

Montana Lidar Inventory

Help Document

Through the Montana Lidar Inventory, users can view, download, and request lidar data throughout Montana.

Use the Viewer to:

- Find (filter) lidar projects based on:
 - Downloadable Data v. Request Only v. Not at the Montana State Library
 - Project Status (completed, in-progress, planned), Recent Collections (<5 years), and Quality Level
 - Availability of contours and building footprints
- View lidar-derived products, including bare-earth DEM, surface DEM, intensity, hillshade, slope, aspect
- Download and request lidar data
- Search by Address, Save and print maps, Identify elevations, and Measure distances and areas
- Compare various GIS layers using a Swipe Tool.

*This application was developed by the GIS programmers at the Montana State Library
with support from the USDA- MT Natural Resources Conservation Service*



<http://msl.mt.gov>

Introduction to the Montana Lidar Inventory: View, Download, Request

This application was built using Esri's Experience Builder in ArcGIS Online. ArcGIS Online is a cloud-based environment for storing and managing geographic content. It enables users to create and share maps and explore data through a web browser.

Once you have navigated to the Montana Lidar Inventory through a web browser and opened the "View, Download, and Request" page, the application opens to a map of Montana with Lidar Project Area boundaries in the foreground. The currently available lidar is also displayed as a hillshade generated from the 1-meter, bare-earth digital elevation model. As you navigate to projects with lidar data available for download and zoom in, the Quads with Downloadable Lidar layer displays. Lidar-derived raster products may be downloaded for an entire project area or by Quad.

Help Document Outline

[Step 1 – Selecting a Basemap](#)

[Step 2 – Viewing the Data Layers and Legend](#)

[Step 3 – Changing the map extent](#)

[Step 4 – Navigating to an area of interest, searching, and bookmarks](#)

[Step 5 – Tools: Filters](#)

[Step 6 – Tools: Measure](#)

[Step 7 – Tools: Swipe](#)

[Step 8 – Tools: Print](#)

[Step 9 – Tools: Elevation Profile](#)

[Step 10 –Tools: Add Data](#)

[Step 11 – Identifying Features and Downloading Data](#)

[Step 12 – Viewing Layer Attribute Tables](#)

The screenshot shows the Montana Lidar Inventory web application. At the top, there is a navigation bar with the Montana State Library logo on the left and the title "Montana Lidar Inventory" on the right. Below the navigation bar, there is a main content area with a heading "Discover where lidar has been collected in Montana. View, download, or request data, and collaborate on future acquisitions." This is followed by a list of bullet points detailing how to use the inventory, including checking the status of lidar for Montana, viewing, downloading, or requesting lidar data, and collaborating on future acquisitions. Below the text, there is a grid of images showing various lidar data visualizations, including hillshades, point clouds, and maps. At the bottom of the page, there is a contact information section with the Montana State Library logo, address, phone number, and hours of operation.

Montana Lidar Inventory

Discover where lidar has been collected in Montana. View, download, or request data, and collaborate on future acquisitions.

Use the Montana Lidar Inventory to:

- Check on the status of lidar for Montana - This page provides a dashboard of completed, in-progress, and planned lidar acquisitions
- View, download, or request lidar data - Access a web application for viewing, downloading, and requesting lidar data
- Collaborate and submit areas of interest for future acquisitions - Interact with a map for submitting priority areas of interest for future lidar planning
- Learn how lidar data is being used in Montana - Explore a map, charts, and table documenting lidar use in Montana and also view lidar images and posters
- View Lidar Images and Posters

Any organization acquiring lidar data in Montana should:

- Check the inventory to see where data is already available or planned for acquisition.
- Identify potential partners with mutual areas of interest, and identify partner funding.
- Apply for a USGS 3DEP Data Collaboration Announcement. The Montana Elevation Working Group led by the Montana State Library can assist with coordination.

Contact Montana State Library GIS for additional information.

Learn more!

- 2019 Montana Lidar Plan
- Overview of Montana State Library Lidar Resources

CONTACT US:

1201 11th Ave
Helena, Montana 59620
Hours: Monday-Friday 8AM-5PM
[Submit a request for Geoinfo Support](#)

Phone: (406) 444-2115
Toll Free: (800) 338-5087
Email: [View Directory](#)

Step 1 – Selecting a Basemap

Click on this icon to open the Basemap Gallery

[Back to Outline](#) 2



Montana Lidar Inventory



Disclaimer

Introduction

Status Dashboard

View, Download, and Request Data

Collaborate

Data Use Survey

Lidar 101

Lidar Imagery & Posters

Search by Parcel, Quad, Project, Address, or County

Moose Jaw



Help



The background map, or Basemap, is a reference image to help provide geographic context.

The default Basemap is set to the Map of Montana. If you want to change the Basemap click the Basemap Gallery button located in the top right to open the window.

To change the Background Map choose from one of the options available in the Basemap Gallery, such as Montana Air Photos or Topographic.

Once you've made a basemap selection, click the x or the Basemap Gallery button to hide the window.

Enable clicking the map to get the coordinates

Selected features: 0

Esri, USGS | Esri, TomTom, Garmin, HERE, DeLorme, Swatch, NOAA, USGS, Bureau of Land Management, EPA, NPS, USFWS | US Bureau of Land Management, Geographic Coordinate Database, US Geological Survey | Powered by Esri

Step 2 – Viewing the Data Layers and Legend

Click on this icon to open the **Layer List and Legend** [Back to Outline](#) 3

The screenshot shows the Montana Lidar Inventory web application. At the top, there is a navigation bar with the Montana State Library logo and several menu items: Introduction, Status Dashboard, View, Download, and Request Data (highlighted), Collaborate, Data Use Survey, and Lidar Imagery & Posters. A search bar is located below the navigation bar with the text "Search by Parcel, Quad, Project, Address, or County". The main map area displays a 3D terrain view with various data layers overlaid. On the right side, there is a "Layers" panel with a "Legend" tab selected. The "Layers" panel lists several categories: Reservations, Counties, and Lidar Projects. The "Lidar Projects" section includes a legend for project status: Completed (green), In Progress (blue), Planned (yellow), and Proposed (purple). A text box on the left side of the map provides instructions on how to use the Layer List and Legend.

Turn on the **Legend** to see how the features of each visible layer are symbolized.

Turn the data layers on or off within the **Layer List** by clicking the eye to the left of the layer name.

Some layers are only visible when you zoom in and are grayed out in the Layer List if they are not visible at the current extent/scale of your map.

Layers will display in the order shown in the Layer List and may need to be turned off to see the layers underneath (lower in the list), or the layer order can be rearranged by dragging layers up/down.

Step 3 – Changing the map extent – Zooming in or out

MONTANA STATE LIBRARY

Montana Lidar Inventory

Introduction Status Dashboard **View, Download, and Request Data** Collaborate Data Use Survey Lidar 101 Lidar Imagery & Posters

Search by Parcel, Quad, Project, Address, or County

50 mi

Enable clicking the map to get the coordinates

Selected features: 0

Powered by Esri

You can use the roller function on your mouse or the “+” and “-” buttons to zoom in or out on the map. The plus and minus keys on a keyboard will also zoom in/out when your mouse cursor is located on the map. As you zoom in additional layers will become visible.

Step 4 – Navigating to an area of interest, searching, coordinates, and bookmarks

The screenshot shows the Montana Lidar Inventory web application interface. At the top, there is a navigation menu with options: Introduction, Status Dashboard, View, Download, and Request Data (highlighted), Collaborate, Data Use Survey, Lidar 101, and Lidar Imagery & Posters. A search bar is located at the top center, with a dropdown menu for search criteria: Parcel, Quad, Project, Address, or County. On the right side, there is a 'Bookmark' widget with a list of saved locations: Shaw Butte and Lake Como, and a '+' button to add more. A 'Help' button is also visible. The main area is a map of Montana with county boundaries and names. A search bar is overlaid on the map, and a search bar is also present at the bottom of the map. A scale bar for 50 miles is in the bottom left corner. The footer contains copyright information for Montana State Library and US Bureau of Land Management.

After Reloading the Map you can go back to the default map extent

Type in an Address, Parcel, Lidar Project, Quad, or County

You can navigate to an area of interest by panning and zooming or by using the search tool. Pan by holding down the left mouse button and dragging or by using the arrows keys on your keyboard when the mouse cursor is over the map.

Lat/Long coordinates –
By default, lat/long is displayed for the location of your cursor. Toggle the crosshair icon to get the coordinates for a clicked location (place marker).

You can add bookmarks by selecting the bookmark widget. Zoom in/out to your area of interest and click the “+” button to save the bookmark. You can then customize the name of your bookmark. These will be saved until you exit the experience, or you may choose to delete them by clicking the black garbage can.

Step 5 – Filters

[Back to Outline](#) 6

MONTANA STATE LIBRARY

Montana Lidar Inventory

Introduction | Status Dashboard | **View, Download, and Request Data** | Collaborate | Data Use Survey | Lidar 101 | Lidar Imagery & Posters

Search by Parcel, Quad, Project, Address, or County

- Viewable lidar projects
- Downloadable lidar projects
- 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)

[Submit a request for lidar data not available by download]
[View lidar projects as a list]
[Submit a lidar data use survey]

Click Button Next to Filter to Turn them On/Off . You can Choose Multiple Filters, though keep in mind an “or” statement is used. Selections will display on Map. After setting a filter, click the tab (arrow) to move the window out of the way.

Submit a lidar request, view the lidar project list, and submit a lidar data use survey by clicking any of these links

Enable clicking the map to get the coordinates

Selected features: 0

Step 6 – Tools: Measuring

[Back to Outline](#) 7

The screenshot displays the Montana Lidar Inventory web application interface. At the top, the Montana State Library logo is on the left, and the title "Montana Lidar Inventory" is centered. Navigation tabs include "Introduction", "Status Dashboard", "View, Download, and Request Data" (highlighted), "Collaborate", "Data Use Survey", "Lidar 101", and "Lidar Imagery & Posters". A search bar is located below the navigation tabs. The main map area shows various counties and features. A "Measure" tool window is open, displaying a "Distance" of "4.50 mi" and a "Unit" dropdown menu set to "Imperial". A blue button labeled "New measurement" is at the bottom of the window. A yellow arrow points to a measurement tool icon in the top right corner of the map area. A text box with an orange border provides instructions: "To make area or distance, click on the measurement tool to open the Tool Window." "Click on the button to choose which type of measurement, area, distance or location." "Then left click in the map to start the measurement, and double click on the map to finish." "Use the Dropdown Arrow to Change the Unit of Measure".

Measure

Unit

Imperial

Distance

4.50 mi

New measurement

To make area or distance, click on the measurement tool to open the Tool Window.

Click on the button to choose which type of measurement, area, distance or location.

Then left click in the map to start the measurement, and double click on the map to finish.

Use the Dropdown Arrow to Change the Unit of Measure

The screenshot displays the Montana Lidar Inventory web application. At the top, the Montana State Library logo is on the left, and the title "Montana Lidar Inventory" is centered. Navigation links include "Introduction", "Status Dashboard", "View, Download, and Request Data", "Collaborate", "Data Use Survey", "Lidar 101", and "Lidar Imagery & Posters". A search bar is located below the navigation. The main map area shows a grid of lidar data with various layers. A "Swipe" tool is active, showing a list of layers on the right side of the map. A yellow arrow points to the "Swipe" button in the top right corner of the map. Another yellow arrow points to the "Swipe" tool's toggle button on the map. A text box with an orange border provides instructions on how to use the tool.

Montana Lidar Inventory

Introduction Status Dashboard **View, Download, and Request Data** Collaborate Data Use Survey Lidar 101 Lidar Imagery & Posters

Search by Parcel, Quad, Project, Address, or County

Swipe

- 1 meter Lidar
- Bare Earth Digital Model (1 meter...)
- Relief - Digital Model (1 meter Lidar)
- Relief - Bare Earth Elevation Model (1...

Click on the Swipe Button to open the Swipe Tool

Choose your leading layer (left side) followed by your trailing layer (right side). Then click the toggle button to begin swiping.

You can hide/reveal layers and toggle them on and off in the pop-up window

Use the Swipe Slider Bar to reveal/hide the selected layer

Enable clicking the map to get the coordinates

Selected features: 0

Step 8 – Tools: Printing

Print Tool

Print

Print template Results

Template
A3 Landscape

Title
ArcGIS Web Map

Advanced
Map printing extents
 Current map extent
 Current map scale
 Set map scale

Output spatial reference WKID
6318
GCS_NAD_1983_2011

Layout options
Author
Copyright
 Show print area

Print

Selected features: 0

10 mi

Montana State Library | US Bureau of Land Management, Geographic Coordinate Database, US Geological Survey 1:24,000 Digital Raster Graphics | US Bureau of Land Management, Geograph... Powered by Esri

Click on the Print tool button to open the tool window.

Enter a Title, Choose your layout template , and pick a file format from the Dropdown Arrows.

Click on the Advanced button for additional options:
Scale, Size, Author, Print Quality, etc.

Then click the Print button to export your map.

After a brief processing time, the map will show up in the Results Tab as PDFs. From here the PDF can be saved or sent to your printer.

Step 9 – Tools: Elevation Profile

Elevation Profile

Introduction Status Dashboard **View, Download, and Request Data** Collaborate Data Use Survey Lidar 101 Lidar Imagery & Pos

Search by Parcel, Quad, Project, Address, or County

Profile Statistics

Ground Elevation	
AVG Elevation	AVG Negative Slope
5,405.08 ft	4.62 °
AVG Positive Slope	Elevation Gain
22.1 °	1,487.4 ft

The elevation profile tool can be used to measure distances on the ground within your project or area of interest.

With the elevation widget selected, begin drawing a line on the area you want to measure. Double clicking your left mouse button will complete your line.

The window will populate with your elevation profile. Selecting the bar chart icon will bring up profile statistics. Selecting the arrows will inverse your graph. Selecting the export button will allow you to export the values as a CSV. Selectin the gear icon allows you to change units of measurement.

1,000 ft

Enable clicking the map to get the coordinates

Selected features: 0

Elevation Profile

Ground Elevation

AVG Elevation: 5,405.08 ft

AVG Negative Slope: 4.62 °

AVG Positive Slope: 22.1 °

Elevation Gain: 1,487.4 ft

0.1 mi 0.2 mi 0.3 mi 0.4 mi 0.5 mi 0.6 mi

Ground Elevation

Reset New profile

Powered by Esri

Step 10 – Tools: Add Data

Montana State Library

Introduction Status Dashboard **View, Download, and Request Data** Collaborate Data Use Survey Lidar 101 Lidar Imagery & Posters

Search by Parcel, Quad, Project, Address, or County

Add Data

Search URL File

My content

Search

Lidar Posters Locator_ WFL1

File

ArcGIS Server Web Serv...

ArcGIS Server Web Service WMS OGC Web Service WMTS OGC Web Service WFS OGC Web Service KML Layer CSV Layer GeoJSON Layer

Supported formats: Shapefile, CSV, KML, GeoJSON, GPX.

Drop or browse to upload

+ Upload

https://services.arcgis.com/P3Mys2RVChkXj/arcgis/rest/serv/World_Cities/FeatureServer/0

Enable clicking the map to get the coordinates

Selected features: 0

1,000 ft

Esri, NASA, NGA, USGS, FEM/ Community Maps Contributors, County of Lewis and Clark, Montana State Library, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTec... Powered by Esri

Add Data

You can add your own data to the map by selecting the Add Data widget in the top right corner of the page.

You can search and add data from your ArcGIS Online account, add data via a URL, or insert any of the supported file types.

Step 11 – Identifying Features and Downloading Data

[Back to Outline](#) 12

The screenshot displays the Montana Lidar Inventory web application. The main map shows a grid of parcels in Cascade County, with a specific area highlighted in green. A popup window titled "Lidar Projects: CASCADE_2020_CSctyQL1" is open, showing project details. The popup window has a top right corner with a menu icon and "2 of 2" text. The popup window contains the following information:

properties of the study area to support floodplain mapping being carried out by MTDNRC and the Federal Emergency Management Agency (FEMA).	
Square Miles	631.71
Project Data Download	View
Report Link	View
Additional Info	View
Month Collected	April
Year Collected	2020
QL	1
Notes	
Primary County	Cascade
Lead Org	MT DNRC
Vertical Accuracy (NVA)	.049
Vertical Accuracy (VVA)	.233
Vertical RMSE	0.02

The popup window also shows a "Selected features: 1" indicator at the bottom right. A yellow arrow points from the "View" link in the popup window to the "2 of 2" text in the top right corner of the popup window.

Once you have navigated to an area of interest, click within the map to reveal the **Popup Window** that displays selected attributes of the Data Layers.

Only layers that are checked on in the Layer List and visible in the Legend will have a popup window open when you click in the map.

The topright of the popup window shows how many layers have been opened (2 in this example). If there are several layers visible, then click through the left and right arrows on the popup window (top left) to view information about the other visible layers.

Click on Links ("View") in the Popup to Download Data or View Reports

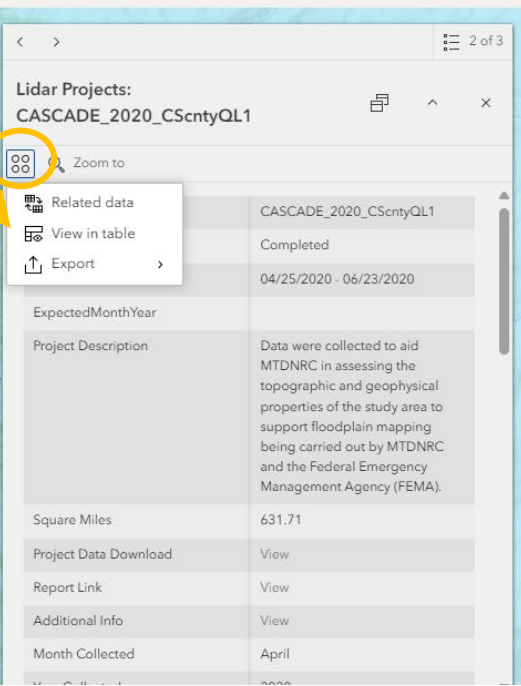
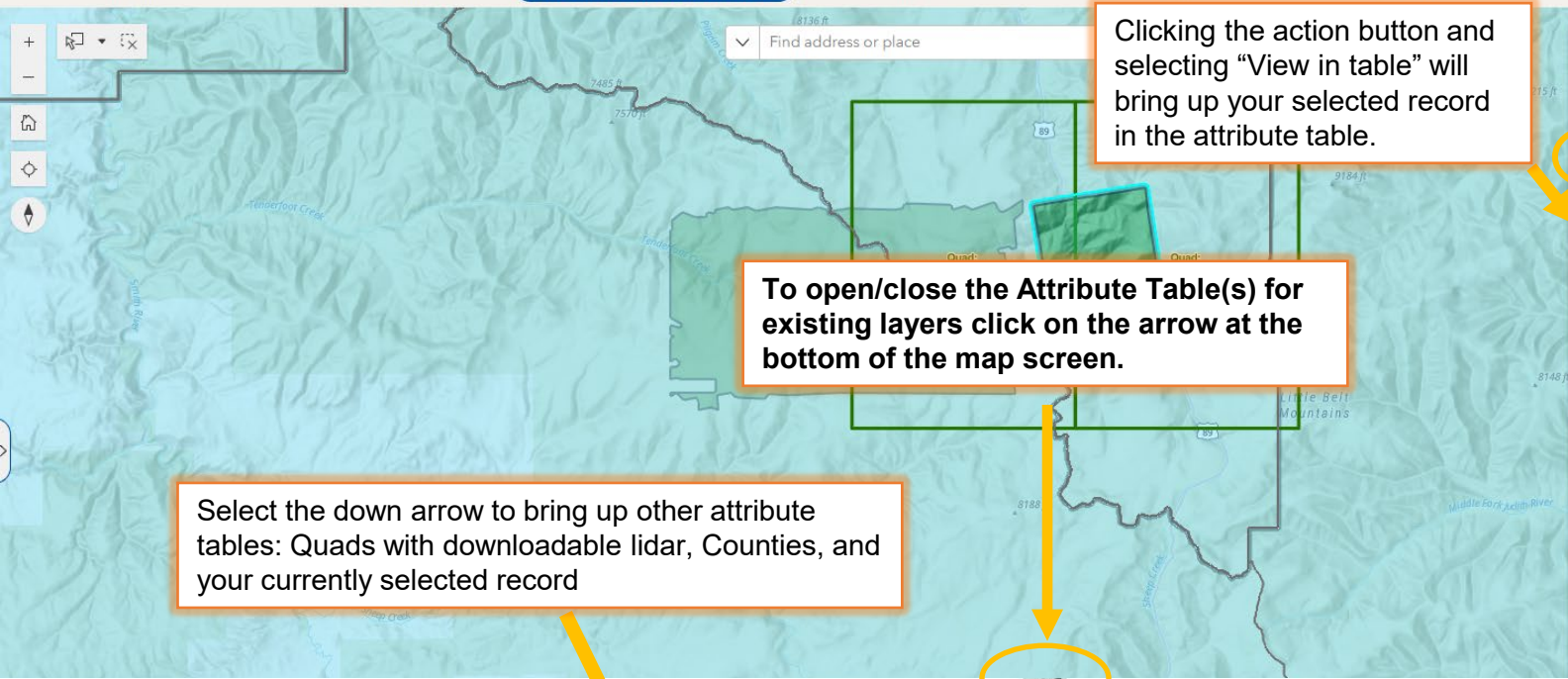
Step 12 – Viewing Layer Attribute Tables



Montana Lidar Inventory



Introduction Status Dashboard **View, Download, and Request Data** Collaborate Data Use Survey Lidar 101 Lidar Imagery & Posters



Lidar Projects

Project Name	Collection Sta...	Collection Dates	ExpectedMon...	Project Descri...	Square Miles	
Statewide Phase 4 USGS	In Progress		Aug 2024	Lidar acquisitions in Mont...	29,259.75	
MT STATEWIDE PHASE 5 Q2	In Pro		Mar 2026	MT Statewide Phase 5 - a f...	14,616.41	
MT STATEWIDE PHASE 5 Q1	In Pro		Mar 2026	MT Statewide Phase 5 - a f...	5,367.98	
MT DNRC 2023 LIDAR FL...	In Progress		Sep 2024	MT DNRC 2023 - lidar acq...	5,153.23	
Statewide Phase 3 USGS 3...	In Progress		Jul 2024	Lidar acquisitions in Mont...	4,860.93	
ROSEBUD_2019_RSctyQL2	Completed	05/03/2019 - 05/15/2019		Lidar derivative products t...	4,109.38	View
Statewide Phase 3 USGS 3...	In Progress		Jul 2024	Lidar acquisitions in Mont...	3,652.11	
Statewide Phase 2 USGS 3...	Completed			Lidar acquisition complet...	3,446.91	

Callout boxes on the table:
- Points to column headers: 'Click on the column headings to sort the data.'
- Points to a 'View' link: 'Attribute table options can be found by clicking the four white dots. Exports, Filters, and Statistics can be found here.'
- Points to a 'Show/Hide Columns' button (eye icon): 'Turn column headings on or off by using the show/hide columns button (the button looks like an eye).'