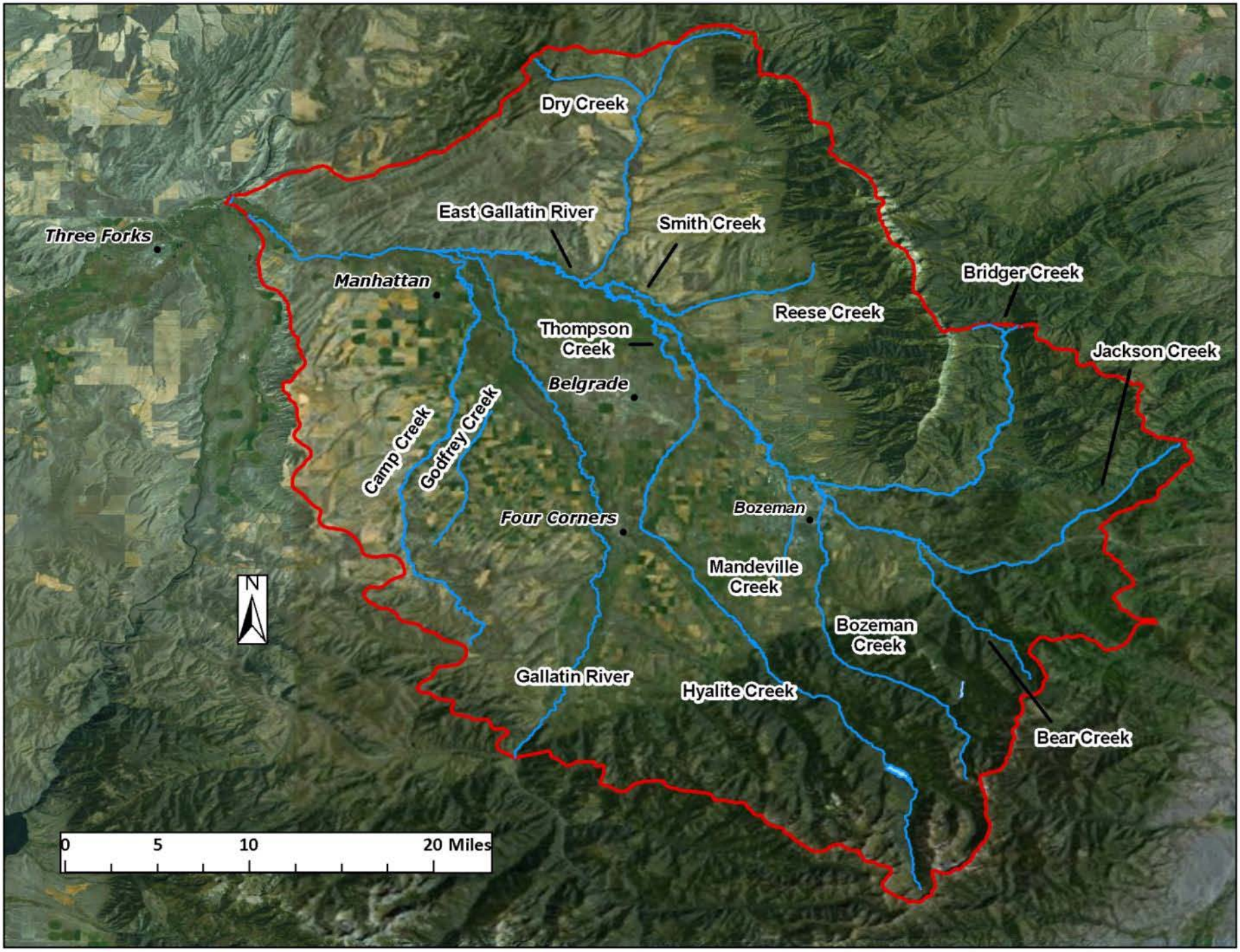
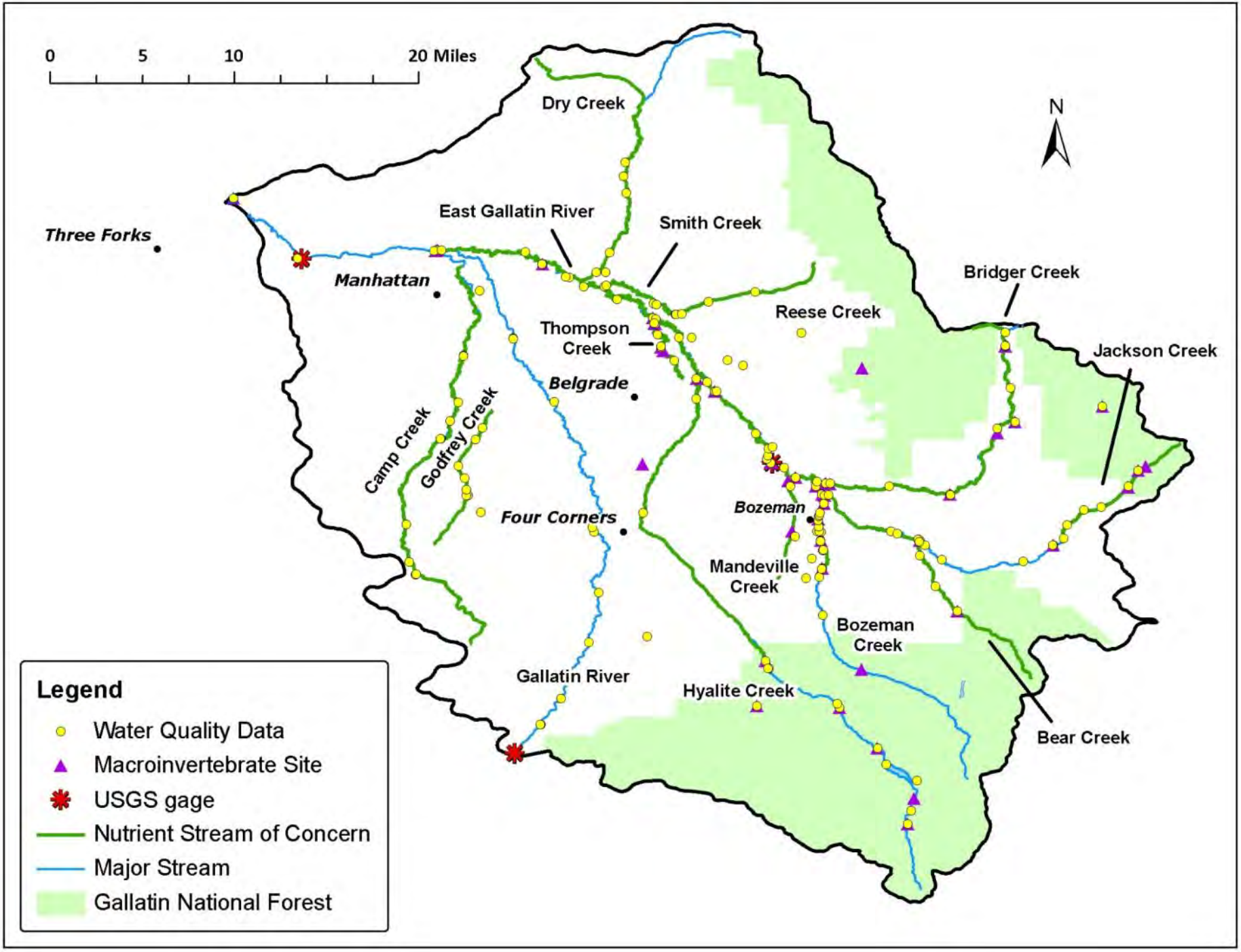
Lower Gallatin WAG/TAG

April 26, 2012


Dry Creek
East Gallatin River
Smith Creek
Three Forks
Manhattan
Bridger Creek
Reese Creek
Thompson Creek
Jackson Creek
Belgrade
Camp Creek
Godfrey Creek
Four Corners
Bozeman
Mandeville Creek
N
Bozeman Creek
Gallatin River
Hyalite Creek
Bear Creek
0
5
10
20 Miles

Project Scope

- Nutrients
- Sediment
- Pathogens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Water Quality Data
Macroinvertebrate Site
USGS gage
Nutrient Stream of Concern
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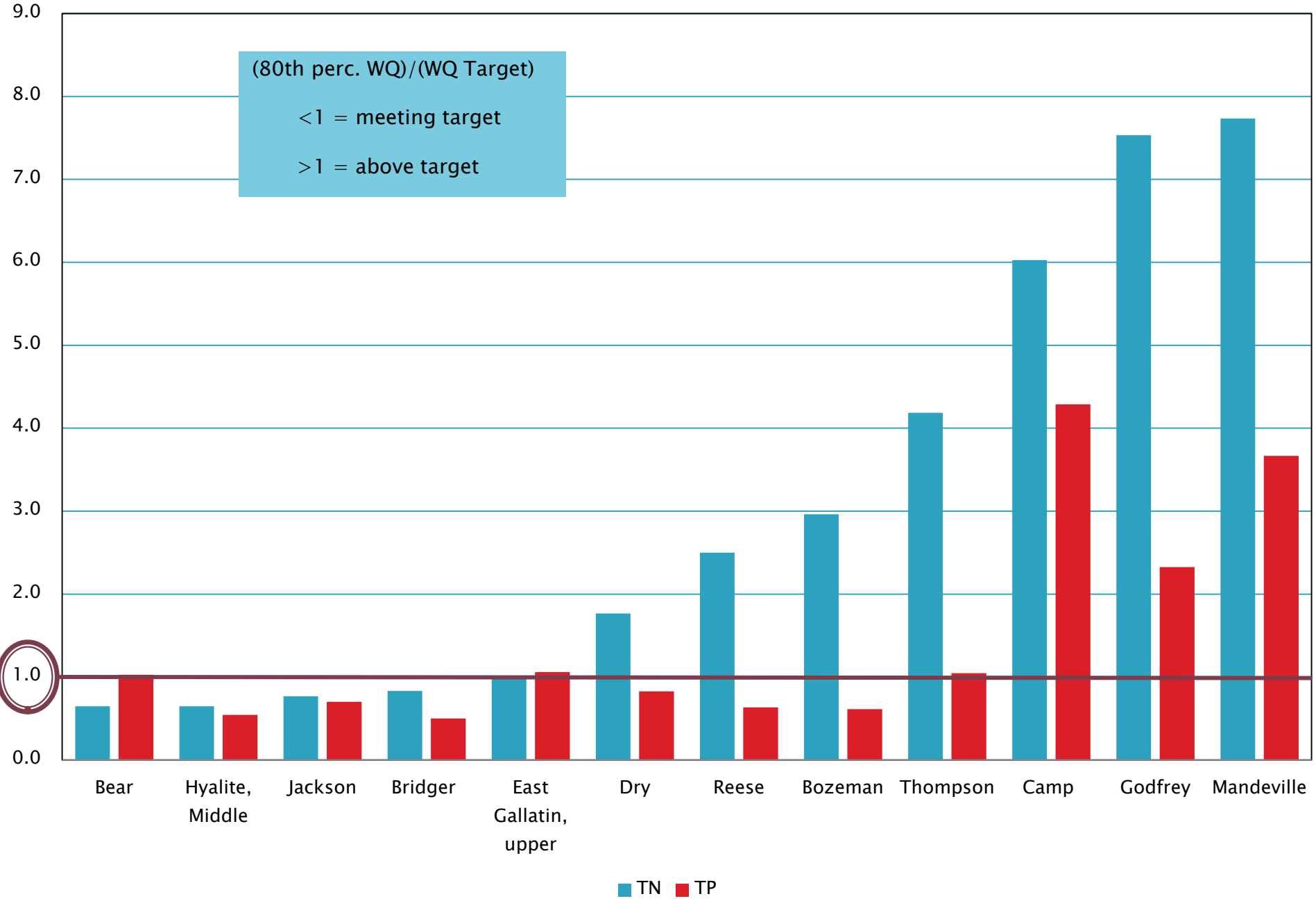
Water Quality Data and Numeric Targets



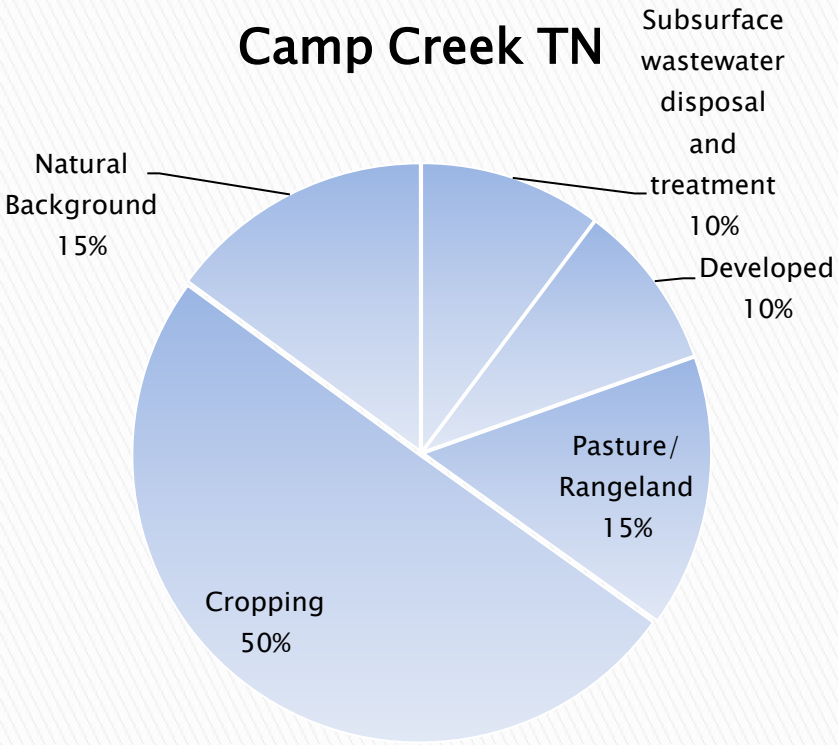
TMDLs – nutrients

- Notable changes
  - Bozeman Creek
  - Hyalite Creek

- TMDL example
  - Camp Creek vs. Bozeman Creek
    - Agriculture vs. mixture of urban/developed/agriculture

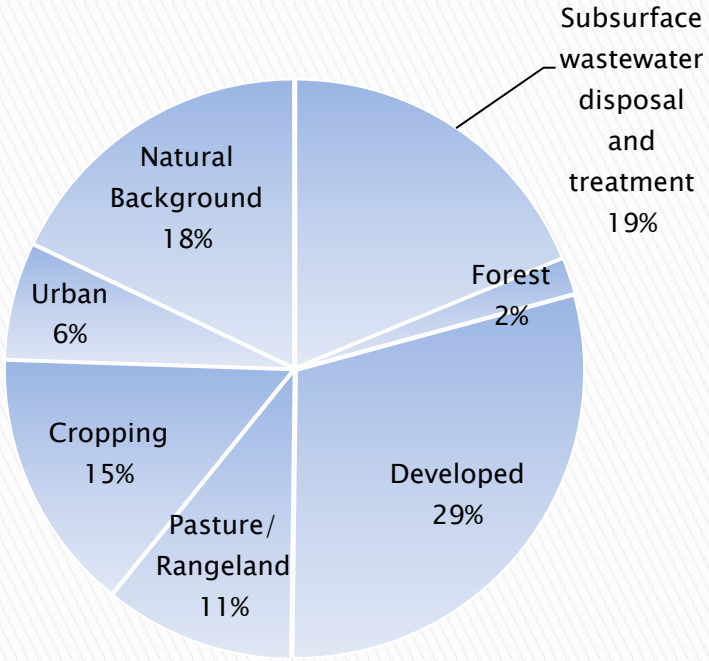
TN TMDL examples

Camp Creek TN



To achieve TN TMDL:
47% reduction in existing load

Bozeman Creek TN



To achieve TN TMDL:
59% reduction in existing load

TMDLs – nutrients

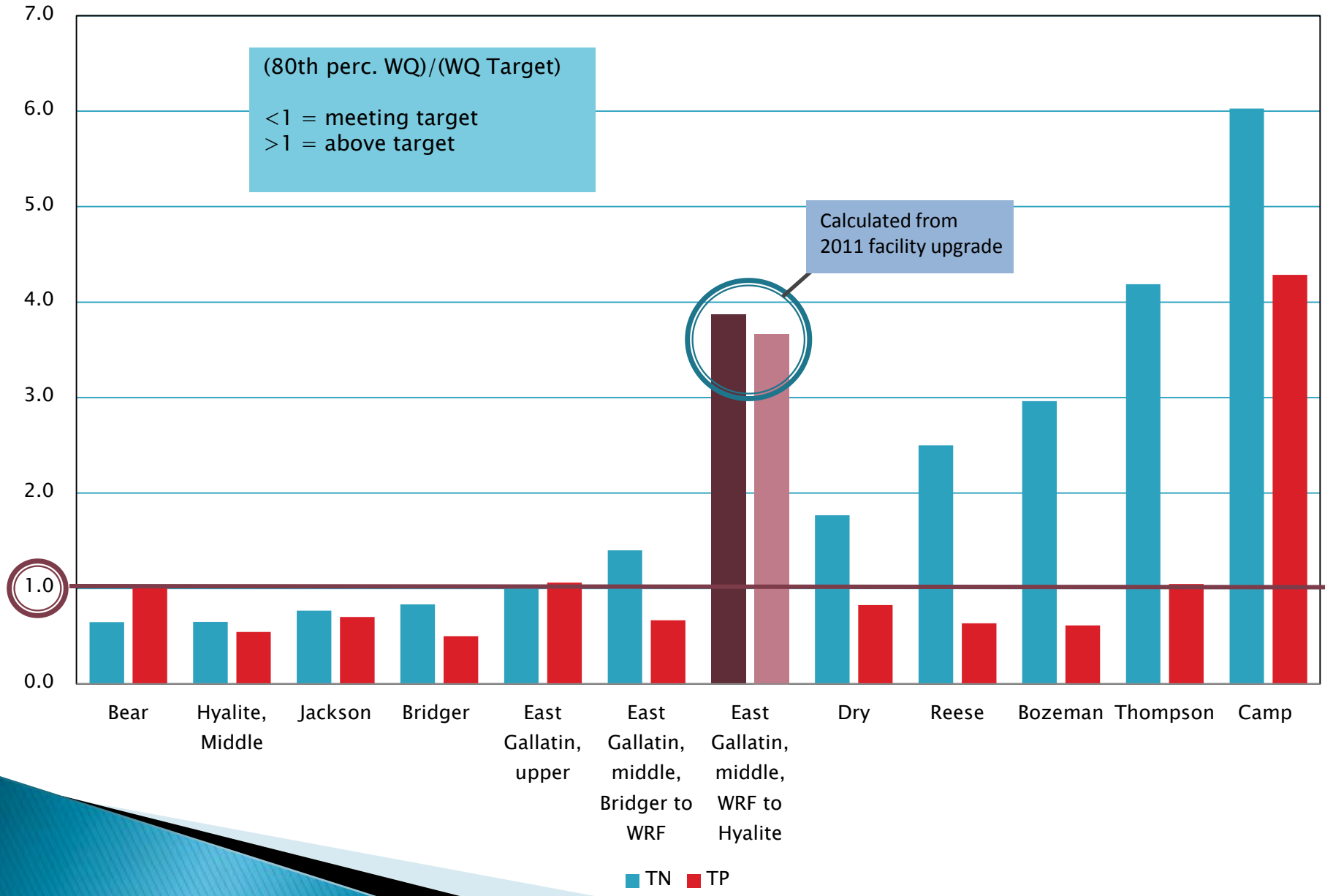
- Waste Load Allocations (WLAs)
  - Bozeman Fish Tech Center
  - MS4 (Stormwater)
    - SWMM model; DMR data
    - Performance based
    - Permit – **S**torm**W**ater **M**anagement **P**rogram (SWMP)

TMDLs – nutrients

- WLAs (cont.)
  - City of Bozeman Water Reclamation Facility
  - Decrease in nutrient loading with Fall 2011 facility upgrade

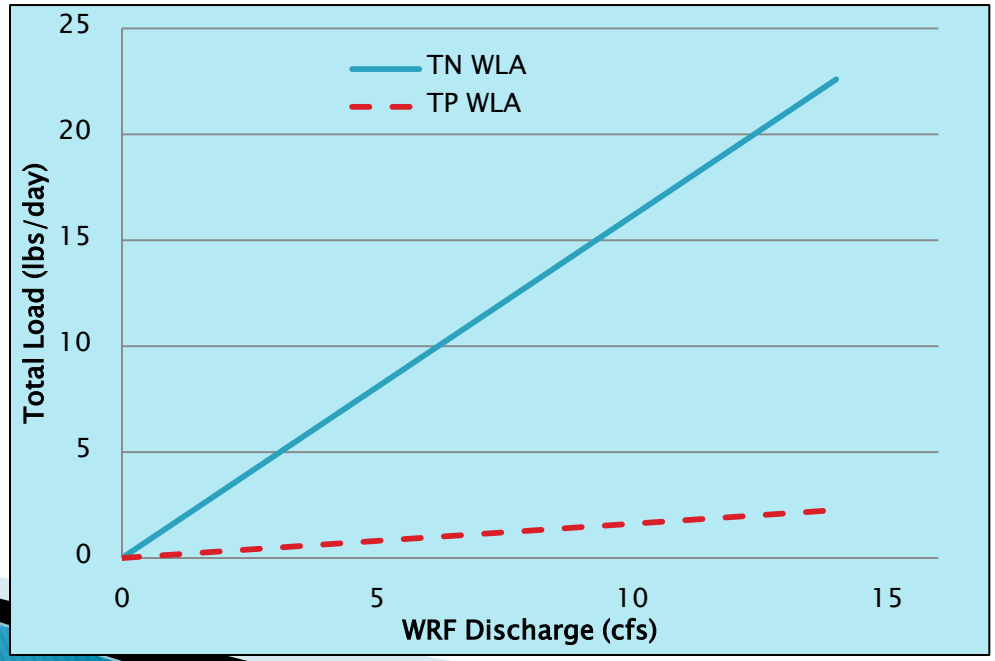
Nutrient impaired stream segments	Total Nitrogen reduction	Total Phosphorus reduction
East Gallatin River		
Bridger Creek to Hyalite Creek	41%	77%
Hyalite Creek to Smith Creek	18%	35%
Smith Creek to Gallatin River	9%	18%
Tributaries to the East Gallatin River		
Lower Hyalite Creek via Buster Gulch	13%	*ND*
Smith Creek via Dry Creek Irrigation Canal	13%	*ND*
ND – not determined; streams not currently listed for TP		

Water Quality Data and Numeric Targets



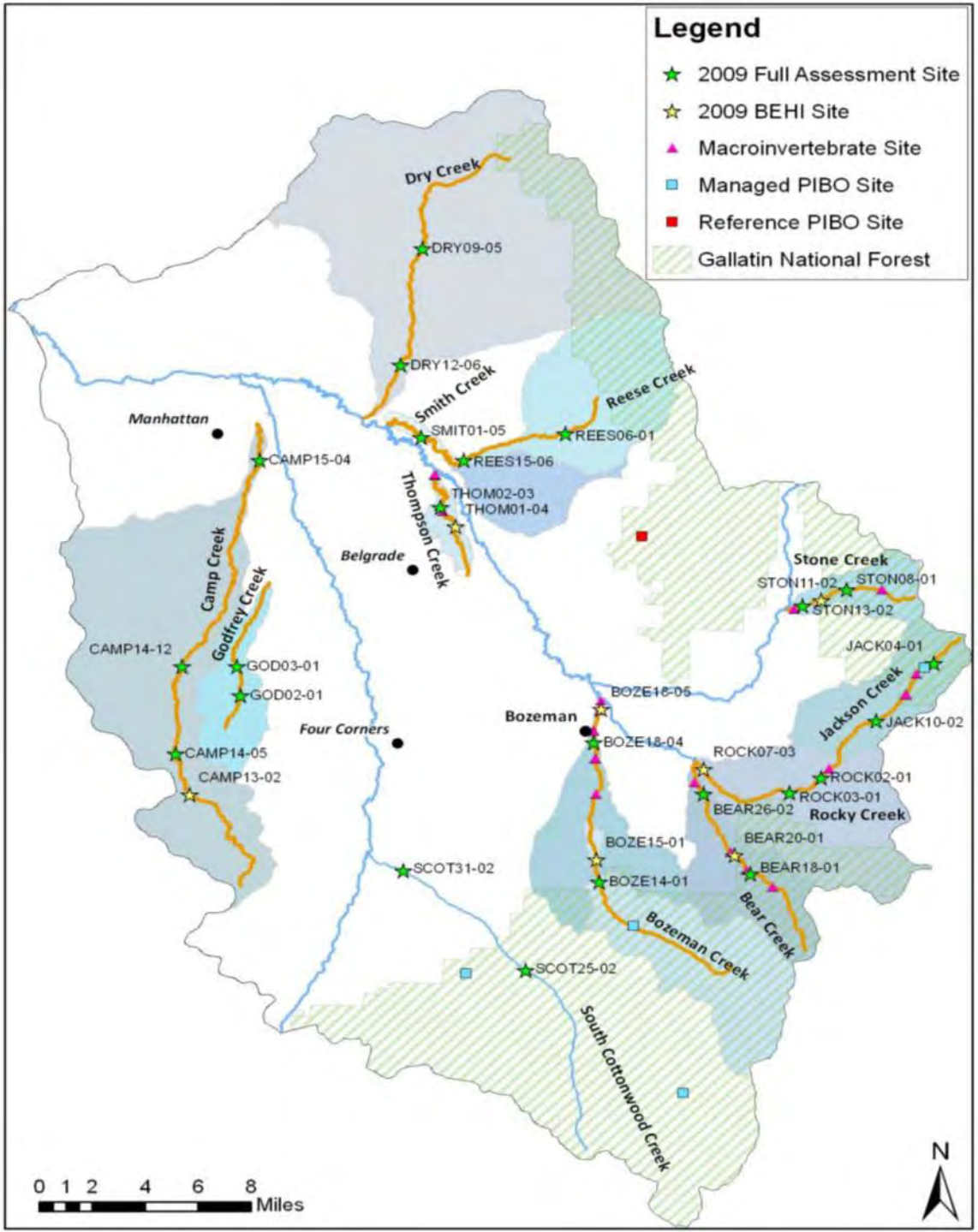
TMDLs – nutrients

- WLAs (cont.)
  - City of Bozeman Water Reclamation Facility
    - Discharge to impaired waterbody
    - WLA based on discharge volume and WQ target
    - Variance process/nutrient trading



Sediment Data

- Sediment/habitat data collected at 23 sites in 2009
- Water quality targets developed for measurements of fine sediment, channel form, biological health, and habitat
- 2009 and other available data compared to targets



Sediment Targets

Parameter Type	Target Description	Criterion
Fine Sediment	Percentage of fine surface sediment <6mm and <2mm in riffles via pebble count (reach average)	<6mm: B/C stream types: ≤ 11%, E stream types: ≤ 30% <2mm: B/C stream types: ≤ 9%, E stream types: ≤ 16%
	Percentage of fine surface sediment < 6 mm in pool tails via grid toss (reach average)	B/C stream types: ≤ 8% E stream type: ≤ 14%
Channel Form and Stability	Bankfull width/depth ratio (reach average)	B stream types: ≤ 17 C stream types: ≤ 23 E stream types: ≤ 12
	Entrenchment ratio (reach average)	B stream types: > 1.4
		C and E stream types: > 2.2
Instream Habitat	Residual pool depth (reach average)	< 15 ft bankfull width : ≥ 0.7 ft
		> 15 ft bankfull width : ≥ 1.2 ft
	Pools/mile	< 15 ft bankfull width : ≥ 84
		> 15 ft bankfull width : ≥ 52
	LWD/mile	All bankfull widths: 143
Human Sediment Sources	Significant and controllable sediment sources	Presence of significant and controllable anthropogenic sediment sources throughout the watershed
Biological Index	Macroinvertebrate bioassessment impairment threshold	O/E: ≥ 0.80

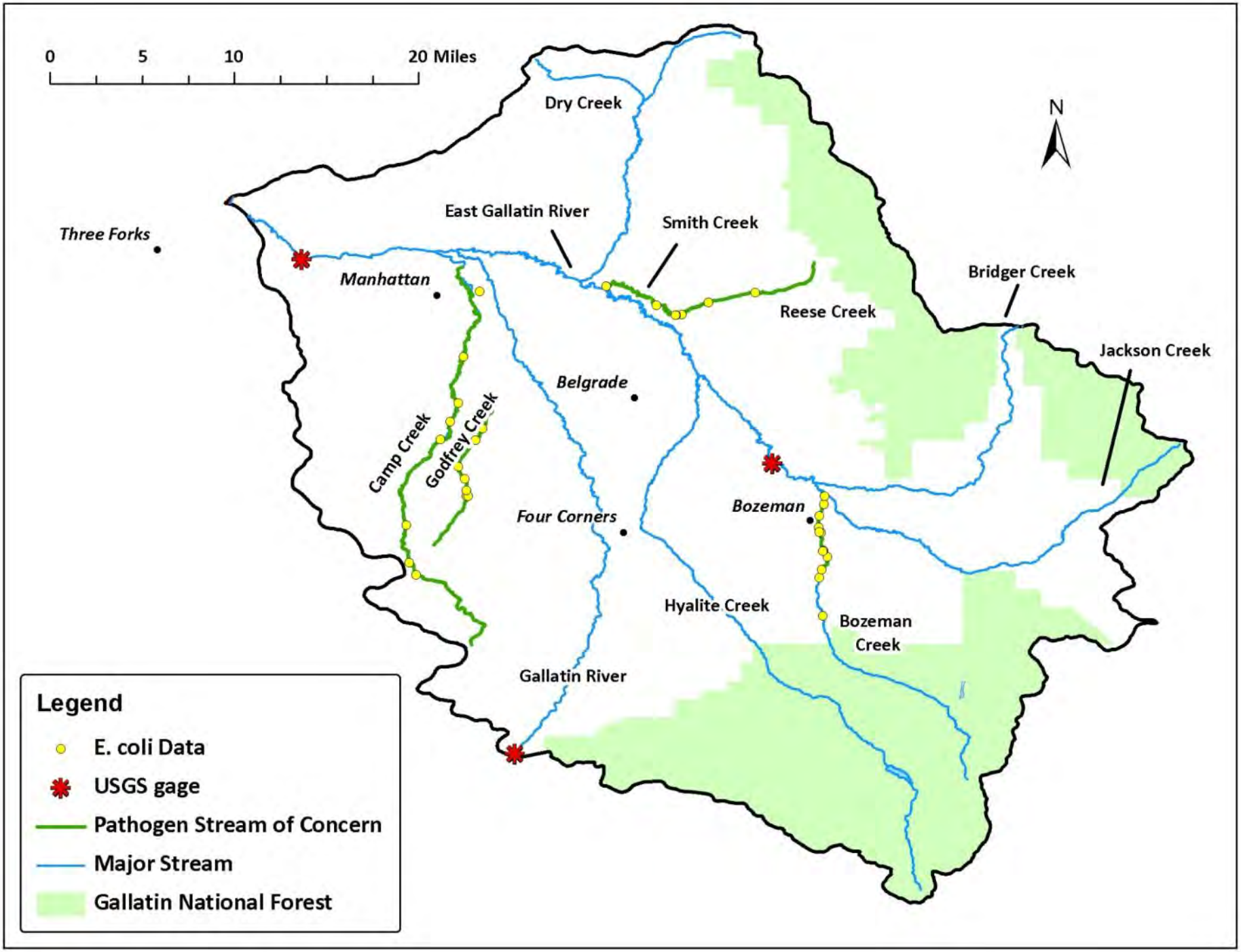
Source Assessments

- Streambank Erosion
- Unpaved Roads
- Upland Erosion
- Point Sources
  - MS4
  - Stormwater: Construction and Industrial

TMDL Example

Sediment Sources		Current Estimated Load (Tons/Year)	Total Allowable Load (Tons/Year)	Load Allocations (% reduction)
Roads	**Unpaved Roads Total**	**5.2**	**1.5**	**71%***
Streambank Erosion	Human Caused	212	175	18%
	Natural Background	22	22	0%
	Total	**234**	**197**	**16%**
Upland Sediment Sources	Forest	504	504	0%
	Range	1,579	1,299	18%
	Pasture	31	4	87%
	Developed	68	68	0%
	Total	**2,182**	**1,876**	**14%**
Point Sources	**Construction Stormwater Permits**	**4.1**	**1.4**	**65%**
Total Sediment Load		**2,426**	**2,076**	**14%**

*The allocation to roads also includes no loading from undersized, improperly installed, or inadequately maintained culvert. The 25-year event is considered the minimum but the 100-year event is recommended for fish-bearing streams.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E coli. In-stream WQ criteria

- For B-1 waterbodies (applies to Lower Gallatin)
- April 1 – October 31
  - Geometric Mean < 126 cfu/100mL
  - 10% of all samples cannot >252 cfu/100mL
- November 1 – May 30
  - Geometric Mean < 630 cfu/100mL
  - 10% of all samples cannot >1,260 cfu/100mL
- Assessment
  - based on a minimum of five samples obtained during separate 24-hour periods during any consecutive 30-day period that are analyzed by the most probable number (MPN) or equivalent membrane filter method

Tentative TMDL Schedule

- Stakeholder review
  - June 1st – 30th
- Respond to stakeholder comments
  - July 1st – 15th
- Public comment period
  - mid-July to mid-August
  - Public meetings
    - Bozeman
    - Belgrade/Manhattan

Other information

- West Fork Gallatin TMDL document
  - Approved by EPA September 30, 2010
  - Available on-line

- Lower Gallatin wiki site
  - Draft documents will be available through this site
  - http://montanatmdlflathead.pbworks.com/w/page/27090402/Lower%20Gallatin%20TMDL%20Planning%20Area
    - Simply search for **Lower Gallatin wiki** in browser

Contact Information

- Lisa Kusnierz, EPA
  - Sediment TMDLs
  - Kusnierz.Lisa@epamail.epa.gov
  - Ph. 406-457-5001

- Christian Schmidt, DEQ
  - Nutrients and pathogens TMDLs
  - cschmidt2@mt.gov
  - Ph. 406-444-6777