

Boulder Elkhorn

TMDLs for Sediment, Temperature and Nutrients



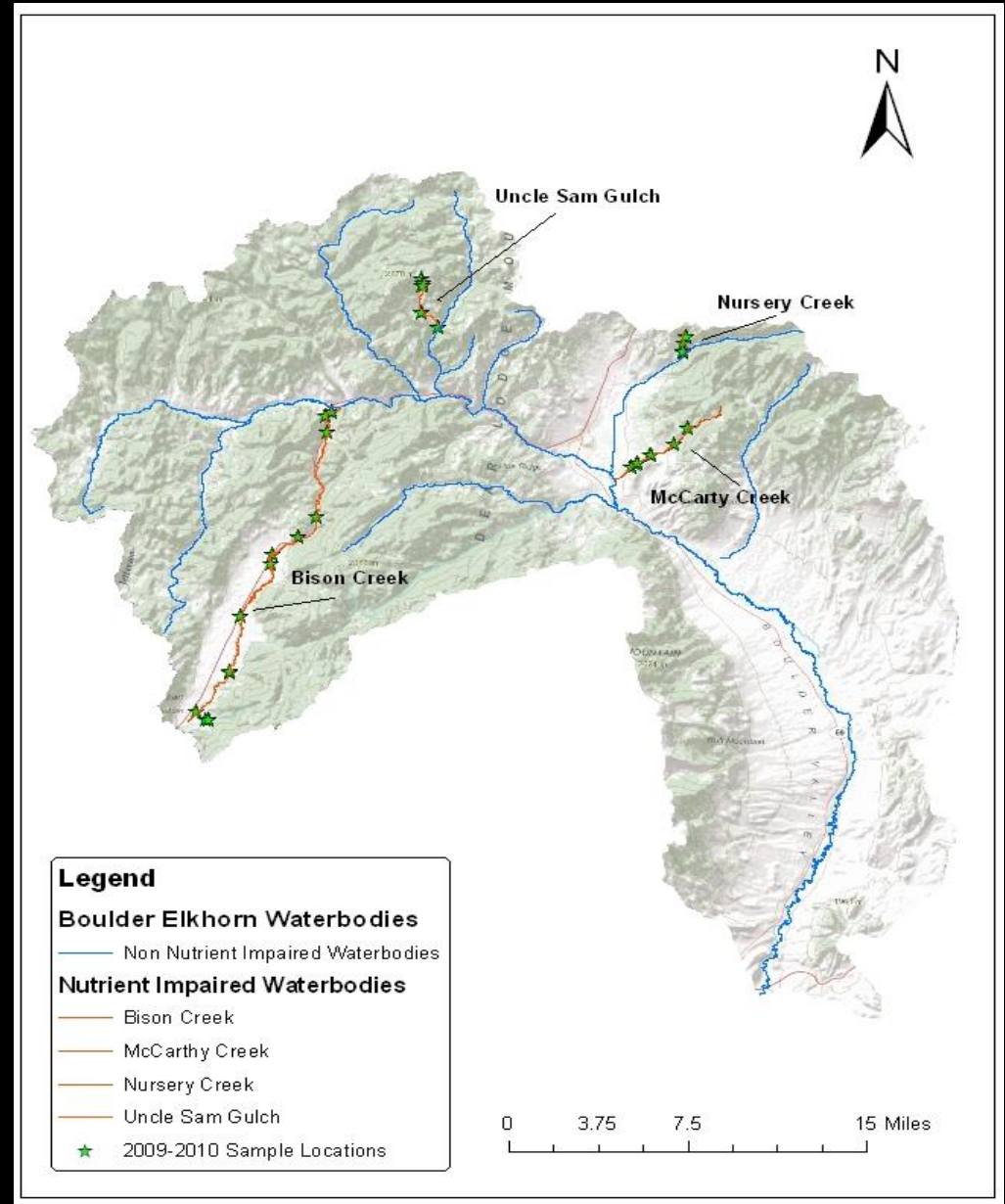
MDEQ: Christina Staten, Jim Bond, Lou Volpe

March 12, 2013

Nutrient TMDLs

Nutrient TMDL Streams

- Bison Creek
- Uncle Sam Gulch
- Nursery Creek
- McCarty Creek



Nutrient TMDLs

Nutrients : naturally occurring chemical elements required for a functioning aquatic ecosystem.

Occurrences:

Typically occur in the forms of Nitrogen and Phosphorous

Excess inputs of nutrients may:

Accelerate algal growth

Depletion of dissolved oxygen
-creates toxic conditions
for fish and bugs

Cause toxicity to aquatic life
(nitrogen in the form of ammonia)

Inhibit hemoglobin function in infants



Nutrient Target Values

- Target values are a result of:
 - Water quality standards:
 - NO₂+NO₃ is based on human health standards in DEQ-7 and levels that cause excess algae
 - TN and TP based on numeric nutrient criteria.
 - As well as number of technical studies in pursuit of numeric criteria for nutrients
 - Public perception of what level of algae is perceived as “undesirable”
 - Outcomes of nutrient stressor-response studies that determine nutrient concentrations that will maintain algal growth below undesirable levels

Nutrient Targets for the Boulder Elkhorn TPA	
Parameter	Target Value
Nitrate + Nitrite (NO ₃ +NO ₂)	≤ 0.100 mg/L
Total Nitrogen (TN)	≤ 0.300 mg/L
Total Phosphorus (TP)	≤ 0.030 mg/L
Chlorophyll- <i>a</i> (or Ash Free Dry Weight)	≤ 120 mg/m ² (≤35 g AFDW/m ²)

Nutrient Impaired Stream Listings

- 2012 Listed Nutrient Impaired Streams
 - Bison Creek (Nitrates)
 - Uncle Sam Gulch (Nitrate Nitrogen)
 - Nursery Creek (TKN, Nitrate + Nitrite)
 - McCarty Creek (Total Phosphorous)
 - Cataract Creek (Nitrate Nitrogen)
 - North Fork Little Boulder River (TKN)
- 2013 TMDLs Developed
 - Bison Creek (TN, TP)
 - Uncle Sam Gulch (NO₂+NO₃)
 - Nursery Creek (TN, TP, NO₂+NO₃)
 - McCarty Creek (TP)

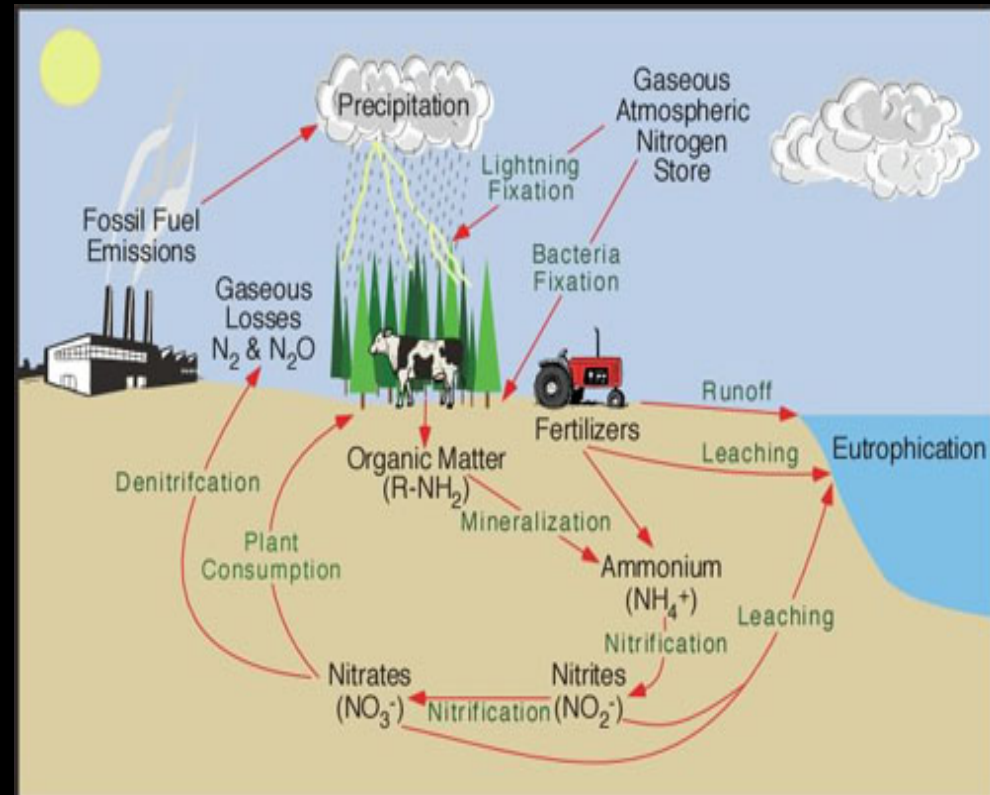
Nutrient Source Categories

Natural Sources

- Result of regional and local geology, soils, climatic and hydrologic processes
- Natural biochemical processes
- Natural vegetative decay

Human Caused Sources

- Agricultural Land Use
 - Grazing practices
 - Domestic animal waste
 - Vegetative decay from feeding operations
- Historical Mining and Milling
 - 1860's- 1960's (lead, zinc, gold, silver, Iron)
 - Waste rack and tailings still present
- Silvicultural Practices
 - Timber harvest
 - Forest Fires/Prescribed Burns
- On Site Septic Systems
 - Majority is Low density (<50/sq mile)
 - Minor contributions of moderate and high density (50-300 and > 300 /sq mile)



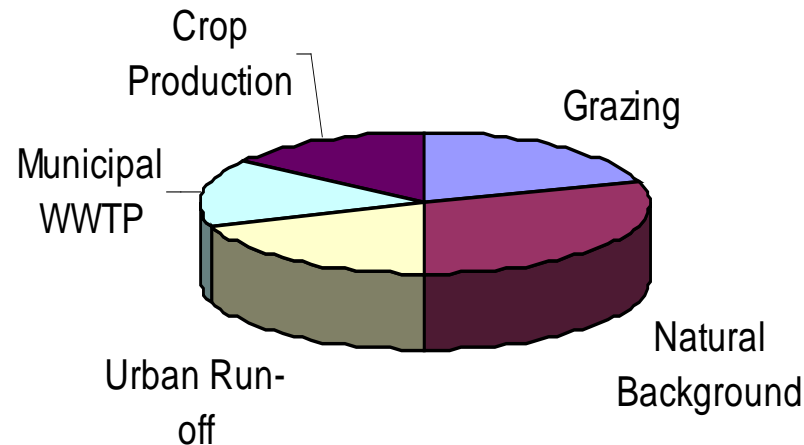
Boulder Elkhorn TMDL Planning Area

Nutrient Sources

- Bison Creek
 - Agricultural land use
 - Septic Systems
- Uncle Sam Gulch
 - Mining
- Nursery Creek
 - Agricultural land use
- McCarty Creek
 - Agricultural land use

The TMDL and Load Allocations

- The TMDL is the pie. (the amount of as specific pollutant a stream can handle and still meet standards)
- The allocations are the pie pieces. (how much each source can contribute)



Example Nutrient TMDLs and Allocations

Table 7-16. Bison Creek TN Example load allocations and TMDL*			
Source Category	Existing Load (lbs/day)	Example Allocation & TMDL (lbs/day)*	Percent Reduction
Natural Background	4.8	4.8	0%
Agricultural Land-Use Sources	27.5	12.1	59%
On-site Septic Systems	1.8		
	Total = 34.1**	TMDL = 16.9	Total = 50%
*based on a median growing season flow of 10.5 cfs			
** based on 80 th percentile of sample loads			

Table 7-18. Bison Creek Example TP load allocations and TMDL*			
Source Category	Existing Load (lbs/day)	Example Allocation & TMDL (lbs/day)*	Percent Reduction
Natural Background	0.57	0.57	0%
Agricultural Land Use Sources	2.16	1.13	48.5%
On-site Septic Systems	0.035		
	Total = 2.77**	TMDL = 1.7	Total = 39%
*based on a median growing season flow of 10.5 cfs			
** based on 80 th percentile of sample loads			

TMDL Implementation

- The TMDL report provides a basis for action, but TMDLs are not self-implementing
- It is up to local stakeholders, organizations and government agencies to determine how to best use the loading information and implement a restoration strategy
- TMDL implementation is voluntary

How to Meet TMDLs

- Reduce nutrients inputs to surface water and ground water:
 - increasing the filtering and uptake capacity of riparian vegetation areas,
 - decreasing the amount of bare ground, and
 - limiting the transport of nutrients from rangeland , cropland and historically impacted areas (mining).
- Adaptive management approach
 - Adaptive management approach works in cooperation with monitoring, and as new information is collected, it allows for adjustments to restoration goals or pollutant targets, TMDLs, and/or allocations.

Agricultural Land Use BMPs

- Develop a nutrient and grazing management plan
- Erosion Control
 - Vegetation and stream bank protection
- Grazing management
 - Alternate feeding and watering areas,
 - Timing of grazing
 - Lower intensity
 - Distribute stock more
 - Improve riparian area management
 - Fencing, water gaps, streamside buffering
 - Limit runoff from high concentration areas to surface or groundwater

Mining BMPs

- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA),
- The State of Montana Mine Abandoned Mine Lands Reclamation Program (AML) ,
- The Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), which incorporates additional cleanup options under the Controlled Allocation of Liability Act (CALA) and the Voluntary Cleanup and Redevelopment Act (VCRA).



Questions ?