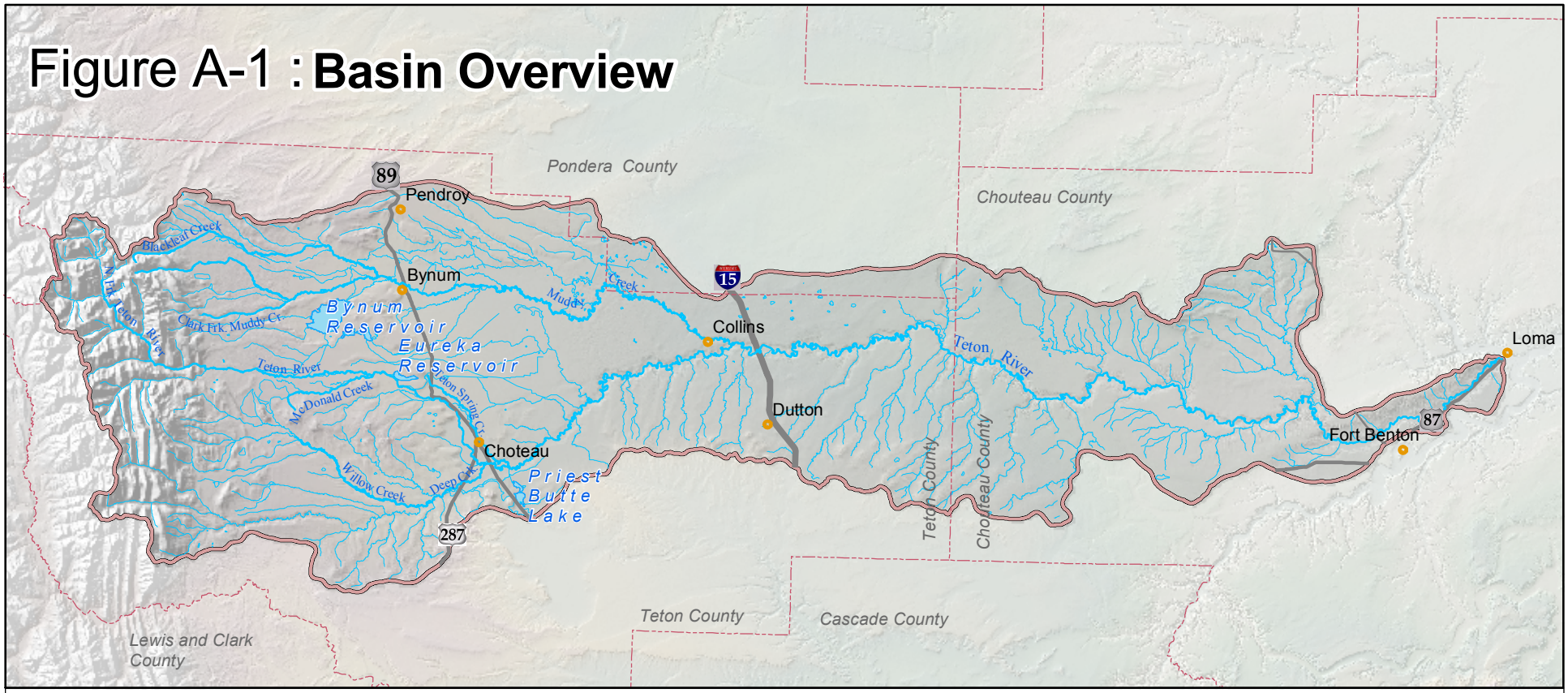
APPENDIX A
THEMATIC MAPS OF THE TETON RIVER WATERSHED

Figure A-1 : **Basin Overview**



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

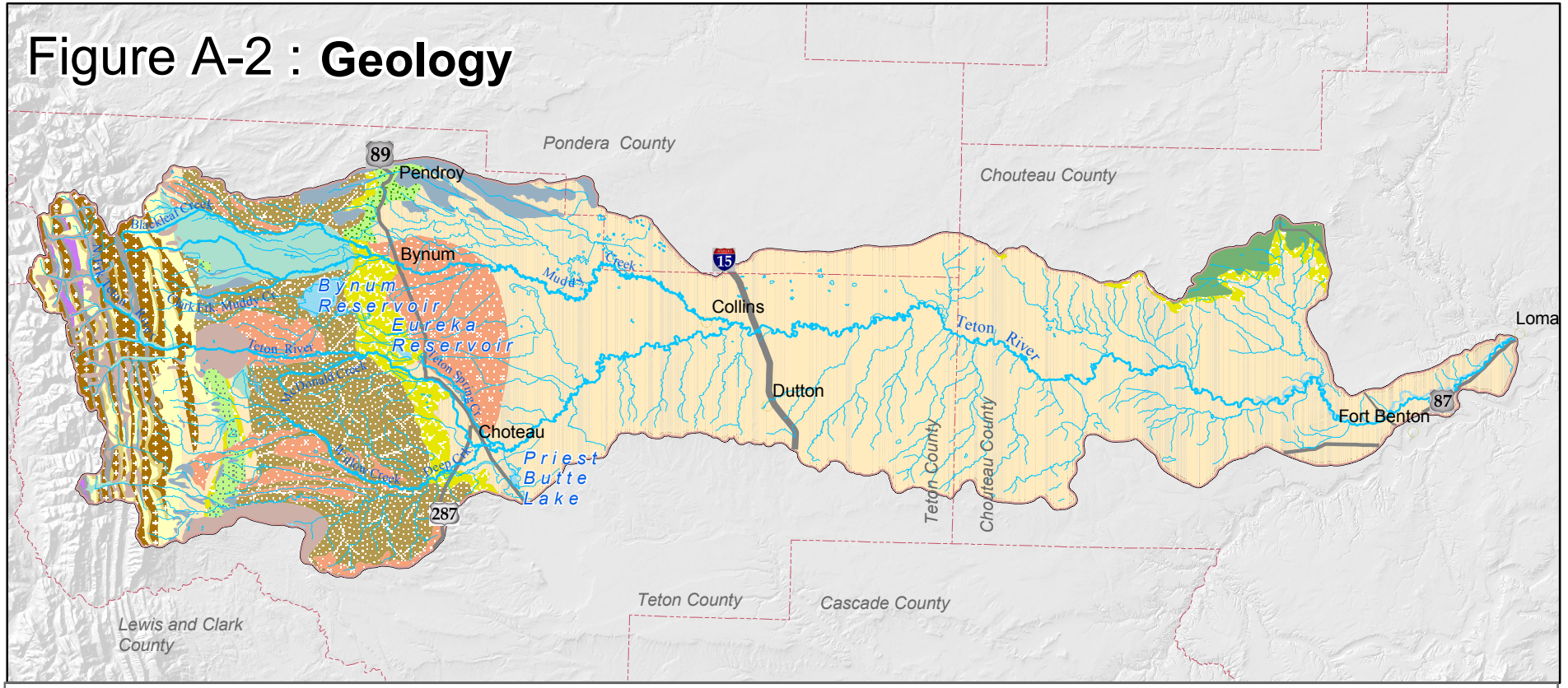
Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

N

LEGEND

- Teton Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

Figure A-2 : **Geology**



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 2 0 4 8 12 16 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

LEGEND

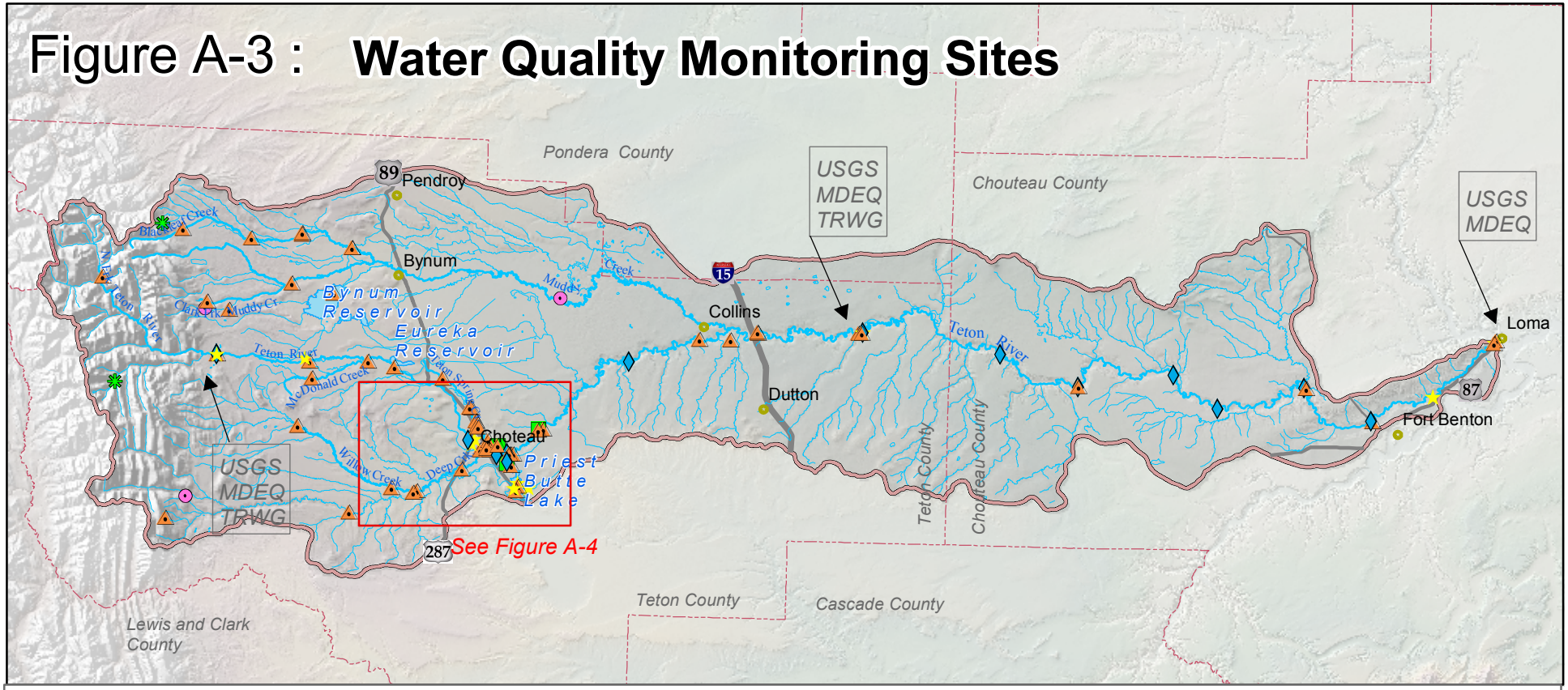
- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

FORMATION

Qal, Qg, QTt, Ts, Km, Kcl, Keu, Kvi, Ktc, Ktm, Kc, Kk, Ju, Mu, Du, Cu, OW *open water*

Formation		Unit Name
Qal	.....	Alluvium
Qg	.....	Glacial
QTt	.....	Terrace deposits
Ts	.....	Tertiary sedimentary rocks, undifferentiated
Km	.....	Montana group, undifferentiated
Kcl	.....	Claggett formation
Keu	.....	Eagle sandstone
Kvi	.....	Virgelle sandstone
Ktc	.....	Telegraph Creek formation
Ktm	.....	Two Medicine formation
Kc	.....	Colorado shale
Kk	.....	Kootenia formation and associated rocks
Ju	.....	Jurrassic, undifferentiated
Mu	.....	Mississippian, undifferentiated
Du	.....	Devonian, undifferentiated
Cu	.....	Cambrian, undifferentiated

Figure A-3 : Water Quality Monitoring Sites



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS). The coordinates for monitoring stations were obtained from a variety of sources and represent an approximate location of the station.

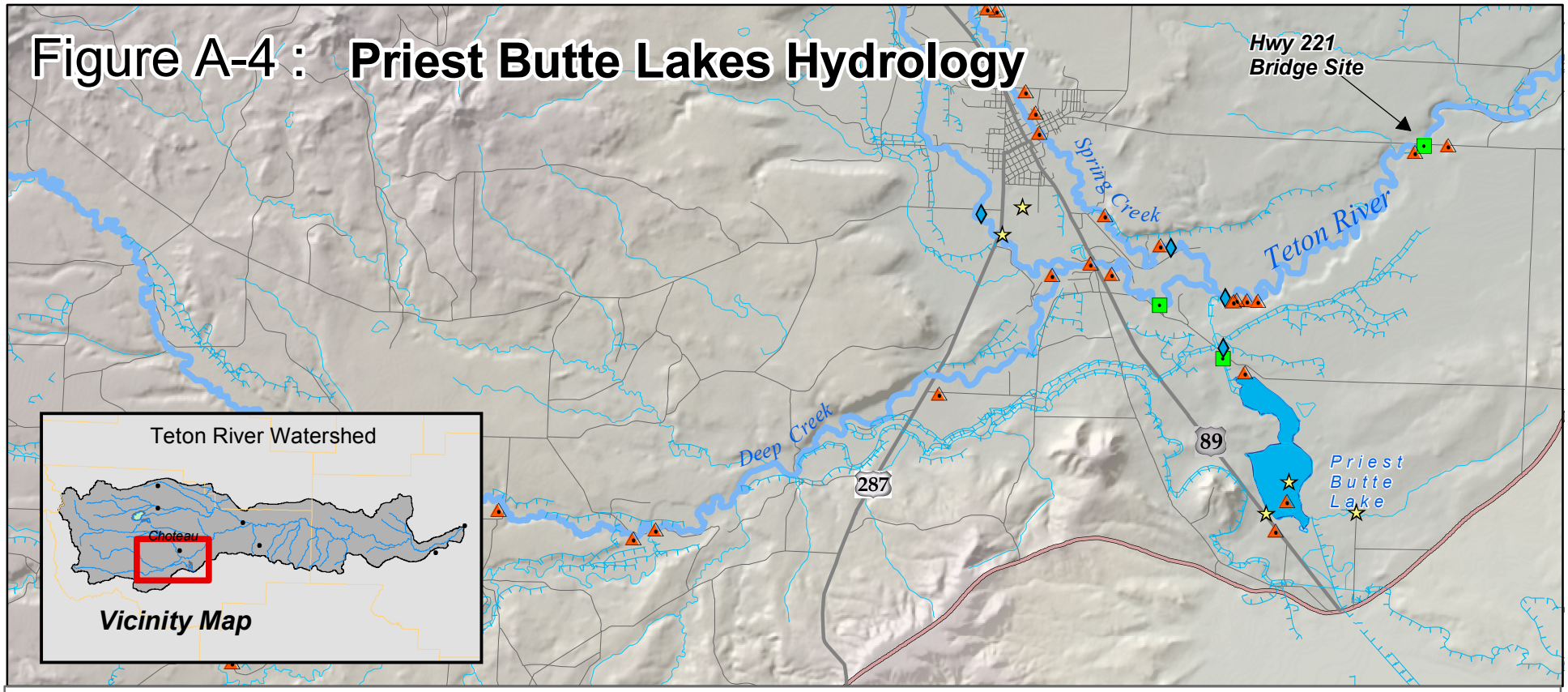
LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

Monitoring Stations By Agency

- TRWG
- BLM
- FWP
- MDEQ
- USFS
- USGS

Figure A-4 : Priest Butte Lakes Hydrology



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

0.8 0.4 0 0.8 1.6 2.4 Miles

1:120,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS). The coordinates for monitoring stations were obtained from a variety of sources and represent an approximate location of the station.

LEGEND

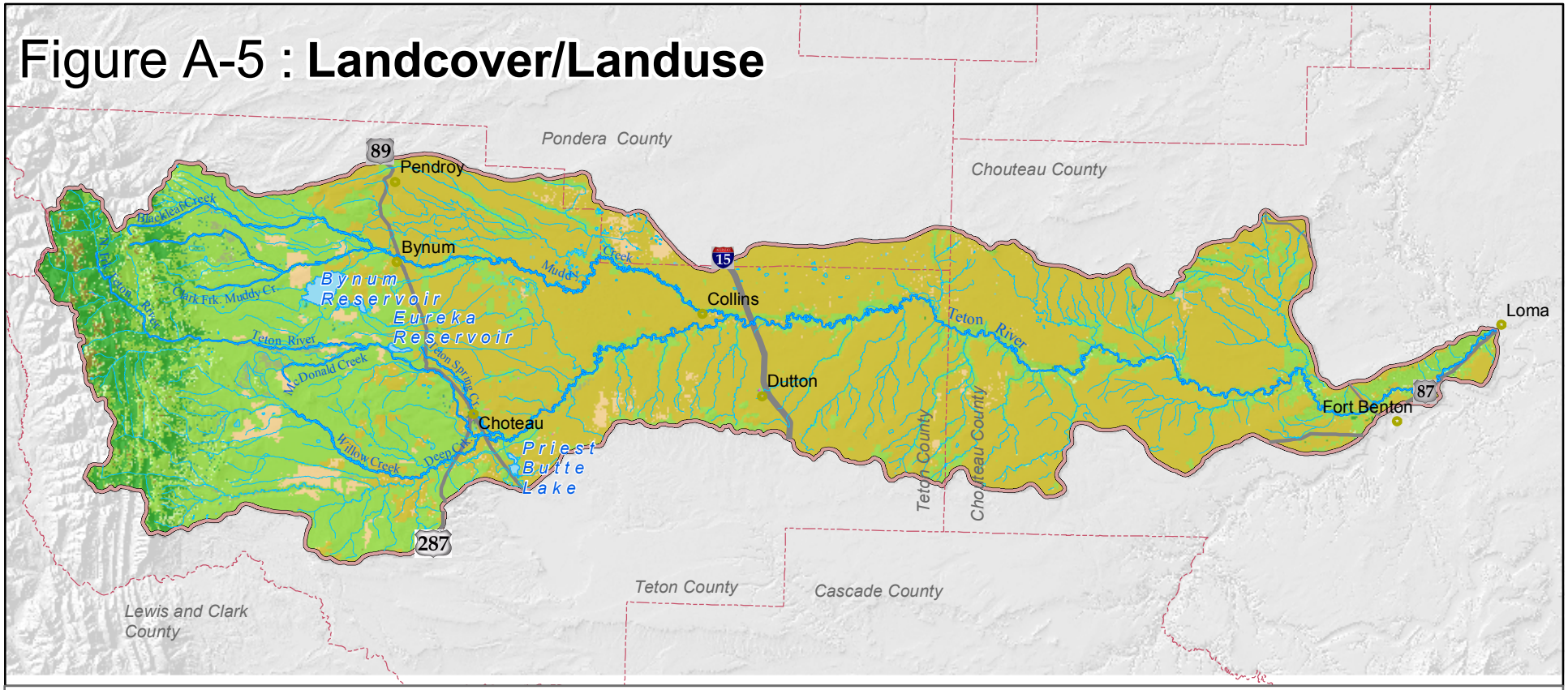
- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- County Boundary
- 2002 303(d)(b) Stream
- Irrigation Ditch
- Reservoirs/lakes

Monitoring Stations

By Agency

- BLM
- FWP
- MDEQ
- TRWG
- USFS
- USGS

Figure A-5 : **Landcover/Landuse**



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Landcover information from USGS NLCD 1992. Additional map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

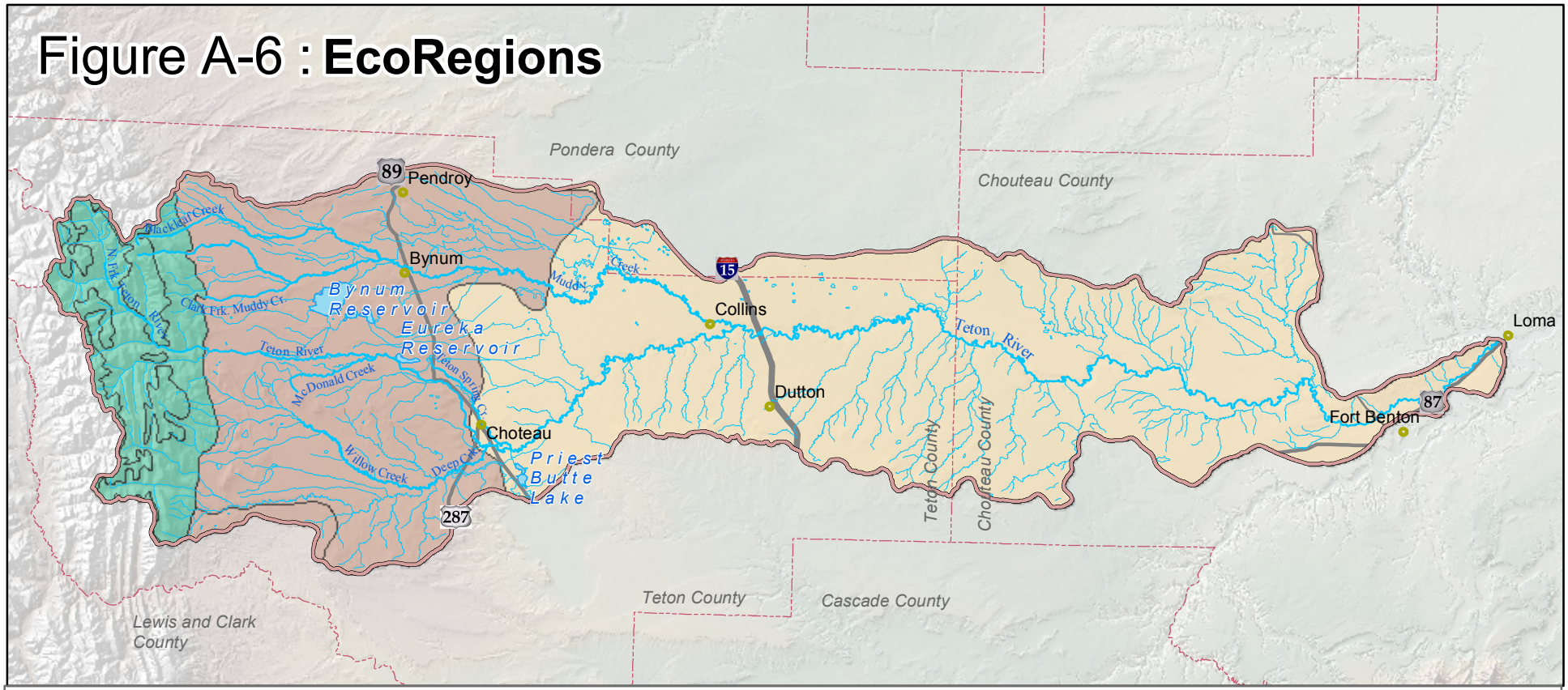
LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

Landcover/Landuse

- Ag - Non-pasture crops
- Open Water
- Ice/Snow
- Low Intensity Res.
- High Intensity Res.
- Commercial/Industrial/Trans.
- Bare rock/quarries
- Deciduous Forest
- Evergreen Forest
- Shrubland
- Grassland
- Ag - Pasture/hay
- Urban/grasses
- Wetland - woody
- Wetland - herbaceous

Figure A-6 : **EcoRegions**



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), and the United States Geological Survey (USGS).

N

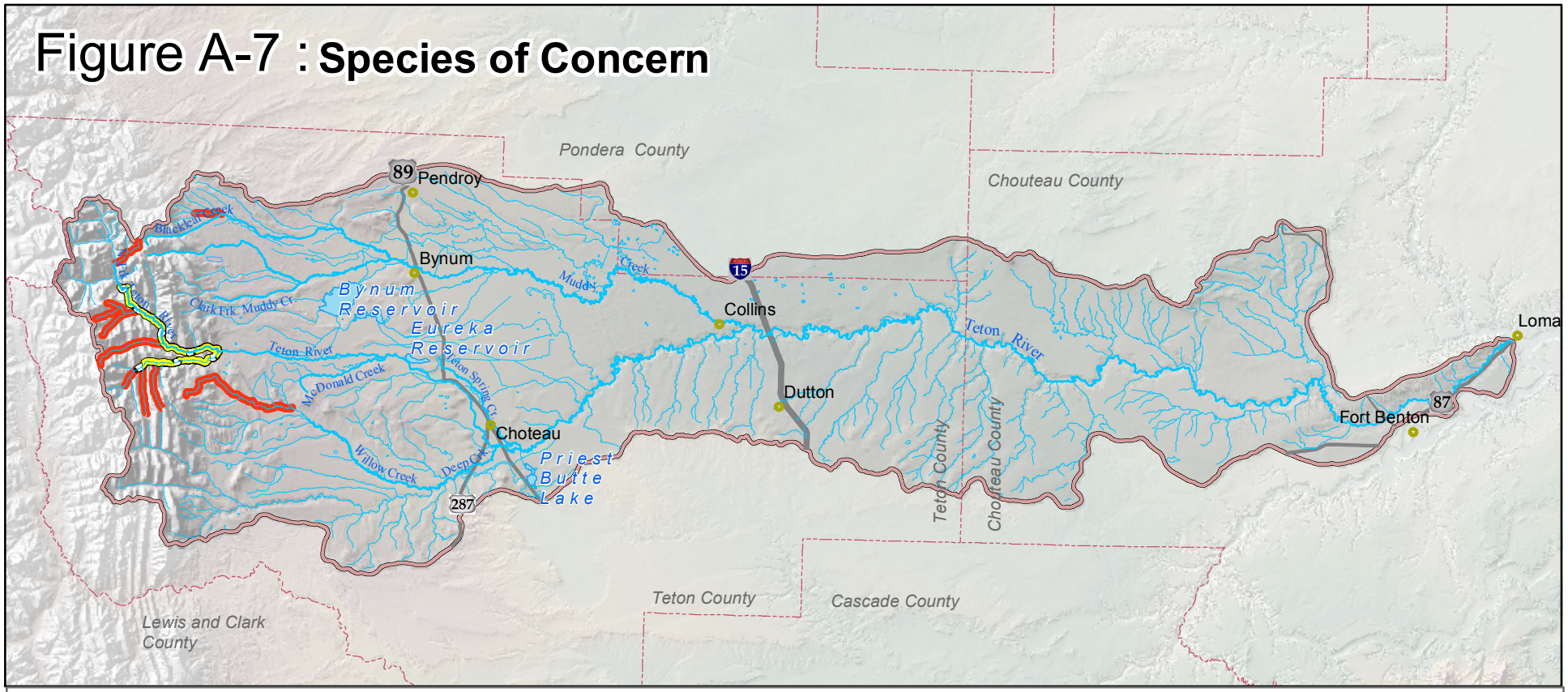
LEGEND

- Interstate
- U.S. Route
- Secondary Route
- Watershed Boundary
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

EcoRegions - Level III

- 16 Montana Valley and Foothill Prairies
- 41 Canadian Rockies
- 42 Northwestern Glaciated Plains

Figure A-7 : Species of Concern



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

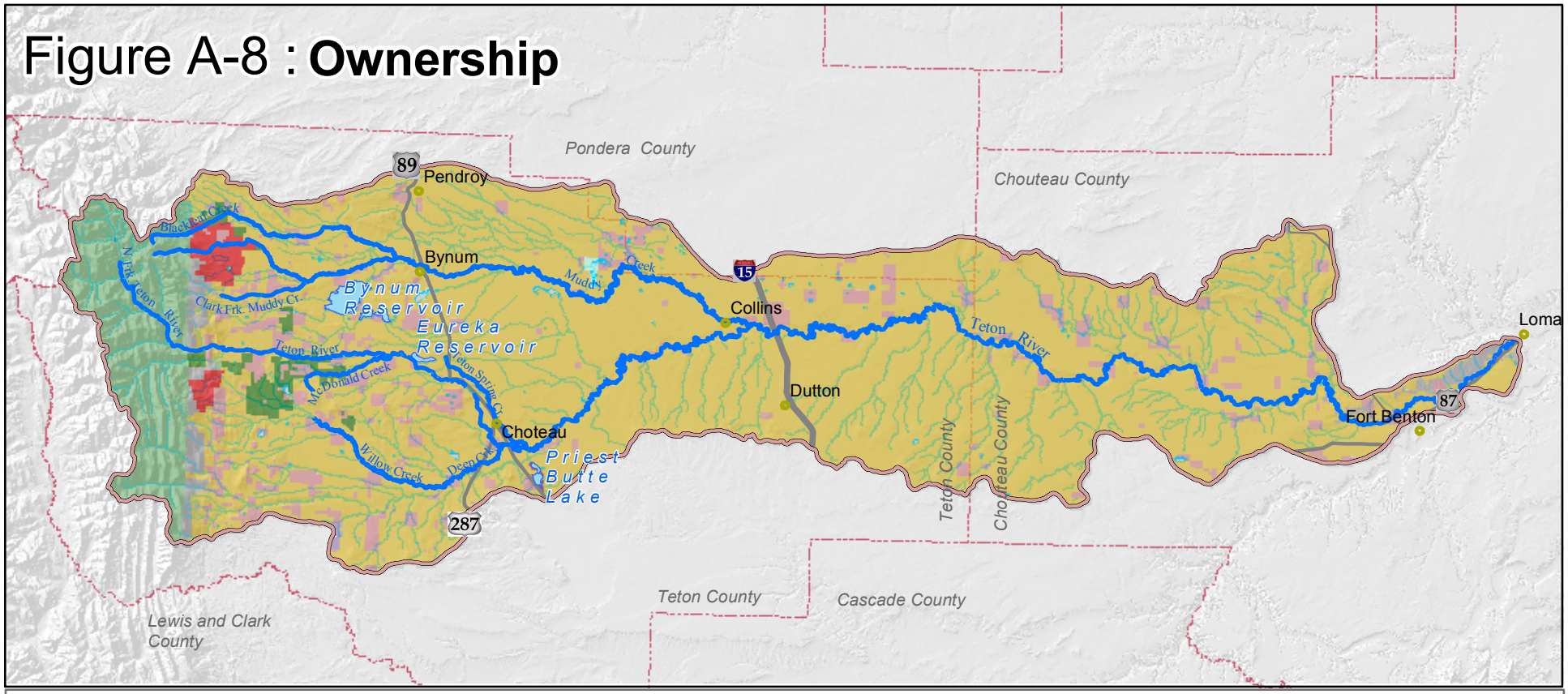
Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes
- Westslope Cutthroat Trout
- Harlequin Duck

NOTE:
Data from Montana Natural Heritage Program and may not cover/display all potential occurances or distribution of ASC/T&E species.

Figure A-8 : **Ownership**



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

N

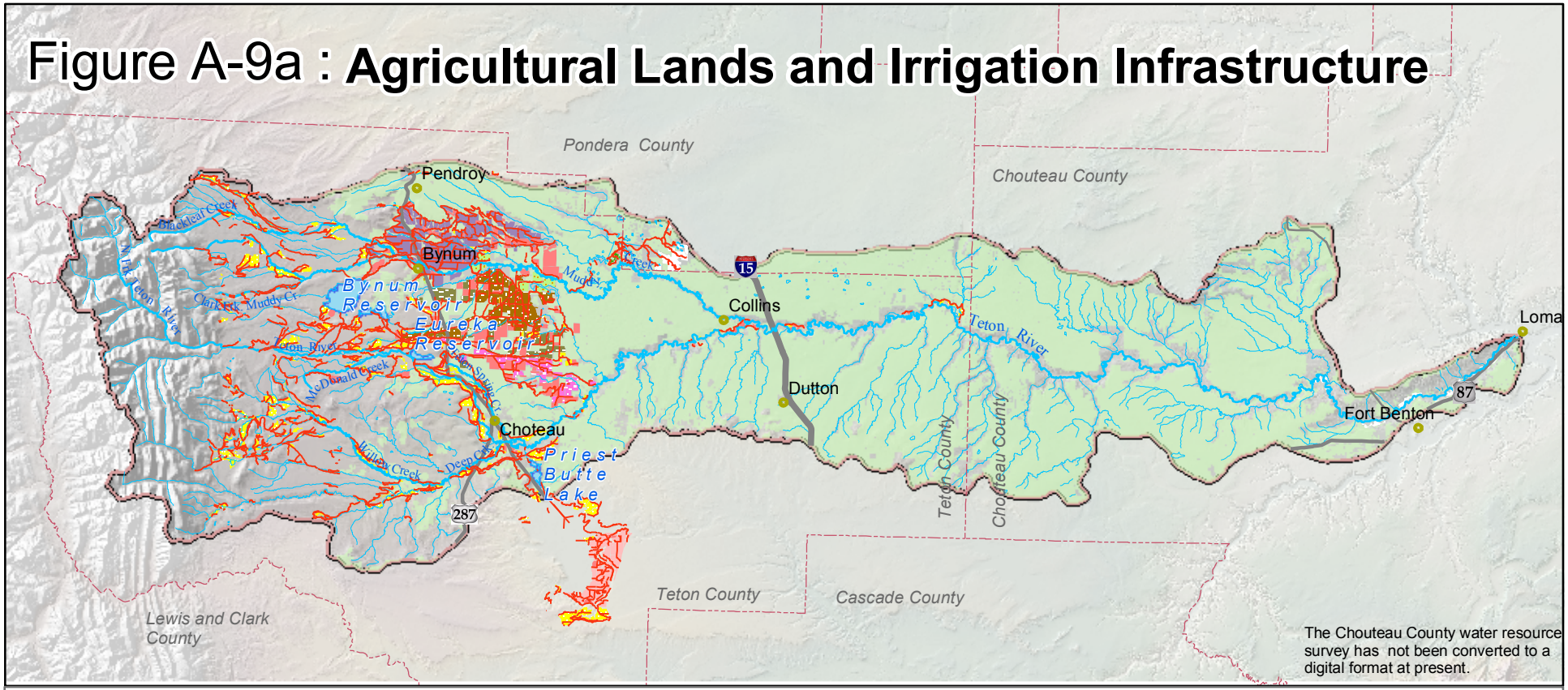
LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

Ownership

- Boone & Crockett Club
- Montana Fish, Wildlife, and Parks
- Montana State trust lands - DNRC
- The Nature Conservancy
- U.S. Bureau of Land Management
- U.S. Bureau of Reclamation
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- undifferentiated private lands

Figure A-9a : **Agricultural Lands and Irrigation Infrastructure**



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS). The county water resources surveys were completed in June 1964 for Chouteau County; June 1964 for Pondera County; and June 1962 for Teton County.

N

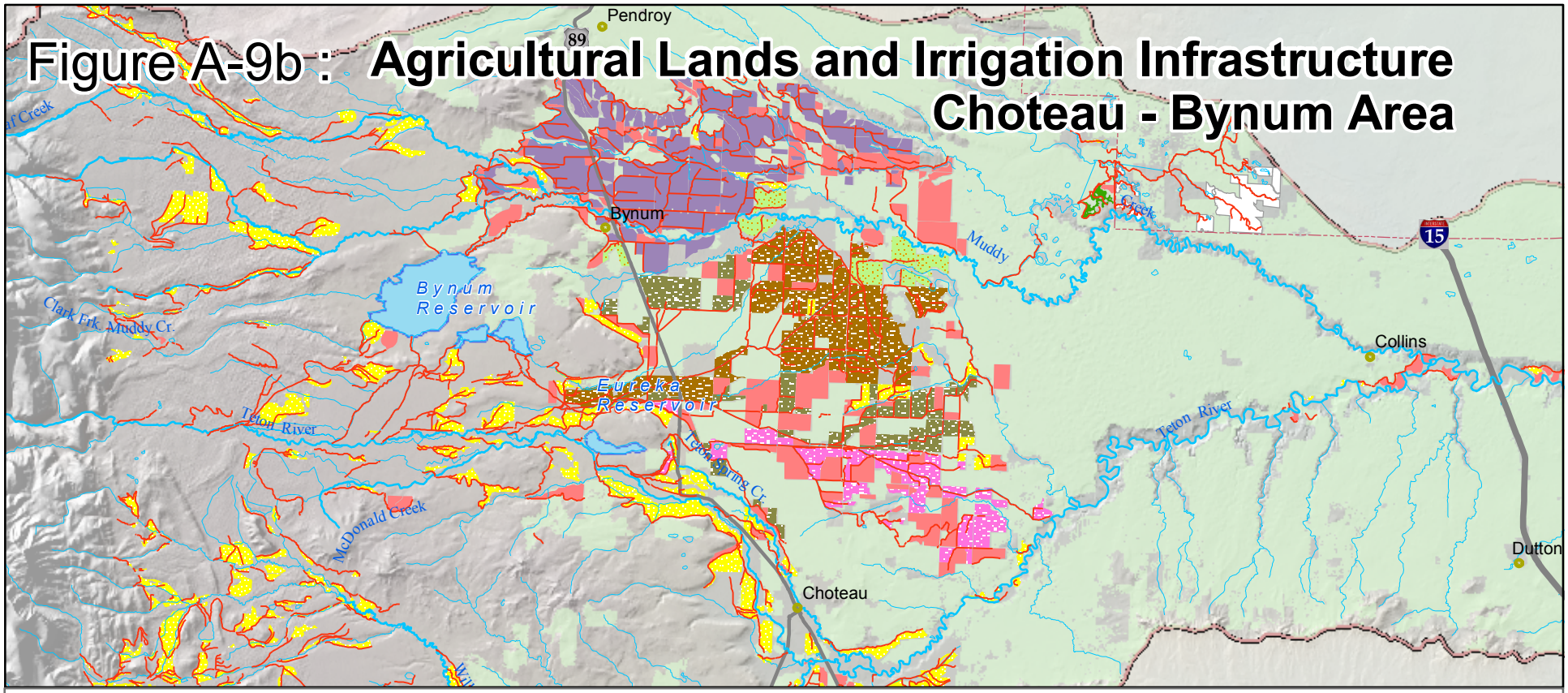
LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes
- Teton Ditches
- Pondera Ditches
- Dryland Crops

Irrigated Acres (Name)

- Brady Irrigation Co
- Bynum Irrigation District
- Eldorado Cooperative Canal Co
- Farmers Cooperative Canal Co
- Potential
- Private
- Sun River Project
- Teton Cooperative Canal Co
- Teton Cooperative Reservoir Co
- Other

Figure A-9b : Agricultural Lands and Irrigation Infrastructure Choteau - Bynum Area



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

2 1.5 1 0.5 0 2 4 6 Miles

1:300,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS). The county water resources surveys were completed in June 1964 for Chouteau County; June 1964 for Pondera County; and June 1962 for Teton County.

N

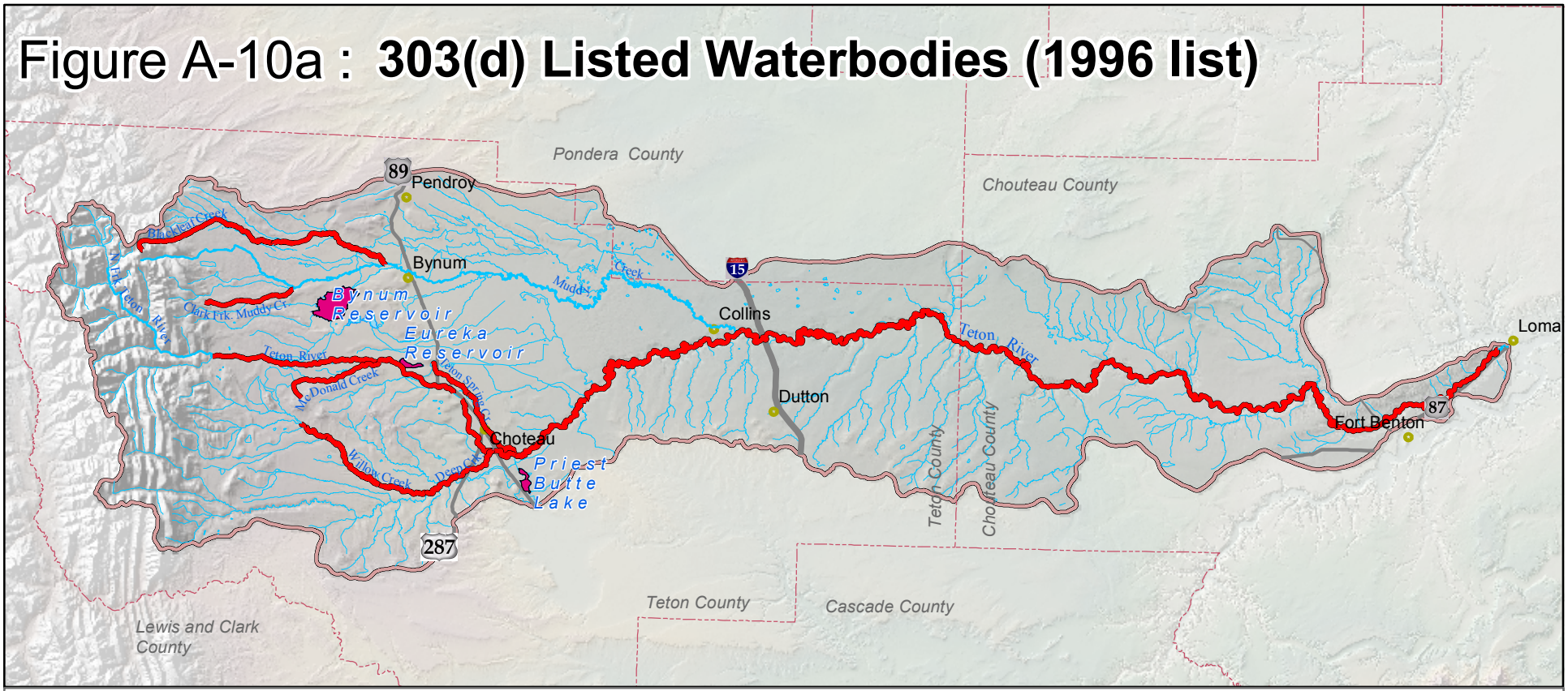
LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes
- Teton Ditches
- Pondera Ditches
- Dryland Crops

Irrigated Acres (Name)

- Brady Irrigation Co
- Bynum Irrigation District
- Eldorado Cooperative Canal Co
- Farmers Cooperative Canal Co
- Potential
- Private
- Sun River Project
- Teton Cooperative Canal Co
- Teton Cooperative Reservoir Co
- Other

Figure A-10a : 303(d) Listed Waterbodies (1996 list)



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

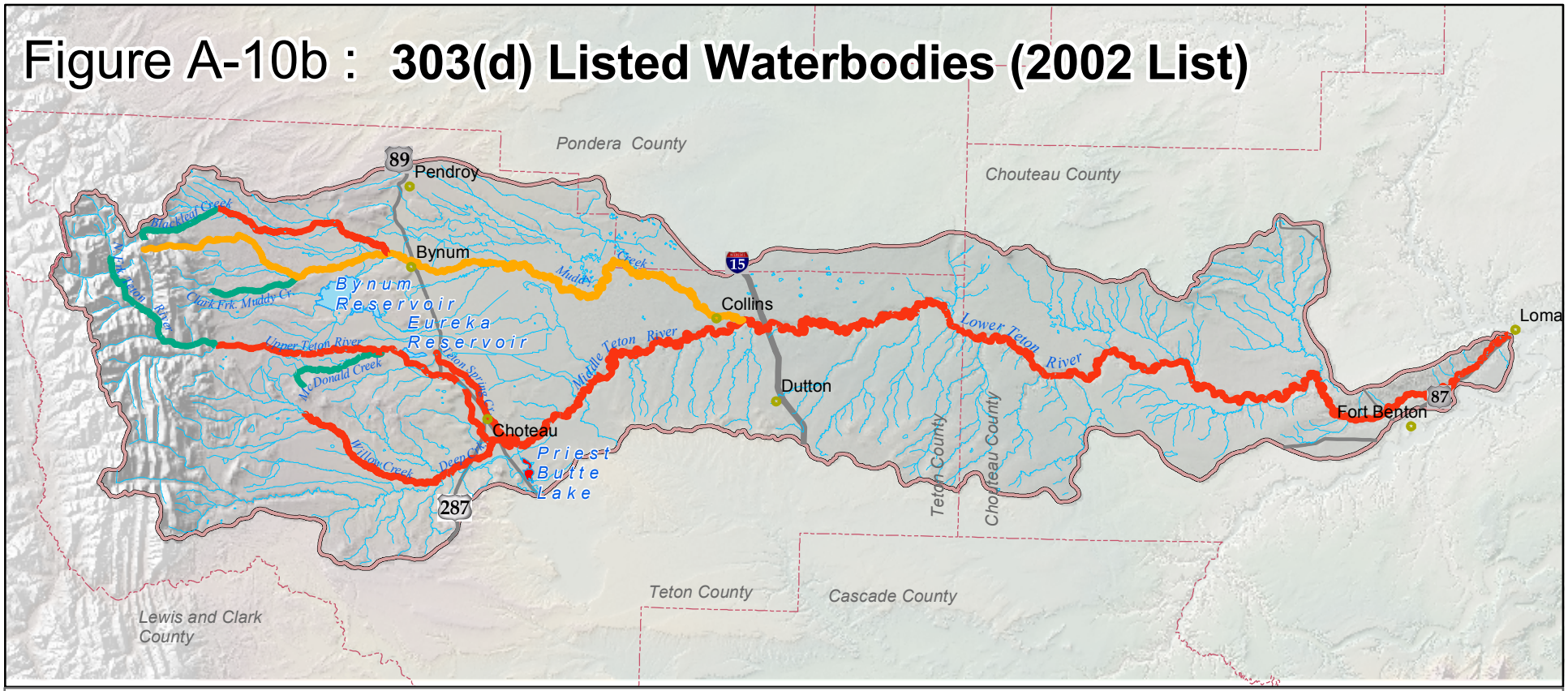
Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- County Boundary
- Streams
- Reservoirs/lakes
- Towns
- 1996 303(d) Listed Lakes
- 1996 303(d) Listed Streams

Bynum Reservoir	MT41O003_010
Eureka Reservoir	MT41O003_020
Priest Butte Lake	MT41O004_020
Blackleaf Crk:	MT41O002_041, 042
Willow Crk:	MT41O002_010
Deep Crk:	MT41O002_020
Clark Fork of Muddy Crk:	MT41O002_080
McDonald Crk:	MT41O002_030
Teton Spring Crk:	MT41O002_060, 070
Teton River :	MT41O001_010, 020, 030

Figure A-10b : 303(d) Listed Waterbodies (2002 List)



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

LEGEND

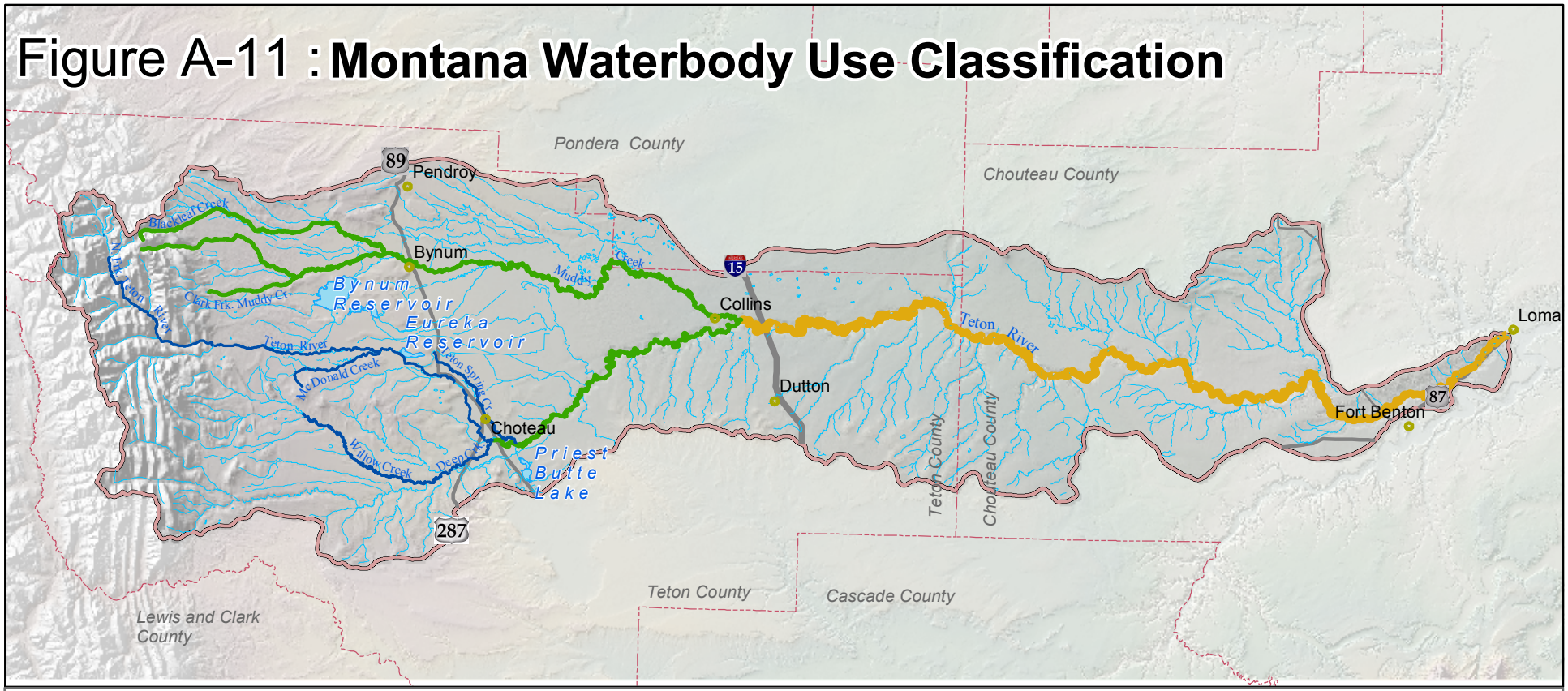
- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

2002 303(d) Waterbodies

- 2002 303(d) Listed Lakes
- Full Use Support
- Impaired Use Support
- Undetermined Use Support

Name	*ID*
Priest Butte Lake:	MT41O004_020
Blackleaf Creek:	MT41O002_041, 042
Deep Creek:	MT41O002_020
Teton River:	MT41O001_010, 020, 030, 050
Willow Creek:	MT41O002_010
Spring Creek:	MT41O002_060, 070
Muddy Creek:	MT41O002_090
McDonald Creek:	MT41O002_030

Figure A-11 : Montana Waterbody Use Classification



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

N

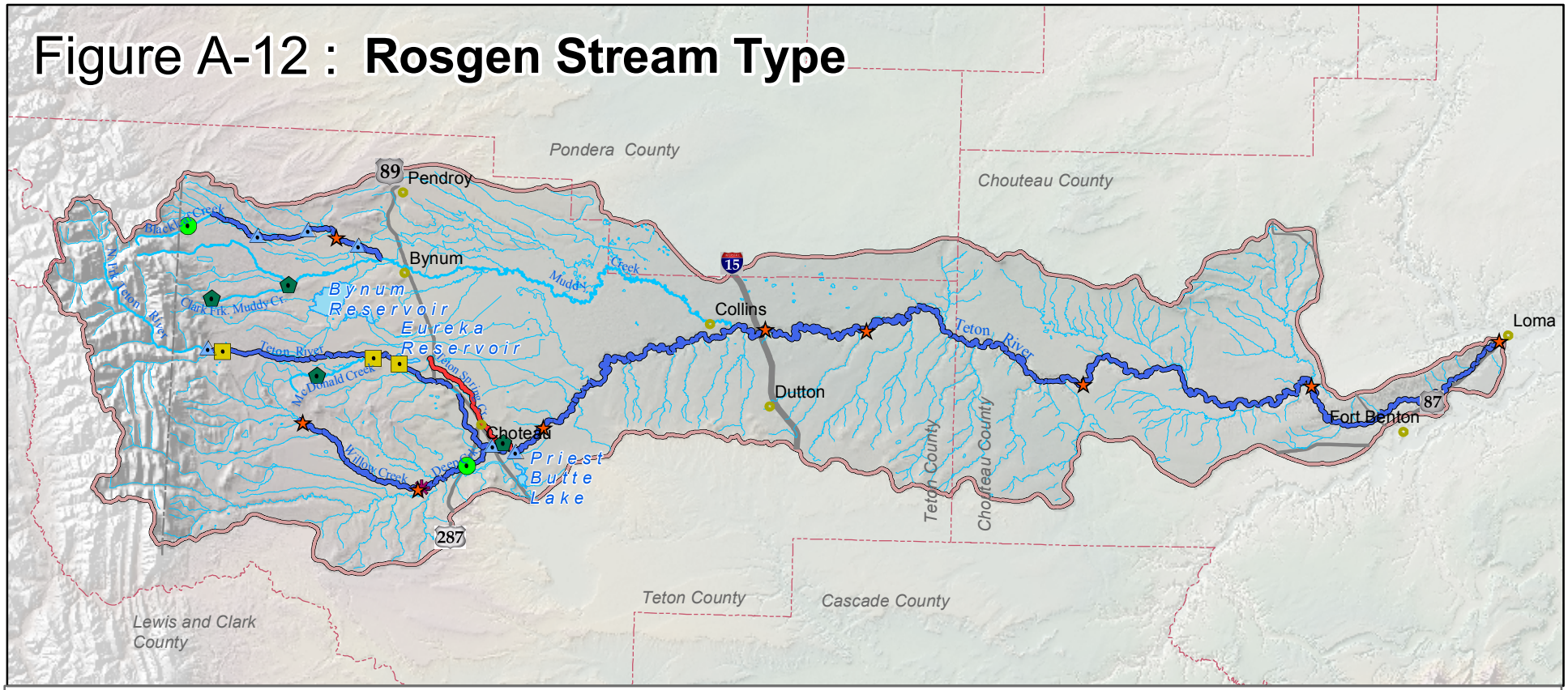
LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

Waterbody Use Class

- B-1 (Cold water)
- B-2 (Intermediate)
- B-3 (Warm water)

Figure A-12 : **Rosgen Stream Type**



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

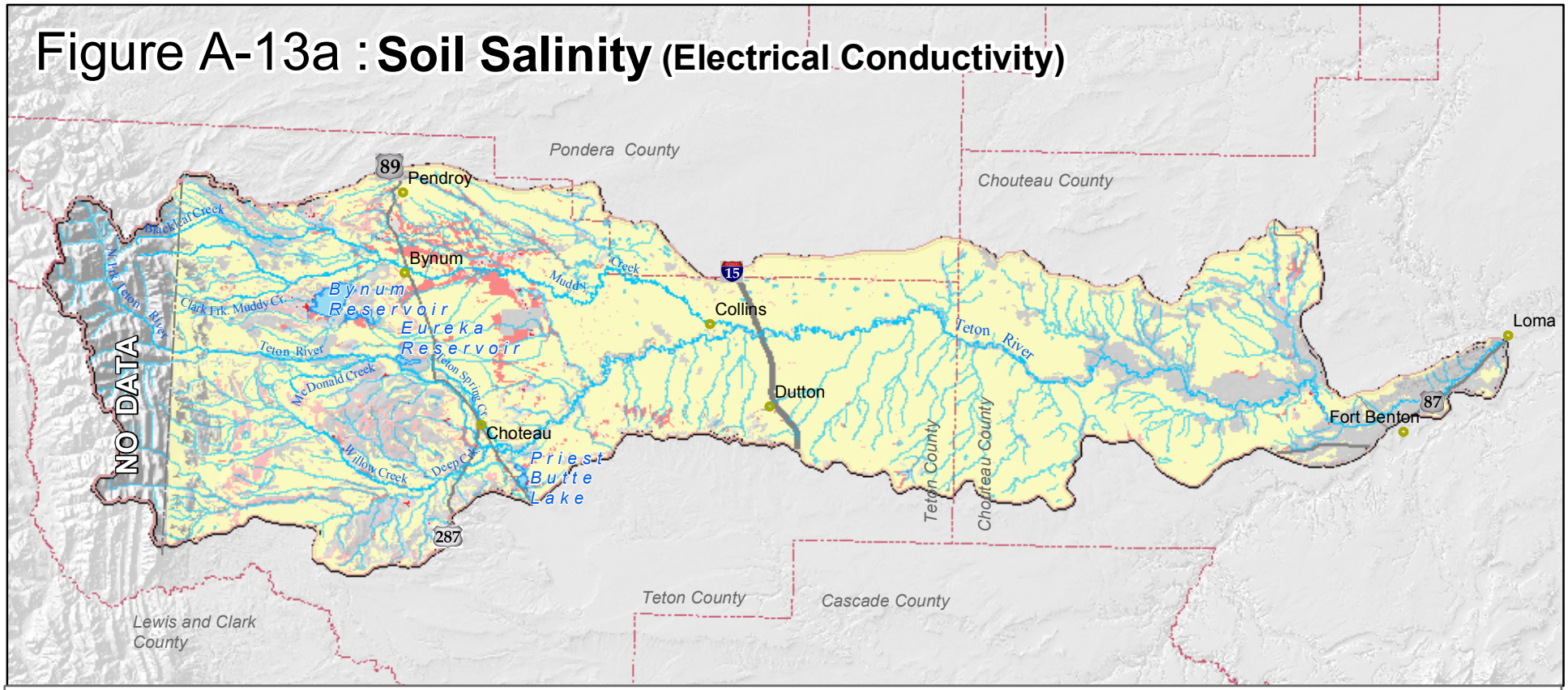
Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

Desired Stream Type	Field-assessed point data
C	B
E	C
	D
	E
	F
	G

Figure A-13a : **Soil Salinity** (Electrical Conductivity)



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

NOTE: Mean value for the range in soil salinity of the soil layer or horizon measured as E.C. of the soil in a saturated paste. Values as mS/cm.

LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

Ssurgo - Soil Salinity (Electrical Conductivity) Units: (mS/cm)

- 0
- < 1 - 2
- 2 - 5
- 5 -11
- 11 - 33

Map Projection

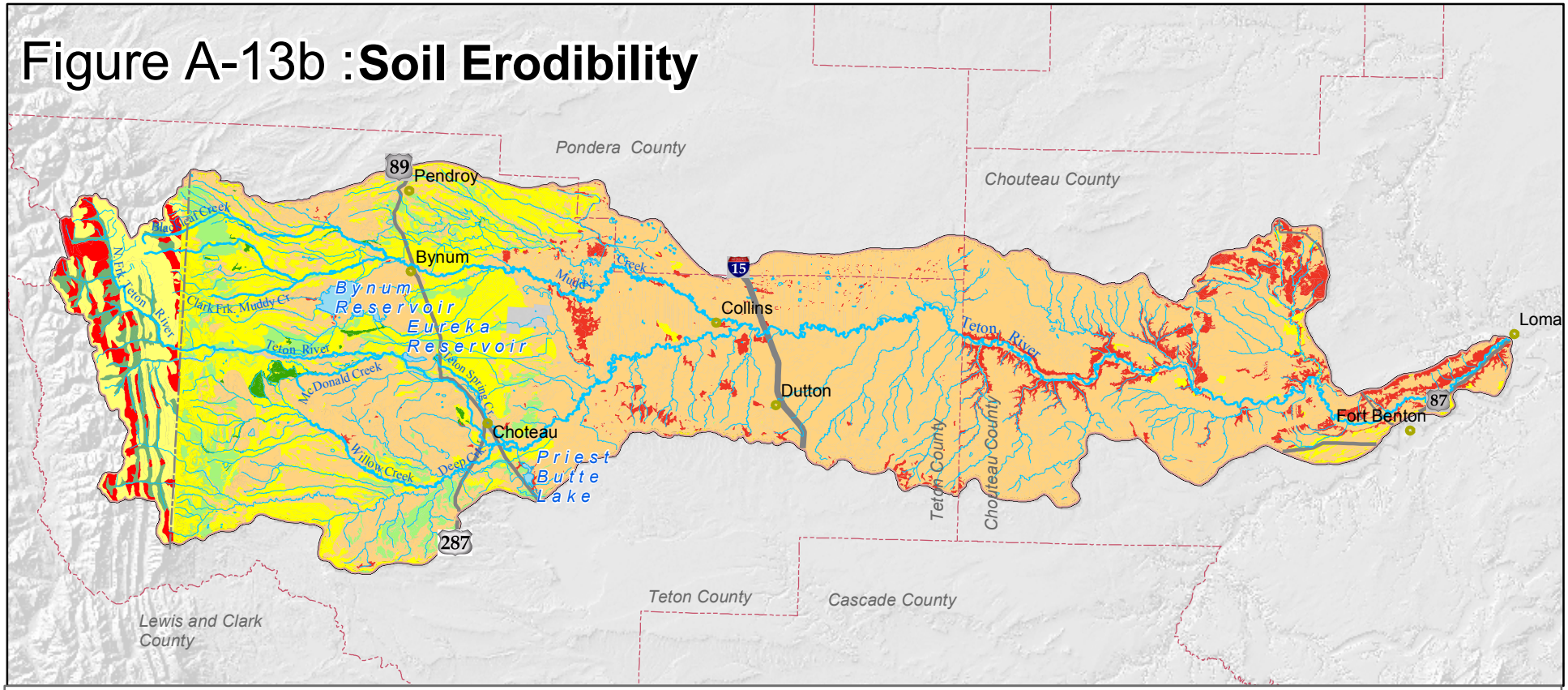
Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Soil Salinity (electrical conductivity) values were derived from the dominate soil and reflect the mean value for the entire profile at depth of 150 cm. Units are milliseimens/centemeter (mS/cm). Soil data from NRCS. Additional map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

N

Figure A-13b :**Soil Erodibility**



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Soil erodibility is for the entire profile and dominant soil. Kw from Ssurgo soils database (NRCS) and Land Type Association (LTA) is from the USFS. Additional map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

N

LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

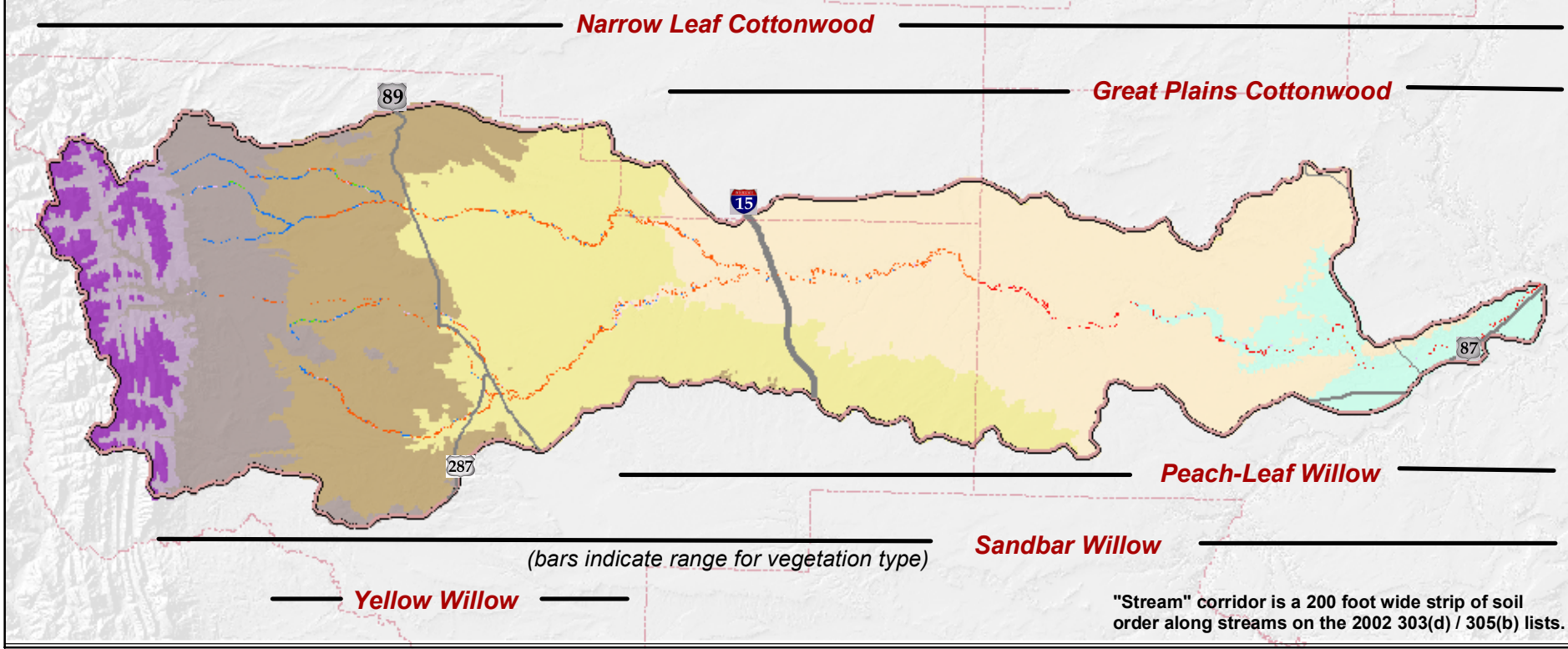
LTA Erodibility (for Western 1/8 of Map)

- low
- mod
- high

Ssurgo Soil Kw Factor (for Eastern 7/8 of Map)

.02	.28
.10	.32
.15	.37
.17	.43
.20	.49
.24	No Data

Figure A-14: Riparian Zone Soils and Vegetation Species Distribution



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

LEGEND

Map Features

- Teton Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- County Boundary

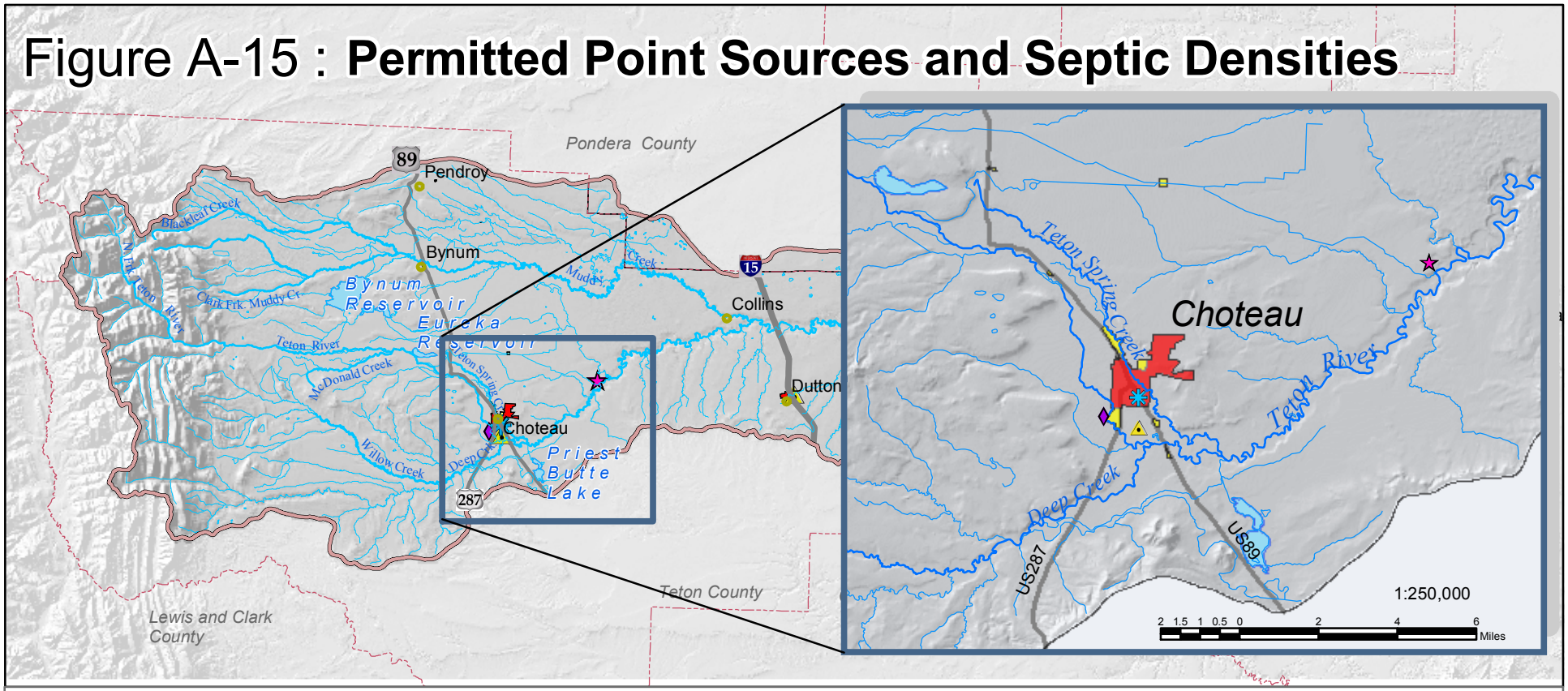
Soil Order

- Alfisols
- Entisols
- Histosols
- Inceptisols
- Mollisols
- Vertisols

Elevation Bands

- 2500 - 3000 ft
- 3000 - 3600 ft
- 3600 - 4000 ft
- 4000 - 4500 ft
- 4500 - 5700 ft
- 5700 - 6700 ft
- > 6700 ft

Figure A-15 : **Permitted Point Sources and Septic Densities**



Teton River Watershed

Montana Department of Environmental Quality

January, 2003

Scale in Miles

4 3 2 1 0 4 8 12 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS).

N

LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- County Boundary
- Streams
- Reservoirs/lakes
- Towns

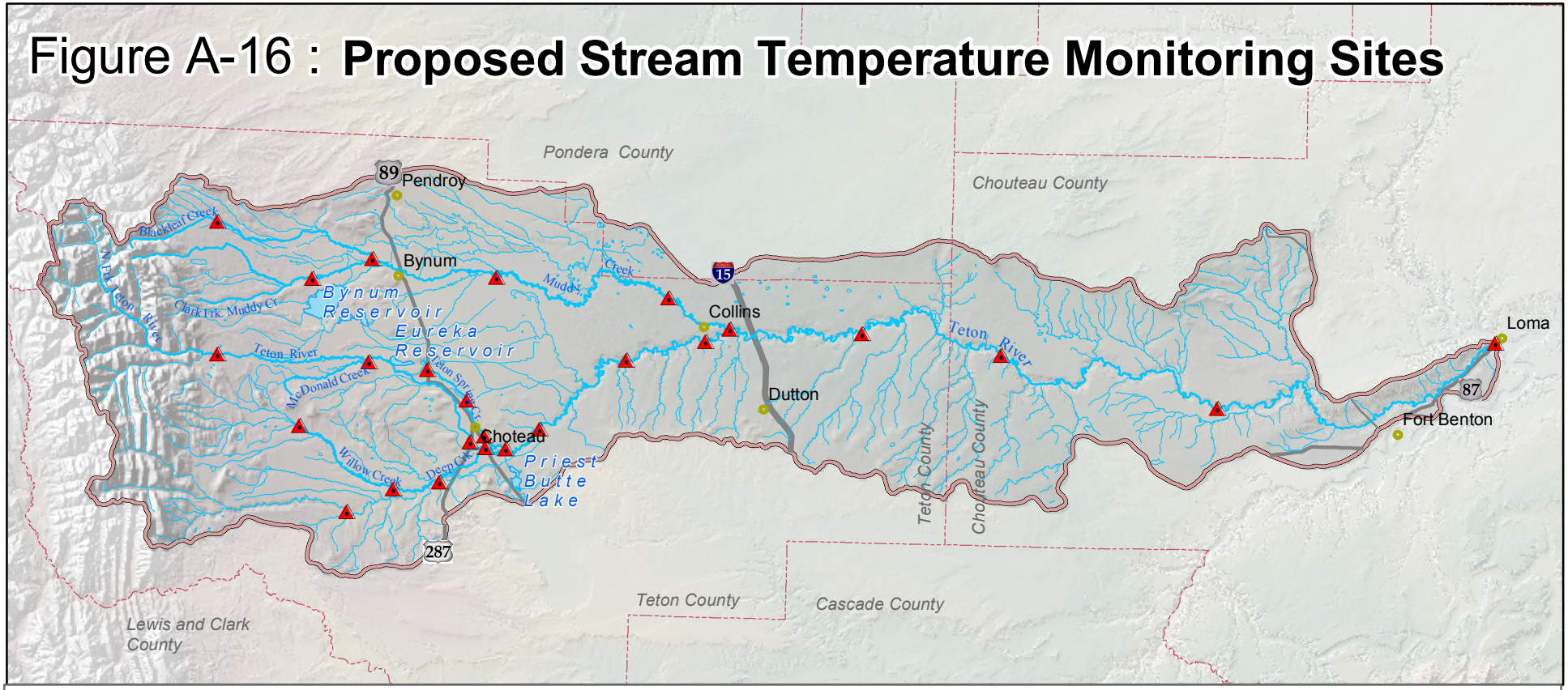
Montana Pollution Discharge Elimination System (MPDES)

- Concentrated Animal Feeding Opr.
- Industrial
- Municipal
- Storm Water

Septic Density 2000

- Low
- Medium
- High
- Chronic

Figure A-16 : **Proposed Stream Temperature Monitoring Sites**



Teton River Watershed

Montana Department of Environmental Quality

May, 2003

Scale in Miles

4 2 0 4 8 12 16 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS). The coordinates for monitoring sites were obtained using NRIS' "Topofinder" tool and represent approximate site locations.

LEGEND

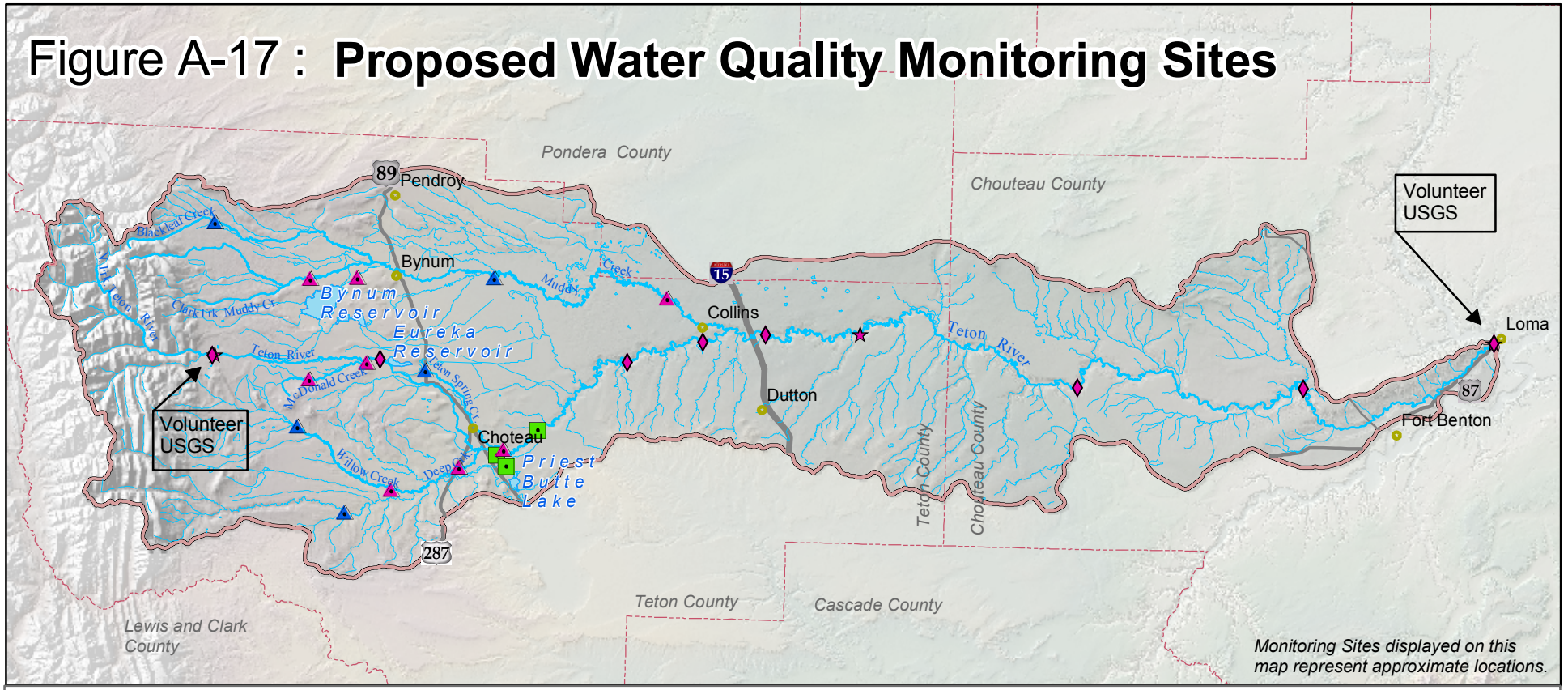
- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

Monitoring Sites

- DEQ

Monitoring sites (approximate locations) displayed on this map are continuous, seasonal stations monitored by the MDEQ.

Figure A-17 : **Proposed Water Quality Monitoring Sites**



Teton River Watershed

Montana Department of Environmental Quality

May, 2003

Scale in Miles

4 2 0 4 8 12 16 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS). The coordinates for monitoring sites were obtained using NRIS' "Topofinder" tool and represent approximate site locations.

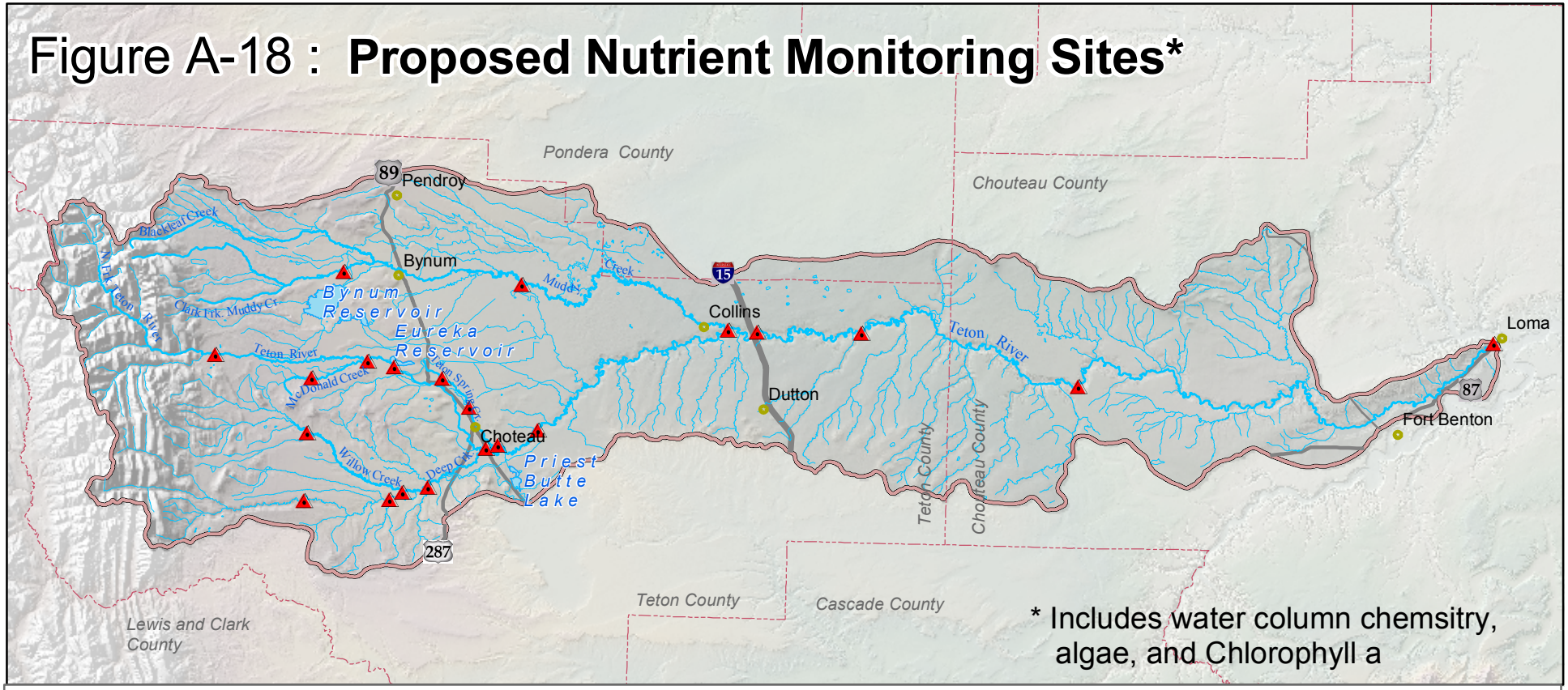
LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

Monitoring Sites

	daily	bi-monthly	bi-monthly tier 2
FWP	■	■	■
USGS	★	★	★
Volunteer	♦	♦	♦
Unknown	▲	▲	▲

Figure A-18 : **Proposed Nutrient Monitoring Sites***



Teton River Watershed

Montana Department of Environmental Quality

May, 2003

Scale in Miles

4 2 0 4 8 12 16 Miles

1:750,000

Map Projection

Lambert Projection; North American Datum of 1983; Stateplane Coordinate System

Data Sources

Map information was compiled from a variety of sources, including the Montana Department of Environmental Quality (MDEQ); Montana Natural Resource Information System (NRIS), the United States Geological Survey (USGS). The coordinates for monitoring sites were obtained using NRIS' "Topofinder" tool and represent approximate site locations.

LEGEND

- Watershed Boundary
- Interstate
- U.S. Route
- Secondary Route
- Towns
- County Boundary
- Streams
- Reservoirs/lakes

Monitoring Sites

- DEQ

Monitoring sites (approximate locations) displayed on this map are continuous, seasonal stations monitored by the MDEQ.