

WAG Outline

TMDL Overview

- What is a TMDL?
- Regulatory framework
- State Law & Fed requirements (& lawsuits)
- TMDL Technical Process/Steps

Gallatin Watershed TMDLs

- Upper and Lower Gallatin TMDL Planning Areas
- Pollutant Listings/Stream Segments
- TMDL Completion Schedules
- Present TMDL Development Status
 - Recent data collection
 - Planned data collection and assessments for 2008
 - Planning and technical documentation, reports, and data

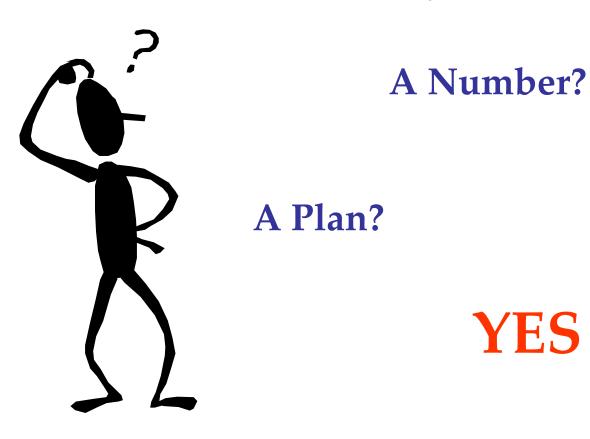
Further TMDL Development Considerations

- Next Steps (technical assessments, analysis, modeling...)
- TMDL Implications: regulatory and non (MCA 75-5-703)
- Public Involvement Process
- Discussion/Questions/further WAG meetings...

What's a TMDL?

Total Maximum Daily Load?

YES



Total Maximum Daily Load:

A Number...

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

A Plan...

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
- Water Quality Assessment Process
- Impaired Streams 303(d) list
- State TMDL Law (MCA 75-5-703)
- EPA Settlement Agreement/Lawsuit

Again...What's a TMDL?





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







Evaluate Data

Water Quality Standards

Metals: Cu, Pb, As, Cd, Ni...

Sediment: Suspended & Bedded Sediments

Nutrients: Algae, Phosphorous, Nitrogen

Fecal Coliform/E. coli, pH, etc...

Reference Condition

Similar unimpaired streams/sites

'Naturally occurring' conditions

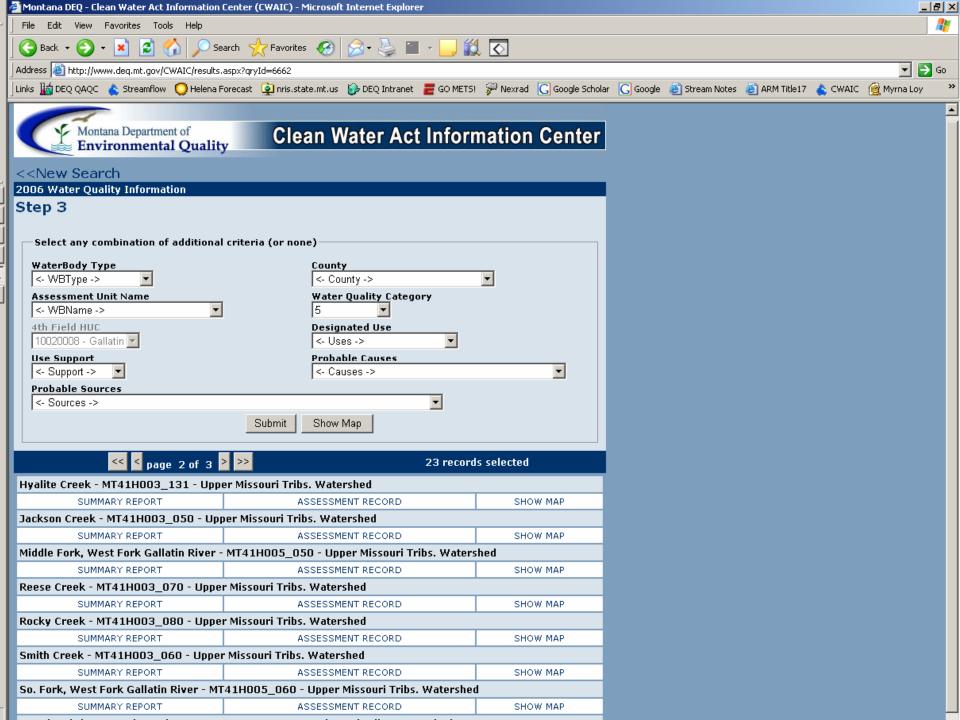
Values/criteria from scientific literature

Watershed modeling

Statistical analysis

Professional judgment

Standard Assessment Methods – SCD/BUD



🚰 http://www.deq.mt.g	ov - Mon	tana DEQ	- Clean Water Act Inl	formation Cente	r (CWAIC) - Mic	crosoft Internet Exp	plorer		
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2006 Water (Qualit	ty Inf	ormation						
Water Information									
Waterbody Id	MT41	LH005_06	Water Ty		ne	RIVER	_		
Name			st Fork Gallatin River	Hydro Uni		10020008 - Gallatin			
Location SOUT		ATIN RIV	OF WEST FORK VER, headwaters to Fork Gallatin River)	Basin		Upper Missouri			
Size (Miles/Acres)	Size (Miles/Acres) 13.8			Watershe	d	Upper Missouri Tribs.			
Ecoregion	E coregion Middle		s	Use Class		B-1			
County GALL		LATIN, MADISON		Trophic St Trend	tatus and	NA			
Water Quality Category	5 - 0	ne or mo	ore uses are impaired	d and a TMDL is	required.				
Beneficial Use Supp	ort Info	rmation							
Use Name	Fu Suppo		Partially Supporting	Not Supporting	Threatened	Insufficient Information		Not Assessed	
Agricultural	~	/							
Aquatic Life			✓						
Cold Water Fishery			✓						
Drinking Water	orinking Water								
Industrial	V	/							
Primary Contact Recreation			✓						
Impairment Informa	tion								
Probable Caus	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			Aquatic Life Cold Water Fishery		NO		

_BX

WATERBODY NAME WATERBODY NUMBER HYDROLOGIC UNIT CODE

So. Fork, West Fork Gallatin river MT41H005 060 10020008

Spatial Layout of Da	ata-Biological
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	Spatial Layout of Data-Biological									
		Upstream								
		Site/Reach Name								
		Sternesul Name								
Document Number & Code	Data Parameter	entire stream								
	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 improvementThe 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 taxaThe 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 WATERBODY NUMBER HYDROLOGIC UNIT CODE So. Fork, West Fork Gallatin river MT41H005_060 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

Total Maximum Daily Loads

TMDLs are pollutant-specific (can calculate a *LOAD*)

Pollutants: copper, phosphorous, sediment, nitrogen, e.coli Pollution: habitat, flow alteration, riparian degradation

What a **TMDL IS**:

Plan to reduce pollutant loading to a level that meets state water quality standards and beneficial uses.

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

What a **TMDL IS NOT:**

Not a panacea/cure-all for watershed issues

TMDL Plans – Required Components

Watershed Characterization

Water Quality Standards & Impairment Status Review

- Define standards and water quality targets
- Evaluate individual streams and define pollutant issues

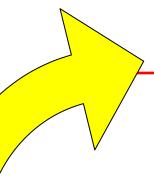
Pollutant Source Assessment

• Estimate existing pollutant loading from a variety of sources

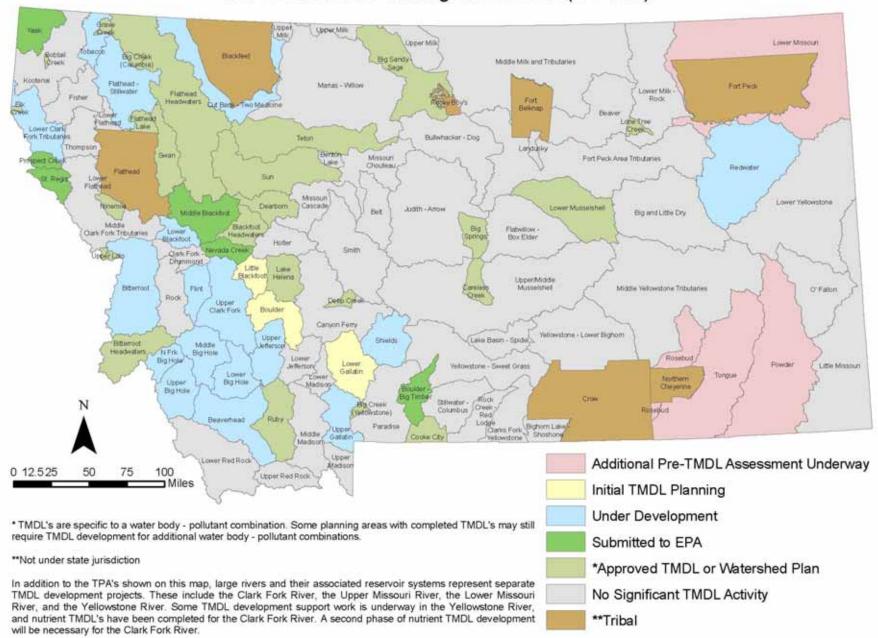
Establish Total Maximum Daily Loads & Allocations

- Define maximum amount of pollutant allowed
- Identify pollutant reductions necessary to meet the TMDL and water quality targets
- Allocate loads to contributing sources

Monitoring, Restoration and Adaptive Management



MT DEQ TMDL Planning Area Status (5-14-08)



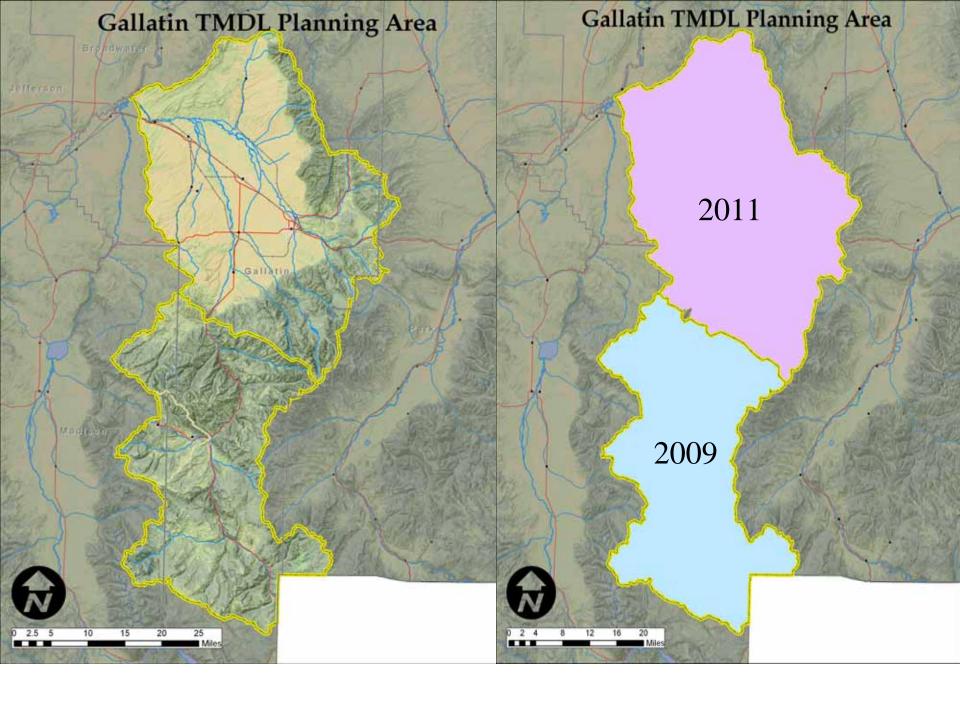
Summary....

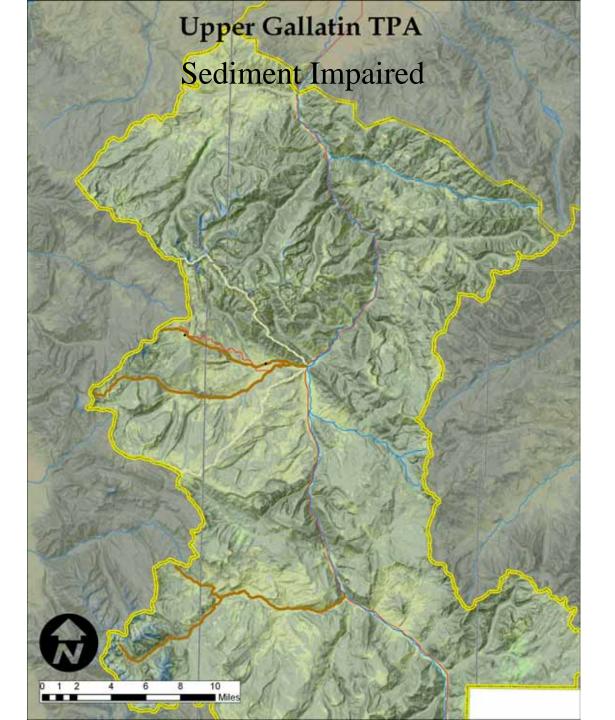
- Federal and State TMDL 'Law' requires development of Total Maximum Daily Loads for 'pollutants of concern'.
- Montana DEQ is leading technical effort to assess, analyze, and develop TMDLs statewide
- Development of TMDLs in the Upper and Lower Gallatin Planning Areas is underway....

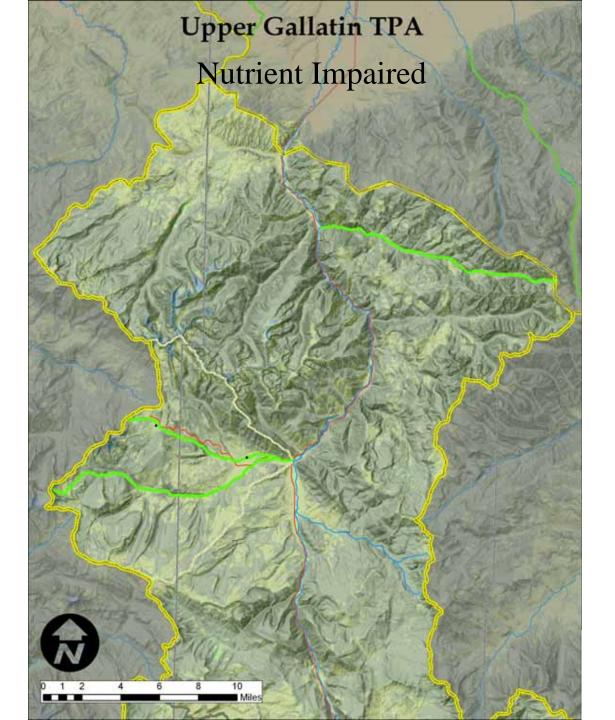
Gallatin Watershed TMDL Status

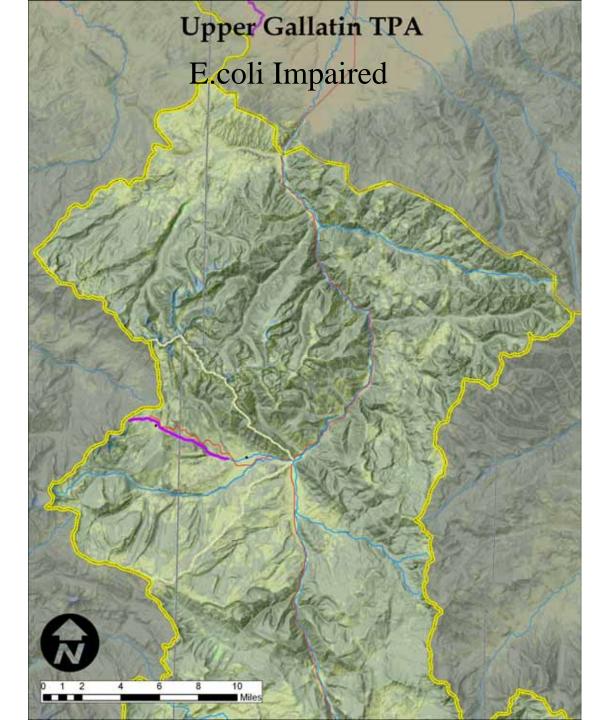
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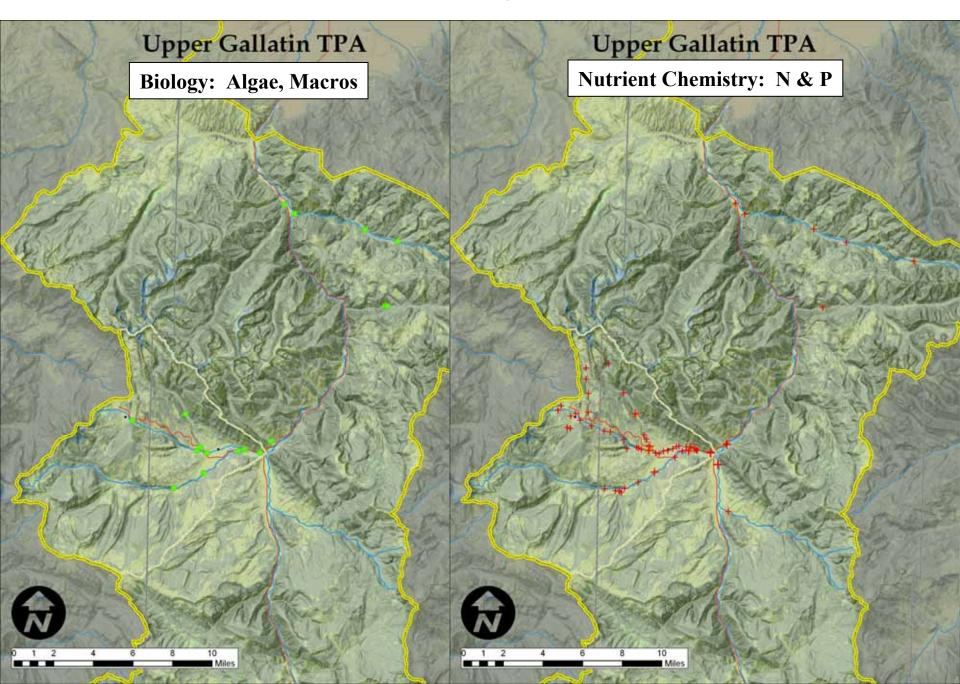








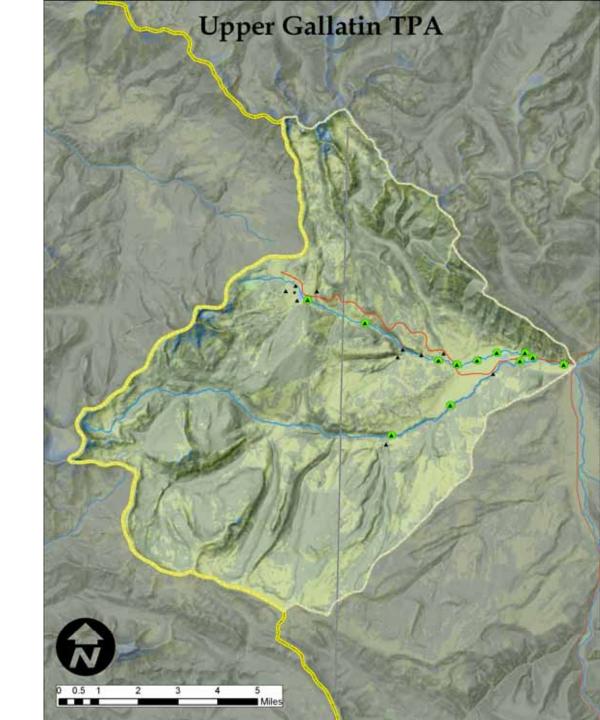
Recent Data Collection

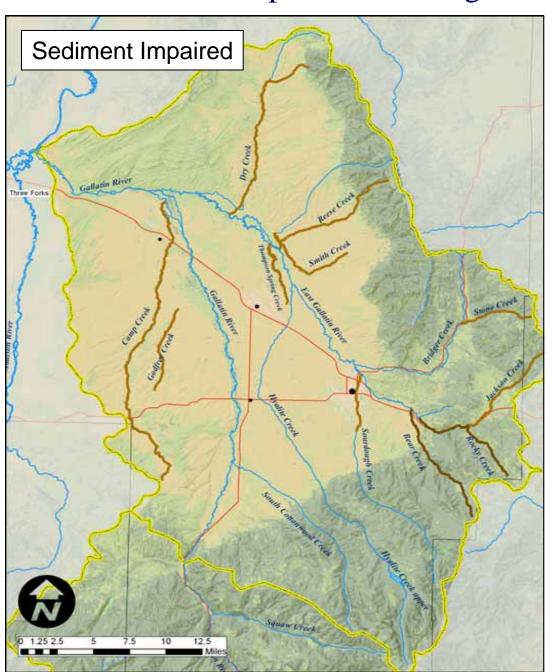


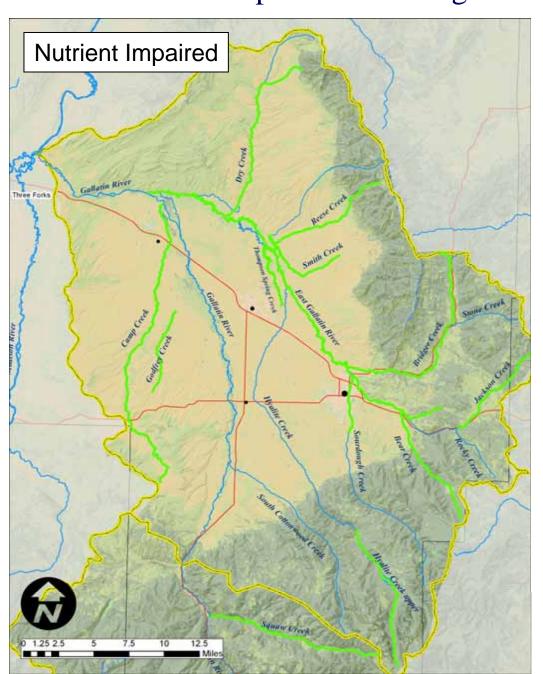
Recent Data Collection

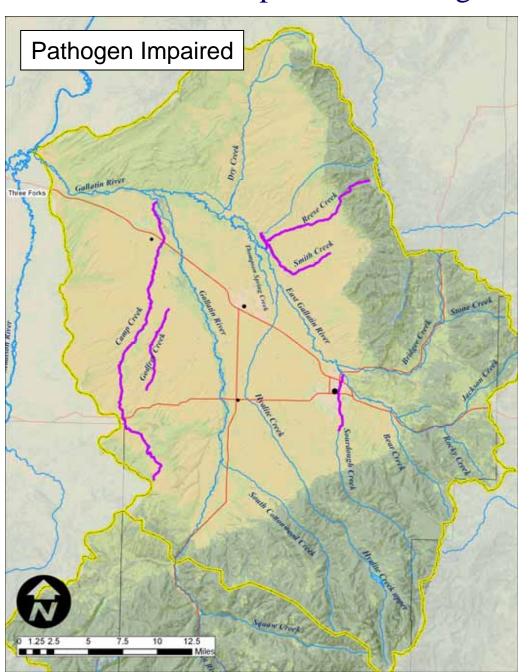
Nutrients, E.coli & Chl-a 2007 & 2008

Sampling is underway...

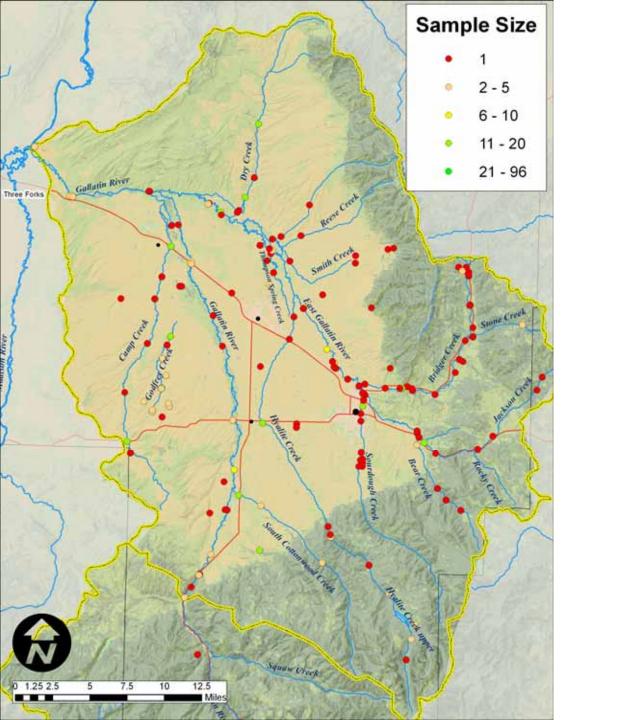


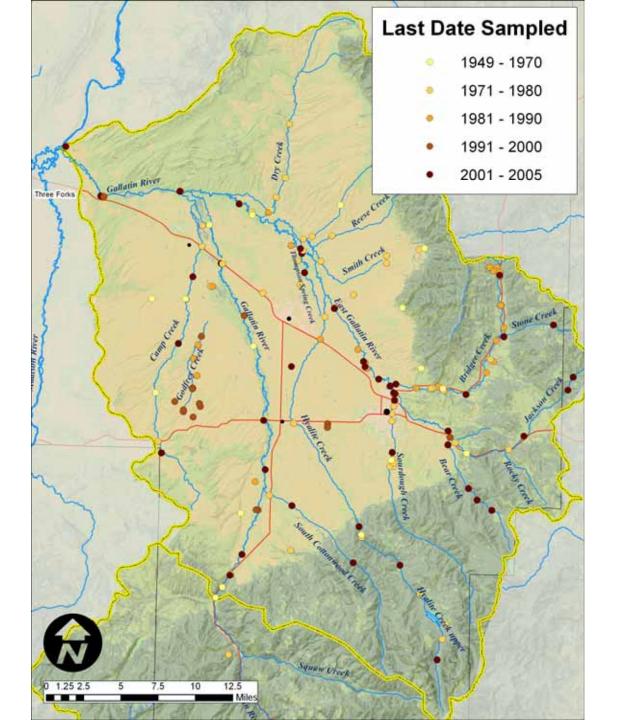


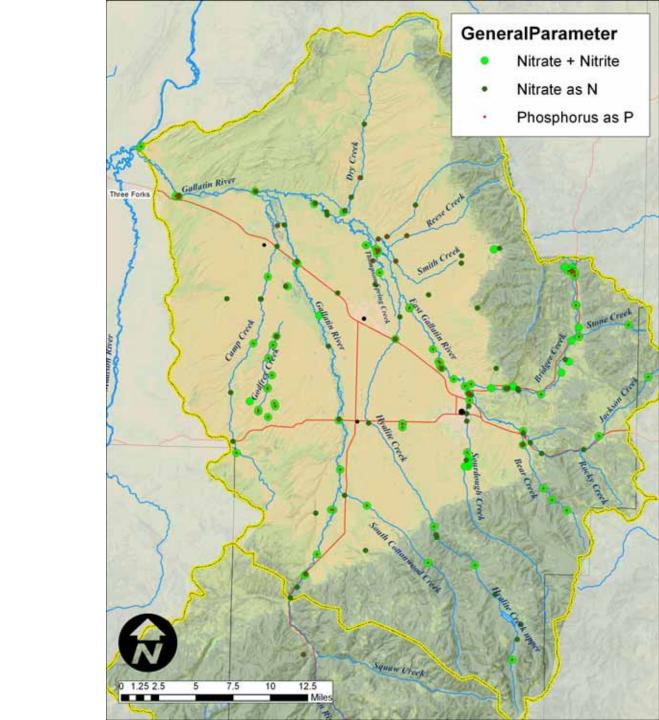




Examples of Data Review to date...



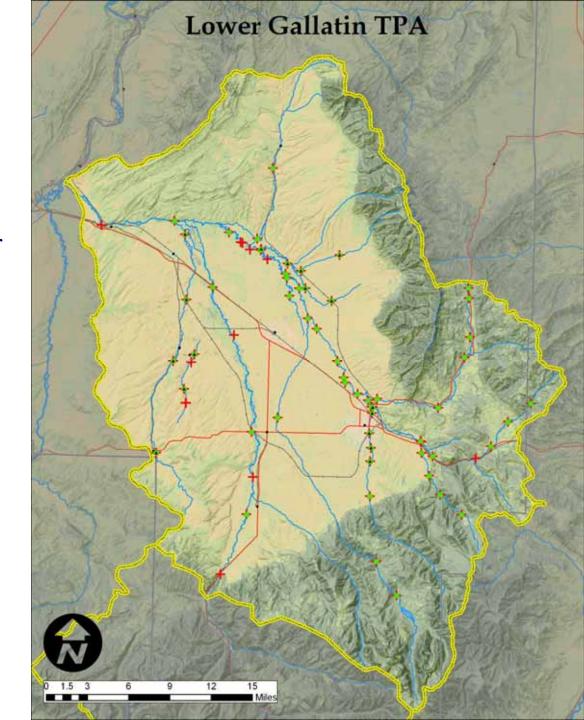




Upcoming (2008) Data Collection

Nutrients, E.coli & Chl-a

Sampling to begin late summer 2008



Gallatin TMDL Planning Documents

- Sampling & Analysis Plans sediment nutrients ecoli
- Aerial Assessments
- Data reports and data deliverables
- TMDL Sections/Reports
 Watershed Characterization
 Water Quality Status
- Public Involvement Strategy
- other Project Planning documents....

All final planning documents are available through DEQ, BWTF or GGWC.

Next Steps and Further Considerations...

• Continued assessments in 2008/2009/2010...



Next Steps and Further Considerations...

• Regulatory Implications...

MCA 75-5-703

- 75-5-703. Development and implementation of total maximum daily loads. (1) The department shall, in consultation with local conservation districts and watershed advisory groups, develop total maximum daily loads or TMDLs for threatened or impaired water bodies or segments of water bodies in order of the priority ranking established by the department under 75-5-702. Each TMDL must be established at a level that will achieve compliance with applicable water quality standards and must include a reasonable margin of safety that takes into account any lack of knowledge concerning the relationship between the TMDL and water quality standards. The department shall consider applicable guidance from the federal environmental protection agency, as well as the environmental, economic, and social costs and benefits of developing and implementing a TMDL.
- (2) In establishing TMDLs under subsection (1), the department may establish waste load allocations for point sources and may establish load allocations for nonpoint sources, as set forth in subsection (8), and may allow for effluent trading. The department shall, in consultation with local conservation districts and watershed advisory groups, develop reasonable land, soil, and water conservation practices specifically recognizing established practices and programs for nonpoint sources.
- (3) Within 15 years from May 5, 1997, the department shall develop TMDLs for all water bodies on the list of waters that are threatened or impaired, as that list read on May 5, 1997. This provision does not apply to water bodies that are subsequently added or removed from the list according to the provisions of <u>75-5-702</u>. The department shall establish a schedule for completing the TMDLs within the 15-year period established by this subsection. The schedule must also provide a reasonable timeframe for TMDL development for impaired and threatened water bodies that are listed subsequent to May 5, 1997, and are prioritized as set forth in 75-5-702.
- (4) The department shall provide guidance for TMDL development on any threatened or impaired water body, regardless of its priority ranking, if the necessary funding and resources from sources outside the department are available to develop the TMDL and to monitor the effectiveness of implementation efforts. The department shall review the TMDL and either approve or disapprove the TMDL. If the TMDL is approved by the department, the department shall ensure implementation of the TMDL according to the provisions of subsections (6) through (8).
- (5) For water bodies listed under 75-5-702, the department shall provide assistance and support to landowners, local conservation districts, and watershed advisory groups for interim measures that may restore water quality and remove the need to establish a TMDL, such as informational programs regarding control of nonpoint source pollution and voluntary measures designed to correct impairments. When a source implements voluntary measures to reduce pollutants prior to development of a TMDL, those measures, whether or not reflected in subsequently issued waste discharge permits, must be recognized in development of the TMDL in a way that gives credit for the pollution reduction efforts.
 - (6) After development of a TMDL and upon approval of the TMDL, the department shall:
 - (a) incorporate the TMDL into its current continuing planning process;
 - (b) incorporate the waste load allocation developed for point sources during the TMDL process into appropriate water discharge permits; and
 - (c) assist and inform landowners regarding the application of a voluntary program of reasonable land, soil, and water conservation practices developed pursuant to subsection (2).
- (7) Once the control measures identified in subsection (6) have been implemented, the department shall, in consultation with the statewide TMDL advisory group, develop a monitoring program to assess the waters that are subject to the TMDL to determine whether compliance with water quality standards has been attained for a particular water body or whether the water body is no longer threatened. The monitoring program must be designed based on the specific impairments or pollution sources. The department's monitoring program must include long-term monitoring efforts for the analysis of the effectiveness of the control measures developed.
- (8) The department shall support a voluntary program of reasonable land, soil, and water conservation practices to achieve compliance with water quality standards for nonpoint source activities for water bodies that are subject to a TMDL developed and implemented pursuant to this section.
- (9) If the monitoring program provided under subsection (7) demonstrates that the TMDL is not achieving compliance with applicable water quality standards within 5 years after approval of a TMDL, the department shall conduct a formal evaluation of progress in restoring water quality and the status of reasonable land, soil, and water conservation practice implementation to determine if:
 - (a) the implementation of a new or improved phase of voluntary reasonable land, soil, and water conservation practice is necessary;
 - (b) water quality is improving but a specified time is needed for compliance with water quality standards; or
 - (c) revisions to the TMDL are necessary to achieve applicable water quality standards.
 - (10) Pending completion of a TMDL on a water body listed pursuant to <u>75-5-702</u>:
 - (a) point source discharges to a listed water body may commence or continue, provided that:
 - (i) the discharge is in conformance with a discharge permit that reflects, in the manner and to the extent applicable for the particular discharge, the provisions of 75-5-303;
 - (ii) the discharge will not cause a decline in water quality for parameters by which the water body is impaired; and
 - (iii) minimum treatment requirements adopted pursuant to 75-5-305 are met;
 - (b) the issuance of a discharge permit may not be precluded because a TMDL is pending;
- (c) new or expanded nonpoint source activities affecting a listed water body may commence and continue if those activities are conducted in accordance with reasonable land, soil, and water conservation practices;
 - (d) for existing nonpoint source activities, the department shall continue to use educational nonpoint source control programs and voluntary measures as provided in subsections (5) and (6).

MCA 75-5-703

- (6) After development of a TMDL and upon approval of the TMDL, the department shall:
 - (a) incorporate the TMDL into its current continuing planning process;
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- (8) The department shall support a voluntary program of reasonable land, soil, and water conservation practices to achieve compliance with water quality standards for nonpoint source activities...
- (9) If the monitoring program provided under subsection (7) demonstrates that the TMDL is not achieving compliance with applicable water quality standards within 5 years after approval of a TMDL, the department shall conduct a formal evaluation of progress in restoring water quality and the status of reasonable land, soil, and water conservation practice implementation.

Next Steps and Further Considerations...

- Public & Stakeholder Involvement
 - annual public meetings
 - WAG & TAG meetings as needed
 - Distribution of reports, planning docs, etc...

Role of BWTF & GGWC

Local coordination and collaboration

Education & information dissemination

Stakeholder & public participation

Stakeholder & technical review/feedback of TMDL products

Restoration planning & implementation

Ongoing water quality trends & restoration tracking

Homegrown stewardship



Some TAG example data results and assessments....

About TMDLs

$TMDL = \Sigma WLA + \Sigma LA + MOS$

TMDL= Total Maximum Daily Load in lbs/day

WLA= Waste Load Allocation (permitted point sources)

LA= Load Allocation (nonpoint and natural sources)

MOS = Margin of Safety

Example Sediment Sources

Natural Sediment Sources

- Upland Erosion
- Bank Erosion
- Hillslope Failure
- 'Naturally Occurring'





Example Sediment Sources

Human-Caused Sediment Sources

- Upland Erosion
- Bank Erosion
- Hillslope Failure
- Forest Roads (culverts, crossings)





Estimating/Quantifying Sediment Loads

Methods

Field Sediment Source Surveys

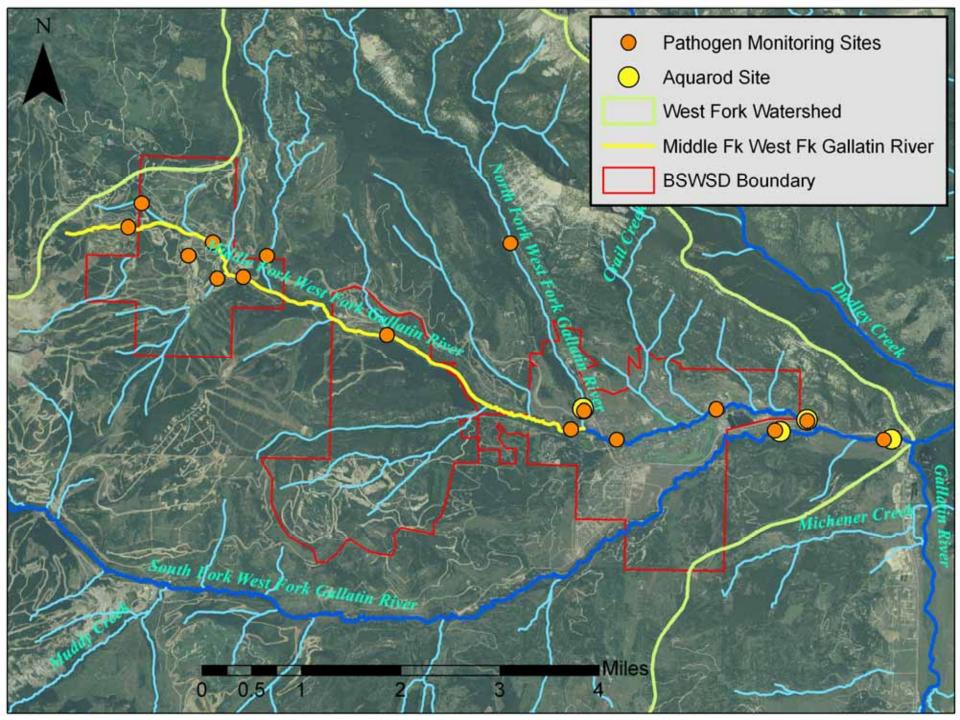
Road Field Assessments & Modeling

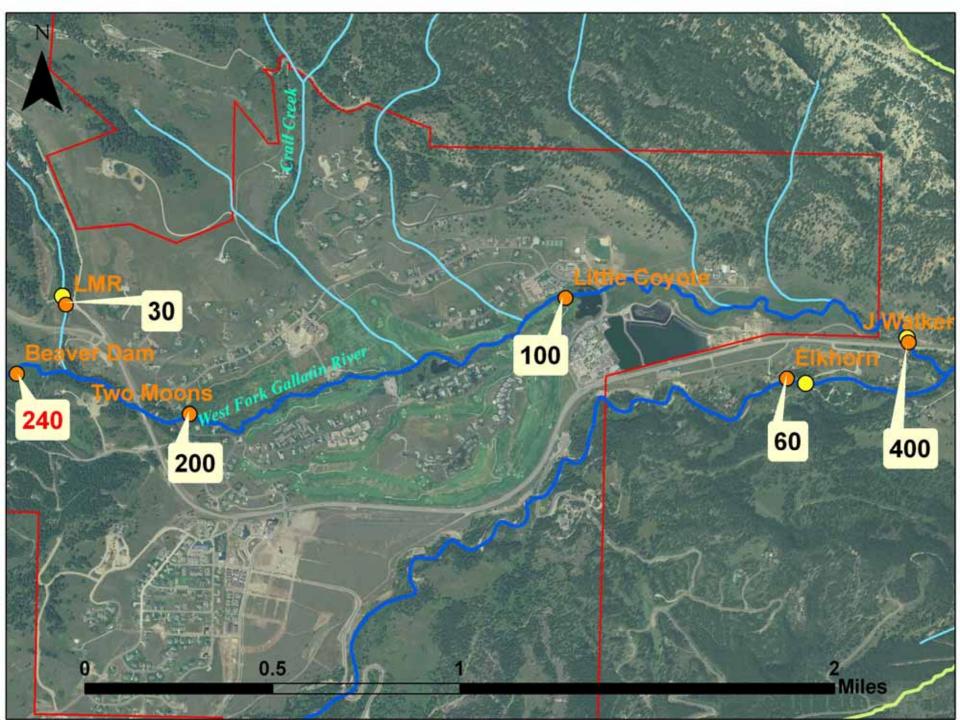
Upland Source Modeling

Culvert Failure Risk Assessment

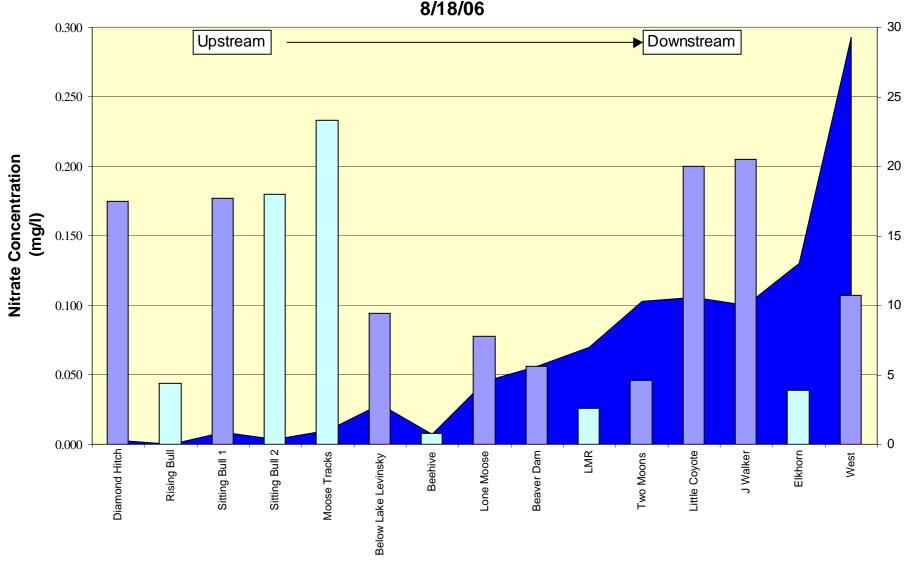
TMDLs & Allocations

		Existing	Allocation
Seventeenmile Creek	Natural Background Load	443	443
	Forest Roads	24	12
	Culvert Failure	421	85
	Total Load	888	540
Lap Creek	Natural Background Load	62	62
•	Forest Roads	2.4	1.1
	Culvert Failure	70	14
	Total Load	134	77
South Fork Yaak River	Natural Background Load	445	445
	Forest Roads	21	12
	Culvert Failure	425	86
	Total Load	891	543

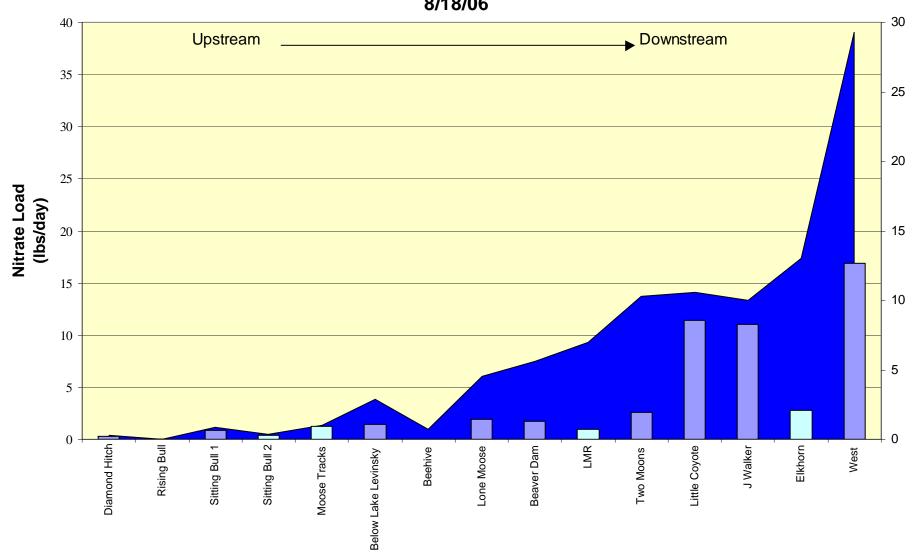




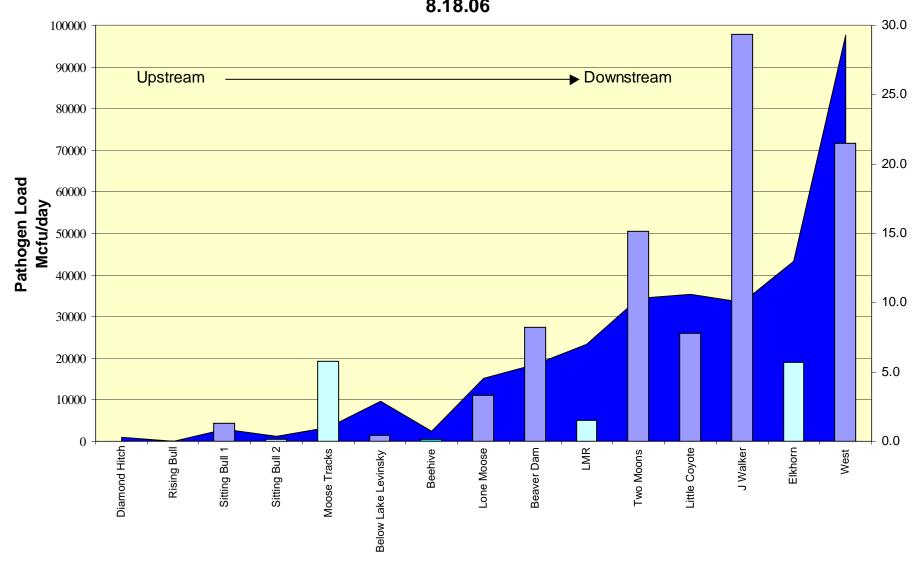
West Fork Gallatin Watershed Nitrate Concentrations 8/18/06



West Fork Gallatin Watershed Nitrate Loading 8/18/06



West Fork Gallatin Watershed Pathogen Loading 8.18.06



Questions....

Discussion....

Thanks....