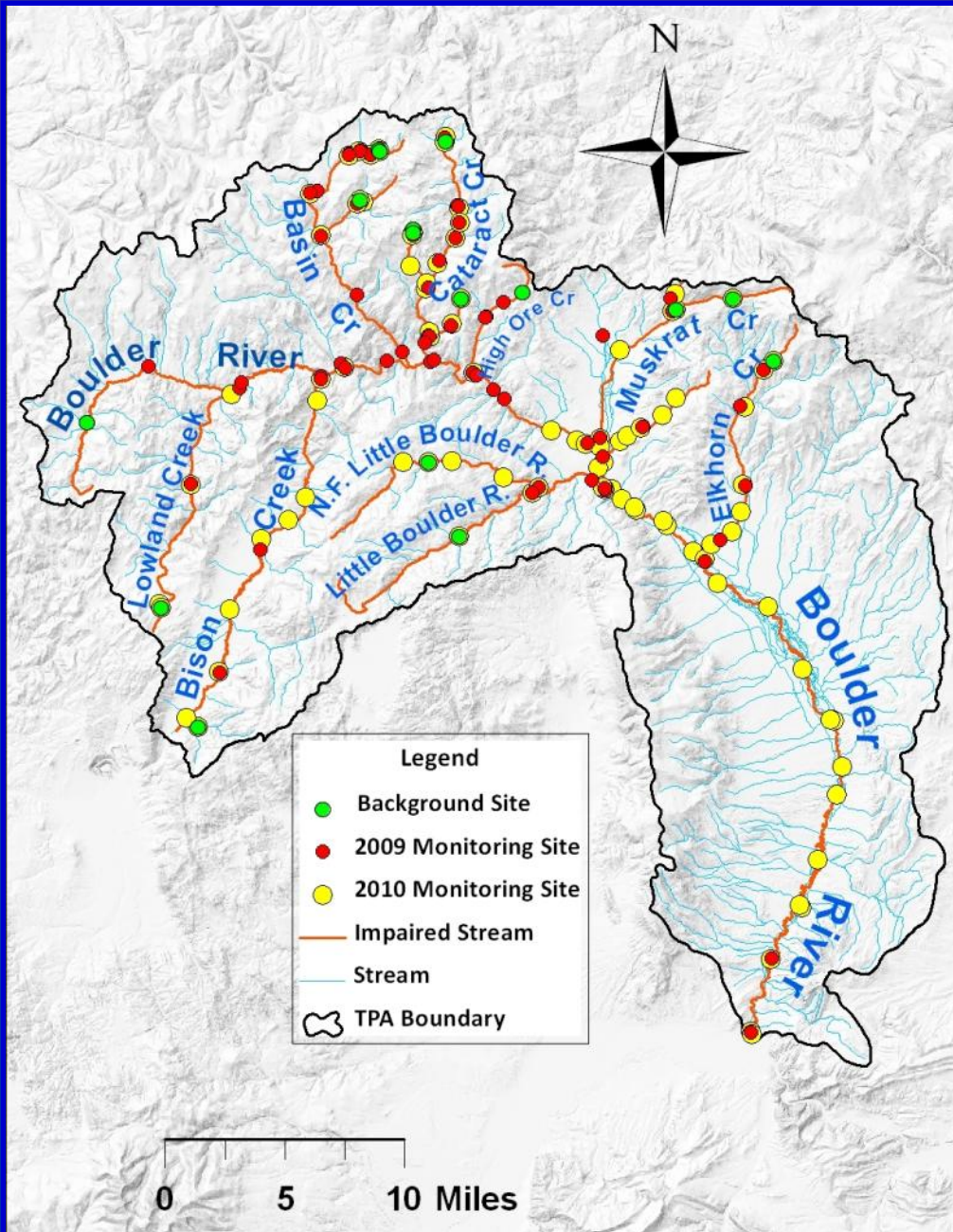
The TMDL Development Process

- A TMDL is developed for each pollutant cause in each stream.
- TMDL Document - a final report of current conditions and provides necessary reductions to restore water quality.

The Extent of Montana's Impaired Streams

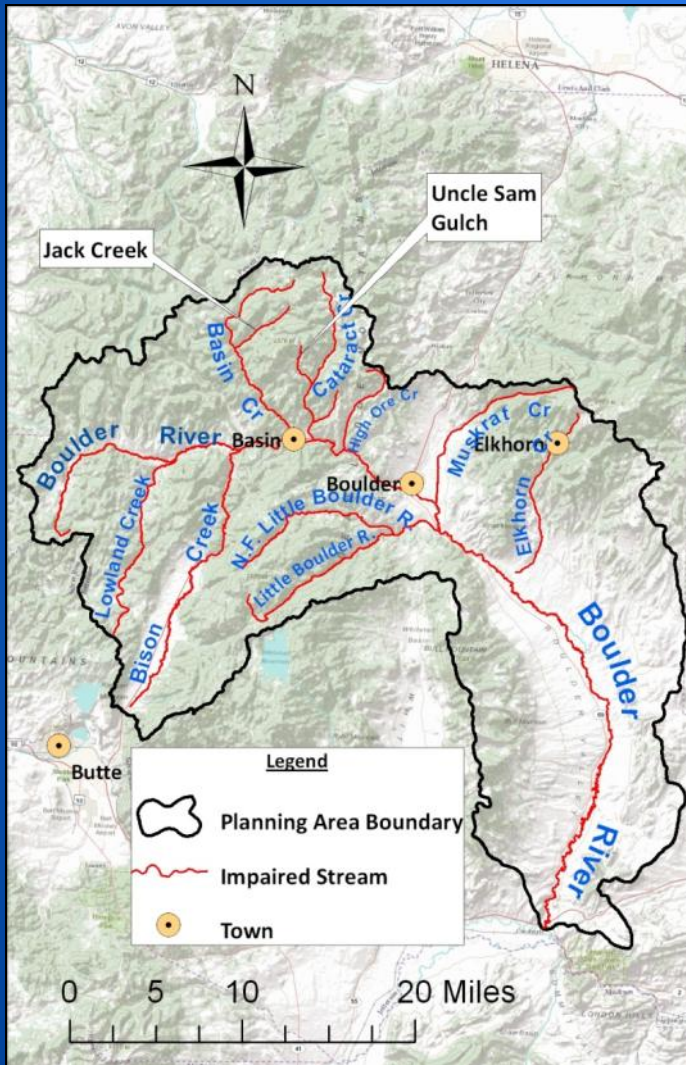
2012 Integrated Report





Monitoring and Assessment 2009/2010

Pollutants:



Metals

Aluminum
Arsenic
Cadmium
Copper
Iron
Lead
Zinc

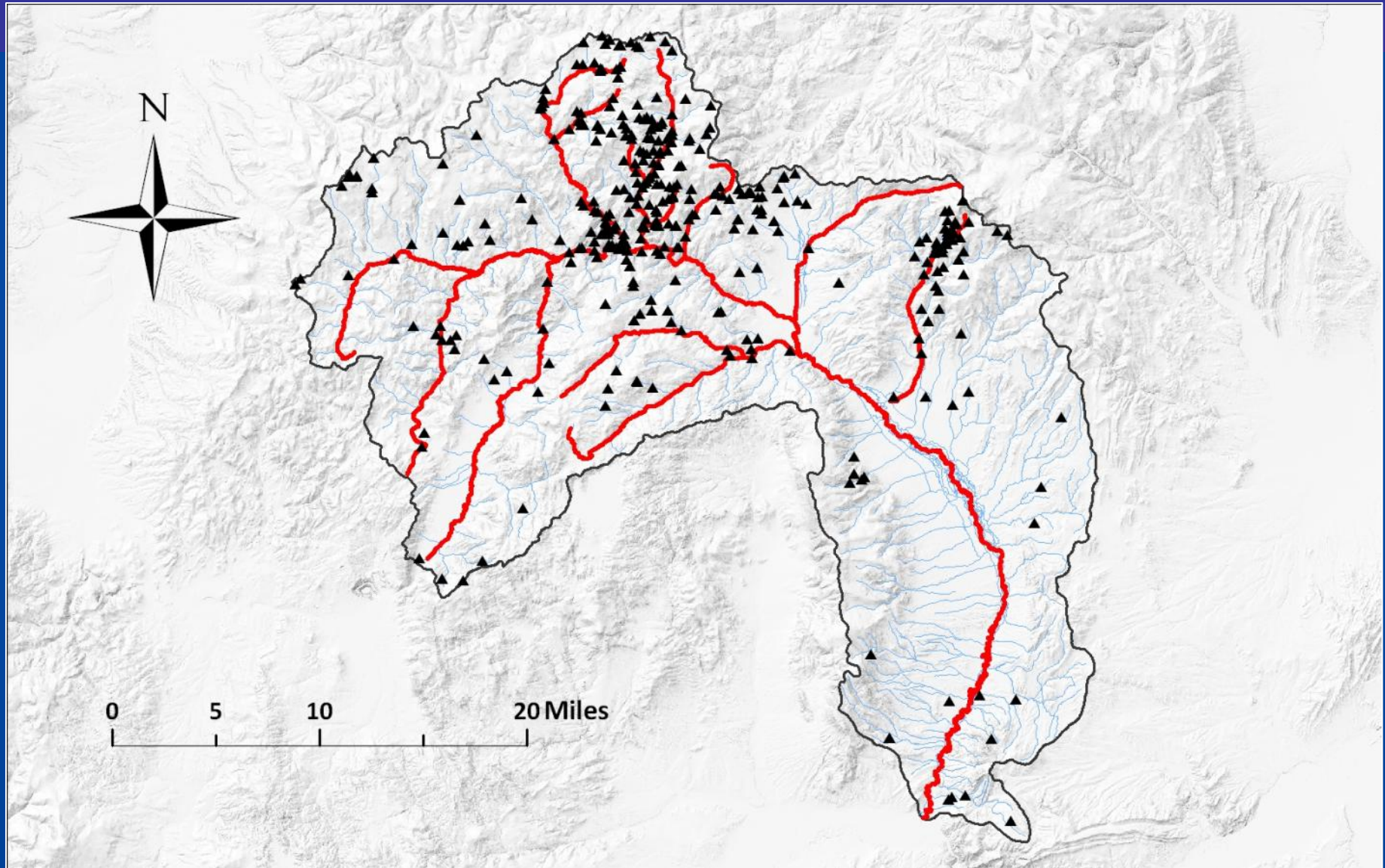
Others

Nutrients
Temperature
Sediment

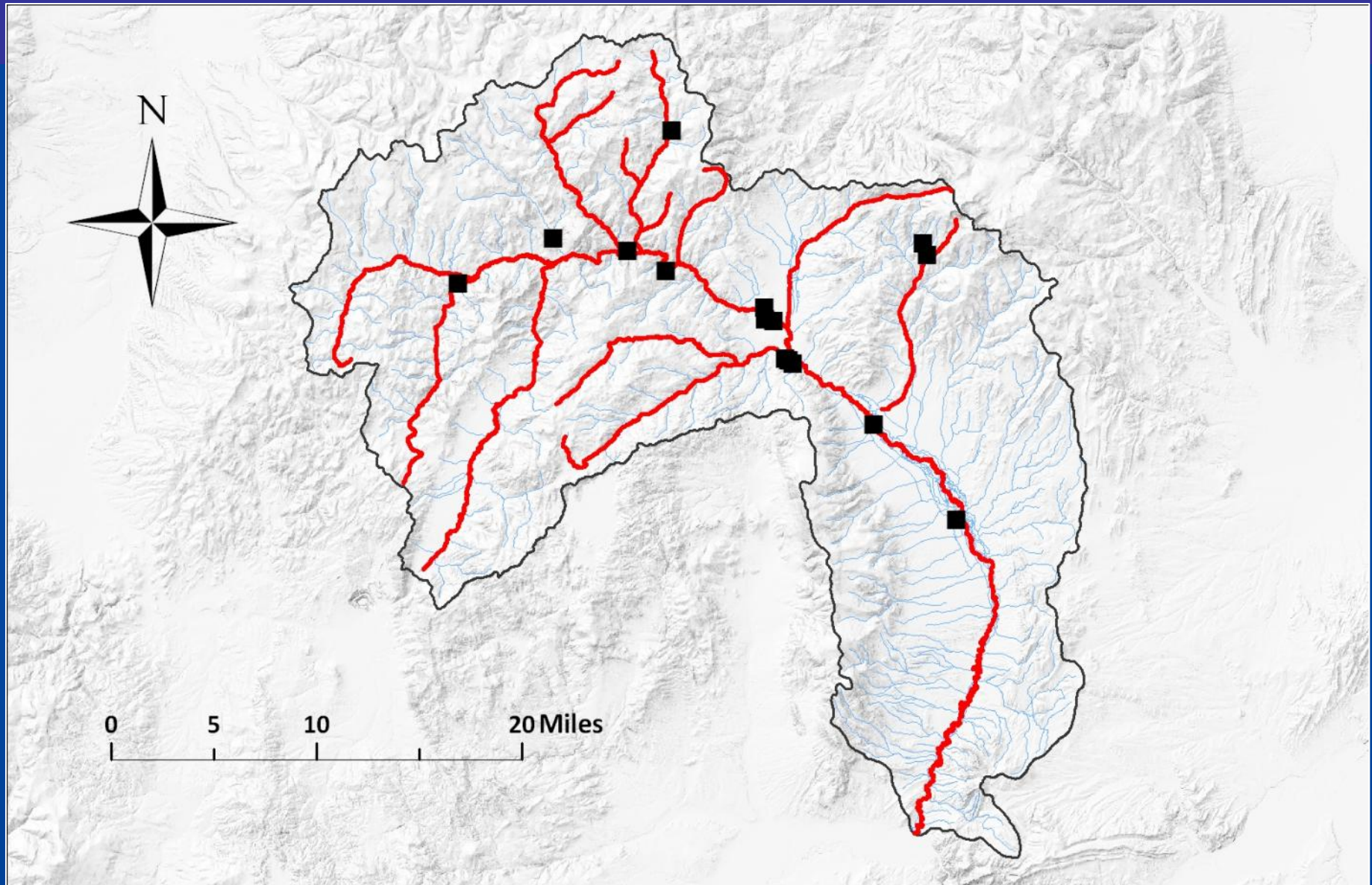
Metal Pollutants



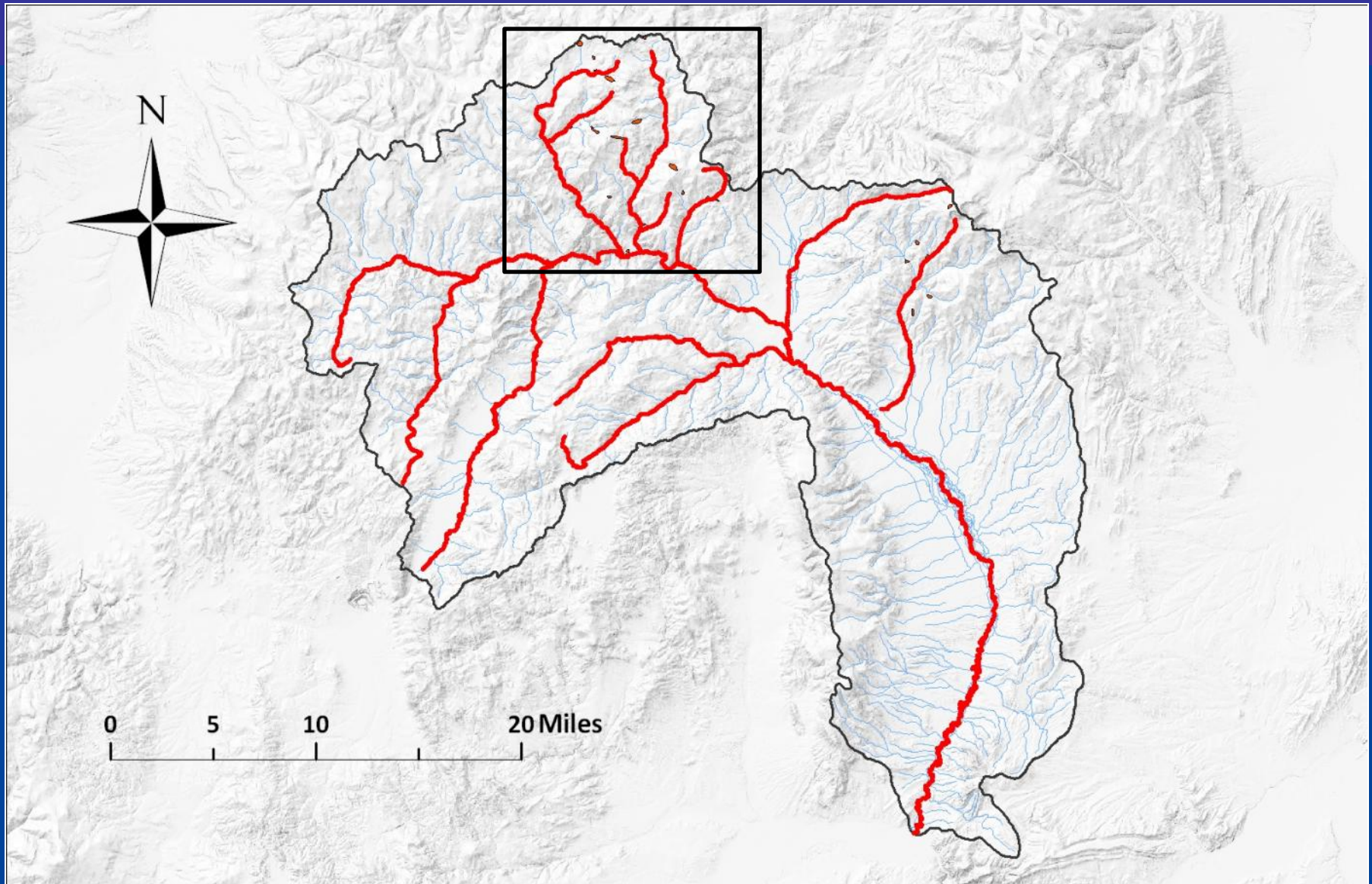
Inactive Mine Sources



Permitted Point Sources

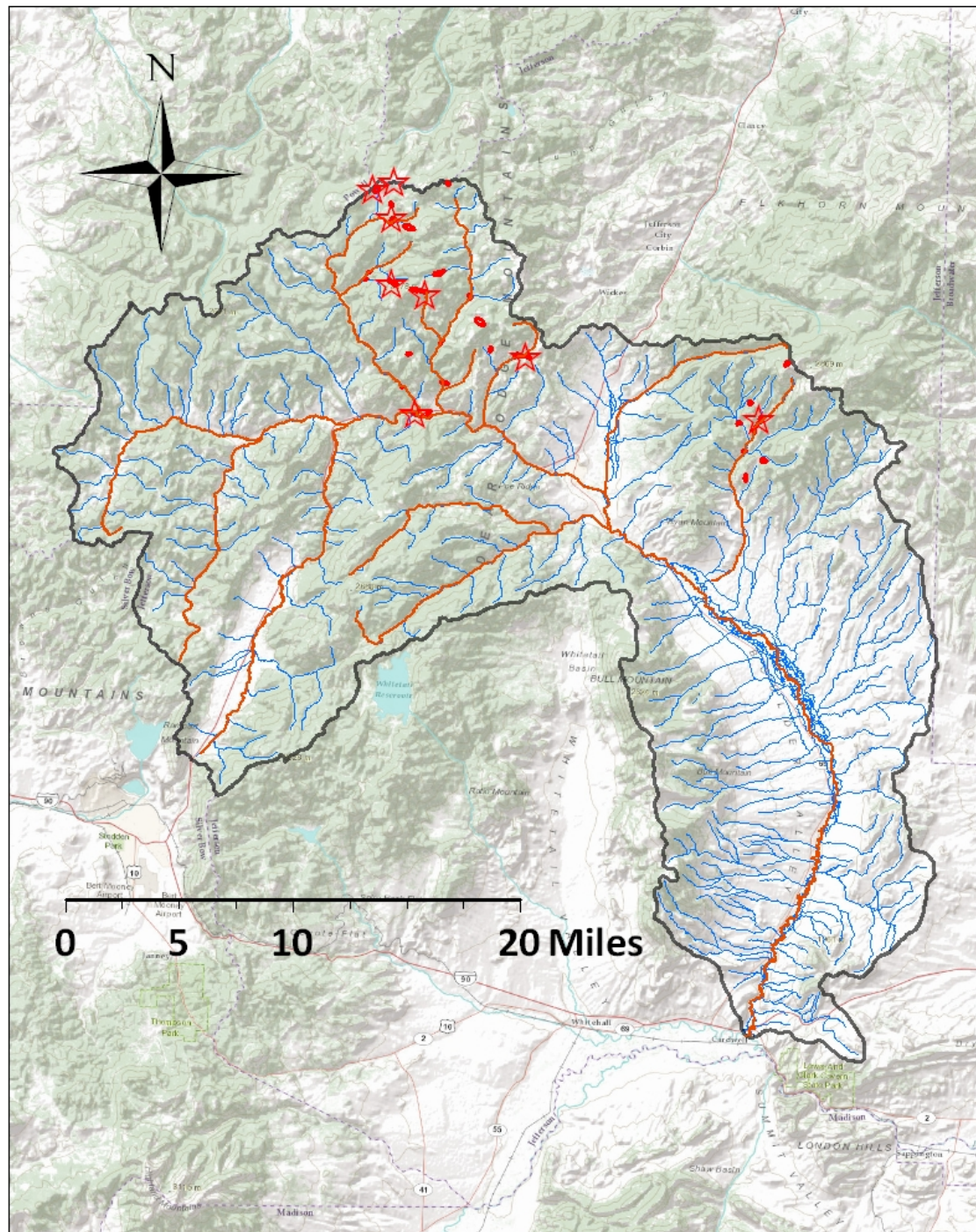


Priority Mine Sites

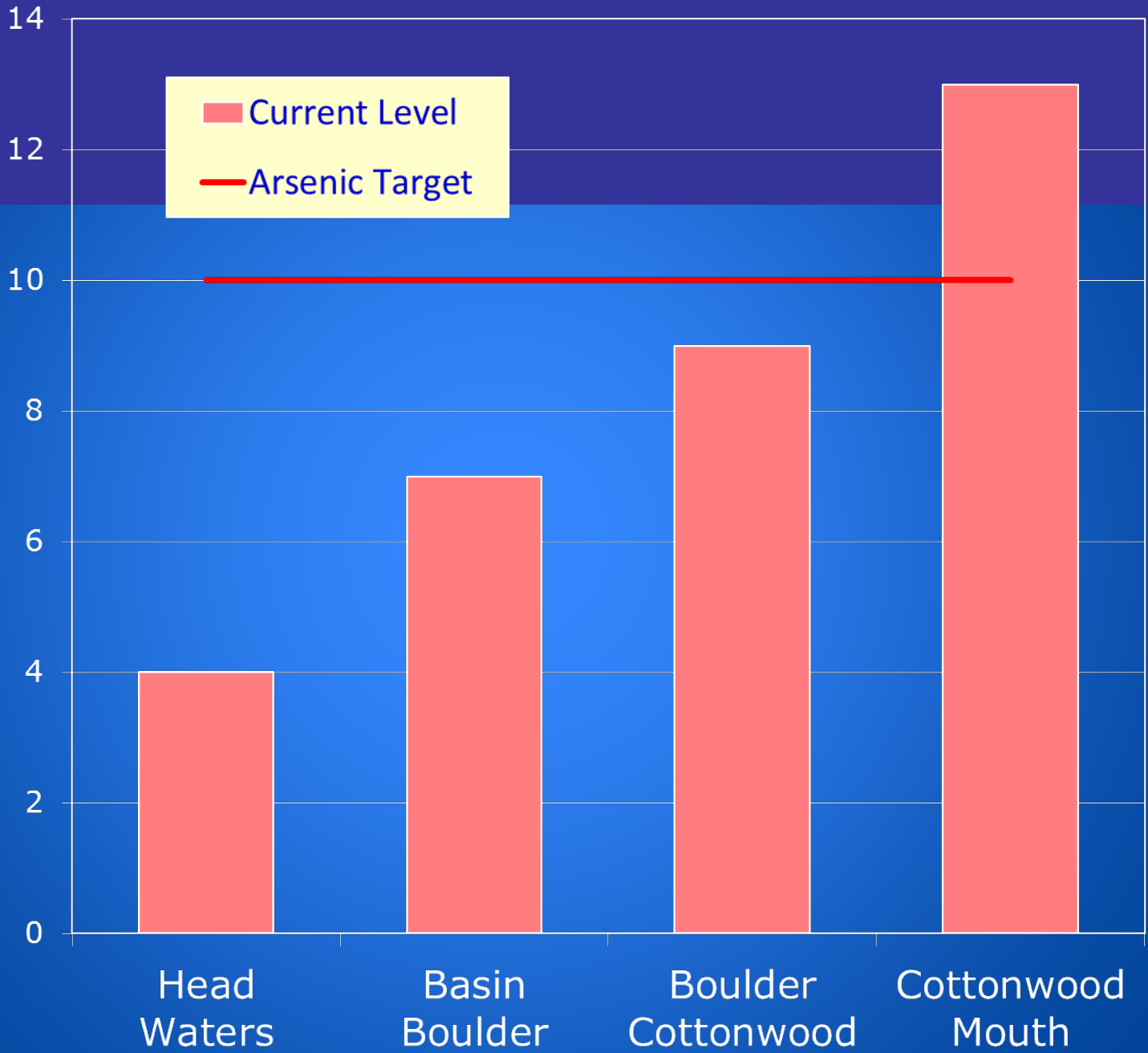


Major Sources

- Josephine-
Pauper's Dream-
Basin Creek Mine
- Buckeye-Enterprise
Hope-Katie
- Bullion (Jack Creek)
- Crystal (Uncle Sam Gulch)
- Comet (High Ore Creek)
- Carmody Group



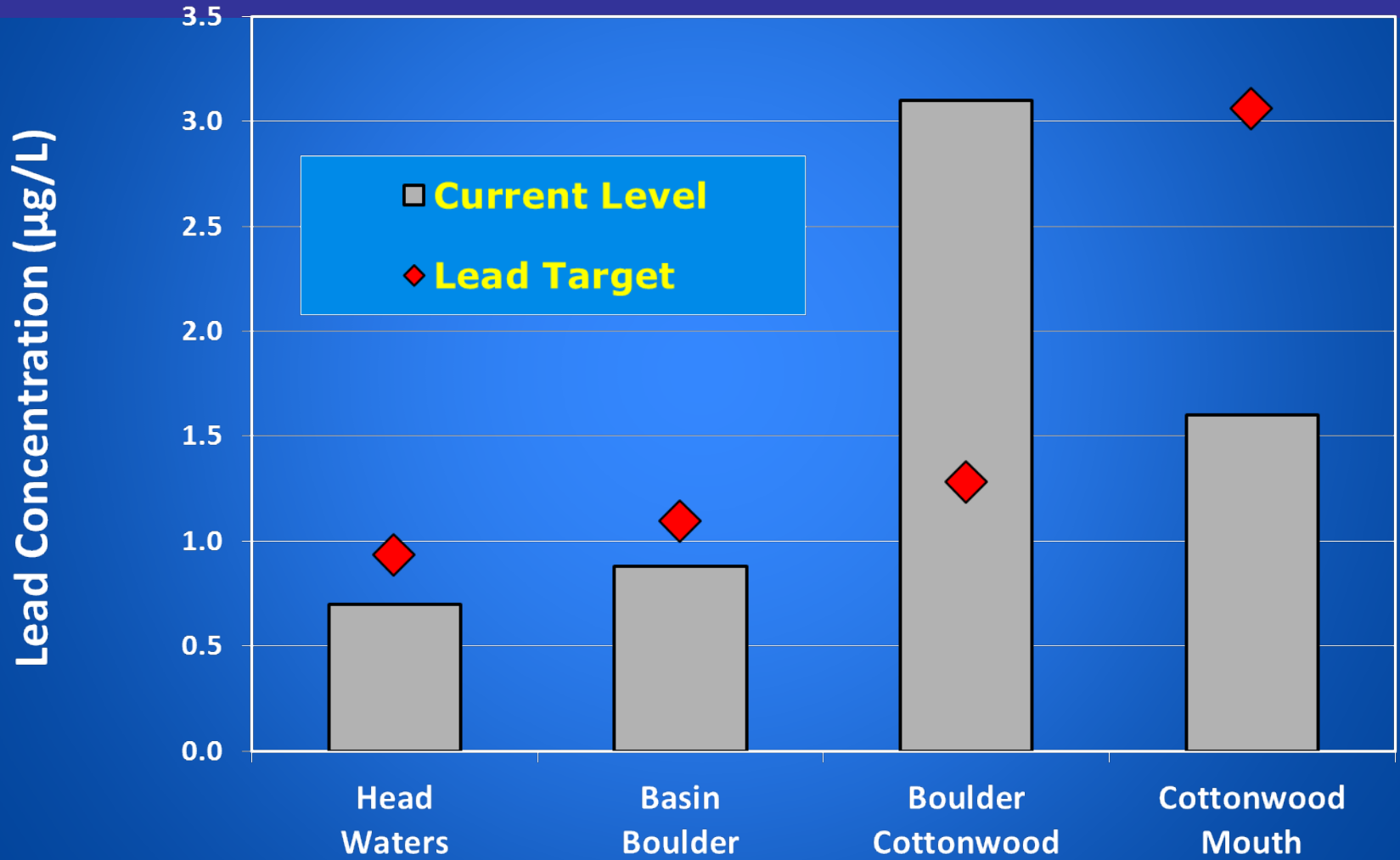
Arsenic Concentration ($\mu\text{g/L}$)

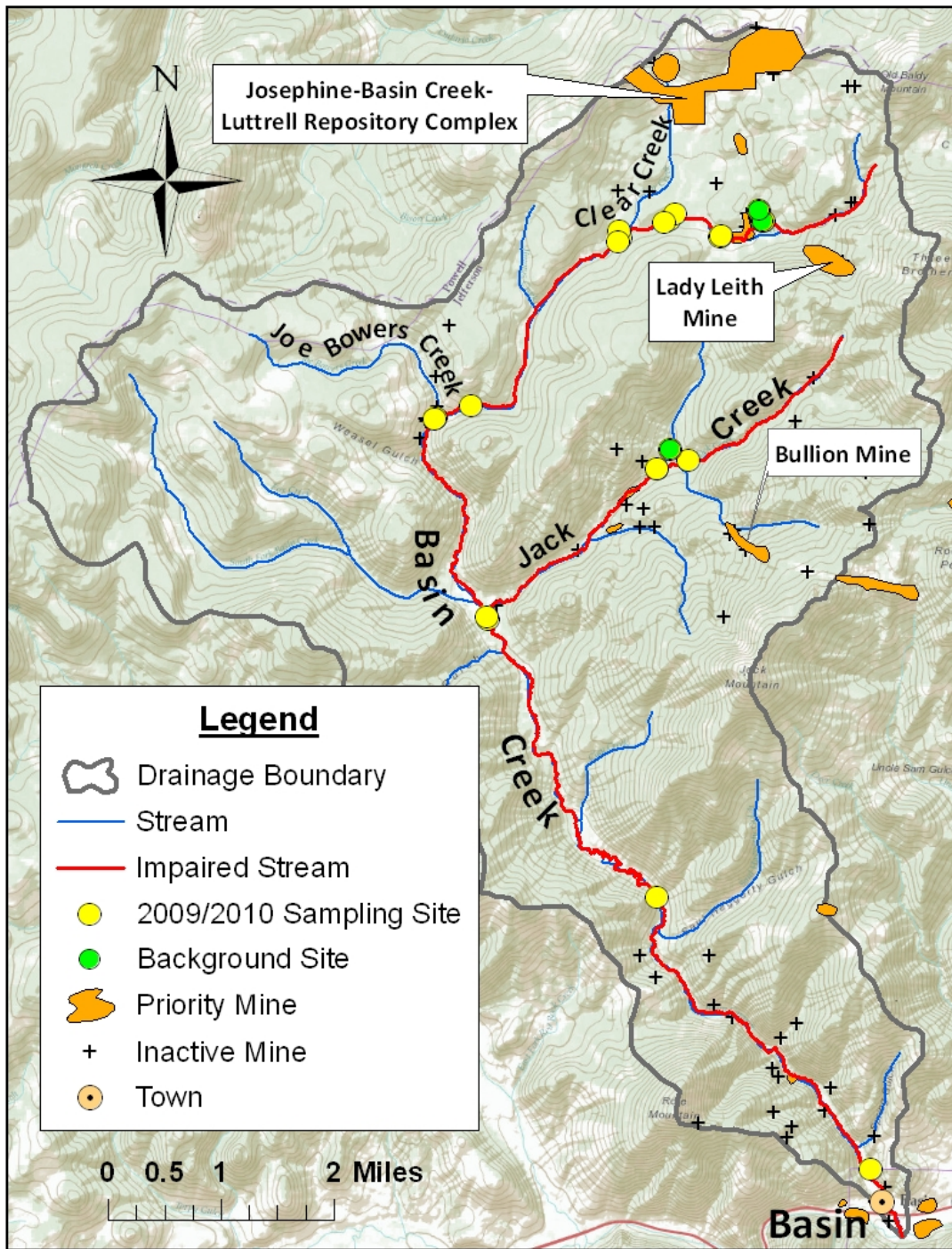


Boulder River Copper



Boulder River Lead





Josephine-Basin Creek-Luttrell Repository Complex

Lady Leith Mine

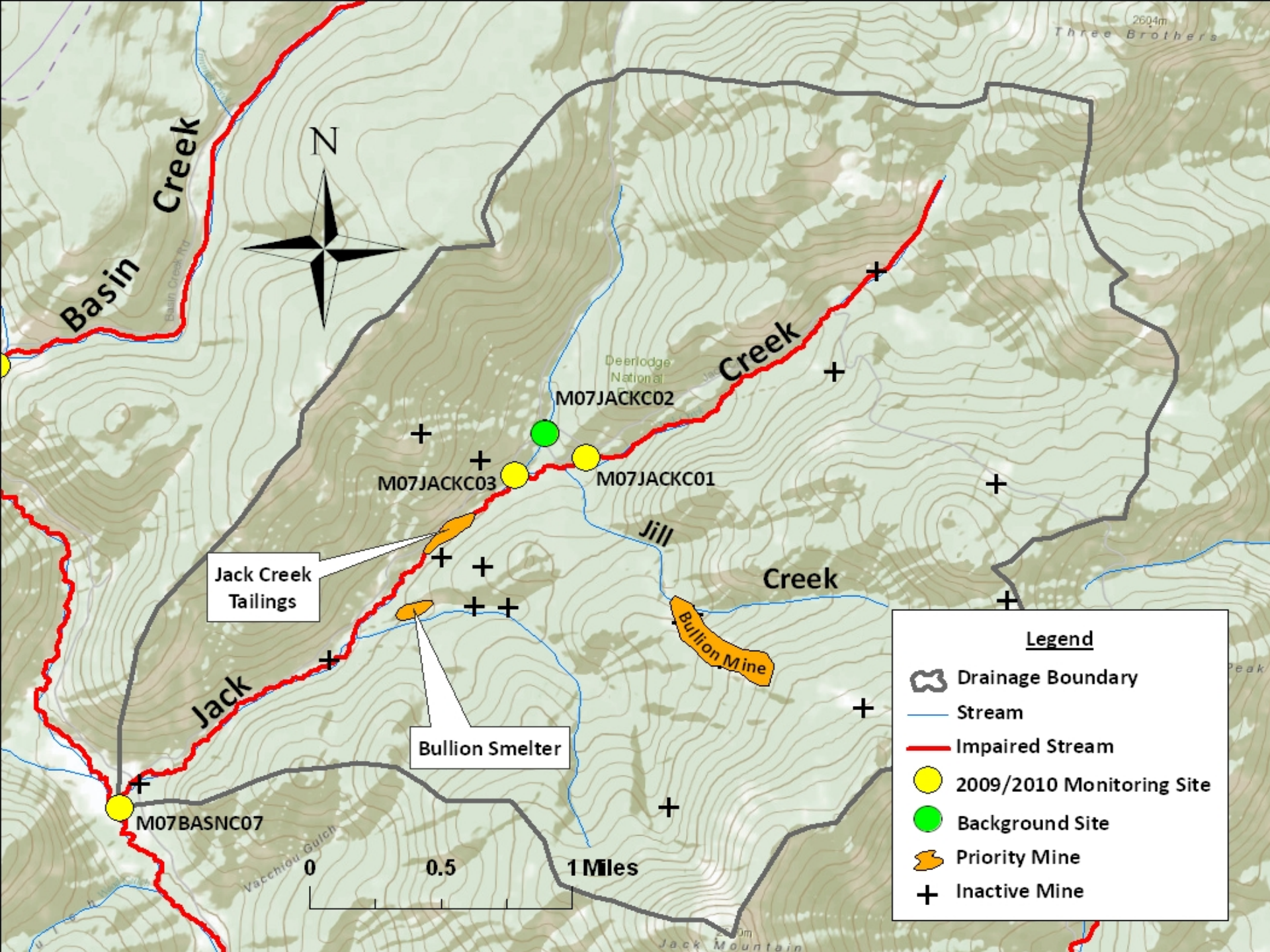
Bullion Mine

Legend

- Drainage Boundary
- Stream
- Impaired Stream
- 2009/2010 Sampling Site
- Background Site
- Priority Mine
- Inactive Mine
- Town

0 0.5 1 2 Miles

Basin



2604m
Three Brothers

Basin Creek



Deer Lodge National
M07JACKC02

M07JACKC03

M07JACKC01

Jack Creek
Tailings

Jill

Creek

Bullion Mine

Bullion Smelter

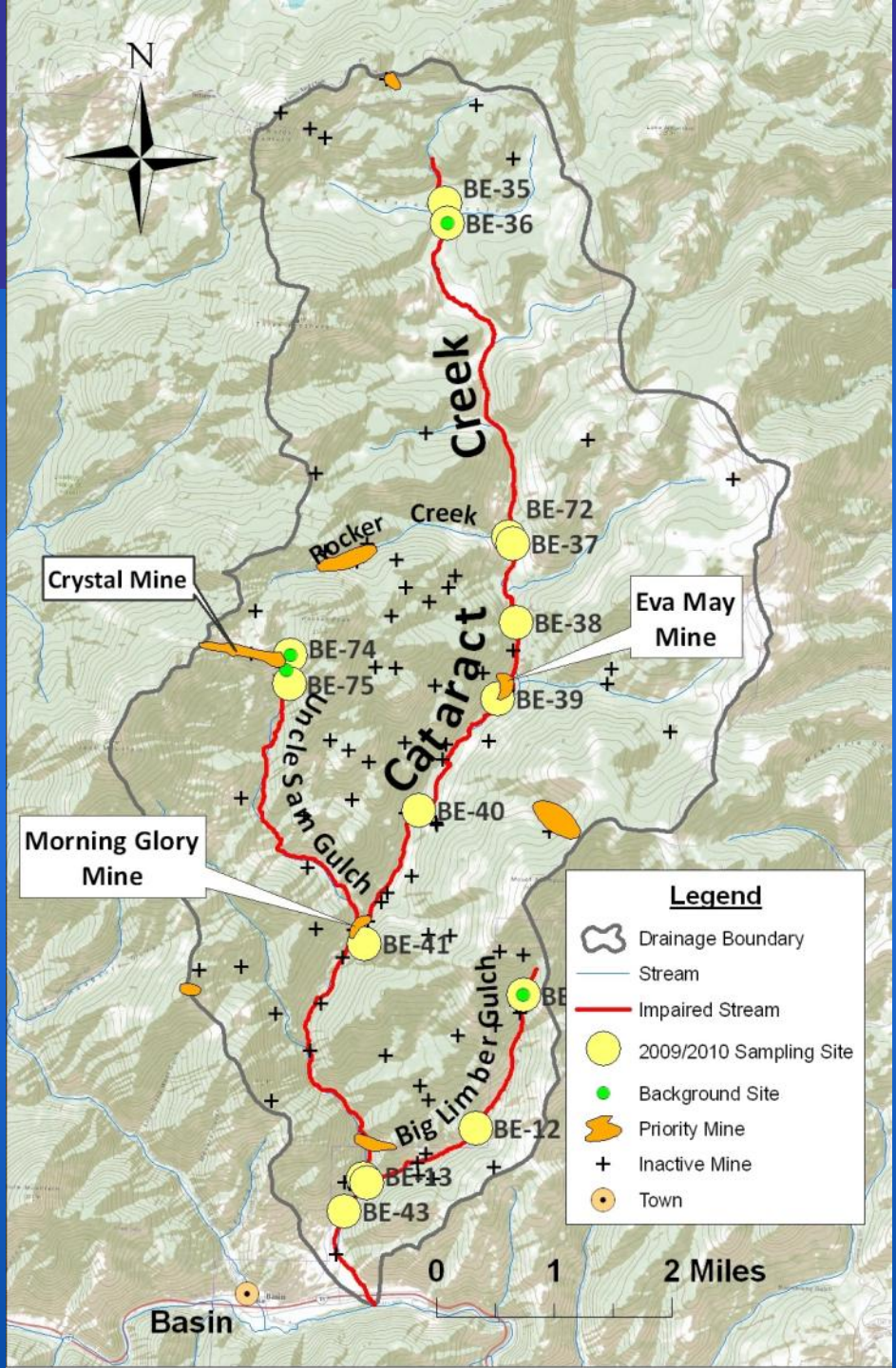
M07BASNC07

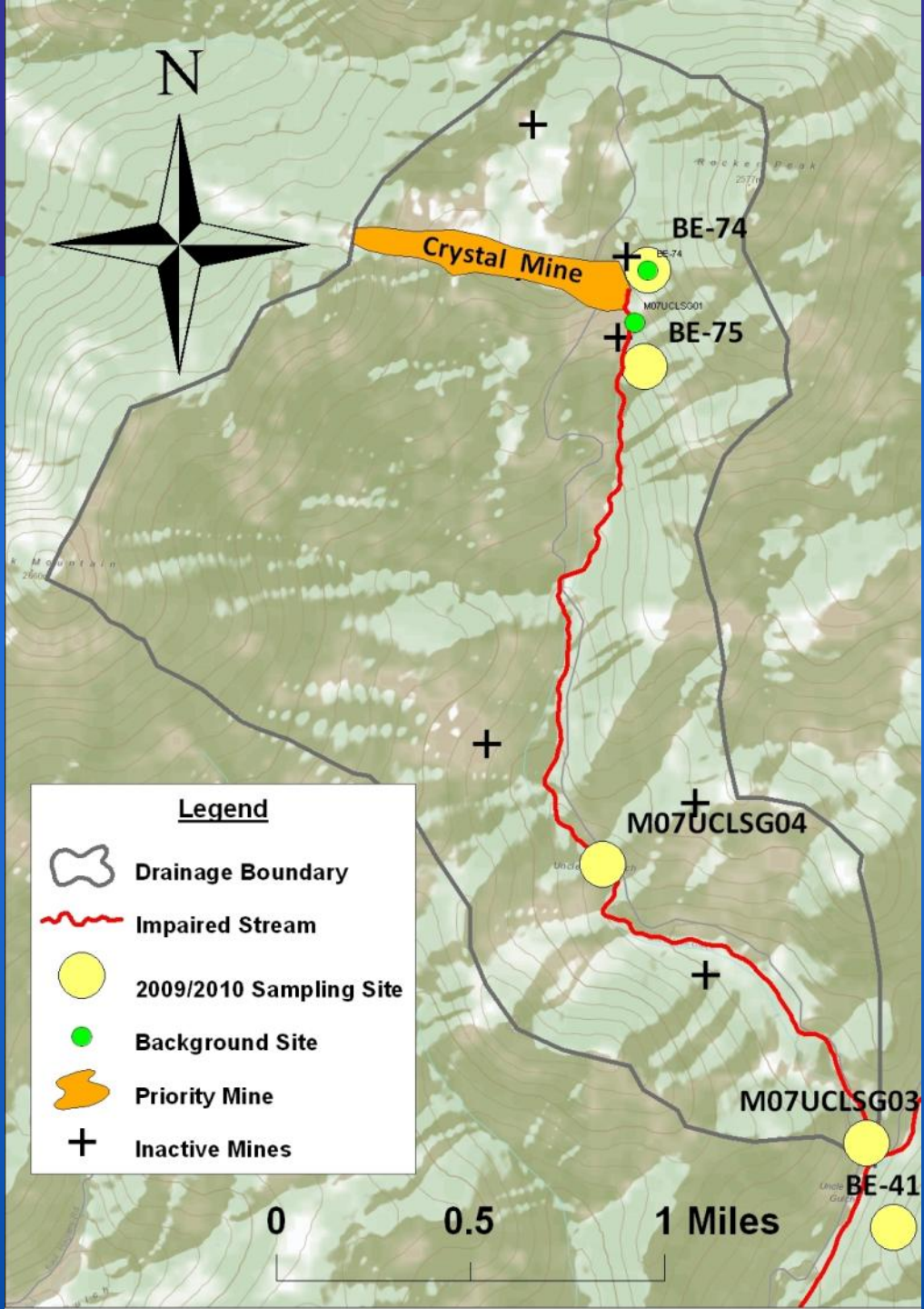
0 0.5 1 Miles

Legend

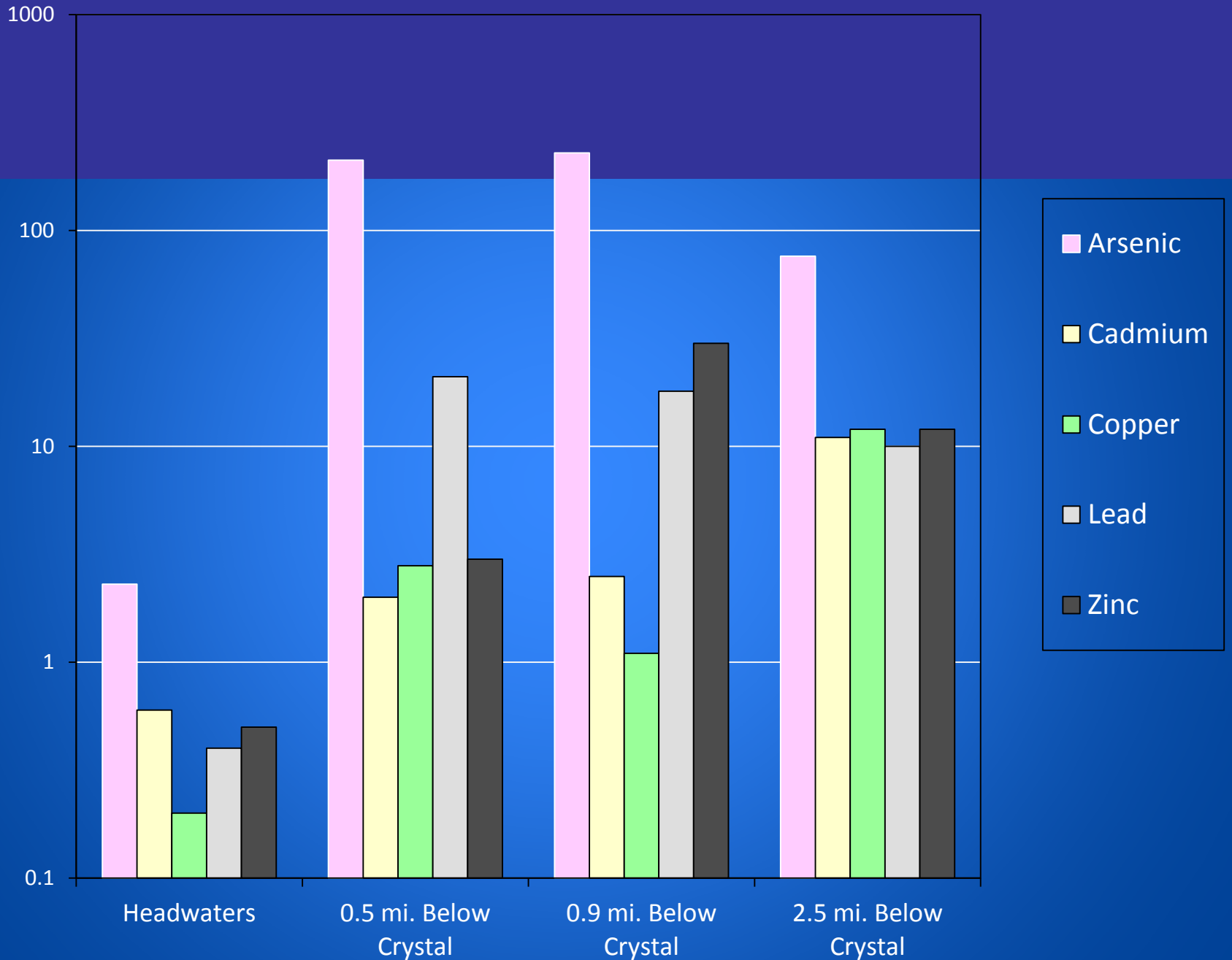
- Drainage Boundary
- Stream
- Impaired Stream
- 2009/2010 Monitoring Site
- Background Site
- Priority Mine
- Inactive Mine

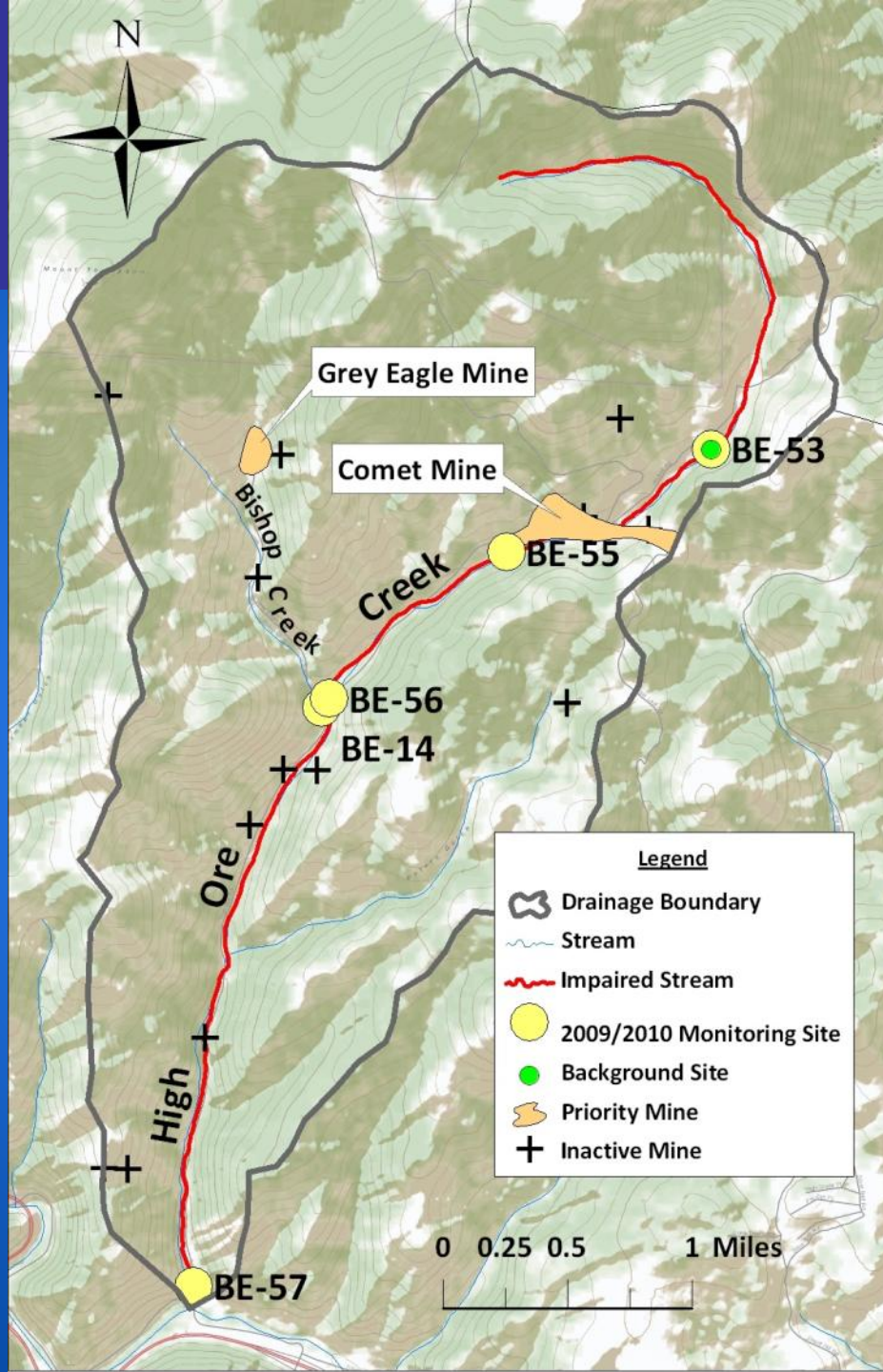
Jack Mountain





Metals Concentration / PEL Target





Metal Concentration/PEL Target

100.0

10.0

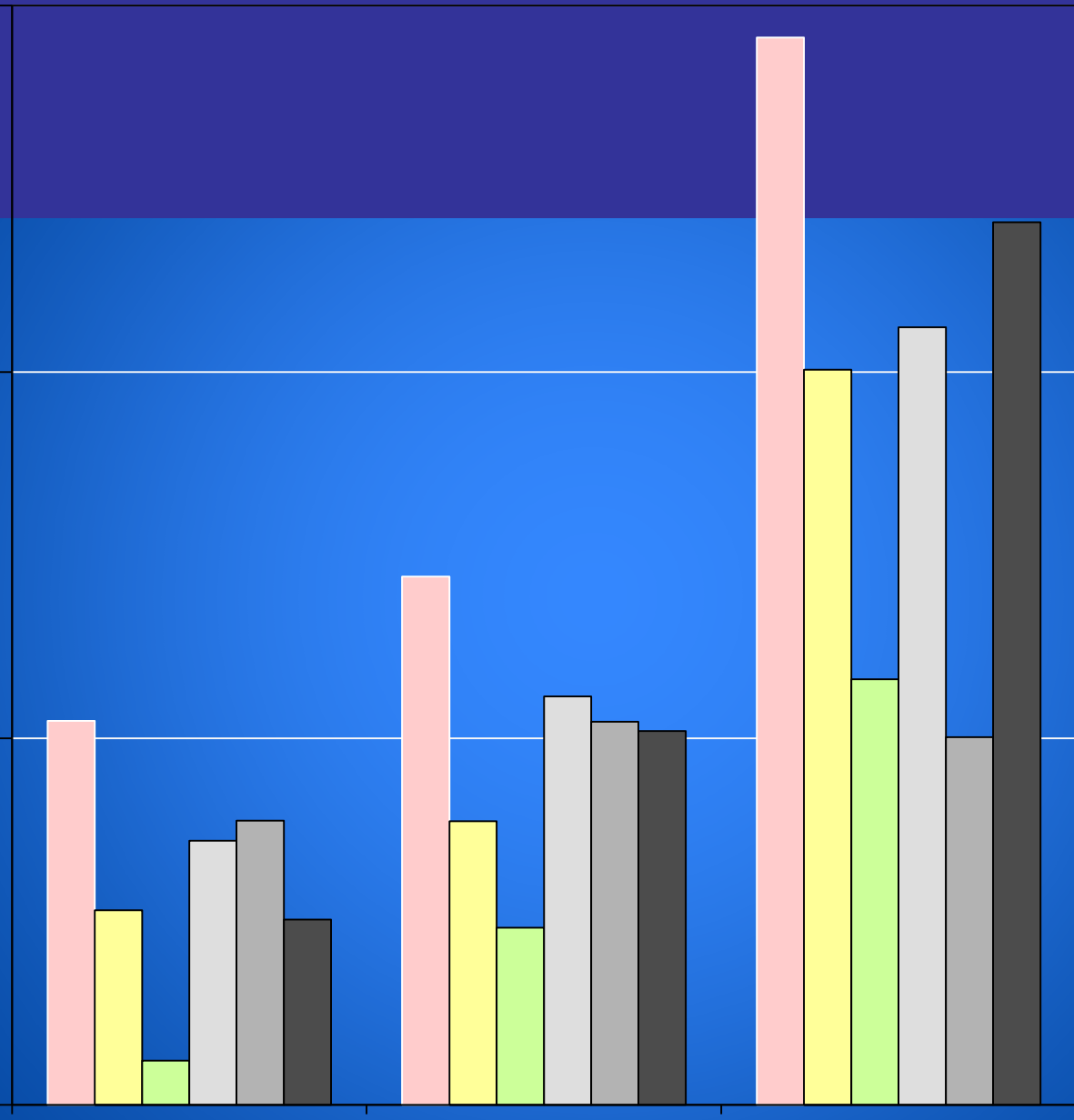
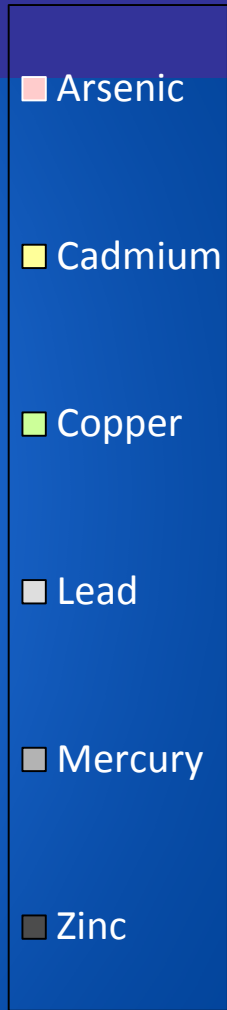
1.0

0.1

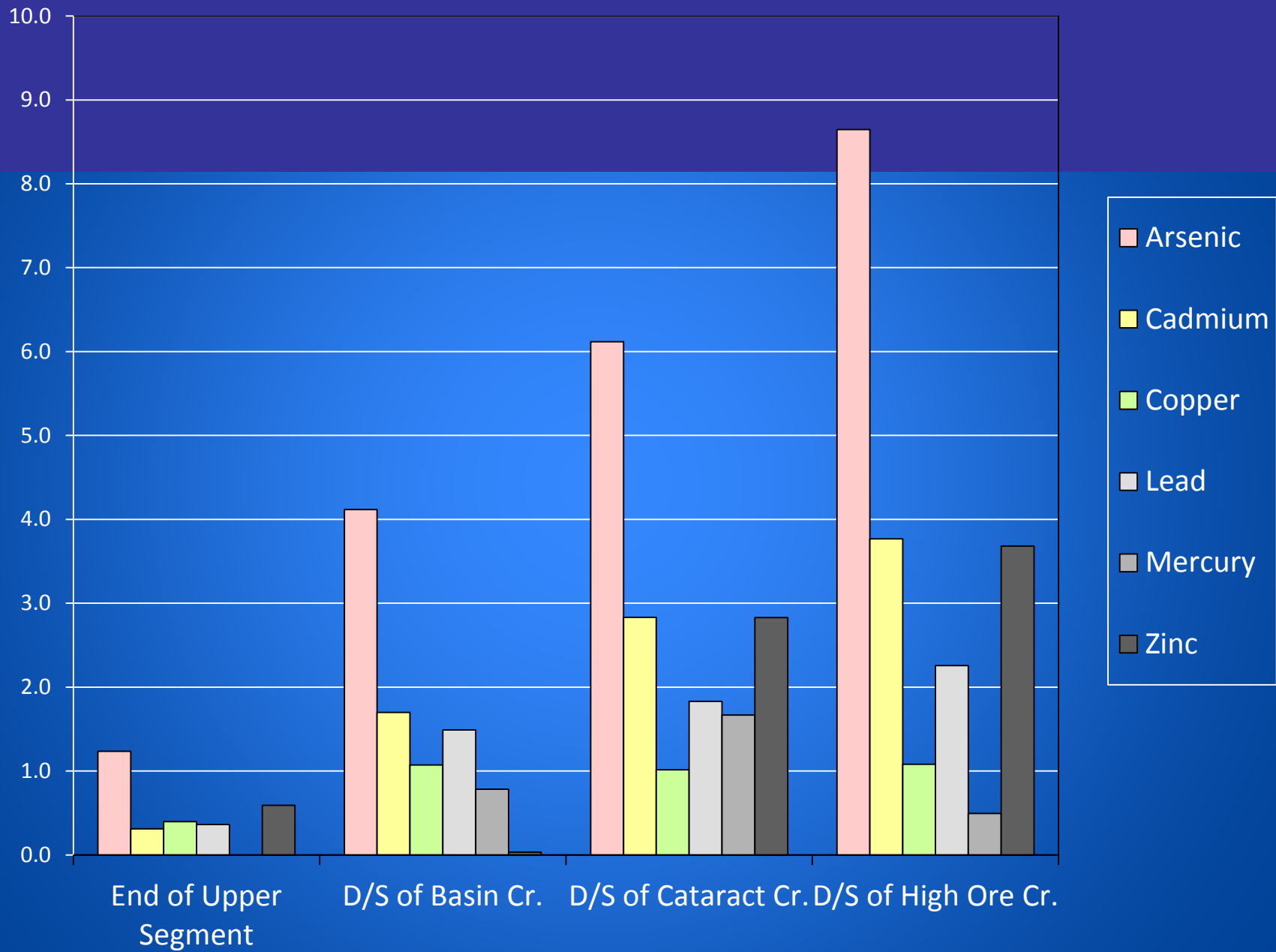
Headwaters

Bishop Creek

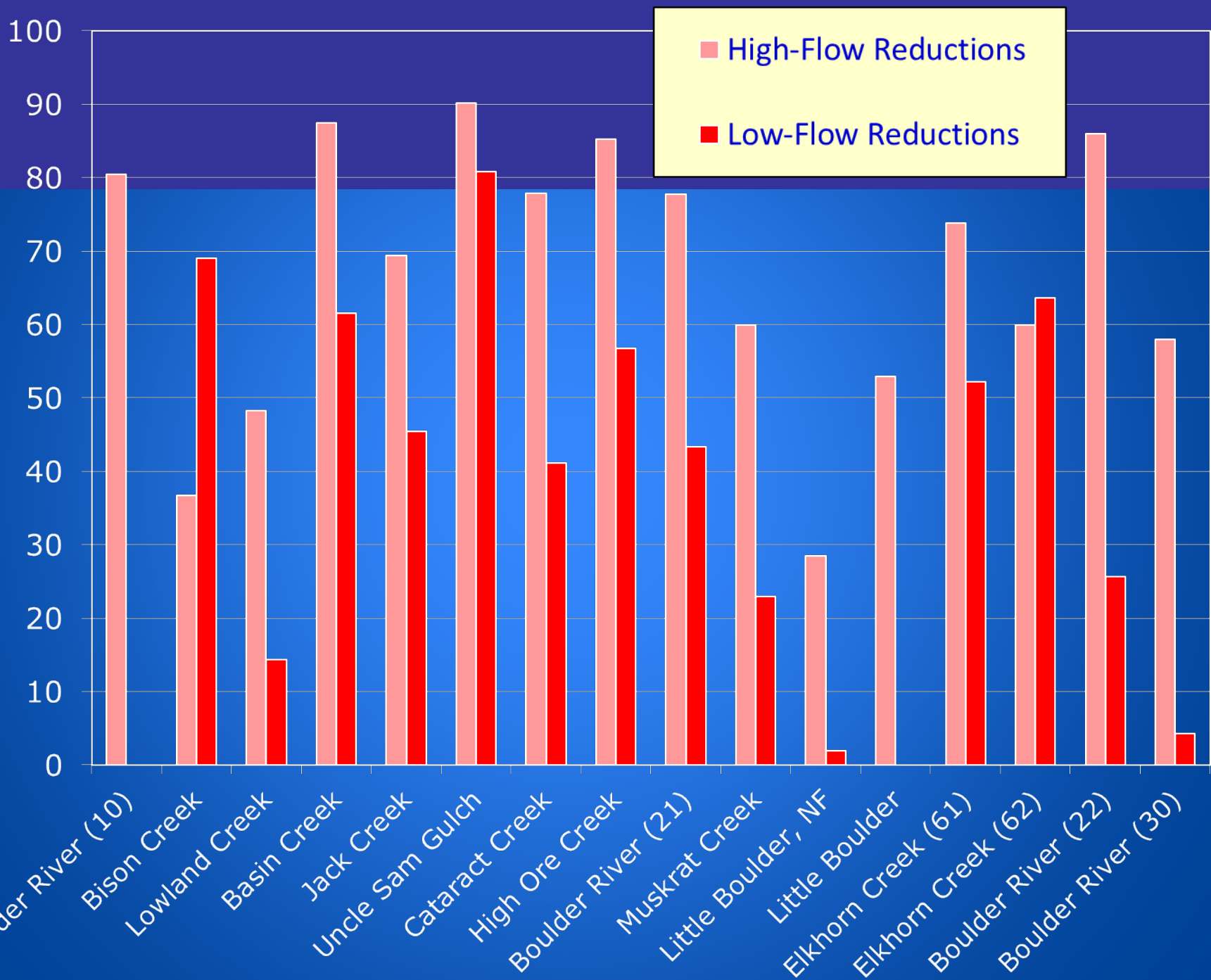
At Mouth



Metals Concentration/PEL Target

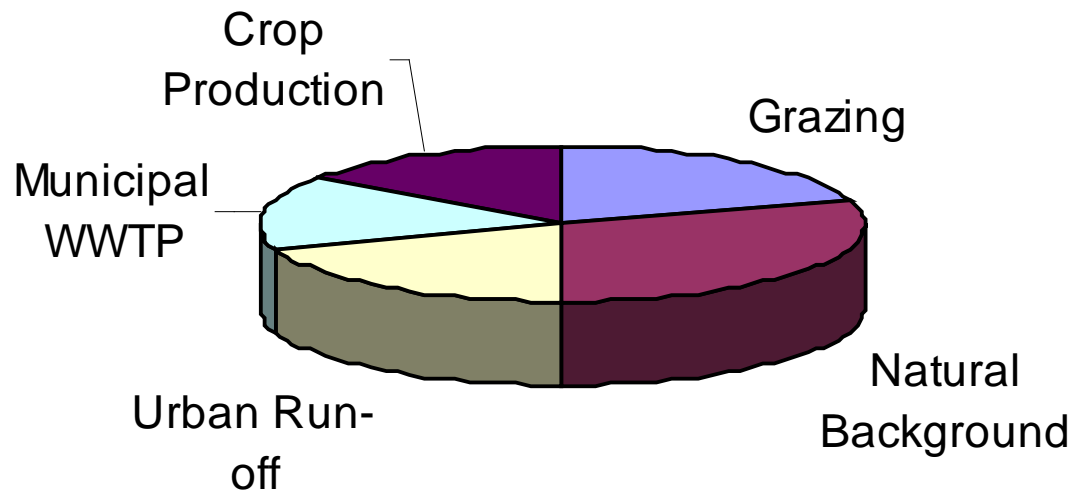


Percent Reduction



Allocating Loads to Meet the TMDL

The TMDL is the pie. The allocations are the pieces



Implementing the TMDL Report Recommendations

- The TMDL report provides a basis for action, but TMDLs are not self-implementing
- Local stakeholders, organizations and government agencies determine how to best use the loading information