

2026 Montana State Library GIS Resources

04/2026



MONTANA
STATE LIBRARY

GIS COORDINATION



Agenda

- Montana GIS Coordination
- Geospatial Data Assets & Services
 - GIS Data Resources and Applications
 - Montana Spatial Data Infrastructure (MSDI)
 - Imagery
 - Lidar Inventory and 3D Hydrography
 - Water Resources
 - Montana State Realtime Network
- Wrap Up
- Questions



Montana State Library

<https://msl.mt.gov>



MONTANA STATE LIBRARY

A GREATER STATE OF KNOWLEDGE

The Montana State Library provides information, resources, and guidance to Montanans to help expand their knowledge and empower their decisions. We offer leading-edge data and applications, plus a dedicated staff, to help all people efficiently seek accurate and transparent answers about Montana.





Montana State Library – An Online Portal to Information you Need

Government Information

Access state publications, state agency databases, archived state and local government websites, and federal documents

Cultural and Historic

Learn about Montana through cultural and historic photographs, documents, yearbooks, oral histories, and more

Water and Natural Resources

Find field guides, plant and animal species reports, mapped information on lakes and rivers, drought and water supply maps, elevation data, and more

Services for Libraries and our Patrons

Benefit from our programming, education, and consulting services; e-books, online research databases, and additional robust library resources

Geographic Information

View statewide information on land ownership, boundary, structure, address, transportation, and other datasets through maps, application, and data feeds

Services for those unable to Read Printed Materials

If reading print is difficult due to permanent or temporary conditions, sign up for braille and audio reading services



Montana State Library Geographic Information

<https://msl.mt.gov/geoinfo/>

Montana Geographic Information

The Montana State Library is at the center of Geographic Information and Coordination in Montana. The MSL provides open access to authoritative geospatial data and applications that inform and empower all Montanans. The Program meets these mandates through coordination, development, collection, support, distribution, and promotion of Montana Geographic Information and specifically the Montana Spatial Data Infrastructure in Montana and beyond.

[GIS Data](#) | [Featured](#) | [MSDI](#) | [MGIAC](#) | [Initiatives](#) | [Reports](#) | [Calendar](#) | [Help](#)

Government Information-State

- MT.Gov Web Archive
- Digitized State Publications

Government Information-Local Montana

Government Information-Federal

Research Resources

- InterLibrary Loan
- Submit your request
- Article Request
- Resource Request
- ILL Policy
- Access Policy

GEOGRAPHIC INFORMATION CLEARINGHOUSE

Data

MGIA Grants

- Data List
- Data Bundler

Montana Spatial Data Infrastructure (MSDI)

- Administrative Boundaries
- Cadastral
- Climate
- Elevation
- Geographic Names
- Geology
- Hydrography
- Hydrologic Units
- Land Use/Land Cover
- Mapping Control
- Orthoimagery
- Soils
- Structures & Addresses
- Transportation
- Wetlands

Aerial Photographs

USGS Topographic Maps

Channel Migration Zones

Flathead Basin Mapping Project

Yellowstone River Corridor Clearinghouse

Web Services

Applications

- Data and Maps
- Natural Resources and Water
- Subject Guides
- Tools

Maps

NRIS

Water

GIS Community

- State GIS Coordination
- GIS Coordination Calendar
- State Geographic Names Advisor
- MSDI Working Groups
- MAGIP
- Montana State Library Careers

Montana State Reference Network

Help

NATURAL HERITAGE PROGRAM

- Field Guide
- Map Viewer

NRCS PARTNERSHIP

GIS Coordination in the State of Montana



**MONTANA
STATE LIBRARY**

GIS COORDINATION

Public Land Ownership

- Bureau of Land Management
- US Fish and Wildlife
- National Park Service
- US Forest Service
- US Dept of Agriculture
- Montana State Trust Land
- State of Montana - Miscellaneous



2010 Montana Facts

Montana Total Area: 345,892 Sq. Miles | Largest County: Beaverhead, 5,548 Sq. Miles | Smallest County: Silver Bow, 718 Sq. Miles
Largest City: Billings, Yellowstone County, Population 104,170 | Smallest County Seat: Winnett, Petroleum County, Population 182
Major Rivers: Yellowstone River, Missouri River, Clark Fork River | High Point: Granite Peak 12,796 ft | Low Point: Gooseneck River 1200 ft



Montana State Library **Geospatial Statute** Activities & Programs

- State GIS Coordination
- Montana Spatial Data Infrastructure
- Natural Resource Information System
 - Water Information System
 - Natural Heritage Program
- Montana State Reference Network (MTSRN)



Montana Geospatial Information Act (MGIA)

- State GIS Coordination
- Advisory Council
- **Montana Spatial Data Infrastructure**
- Grant Program
- Geospatial Information Plan
- GIS Coordination Strategic Plan

Montana Geospatial Information Act

Modernized & Updated Language

Section 90-1-401 – 90-1-413

90-1-404 – Geospatial information -- management -- duties of state library. (1) The state library shall:

(b) work with all stakeholders, including but not limited to federal, state, local, private, and tribal entities, to prioritize needs and collect, develop, maintain, and disseminate geographic information systems, geospatial information, and geospatial technologies;

Montana Geospatial Information Advisory Council



- Governor's Appointed Council
- 11 Members
- Advise the State Library on ...
 - Geographic information systems, geospatial information, and geospatial technologies;
 - Data Development;
 - Geospatial Information Plan;
 - MGIA Grant Program;
 - Promote coordination of programs, policies, technologies for geographic information systems, geospatial information, and geospatial technologies;
 - Advocate for the development of consistent policies, standards, and guidelines for geographic information systems, geospatial information, and geospatial technologies

Montana Geospatial Information Advisory Council

	First	Last	Agency/Organization	Representative Type
1	Allen	Armstrong	Bureau of Land Management	Federal Government Representative
2	Adam	Carpenter*	State Chief Data Officer (Dept. of Admin)	Director of the Dept. of Administration or Designee
3	Maureen	Celander	Custer County	County or Municipal Government Representative
4	Nick	Youngstrom	MT Dept. of Natural Resoures & Conservation	State of Montana Executive Branch Department Director
5	Brian	DeMarco	Siyeh Communications	Tribal Government Interests Representative
6	Valentijn	Hoff	University of Montana - Fire Center	Montana University System Representative
7	Joseph	Kauffman	MARLS	Montana Association of Registered Land Surveyors Representative
8	<i>Vacant</i>		tbd	Private Business (Active in GIS) Representative
9	Lee	Macholz	City of Missoula	County or Municipal Government Representative
10	Eric	Spangenberg	MAGIP Rep (City of Helena/LC County)	Montana Association of GIS Professionals Representative
11	Jennie	Stapp*	State Librarian	State Librarian or Designee - Serves as Presiding Officer

**Denotes Permanent Member*

Montana Geospatial Information Advisory Council

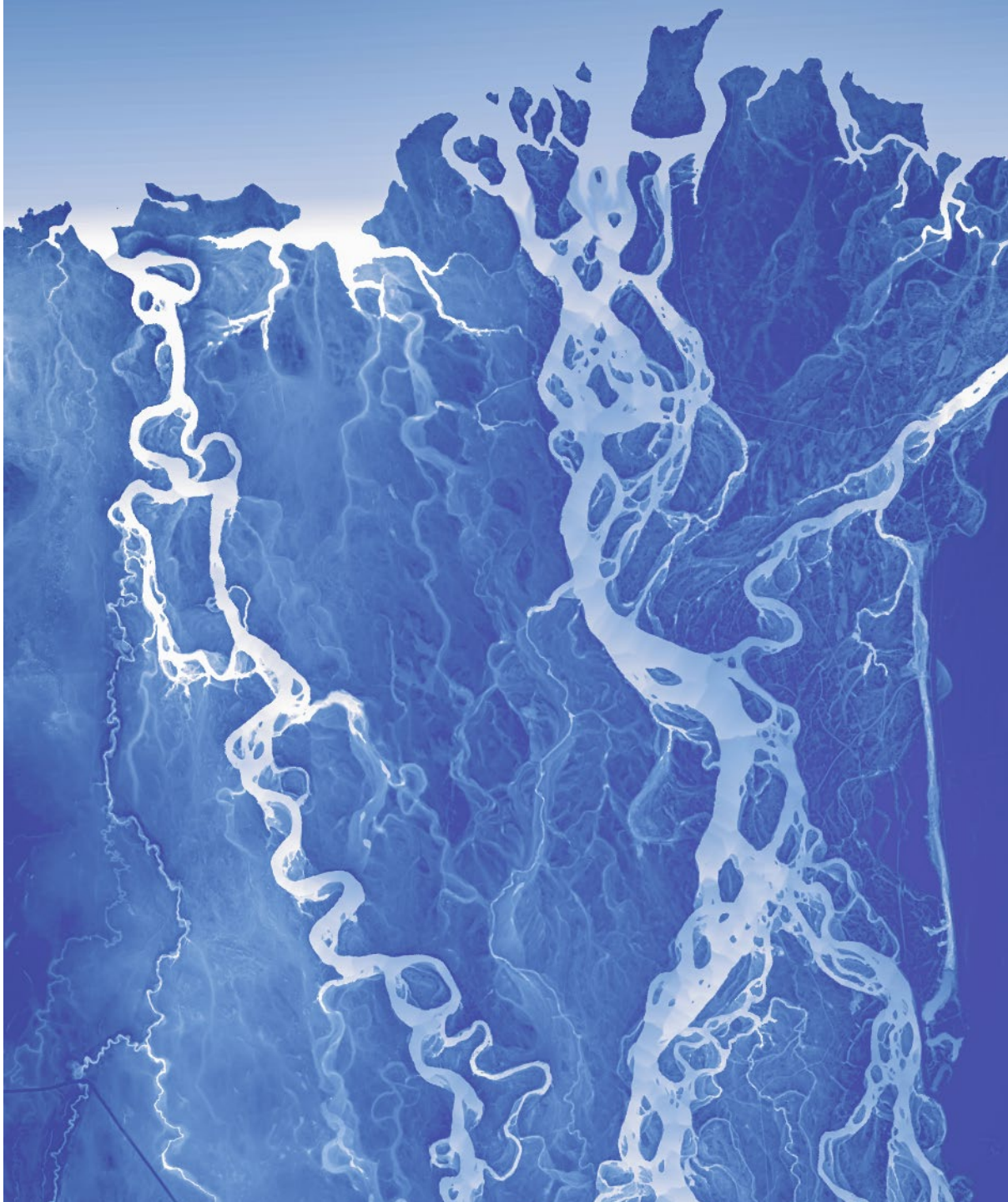
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Montana Geospatial Information Plan

- Written in consultation with the MGIA Council, Montana Spatial Data Infrastructure (MSDI) Theme Leads, and other stakeholders.
- Prioritizes:
 - needs to collect, maintain, and disseminate geospatial information;
 - Geospatial coordination
 - MGIA Grant awards
- Reviewed and, if appropriate, updated every three years.



Montana Geospatial Information Plan

- Review & public comment period:
 - Spring & Summer 2025
- MGIA Council approved the Plan at the September 25th meeting and recommended the MSL Commission adopt the Plan.
- The MSL Commission approved the Plan at the October 8th meeting.

Montana Spatial Data Infrastructure (MSDI)



Administrative Boundaries

Legally documented and attributed jurisdictional boundaries.



Cadastral

Tax Parcels, Land Ownership, and Conservation Easements.



Climate

Accurate, timely, and relevant climate data.



Elevation

Spatially references vertical positions above or below a datum surface.



Geographic Names

Names and locations for cultural and geographic features.



Geology

Geologic map data collected from field research.



Hydrography

Networked geometry and attributes representing surface water.



Hydrologic Units

The area of land surrounding a hydrologic feature.



Land Cover

Records natural biological communities and disturbances.



Mapping Control

Locations of monumented points.



Imagery

Georeferenced images of the Earth's surface.



Soils

Polygons representing soil map units and attribution.



Structures and Addresses

Spatial database of primary structures, buildings, and their addresses.



Transportation

Transportation features and attribution.



Wetland & Riparian

Extent, type, and approximate location of wetlands, riparian areas, and deepwater habitats



















MSDI Contacts

Contact Information for the MSDI Theme Leads and Stewards.

Montana Spatial Data Infrastructure

Montana Spatial Data Infrastructure (MSDI)

The Montana Spatial Data Infrastructure (MSDI) is made up of fifteen (15) framework geographic data themes vital to Montanans for viewing, analyzing, exploring, and understanding its expansive and complex geography. Eight (8) themes are [federally defined](#) framework themes. Seven (7) additional framework layers were selected by the [Montana Geospatial Information Advisory Council \(MGIAC\)](#).

 <p>Administrative Boundaries Legally documented and attributed jurisdictional boundaries.</p>	 <p>Cadastral Tax Parcels, Land Ownership, and Conservation Easements.</p>	 <p>Climate Accurate, timely, and relevant climate data.</p>	 <p>Elevation Spatially references vertical positions above or below a datum surface.</p>
 <p>Geographic Names Names and locations for cultural and geographic features.</p>	 <p>Geology Geologic map data collected from field research.</p>	 <p>Hydrography Networked geometry and attributes representing surface water.</p>	 <p>Hydrologic Units The area of land surrounding a hydrologic feature.</p>
 <p>Land Cover Records natural biological communities and disturbances.</p>	 <p>Mapping Control Locations of monumented points.</p>	 <p>Imagery Georeferenced images of the Earth's surface.</p>	 <p>Soils Polygons representing soil map units and attribution.</p>
 <p>Structures and Addresses Spatial database of primary structures, buildings, and their addresses.</p>	 <p>Transportation Transportation features and attribution.</p>	 <p>Wetland & Riparian Extent, type, and approximate location of wetlands, riparian areas, and deepwater habitats</p>	 <p>MSDI Contacts Contact information for the MSDI Theme Leads and Stewards.</p>

- Stewarding Agency
- Theme Lead
- Statewide Datasets
 - Downloadable
 - Web Services
 - Metadata
 - Applications
- Working Group – open to all
- 1-3 Data Improvement Plan*
- Documented Standards*

Collaboration: MSDI Working Groups

- Develop Standards for Imagery Data
- Create an Inventory of Existing Data
- Understand Business Uses and Critical Activities
- Explore Cost Efficiencies of Shared Resources
- Develop MSDI Imagery Plan



Standards & Best Practices

- Create Geospatial Information & Technology Standards & Best Practices
 - Widely Used
 - Create Efficiencies
 - Reduces Duplicative Efforts
 - Saves Time
 - Saves Money

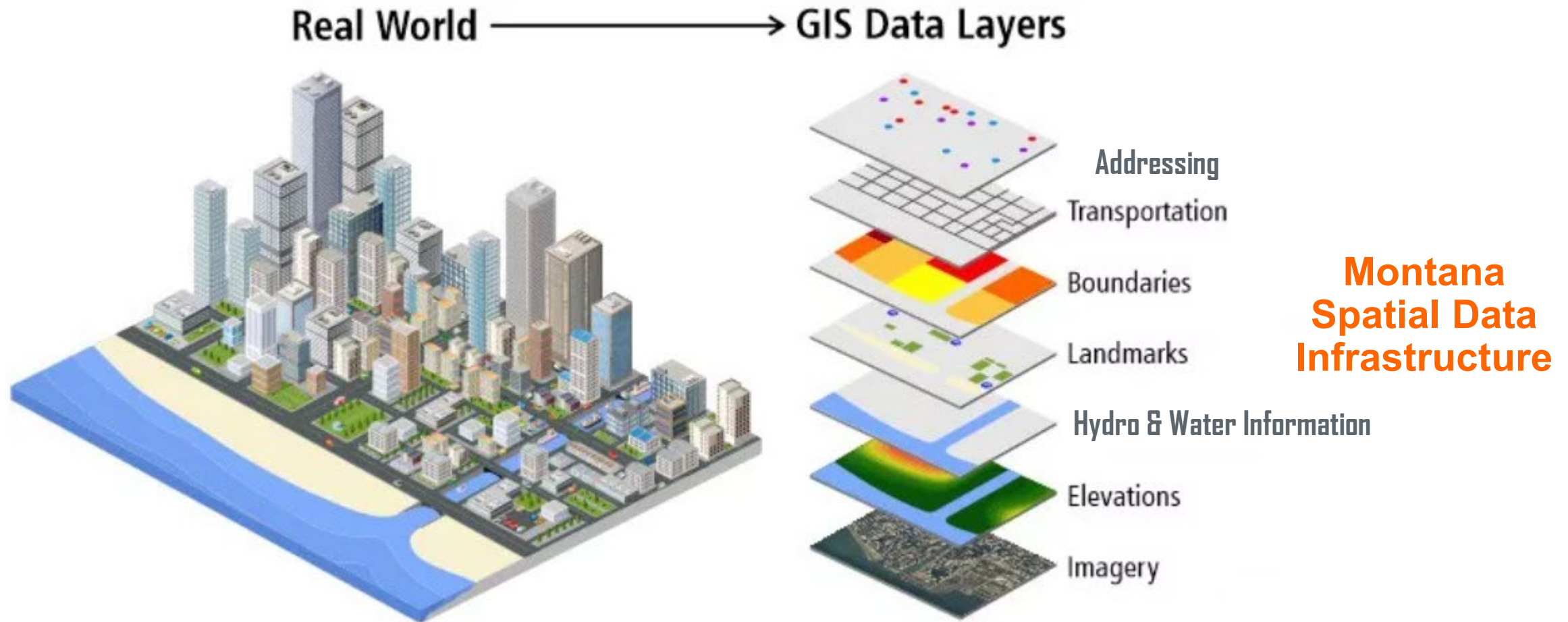


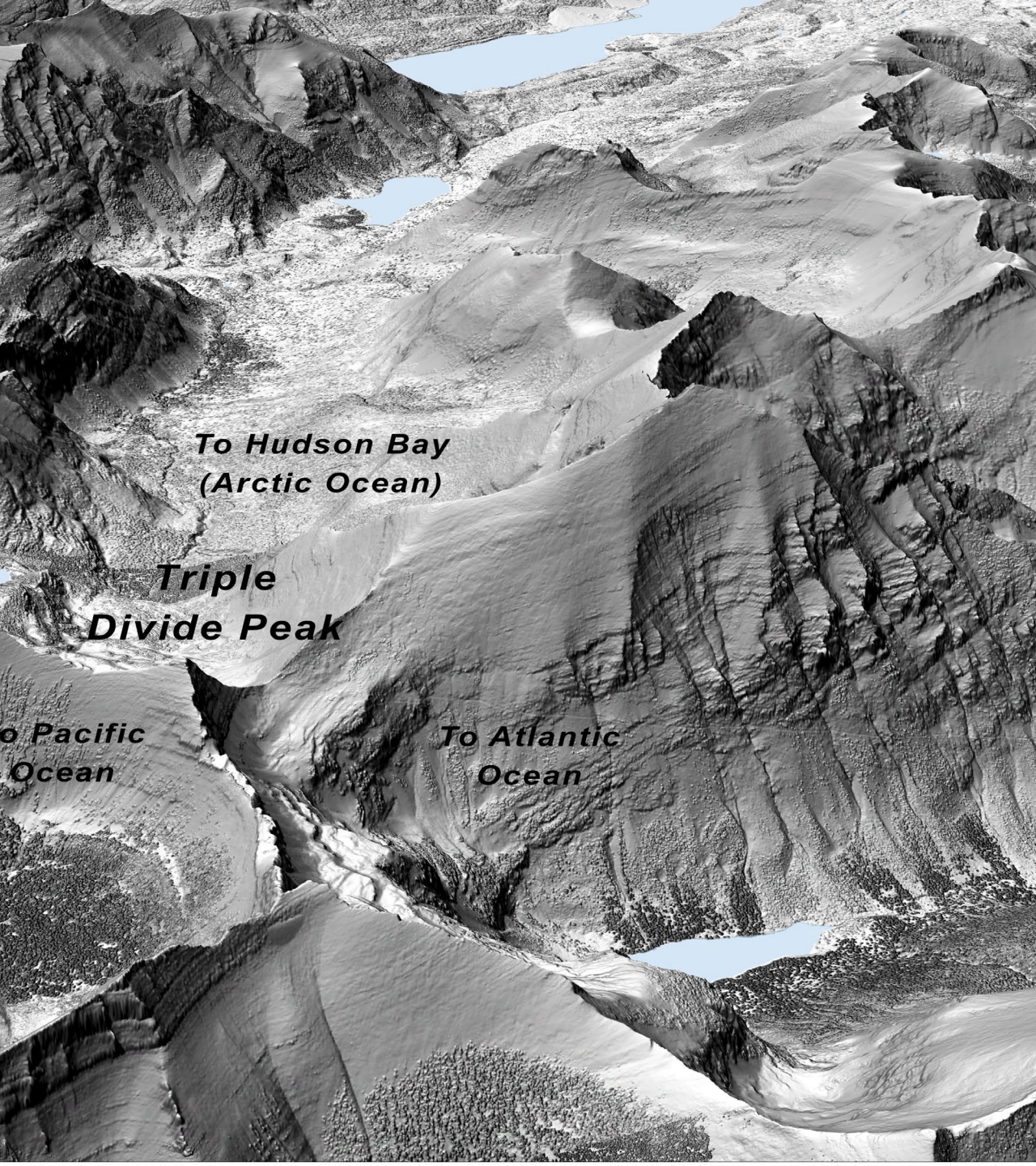
Promotion & Communication

- Provide Training
 - Subject Matter Expert Webinars, Case Studies, hands-on
- Provide Expertise
- Communicate to Stakeholder Communities
 - GovDelivery, Email, Website, Direct Invites, Summits, Working Group Meetings
- Supportive Grant Program
- Represent Montana Locally, Regionally, & Nationally
 - Present to stakeholder groups



Coordination Makes it Possible!





Montana Geospatial Information Act Grant Program

- Funding through Recordation Fees
- Cancelled State Fiscal Years 2025-2026 – due to funding downturn
- Grant program priorities are set through the Geospatial Information Plan
- Eligible Recipients
 - local, state, & tribal government entities & Montana universities

4 MONTANA GEOSPATIAL INFORMATION ACT GRANT PROGRAM

4.1 Prioritize Grant Awards that directly impact the improvement of the MSDI Framework Thems & Data Initiatives in *Figure 4.1*:

MSDI Framework Theme Grant Priorities	
Administrative Boundaries	Hydrography
Cadastral	Transportation
Elevation	Structures & Addresses

Key Geospatial Data Initiatives:
NG9-1-1 Data Development
Geo-Enabling Montana's Elections
3DHP/Elevation Derived Hydrography

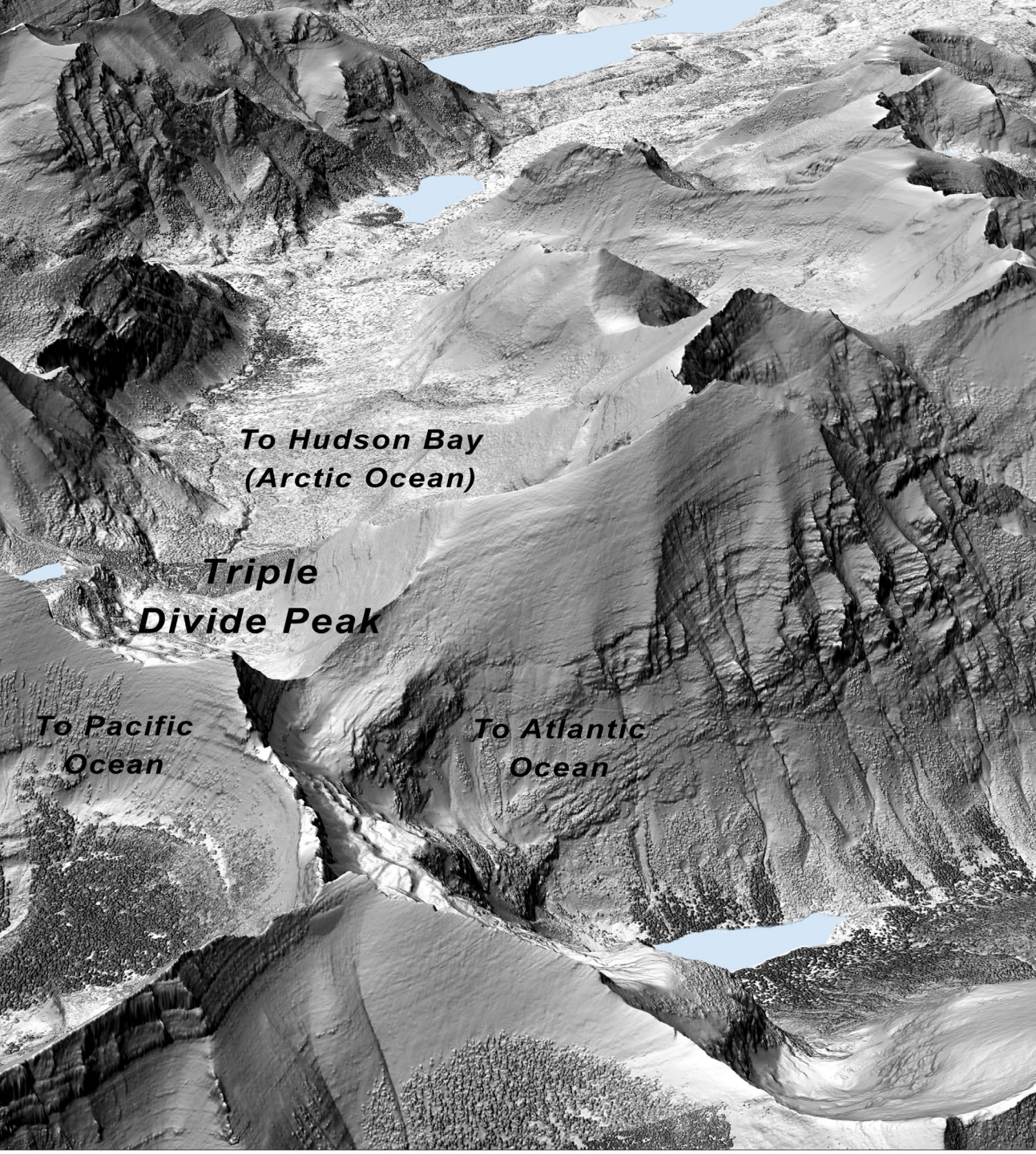
Figure 4.1

4.2 Conduct an internal review of the MGIA Grant Program

- Present internal review findings to the Council.
- Act on findings, recommendations, and advice from the Council.

4.3 Improve Communication for the MGIA Grant Program's Grant Criteria

- Conduct outreach, create/record webinars, oversee in-person trainings, etc.



Changes to the MGIA Grant Program

- Reopening for State Fiscal Year 2027.
- Funding Amount will be set at the November Council Meeting.
- Grant Project priorities must be set by May 15th.
- Two Year Program
- Simplified Reporting

Geospatial Data Assets & Services



Geospatial Data Assets & Services

- Montana Spatial Data Infrastructure (MSDI)
- GIS Data Resources and Applications
- Imagery Collection
- Lidar Inventory | 3D Hydrography Program
- Water Information Resources
 - Water Supply
 - Drought Maps & Survey
 - Climate
 - Channel Migration Zones

Montana Spatial Data Infrastructure (MSDI)



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Cadastral

Tax Parcels, Land Ownership, and Conservation Easements.



Climate

Accurate, timely, and relevant climate data.



Elevation

Spatially references vertical positions above or below a datum surface.



Geographic Names

Names and locations for cultural and geographic features.



Geology

Geologic map data collected from field research.



Hydrography

Networked geometry and attributes representing surface water.



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Spatial database of primary structures, buildings, and their addresses.



Transportation

Transportation features and attribution.



Wetland & Riparian

Extent, type, and approximate location of wetlands, riparian areas, and deepwater habitats



MSDI Contacts

Contact Information for the MSDI Theme Leads and Stewards.

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- Documented Standards*

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Montana Geospatial Data Assets & Services

Search, Explore, Clip and Ship GIS Data in Montana

Data List

Find GIS Data and
Web Services

Data Bundler

Clip GIS Data to your
area of interest

Digital Atlas

View and summarize
GIS Data and Basemaps

What is the Data List?

- Catalog of metadata records for geographic data and web services that may be used with GIS software to make maps and perform analysis
- The Montana State Library and other organizations have published their data here for you to search
- Search for and Download Datasets

What is Metadata?

- Data about Data
- Provides basic descriptive information:
(who, what, where, when, and why)
- Include core Library Catalog Elements
(Title, Abstract, Publication Date)
- Geographic Elements (Geographic Extent, Projection)
- Database Elements (Attribute Labels and Domain Values)
- Provides information on where to retrieve the dataset
- Conforms to a standard (e.g. FGDC, ISO)
- Text file (usually XML file)

Data List Metadata Required Elements

- Title
- Abstract
- Originator
- Publisher
- Time Period of Content
- Bounding Coordinates
- Theme Keywords
- Distributor
- Resource Description
- Metadata Date

Searching the Data List

- Use “Browse Full Data List” to see all of the records
- Text Search
 - First searches records that have the word in the title, then keywords, then elsewhere
 - Exact Phrase
 - All Words
 - Any Words
- MSDI Framework(s)
 - Montana Spatial Data Infrastructure
 - Search by theme(s)
- Content
 - Applications, Downloadable Data, Live Data and Maps, Offline Data
- Data Category
 - 19 categories

Search Results

- Current vs. Historic
 - Most recently updated data in current tab
- Collections/Related Records
 - Some records are part of a collection
 - Only the collection title will show up in a search
 - Other records will be displayed in the “Related Records” tab

Data List Record

Revenue Final Land Unit (FLU) Classification, 2017

Download Data

This data set may have multiple access options or be a data collection or member. Please see the [Related Records](#) tab for other data access options or collection members.

Data Provider Montana Department of Revenue

Date 2017

Content Type Downloadable Data

Description

Usage

Distribution

Metadata

Related Records

Abstract

The Department of Revenue Final Land Unit Classification (FLU) is a classification of private agricultural land into one of six uses, fallow, hay, grazing, irrigated, continuously cropped and forest, with forest additionally classified as commercial or non-commercial and irrigated land classified as being flood, pivot, or sprinkler. This layer contains forested land and agricultural land that was not classified as grazing. The data are used in property valuation for agriculture and forest land on private properties. FLU data may exist in tax-
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Content Type Downloadable Data

Description

Usage

Distribution

Metadata

Related Records

Data Access ftp://ftp.geoinfo.msl.mt.gov/Data/Spatial/NonMSDI/DOR/01312017_FLU.zip

Distributor Montana State Library
PO Box 201800

Helena, MT 59620-1800
Telephone: 406-444-5354
TDD/TTY: 406-444-4799
Fax: 406-444-0266
Email: geoinfo@mt.gov

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Date 2017

Content Type Downloadable Data

Description

Usage

Distribution

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Related Records

[View Metadata](#)

[View Metadata \(XML\)](#)

Metadata date 01/31/2017

Metadata Record

Metadata for Revenue Final Land Unit (FLU) Classification, 2017

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

- [Download full XML Metadata](#)

Identification Information:

Citation:

Originator: Montana Department of Revenue
Publication date: 01/31/2017
Title: Revenue Final Land Unit (FLU) Classification, 2017

Publication place: Helena, MT
Publisher: Montana State Library

Online linkage: ftp://ftp.geoinfo.msl.mt.gov/Data/Spatial/NonMSDI/DOR/01312017_FLU.zip

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Purpose:

The Department of Revenue Agriculture and Forest Final Land Unit Classification data (FLU) is used for property valuation for agriculture and forest land on private properties in Montana. The data is used with the NRCS SURRGO and NASIS soil databases, a DOR GIS dataset of forest productivity and the Department of Revenue statewide cadastral GIS databases to determine productivity for agriculture and forest land on private parcels

Time period of content:

Calendar date: 2017
Currentness reference: publication date

Status:

Progress: In work
Maintenance and update frequency: Continually

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        <southbc>44.237720</southbc>
      </bounding>
    </spdom>
  </idinfo>

```

Data List Record

Revenue Final Land Unit (FLU) Classification, 2017

[Download Data](#)

This data set may have multiple access options or be a data collection or member. Please see the [Related Records](#) tab for other data access options or collection members.

Data Provider Montana Department of Revenue

Date 2017

Content Type Downloadable Data

Description

Usage

Distribution

Metadata

Related Records

[\[Child\] Revenue Final Land Unit \(FLU\) Classification, 2009](#)

[\[Child\] Revenue Final Land Unit \(FLU\) Classification, 2011](#)

[\[Child\] Revenue Final Land Unit \(FLU\) Classification, 2013](#)

[\[Child\] Revenue Final Land Unit \(FLU\) Classification, 2015](#)

The Data Bundler

- The Data Bundler is MSL's "clip, zip, & ship" service for obtaining GIS datasets for selected areas
- Built with FME Server, ArcGIS Server, and JavaScript
- Provides many options for output formats, data sources, and user interface enhancements

Step 1: Choose Geography to Clip Data By

[Home](#) / [Geographic Information Clearinghouse](#) / [Data](#) / [Data Bundler](#)

Data Bundler

The Data Bundler clips GIS datasets from the Montana State Library's geographic database to an extent of your choice. You may also download statewide datasets. The Bundler allows you to choose the coordinate systems and file formats to receive your data in.

Start by picking the geography you would like to clip data by:

- [Select One](#)
- [Census Designated Place](#)
- [County](#)
- [Incorporated Cities and Towns](#)
- [PLSS – Township, Range, Section](#)
- [Reservation](#)
- [Watershed Subbasin](#)
- [User Drawn Polygon \(please do not draw polygons larger than a county\)](#)
- [Download Statewide Datasets](#)

Login

A A A A

Geography

Data Bundler - Clip by County

search map here...

Search

Street Aerial Topographic View Legend



Login

A A A A

Geography

County

1. Clip by County

Select features from map or dropdown

Select One

2. Set Parameters

Add/Remove Layers

Output Coordinate System

Select One

Output Format

Select One

Email

Request Data

Step 2: Select Geographic Extent

Data Bundler - Clip by County

search map here...

Search

Street Aerial Topographic View Legend

The map displays several counties: GARFIELD, MCCONE, DAWSON, PRAIRIE, WIBAUX, ROSEBUD, CUSTER, FALLON, TREASURE YELLOWSTONE, BIGHORN, and POWDER RIVER. The CUSTER county is highlighted in yellow with a red dashed border. A scale bar at the bottom left indicates 0, 15, and 30 miles. Navigation controls (plus, minus, home) are on the left side of the map.

Login

A A A A

Geography

County

1. Clip by County

Select features from map or dropdown

CUSTER

2. Set Parameters

Add/Remove Layers

Output Coordinate System

Select One

Output Format

Select One

Email

Request Data

Step 2: Select Geographic Extent

Step 3: Select Layers

Add/Remove Layers

Categories

- All Categories
- Montana Spatial Data Infrastructure
- Farming
- Biota
- Boundaries
- Climatology/Meteorology/Atmosphere
- Economy
- Elevation
- Environment
- Geoscientific Information
- Health
- Imagery/Base Maps/Earth Cover
- Intelligence/Military
- Inland Waters
- Location
- Oceans
- Planning Cadastre
- Society
- Structure
- Transportation
- Utilities/Communications

All Categories

- Airport Runways
- Cadastral Owner Parcels
- Census Blocks, 1990
- Census Blocks, 2000
- Census Blocks, 2010
- Conservation Easements
- County Boundaries
- Dams
- Geographic Names Information System
- Geology
- Groundwater Wells from GWIC
- Incorporated Cities and Towns
- Indian Reservations
- Lakes - Major
- Legislative Districts 2014-2023
- Managed Areas
- Mining Districts
- NHD Flowline
- NHD Waterbody
- NOAA Climate Stations
- Public Land Survey System
- Public Lands
- Public Water Supply Locations
- Railroads
- Roads
- SSURGO Soil Data
- School District Boundaries - Elementary
- School District Boundaries - Secondary
- School District Boundaries - Unified (K-12)
- Schools
- Streams - Major
- Structure and Address Points
- Tax Increment Financing Districts
- Towns (points)
- Trails
- US Forest Service Districts
- USGS 100k Quadrangle boundaries
- USGS 250k Quadrangle boundaries
- USGS 3.75 minute Quarter Quadrangle boundaries
- USGS 7.5 minute Quadrangle boundaries
- USGS Stream Gauges
- Water Rights Points - Diversion
- Water Rights Points - Reservoirs
- Water Rights Points - Uses
- Watershed Boundaries - 4th Code Sub-basins
- Watershed Boundaries - 5th Code Watersheds
- Watershed Boundaries - 6th Code Sub-watersheds
- Weed Districts
- Wetlands - National Wetlands Inventory Final Data
- Wetlands - National Wetlands Inventory Provisional Data

Step 3: Select Layers

Add/Remove Layers

Categories

- All Categories
- Montana Spatial Data Infrastructure
- Farming
- Biota
- Boundaries
- Climatology/Meteorology/Atmosphere
- Economy
- Elevation
- Environment
- Geoscientific Information
- Health
- Imagery/Base Maps/Earth Cover
- Intelligence/Military
- Inland Waters
- Location
- Oceans
- Planning Cadastre
- Society
- Structure
- Transportation
- Utilities/Communications

Montana Spatial Data Infrastructure

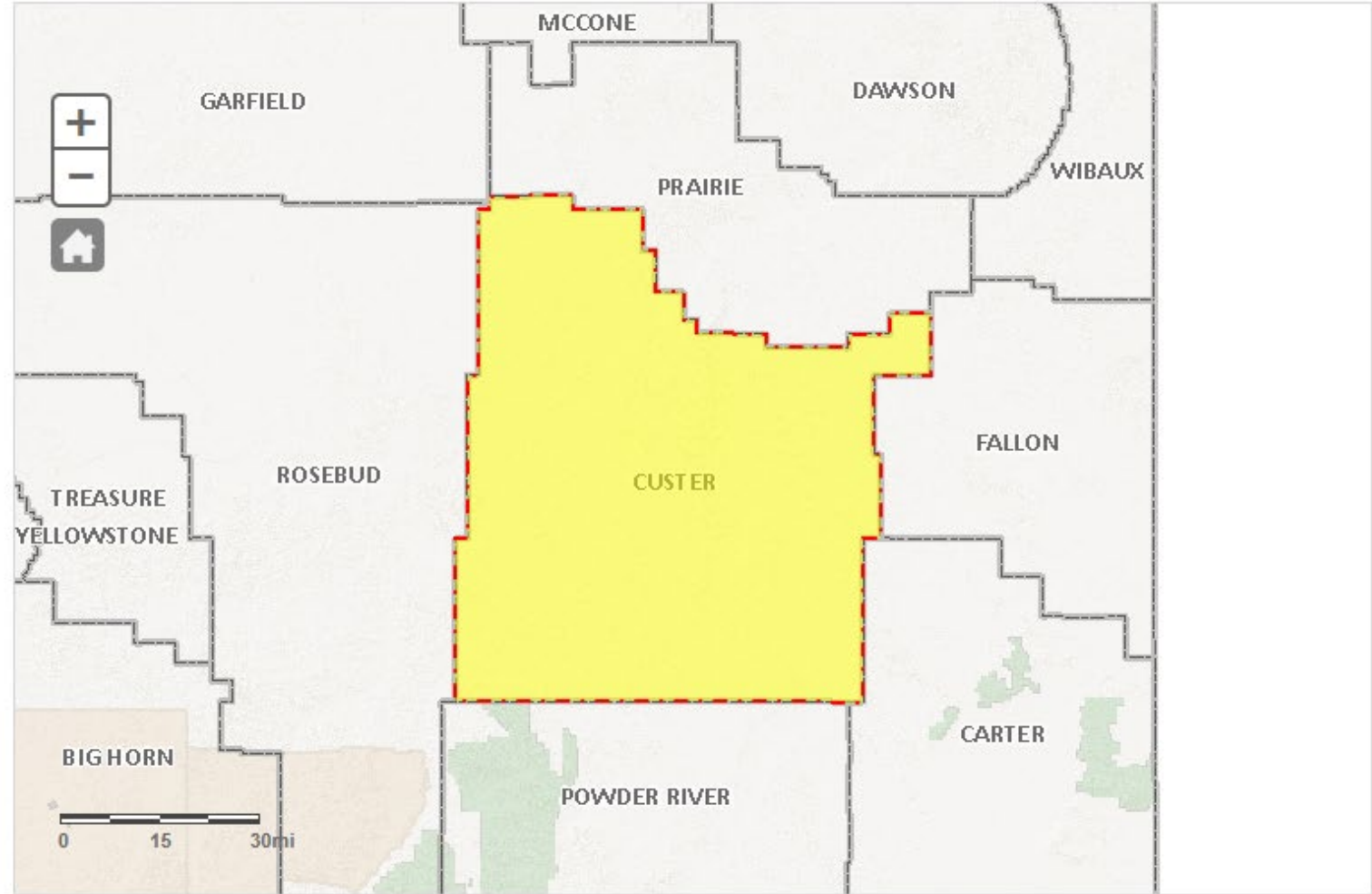
- Airport Runways
- Cadastral Owner Parcels
- County Boundaries
- Geographic Names Information System
- Incorporated Cities and Towns
- Indian Reservations
- NHD Flowline
- NHD Waterbody
- Public Land Survey System
- Railroads
- Roads
- SSURGO Soil Data
- School District Boundaries - Elementary
- School District Boundaries - Secondary
- School District Boundaries - Unified (K-12)
- Structure and Address Points
- Tax Increment Financing Districts
- Trails
- Weed Districts
- Wetlands - National Wetlands Inventory Final Data
- Wetlands - National Wetlands Inventory Provisional Data

Data Bundler - Clip by County

search map here...

Search

Street Aerial Topographic View Legend



The map displays the state of Montana with county boundaries. The county of Custer is highlighted in yellow and outlined with a red dashed border. Other labeled counties include Garfield, McCone, Dawson, Prairie, Wibaux, Rosebud, Fallon, Treasure, Yellowstone, Big Horn, Powder River, and Carter. A scale bar at the bottom left indicates 0, 15, and 30 miles. On the left side of the map, there are navigation controls: a plus sign for zoom in, a minus sign for zoom out, and a home icon.

Login

A A A A

Geography

County

1. Clip by County

Select features from map or dropdown

CUSTER

2. Set Parameters

Add/Remove Layers

-Cadastral Owner Parcels

Output Coordinate System

NAD83 Montana State

Output Format

Esri File Geodatabase

Email

Request Data

Step 3: Select Layers

Step 4: Select Coordinate System

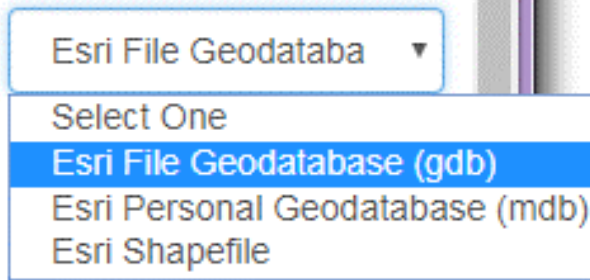
Output Coordinate System

NAD83 Montana Sta: ▼

- Select One
- NAD83 HARN Montana State Plane, International Foot (EPSG #2901)
- NAD83 HARN Montana State Plane, Meter (EPSG #2818)
- NAD83 Montana State Plane, International Foot (ESPG #2256)
- NAD83 Montana State Plane, Meter (EPSG #32100)**
- NAD83 datum, Latitude-Longitude; Degrees (EPSG #4269)
- UTM with NAD83 datum, Zone 11, Meter (EPSG #26911)
- UTM with NAD83 datum, Zone 12, Meter (EPSG #26912)
- UTM with NAD83 datum, Zone 13, Meter (EPSG #26913)

Step 5: Select Data Format for Output

Output Format



A screenshot of a software interface showing a dropdown menu for selecting an output format. The menu is open, displaying four options: "Select One", "Esri File Geodatabase (gdb)", "Esri Personal Geodatabase (mdb)", and "Esri Shapefile". The "Esri File Geodatabase (gdb)" option is highlighted with a blue background. The dropdown is positioned below a label "Output Format" and a partially visible button labeled "Esri File Geodataba".

- Select One
- Esri File Geodatabase (gdb)
- Esri Personal Geodatabase (mdb)
- Esri Shapefile

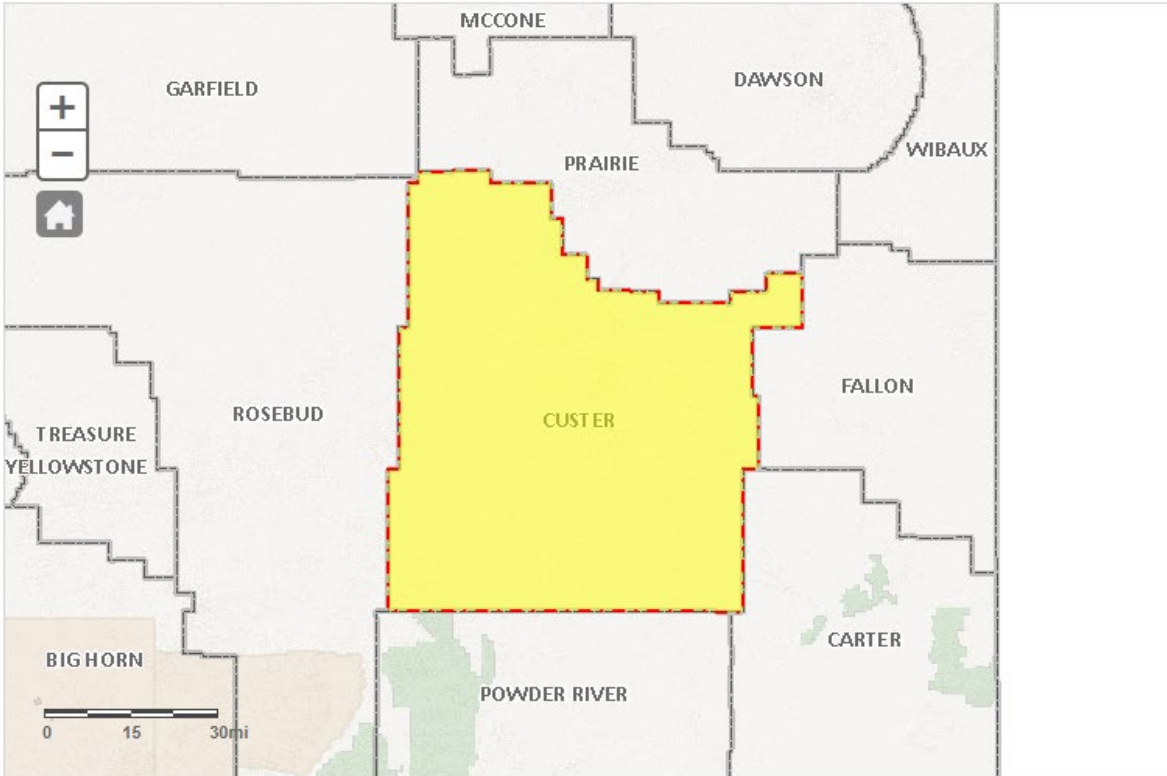
Step 6: Enter email address

Data Bundler - Clip by County

search map here...

Search

Street Aerial Topographic View Legend



The map displays the state of Montana with county boundaries. The county of Custer is highlighted in yellow. Other labeled counties include Garfield, McCone, Dawson, Prairie, Wibaux, Rosebud, Fallon, Treasure, Yellowstone, Big Horn, Powder River, and Carter. A scale bar at the bottom left indicates 0, 15, and 30 miles. Map navigation controls (zoom in, zoom out, home) are visible on the left side.

[Page History](#)

Login

A A A A

Geography

County ▾

1. Clip by County

Select features from map or dropdown

CUSTER ▾

2. Set Parameters

Add/Remove Layers

-Cadastral Owner Parcels

Output Coordinate System

NAD83 Montana St: ▾

Output Format

Esri File Geodataba ▾

Email

mburns2@mt.gov

Request Data

BRARY

Data Bundler Request Output

From: geoinfo@mt.gov [<mailto:geoinfo@mt.gov>]
Sent: Wednesday, April 11, 2018 4:54 PM
To: Burns, Meghan <MBurns2@mt.gov>
Cc: Montana State Library Geoinfo <Geoinfo@mt.gov>
Subject: MSL Geographic Information Data Bundler Request

This zip file contains the results of the request you made to the MSL Geographic Information Data Bundler on Wed-11-Apr-2018 04:51:32 PM (Request#: 1106).

Click here to download the result: https://mslfme.mt.gov/fmedatadownload/results/FME_2D335913_1523487092560_8600.zip

For more information about your request, see the `_ReadMe.txt` in the zip file.

If you have questions, please contact the MSL Geographic Information Staff at: geoinfo@mt.gov or 406-444-5354.

What can you do with the Digital Atlas?

- Build a Map and Share it
- Find Locations in Montana
- Explore Databases
- Browse Aerial photos and Topographic Maps
- Generate reports from the Data
- Download Data
- View Metadata

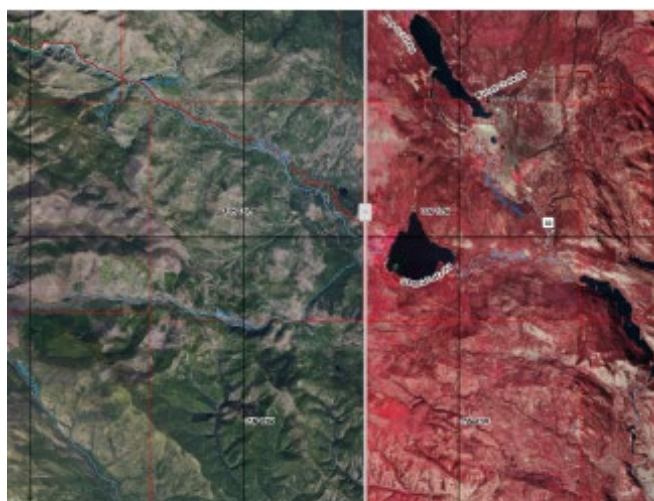
Available Map Layers

- Administrative Boundaries
 - Counties, Reservations, Cities, TIFDs
- Air Photo Dates
- Aviation
 - Airports, Heliports
- Cadastral
 - Owner Parcels, Conservation Easements, Public Lands
- Census Blocks
 - 1990, 2000, 2010
- Dams
- Groundwater Wells
- Legislative Districts
 - 2015 House and Senate Districts
- Managed Areas
- Mining
 - Abandoned and Inactive Mines
 - Mining Districts
- Public Land Survey System (PLSS)
 - Townships, Sections, Sub-Sections, Special Surveys
- Registered Commercial Apiaries
- Schools
- School Districts
 - Elementary, Secondary, K-12
- Septic System Density
- Soil Data (SSURGO)
 - Point, Line, Mapping Units, Surveys
- USGS Gauges
- Streams and Lakes
- Registered Commercial Apiaries
- Structures
- Addresses
- Towns
- Population Estimate Areas
- Transportation
 - Highways, Public Roads, Other Roads, Trails, Railroads
- US Forest Service Districts
- Watershed Boundaries
 - 4th, 5th, 6th Code
- Weed Districts
- Water Rights
 - DNRC Places of Use, Diversions
- Wetlands
 - Wetland and Riparian Areas, Mapping Status by USGS Quad

Features Applications



Montana Cadastral



Air Photo Browser



Montana Lidar Inventory

Cadastral

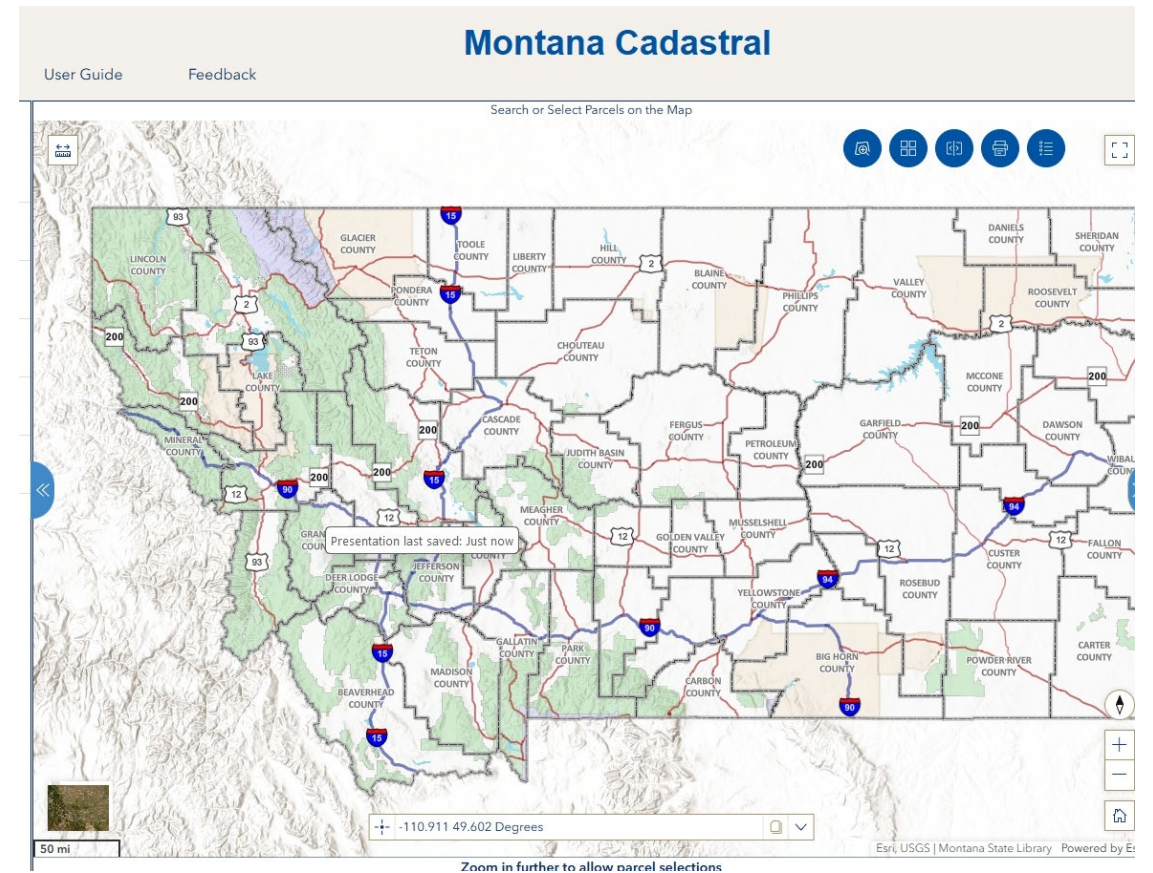
<https://msl.mt.gov/GIS/Cadastral>

What can you do with the Cadastral Application?

- Search for property information by geocode, owner, or subdivision.
- Search for property information by zooming in to a specific part of the state and clicking on one parcel at a time to display the property record card.
- Download the parcel GIS data and the Department of Revenue (DOR) Computer Assisted Mass Appraisal (CAMA) database.

MSDI Cadastral

- Data Layers:
 - Owner Parcels
 - CadNSDI (PLSS)
 - Conservation Easements
- Available as file gdb, shapefile, and web services
- View in the Cadastral Application, Digital Atlas, and many other MSL web applications
- Additional information available in the Cadastral App User Guide



Additional GIS Data Resources & Apps

Water Info System

The starting point to discover water resource information within Montana

NRCS Partnership

A collection of Natural Resource, Environmental, and Conservation GIS Resources

MT Reference Network

State-owned real-time positioning network

Map Gallery

Curated and searchable list of MSL maps and apps

Ecological Site Reviewer

Explore biophysical GIS Data such as elevation, soils, land cover and vegetation

MTNHP Map Viewer

Discover species, ecological, and land management GIS Data

Structures and Addresses

<https://msl.mt.gov/GIS/Structures>



Advancing Technology in Public Safety

- Support Public Safety through MSDI Data Layers
- Next Generation 9-1-1: modernizes current system to be all IP-based.
 - Geospatial data & technology is the foundational for all location validation & call routing.
- MSL works with state, local, & tribal governments to produce state's authoritative Addressing & Boundaries data.
- [Montana Geocoding Web Service](#)

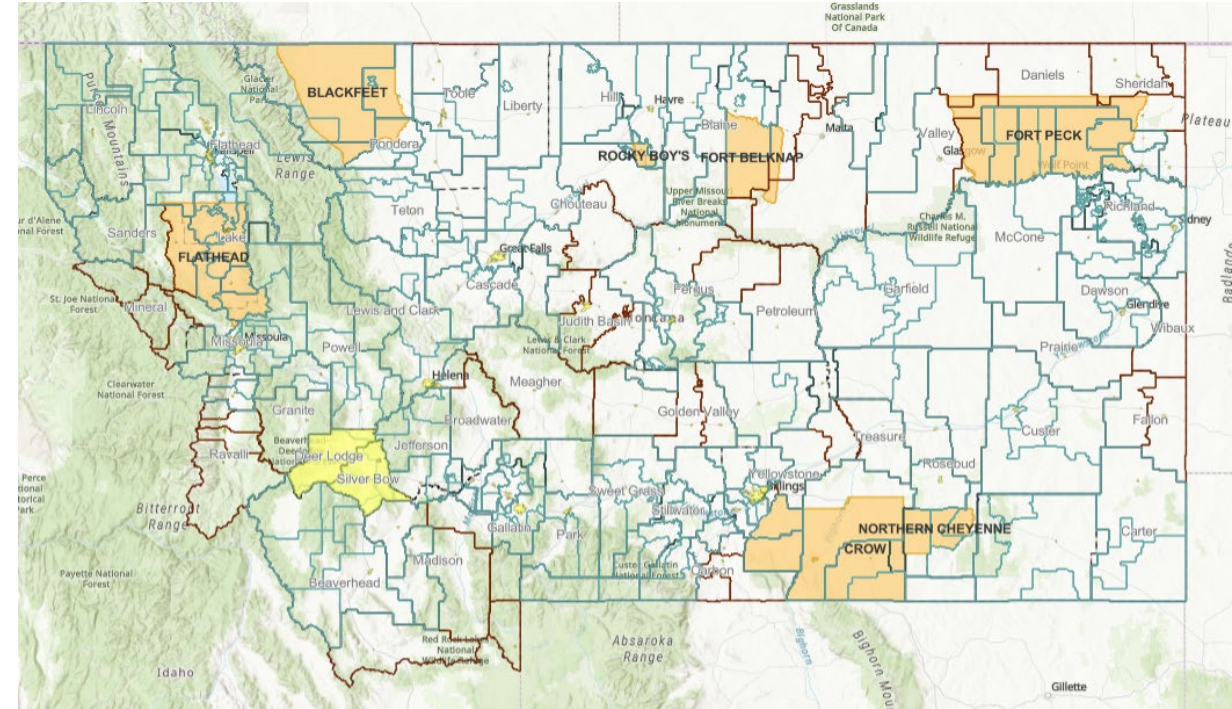
Dispatcher Becky Brubaker works on six screens at once in the Cascade County 911 dispatch center. Cascade County 911 celebrated its 30th anniversary June 1. *TRACI ROSENBAUM/GREAT FALLS TRIBUNE*

Administrative Boundaries

<https://msl.mt.gov/GIS/Boundaries>

Administrative Boundaries Theme Updates

- The number of sub-themes has grown from 18 to 43
- Election Districts are used for state/county/city elections
- Data come from federal, state, and local partners
- MSL provides data updates to: Census, USGS PAD-US, Esri
- MSL publishes datasets in various formats, maps, and apps



Administrative Boundaries Sub-Themes: Core

- State
- Tribal Nations Reservations & Off Reservation Trust Land
- Congressional Districts (LEG)
- Legislative Districts (House and Senate Districts)
- Voting Precincts
- County
- County Commissioner Districts
- Incorporated Cities and Towns
- School Districts (Elementary, High School, K-12)
- Rural Fire Districts (DNRC)
- Soil Conservation Districts (DNRC)
- Tax Increment Financing Districts (DOR)
- Weed Management Districts
- Managed Areas

Administrative Boundaries Sub-Themes: US Census Bureau Data

- State*
- Tribal Nations Reservations*
- Congressional Districts*
- Legislative Districts (House and Senate Districts)*
- Voting Precincts*
- County*
- Incorporated Cities and Towns*
- School Districts (Elementary, High School, K-12)*

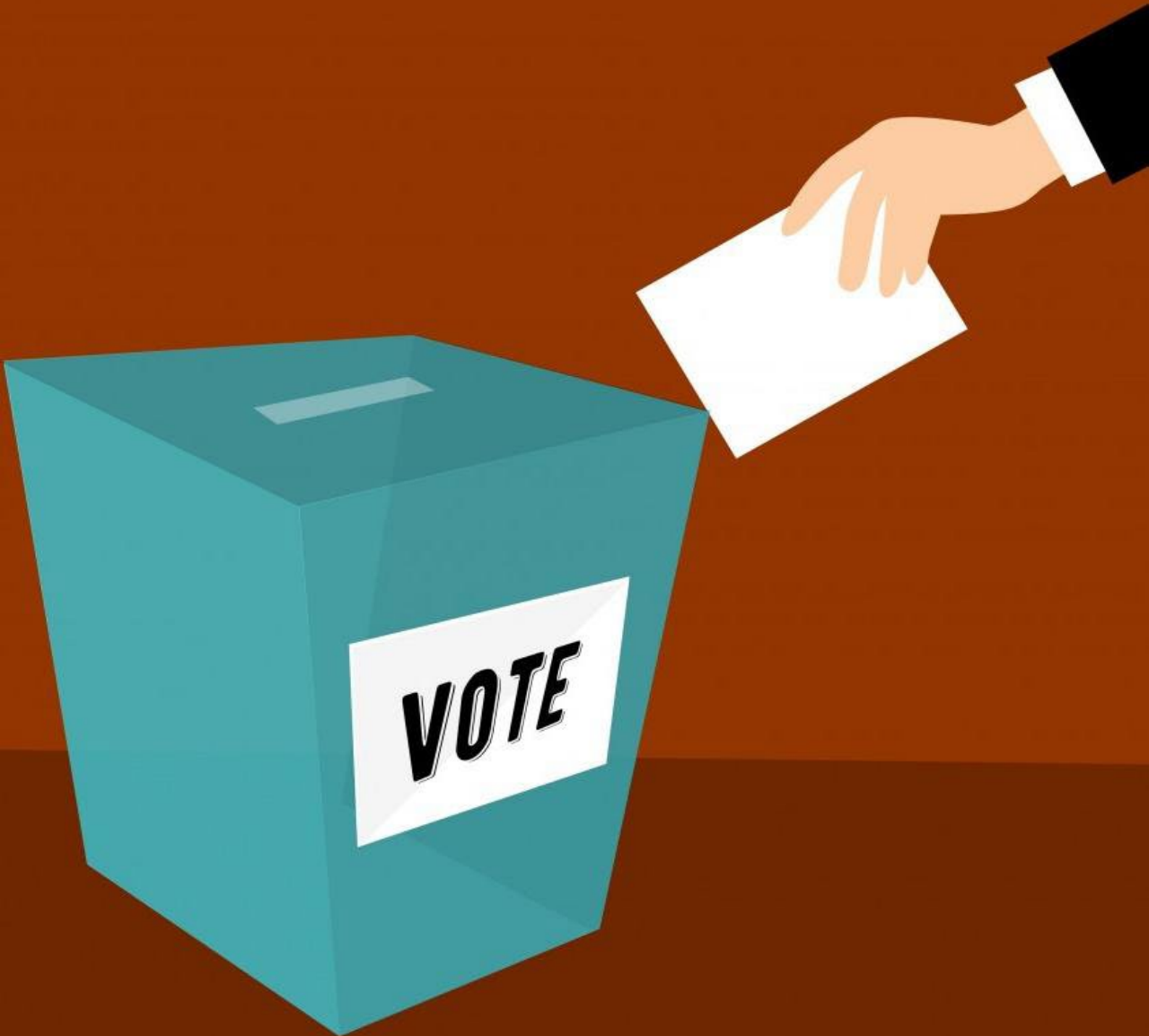
Non-MSDI include:

- Census Tracts
- Census Block Groups
- Census Blocks
- County Subdivisions
- Public Use Microdata Areas (PUMAs)
- Census Designated Places (CDPs)

*** Indicates sub-theme is also a Core Sub-Theme**

Geo-Enabling Montana's Elections

- Support Montana's Elections through MSDI Data Layers
- Partner with Secretary of State and Local Government Election Administrators
- State & Local Elections Systems are now using geospatial data and technology to locate voters.
 - Geospatial data & technology is the foundational for getting the right ballot to the right person.
- Similar to NG9-1-1 efforts GEE relies upon MSDI Addressing & Boundaries data.



Administrative Boundaries Sub-Themes: Election Districts

- Ambulance/EMS
- Cemetery
- City*
- Community Council
- Congressional*
- County Commissioner*
- County*
- Fire*
- House District*
- Irrigation
- Judicial
- Jury
- Library
- Mosquito
- Park and Recreation
- Public Hospital
- Public Service Commission
- Resort
- Rural
- Rural Improvement
- School*
- School Single Member Trustee
- Senate District*
- Sewer
- Soil Conservation*
- Special
- State*
- Study Commission
- Supreme Court Justice
- Transportation
- Voting Precinct*
- Ward
- Water

*** Indicates sub-theme is also a Core Sub-Theme**

Public Boundary Data Layer Updates

March 2026

- Election Districts and Precinct Splits are current as of Date (for the May Elections)
 - Available to download from the MSDI Boundary Page or the FTP:
 - ✓ Statewide and by County
 - ✓ Format:
 - File Geodatabases
 - Shapefiles
 - Web Services
 - ✓ And Current Precinct Splits Excel Table
- Visit the MSDI Boundary page for: <https://msl.mt.gov/GIS/Boundaries>
 - Metadata Records (links to MSL GIS Data List Application)
 - Data Download Links (File Geodatabase and Shapefile)
 - Web Services: https://gisservicemt.gov/arcgis/rest/services/MSDI_Framework/Boundaries/MapServer
 - Map/App Gallery: <https://montana.maps.arcgis.com/apps/instant/filtergallery/index.html?appid=02748f7435284288bc4e0a656a634a6c>
 - Geo-Enabled Elections Hub: <https://geoenabled-elections-montana.hub.arcgis.com/>
 - FTP Link: <https://ftpgeoinfo.msl.mt.gov/Data/Spatial/MSDI/AdministrativeBoundaries/Elections/>

Soils

<https://msl.mt.gov/GIS/Soils>

MSDI Soils

- Soils Data Download (from web map or Site Reviewer)
 - https://msl.mt.gov/geoinfo/data/Soils_Data_Download
 - [Statewide gSSURGO file geodatabase](#) or by Soil Survey Area (SHP)
- Applications
 - [NRCS WEB Soil Survey](#)
 - [NRCS Soil Data Viewer](#)
 - [Montana Ecological Site Reviewer](#)



Land Cover

<https://msl.mt.gov/GIS/LandUse>

MSDI Land Cover

- 30-meter Resolution
- Adapted from a NatureServe version of the National Vegetation Classification Group-Level Vegetation Communities
- Current: Published in 2025
- Archive:
 - 2023
 - 2010-2017
- Applications:
 - [MTNHP Map Viewer](#)
 - [MTNHP Ecological Communities Guide](#)
 - [Ecological Site Reviewer](#)



Wetlands and Riparian Areas

<https://msl.mt.gov/GIS/Soils>

MSDI Wetlands and Riparian Areas

- Nearly statewide coverage of modern wetland mapping with legacy (outdated mapping) to fill in the gaps
- Mapped to the National Wetlands Inventory (USFWS) standards
- Available as file gdb, shp, web service
- Applications
 - [MTNHP Map Viewer](#)
 - [Montana Wetlands Story Map](#)
 - [Ecological Site Reviewer](#)

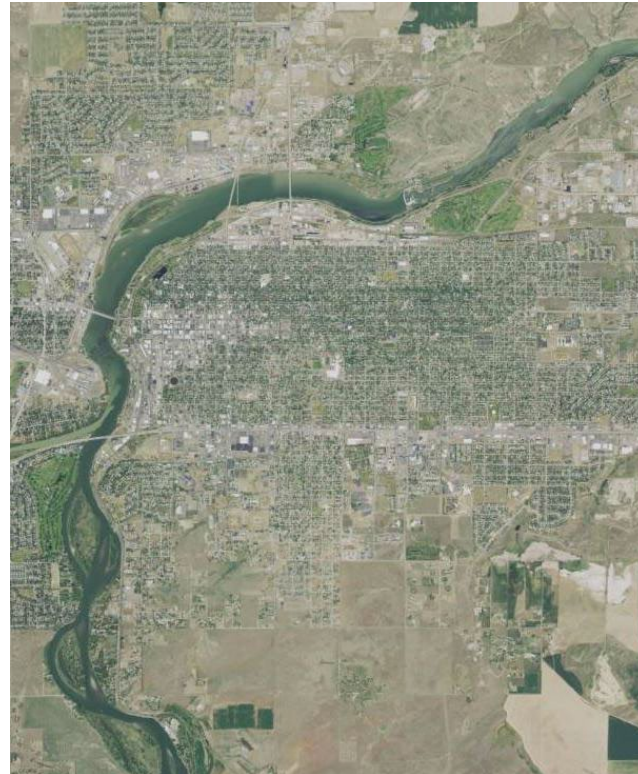


Imagery

<https://msl.mt.gov/GIS/imagery>

Imagery Collection

- Statewide imagery is NAIP
 - 10 years of NAIP since 2005 (approx. every 2 years)
 - Natural Color and Color Infrared
- NAIP 2025
 - 30 cm resolution in MT!
 - County Mosaics Available Now
 - Web Service Coming Soon!
- Other ad hoc collections



Natural Color



Color Infrared

Imagery Collection

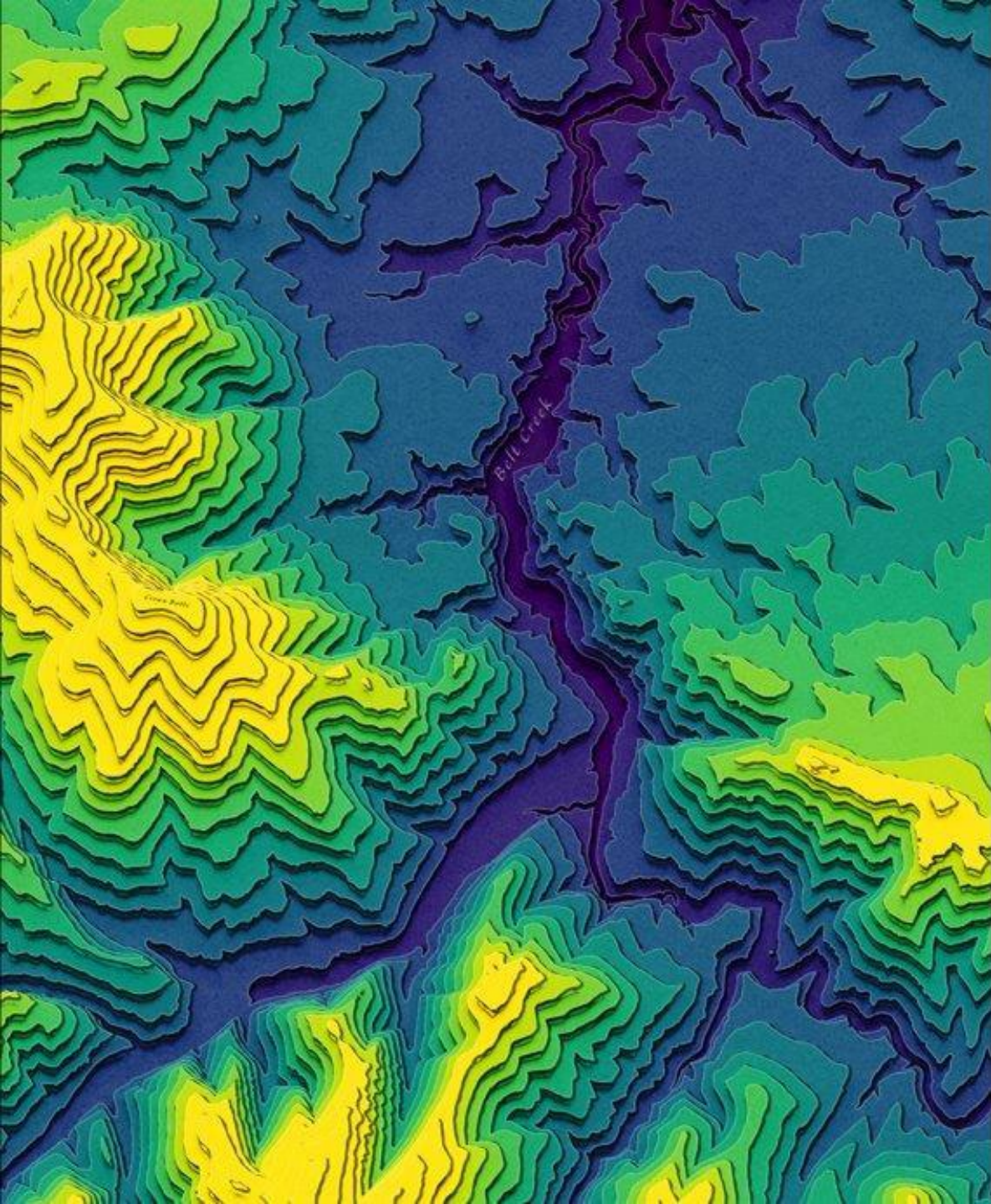
- Browse the State Library Collection online:
 - [Montana Air Photo Browser](#)
 - [Montana Digital Atlas](#)
 - [Web map services](#)
 - [ArcGIS Online Basemaps](#)
- View the image dates
- Download county mosaics or
- Request tiffs



<https://msl.mt.gov/GIS/imagery>

Elevation - Lidar

<https://msl.mt.gov/GIS/Elevation>

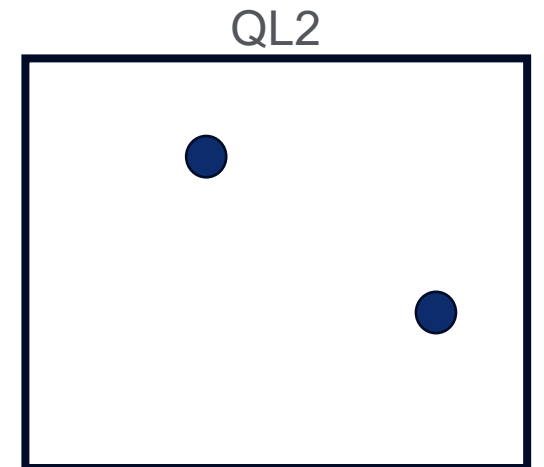
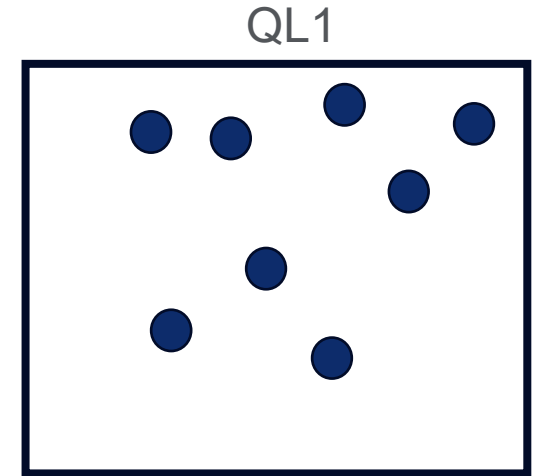


LiDAR (Elevation Data)

- MSL serves in a coordination role finding partners to acquire lidar through the **USGS 3D Elevation Program (3DEP)**.
- Kicked off in 2019
- From meters (current) to centimeters (future) accuracy
- Ubiquitous access

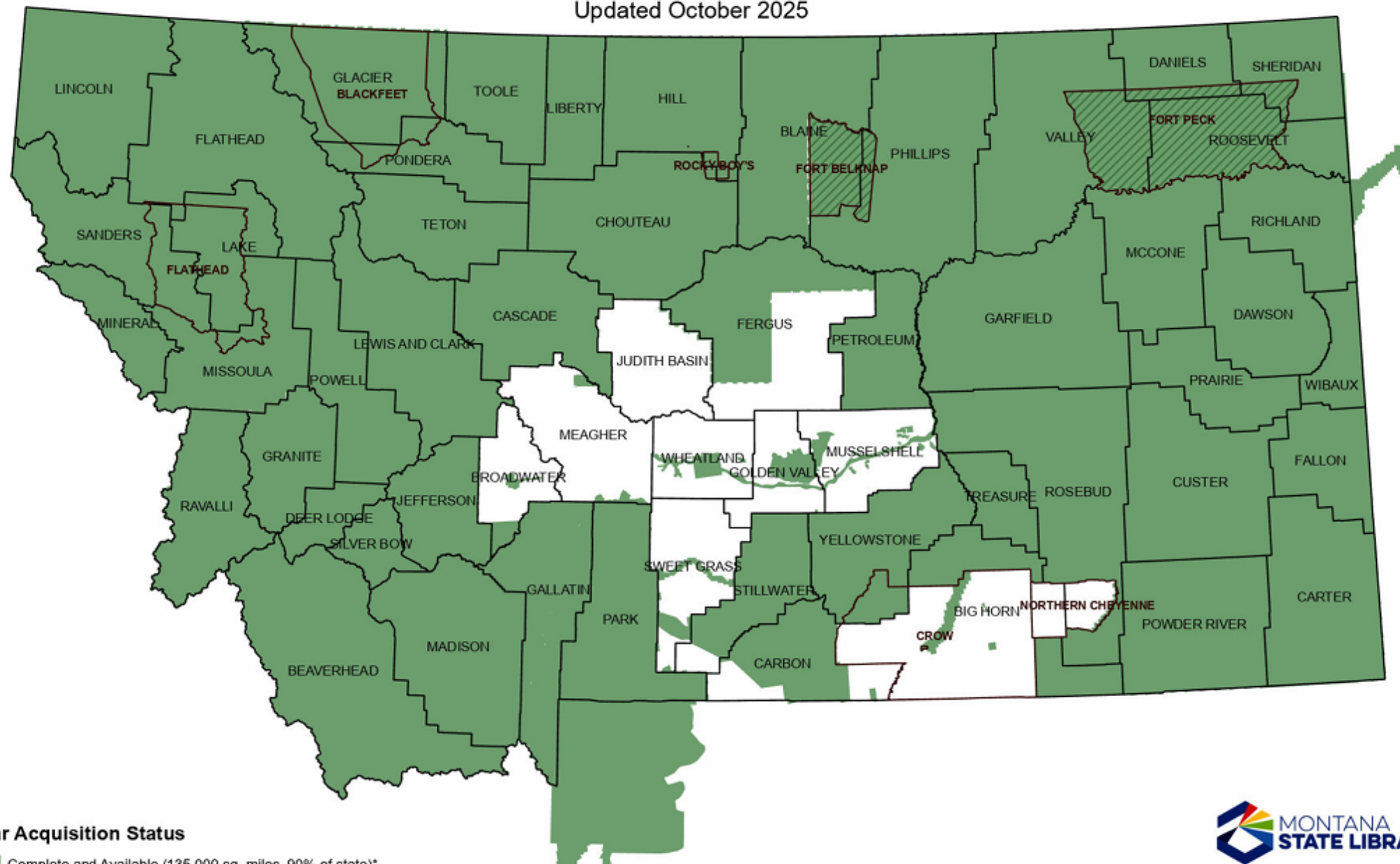
Montana lidar by the numbers

- **130,000** square miles covered (90%)
 - 100% expected by Spring 2026
- **20,000** square miles repeat coverage
- **170 TB** of data stored
 - 13+ million files
- **20%** Quality Level 1 (1/2m DEM)
- **80%** Quality Level 2 (1m DEM)
- **~10 cm** vertical accuracy $RMSE_z$
- **~50 cm** horizontal accuracy




Montana Lidar Inventory

Updated October 2025



Lidar Acquisition Status

 Complete and Available (135,000 sq. miles, 90% of state)*

 Complete (not available at MSL)

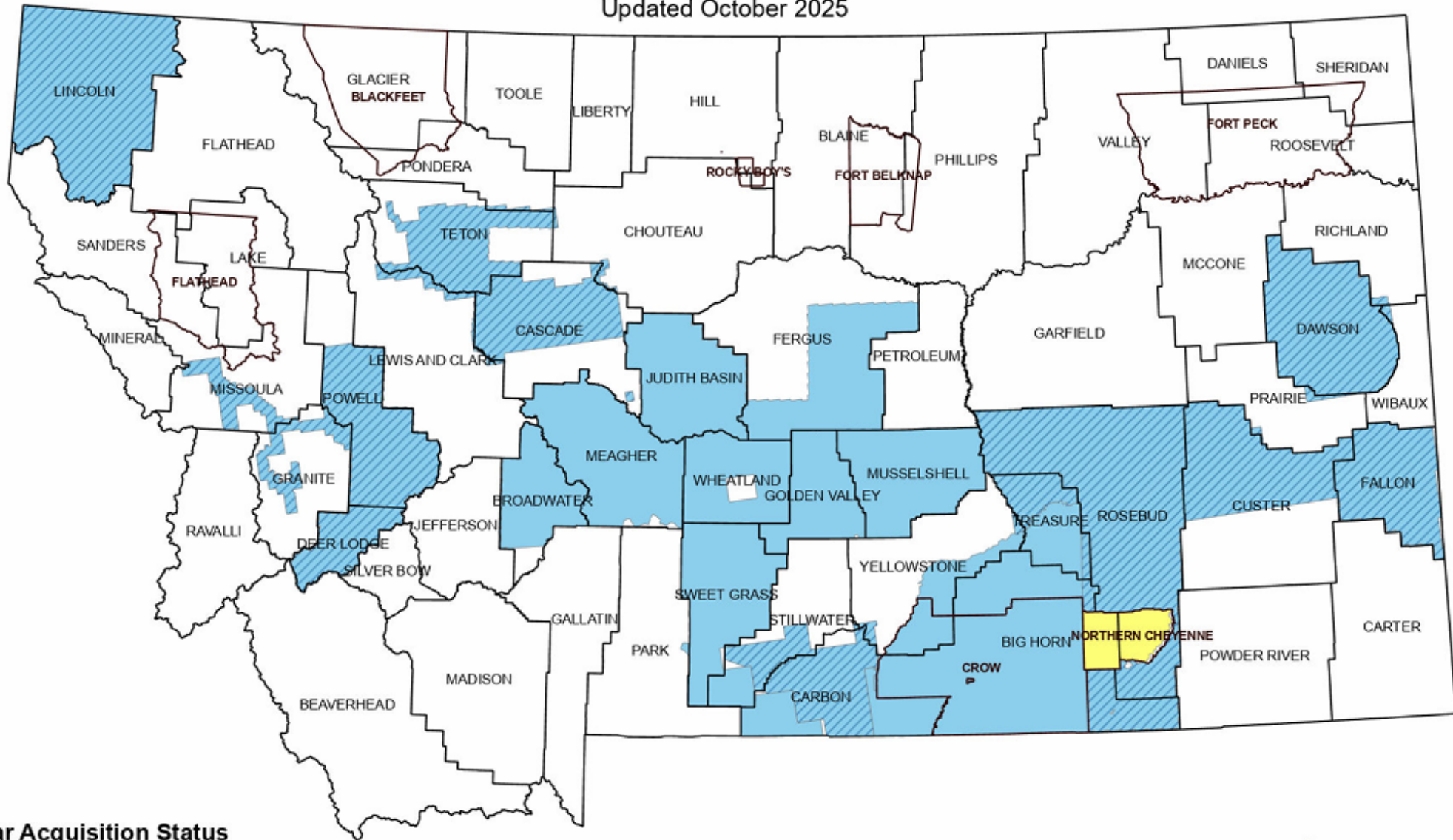
*Includes overlapping projects and Yellowstone National Park






Map updated October 3, 2025
Map number: 19MT0010
<https://msl.mt.gov/gis/lidarinventory>

Montana Lidar Inventory

Updated October 2025



Lidar Acquisition Status

-  In Progress (45,000 sq. miles)*
-  In Progress (Reacquire)
-  Planned

*Includes overlapping projects and Yellowstone National Park



Map updated October 3, 2025
Map number: 19MT0010
<https://msl.mt.gov/gis/lidarinventory>

Spot the Difference

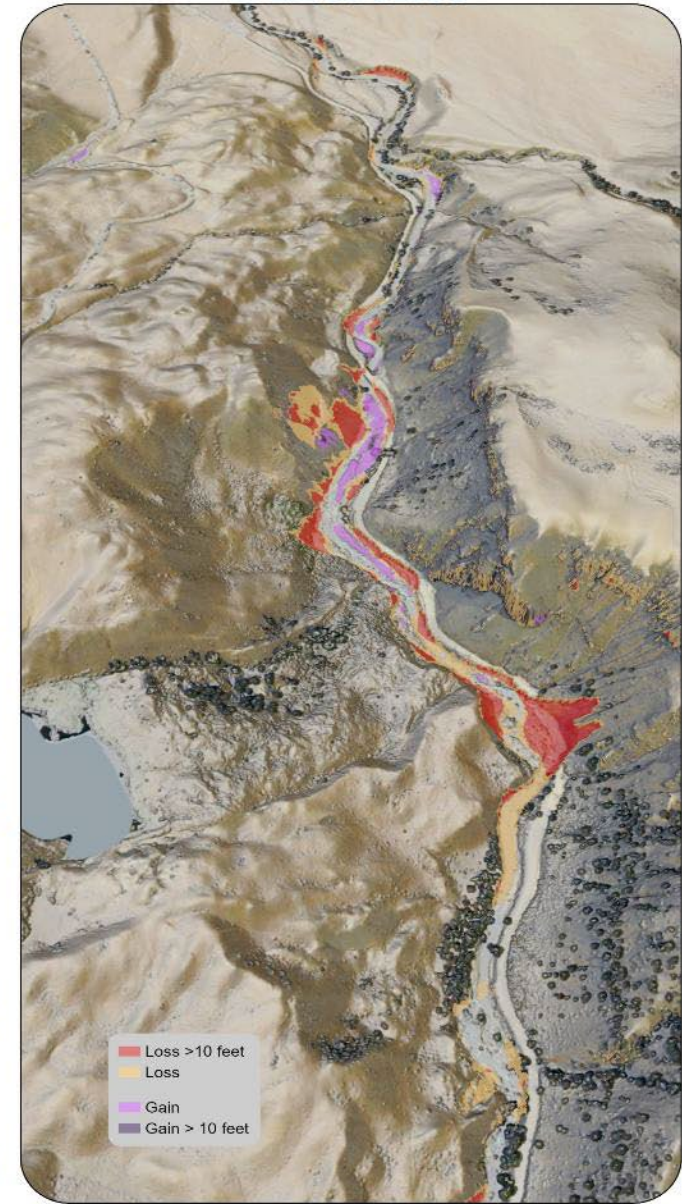
2020



2023



Difference

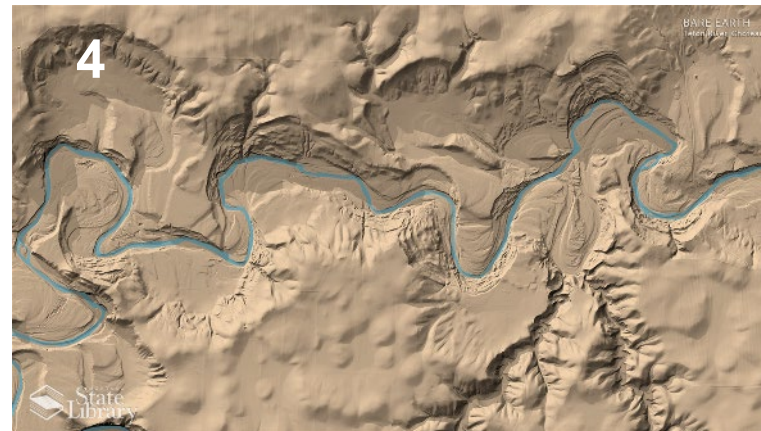
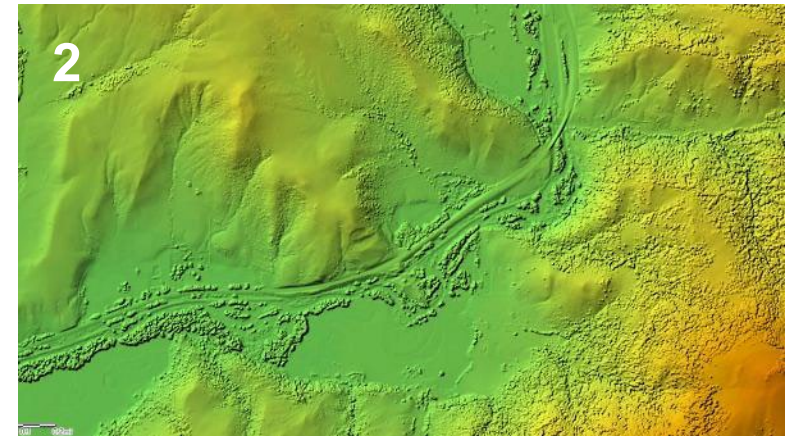
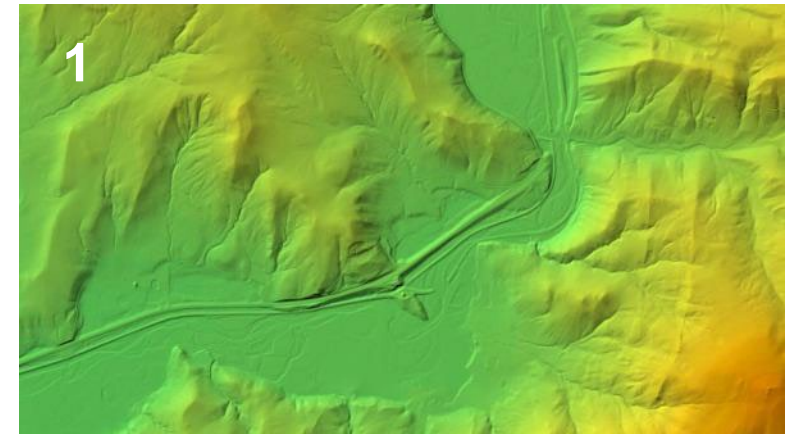


- Loss > 10 feet
- Loss
- Gain
- Gain > 10 feet

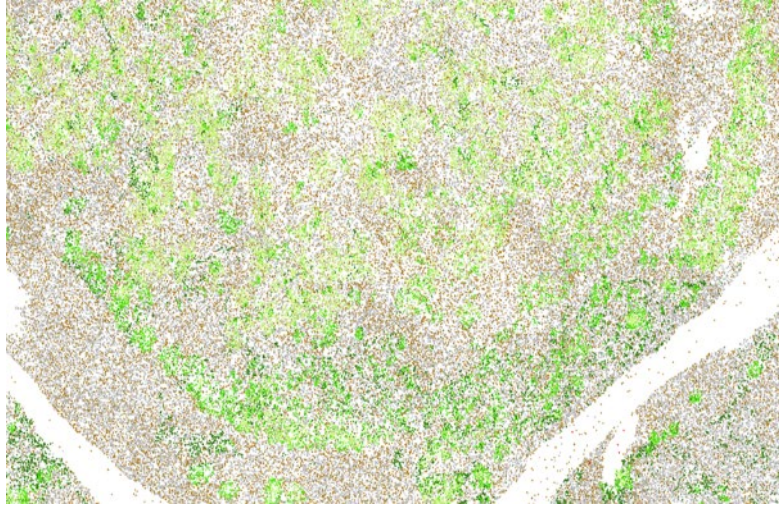
What is available?

Core Products (1 meter resolution)

1. Bare-earth Digital Elevation Model
2. Digital Surface Model
3. Canopy Height Model
4. Hillshade
5. Intensity image



Point Cloud



Water breaklines



Control



Reports and metadata

LocationData	11/3/2020 9:48 AM	File folder
Metadata	6/23/2020 1:28 PM	File folder
Mosaics	9/27/2021 2:11 PM	File folder
PointCloudData	7/21/2021 9:48 PM	File folder
Quads	10/5/2021 4:38 PM	File folder

Building footprints



Contours



Where to get lidar data?


The screenshot shows the Montana Lidar Inventory web application. At the top left is the Montana State Library logo. The main title is "Montana Lidar Inventory". A navigation bar includes links for "Introduction", "Status Dashboard", "View, Download, and Request Data" (highlighted), "Collaborate", "Data Use Survey", "Lidar 101 & Images", and "User Guide". On the right, there are social media icons and a "Disclaimer" link. The left sidebar contains a list of filterable categories, each with a toggle switch:

- Viewable Lidar Projects (in this application)
- Downloadable lidar projects (MSL or USGS)
- Lidar projects not yet at the State Library
- Completed lidar acquisitions
- In-progress lidar acquisitions
- Planned lidar acquisitions
- Completed lidar projects that are less than 5 years old
- Lidar projects that have contours
- Lidar projects that have building footprints
- Quality Level 1 lidar (~8 points per square meter)
- Quality Level 2 lidar (~2 points per square meter)

The main map area displays a 3D topographic view of a region in Montana, colored by elevation (green for lower elevations, yellow and orange for higher elevations). A search bar at the top of the map contains the text "Address, Parcel, Quad, Project Name". A search icon is to the right of the search bar. On the left side of the map, there are navigation controls: a plus sign for zoom in, a minus sign for zoom out, a home icon, a location pin icon, and a compass icon. On the right side of the map, there are several utility icons: a globe, a magnifying glass, a print icon, a share icon, a refresh icon, and a full screen icon. At the bottom of the map, there is a checkbox labeled "Enable clicking the map to get the coordinates" which is currently checked. Below the map, there are three links: "Request lidar data not available by download |", "View lidar projects as a list |", and "Let us know how you are using the data |".



USGS National Map – LidarExplorer

 science for a changing world

3DEP LidarExplorer

[Search](#) [Process](#) [About](#) LIDAR [BASE MAP](#)

Which product are you interested in?


LIDAR DEM OTHER

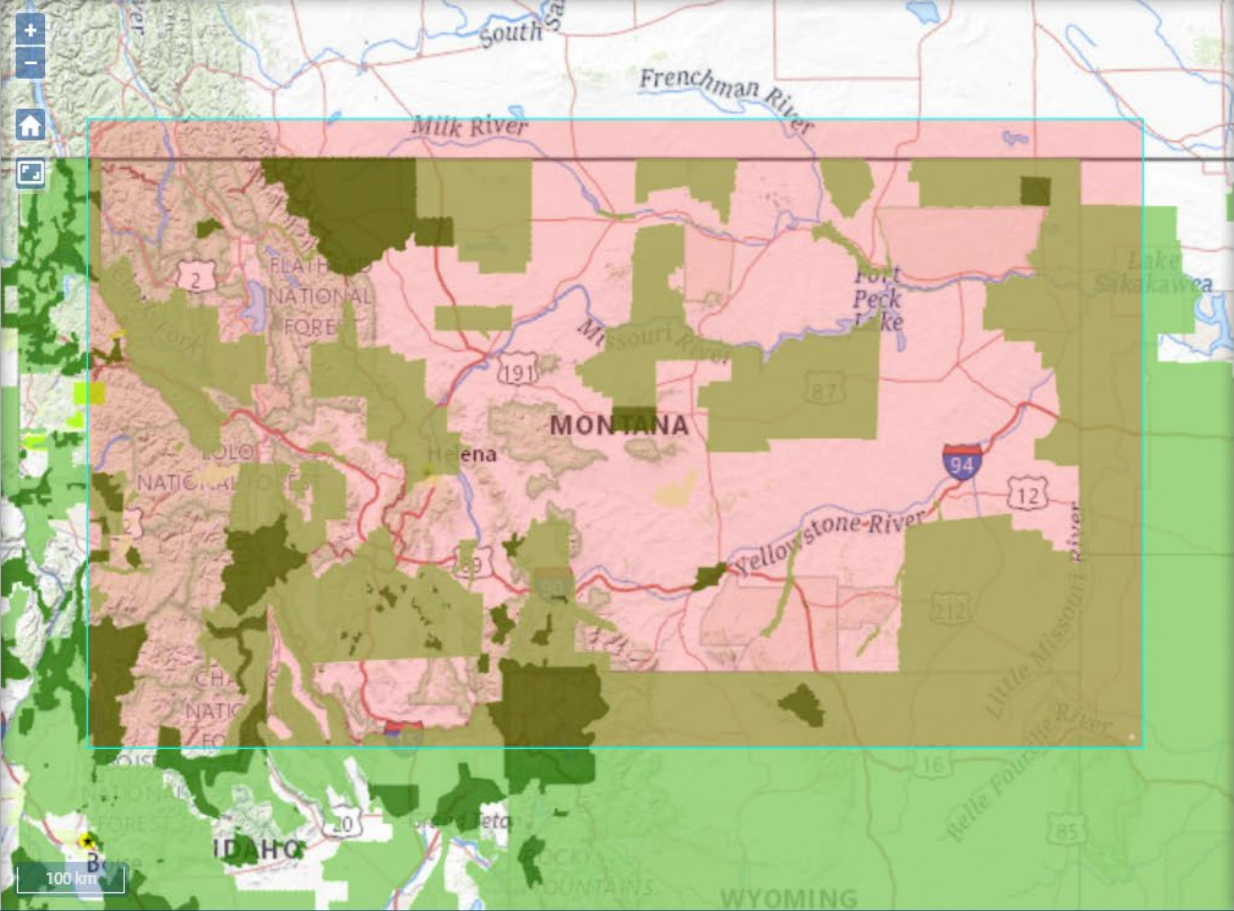
Show where Lidar is available.

Show Topobathy Lidar.

Click on the map to retrieve information about a lidar project.

Show options for filtering the lidar map display? [Show Legend](#) [More Info](#)

Show AOI Results 



MT GlacierNP 2016

MT Stillwater 2016

ID NezPerce QL2 2016

ID Nez Perce QL2 TL 2016

ND 3DEPProcessing 4 D22

SD NRCS DAS 2017

SD NRCS PAR 2017

SD NRCS Fu

SD NRCS Fu

ID FEMAHQ

MT NRCS B:

MT NRCS B



Comparison – When to use each app?

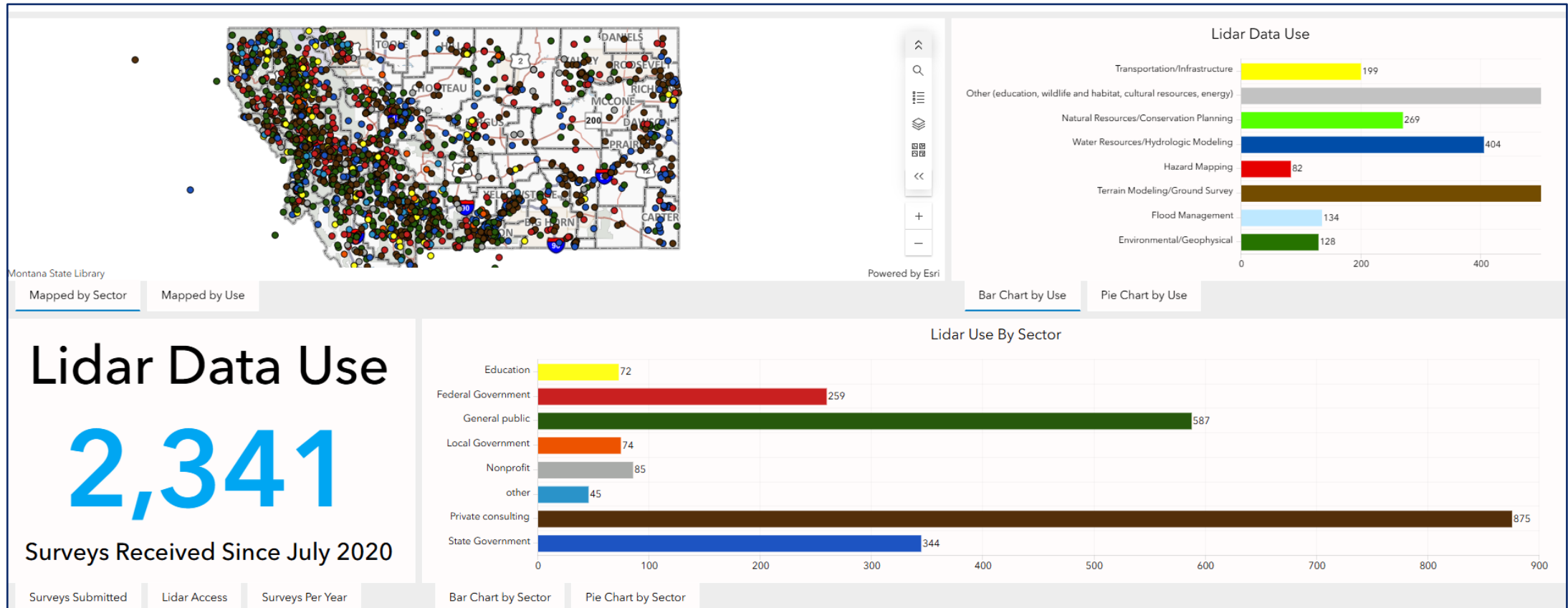
MSL – Montana Lidar Inventory

- Download full-project mosaics (~countywide) - geotiff
- Download by 24K quadrangle - geotiff
- State-led collections
- LAZ/LAS by request only
- Additional derived products:
 - DSMs, canopy height, hillshade, and bare-earth
 - Building footprints and contours (where available)
 - Additional point cloud classification (some areas)
- Older lidar projects (>6 years)
- Data that have not yet been accepted by USGS 3DEP

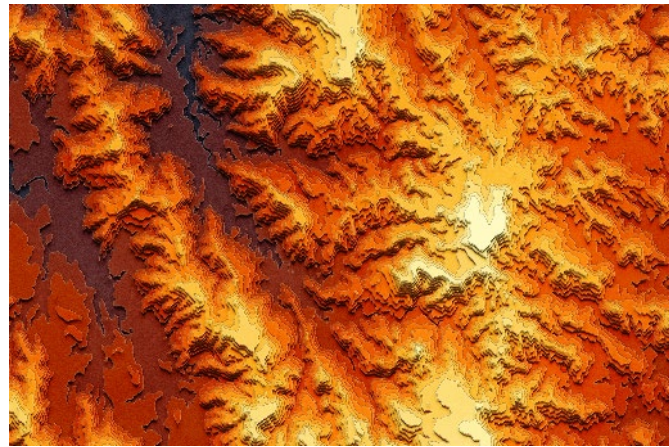
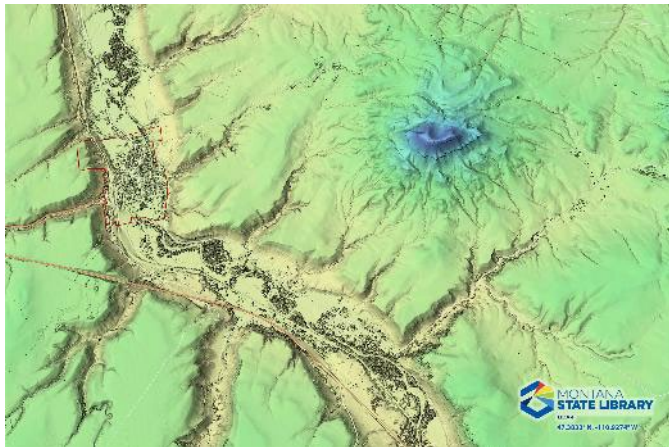
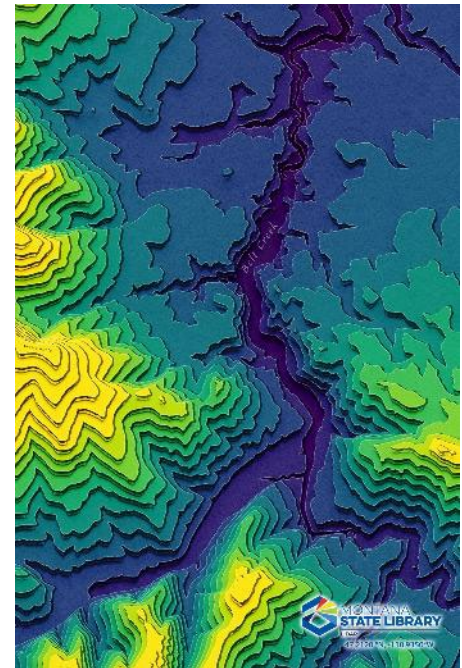
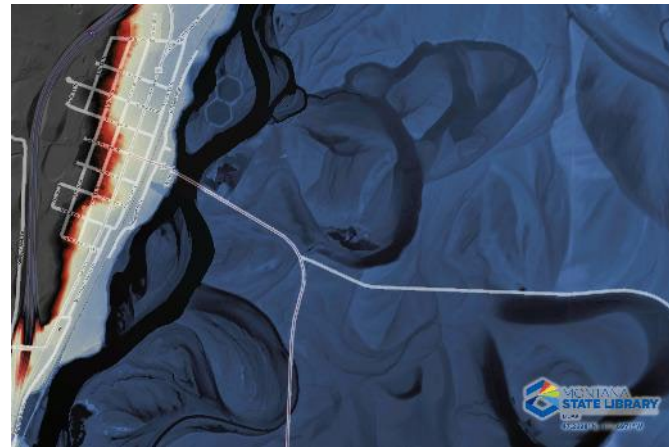
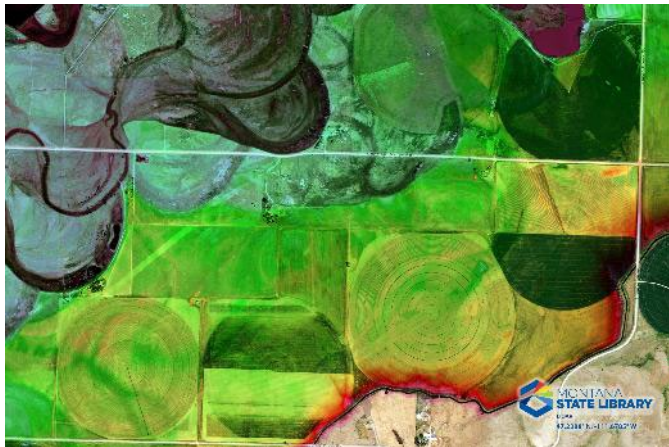
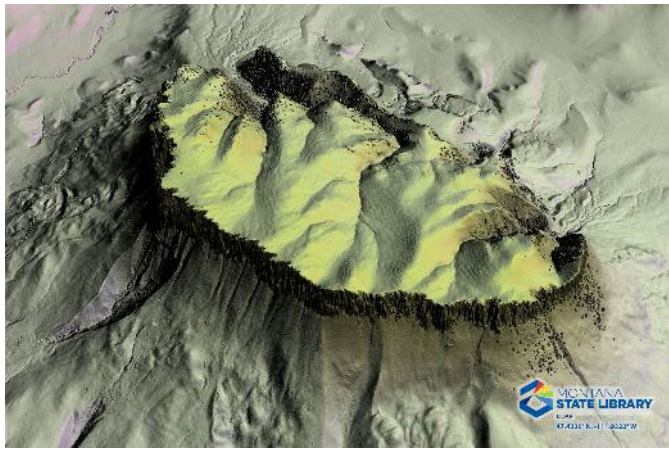
USGS – National Map

- Download tiles (~1km by 1km tiles)
- USGS-led collections, State contributed data pending
- Newest of new data releases (work units)
- Download LAZ
- Lidar outside of Montana
- Primary focus is bare-earth
- Only lidar that meets USGS 3DEP Specifications*

Lidar data use in Montana



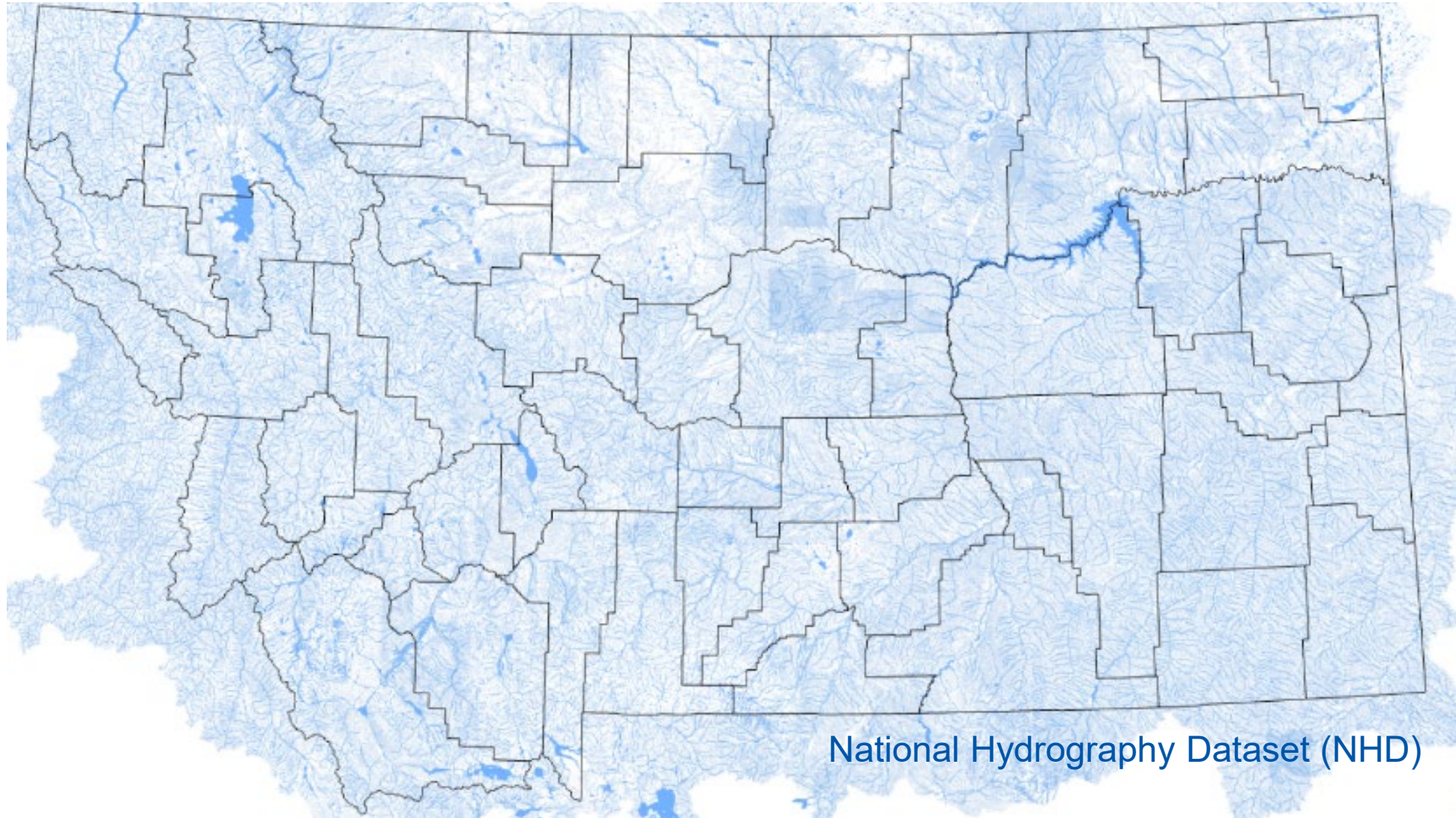
- “We intend to use the data for an engineering feasibility study for a wildlife crossing structure overpass. It will be used for **preliminary assessments**. Your GIS data portal is fantastic, by the way!”
- “I am creating a water distribution system model for the town of Belt and will use the data to assign elevations to nodes in the model. The use of the water model is for **planning purposes** to assess water distribution system hydraulic deficiencies.

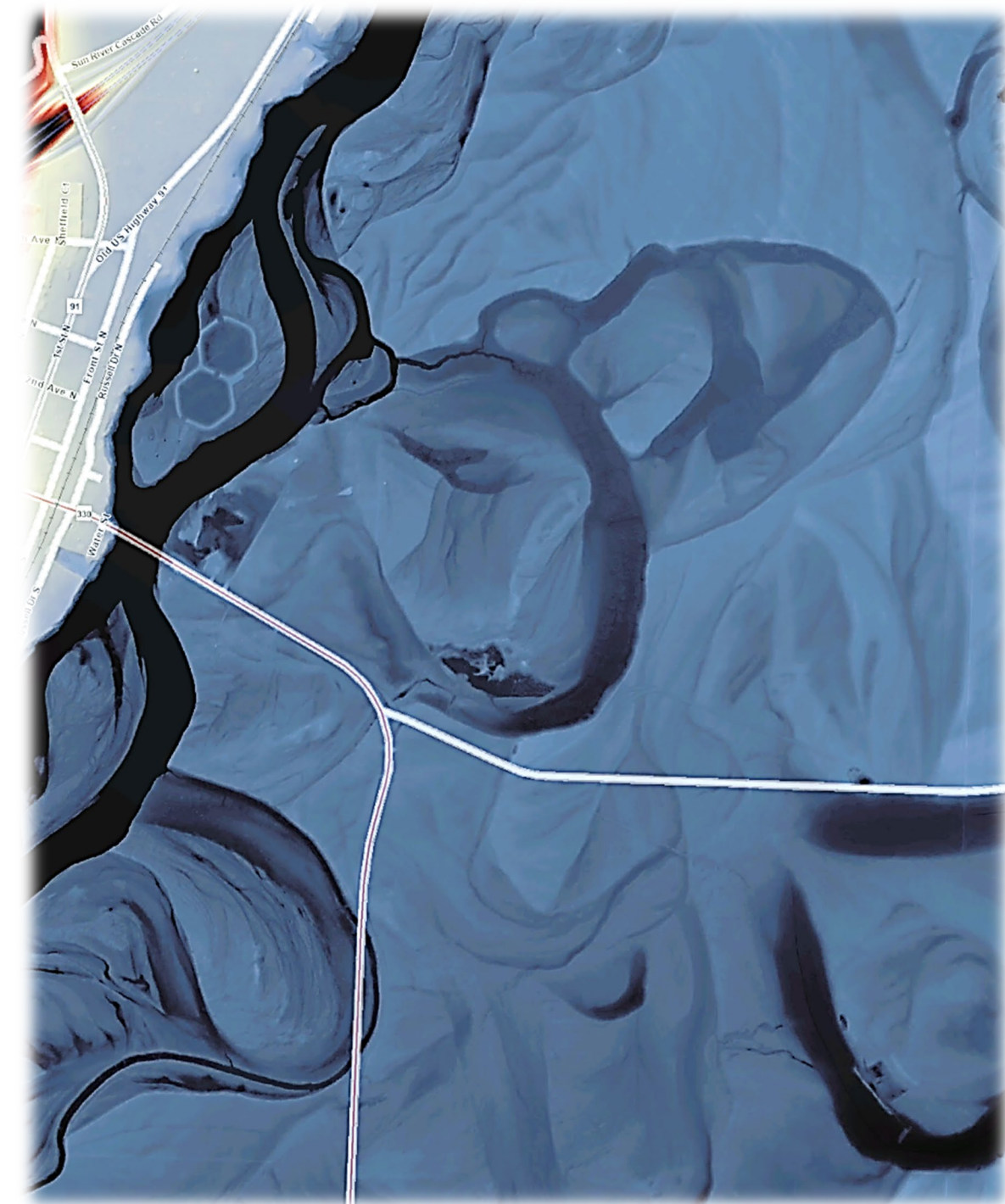


Hydrography

<https://msl.mt.gov/GIS/Hydro>

Mapping Montana's rivers, streams, canals, lakes and other waterbodies



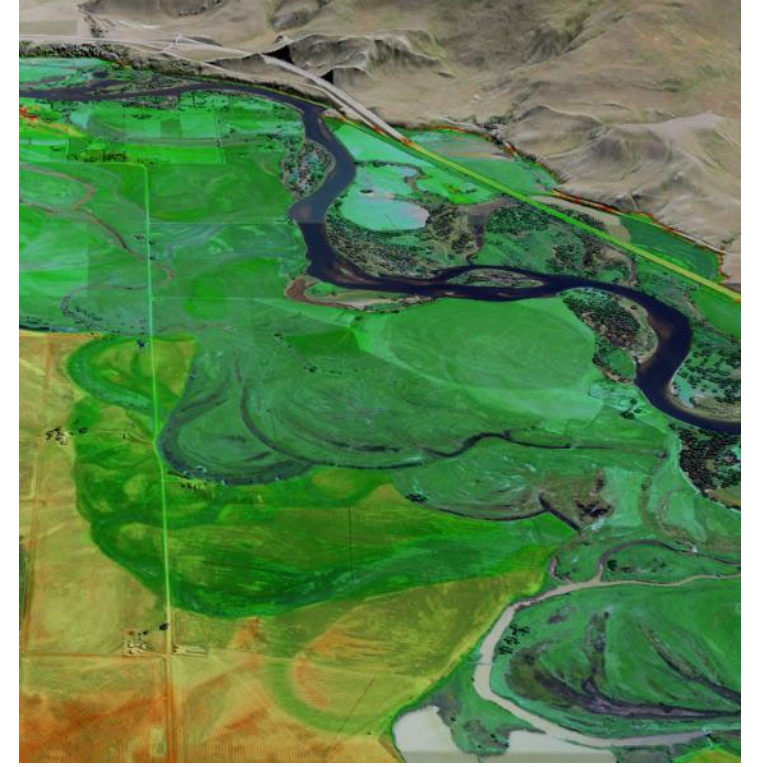


Elevation (lidar)- Derived Hydrography

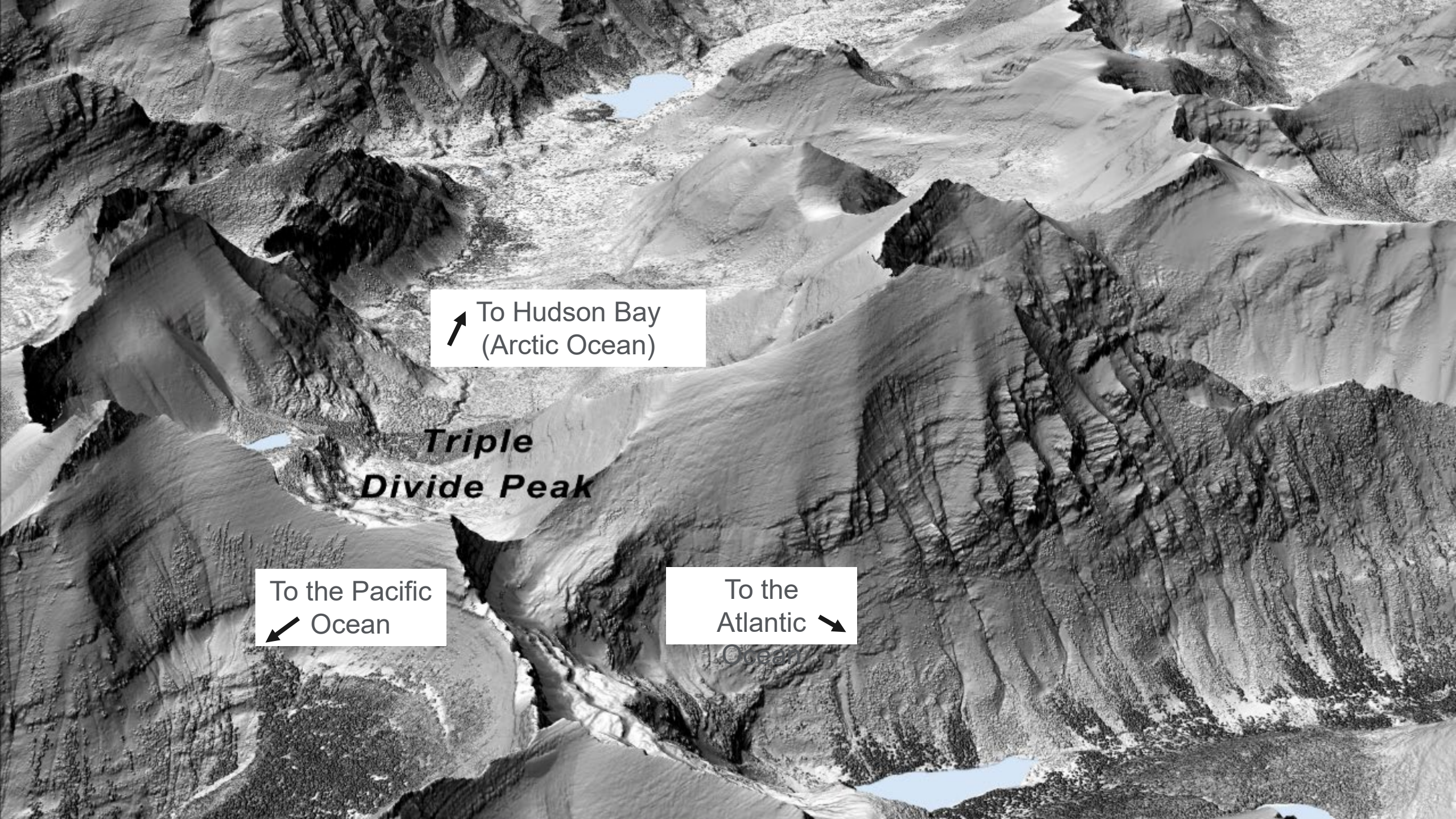
- The National Hydrography Dataset and Watershed Boundary Dataset are frozen (no more updates)
- Elevation-derived hydrography is coming
 - USGS 3D Hydrography Program (3DHP)
- **Seeking funding partners!**

High-accuracy elevation data (LiDAR) informs stream mapping

Topography and water shape each other



Water flows downhill > Align hydrography with elevation data



↖ To Hudson Bay
(Arctic Ocean)

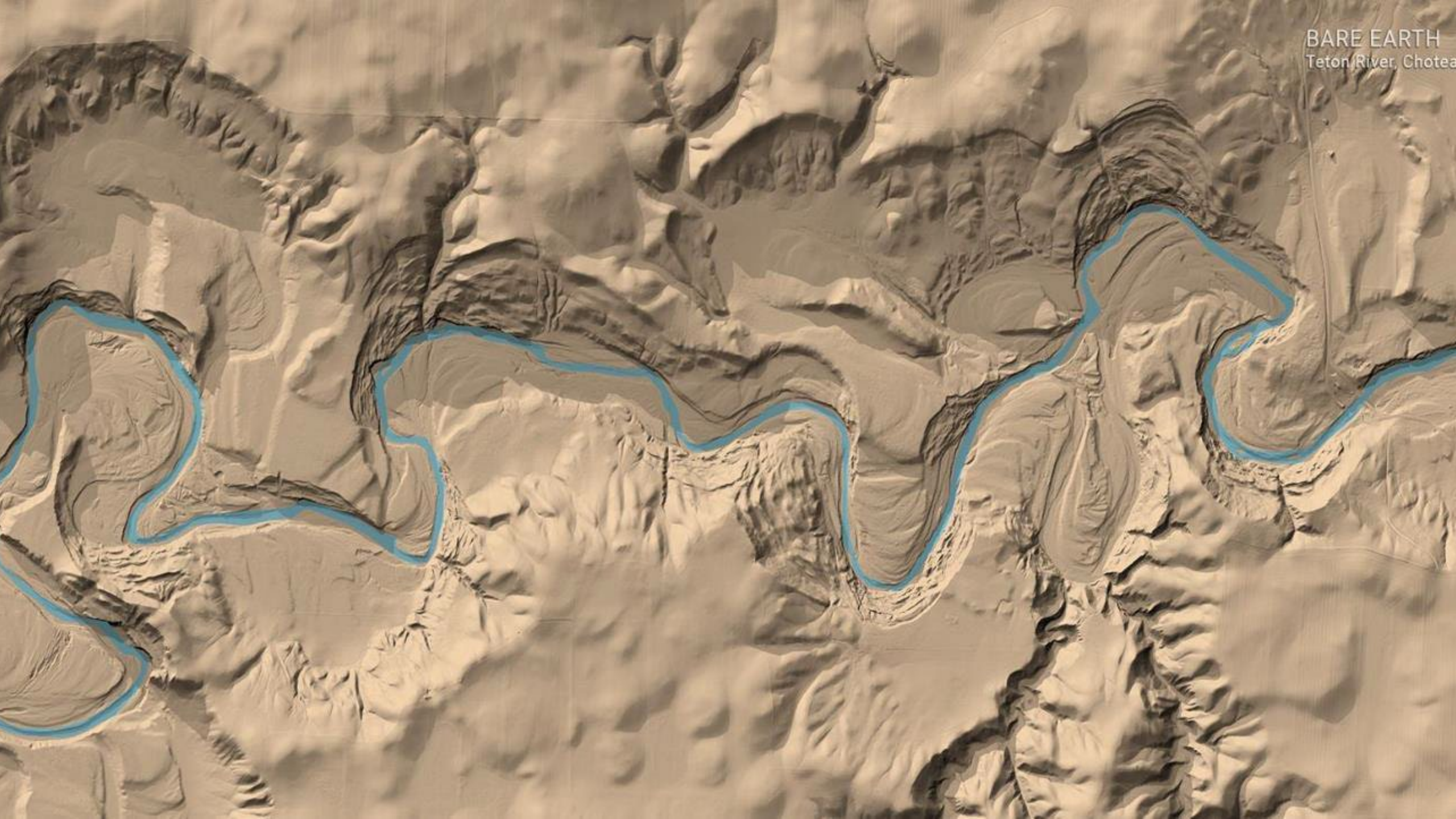
*Triple
Divide Peak*

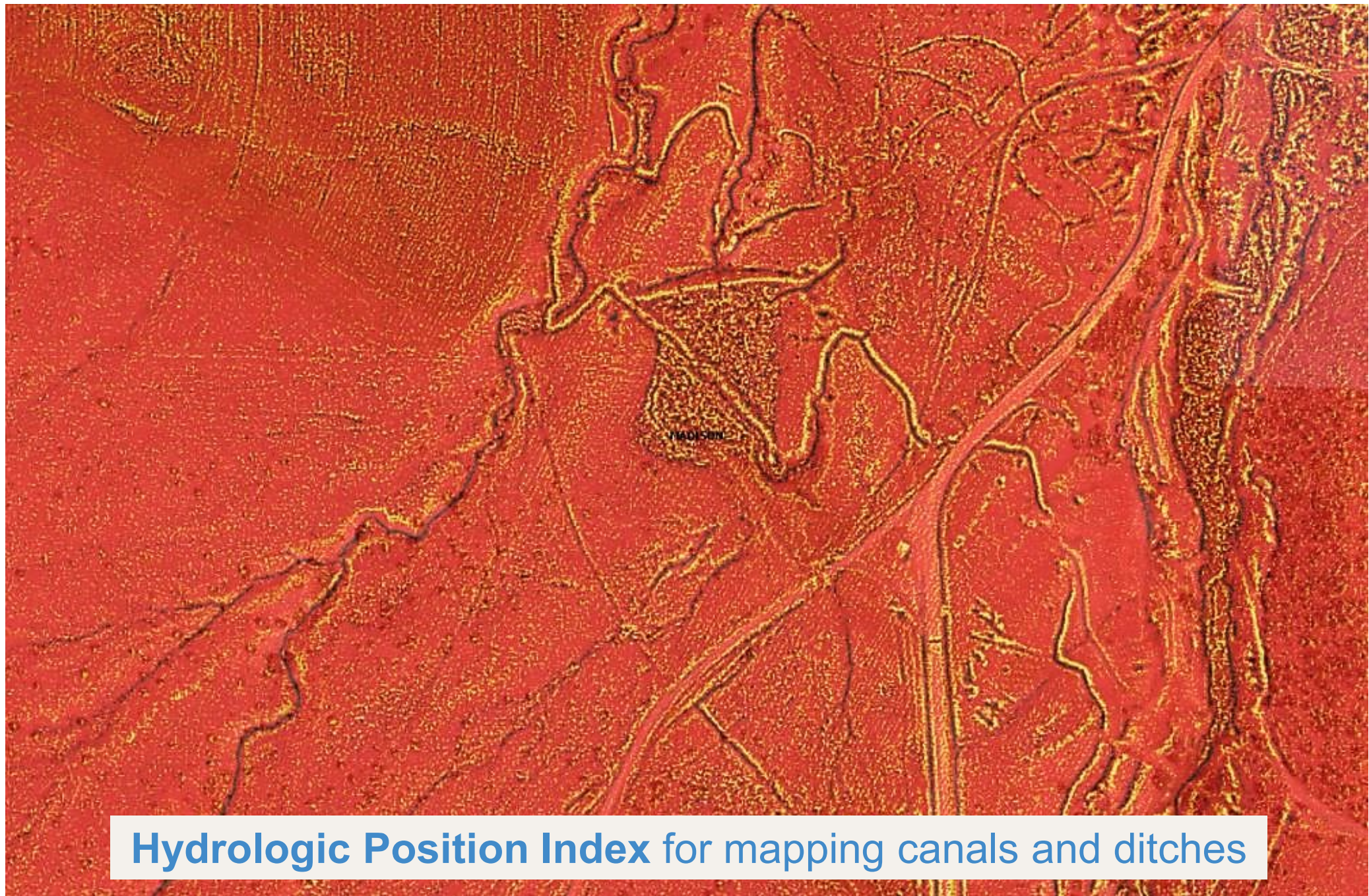
↙ To the Pacific
Ocean

To the Atlantic
Ocean ↘

BARE EARTH

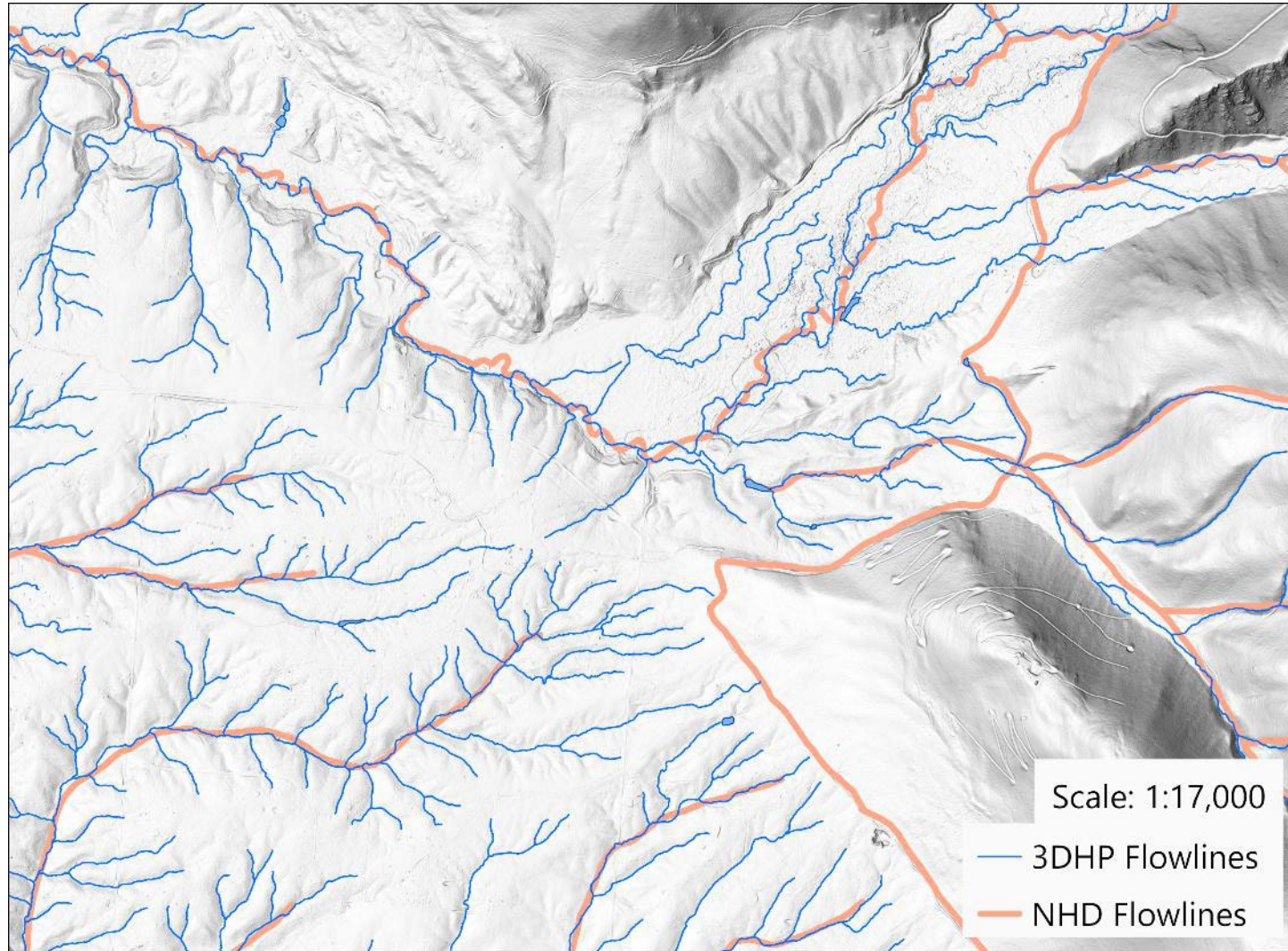
Teton River, Choteau





Hydrologic Position Index for mapping canals and ditches

NHD & EDH comparison - Montana

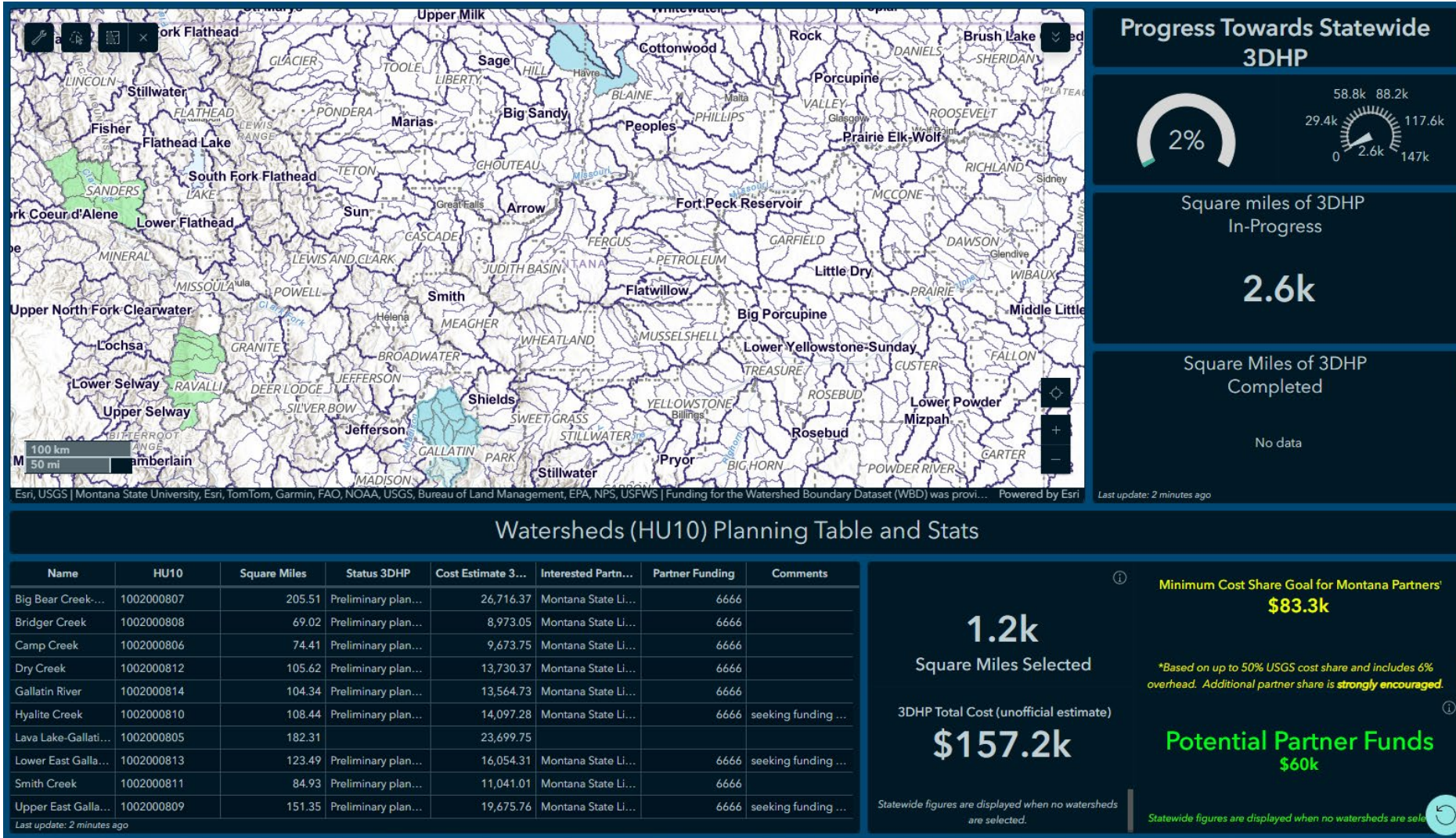


Swamp Creek in the Lower Noxon Reservoir HU-10, Sanders County, MT





Montana's 3DHP Planning Dashboard



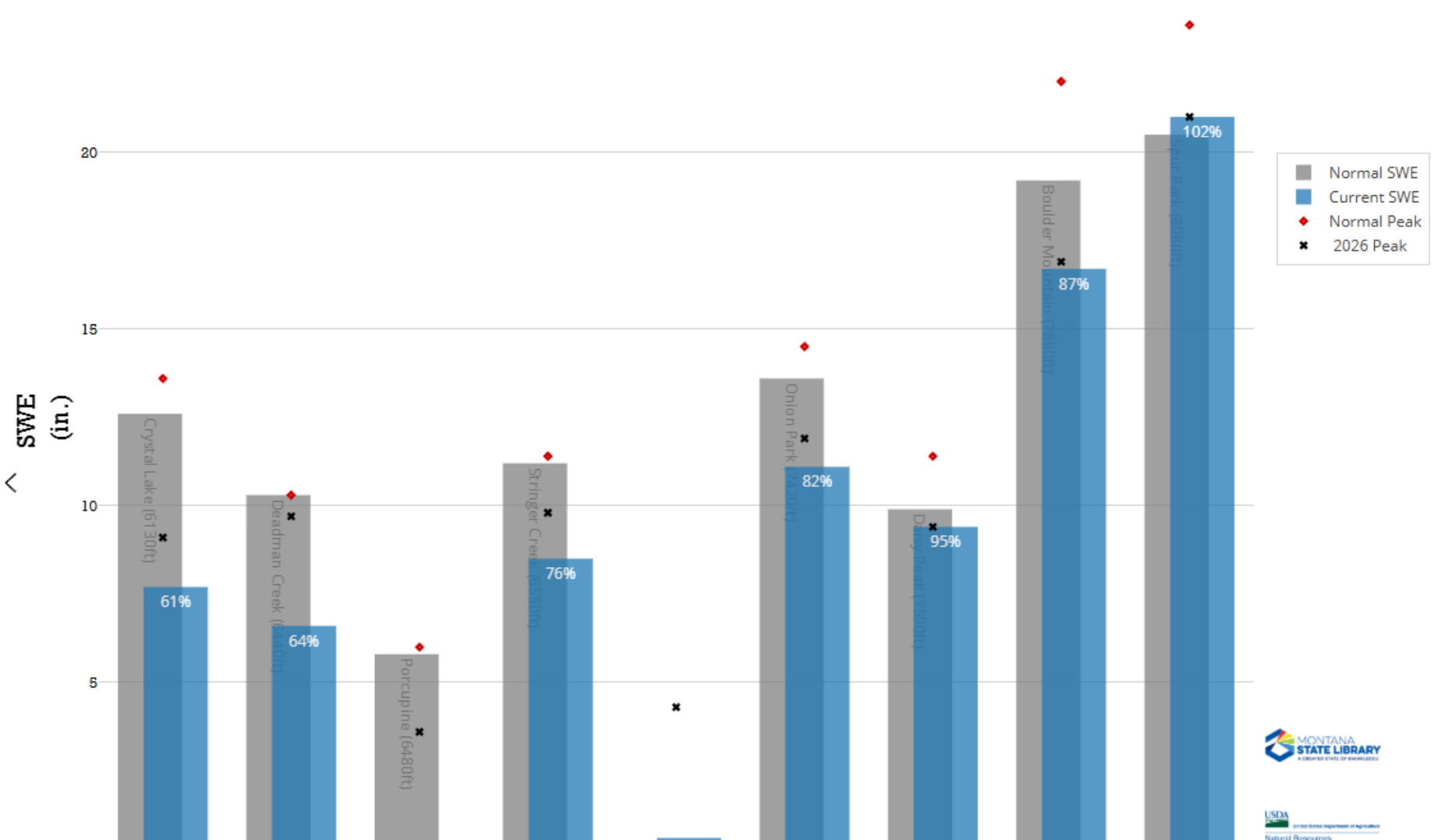
Water Supply

https://msl.mt.gov/geoinfo/water_information_system/water_supply



SmithJudithMusselshell Snow Water Equivalent 2026-04-02

- Upper Clark Fork
- Upper Yellowstone
- Madison
- Bitterroot
- Gallatin
- Jefferson
- Lower Clark Fork
- Sun-Teton-Marias
- Headwaters Mainstem
- Kootenai
- Flathead
- St Mary's



Statewide and Basin Map Gallery

2025

Grid Relevance Filter

Filter

Items: 47

> Tags



2025-06: Montana Statewide Water Year to Date Precipitation

Water Year to Date Precipitation in Montana for June 1 2025

[View item details](#)



2025-07: Montana Statewide Water Year to Date Precipitation

Water Year to Date Precipitation in Montana for July 1 2025

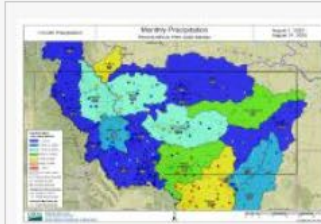
[View item details](#)



2025-06: Montana Statewide Stream Flow Forecast Stations

Stream Flow Forecast in Montana for June 1 2025

[View item details](#)



2025-09: Montana Statewide Monthly Precipitation

Monthly Precipitation in Montana for September 1 2025

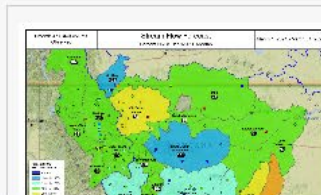
[View item details](#)



2025-09: Montana Statewide Reservoir Storage Stations

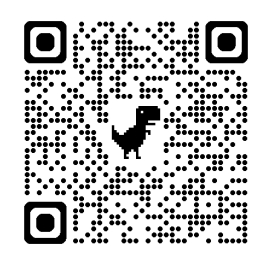
Reservoir Storage in Montana for September 1 2025

[View item details](#)



Drought

<https://nris.mt.gov/drought/>

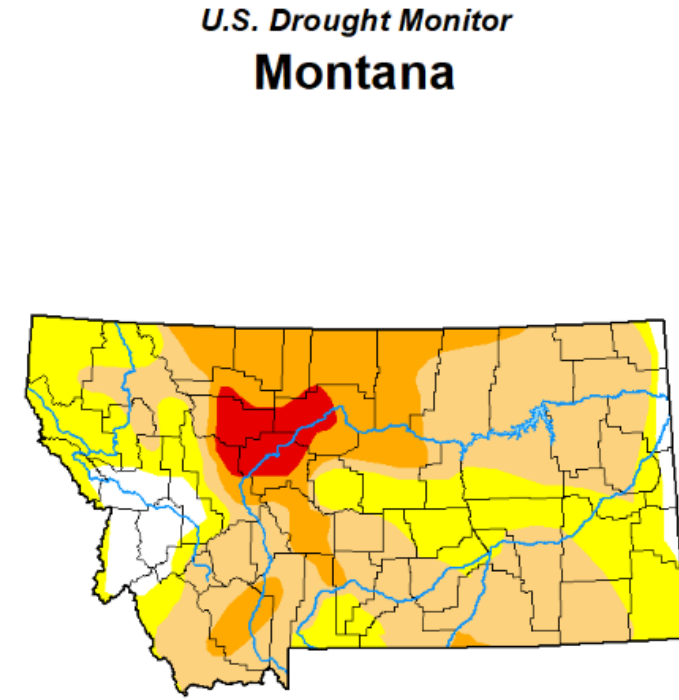
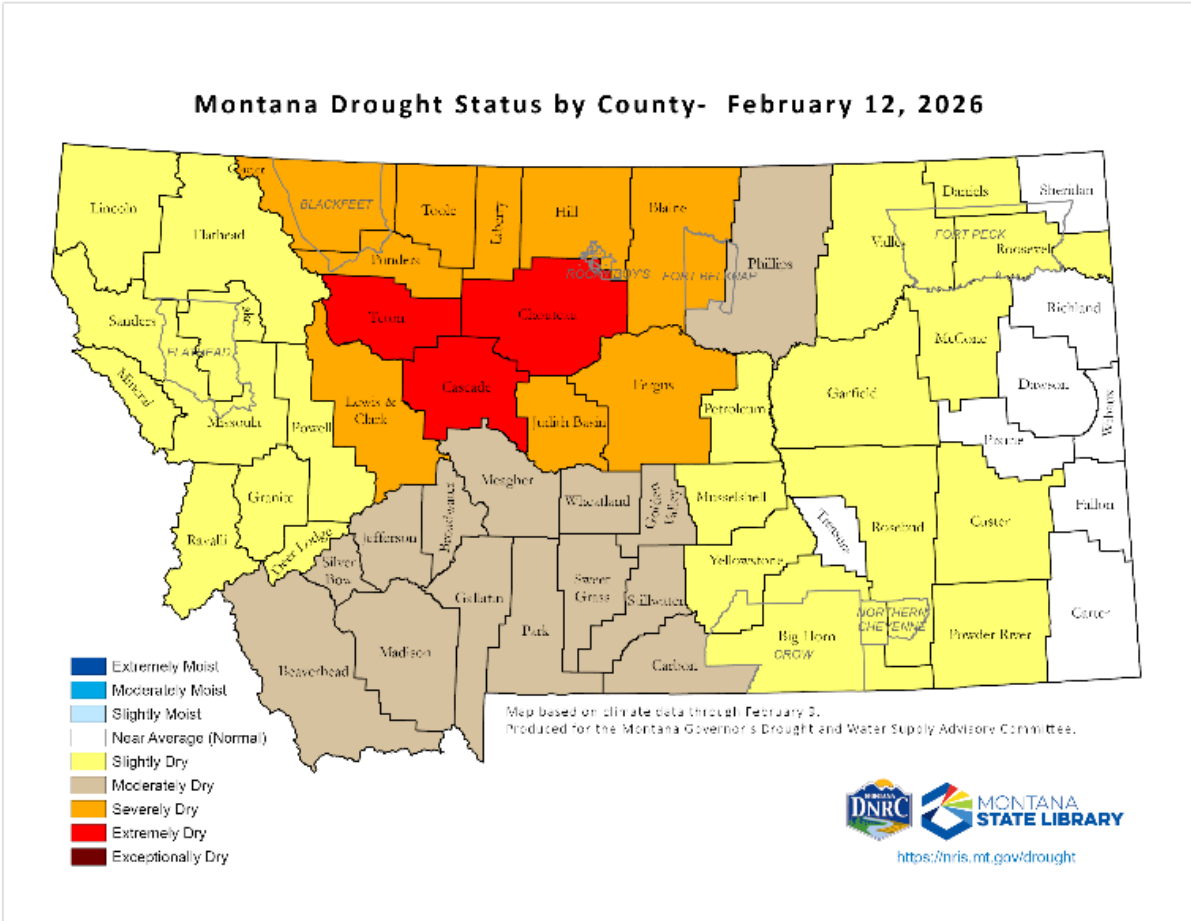


[Current Maps](#)

[View Drought Impacts](#)

[Submit Drought Impacts](#)

[Archived Maps](#)



March 31, 2026

(Released Thursday, Apr. 2, 2026)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	6.49	93.51	65.58	21.19	3.96	0.00
Last Week <small>03-24-2026</small>	7.57	92.43	66.70	18.30	3.96	0.00
3 Months Ago <small>12-30-2025</small>	48.41	51.59	24.71	9.75	1.66	0.00
Start of Calendar Year <small>01-06-2026</small>	48.61	51.39	19.79	8.08	1.46	0.00
Start of Water Year <small>08-30-2025</small>	27.06	72.94	40.74	31.81	8.55	0.00
One Year Ago <small>04-01-2025</small>	36.81	63.19	35.18	12.66	1.72	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:
David Simeral
Western Regional Climate Center



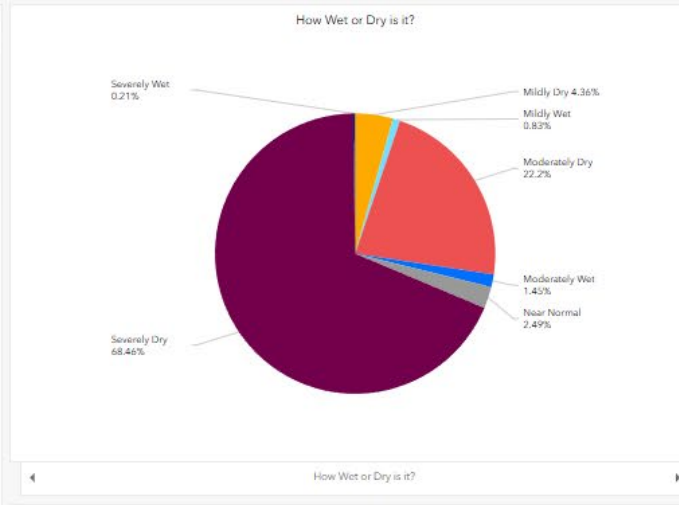
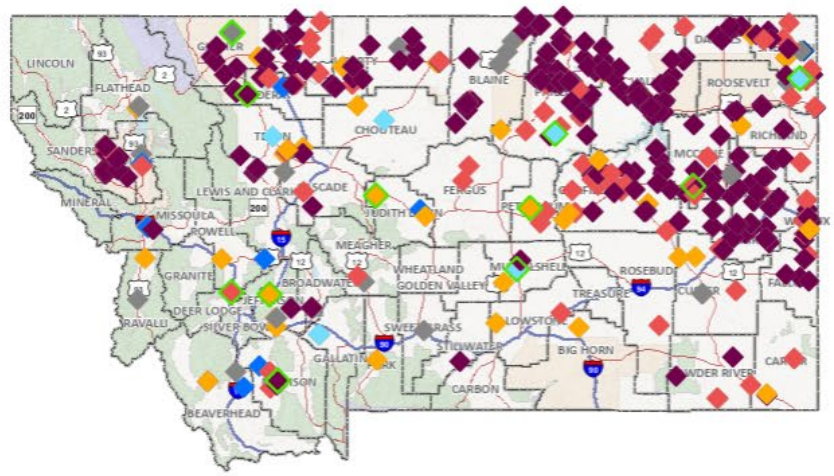
droughtmonitor.unl.edu

The county drought map (left) is updated monthly and depicts dry and moist conditions. The [U.S. Drought Monitor](#) (right) is updated weekly and depicts dry conditions.

Montana Drought Impact Reporter

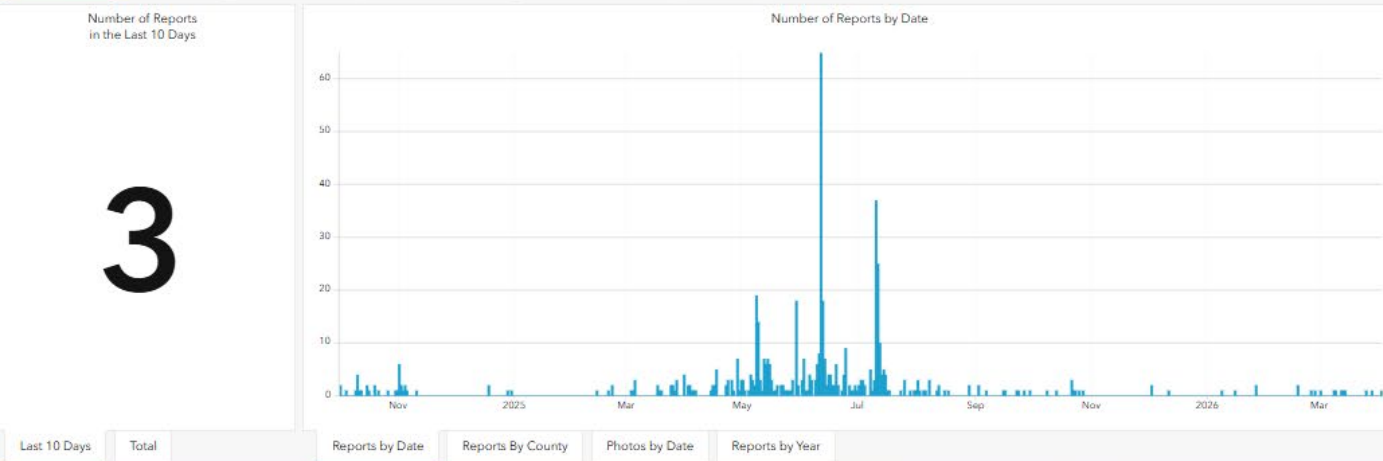
Reports since October 1, 2024

- 4/2/26: Sheridan County**
 Early snow melt has left topsoil exceptionally dry, and recent showers have only maintained enough to barely germinate weeds. Soil moisture levels below immediate topsoil remain exceptionally dry (as they have been for last couple years - no replenishment of subsoil). Early in season, hopefully we get an improvement, but certainly not normal conditions for this point of year. Consistently dry locally. Worse further west, better about 50 mi east. Experience: 10-20 years. Photo: No.
- 3/28/26: Madison County**
 These are photos of the daily dusty and dry conditions. Normally we would see snow cover and mud this time of year for another additional month. No additional moisture in any form since my last report two weeks ago. It continues to be unseasonably warm and very windy. This is creating dusty and continuously dry conditions. Experience: 20 or more years. Photo: Yes.
- 3/25/26: Toole County**
 At least 10 mile radius. Experience: 20 or more years. Photo: No.
- 3/14/26: Madison County**
 The consistent and pervasive dust storms are not done justice in the first photo. Keep in mind that normally we have some snow cover and or mud for the last several months during this time period of the year. Where there is some soil moisture, the grass has begun to green up, which is over a month earlier than normal. We received our first snow accumulation of over 1 inch so far this winter last week. It was a good shot of moisture, but has already returned to wind and extremely dusty dry conditions. Abnormal and seemingly constant high winds lasting several weeks now, on top of the long term lack of moisture continue to keep the area dry and very dusty. Experience: 20 or more years. Photo: Yes.
- 3/13/26: Judith Basin County**
 Local to western Judith basin county south of hwy 200. Experience: 20 or more years. Photo: No.
- 3/12/26: Lewis and Clark County**
 There is hardly any snow in the mountains. We have maybe received an inch of moisture this year. Huge area. Experience: 20 or more years. Photo: No.
- 3/9/26: Phillips County**
 Most of Montana is in a drought. Specifically in Phillips County (Malta) according to NOAA January was 0.05 and February was 0.0. March has seen some of the highest wind days in recent history. Current March precipitation in no more than 0.10. All Montana snow tell sites are below 100% snow water equivalent for this time of year. For the Milk River it is 70% for the St. Mary side and 9% for the Milk River. Experience: 20 or more years. Photo: No.
- 3/8/26: Madison County**
 Photo is of the lower foothill area of the Ruby Valley in March which would normally have snow cover most of the winter. It has looked like this for the entire winter so far other than the moisture we received two days ago. Winter seems to have missed us this year. Current snowpack is trending at the lowest level for the Ruby River Basin since records of SNOTEL sites began in 1981. Dry unreasonably warm conditions have made for excellent calving weather, but we just received our first appreciable snow (over 3 inches) of the entire winter in March. December-March so far has been abnormally warm. With the dry pasture conditions we had last year with no rain from June 5th to August 25th 2025, many mountain pastures were left in poor



Montana State Library | National Drought Mitigation Center, University of Nebraska

- Overview Map
- Photo Map
- Impact Type Map
- Crop Condition Map
- Range Condition Map
- All Years
- All Photos



3/28/26 - Madison County

Description: These are photos of the daily dusty and dry conditions. Normally we would see snow cover and mud this time of year for another additional month.

Photos | Photo Viewer

Submit Drought Impacts

Report on moisture conditions in your part of Montana with this questionnaire. The survey may be completed more than once to report impacts in another location or to report changing conditions. Regular reporting helps track when moisture conditions are improving or deteriorating. Reports should capture the longer-term average or trend, not the short-term, day-to-day weather. Please consider reporting every month or any time, wet or dry.

[Report Drought Impacts Here](#)

<https://nris.mt.gov/droughtsurvey>

Confirm state:*

This will help us spot wrong locations but does not position your report correctly on the map. Use the marker on the map above to make sure your report shows up in the right place.

Montana ▼

Select county:

This will help us spot wrong locations but does not position your report correctly on the map. Use the marker on the map above to make sure your report shows up in the right place.

-Please select- ▼

What is the date?*

Please use the calendar to select the date of your observation, if it is other than today.

4/3/2026 ▼

How dry or wet is it?*

Please use what you know about your part of the country and base your observation on what is normal for this time of year. A normal dry season is not the same as drought. The rating should capture the long-term average or trend, not the short-term, day-to-day weather.

Severely Dry: There is no soil moisture. Ponds, lakes, streams and wells may be nearly empty or dry. Producers may have crop or pasture losses. Mandatory water restrictions may be in place.

Moderately Dry: Plants may be brown due to dry conditions. Streams, reservoirs or well water levels may be low. Voluntary water use restrictions may be in place. There may be water shortages. Plants, crops or pastures may be stressed. Soil is dry.

Mildly Dry: Growth may have slowed for plants, crops or pastures. Soil is somewhat dry. Local plants, pastures or crops may not have fully recovered if conditions are changing from drier to wetter.

Near Normal: What you're seeing is what you expect for this time of year.

Mildly Wet: Local plants, crops or pastures are healthy, recovering from dry conditions or draining from wet conditions. Soil moisture is above normal.

Moderately Wet: Local plants, crops or pastures are healthy and lush. Soil is very damp and the ground may be saturated with water. There may be standing water in low areas and ditches. Water bodies may be fuller than normal.

Climate

<https://msl.mt.gov/geoinfo/msdi/climate>

MSDI Climate

The climate framework provides 30-year summaries of climate data.

Annual and monthly climate normals for the following variables are produced for Montana:

- **Precipitation** - Total amount of rainfall and snowfall (mm).
- **Minimum Temperature** - Daily average minimum temperature (deg F).
- **Maximum Temperature** - Daily average maximum temperature (deg F).
- **Minimum Relative Humidity** - Average minimum amount of water vapor in air relative to theoretical maximum potential vapor (%).
- **Maximum Relative Humidity** - Average maximum amount of water vapor in air relative to theoretical maximum potential vapor (%).
- **Solar Radiation** - Average daily incoming shortwave solar radiation (W/m^2).
- **Vapor Pressure Deficit** - Average daily difference between moisture currently in the air vs theoretical maximum moisture (kPa).
- **Wind Speed** - The daily average wind speed (m/s).
- **Reference Evapotranspiration** - The average amount of water lost from a hypothetical well-watered grass surface to the atmosphere.



Theme Lead

Dr. Kelsey Jencso
University of Montana
kelsey.jencso@umontana.edu
(406) 243-6793

- MONTANA CLIMATE OFFICE HOME
- MSDI HOME
- ABOUT MSDI
- MONTANA GEOSPATIAL INFORMATION PLAN
- MSDI WEB SERVICES
- GIS COORDINATION (COUNCIL, GRANTS, PLANS, REPORTS, ETC.)

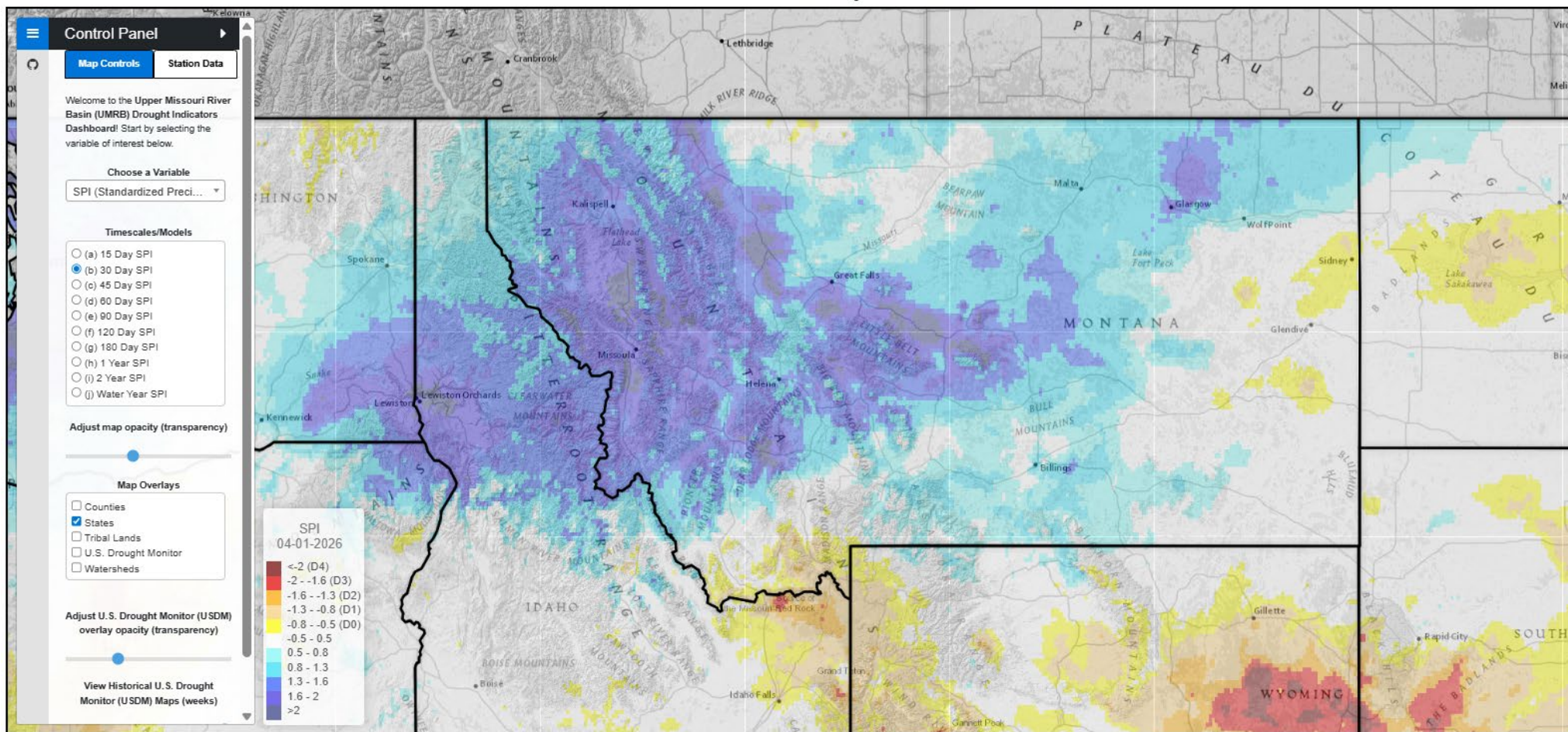
Drought Dashboard

Montana Climate Office

<https://drought.climate.umt.edu/>

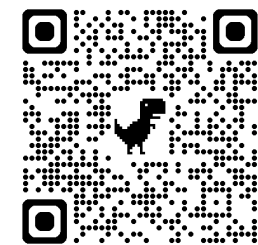
UMRB Drought Indicators Dashboard MT Mesonet Drought Impacts About Us

30 Day SPI for 04-01-2026



Channel Migration Zone

https://msl.mt.gov/geoinfo/data/montana_channel_migration_zones



Home

Channel Migration

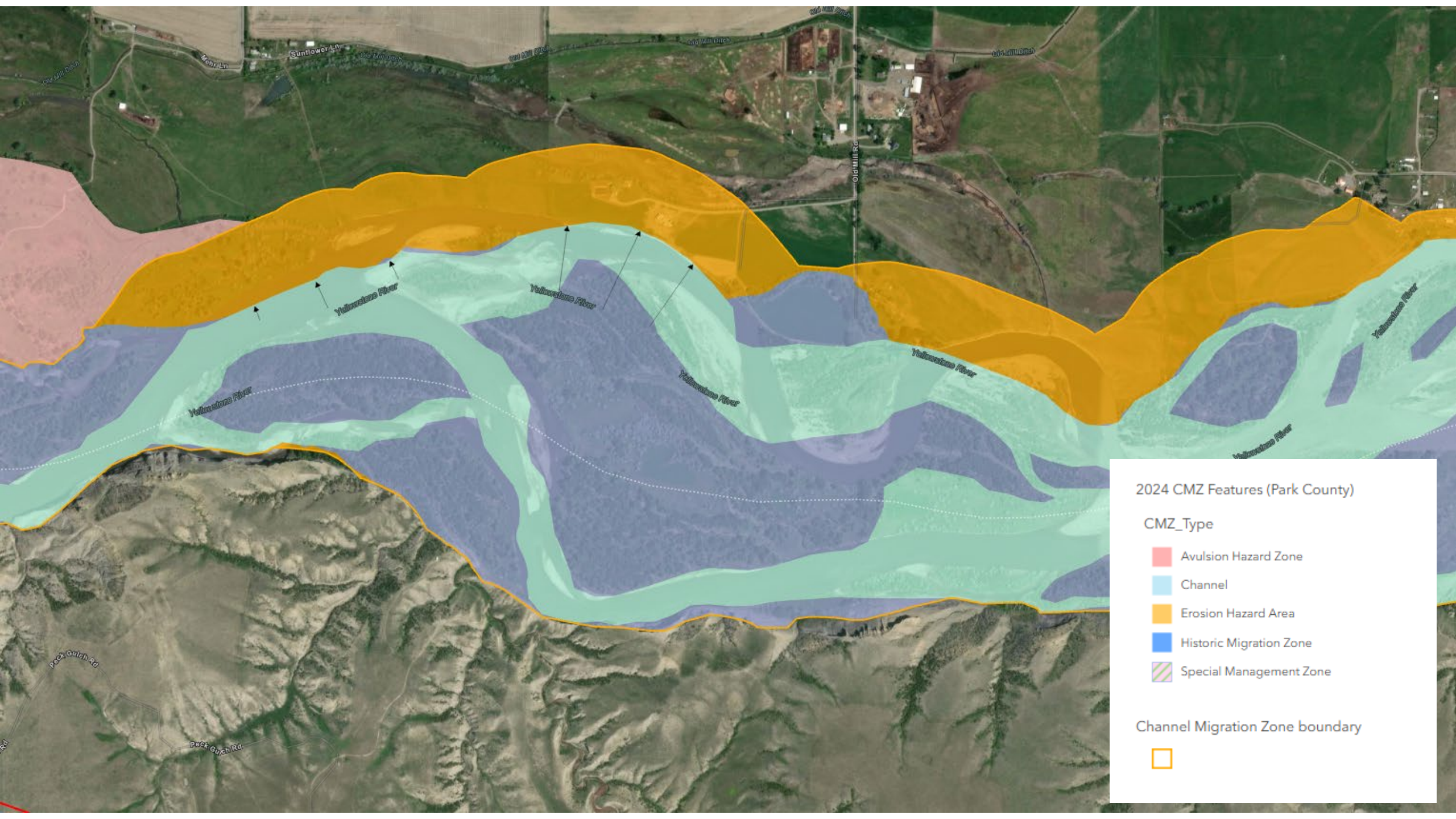
Dynamic physical processes of rivers can cause channels in some areas to move laterally, or "migrate," over time. The area within which a river channel is likely to move over a period of time is often referred to as the channel migration zone. The migration of river channels across their floodplains and the occasional erosion of terrace banks are natural processes. *Figure 1* is an aerial view of the Big Hole River showing channel migration locations (former channels) as darker green meander scrolls in the floodplain (*photographer unknown*).



Channel migration can occur as a persistent process of lateral bank erosion and sediment deposition; the natural meander patterns of stream channels are the result of this process of sediment cycling. Channel migration also can occur abruptly, as the river carves a new channel at a new location ("avulses"). Avulsions may occur within the river's meanderbelt as bendway cutoffs, or may occur on the floodplain beyond the main axis of the river corridor. Floodplain avulsions can be unpredictable, occurring during floods when the existing channel becomes less efficient than the avulsion path. This can be due to a topographic advantage of the avulsion path (steeper gradient), or due to more random events such as debris accumulations, ice jamming, or sediment infilling of the main channel.

Montana Channel Migration Links

- MONTANA CHANNEL MIGRATION HOME
- PROJECTS
 - BEAVERHEAD RIVER
 - BIG HOLE RIVER
 - BIGHORN RIVER
 - CLARK FORK - BITTERROOT TO HUSON
 - CLARK FORK - PLAINS AREA
 - CLARK FORK AND BITTERROOT RIVERS
 - DEEP CREEK
 - EAST GALLATIN RIVER
 - FLATHEAD RIVER - OLD STEEL BRIDGE TO FLATHEAD LAKE
 - GALLATIN RIVER
 - JEFFERSON RIVER



2024 CMZ Features (Park County)

CMZ_Type

- Avulsion Hazard Zone
- Channel
- Erosion Hazard Area
- Historic Migration Zone
- Special Management Zone

Channel Migration Zone boundary



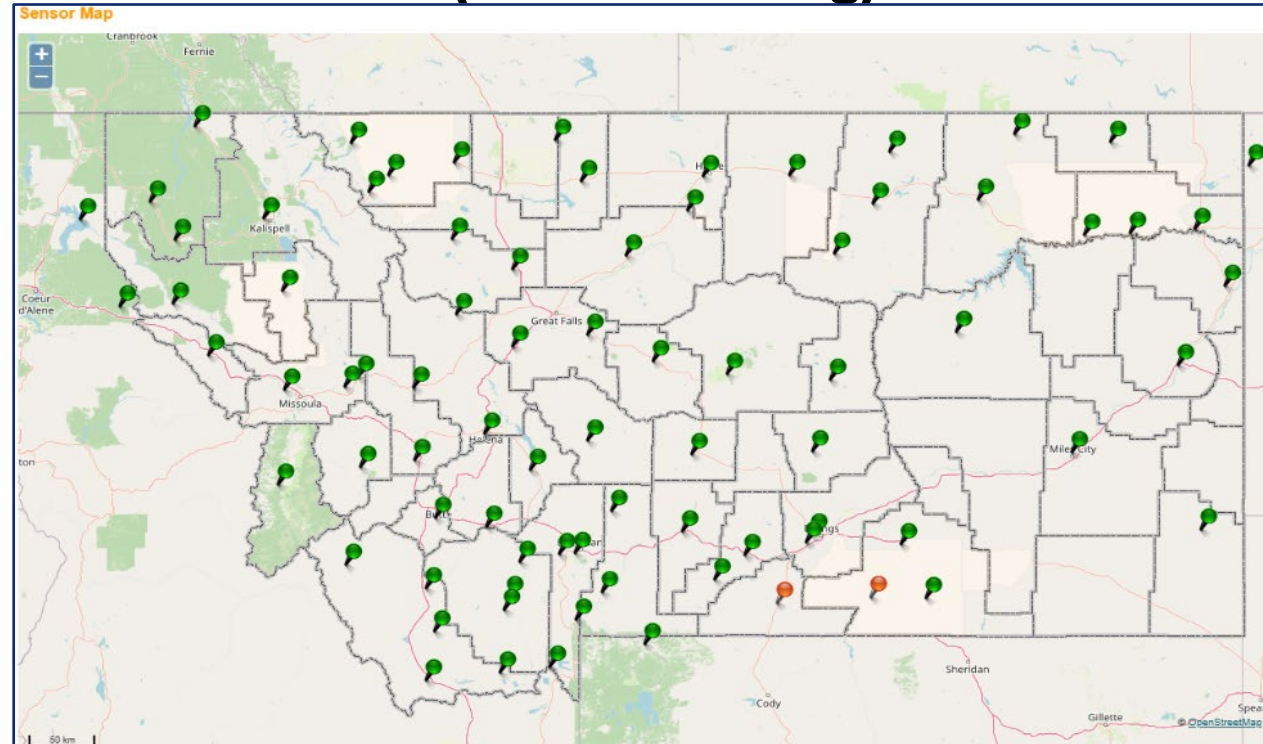
Montana State Reference Network (RTN)

<https://msl.mt.gov/mtsrn/>

Real Time Network (RTN)

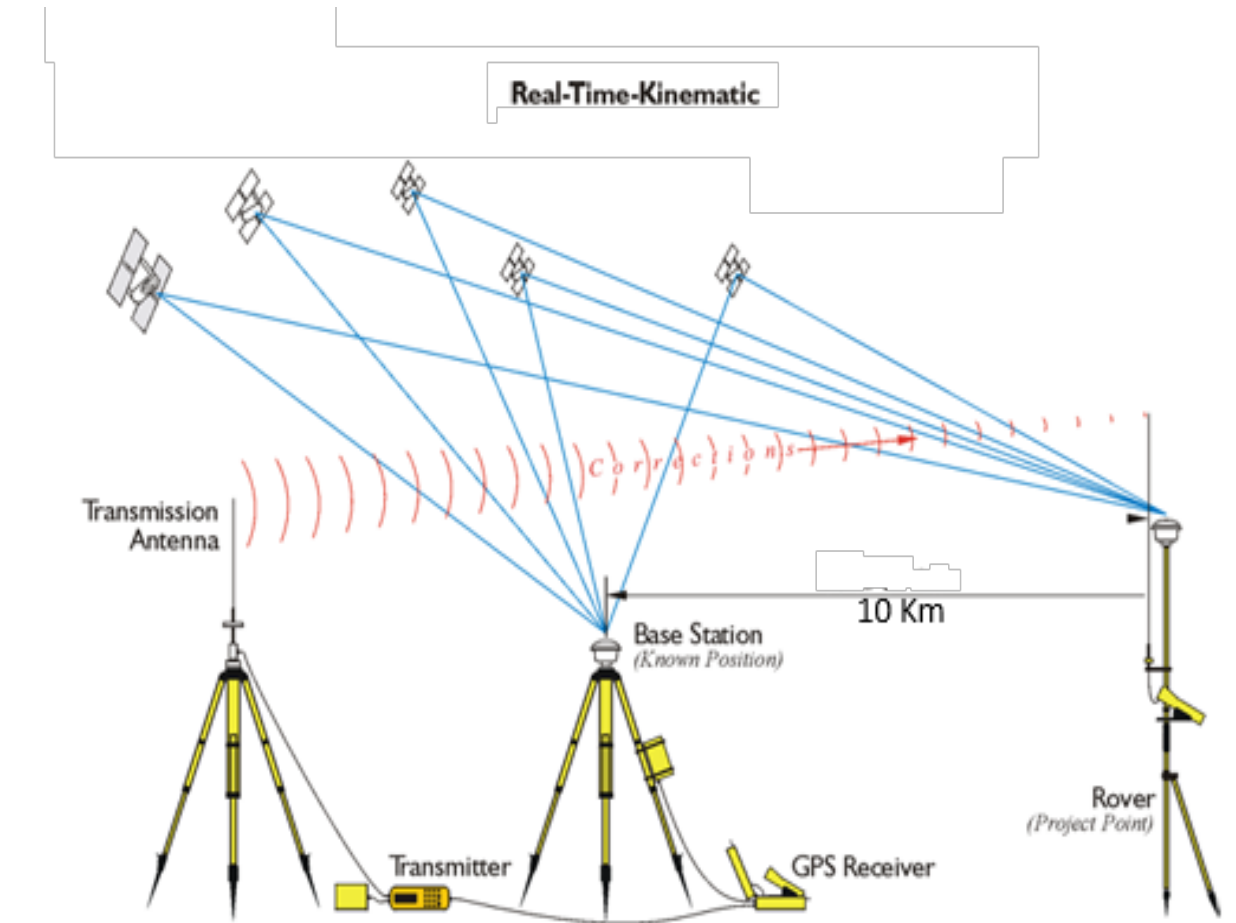
- 80 Reference Stations
- Represent true positions in current national datum
- Uninterrupted power supply and internet connection to receiver
- Low impedance antenna cable

Montana State Reference Network (MTSRN) (www.mtsrn.org)



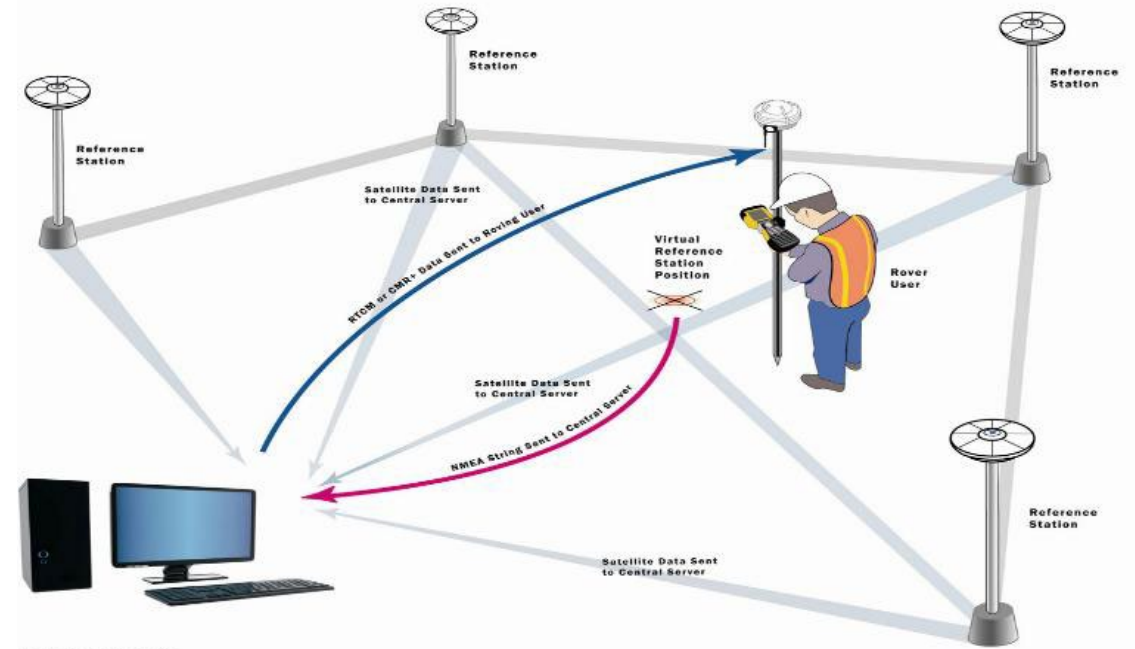
Real Time Kinematic (RTK)

- A relative positioning technique where one antenna is set on a static point with fixed coordinates (base station). Base station transmits raw observations to rover in real time and rover can use both the rover and base observations to compute its position relative to the base station
- The precision of RTK decreases as the length of baseline increases
- To overcome this base-to-rover range limitations, **Real-Time Network (RTN)** was developed



Real Time Network (RTN)

- Stations collect real time GNSS observations and send to a Central Processor Center (CPC)
- MTSRN uses Trimble Pivot Platform (v.5.2.3)
- CPC determines real time solutions and computes errors
- sends correction to rovers located within the bounds of the network
- Trimble uses Virtual Reference Station (VRS) concept to send correction to the rover

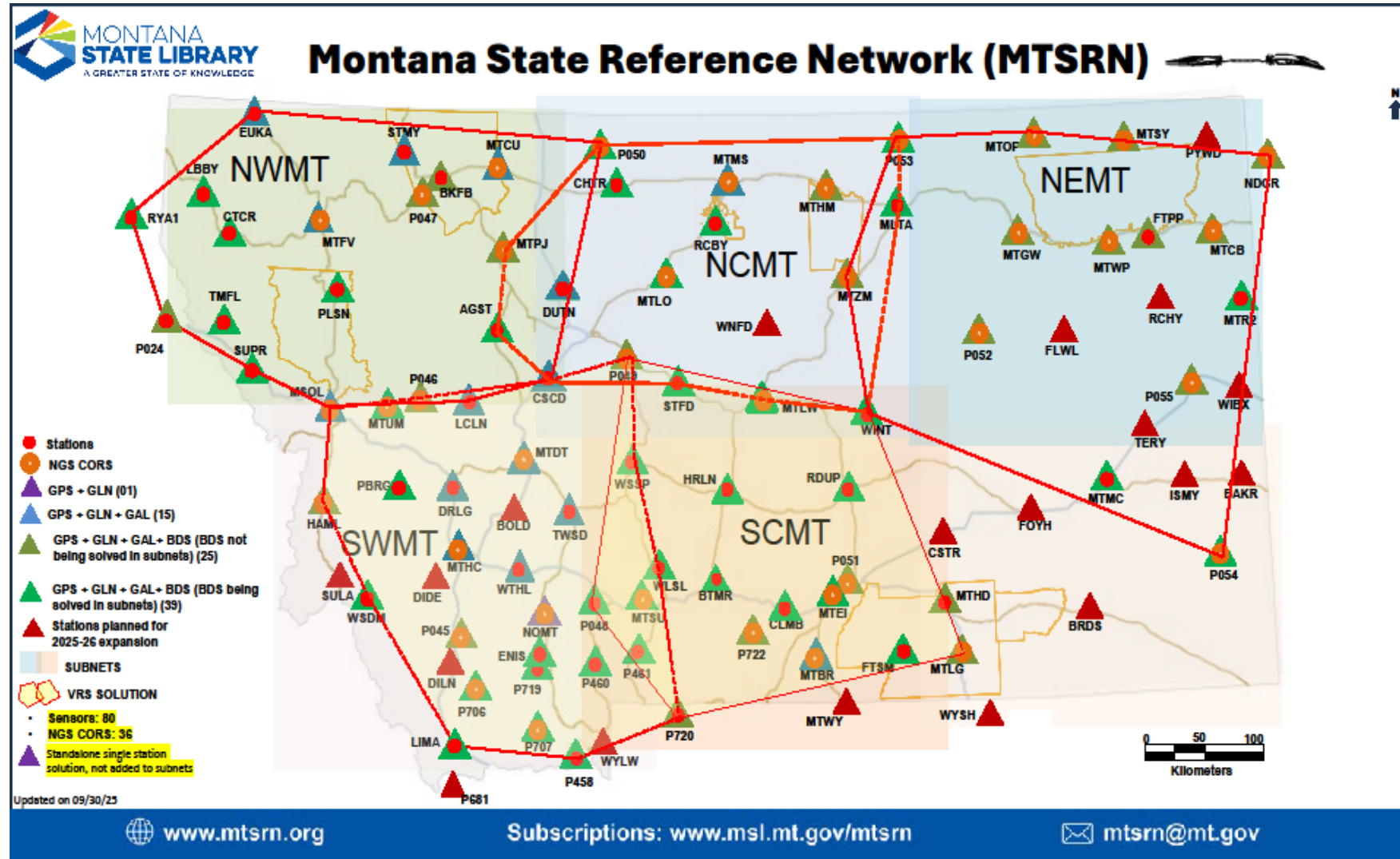


Benefits to the user

- No base station necessary; no security issue with the base, no lost time setting up and breaking down the base
- Ionospheric, tropospheric and orbital errors are drastically reduced and interpolated to the site of the rover
- Since it complies NSRS, user data will fit seamlessly across the RTN coverage
- Different output formats (RTCM, CMR) are readily available
- RTN quality can be checked using OPUS

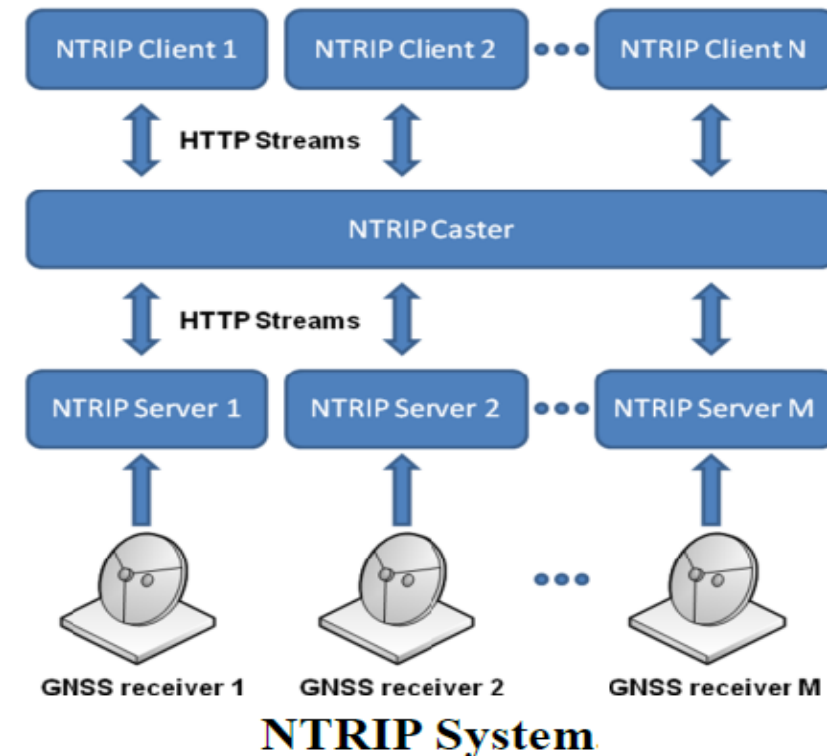
RTN Solutions

- 5 subnets: NEMT, NCMT, NWMT, SWMT and SCMT
- Solutions:
- relative to each subnet and
- relative to each station



RTN via Internet: RTCM and NTRIP

- Radio Technical Commission of Maritime Services (RTCM) designed an agreed upon protocol for communication
- It is not specific to any receiver type
- RTCM 3.1 provides network corrections message and information of GPS and GLN.
- RTCM 3.2 refers to Multi-System Messages (MSM) that can handle GAL and BDS as well
- NTRIP stands for “Networked Transport of RTCM via Internet Protocol”, based on HTTP with TCP/IP foundation
- NTRIP Designed to disseminate RTCM data
- NTRIP Caster (acts like a switchboard) receives data from Reference Stations
- NTRIP Caster sends corrections to NTRIPClient at the data collector



RTN Access and Mountpoints

- Users need internet connection to connect NTRIP Caster (IP & Port, and login credentials to login through NTRIPClient)
- SIM card inside a data collector.
- Cellular modem
- MiFi device e.g. Verizon jetpack MiFi
- Wi-Fi from a work vehicle's available hotspot based on paid data plan
- Hotspot from your phone

	Single Station Mountpoint Format (No selection required)	Consetellation used in the solution
RTCM3.1	MTSS_RTCM	GPS+GLN
RTCM3.4	MTSS_RTCM_MSM	GPS+GLN+GAL+BDS
CMR	MTSS_CMR_PLUS	GPS+GLN
CMRX	MTSS_CMRX	GPS+GLN+GAL+BDS

- Users can see list of correction streams (called mountpoints) and select one that is suitable for the area of interest

	Network Mountpoint Format (example for NEMT subnet)	Consetellation used in the solution
RTCM3.1	NEMTVRS_RTCM3	GPS+GLN
RTCM3.4	NEMTVRS_MSM	GPS+GLN+GAL+BDS

	Single Station Mountpoint Format (example for Station MTDT)	Consetellation used in the solution
RTCM3.1	MTDT_3	GPS+GLN
RTCM3.4	MTDT_MSM	GPS+GLN+GAL+BDS

Trimble Proprietary Data format	Mountpoint Format	Consetellation used in the solution
CMR	NEMTVRSCMR	GPS+GLN
CMRX	NEMTVRSCMRX	GPS+GLN+GAL+BDS
CMR	MTDT	GPS+GLN
CMRX	MTDTCMRX	GPS+GLN+GAL+BDS

Receiver Types and Contributors

Alloy	NETR9	Sept Polarx5	Leica GR30	total
29	33	17	1	80
MDT: 24	MDT: 23			MDT:47
Non MDT: 05	Non MDT: 06			Non MDT:13
	Earthscope: 04	Earthscope: 16		Earthscope:20
		WSRN: 01		
			SmartNet: 01	

GPS+GLN+GAL+BDS Solved	GPS+GLN+GAL Solved	GPS+GLN Solved
39	40	1
MDT: 23	MDT: 23	MDT:01
Non MDT: 06	Non MDT: 07	
Earthscope: 10	Earthscope: 10	

MTSRN conforming NSRS

- Is MTSRN Datum consistent with US National Datum? Yes, the datum at MTSRN configured to be NAD83 (2011), 2010.0 which is the current national horizontal datum.
- NGS recommends at least 10% of stations would be NGS CORS. In MTSRN 45% of the stations are NGS CORS.
- NGS Recommends RTN Reference Stations' coordinates should not differ by more than 2 cm horizontally and 4 cm vertically. NGS compliant? Yes.
- RTN connection to NAVD 88
- Using GEOID18 on NGS CORS provides consistent NAVD88 heights
- GEOID18 is recommended to derive NAVD88 values

Best Practices for RTN Users

- Check if you have the correct NTRIP caster address along with your login credentials. Use your credentials to login to www.mtsrn.org site if they are working fine.
- Check the subnet of your project area and check the sensor map.
- Check predicted ionospheric and geometric error at www.mtsrn.org site
- Ensure the availability of internet at your project area.
- Check shots before, doing and after.

MTSRN Account Types

- Trial Account for a month: Free of Cost
- Academic Account: Free of Cost
- Contributor Account: Free of Cost
- Paid Account: \$1500/year
- Create MTSRN trial account
- Register your information through www.mtsrn.org and submit
- Visit www.msl.mt.gov/mtsrn and find MTSRN resources

MTSRN – Network Contributors



MTSRN – RTN Coordinator

Contact the MTSRN Coordinator Kazi Arifuzzaman

Kazi Arifuzzaman

Montana State Library

mtsrn@mt.gov

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Wrap Up



Key Take Aways

- MSL is the coordinating body for MSDI Data.
- Partnership is necessary for MSDI Data Layers.
- Lidar for Montana is here. Come and get it!
- The hydrography dataset is being modernized using lidar.
- Imagery, Elevation, & Hydrography Themes need Funding Partners!
- Montana State Reference Network (MTSRN) is used for real-time, high-accuracy GPS positioning and benefits many partners.

MSDI Working Groups are open to anyone interested

Welcome to join future meetings!

MSL Email Updates





Questions?

Thank You!

Please reach out with your questions:

For additional GIS Assistance visit: <https://msl.mt.gov/geoinfo/Help/>
(Submit a GeoSupport Ticket through ServiceNow)

Subscribe to MSL News through GovDelivery for future meeting dates and other announcements:
<https://public.govdelivery.com/accounts/MTLIBRARY/subscriber/new>

