

# Bitterroot Mainstem TMDL Planning Area

Advisory Group Meeting  
October 7, 2010

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PRESENTED BY:

Christina Staten, DEQ Project Coordinator

Kristy Zhinin, DEQ Sediment Project Manager

Darrin Kron, DEQ Temperature & Nutrient Project Manager

## For more information:

### Department of Environmental Quality

Telephone (406) 444-6697  
Fax: (406) 444-6836  
1520 E. Sixth Avenue  
P.O. Box 200901  
Helena, MT 59620-0901

### ~~DEQ Senior Planner~~

~~Banning Starr  
bstart@mt.gov  
(406) 444-6777~~

~~[www.deq.state.mt.us/  
wqinfo/TMDL/index.asp](http://www.deq.state.mt.us/wqinfo/TMDL/index.asp)~~  
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### Watershed Groups

#### Bitter Root Water Forum

P.O. Box 1247  
Hamilton, MT 59840  
(406) 375-2272  
[brwaterforum@bitterroot.net](mailto:brwaterforum@bitterroot.net)

#### Lolo Watershed Group

P.O. Box 1354  
Lolo, MT 59847  
(406) 273-2446  
[wendysurgis@bresnan.net](mailto:wendysurgis@bresnan.net)

### Major Types of Stakeholders

City/County Governments  
Conservation Districts  
Citizens  
Educational and Research Institutions  
Landowners  
Non-Profit Conservation Groups  
Timber, Agricultural, Recreational and Industrial Sectors  
Watershed Groups



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Helene G. Bazin-Lee; Doug Nation, Bitter Root Trout Unlimited; Bitter Root Water Forum; Department of Environmental Quality; Geum Environmental Consulting; Lolo National Forest; Will McDowell; Ravalli County Weed District.

# Presentation Outline:

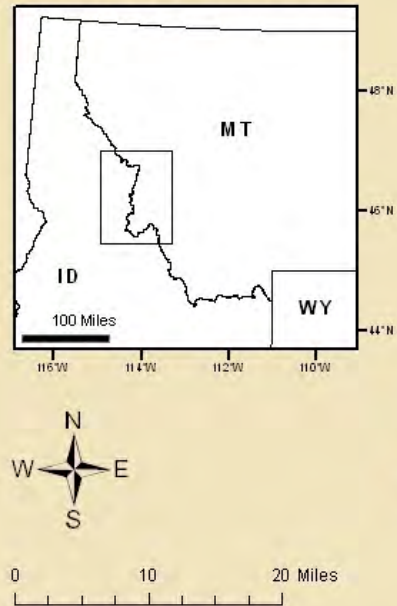
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- Overview of Bitterroot TMDL Planning Areas
- TMDL Basics
- Components of the Sediment Tributary TMDLs
- Components of the Temperature TMDLs
- Document Completion Steps
- How to Use the TMDL Wiki

# Project Boundaries

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**Bitterroot Watershed**



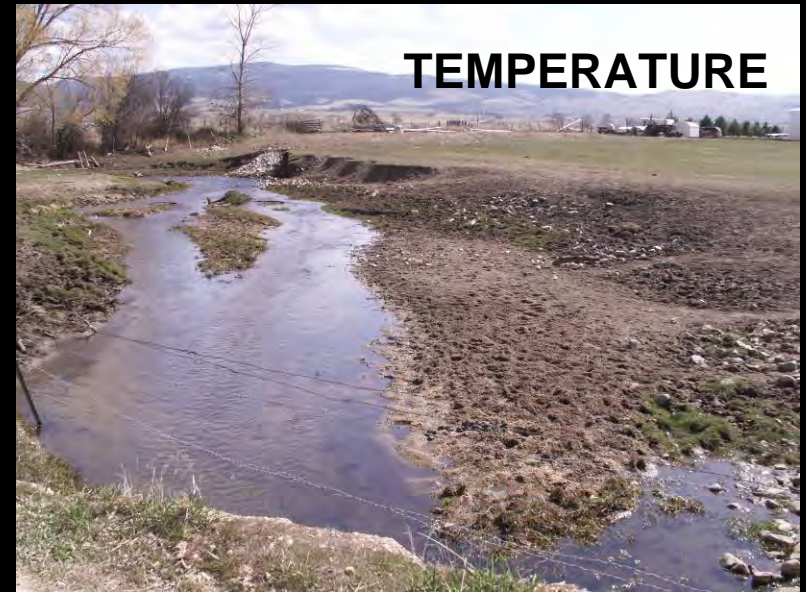
The Bitterroot River Watershed is divided into three TMDL Planning Areas (TPAs)

TMDL Planning Area	TMDL Status
<p>Upper Lolo Creek</p> <p>Headwaters of Lolo Creek (area above Lolo Hot Springs)</p>	<p>Sediment TMDLs completed April, 2003</p>
<p>Bitterroot Headwaters</p> <p>Headwater streams of the Bitterroot River</p>	<p>Sediment &amp; temperature TMDLs completed October, 2005</p>
<p>Bitterroot Mainstem</p> <ul style="list-style-type: none"> <li>•The Bitterroot River</li> <li>•The Bitterroot River tributaries</li> <li>•The mainstem of Lolo Creek</li> </ul>	<p>Sediment &amp; temperature TMDLs almost complete</p> <p>Nutrient TMDLs in progress</p>



# TMDL Basics

- Pollutants
  - Why Develop TMDLs?
  - What is a TMDL?
  - What a TMDL Does & Does Not Do



# TMDL Basics

- Pollutants
- Why Develop TMDLs?
- What is a TMDL?
- What a TMDL Does & Does Not Do

- The Clean Water Act (CWA) requires assessment of waters
- Water bodies not meeting water quality standards are placed on the 303(d) list
- Per CWA & Montana law, TMDLs must be developed for those waters with pollutant causes of impairment (e.g. nutrients or sediment)
- A TMDL is not required for pollution causes of impairment (e.g. alterations in stream-side or littoral vegetative covers)
- Court Order: The DEQ is under a court order which influences our pace and focus for the TMDLs that get completed

# TMDL Basics

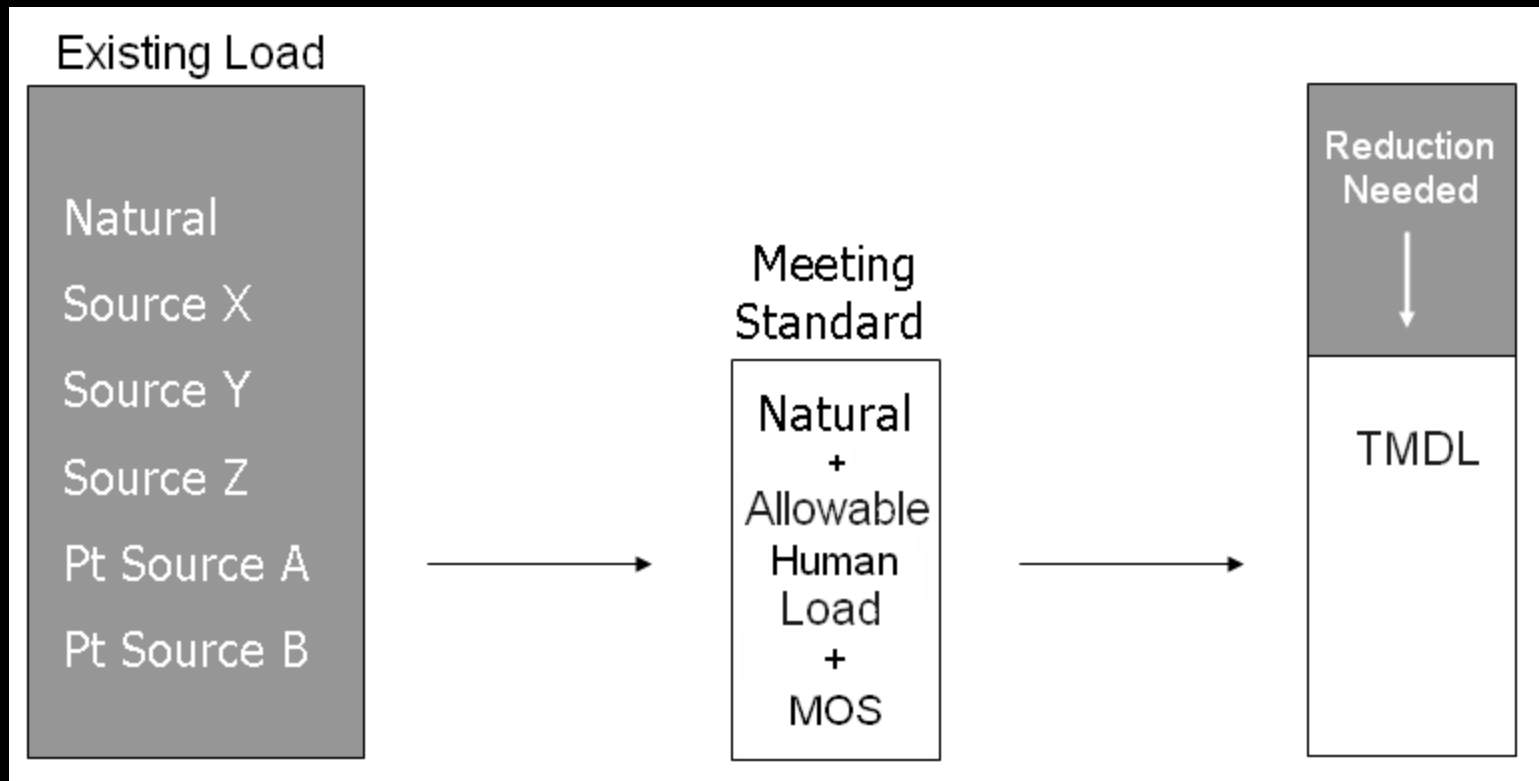
- Pollutants
- Why Develop TMDLs?
- What is a TMDL?
- What a TMDL Does & Does Not Do

- **T**otal **M**aximum **D**aily **L**oad is the amount of a pollutant that a stream can receive from all sources and still meet water quality standards
- Basically the allowable loading rate or loading capacity
- Expressed as a load per given time & also as a percent reduction(16 pounds/per day; 2.6 tons/year; 30% total load reduction)



# TMDL Basics

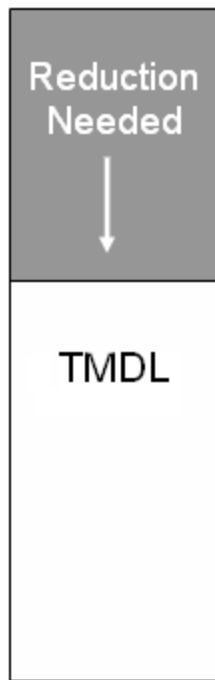
- Pollutants
- Why Develop TMDLs?
- What is a TMDL?
- What a TMDL Does & Does Not Do



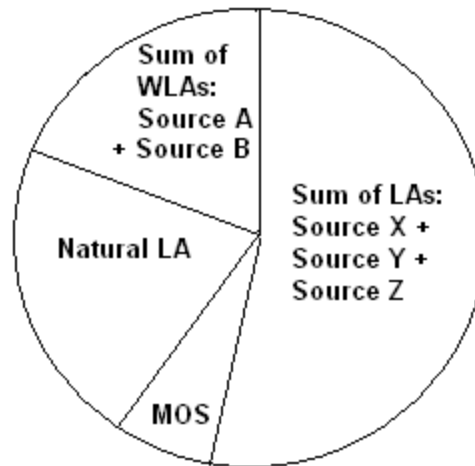
MOS = Margin of Safety

# TMDL Basics

- Pollutants
- Why Develop TMDLs?
- What is a TMDL?
- What a TMDL Does & Does Not Do



**The TMDL is broken  
into Allocations**



WLA = Waste Load Allocation

LA = Load Allocation

MOS = Margin of Safety

**TMDL = Sum of WLAs** for point sources + **Sum of LAs** for nonpoint sources + **MOS** that accounts for the uncertainty in the relationship between pollutant loads and the quality of the receiving stream

# TMDL Basics

- Pollutants
- Why Develop TMDLs?
- What is a TMDL?
- What a TMDL Does & Does Not Do

- An individual TMDL is developed for each water body segment - pollutant combination
- One stream segment may have multiple TMDLs for different pollutants
- One stream may have multiple segments and therefore have multiple TMDLs for the same pollutant

## EXAMPLE:

Lolo Creek is broken into 3 segments

Each segment is listed for sediment

Lolo Creek will have 3 sediment TMDLs

Cumulative source assessment

# TMDL Basics

- Pollutants
- Why Develop TMDLs?
- What is a TMDL?
- What a TMDL Does & Does Not Do

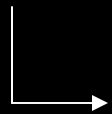
- In Montana, TMDLs are developed at a watershed scale (TMDL Planning Areas) to address multiple water body impairments
- Presented within the context of a scientifically based plan (not a mandate) that identifies a clean-up or restoration strategy for a specific water body and pollutant
- For the Bitterroot Mainstem TPA, the sediment & temperature TMDLs will be published in one document and the nutrient TMDLs will be published in a separate document



# TMDL Basics

- Pollutants
- Why Develop TMDLs?
- What is a TMDL?
- What a TMDL Does & Does Not Do

- A TMDL does not create new regulations; implementation is voluntary unless already covered by existing state, federal, or local regulations (e.g. streamside management zones)
- A TMDL is not enforceable for nonpoint sources (e.g. sediment from eroding banks caused by human activities)
- NPDES permit conditions must be consistent with TMDL waste load allocations



## What Does This Mean?

- An existing permit may be modified to meet the established TMDL allocation
- New point sources may not exceed the TMDL set for the relevant stream segment

# QUESTIONS?



**NEXT: Sediment TMDL Components for  
the Bitterroot River Tributaries**





## **Sediment TMDL Development for Tributaries to the Bitterroot Mainstem**





# Sediment TMDL Development

- Water Quality Targets
- Source Assessments
- TMDLs and Allocations
- Prioritization, Monitoring & Restoration



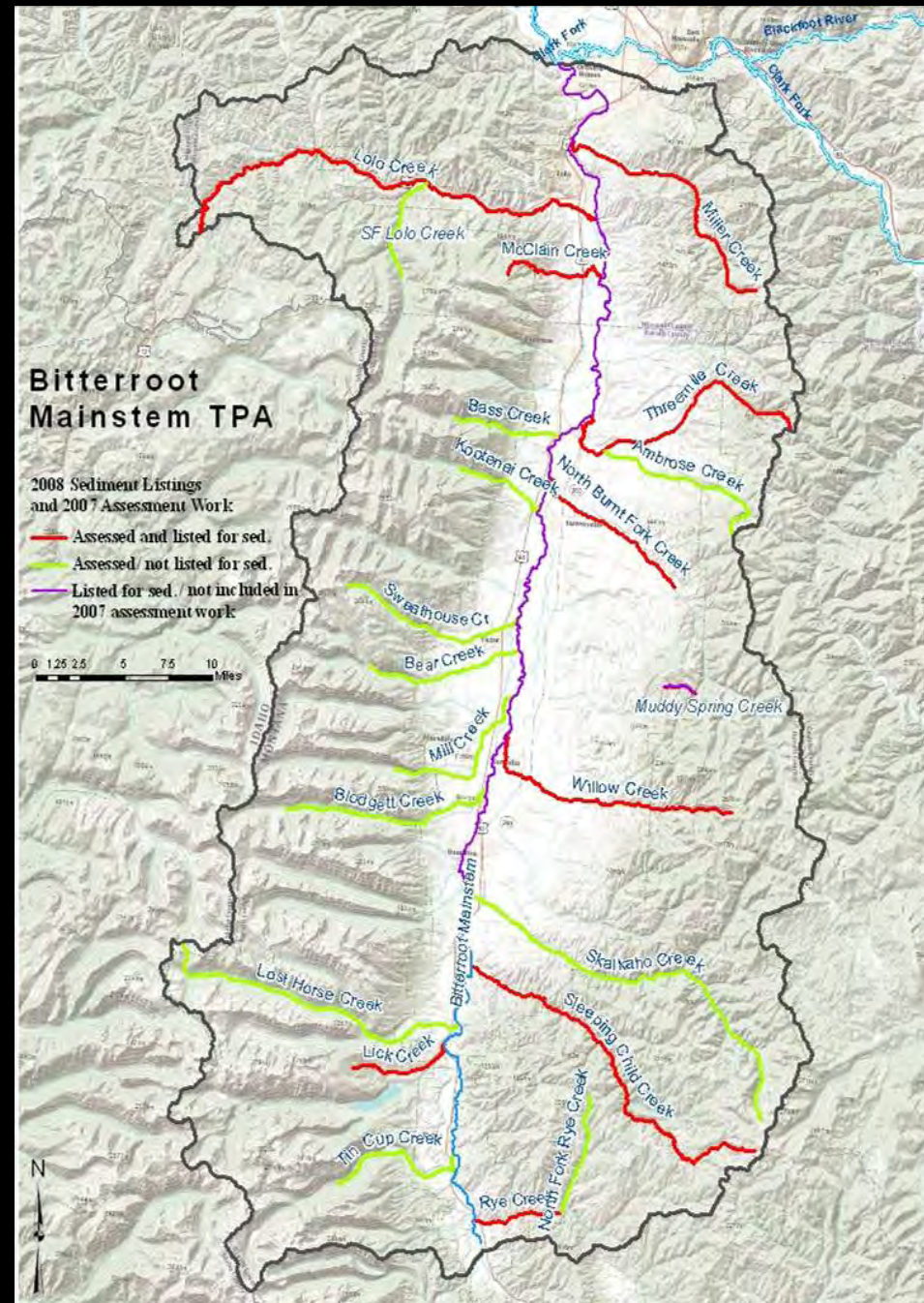


# Sediment TMDL Development

## Listed tributary segments

- Lick Creek
- Lolo Creek (3 segments)
- McClain Creek
- Miller Creek
- Muddy Spring Creek
- North Burnt Fork Creek
- Rye Creek
- Sleeping Child Creek
- Threemile Creek
- Willow Creek

*Placement of a stream on the 303(d) list indicates a beneficial use impairment*



# Water Quality Targets

- Use Support and WQ Standards
- Assess Existing and Future Conditions
- Reference Approach

## Sediment narrative standards

No increases are allowed above naturally occurring concentrations of sediment or suspended sediment, (except as permitted in 75-5-318, MCA), settleable solids, oils, or floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish or other wildlife.



*To aid in the translation of the narrative standard, water quality targets are developed for a suite of sediment related parameters.*



# Water Quality Targets

- Use Support and WQ Standards
- Assess Existing and Future Conditions
- Reference Approach

## Sediment target parameters

- Fine sediment  
(*<6mm and <2mm in riffles and in pools*)
- Channel form stability  
(*W/D ratio and entrenchment*)
- Instream habitat  
(*LWD, pools/mile, and pool depth*)
- Riparian health  
(*% understory shrub cover*)
- Sediment supply and sources  
(*% eroding banks and riffle stability index*)



*Target parameters are selected for their ability to display response to increases or decreases in sediment loading, and their linkage to effects upon aquatic life/cold water fish.*

# Water Quality Targets

- Use Support and WQ Standards
- Assess Existing and Future Conditions
- Reference Approach

## Water quality targets:

- Help define the level of impairment from sediment
- Guide TMDL development determinations
- Establish a starting point to measure future water quality restoration success





# Water Quality Targets

- Use Support and WQ Standards
- Assess Existing and Future Conditions
- Reference Approach

## Reference approach

The DEQ defines “reference” as the condition of a waterbody capable of supporting its present and future beneficial uses when all reasonable land, soil, and water conservation practices have been applied.

- **Reference datasets**

- Bitterroot NF
- Beaverhead Deerlodge NF
- Kootenai NF (Libby District)
- PIBO data

- **Internal datasets**

- Data collected from the 2007 Bitterroot sediment and habitat assessment
- Data from other recent Montana TMDL studies (Ruby River, Middle & Lower Big Hole, and St. Regis TMDLs)

- Literature values and best professional judgment may also be applied

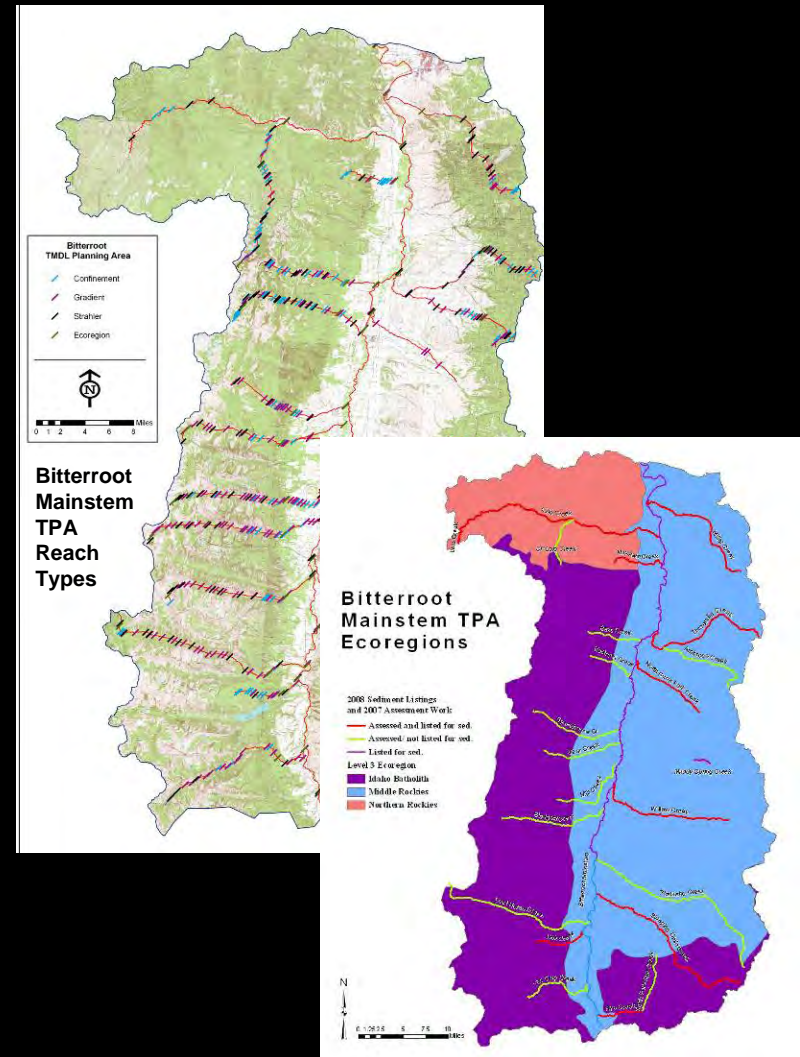
# Water Quality Targets

- Use Support and WQ Standards
- Assess Existing and Future Conditions
- Reference Approach

## Target approach by parameter

### Fine sediment

- *Percent of fine surface sediment <6mm and <2mm in riffles (pebble count – reach average)*
  - Bitterroot NF dataset, Beaverhead Deerlodge NF dataset, Kootenai NF dataset, and internal datasets
  - Examining multiple combinations of ecoregion, ecoregion sequence, gradient, and reach type
- *Percent of fine surface sediment <6mm in riffles and pool tails (grid toss – reach average)*
  - PIBO data and internal datasets
  - Examining multiple combinations of ecoregion, ecoregion sequence, gradient, and reach type



# Water Quality Targets

- Use Support and WQ Standards
- Assess Existing and Future Conditions
- Reference Approach

## Target approach by parameter

### Channel form stability

- W/D ratio (median of cross-section measurements)
  - *Bitterroot NF reference dataset by stream type*
- Entrenchment ratio (median of cross-section measurements)
  - *Rosgen stream type*

### Instream habitat

- Large woody debris (per mile)
- Pools (per mile)
- Residual pool depth (reach average)
  - *Internal datasets by reach type*

### Riparian health

- % understory shrub cover (reach average)
  - *Internal datasets*

### Sediment supply and sources

- % eroding banks
  - *Internal datasets*
- Riffle stability index
  - *Literature values*



# Source Assessments

- Upland Sediment Model
- Unpaved Roads Assessment
- Bank Erosion Assessment

## Potential Sources

### Natural erosion

- Result of climatic and hydrologic processes

### Human influenced sediment/erosion

- Sediment from roads and road crossings
- Land use management
  - Grazing Practices
  - Timber Harvest
  - Riparian Degradation/Removal
  - Crop Production
  - Development
- Bank erosion
  - Riparian Degradation/Removal
  - Unnatural Flow Fluctuations

#### Source assessments:

Provide relative loading estimates within each source category

Provide a basis for percent reductions





# Source Assessments

- Upland Sediment Model
- Unpaved Roads Assessment
- Bank Erosion Assessment

- Upland erosion due to hillslope sources was modeled using a preliminary version of the SWAT (Soil and Water Assessment Tool) model. The loads are outputs of the Modified Universal Soil Loss Equation (MUSLE). Simulated values reflect integrated effects of soil erodibility, slope length and steepness, vegetative cover, and sediment delivery ratio.
- The model provided an estimate of existing sediment loading from upland sources and an estimate of potential sediment loading reductions by applying best management practices (BMPs) in the uplands and filtering in the near-stream riparian area.



# Source Assessments

- Upland Sediment Model
- Unpaved Roads Assessment
- Bank Erosion Assessment

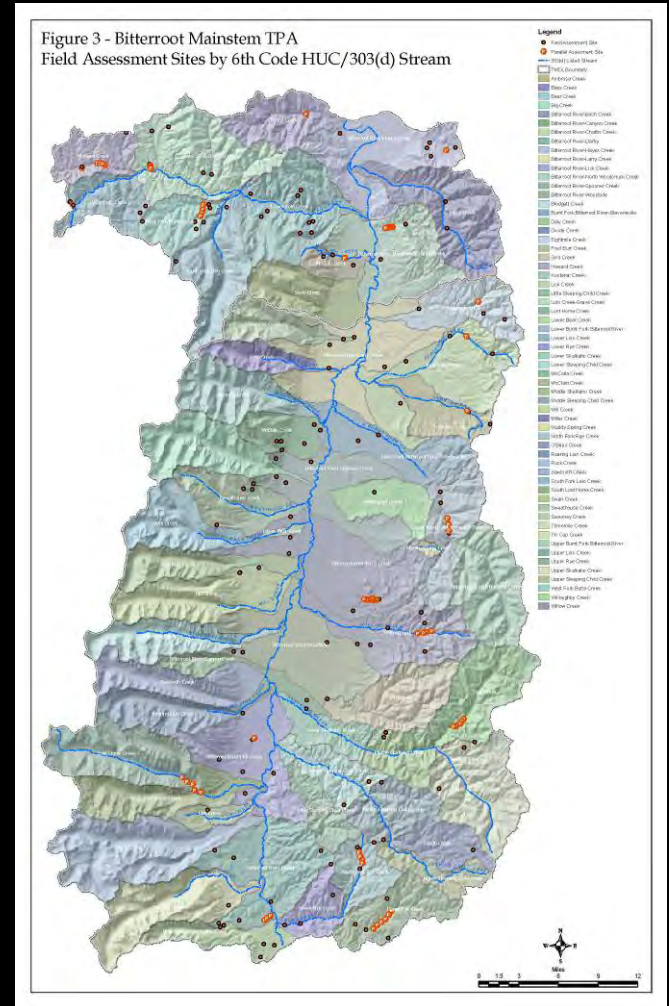
MCCLAIN CREEK			Land Use BMP Efficiency Only		Riparian BMP Efficiency Only	Combined Land Use and Riparian BMP Efficiency	
Sources		Current estimated load based on SWAT (T/Year)	Land use BMP efficiency	Sediment load with land use BMP efficiency applied to current estimated load (T/Year)	Sediment load with 21% riparian improvement applied to current estimated load (T/Year)	Resultant sediment load with riparian buffer applied to load after land use BMP efficiency is in place (T/Year)	Total possible upland % reduction
Upland Erosion	Barnyard <sup>1</sup>	0	50%	0	0	0	
	Agriculture	3	35%	2	2	2	
	Range Grass <sup>2</sup>	4	16%	3	3	3	
	Range Brush <sup>2</sup>	39	12%	34	30	27	
	Forest	32	N/A	N/A	25	32	
	Low/Med Urban	0	N/A	N/A	0	0	
	Total	78		40	61	63	19%



# Source Assessments

- Upland Sediment Model
- Unpaved Roads Assessment
- Bank Erosion Assessment

- Road crossings and parallel road segments were evaluated using the 'Roads' interface of the Water Erosion Prediction Project (WEPP)
- Randomly selected road crossings were sampled in the field and then modeled to represent the various road sediment loading conditions based on watershed, ownership, and road type
- Average sediment loads per road type and ownership were established and extrapolated to all non-sampled roads/crossings in the watershed to determine the total estimated sediment load from roads for each stream



# Source Assessments

- Upland Sediment Model
- Unpaved Roads Assessment
- Bank Erosion Assessment

## Total Sediment Load Reductions from Unpaved Road Network: 200-foot Crossing BMP and 500-foot Parallel BMP

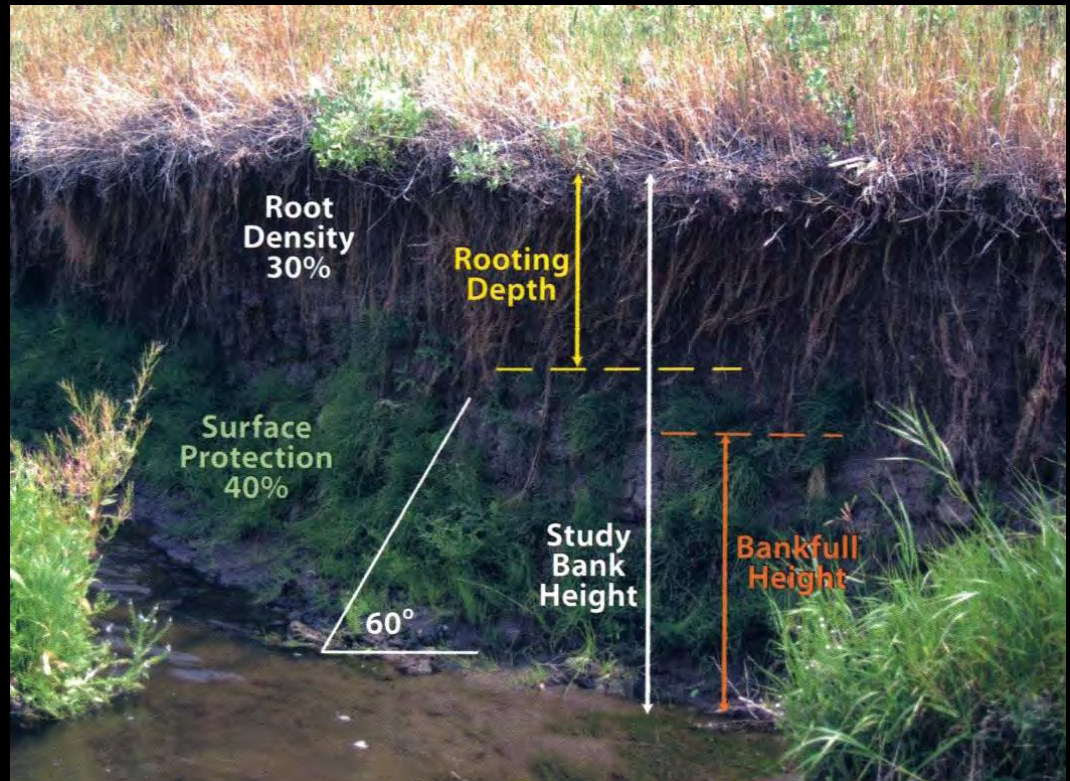
Stream	Total Sediment Load From Unpaved Roads Existing Conditions (tons/year)	Total Sediment Load After 200-ft Crossing and 500 ft Parallel Road Length BMPs (tons/year)	Percent Reduction in Load After 200-ft Crossing and 500 ft Parallel Road Length BMPs (tons/year)
McClain Creek	9.06	3.01	66.79%

# Source Assessments

- Upland Sediment Model
- Unpaved Roads Assessment
- Bank Erosion Assessment

Sediment loading was assessed from eroding banks in 2007 by performing bank erosion hazard index (BEHI) measurements & evaluating near bank stress along monitoring reaches based on these parameters:

- Bank height & bankfull height
- Root depth & root density
- Bank angle
- Percent surface protection



# Source Assessments

- Upland Sediment Model
- Unpaved Roads Assessment
- Bank Erosion Assessment

- BEHI bank assessments were conducted on each reach sampled during the 2007 field assessment
- The sampled reaches represented a variety of stream conditions on each of the streams and throughout the watershed
- Data was analyzed and loading rates determined for the sampled reaches, and loading rates were extrapolated for all of the non-sampled reaches to estimate the total contributing load for each stream



# Source Assessments

- Upland Sediment Model
- Unpaved Roads Assessment
- Bank Erosion Assessment

## Potential Sediment Load Reduction from Stream Segments with BEHI Reduced to “Moderate”

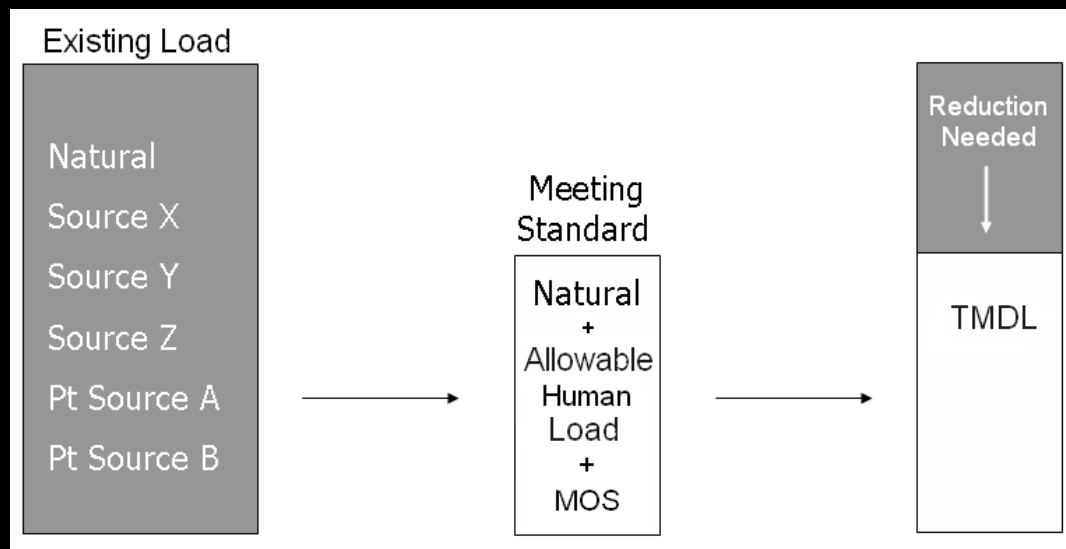
Stream Segment	Total Load (Tons/Year)	Total Load with "Moderate" BEHI (Tons/Year)	Total Load due to Anthropogenic Sources (Tons/Year)	Total Load with "Moderate" BEHI due to Anthropogenic Sources (Tons/Year)	Potential Reduction in Anthropogenic Sediment Load with "Moderate" BEHI	Percent Reduction in Anthropogenic Sediment Load with "Moderate" BEHI
McClain Creek	81.7	73.4	60.0	52.4	7.7	13%



# TMDL Determinations

- TMDL
- Allocations

The TMDL for each stream is expressed as the sum of the sediment loads from all sources assuming all reasonable land, soil, and water conservation practices are in place.





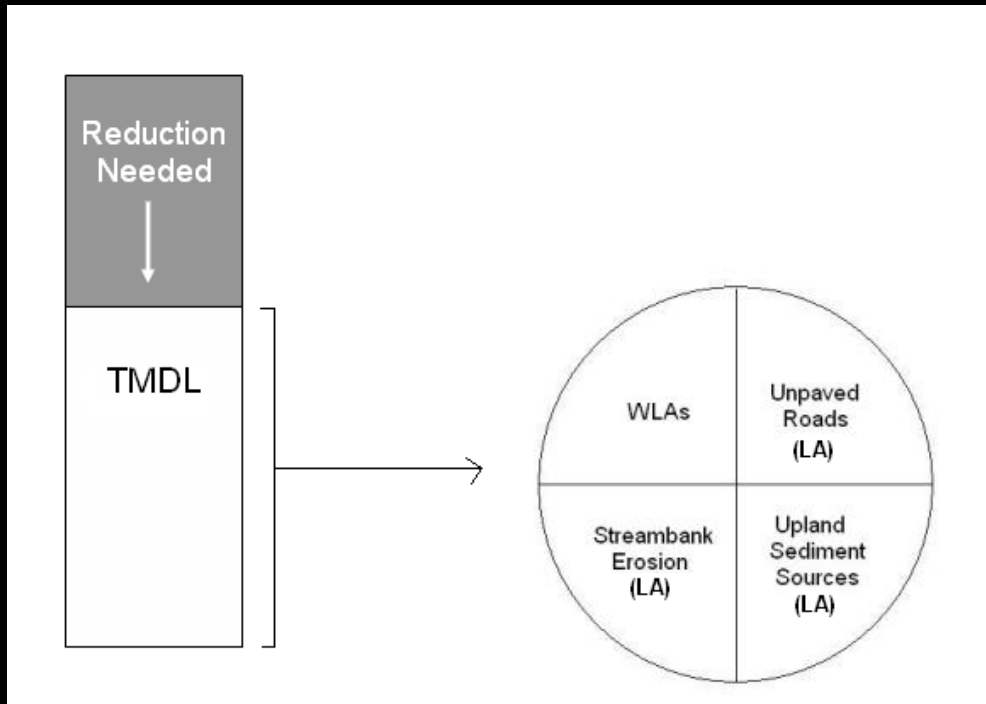
# TMDL Determinations

- TMDL
- Allocations

- The sediment loads are derived from the source assessments
- TMDLs are developed for streams with elevated amounts of fine surface sediment; degraded habitat quality; and near-stream impacts from human sources, such as grazing and road erosion.
- TMDLs are not developed for streams failing to meet the water quality targets if it appeared that there were no significant controllable human causes.
- TMDLs are written based upon a comparison of the collected data to the developed targets and supplemental indicators

# TMDL Determinations

- TMDL
- Allocations



Natural Loads and Margins of Safety are implicitly incorporated into the Bitterroot sediment allocations

- Allocations are derived based on data analysis, model assumptions, and best professional judgment
- Given the methods used for the source assessment, these allocations represent the maximum load that each source type can contribute and achieve water quality standards
- Allocations take into account all reasonable land, soil, and water conservation practices

# TMDL Determinations

- TMDL
- Allocations

## Basis for allocations

- **Bank erosion:**

Although sediment load associated with bank erosion is presented in separate sources categories (e.g. transportation, grazing, cropland), the allocation is presented as a collective percent reduction expected from human sources (moderate BEHI/low NBS)

- **Roads:**

The sediment load that would occur if contributing lengths of road at each input point were reduced to 200 feet maximum for each road crossing and 500 feet for each parallel length (assumes BMP implementation)

- **Upland sediment:**

The sediment load associated with improved grazing/agriculture practices and improved riparian condition expressed as a percent reduction

# Next Steps

- Monitoring
- Implementation

## Monitoring

- Additional monitoring or assessment may be necessary in some cases to further refine and identify restoration needs
- Monitoring is also an essential component to measure success over time as projects are developed
- Monitoring recommendations will be presented in the TMDL document





# Next Steps

- Monitoring
- Implementation

## Implementation recommendations

- Improve grazing, agricultural, timber harvest, and other land use management practices to reduce pollutant loading while still providing viable and sustainable economic growth
- Improve and restore riparian corridors to provide shade, filter sediment, and stabilize eroding banks and floodplains
- Install all appropriate BMPs to road and road crossing networks throughout the Bitterroot watershed





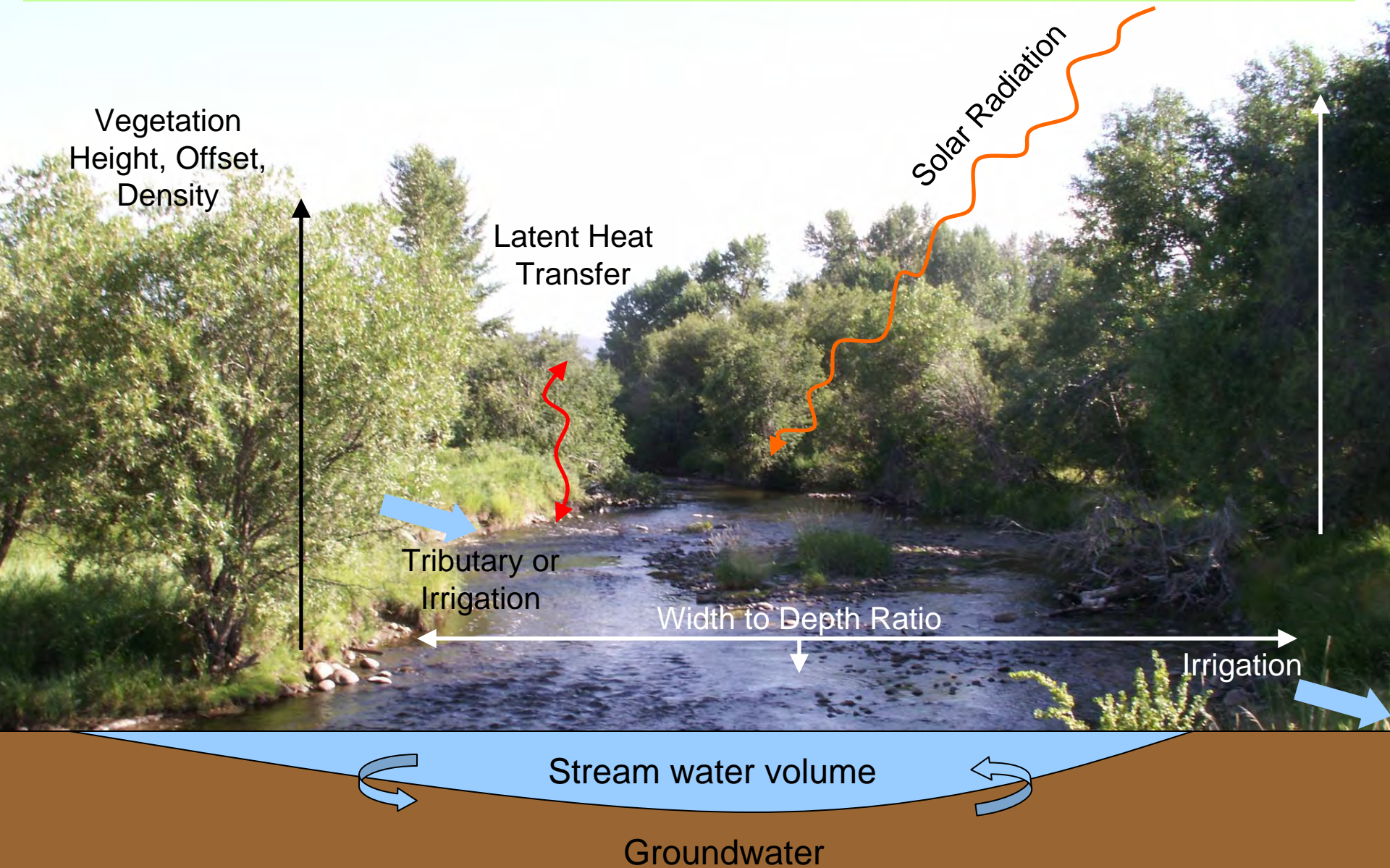


**QUESTIONS?**  
**NEXT: Temperature TMDL Components**





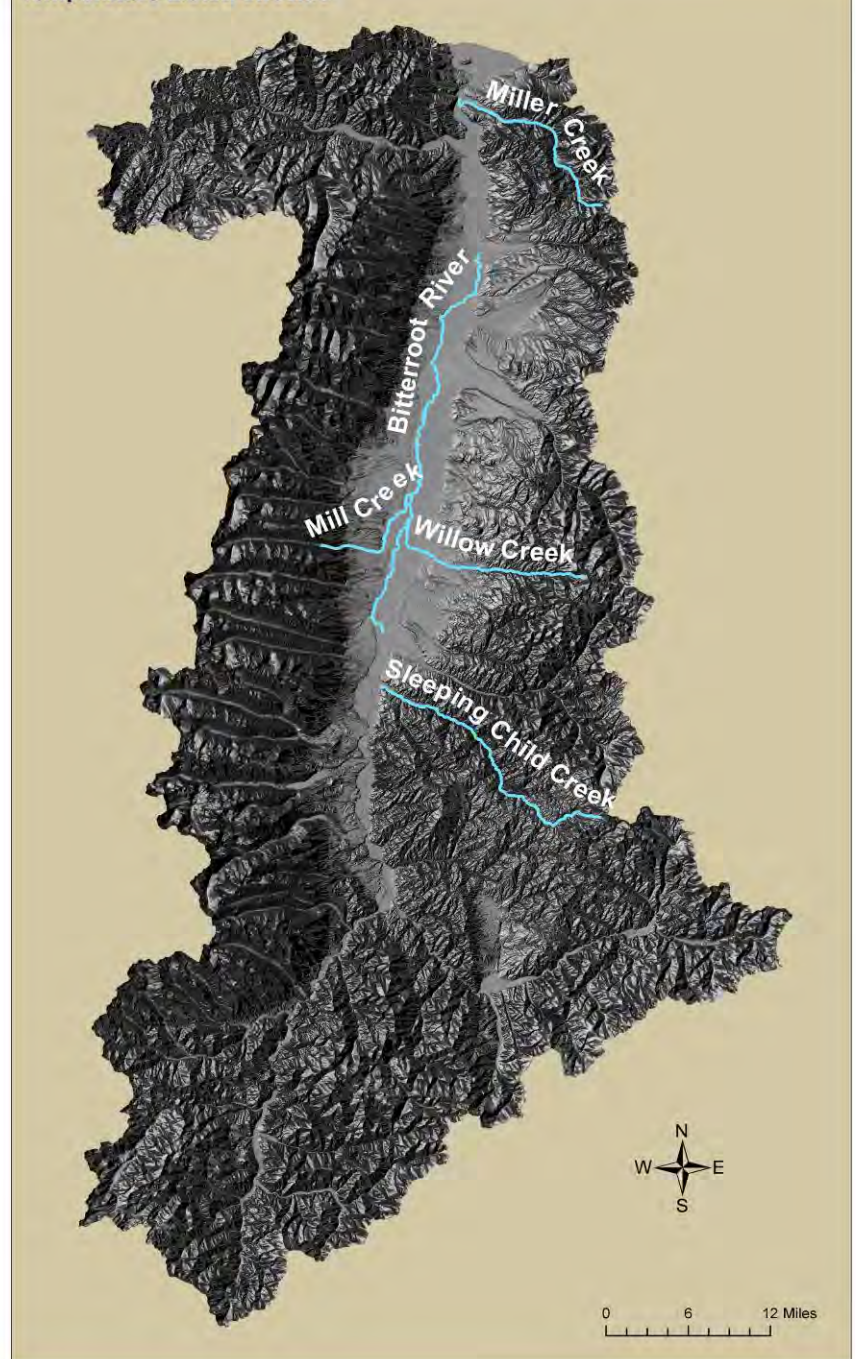
# Temperature TMDL Development



# Temperature TMDL Development

- Impaired Streams
- TMDLs

Temperature Listed streams





# Montana's Temperature Standard

- Part numeric and part narrative
- $\frac{1}{2}$  or  $1^{\circ}\text{F}$  above naturally occurring temperature
- Water quality standards can not divest or imperil water rights\*

Temperature  
Standard

Temperature  
Modeling

Temperature  
at a level  
that it harms  
a use?

Yes

Reference  
Approach  
For Meeting  
Targets

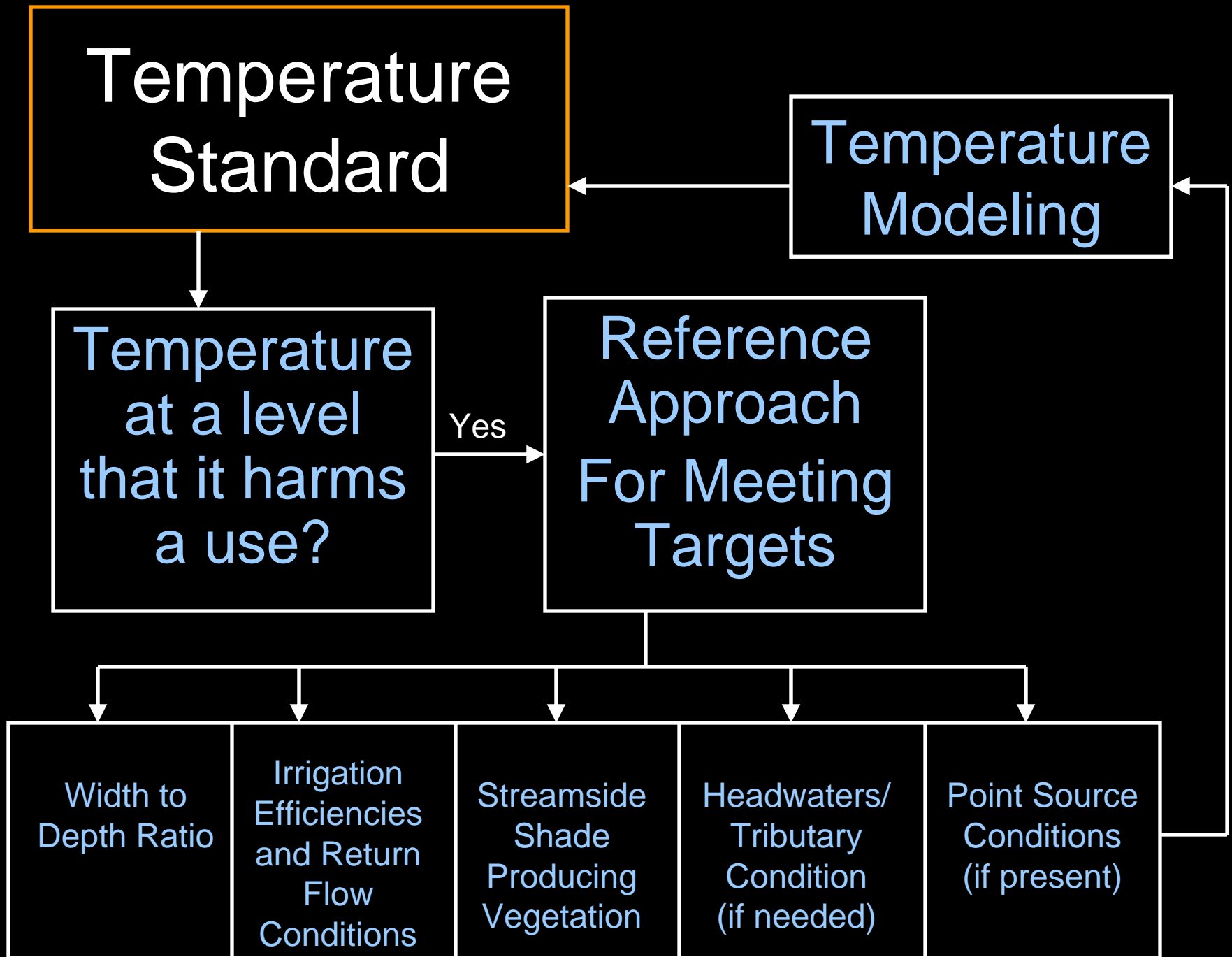
Width to  
Depth Ratio

Irrigation  
Efficiencies  
and Return  
Flow  
Conditions

Streamside  
Shade  
Producing  
Vegetation

Headwaters/  
Tributary  
Condition  
(if needed)

Point Source  
Conditions  
(if present)



# Data Collection and Source Assessment

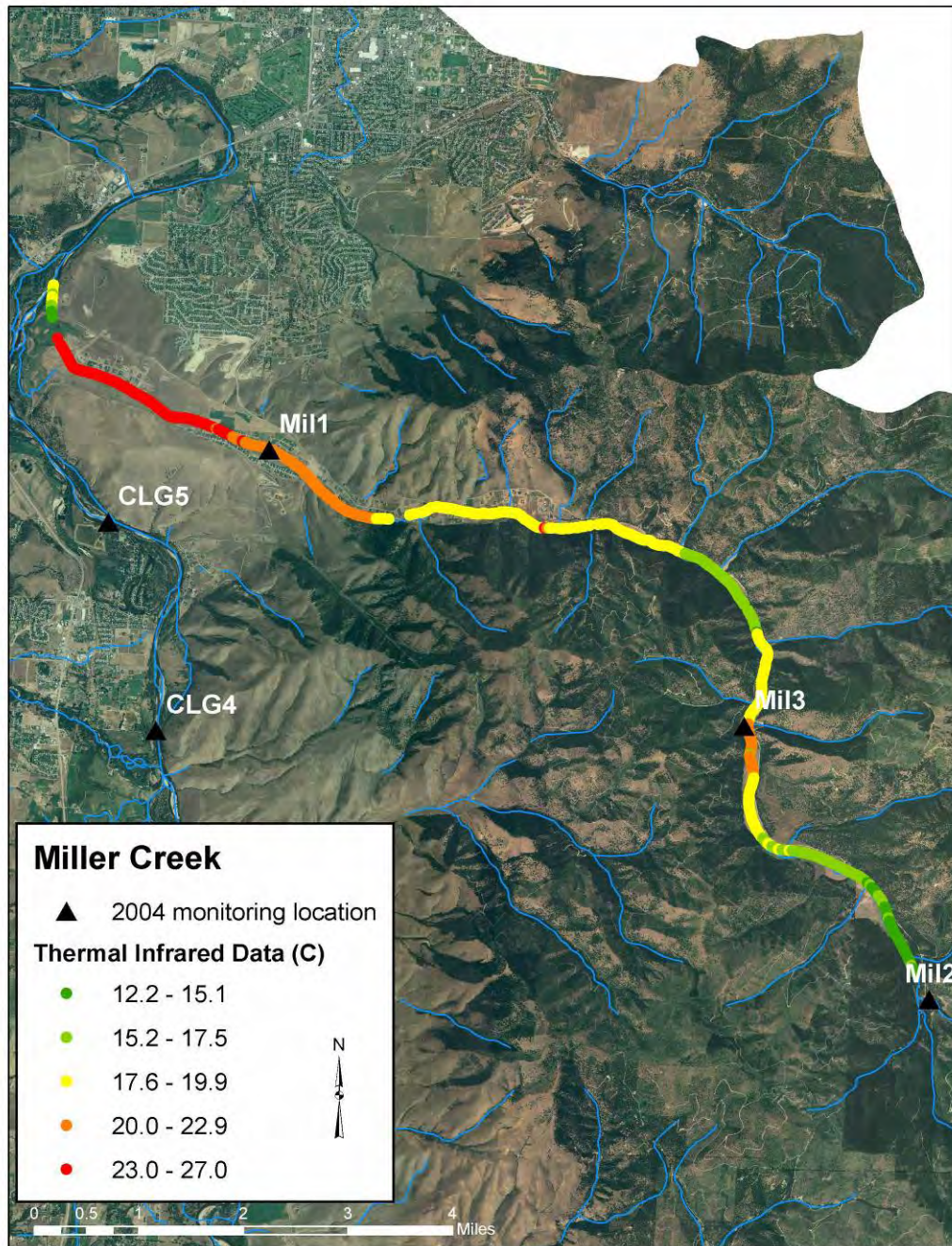
- Temperature and stream flow monitoring
- Stream side vegetation and shade monitoring
  - Aerial photo, Fieldwork
- Thermal infrared flight
- Irrigation network evaluation
- Wastewater treatment facility data

# Temperature Monitoring

- Statistics are run on summer seasonal data
  - Seasonal Maximum/Minimum
  - Weekly average of daily maximum temperature
  - Days and hours over specific temperatures related to fishery
- Comparisons between sites and to fish tolerance



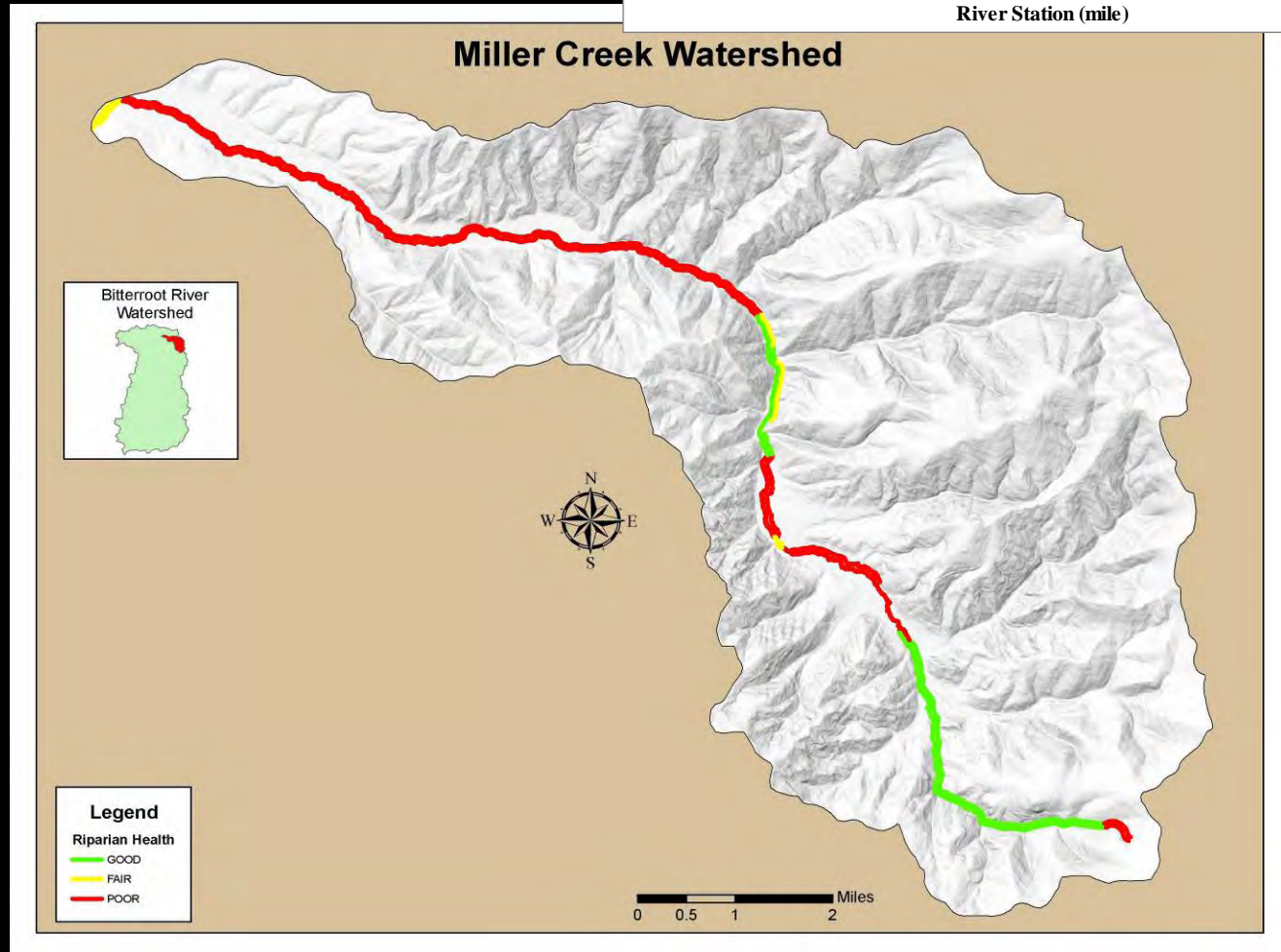
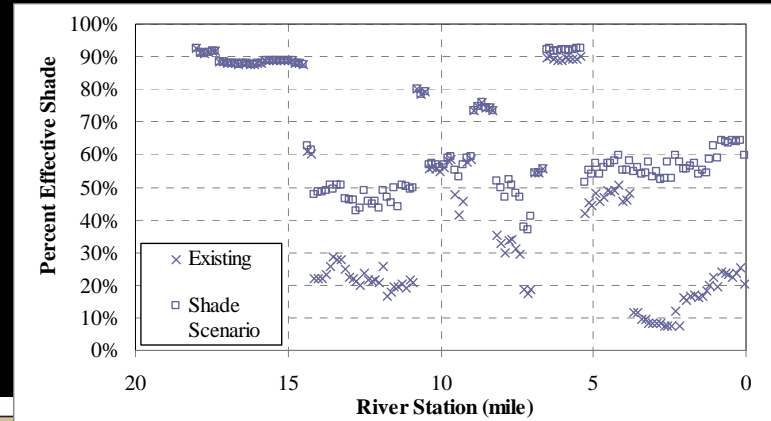
# Thermal Infrared Results



- Can fill spatial gaps between monitoring locations
- Assists in source assessment

# Streamside Vegetation Aerial Photo Assessment

- Maps of streamside vegetation conditions
- tabular info about average vegetation category, height, crown density, offset from channel along 500ft reaches





# Irrigation and Stream Flow Evaluation

- USGS continuous discharge sites
- DEQ instantaneous sites
- Irrigation system and water use



# Wastewater Treatment Effluent Data



- Discharge Rates
- Temperature



# Temperature Targets

- Meet Montana's Water Quality Temperature Standard

Or meet all influencing factors in combination:

- Streamside shade from vegetation
- Channel width to depth ratio
- Irrigation efficiencies and return flows
- WWTP discharge rates
- Tributary conditions

# Miller Creek Temperature Targets

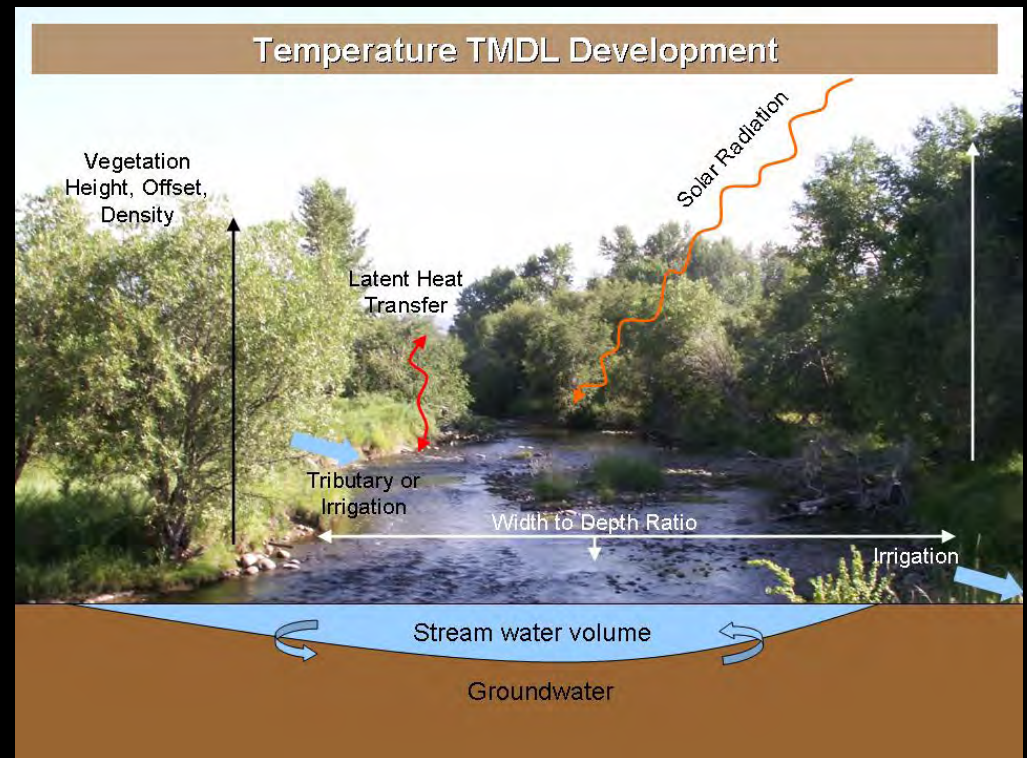
- Montana's Water Quality Temperature Standard - reduce temps by  $\sim 8^{\circ}\text{F}$

Or meet all in combination:

- Shade = from 48% to 65%
- Channel width to depth ratio = from 38 to 19
- Irrigation efficiencies and return flows =  
Adaptive management plan

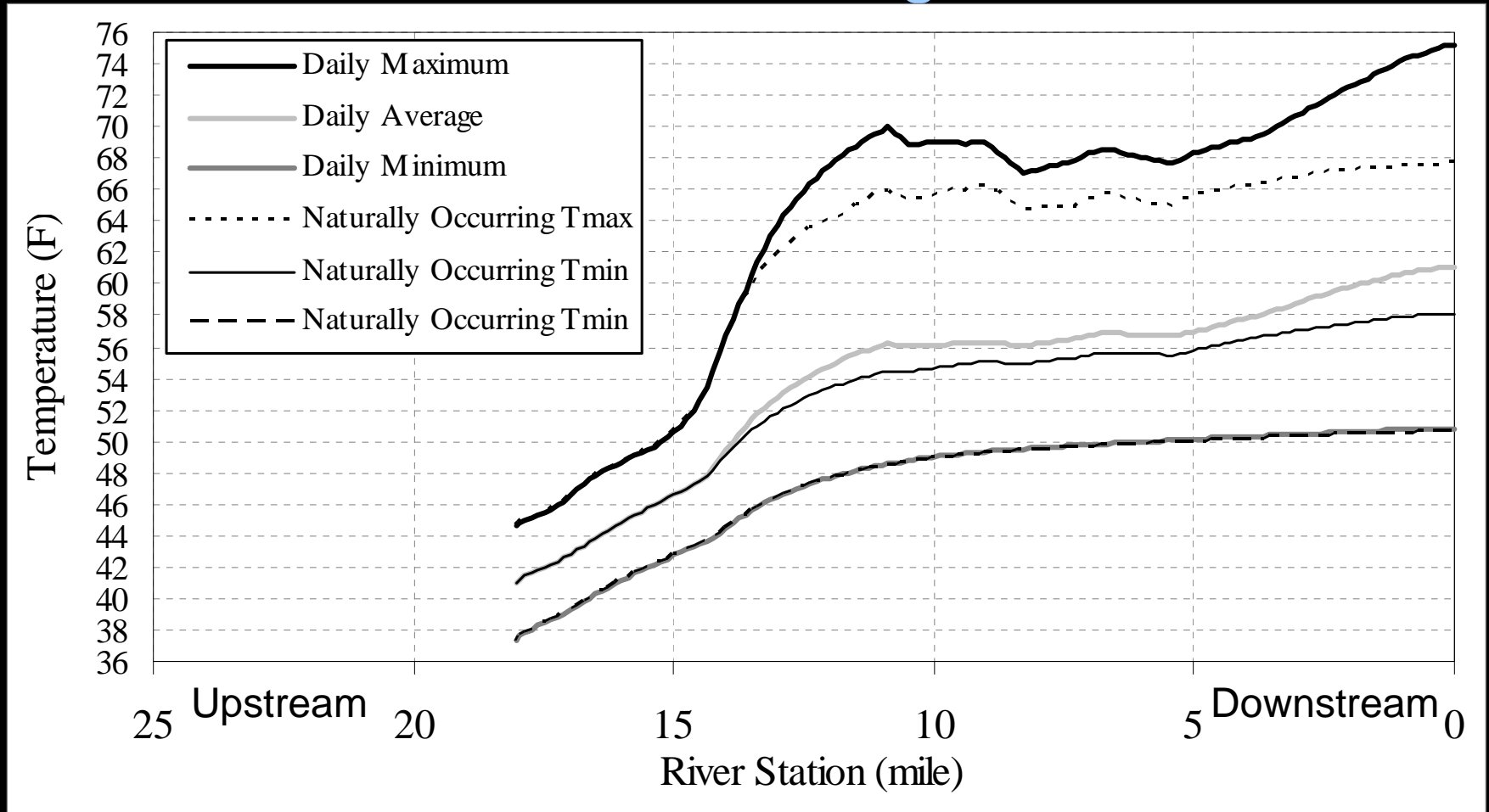
# Water Quality Modeling Steps

- Calibrate
- Restoration scenarios
- Compare existing to restoration temperatures



# Water Quality Modeling

## Miller Creek Modeling Results



Average Summer Afternoon



# Temperature TMDL

- Surrogate TMDL - target conditions
- Numeric heat TMDL also provided

**Table 6-15. Miller Creek numeric TMDL, allocation and MOS example during a typical summer afternoon**

<b>TMDL Component</b>	<b>Load Allocation</b>		<b>Margin of Safety</b>	<b>=</b>	<b>TMDL</b>
<b>Source Description</b>	Natural Sources	All human sources with reasonable land, soil and water conservation practices in place	Reserved for safety factor and uncertainty in analysis		
<b>Estimated Contribution to Temperature TMDL</b>	66.5°F	1.0°F	0.5°F		68.0°F
<b>Heat Load in Kcal/Sec</b>	2153	62	31		2246

# Water Quality Assessment and Restoration Guidance

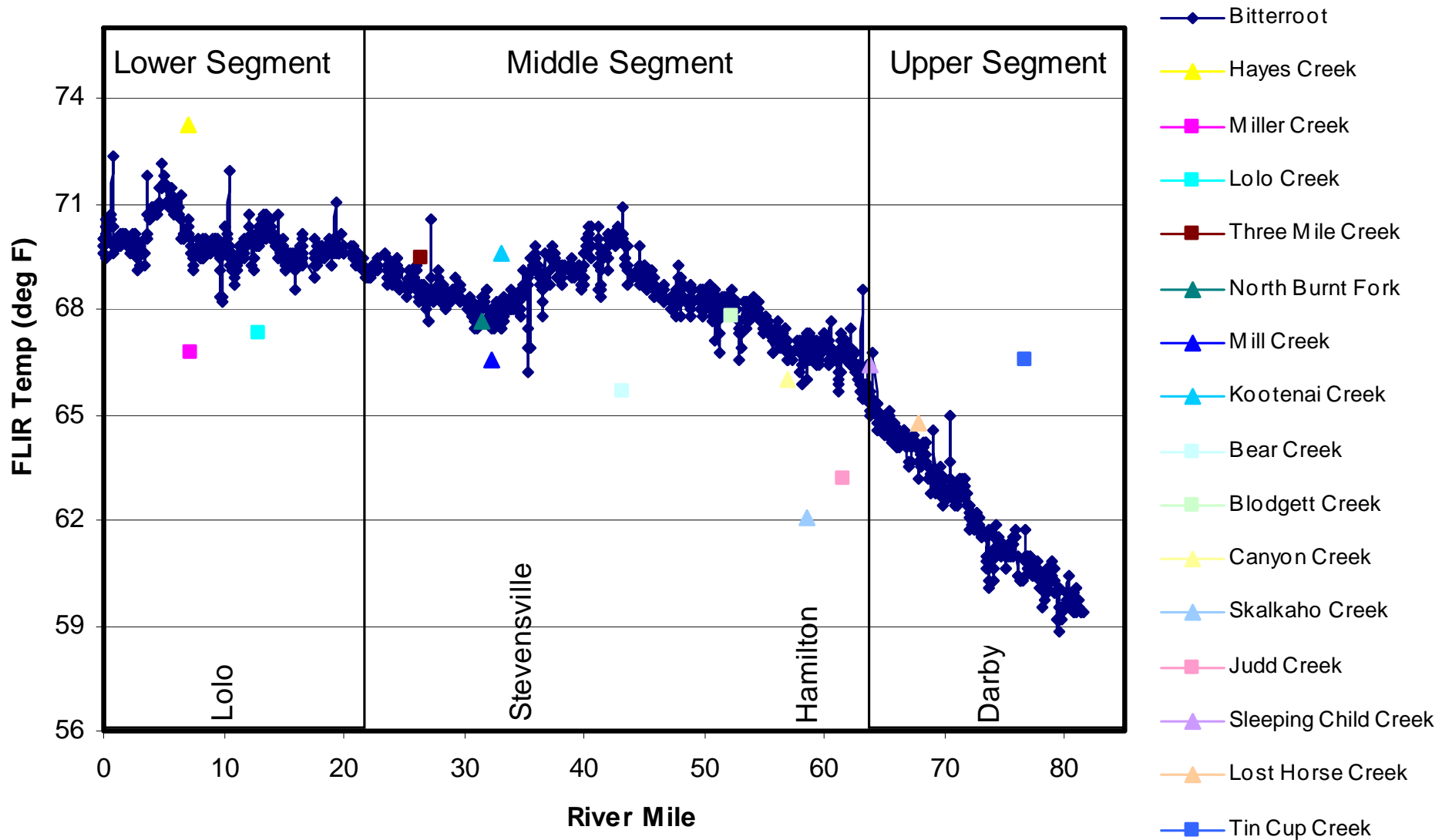
## Miller Creek Results

- Standards are greatly exceeded
- Most of heating from impact to streamside vegetation
  - Hay production, grazing and suburban
- Some heating due to over-wide channel
- Stream is almost totally dewatered and cold springs reemerge near Bitterroot River

# Bitterroot River

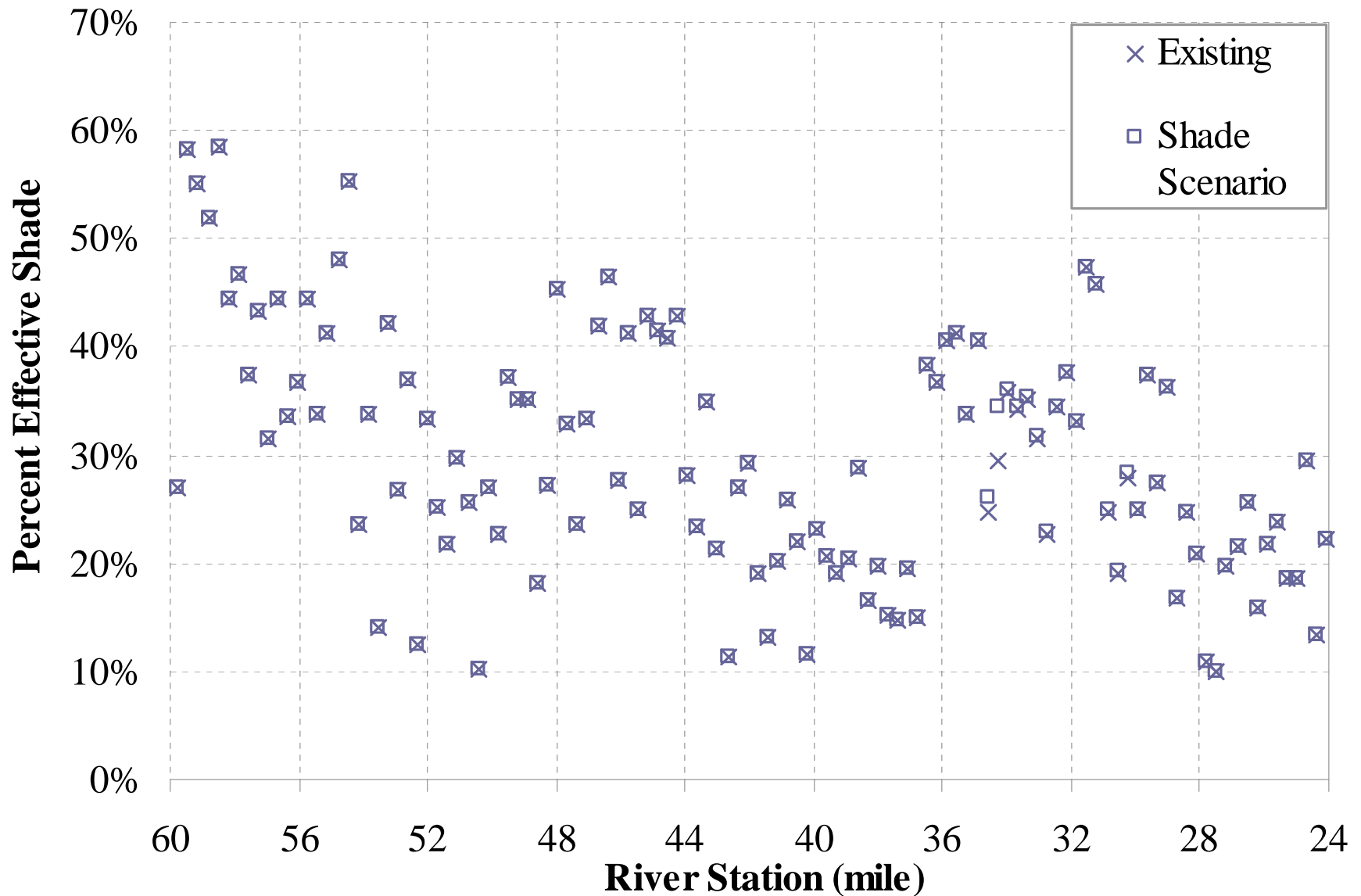
- TMDLs - Middle and Lower Segments
- We will review middle segment

# Bitterroot River Thermal Infrared





# Middle Bitterroot River Shade



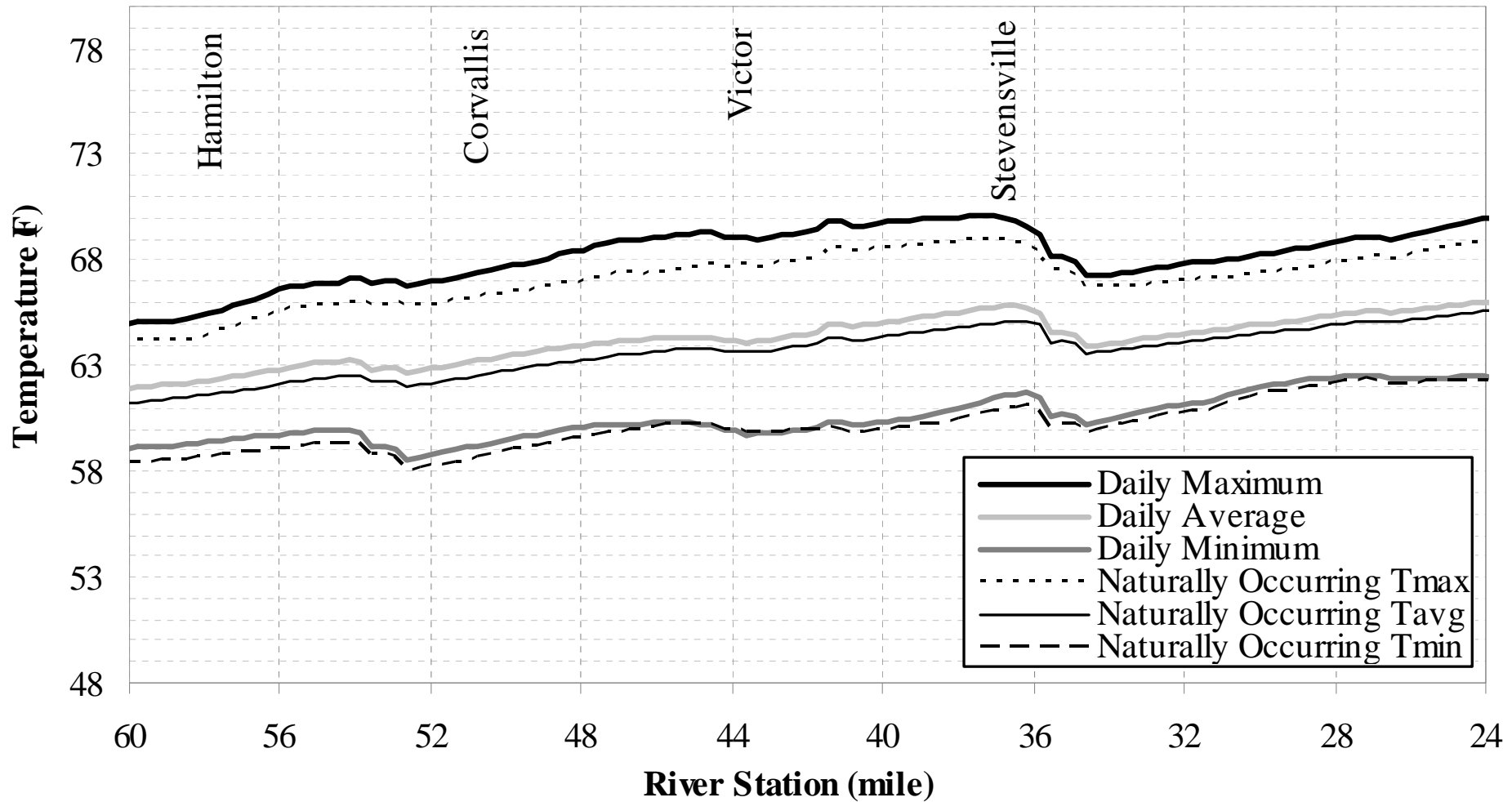
# Middle Bitterroot River Temperature Targets

- Montana's Water Quality Temperature Standard - reduce temps by  $\sim 1.5^{\circ}\text{F}$

Or meet all in combination:

- Bitterroot Headwaters shade = follow TMDLs
- Other tributaries = average of  $1^{\circ}\text{F}$  reduction
- Irrigation efficiencies = 15% efficiencies applied to summer stream flow
- Irrigation Return Flow = no more than  $0.1^{\circ}\text{F}$  cumulatively
- Shade along the segment = slight increase in shade
- Channel width to depth ratio = no change
- WWTP loads = Cap at discharge rates that will cumulatively increase in stream temperature  $< 0.2^{\circ}\text{F}$

# Middle Bitterroot River Modeling



Average Summer Afternoon

# Middle Bitterroot River Restoration

- Cool headwaters and tributaries
- Irrigation efficiencies and water savings applied in-stream
- Shade along main channel
- WWTP
- Irrigation return flow



# Other Tributary Results

- Sleeping Child Creek
  - Streamside Shade
  - Irrigation efficiencies
- Willow Creek
  - Streamside shade
  - Irrigation efficiencies/ditch water mixing/keeping water in the stream

# QUESTIONS?

## **NEXT: Document Completion & How to Use the Wik**



# Next Steps

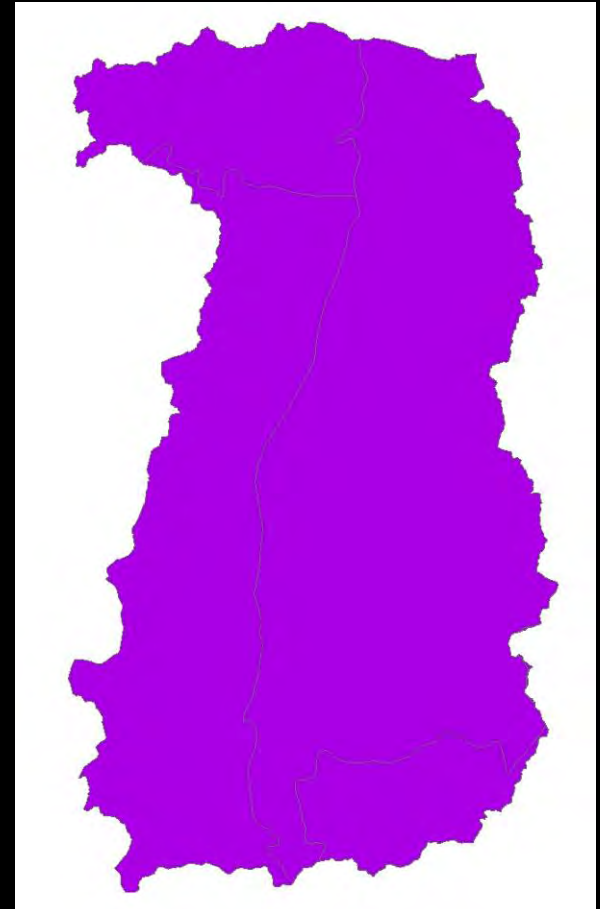
- Final draft document will be completed
- Public comment period (Typically 30 days)
- Response to comments and completion of final document
- Submit to EPA for approval
- Approved plan ready for stakeholder implementation



# Next Steps

## After document completion

- Use information from the TMDL, and other large scale assessment efforts throughout the watershed to address water quality issues in an efficient and effective manner
- Develop a Watershed Restoration Plan (WRP) to help with this prioritization
- Use for state and federal grant applications





## MONTANA TMDL DEVELOPMENT PROJECTS WIKI

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## TMDL Development Projects

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You may also visit the [What is a TMDL](#) page on this wiki for a brief TMDL description.

As this is a dynamic web site and constantly changing, please check back often for updates, or link to our [RSS feed](#). This site is maintained by DEQ's Water Quality Planning Bureau. Please [contact the Bureau](#) if you would like additional information regarding this site or have questions regarding TMDL development. Some pages on this wiki are dedicated to specific TPA technical advisory groups (TAGs). These pages are intended as a communication tool between the TPA Project Managers and the applicable TAG members, and are not viewable by everyone. If you feel you need additional information regarding any of these pages, please contact [Christina Staten](#), the wiki administrator.

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## Welcome to the Bitterroot Mainstem

last edited by Christina Staten 6 mos ago

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### Welcome to the Bitterroot Mainstem TMDL Project

The Bitterroot River watershed is an area of over 2,820 square miles. Water flows from its headwaters of the East and West Forks of the Bitterroot River to its confluence with the Clark Fork River near Missoula. Water quality problems are occurring in many rivers and streams in the Bitterroot Valley.

Clean water is essential for many uses including healthy fisheries, safe drinking water, farming and recreation. The economic and environmental costs of poor water quality can be substantial, particularly in an area renowned for its natural amenities.

Water quality standards have been set to ensure healthy and productive systems for the wellbeing of the natural environment and the people who live, work, and play in Montana. The Montana Department of Environmental Quality (DEQ) assesses the waters, and for those waters not meeting the state standards, develops framework strategies that will lead to the achievement of those standards. This process is known as TMDL development.

In Montana, the geographic scale for the TMDL process is at the watershed level since most pollutants are contributed over a large area from nonpoint sources. The Bitterroot watershed is divided into three separate TMDL planning areas (TPA): The Bitterroot Headwaters TPA (completed October 2005); The Upper Lolo Creek TPA (completed April 2003); and the Bitterroot Mainstem TPA. TMDL development in Bitterroot Mainstem TPA is underway.

DEQ has identified the following primary cause groups as impairments to water quality in the Bitterroot: nutrients (nitrogen and phosphorus), siltation/sediment, and thermal modification (temperature).

The TMDL planning process in the Bitterroot watershed incorporates a combination of a watershed scale hydrologic model and on-the-ground field efforts to further identify and quantify pollutant contributions from all significant sources. Used in combination, these methods will yield the best available picture of the current water quality conditions and reasons for problems.

The result of this process is individual TMDLs for all impaired rivers and streams, plus a comprehensive understanding of how pollutant inputs are affecting the Bitterroot River. Completed TMDL reports give local stakeholders a clear idea of where the problems are, what causes them, and what it will take to improve water quality to preserve existing uses of the water.



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- [Bitterroot Mainstem TMDL Project Scope](#)
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### PROJECT LOCATION & BOUNDARIES

The Bitterroot River watershed encompasses all of Ravalli County and a portion of Missoula County, including the southwest area of the City of Missoula. The watershed is divided into three separate TMDL Planning Areas (TPAs):

TMDL PLANNING AREA (TPA)	TMDL STATUS
<b>Bitterroot Headwaters TPA</b> Headwater streams of the Bitterroot River to the formation of the Bitterroot River	Sediment & temperature TMDLs completed October, 2005
<b>Upper Lolo Creek TPA</b> Headwaters of Lolo Creek to the formation of Lolo Creek (area above Lolo Hot Springs)	Sediment TMDLs completed April, 2003
<b>Bitterroot Mainstem TPA</b> Includes: <ul style="list-style-type: none"><li>The Bitterroot River (from the confluence of the East and West Forks of the Bitterroot River near Conner, MT to its confluence with the Clark Fork River near Missoula, MT),</li><li>The Bitterroot River tributaries, and</li><li>The mainstem of Lolo Creek (from just above Lolo Hot Springs to its confluence with the Bitterroot River)</li></ul>	Nutrient, Sediment, & Temperature TMDLs in progress

A map of all 3 planning areas can be seen on the [Welcome to the Bitterroot Mainstem](#) page. The Bitterroot Headwaters and Upper Lolo Creek TMDL

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### Welcome to the Bitterroot Mainstem TMDL Planning Area

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## UPDATES:

4-26-10: TAG review of sediment-related reports pushed back 2 weeks until May 14th.

5-21-10: All schedule dates will be changed due to changes in staff workload and schedules. New dates to be posted soon.

7-16-10 New dates have not been posted, however, task statuses have been updated.

Main Tasks	Subtasks	Start Date	End Date	Status
<b>SEDIMENT</b>				
Finalize Sediment Targets		3/29 2010	5/21 2010	In Progress
	Finalize Sediment Targets & Analysis of Existing Stream Conditions			
Sediment Source Assessment		3/29 2010	6/3 2010	Completed
	Finalize Bank Erosion and Unpaved Roads Erosion Analysis Reports			
	<b>TAG Review of Bank Erosion &amp; Unpaved Roads Reports</b>	4/16	4/29 5/14	Completed
	Analyze Model Results for Upland Hillslope Erosion Sources			
	Finalize Upland Hillslope Erosion Analysis Report			
	<b>TAG Review of Upland Hillslope Erosion Report</b>	5/21 7/16	6/3 8/6	Completed
Develop TMDLs, Allocations, Daily Loads		6/4 2010	8/2 2010	In Progress
	Write Summary of Sediment Sources and Needed Reductions			
	Development of the TMDLs, Allocations, & Daily Loads Appendix			
<b>TEMPERATURE</b>				
QUAL2K Modeling		1/4 2010	5/3 2010	Completed
	Finalize Model & Develop Report of Modeling Results			
	DEQ Project Manager Review of Model Report			
	<b>TAG Review of Model Report</b>	4/16 July	4/30 August	Completed
Write Up Temperature Document		4/13 2010	8/5 2010	In Progress

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last edited by Pamela Arroues 3 mos ago

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last edited by Christina Staten 5 mos ago

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Tags: FAQs, Frequently Asked Questions, TMDL Wiki

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What is a Wiki?

A wiki is a collaborative website whose content can be edited by anyone who has access to it. [Wikipedia](#) is a well known wiki. Sites like MySpace and Facebook are similar in function, using what is referred to as social software that allows users to interact and share data.

The DEQ TMDL Development Projects Wiki is being used as a tool to distribute information (typically large documents) to many individuals. It also serves as a repository for TMDL Planning Area (TPA) - specific information that is distributed to stakeholders throughout the TMDL planning process. Currently, this wiki is not designed for group interaction in the form of editing site content, leaving comments, and starting discussion threads.

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## Bitterroot Technical Advisory Group Documents

last edited by Christina Staten 2 mos ago

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### Bitterroot Mainstem TMDL Planning Area TMDL Documents Available for Technical Advisory Group Review

The tables below contain nutrient, sediment, and temperature TMDL documents related to the Bitterroot Mainstem TMDL project. Files are either in Microsoft Excel or Adobe Acrobat PDF format. File sizes are noted in the tables. If you have difficulty downloading files or would like higher resolution reports, please contact [Christina Staten via email](#) or at (406) 444-2836.

#### Nutrient Technical Reports

The first table below contains a series of technical reports developed by DEQ for supporting the nutrient TMDL process in the Bitterroot River Watershed. Information from the reports will be used to construct a water quality model (a SWAT model) which will be used for TMDL source assessment and creating TMDL allocations. The water quality model will assess the potential significance of nutrient loading from all sources within the watershed.

Reports are being posted as they are completed.

Report	File Size	Report Date	Version
<a href="#">Waste Water Treatment</a>	0.5 MB	4-9-10	Draft
<a href="#">Appendix A, Nutrient Monitoring Data from WWTPs</a> (Excel spreadsheet)	0.9 MB		
Storm Water - Will be Available Soon			

#### Sediment Reports

This table contains reports related to:

The sediment and habitat assessment field work conducted by DEQ and PBS&J on the Bitterroot River tributaries in 2007, and the 2007 assessment of the unpaved roads network within the watershed contracted by DEQ to Water & Environmental Technologies (WET) out of Butte.

Recently uploaded (7-16-10) is a report related to the quantification of upland sediment sources via a SWAT model.

Report	File Size	Report Date	Version
<a href="#">Map of Sediment Listed Streams &amp; their Assessment Status</a>	1.0 MB	April, 2010	Current Status (Revised 4/26/10)

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<a href="#">Streambank Erosion Assessment Report</a>	0.4 MB	April, 2010	Draft
<a href="#">Appendix B. BEHI Extrapolation Database</a> (Excel spreadsheet)	0.3 MB		
<a href="#">Unpaved Road Erosion Assessment Report</a>	1.6 MB	April, 2010	Draft
<a href="#">Sediment Load Estimates from Upland Sources &amp; BMP Scenario Reductions</a>	0.2 MB	July, 2010	Draft

### Temperature Reports

Reports in the table below relate to the water quality modeling (QAUL2K) for TMDL source assessment for temperature impairments within the Bitterroot Mainstem TPA.

Report	File Size	Report Date	Version
<a href="#">Modeling Streamflow &amp; Water Temperature in the Bitterroot River</a>	3.3 MB	Dec, 2009	Draft

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