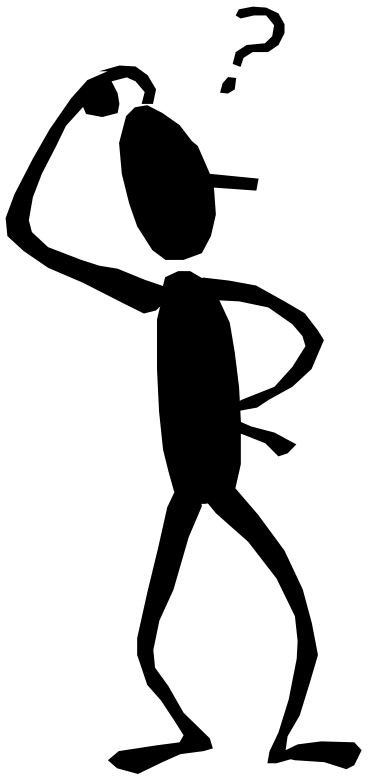

Water Quality Restoration Planning
and Total Maximum Daily Loads

What's a TMDL?



A Number?

A Plan?

YES

A Number…

Total Maximum Daily Load:

Amount of pollutant that a waterbody can receive from point, nonpoint & natural sources & still meet water quality standards.

A Plan…

Water Quality Restoration:

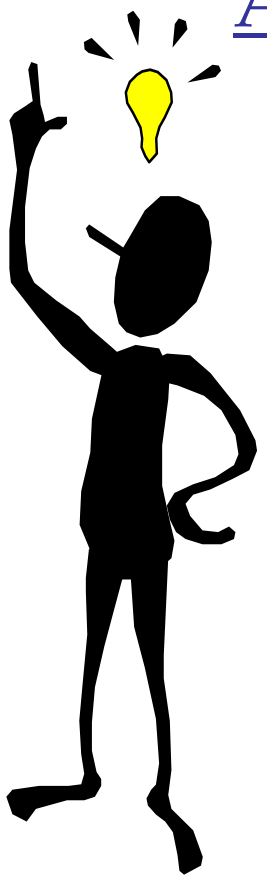
Systematic approach to assessing water quality, determining if there is a problem, developing and implementing solutions.

Regulatory Framework

- 1972 FEDERAL CLEAN WATER ACT
- Montana Water Quality Standards
- Sufficient & Credible Data/Beneficial Use Determinations
- Impaired Streams – 303(d) list

Again…What's a TMDL?

A Problem-Solving Exercise



Sample/monitor streams (is there a problem?)

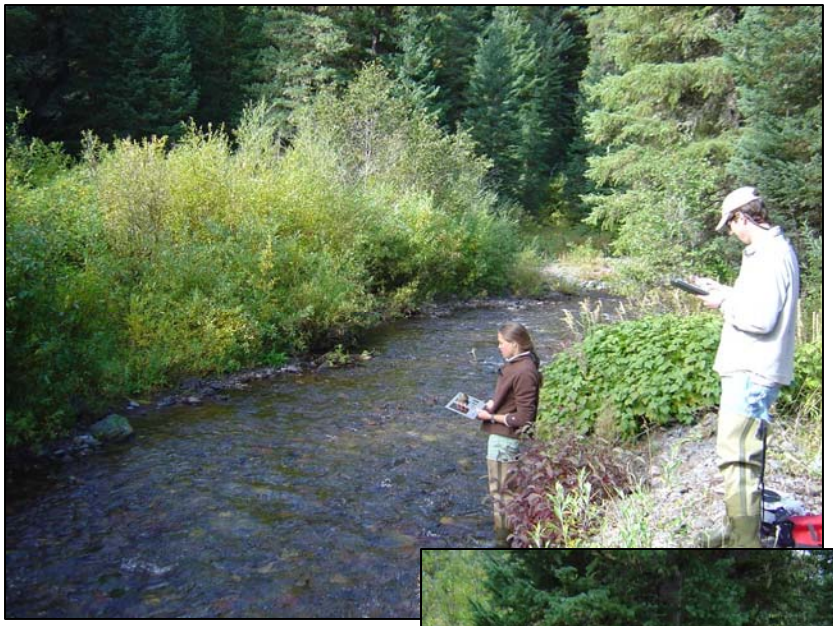
Determine the degree of the problem

Determine the source of the problem

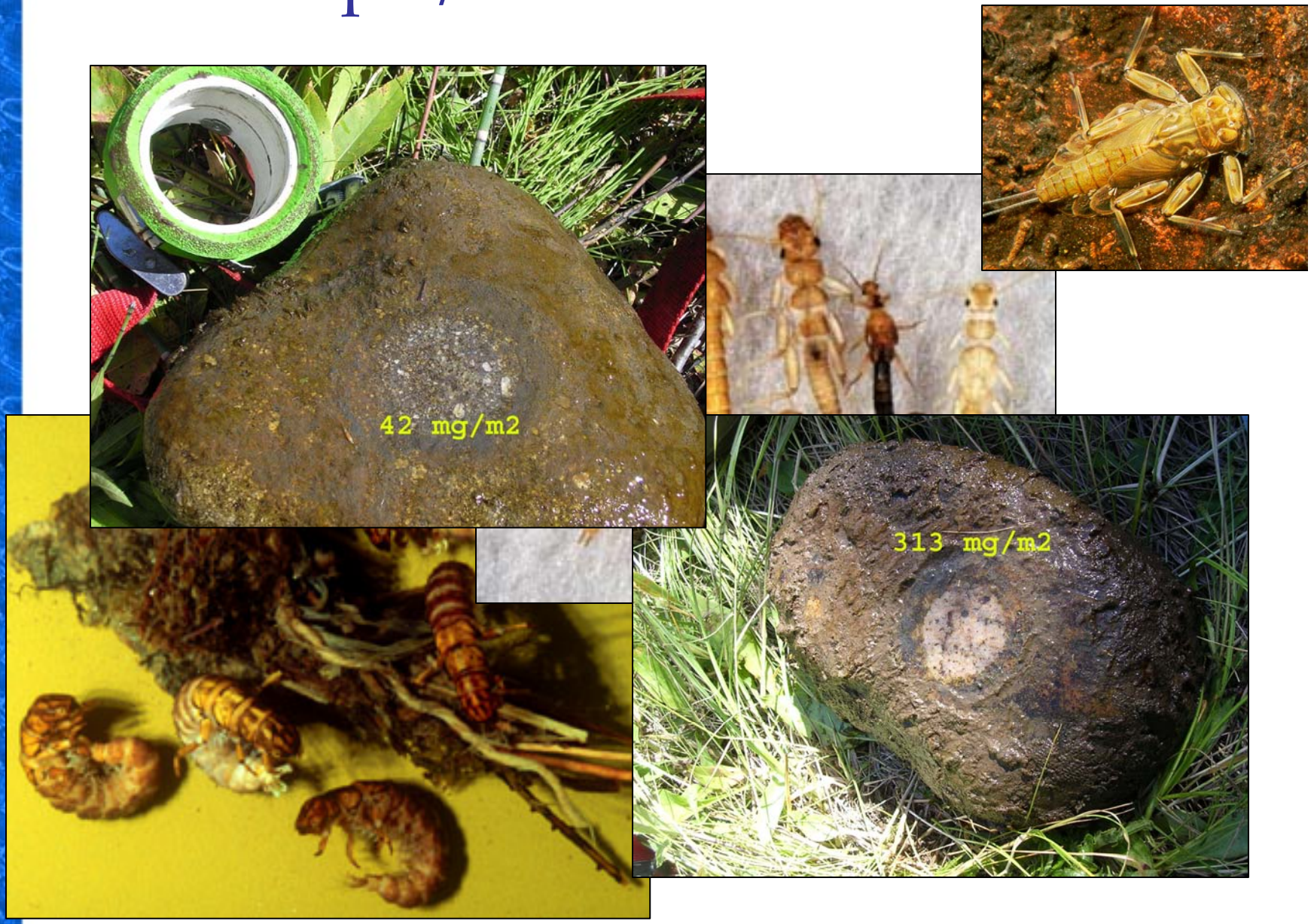
Implement solutions/on-the-ground fixes

Monitor progress and success

Sample/Assess Streams



Sample/Assess Streams



Evaluate Data

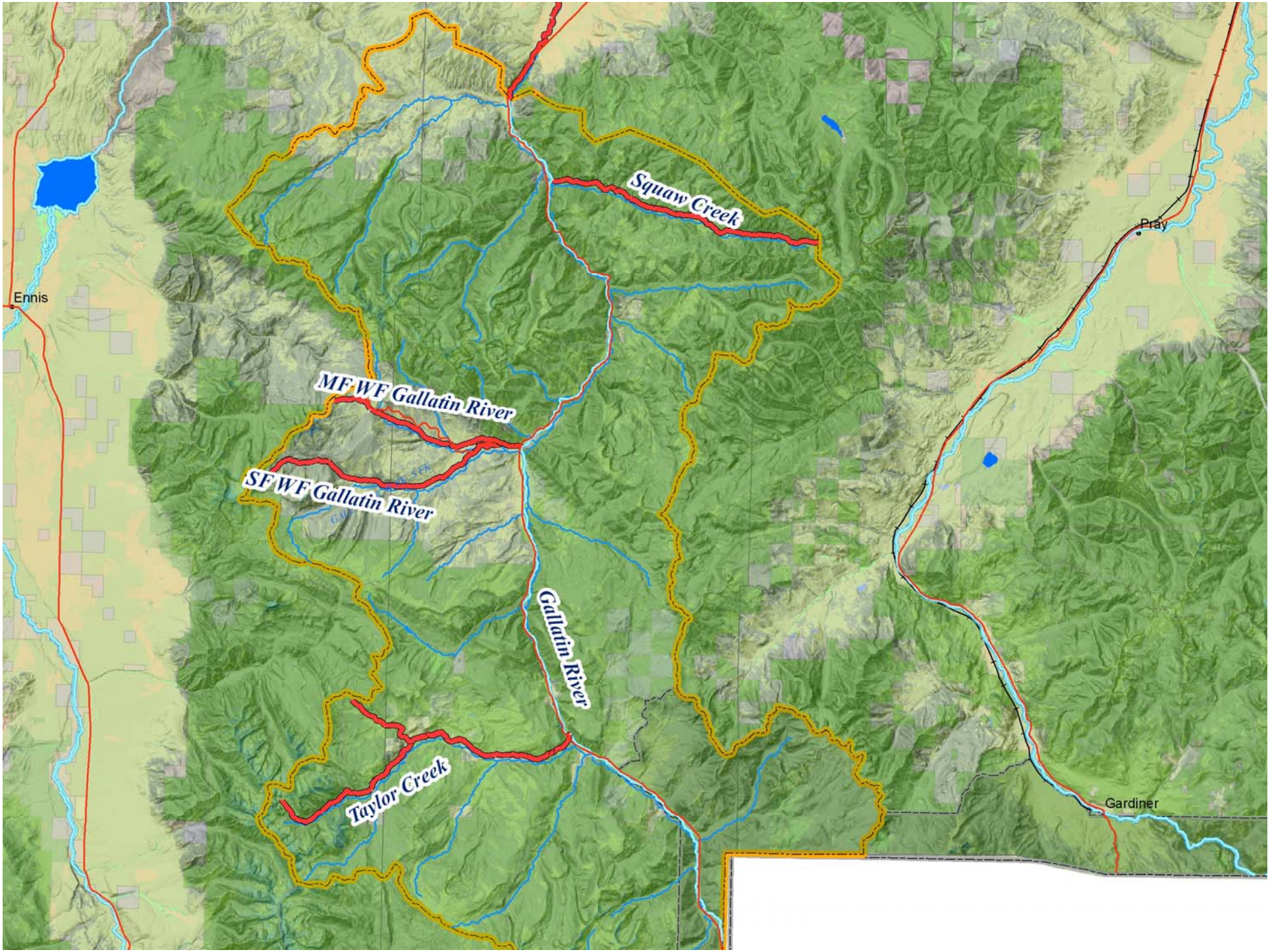
Water Quality Standards

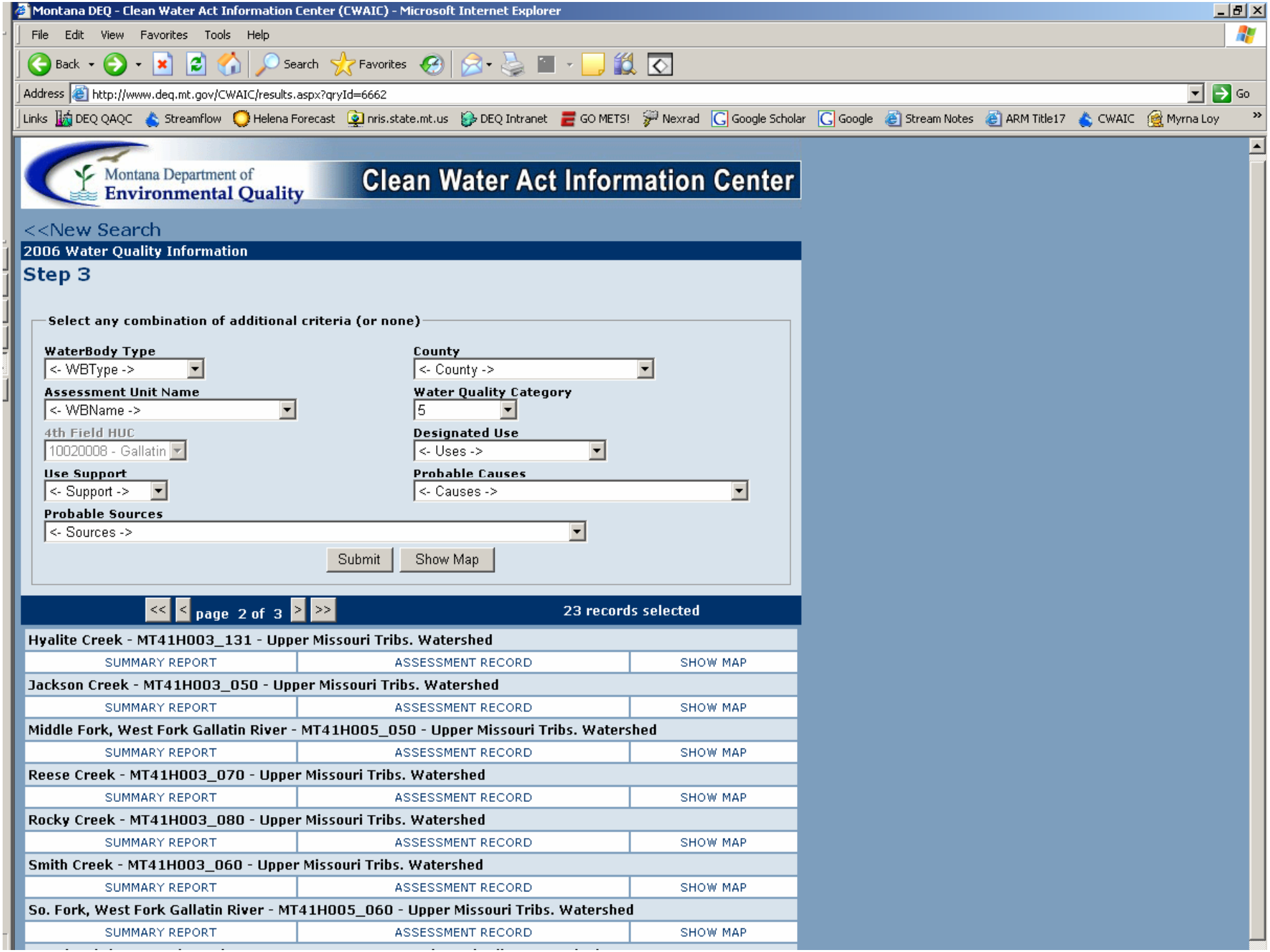
- Metals: Cu, Pb, As, Cd, Ni…
- Sediment: Suspended & Bedded Sediments
- Nutrients: Algae, Phosphorous, Nitrogen

Reference Condition

- Similar unimpaired streams/sites
- 'Natural' conditions
- Values/criteria from scientific literature
- Watershed modeling
- Statistical analysis
- Professional judgment

Standard Assessment Methods – SCD/BUD


Squaw Creek
Pray
Ennis
MF WF Gallatin River
SF WF Gallatin River
Gallatin River
Taylor Creek
Gardiner


Montana DEQ - Clean Water Act Information Center (CWAIC) - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://www.deq.mt.gov/CWAIC/results.aspx?qryId=6662
Go
Links DEQ QAQC Streamflow Helena Forecast nris.state.mt.us DEQ Intranet GO METS! Nexrad Google Scholar Google Stream Notes ARM Title17 CWAIC Myrna Loy
Montana Department of Environmental Quality
Clean Water Act Information Center
<<New Search
2006 Water Quality Information
Step 3
Select any combination of additional criteria (or none)
WaterBody Type
<- WBType ->
County
<- County ->
Assessment Unit Name
<- WBName ->
Water Quality Category
5
4th Field HUC
10020008 - Gallatin
Designated Use
<- Uses ->
Use Support
<- Support ->
Probable Causes
<- Causes ->
Probable Sources
<- Sources ->
Submit
Show Map
<< < page 2 of 3 > >>
23 records selected
Hyalite Creek - MT41H003_131 - Upper Missouri Tribs. Watershed
SUMMARY REPORT
ASSESSMENT RECORD
SHOW MAP
Jackson Creek - MT41H003_050 - Upper Missouri Tribs. Watershed
SUMMARY REPORT
ASSESSMENT RECORD
SHOW MAP
Middle Fork, West Fork Gallatin River - MT41H005_050 - Upper Missouri Tribs. Watershed
SUMMARY REPORT
ASSESSMENT RECORD
SHOW MAP
Reese Creek - MT41H003_070 - Upper Missouri Tribs. Watershed
SUMMARY REPORT
ASSESSMENT RECORD
SHOW MAP
Rocky Creek - MT41H003_080 - Upper Missouri Tribs. Watershed
SUMMARY REPORT
ASSESSMENT RECORD
SHOW MAP
Smith Creek - MT41H003_060 - Upper Missouri Tribs. Watershed
SUMMARY REPORT
ASSESSMENT RECORD
SHOW MAP
So. Fork, West Fork Gallatin River - MT41H005_060 - Upper Missouri Tribs. Watershed
SUMMARY REPORT
ASSESSMENT RECORD
SHOW MAP

Montana Department of Environmental Quality

Clean Water Act Information Center

Close Window | Print Window | Export Data

2006 Water Quality Information

Water Information

Waterbody Id	MT41H005_060	**Water Type**	RIVER
Name	So. Fork, West Fork Gallatin River	**Hydro Unit**	10020008 - Gallatin
Location	SOUTH FORK OF WEST FORK GALLATIN RIVER, headwaters to mouth (West Fork Gallatin River)	**Basin**	Upper Missouri
Size (Miles/Acres)	13.8	**Watershed**	Upper Missouri Tribs.
Ecoregion	Middle Rockies	**Use Class**	B-1
County	GALLATIN, MADISON	**Trophic Status and Trend**	NA
Water Quality Category	5 - One or more uses are impaired and a TMDL is required.		

Beneficial Use Support Information

Use Name	Fully Supporting	Partially Supporting	Not Supporting	Threatened	Insufficient Information	Not Assessed
Agricultural	✓					
Aquatic Life		✓				
Cold Water Fishery		✓				
Drinking Water	✓					
Industrial	✓					
Primary Contact Recreation		✓				

Impairment Information

Probable Causes	Probable Sources	Associated Uses	TMDL Completed
Alteration in stream-side or littoral vegetative covers	Forest Roads (Road Construction and Use) Silviculture Activities Site Clearance (Land Development or Redevelopment)	Aquatic Life Cold Water Fishery	NO
Chlorophyll-a	On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems) Silviculture Activities	Aquatic Life Cold Water Fishery Primary Contact Recreation	NO
Nitrate/Nitrite (Nitrite + Nitrate as N)	Forest Roads (Road Construction and Use) Silviculture Activities Site Clearance (Land Development or Redevelopment)	Aquatic Life Cold Water Fishery	NO

WATERBODY NAME	So. Fork, West Fork Gallatin river
WATERBODY NUMBER	MT41H005_060
HYDROLOGIC UNIT CODE	10020008

Spatial Layout of Data-Biological

Upstream

Document Number & Code	Data Parameter	Site/Reach Name: entire stream	Site/Reach Name	Site/Reach Name
	I. Biological Data			
	A. Fisheries Data			
10F	*1999 fish assemblage*	Fish were surveyed on the SF of the WF 250 feet below Muddy Creek, 250 feet above Muddy Creek and on Muddy Creek. These sites are within the upper 1/3 of the stream and above tributaries identified as signficant sediment sources. Essentially pure WCT occur here. No other species were present.		
10F	*1999 fish age class*	There are about 5 age classes of trout present, including YOY. Maximum size in these reaches is about 11.4 inches which is a reasonable size for resident trout in tributary streams.		
10F	*1999 fish size*	The lower surveyed reach had significantly larger and heavier trout than the upper reach or Muddy Creek. This may be because the larger, deeper pool habitat in this reach supports more fish year-round or because some fish moved into this reach for the winter.		
10F	*1999 biomass*	The biomass of trout in the lowest section was above average, and the biomass of trout in the upper reach and on Muddy Creek were below average for streams in this ecoregion. The biomass for all three reaches considered as a whole was about average.		
10F	*1999 condition*	Trout were in good condition, and plumpness did not decline markedly with increasing length, suggesting that food supplies are adequate.		
7F	*1975 shocking*	A 1000 ft section of the West Fork below the South Fork confluence yielded 6 RBT and 6 CT. The section was not considered to support substantial fisheries.		
	B. Macroinvertebrate Data			
2M	*1997 macroinvertebrate report*	In 1995, the sampling site at the mouth scored within slightly impaired. In 1996, the site near Ousel Falls scored as non-impaired. Conditions deteriorated near the mouth (moderate impairment). The high biotic index and dominance by Orthocladius sp. suggest organic and/or nutrient pollution. Midges constituted up to 54% of the community.		
5M	*1999 macroinvertebrate report*	Using the mountain ecoregion reference, the site at the mouth attained partial support in all three years ('95, '96, '98). Scores were highest in '95, declined in '96, and recovered somewhat in 1998. A replicate sample was collected in 1998, and the average between the two scores was 69% of maximum (= partial support).		
5M	*biotic index*	In 1996, this site had a moderately high biotic index consistent with moderate organic and/or nutrient pollution. In 1998, the biotic index score showed a modest improvement…The possibility that this change may have been due to seasonal influences such as an improvement in flow conditions, cannot be ruled out based on the information at hand. However, there was also a mild decrease in the number of mayfly taxa...The number of mayfly taxa has been shown to be correlated to certain water quality parameters and the diminished presence of the insect order gives credibility to the hypothesis that water quality may have been worsening at this site over the years of the study. The functional composition of the community shifted between the two years; in 1998 scrapers comprised 38% of the community, an increase of 26% since the earlier year. While this has resulted in an improvement in the bioassessment score, it may in fact be a further indication of increasing organic and/or nutrient pollution.		
11M	*1973 macroinvertebrate thesis*	Macroinvertebrates were collected during 10 months in 1970 and 1971. Only EPTs, coleopterans, and dipterans were identified and enumerated. Because of different sampling methodology, it is difficult to make comparisons between these data and more recent collections. Also, there were differences in taxonomic resolution. Chironomids were relatively more abundant on the SF than most other sampling stations in the drainage. Longitudinal trends rather than habitat conditions/human disturbance were identified as shaping the macroinvertebrate community.		

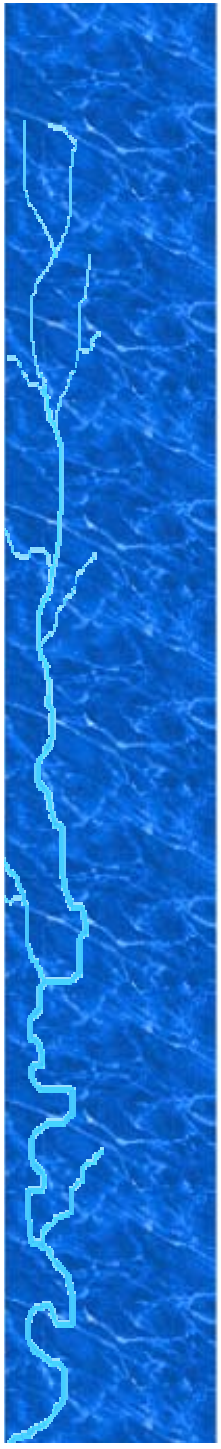
III. SEGMENT IMPAIRMENT LEVEL

WATERBODY NAME	**So. Fork, West Fork Gallatin river**
WATERBODY NUMBER	MT41H005_060
HYDROLOGIC UNIT CODE	10020008

Listing History

Overall Condition of Segment

Site Reach Name: entire stream **Site Reach Condition:** partial support **Comments:** Nutrients and siltation have negative impacts on aquatic life and cold water fish. While it is difficult to compare data from the 1970s to those from the 1990s, the data are suggestive of a decline since the early 1970s. Recent algae data were contradictory, periphyton communities indicated slight to no impairment. Chlorophyll a concentrations were consistent with severe impairment. Impairment is indicated by fish and macroinvertebrate data. **Aquatic Life and Cold Water Fishery:** BIOTA - moderate impairment indicated by macroinvertebrate data 1998, 1996 and 1995 data using the mountain ecoregional reference; no/least impairment indicated by periphyton data; no/least impairment indicated by 1999 fish data, but fisheries study was conducted upstream of historical logging impacts and development; chorophyll a density detected near mouth in 1995 was approximately 3x higher than density detected above Ousel Falls; HABITAT - moderate impairment due to sedimentation, bank erosion and habitat degradation; CHEMISTRY - no/least impairment: although some detected nutrient concentrations exceed total P and total N target levels developed for the Clark Fork River, no good comparison can be made between the reference condition (upstream of Ousel Falls and historical logging) and downstream sites, as nutrient data were only collected at the reference site in the 1970s and most of nutrient data at the downstream sites were collected in the 1990s (a few 1970s data points from 1976 Stuart report, but he only reports annual mean concentrations **Agriculture:** no high salinity or toxicant levels documented **Industrial:** no high salinity or turbidity levels documented **Drinking Water:** no human health standard exceedences **Primary Contact (recreation):** Nuisance algal growth documented in photographs; clorophyll a densities > 50 mg/m2



Prepare TMDLs

TMDLs are Pollutant-Specific (can calculate a ***LOAD***)

Pollutants: nitrogen, phosphorous, sediment, PCBs…
Pollution: habitat, flow alteration, riparian degradation

What a TMDL <u>IS</u>:

Plan to reduce pollutant loading to a level that meets state standards

A tool for use with other tools to provide a comprehensive planning and restoration effort to meet beneficial uses.

What a TMDL <u>IS NOT</u>:

Not a panacea/cure-all for watershed issues

Role of the State of Montana/DEQ

Ensure adherence to federal and state laws & processes
- Water quality standards
- USEPA TMDL requirements
- Permitting
- Etc…

Lead, coordinate and fund the technical planning effort

Provide funds for restoration & BMP implementation

Document preparation and submittal to EPA

Public access and information

Role of BWTF & Local Gallatin

Local coordination and collaboration

Education & information dissemination

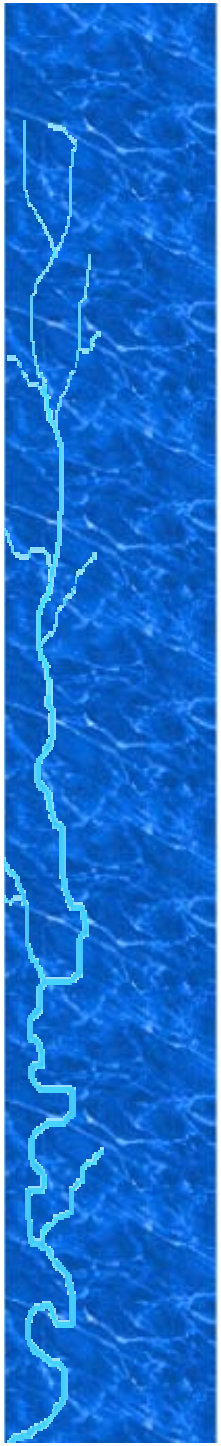
Stakeholder & public participation strategy

Stakeholder & technical review/feedback of TMDL products

Restoration planning & implementation

Ongoing water quality trends & restoration tracking

Homegrown stewardship



Next Steps

Continue TMDL planning& assessment process

Develop stakeholder and public participation strategy

Develop TMDL plans ~2008/2009

post-TMDL Watershed Assistance

Assist restoration and implementation activity

Evaluate successes, restoration & project effectiveness

Modify as necessary – **adaptive management**

Local coordination & collaboration

DEQ Contact

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