APPENDIX A - FIGURES AND TABLES

LIST OF TABLES

Table A-1. 2012 303(d) Impaired Waterbodies, Impairment Causes, Impaired Uses, and Impairment Cause Status in the Lower Gallatin Project Area A-3

LIST OF FIGURES

Figure A-1. Vicinity Map and 303(d) Listed Streams in the Lower Gallatin TMDL Planning Area. A-2
Figure A-2. Precipitation in the Lower Gallatin TMDL Planning Area A-8
Figure A-3. Geology of the Lower Gallatin TMDL Planning Area A-9
Figure A-4. Soil Units of the Lower Gallatin TMDL Planning Area A-10
Figure A-5. Hydrologic Soil Groups in the Lower Gallatin TMDL Planning Area A-11
Figure A-6. Universal Soil Loss Equation (USLE) Factor "K" in the Lower Gallatin TMDL Planning Area A-12
Figure A-7. Soil Permeabilities in the Lower Gallatin TMDL Planning Area A-13
Figure A-8. Level IV Ecoregions Found in the Lower Gallatin TMDL Planning Area..... A-14
Figure A-9. National Land Cover Data Vegetation Types in the Lower Gallatin TMDL Planning Area... A-15
Figure A-10. Riparian/Wetland Areas in the Gallatin Local Water Quality District A-16
Figure A-11. Prime and Important Farmlands in the Lower Gallatin TMDL Planning Area A-17
Figure A-12. Estimated Average Depth to Groundwater Based on Static Groundwater A-18
Figure A-13. Changes in the Number of Groundwater Wells Installed Over Time in the Lower Gallatin TMDL Planning Area..... A-19
Figure A-14. Fifth Code Hydrologic Unit Code Areas, SNOTEL Stations and Stream Gaging Locations..... A-20
Figure A-15. Controlled Groundwater Areas in the Lower Gallatin TMDL Planning Area A-21
Figure A-16. Changes in Septic System Densities between 1990 and 2000 in the Lower Gallatin TMDL Planning Area A-22
Figure A-17. Land Ownership within the Lower Gallatin TMDL Planning Area A-23
Figure A-18. Timber Harvests within the Lower Gallatin TMDL Planning Area A-24
Figure A-19. Historic Wildland Fires within the Lower Gallatin TMDL Planning Area A-25
Figure A-20. Active and Abandoned Mines within the Lower Gallatin TMDL Planning Area A-26
Figure A-21. Changes in Population Density between 1990 and 2000 in the Lower Gallatin TMDL Planning Area A-27
Figure A-22. Location of active Montana Pollutant Discharge Elimination Systems as of March 19, 2012 ... . A-28

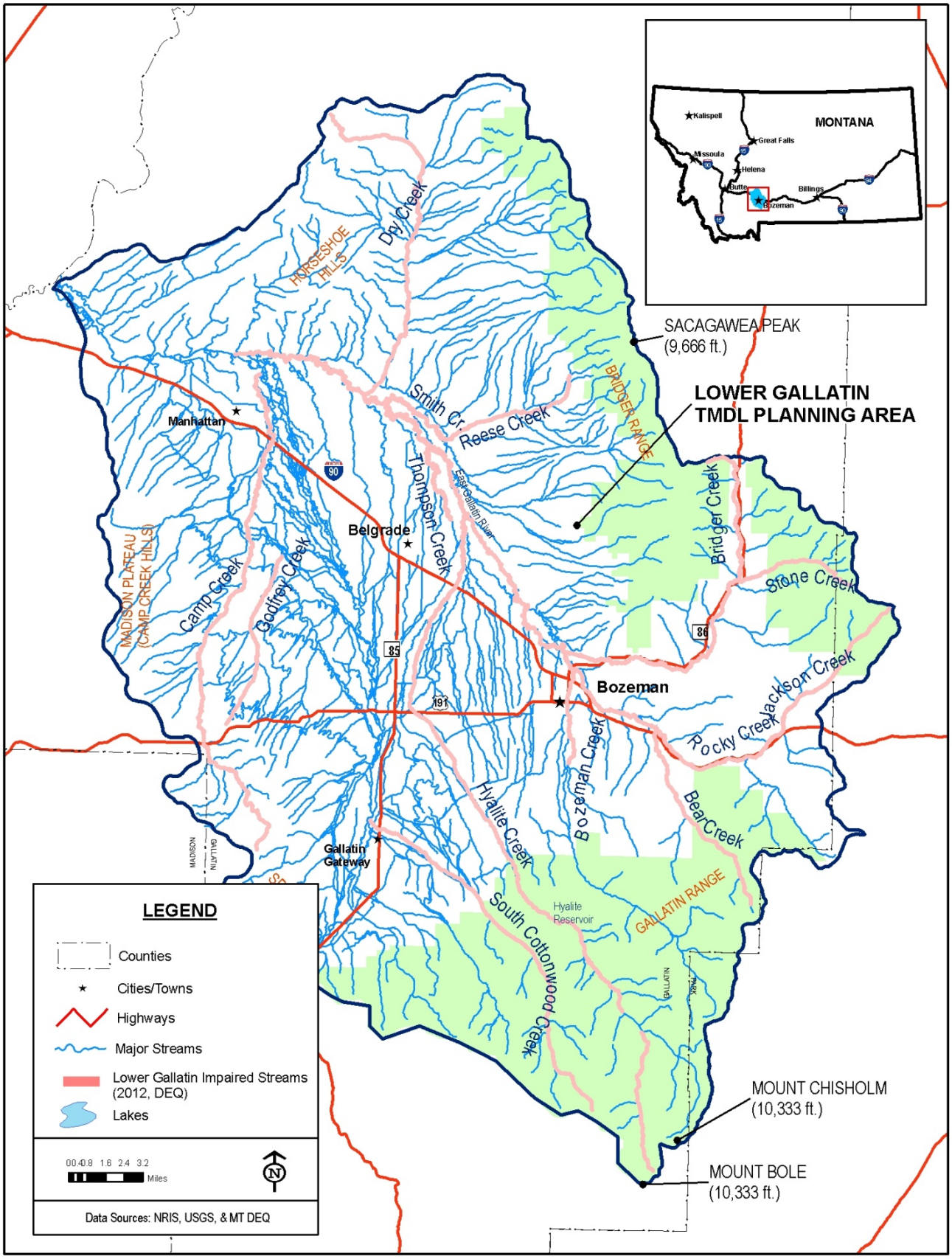

Figure A-1. Vicinity Map and 303(d) Listed Streams in the Lower Gallatin TMDL Planning Area.

Table A-1. 2012 303(d) Impaired Waterbodies, Impairment Causes, Impaired Uses, and Impairment Cause Status in the Lower Gallatin Project Area

Waterbody & Location Description	Waterbody ID	Impairment Cause	TMDL Pollutant Category	Impaired Uses[a]	Impairment Cause Status
BEAR CREEK, headwaters to mouth (Rocky Creek)	MT41H003_081	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Excess Algal Growth	Not a Pollutant	PRIMARY CONTACT RECREATION	Addressed by TP TMDL contained in this document
		Phosphorus (Total)	Nutrients	AQUATIC LIFE PRIMARY CONTACT RECREATION	TP TMDL contained in this document
		Sedimentation/Siltation	Sediment	AQUATIC LIFE	Sediment TMDL contained in this document
		Solids (Suspended/Bedload)	Sediment	AQUATIC LIFE INDUSTRIAL	Addressed by sediment TMDL contained in this document
BOZEMAN CREEK[a], confluence of Limestone Creek and Bozeman Creek (T25 R6E S6) to the mouth (East Gallatin River)	MT41H003_040	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL in this document
		Chlorophyll-*a*	Not a Pollutant	PRIMARY CONTACT RECREATION	Addressed by TN TMDL in this document
		Escherichia coli	Pathogens	PRIMARY CONTACT RECREATION	*E. coli* TMDL contained in this document
		Phosphorus (Total)	Nutrients	AQUATIC LIFE PRIMARY CONTACT RECREATION	Not impaired based on 2011 assessment
		Sedimentation/Siltation	Sediment	AQUATIC LIFE	Sediment TMDL contained in this document
		Nitrogen (Total)	Nutrients	AQUATIC LIFE PRIMARY CONTACT RECREATION	TN TMDL contained in this document
BRIDGER CREEK, headwaters to mouth (East Gallatin River)	MT41H003_110	Chlorophyll-*a*	Not a Pollutant	PRIMARY CONTACT RECREATION	Addressed by $N0_3$+$N0_2$ TMDL contained in this document
		Phosphorus (Total)	Nutrients	AQUATIC LIFE PRIMARY CONTACT RECREATION	Not impaired based on 2011 assessment
		Nitrogen (Total)	Nutrients	AQUATIC LIFE PRIMARY CONTACT RECREATION	Impairment cause removed and replaced by Nitrate+Nitrite

Table A-1. 2012 303(d) Impaired Waterbodies, Impairment Causes, Impaired Uses, and Impairment Cause Status in the Lower Gallatin Project Area

Waterbody & Location Description	Waterbody ID	Impairment Cause	TMDL Pollutant Category	Impaired Uses[a]	Impairment Cause Status
CAMP CREEK, headwaters to mouth (Gallatin River)	MT41H002_010	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Escherichia coli	Pathogens	AQUATIC LIFE PRIMARY CONTACT RECREATION	*E. coli* TMDL contained in this document
		Low flow alterations	Not a Pollutant	AQUATIC LIFE PRIMARY CONTACT RECREATION	Addressed by sediment TMDL contained in this document
		Nitrogen (Total)	Nutrients	AQUATIC LIFE	TN TMDL contained in this document
		Other anthropogenic substrate alterations	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Physical substrate habitat alterations	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Sedimentation/Siltation	Sediment	AQUATIC LIFE	Sediment TMDL contained in this document
DRY CREEK, headwaters to mouth (East Gallatin River)	MT41H003_100	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Cause unknown	Not a Pollutant	PRIMARY CONTACT RECREATION	Not addressed in this document[b]
		Nitrogen (Total)	Nutrients	AQUATIC LIFE	TN TMDL contained in this document
		Phosphorus (Total)	Nutrients	AQUATIC LIFE	TP TMDL contained in this document
		Physical substrate habitat alterations	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Sedimentation/Siltation	Sediment	AQUATIC LIFE	Sediment TMDL contained in this document
EAST GALLATIN RIVER, confluence of Rocky and Bear Creeks to Bridger Creek	MT41H003_010	Nitrogen (Total)	Nutrients	AQUATIC LIFE	TN TMDL contained in this document
		Phosphorus (Total)	Nutrients	AQUATIC LIFE	TP TMDL contained in this document

Table A-1. 2012 303(d) Impaired Waterbodies, Impairment Causes, Impaired Uses, and Impairment Cause Status in the Lower Gallatin Project Area

Waterbody & Location Description	Waterbody ID	Impairment Cause	TMDL Pollutant Category	Impaired Uses[a]	Impairment Cause Status
EAST GALLATIN RIVER, Bridger Creek to Smith Creek	MT41H003_020	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE	Not yet addressed by a TMDL or restoration plan
		Excess Algal Growth	Not a Pollutant	PRIMARY CONTACT RECREATION	Addressed by TN and TP TMDLs contained in this document
		Low flow alterations	Not a Pollutant	AQUATIC LIFE PRIMARY CONTACT RECREATION	Not yet addressed by a TMDL or restoration plan
		Nitrogen (Total)	Nutrients	AQUATIC LIFE	TN TMDL contained in this document
		Phosphorus (Total)	Nutrients	AQUATIC LIFE	TP TMDL contained in this document
		pH	pH/Acidity/ Caustic Conditions	AQUATIC LIFE	Not impaired based on 2011 assessment
EAST GALLATIN RIVER, Smith Creek to mouth (Gallatin River)	MT41H003_030	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE	Not yet addressed by a TMDL or restoration plan
		Nitrogen (Total)	Nutrients	AQUATIC LIFE	TN TMDL contained in this document
		pH	pH/Acidity/ Caustic Conditions	AQUATIC LIFE	Not impaired based on 2011 assessment
GALLATIN RIVER, Spanish Creek to mouth (Missouri River)	MT41H001_010	Low flow alterations	Not a Pollutant	AQUATIC LIFE PRIMARY CONTACT RECREATION INDUSTRIAL	Not yet addressed by a TMDL or restoration plan
GODFREY CREEK, headwaters to mouth (Moreland Ditch; T15 R3E S12)	MT41H002_020	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE AGRICULTURAL	Addressed by sediment TMDL contained in this document
		Excess Algal Growth	Not a Pollutant	AQUATIC LIFE AGRICULTURAL	Addressed by TN and TP TMDLs contained in this document
		Escherichia coli	Pathogens	PRIMARY CONTACT RECREATION	*E. coli* TMDL contained in this document
		Nitrogen (Total)	Nutrients	AQUATIC LIFE AGRICULTURAL	TN TMDL contained in this document
		Phosphorus (Total)	Nutrients	AQUATIC LIFE AGRICULTURAL	TP TMDL contained in this document
		Sedimentation/Siltation	Sediment	AQUATIC LIFE AGRICULTURAL	Sediment TMDL contained in this document
HYALITE CREEK, headwaters to the top of Hyalite Reservoir (T45 R6E S23)	MT41H003_129	Phosphorus (Total)	Nutrients	AQUATIC LIFE PRIMARY CONTACT RECREATION	Not impaired based on 2012 assessment
		Total Nitrogen (TN)	Nutrients	AQUATIC LIFE COLDWATER FISHERY	Not impaired based on 2012 assessment

Table A-1. 2012 303(d) Impaired Waterbodies, Impairment Causes, Impaired Uses, and Impairment Cause Status in the Lower Gallatin Project Area

Waterbody & Location Description	Waterbody ID	Impairment Cause	TMDL Pollutant Category	Impaired Uses[a]	Impairment Cause Status
HYALITE CREEK, Hyalite Reservoir to the Bozeman water supply diversion ditch (T35 R5E S23)	MT41H003_130	Phosphorus (Total)	Nutrients	AQUATIC LIFE PRIMARY CONTACT RECREATION	Not impaired based on 2012 assessment
		Total Nitrogen (TN)	Nutrients	AQUATIC LIFE	Not impaired based on 2012 assessment
HYALITE CREEK, Bozeman water supply intake to the mouth (East Gallatin River)	MT41H003_132	Low flow alterations	Not a Pollutant	PRIMARY CONTACT RECREATION	Not yet addressed by a TMDL or restoration
JACKSON CREEK, headwaters to mouth (Rocky Creek)	MT41H003_050	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Chlorophyll-*a*	Not a Pollutant	AQUATIC LIFE PRIMARY CONTACT RECREATION	Addressed by TP TMDL contained in this document
		Phosphorus (Total)	Nutrients	AQUATIC LIFE PRIMARY CONTACT RECREATION	TP TMDL contained in this document
		Sedimentation/Siltation	Sediment	AQUATIC LIFE	Sediment TMDL contained in this document
REESE CREEK, headwaters to mouth (Smith Creek)	MT41H003_070	*Escherichia coli*	Pathogens	PRIMARY CONTACT RECREATION	*E. coli* TMDL contained in this document
		Nitrates	Nutrients	AQUATIC LIFE	Nitrate+Nitrite TMDL contained in this document
		Solids (Suspended/Bedload)	Sediment	AQUATIC LIFE	Sediment TMDL contained in this document
ROCKY CREEK, confluence of Jackson and Timberline Creeks to mouth (East Gallatin River)	MT41H003_080	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Other anthropogenic substrate alterations	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Physical substrate habitat alterations	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Sedimentation/Siltation	Sediment	AQUATIC LIFE	Sediment TMDL contained in this document
SMITH CREEK, confluence of Ross and Reese Creeks to mouth (East Gallatin River)	MT41H003_060	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Escherichia coli	Pathogens	PRIMARY CONTACT RECREATION	*E. coli* TMDL contained in this document
		Nitrates	Nutrients	AQUATIC LIFE COLDWATER FISHERY	Nitrate+Nitrite TMDL contained in this document

Table A-1. 2012 303(d) Impaired Waterbodies, Impairment Causes, Impaired Uses, and Impairment Cause Status in the Lower Gallatin Project Area

Waterbody & Location Description	Waterbody ID	Impairment Cause	TMDL Pollutant Category	Impaired Uses[a]	Impairment Cause Status
		Physical substrate habitat alterations	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Sedimentation/Siltation	Sediment	AQUATIC LIFE	Sediment TMDL contained in this document
SOUTH COTTONWOOD CREEK, Middle Creek Assoc Ditch diversion to mouth (Gallatin River)	MT41H002_031	Low flow alterations	Not a Pollutant	AQUATIC LIFE PRIMARY CONTACT RECREATION	Not yet addressed by a TMDL or restoration plan
STONE CREEK, headwaters to mouth (Bridger Creek)	MT41H003_120	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Sedimentation/Siltation	Sediment	AQUATIC LIFE	Sediment TMDL contained in this document
THOMPSON CREEK (Thompson Spring), headwaters to mouth (East Gallatin River)	MT41H003_090	Alteration in streamside or littoral vegetative covers	Not a Pollutant	AQUATIC LIFE	Addressed by sediment TMDL contained in this document
		Chlorophyll-*a*	Not a Pollutant	AQUATIC LIFE PRIMARY CONTACT RECREATION	Addressed by TN TMDL contained in this document
		Nitrogen (Total)	Nutrients	AQUATIC LIFE PRIMARY CONTACT RECREATION	TN TMDL contained in this document
		Sedimentation/Siltation	Sediment	AQUATIC LIFE	Sediment TMDL contained in this document

[a] Sourdough Creek is identified on the high resolution National Hydrography Dataset (NHD) as Bozeman Creek and will be referred to as Bozeman Creek here. [b] Cause Unknown for Dry Creek linked to high fecal coliform counts in 1970s in assessment file; not enough data to make a final assessment; future monitoring for *E. coli* has been advised.

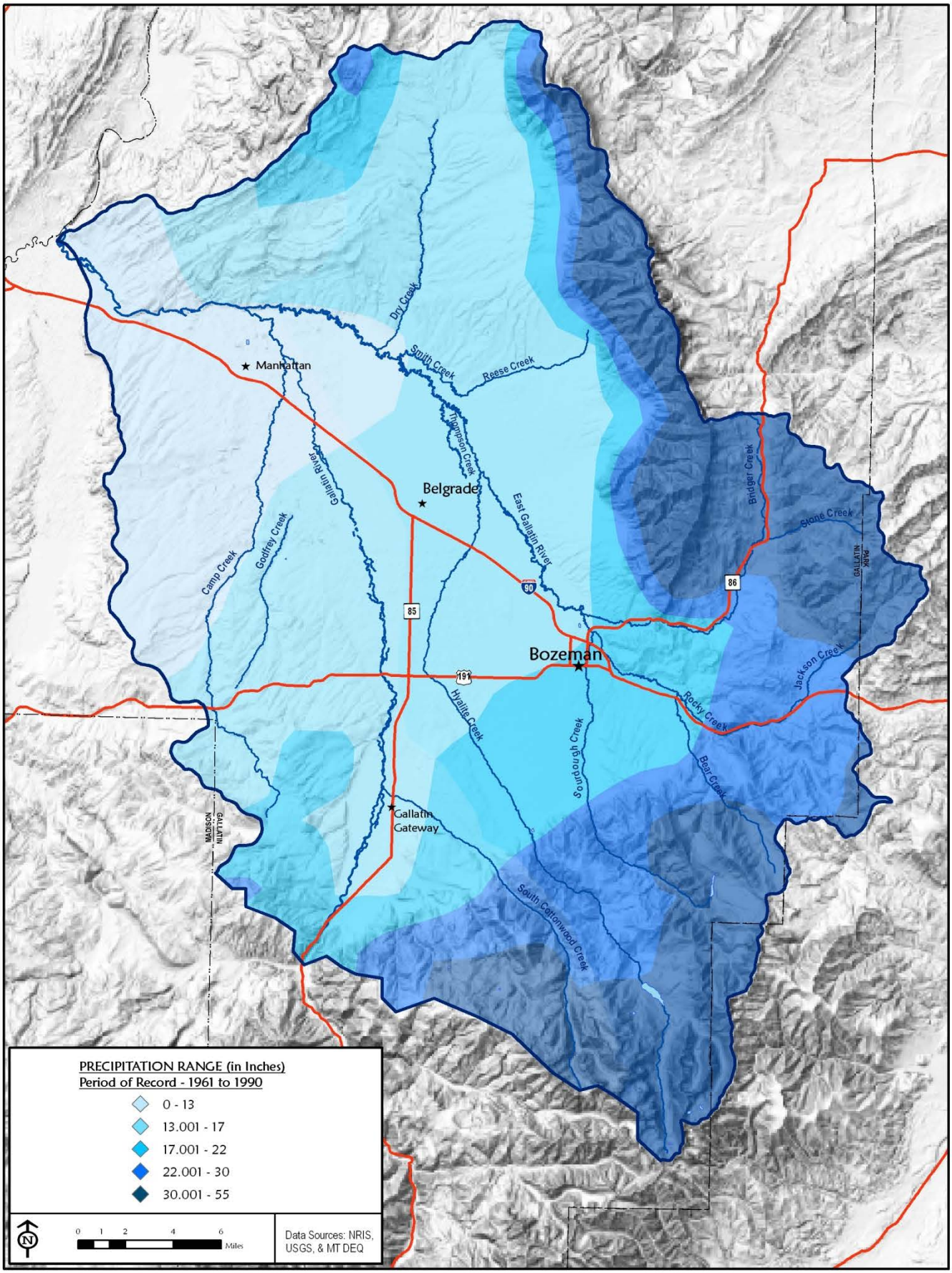

Figure A-2. Precipitation in the Lower Gallatin TMDL Planning Area

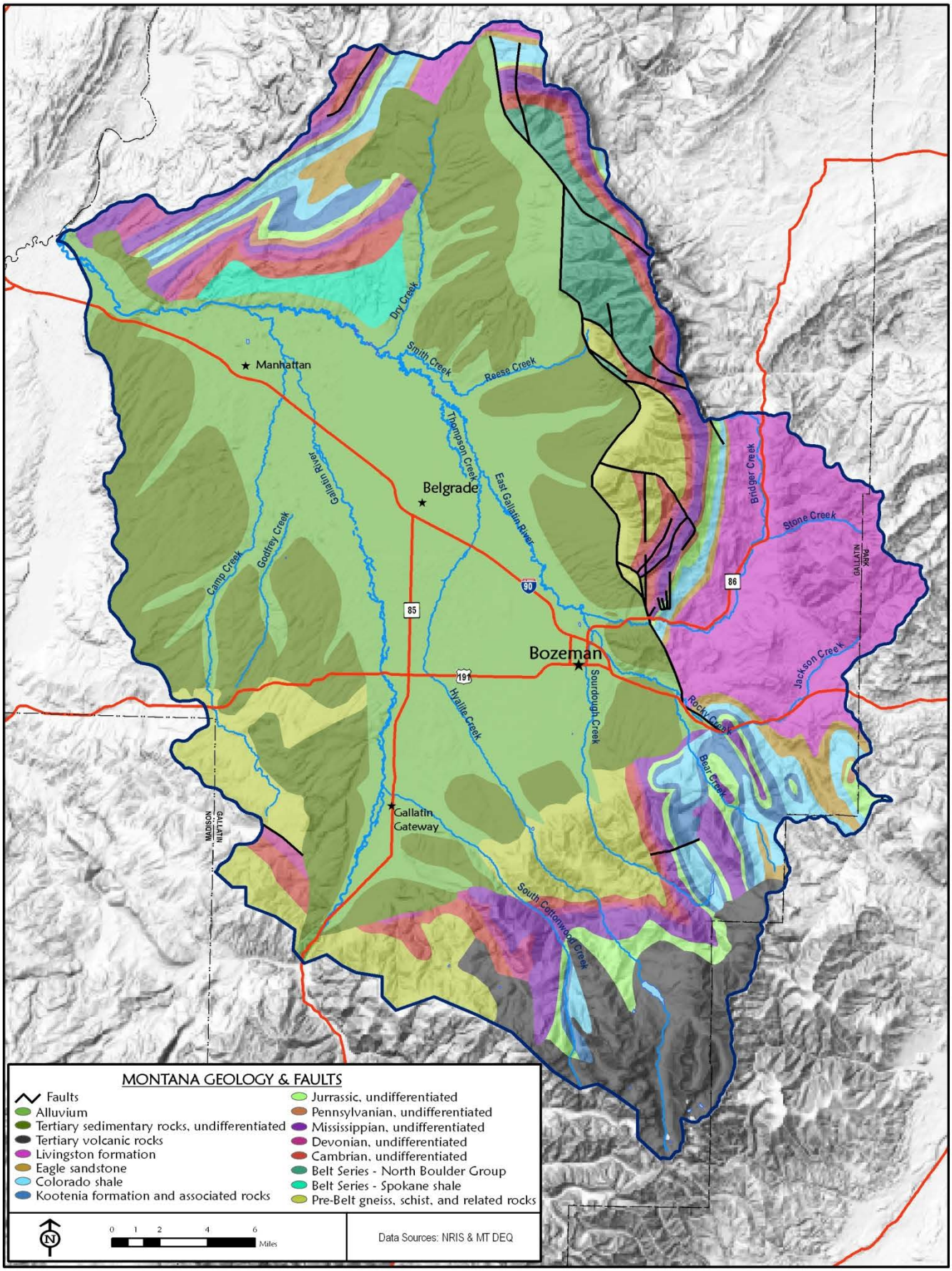

Figure A-3. Geology of the Lower Gallatin TMDL Planning Area

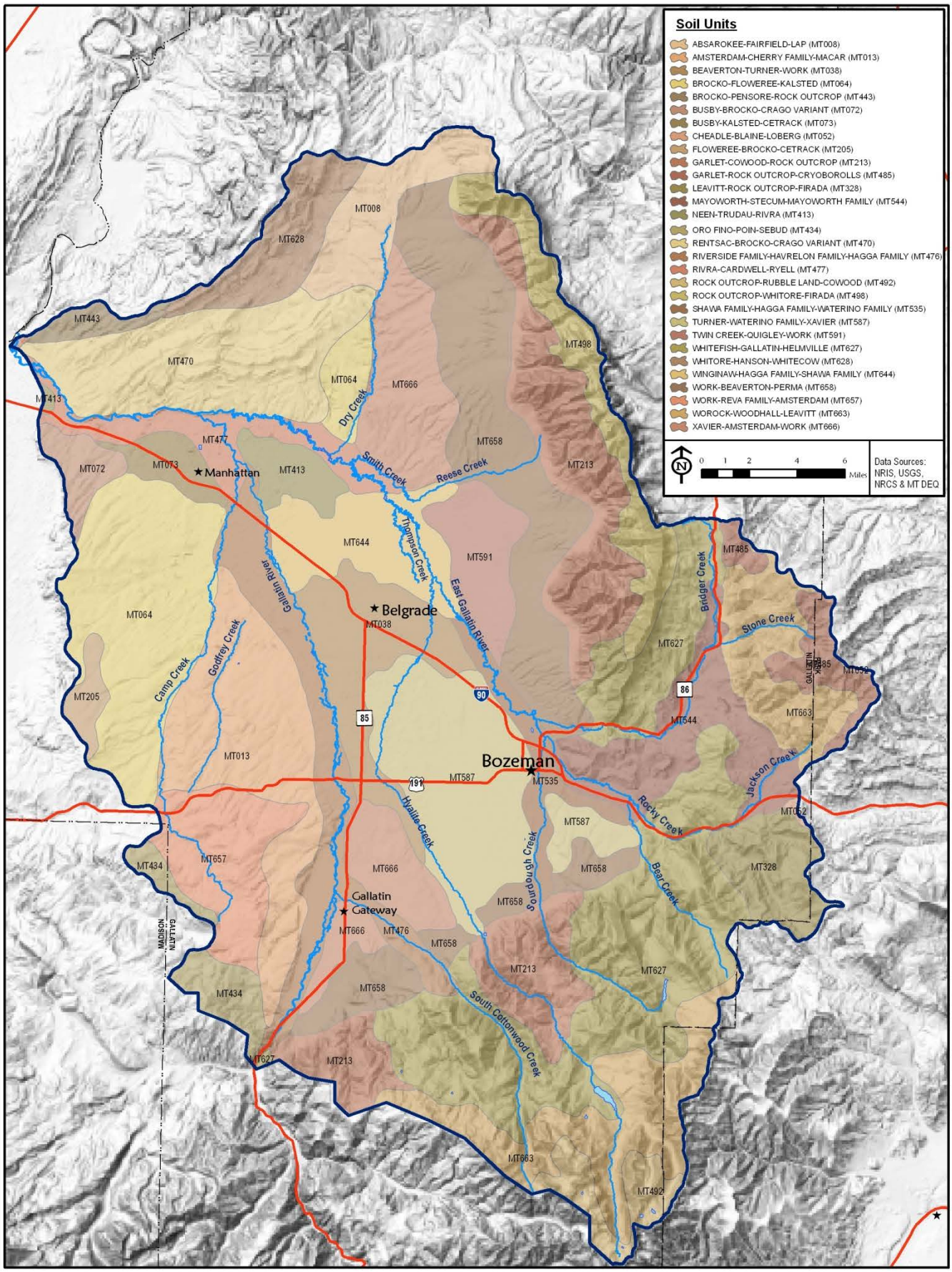

Figure A-4. Soil Units of the Lower Gallatin TMDL Planning Area

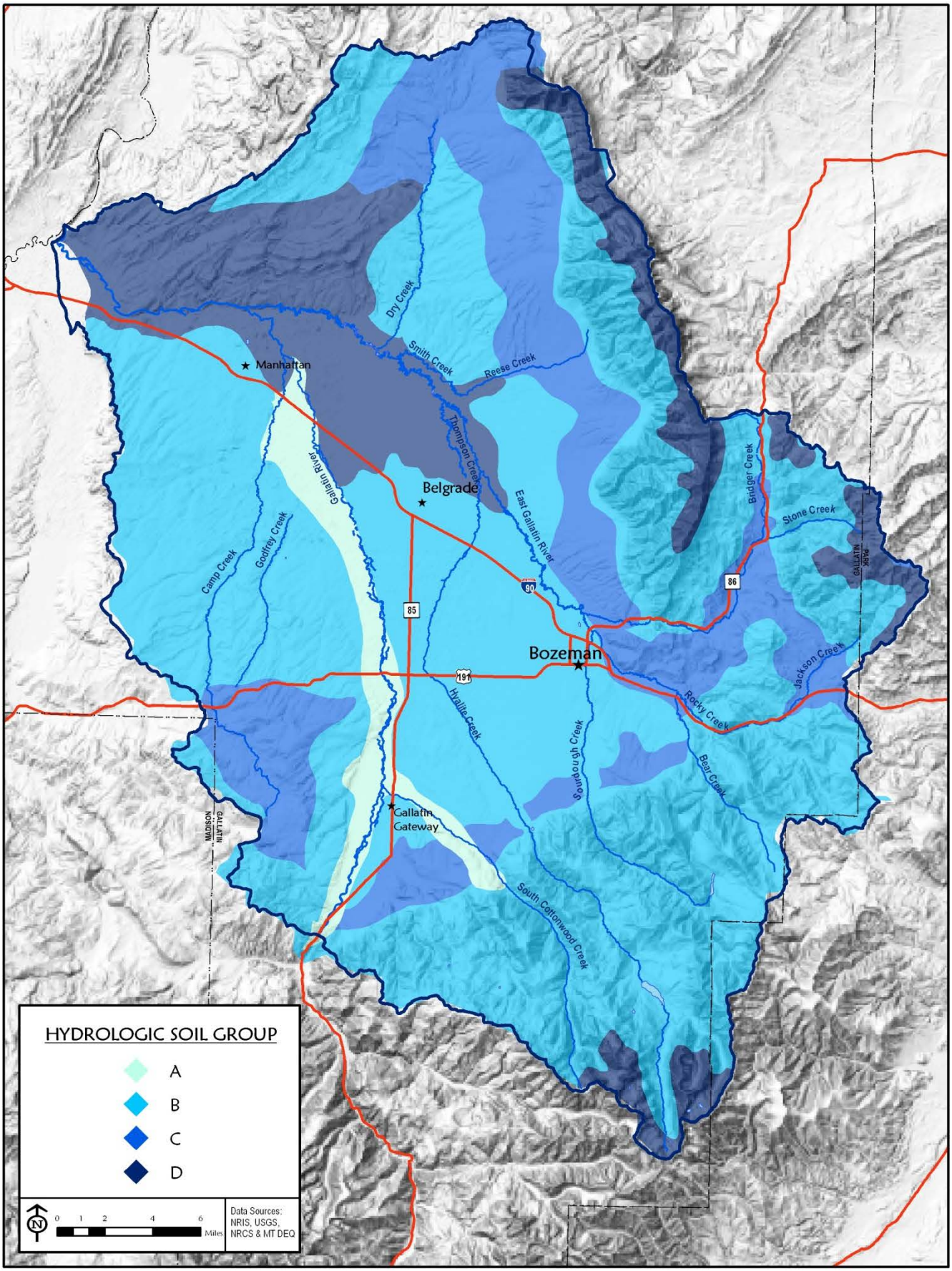

Figure A-5. Hydrologic Soil Groups in the Lower Gallatin TMDL Planning Area

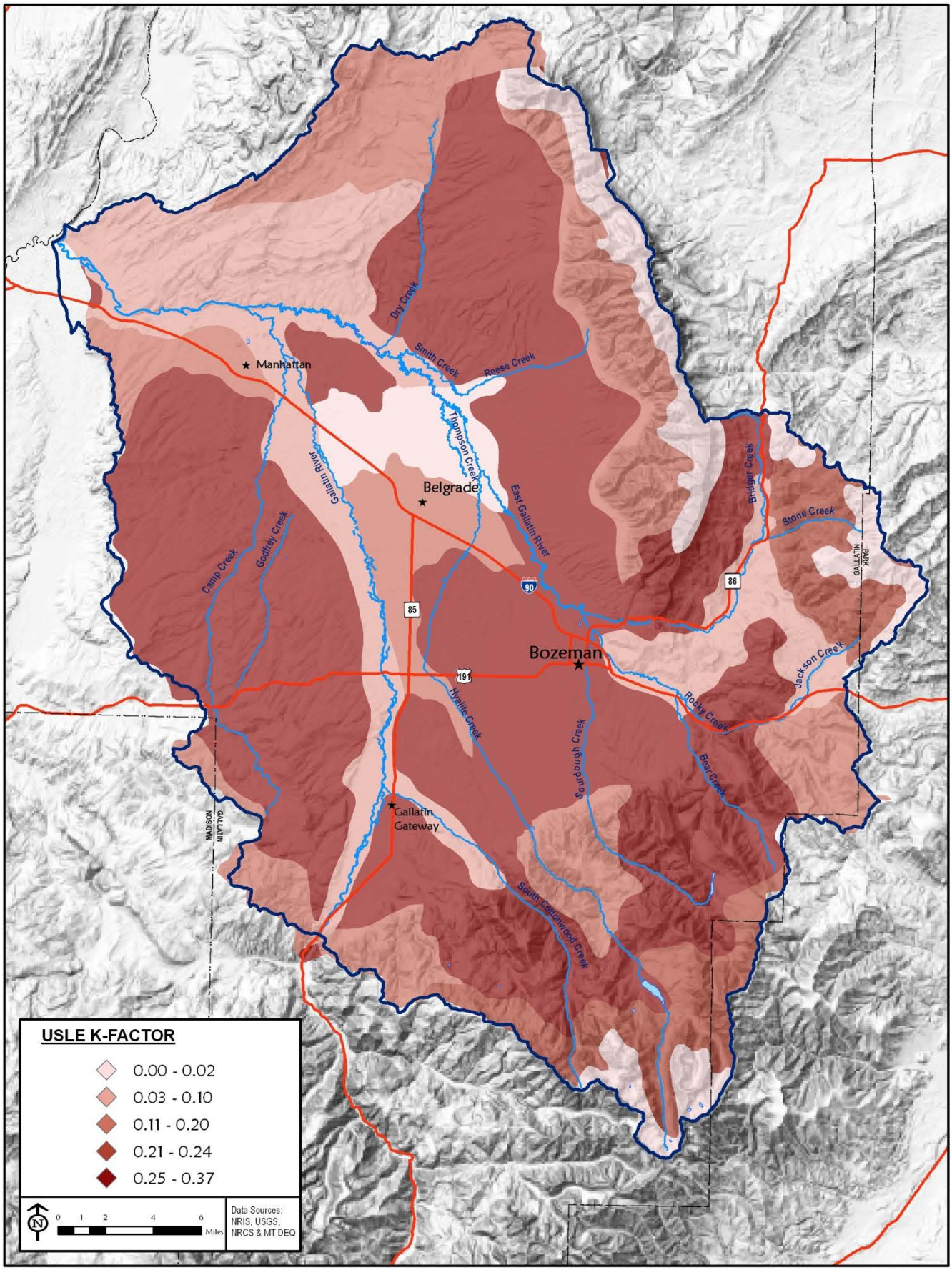

Figure A-6. Universal Soil Loss Equation (USLE) Factor "K" in the Lower Gallatin TMDL Planning Area

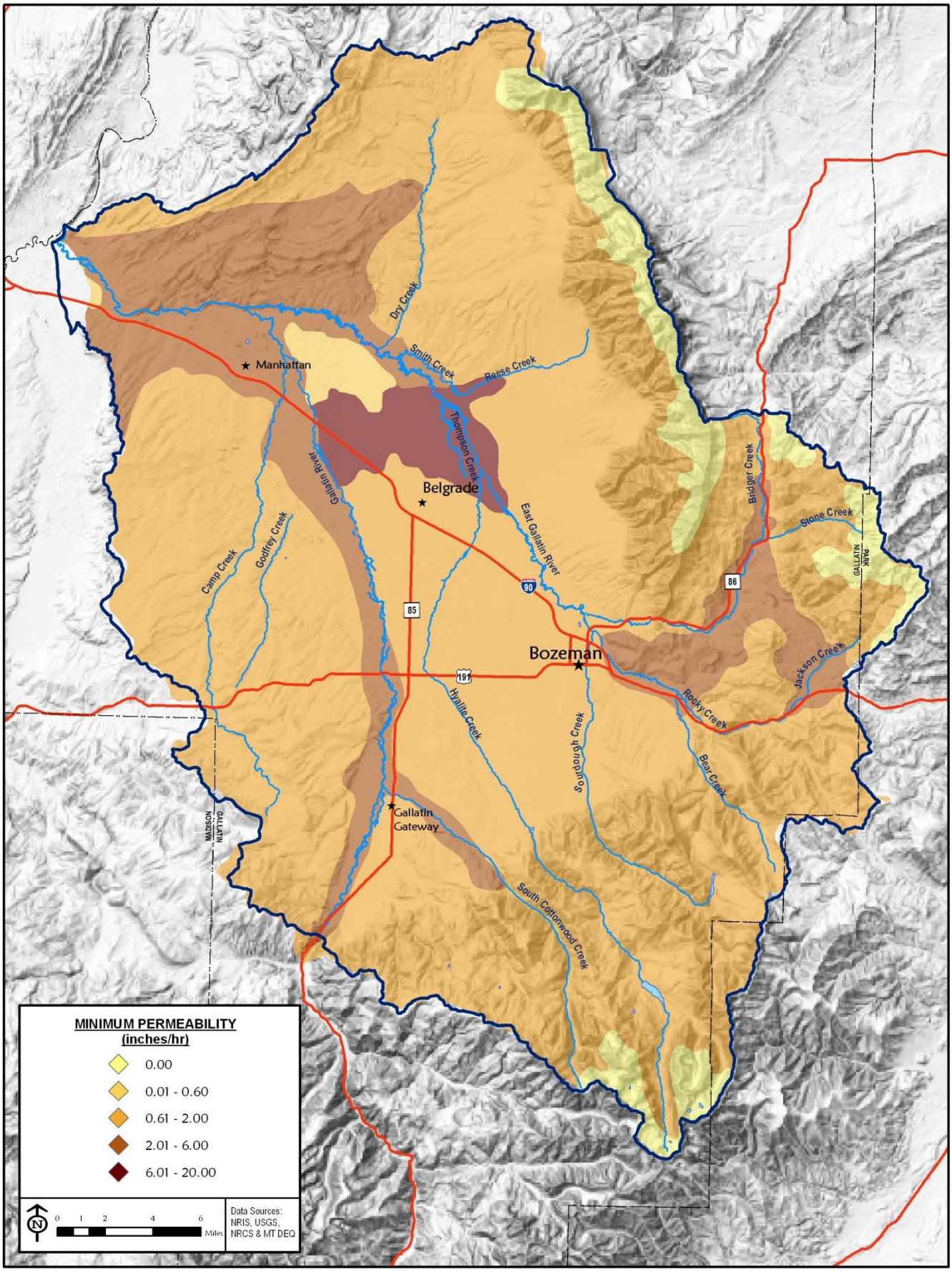

Figure A-7. Soil Permeabilities in the Lower Gallatin TMDL Planning Area

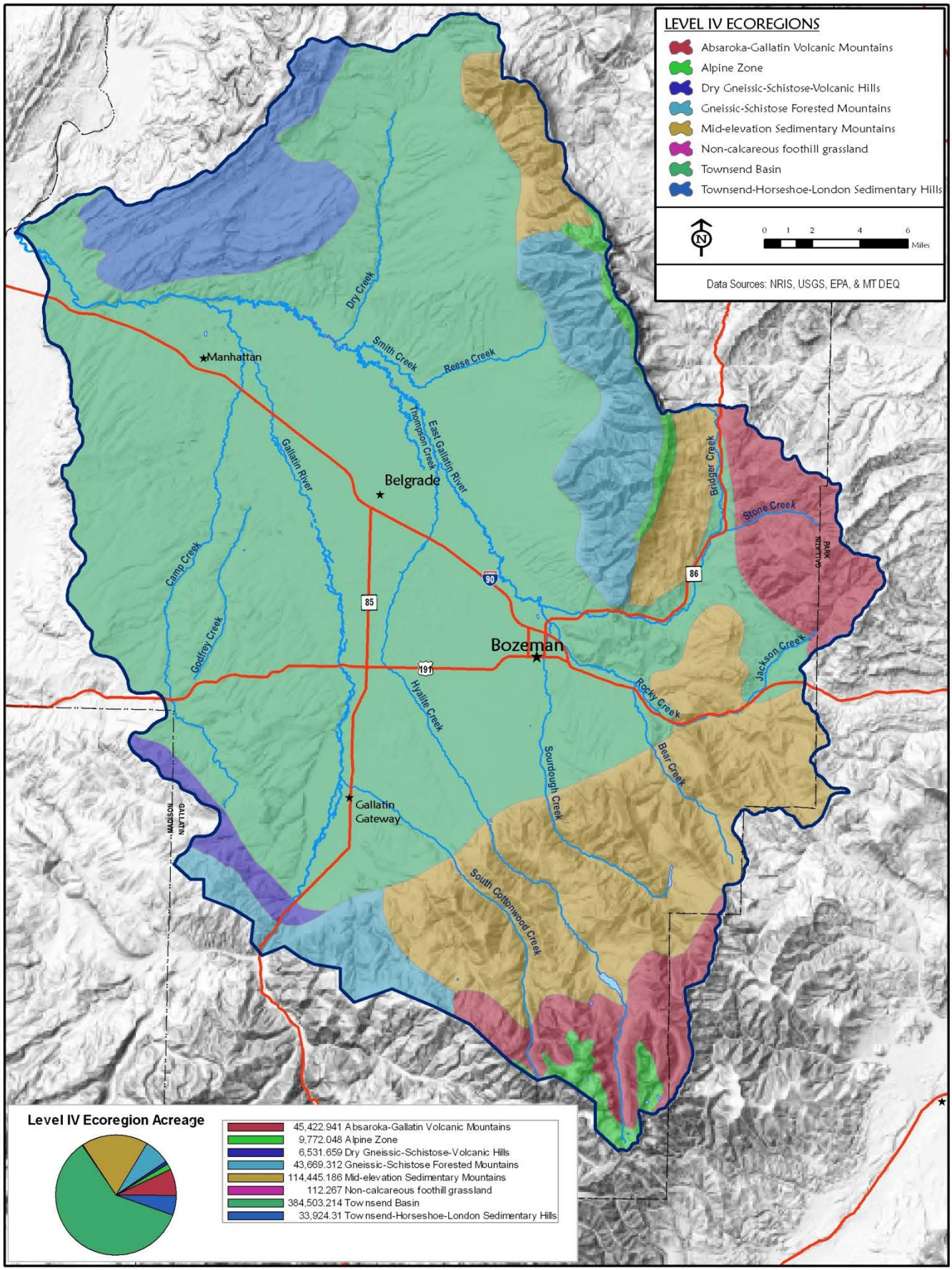

Figure A-8. Level IV Ecoregions Found in the Lower Gallatin TMDL Planning Area

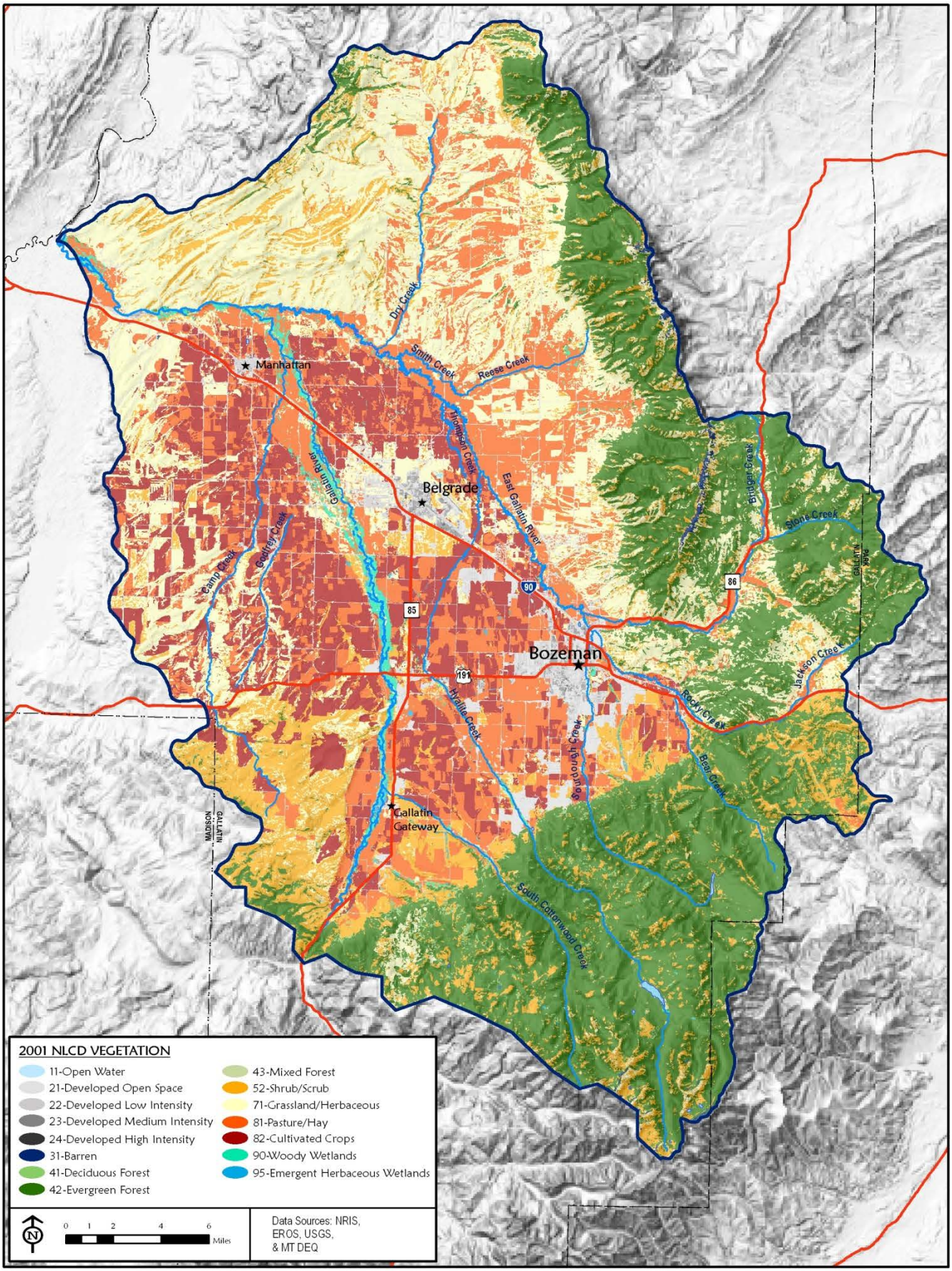

Figure A-9. National Land Cover Data Vegetation Types in the Lower Gallatin TMDL Planning Area

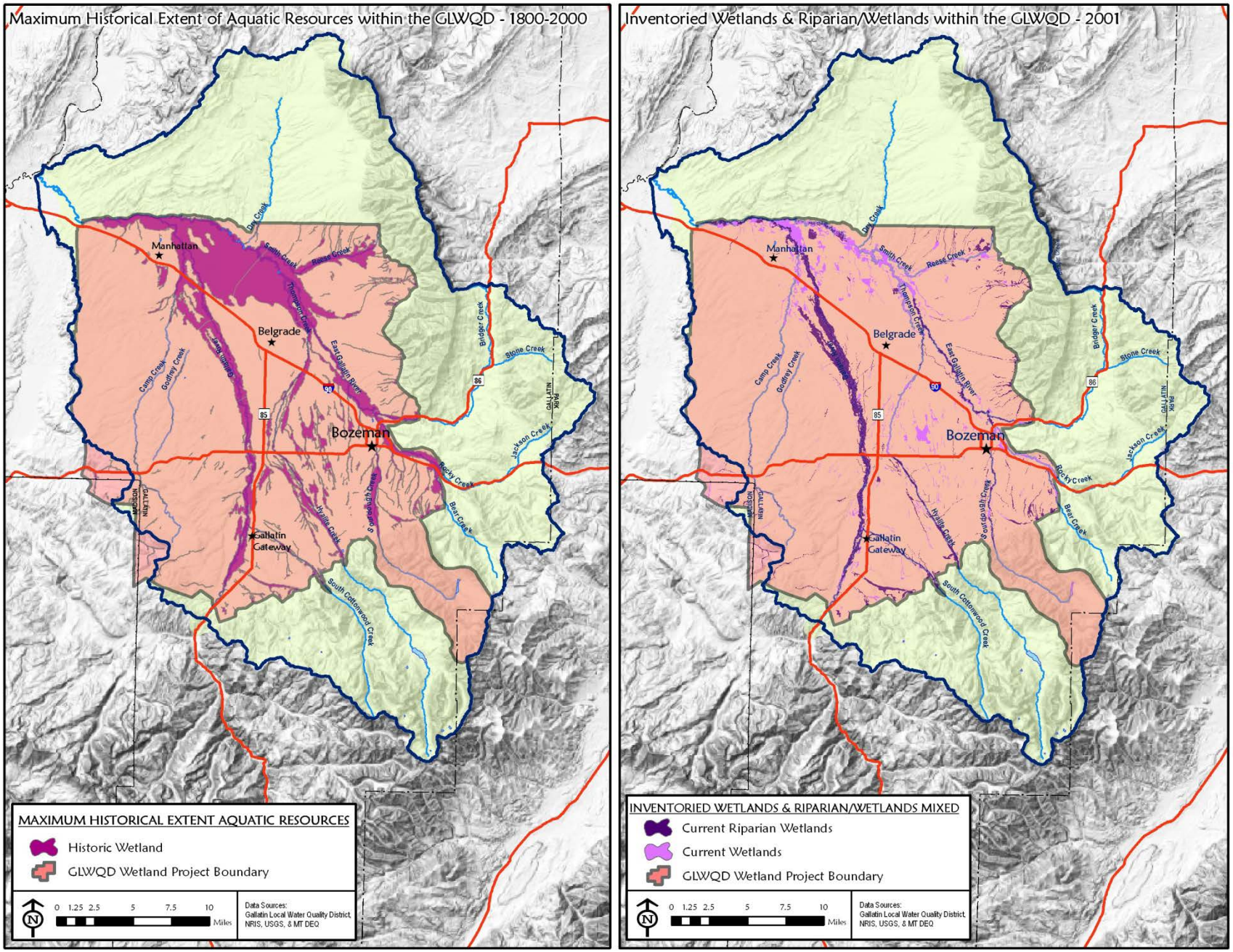

Figure A-10. Riparian/Wetland Areas in the Gallatin Local Water Quality District

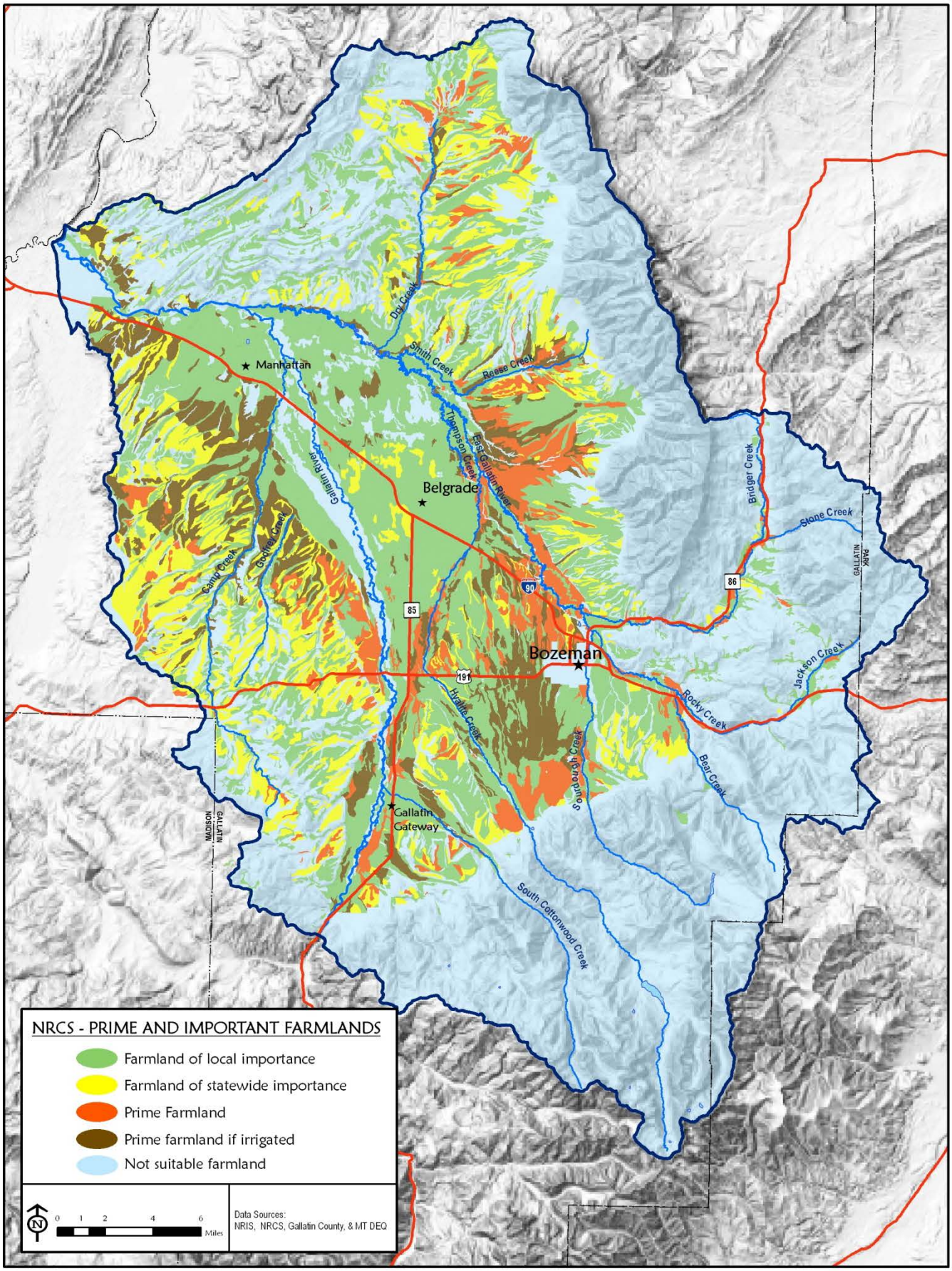

Figure A-11. Prime and Important Farmlands in the Lower Gallatin TMDL Planning Area

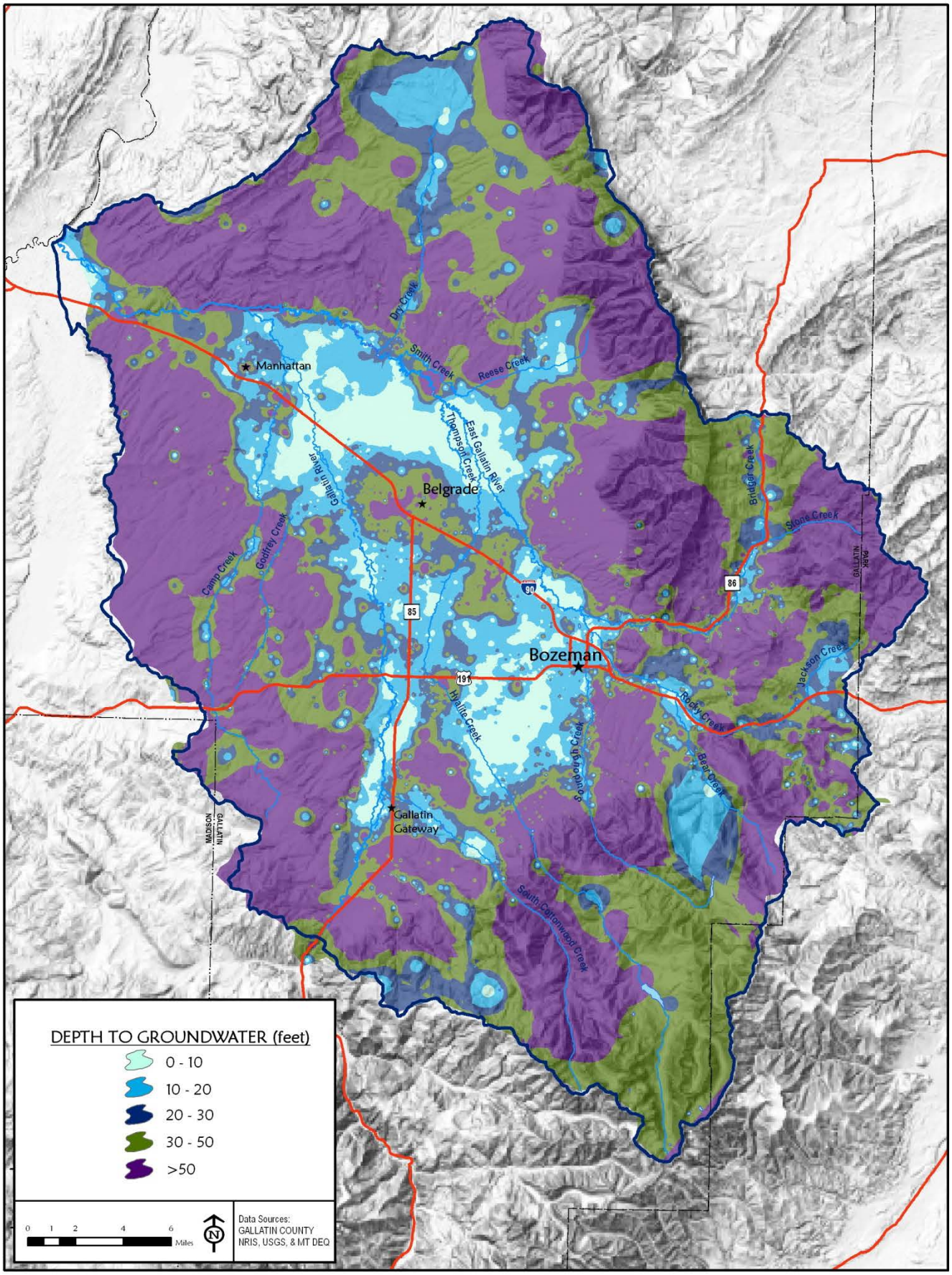

Figure A-12. Estimated Average Depth to Groundwater Based on Static Groundwater

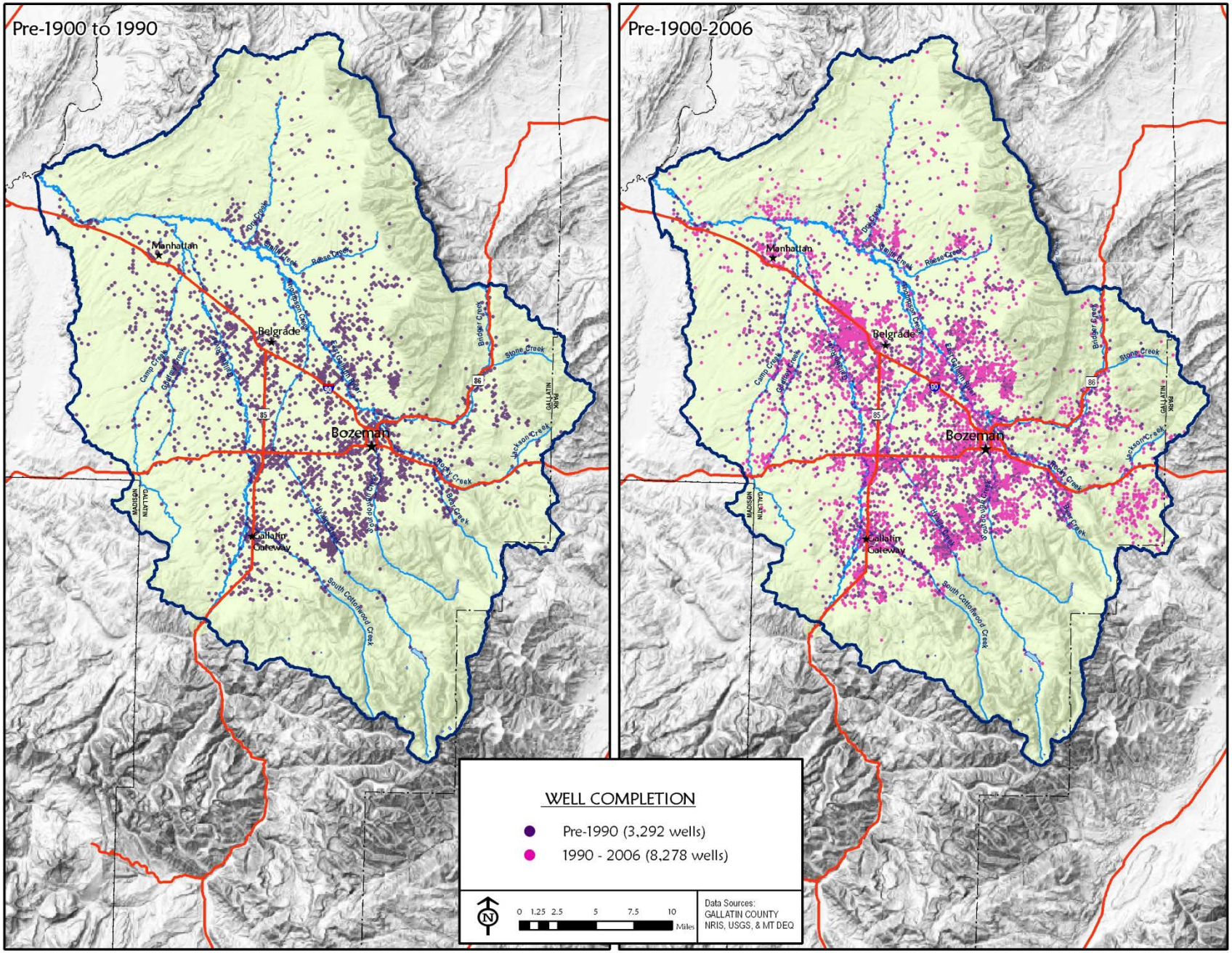

Figure A-13. Changes in the Number of Groundwater Wells Installed Over Time in the Lower Gallatin TMDL Planning Area

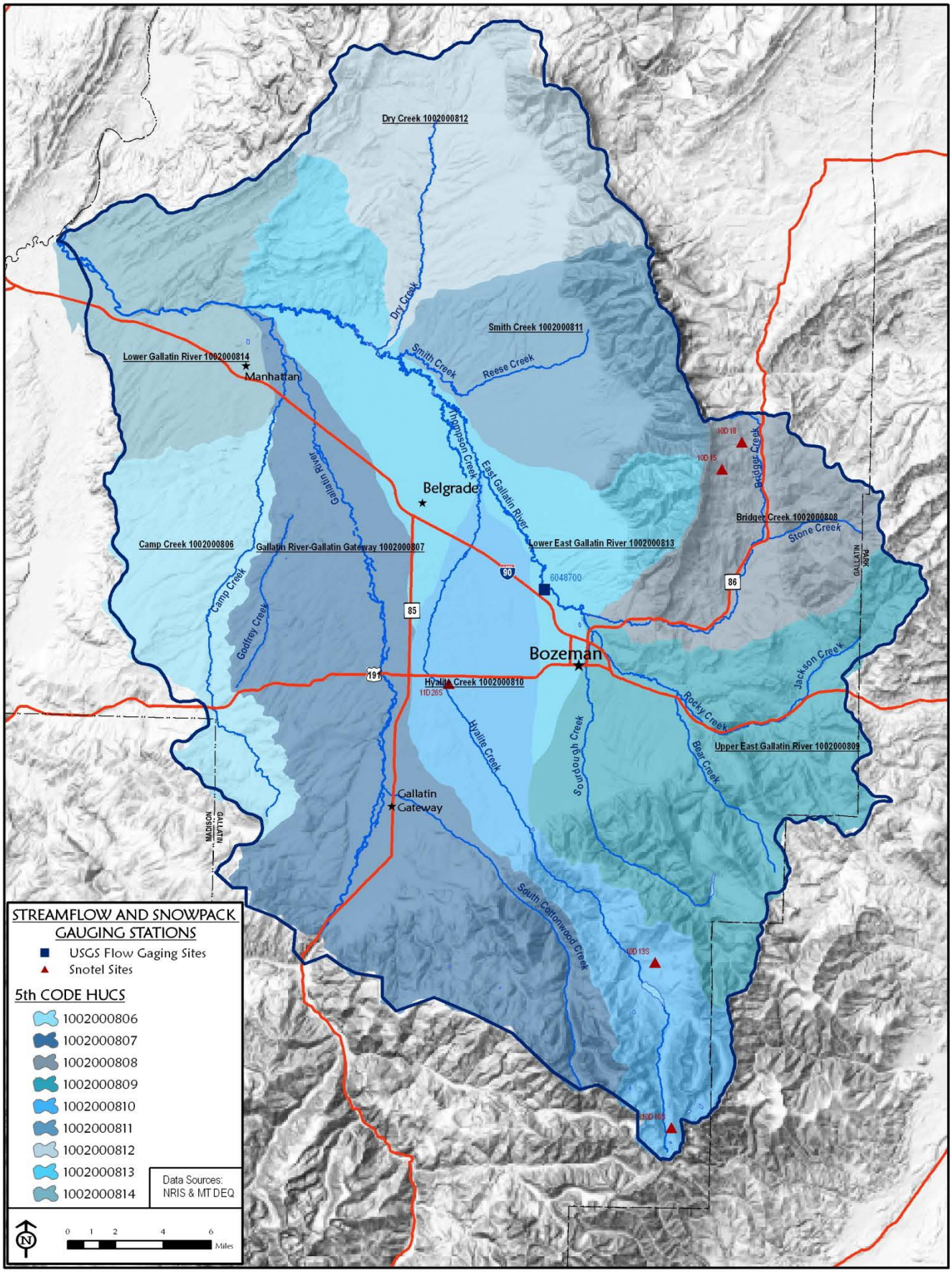

Figure A-14. Fifth Code Hydrologic Unit Code Areas, SNOTEL Stations and Stream Gaging Locations

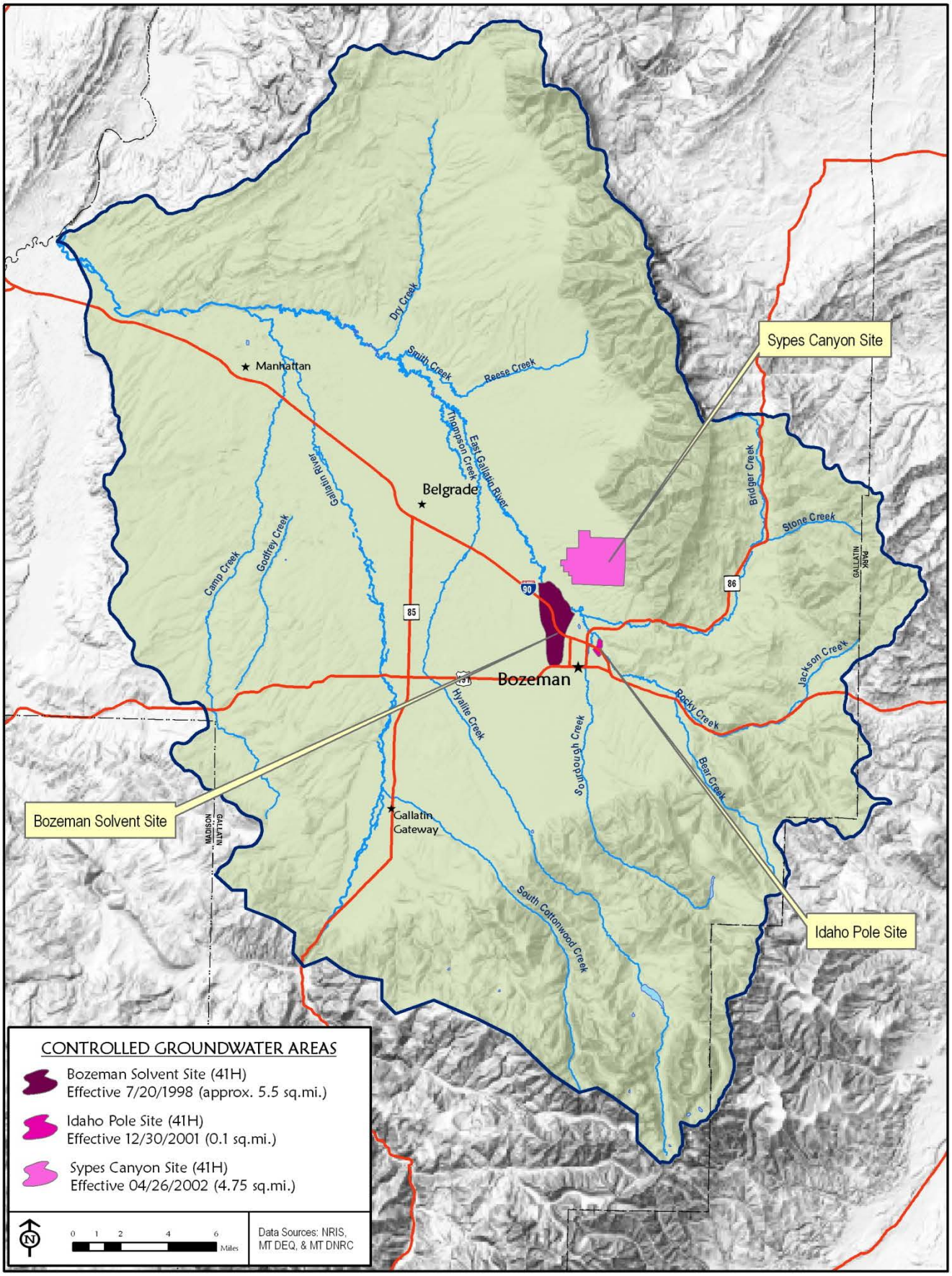

Figure A-15. Controlled Groundwater Areas in the Lower Gallatin TMDL Planning Area

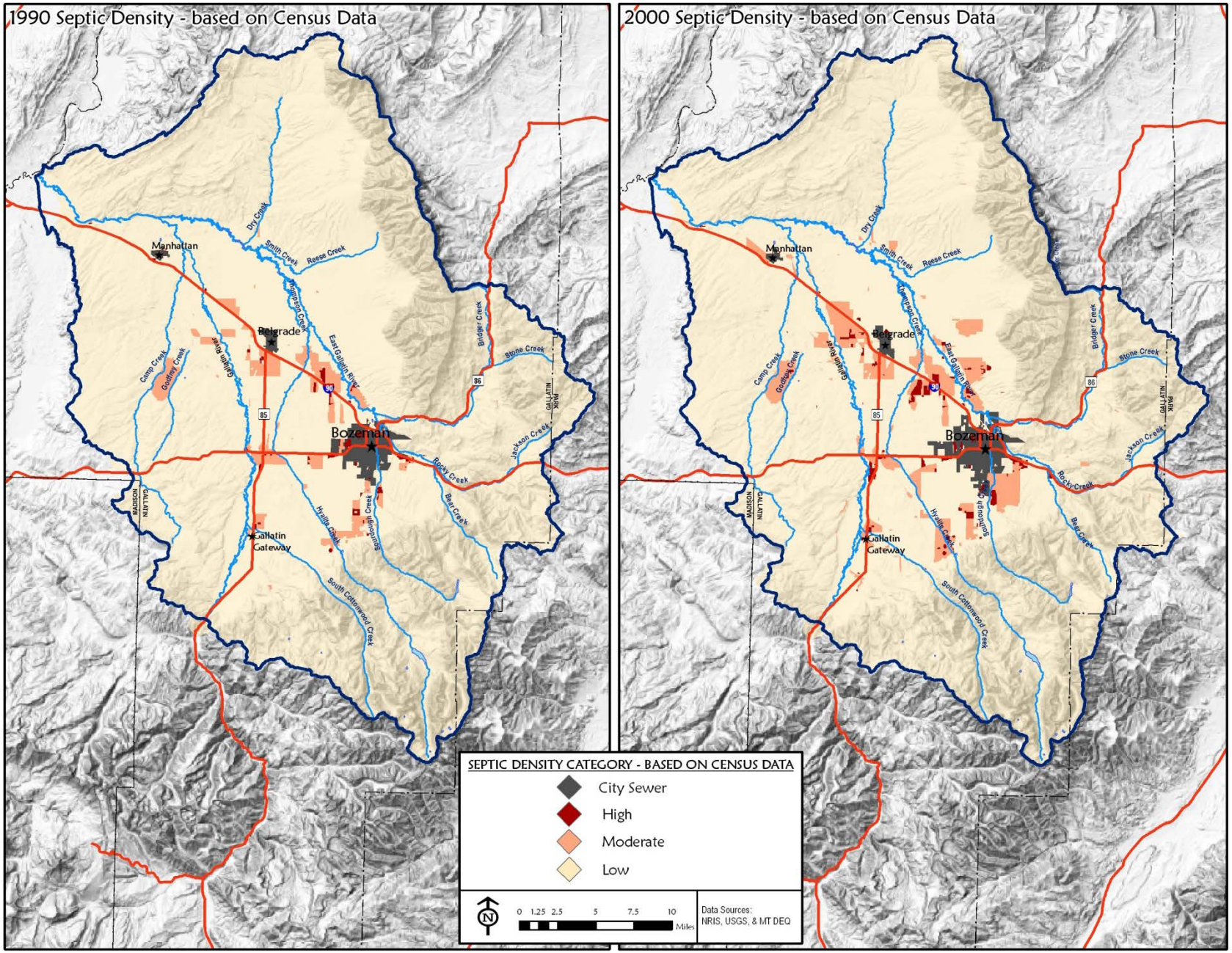

Figure A-16. Changes in Septic System Densities between 1990 and 2000 in the Lower Gallatin TMDL Planning Area

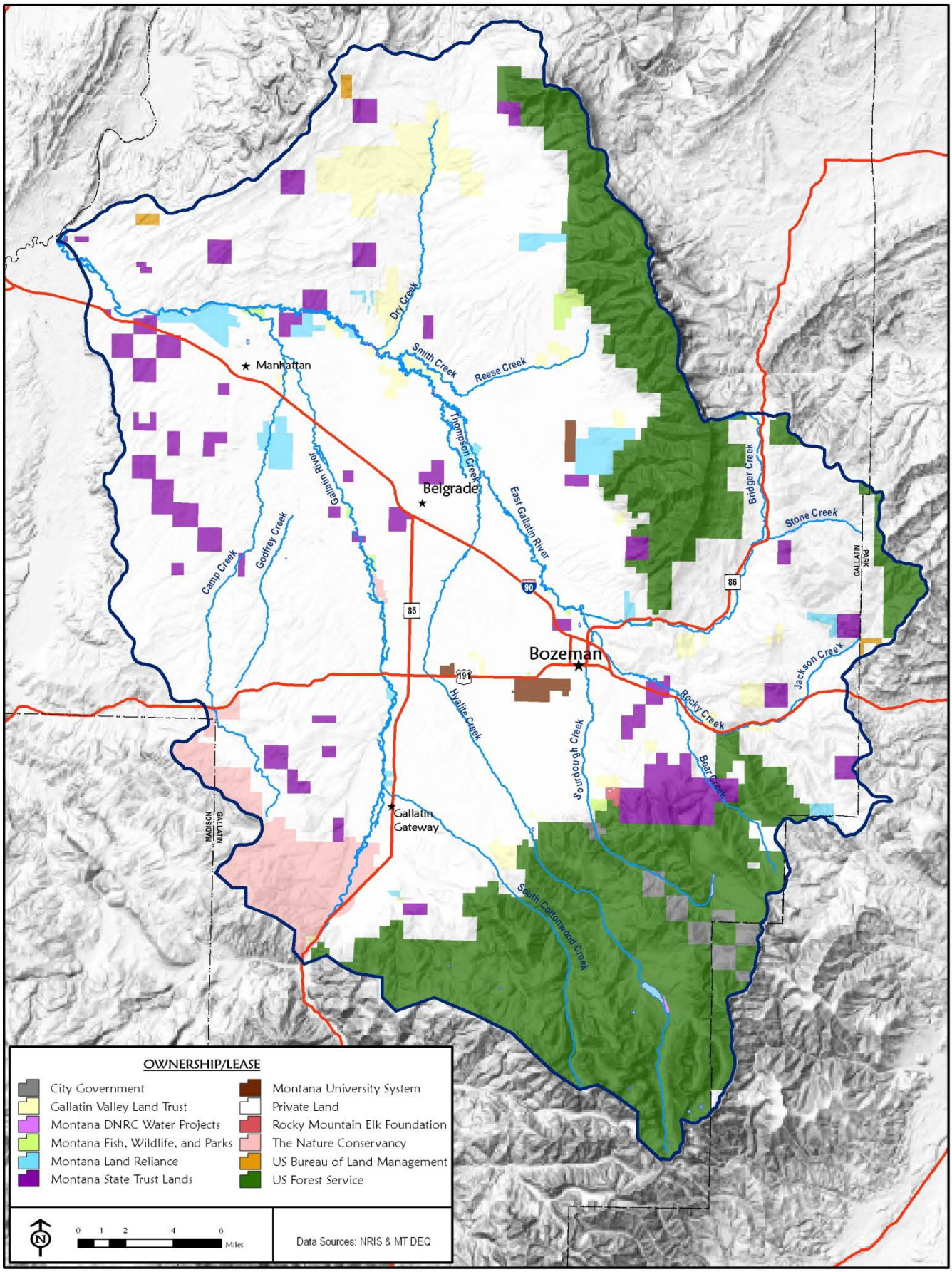

Figure A-17. Land Ownership within the Lower Gallatin TMDL Planning Area

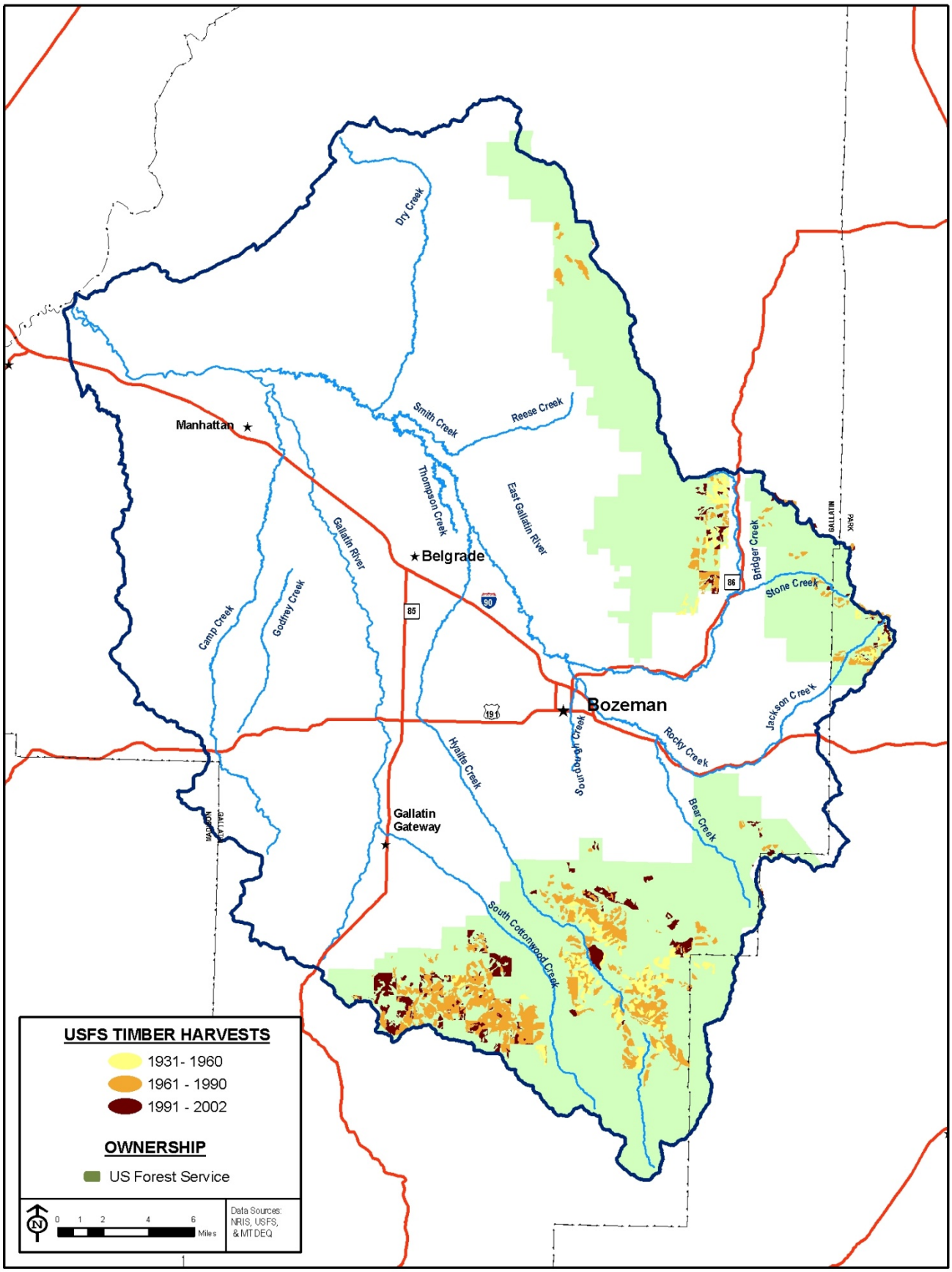

Figure A-18. Timber Harvests within the Lower Gallatin TMDL Planning Area

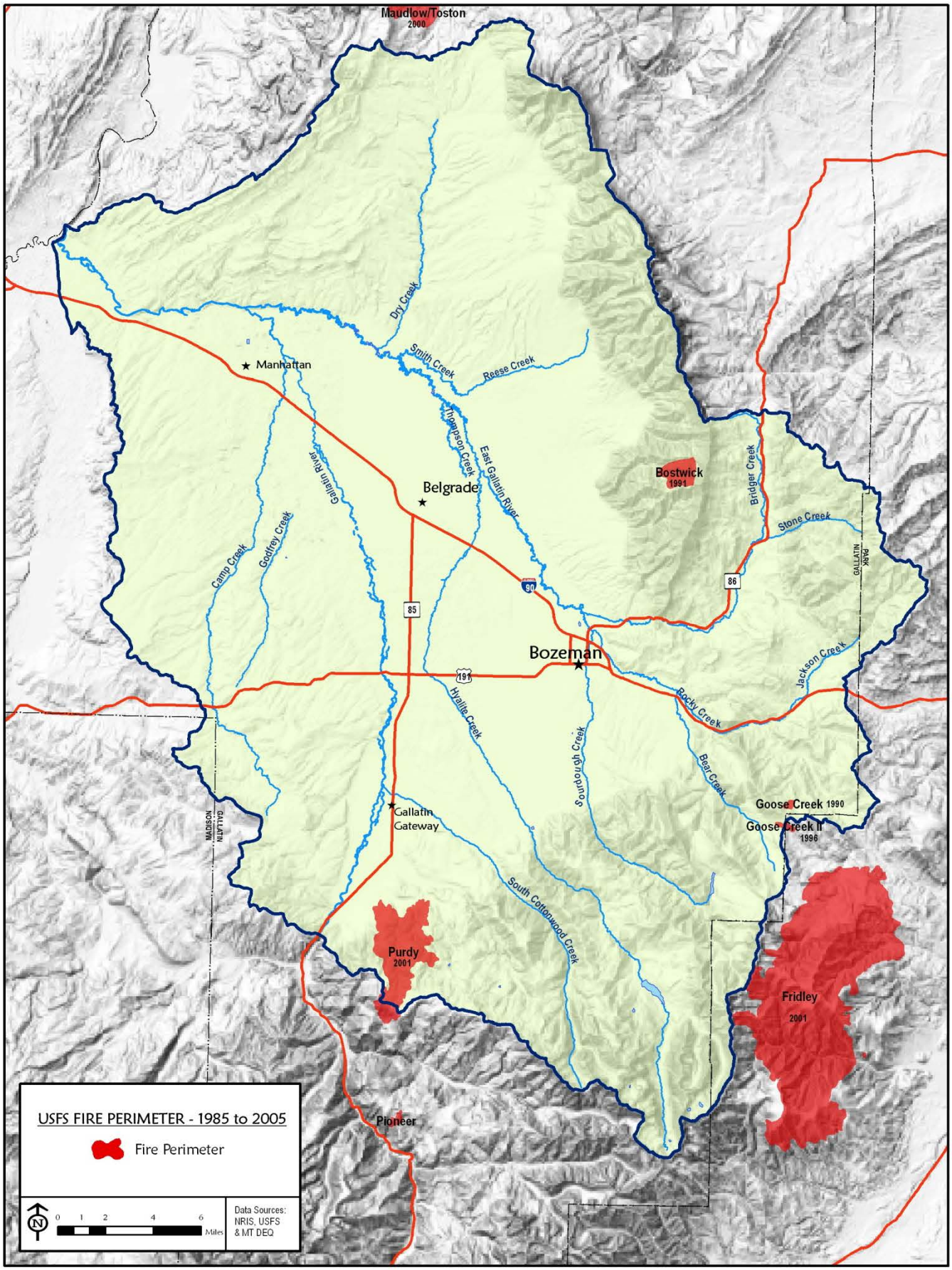

Figure A-19. Historic Wildland Fires within the Lower Gallatin TMDL Planning Area

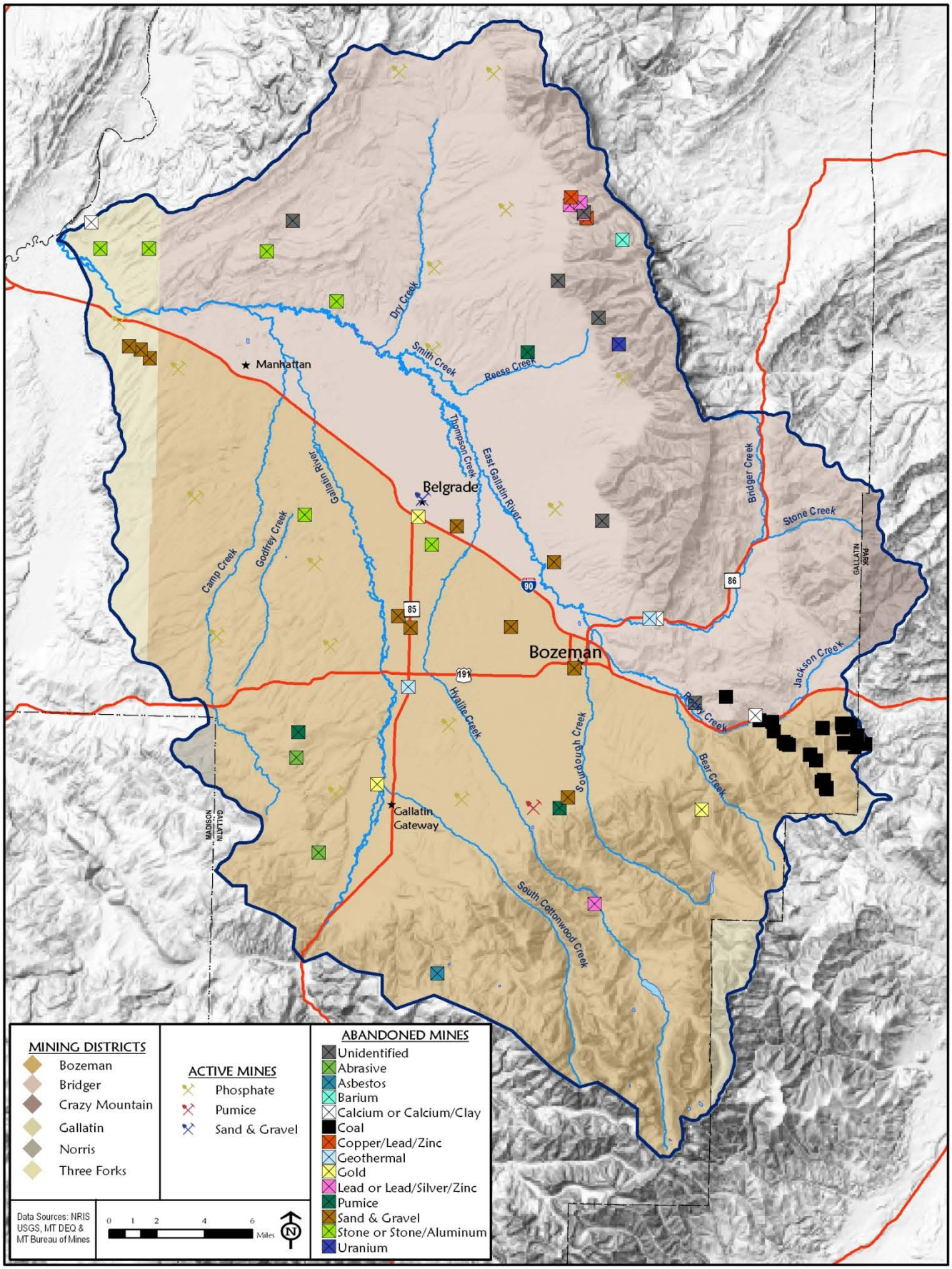

Figure A-20. Active and Abandoned Mines within the Lower Gallatin TMDL Planning Area

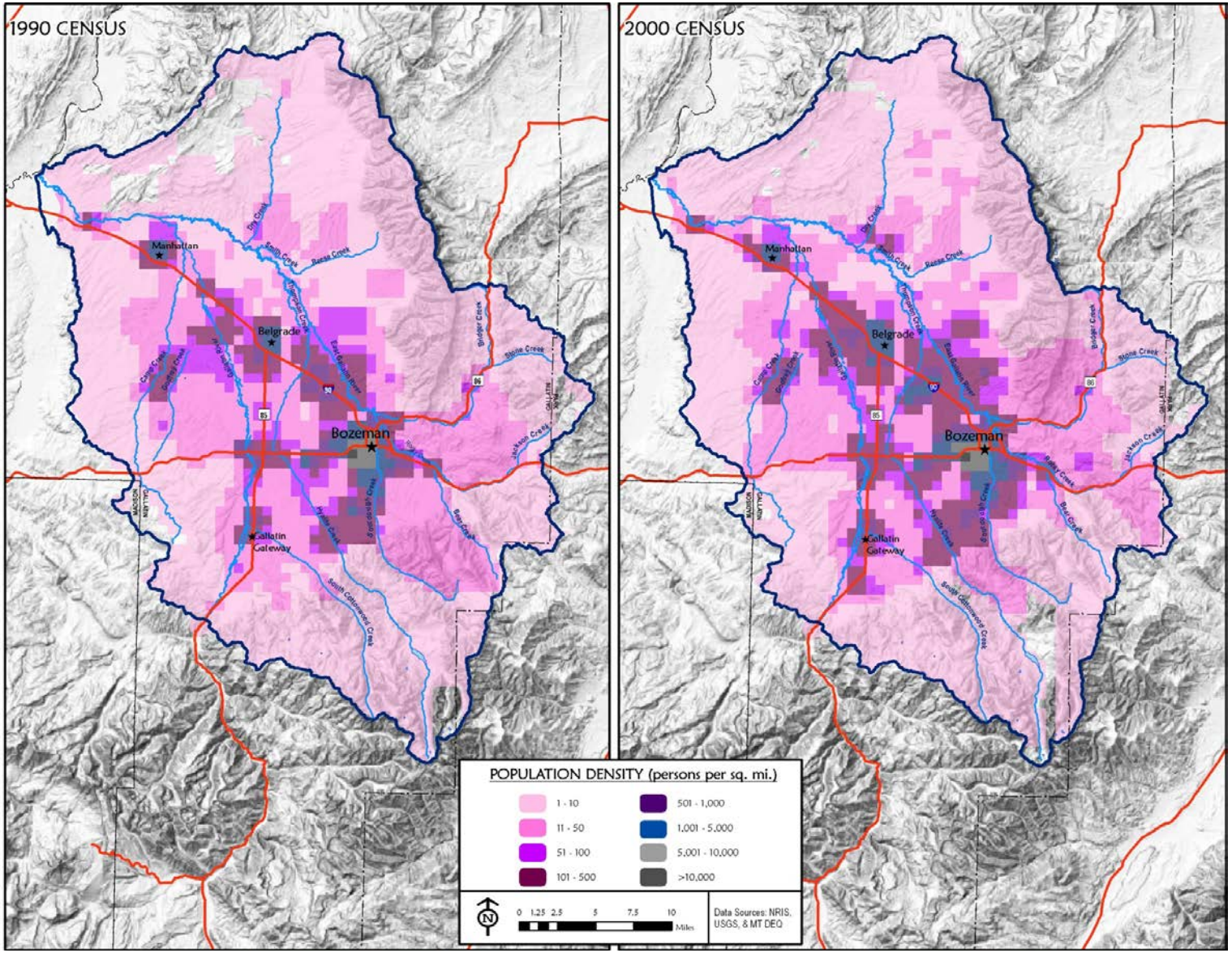

Figure A-21. Changes in Population Density between 1990 and 2000 in the Lower Gallatin TMDL Planning Area

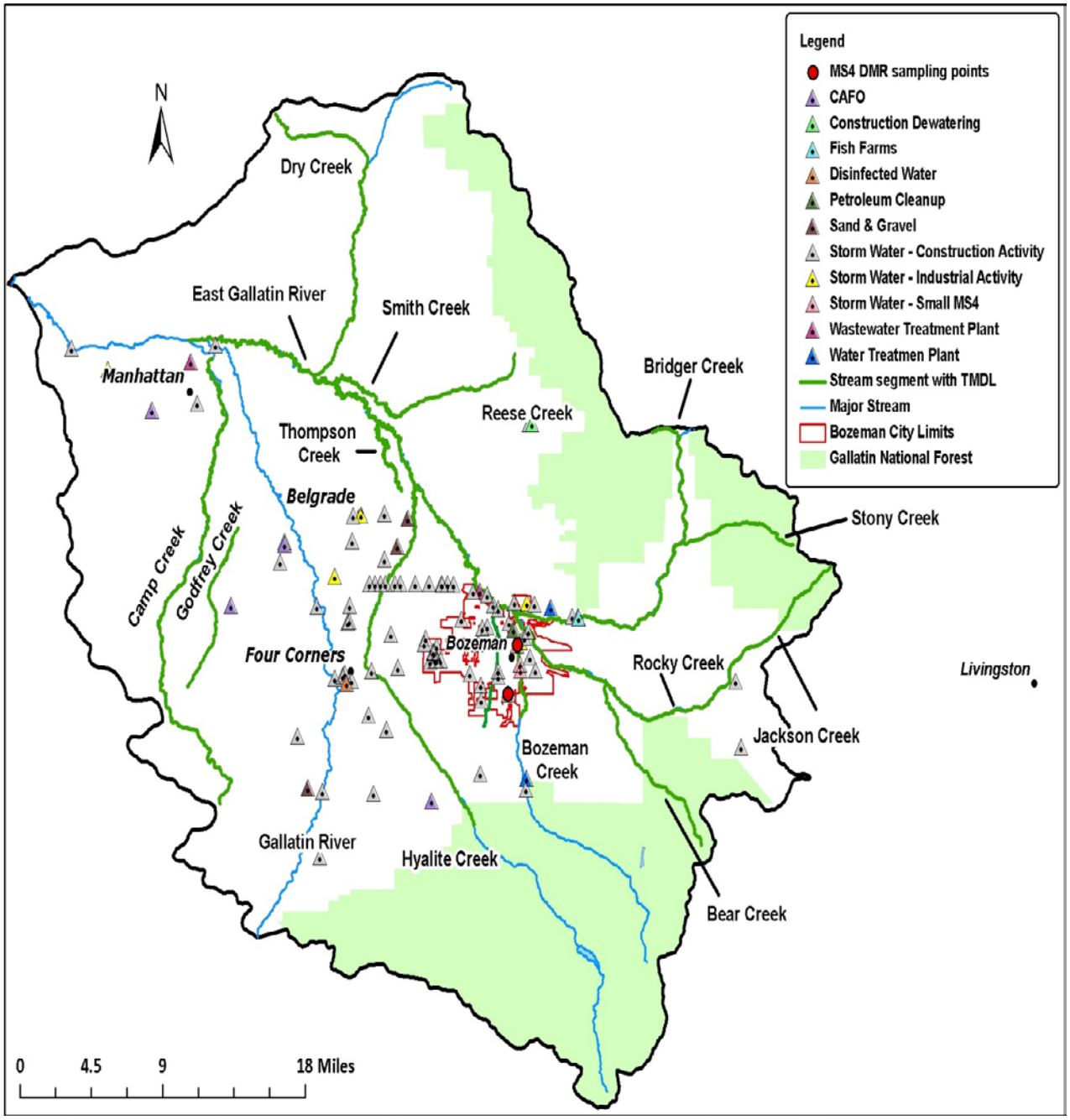

Figure A-22. Location of active Montana Pollutant Discharge Elimination Systems as of March 19, 2012