

Montana Lidar Inventory

Help Document

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

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.

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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 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, such as 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 US:" section with the Montana State Library logo, address (1201 11th Ave, Helena, Montana 59620), hours (Monday-Friday 8AM-5PM), and contact information (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

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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

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 right 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 new bookmarks. A 'Help' button is also visible. The main area is a map of Montana showing county boundaries and major roads. Several callout boxes provide instructions: one points to the map's left edge, another points to the search bar, a large central box explains navigation methods, one points to a crosshair icon on the map, and another points to the '+' button in the bookmark widget. The bottom of the page includes a scale bar (50 mi) and footer text: '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'.

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

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The screenshot displays the Montana Lidar Inventory web application interface. At the top left is the Montana State Library logo. The main header includes navigation tabs: 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 the text "Search by Parcel, Quad, Project, Address, or County". On the left side, there is a filter panel with a list of filter options, each with a toggle switch. The "Quality Level 2 lidar (~2 points per square meter)" filter is highlighted with a yellow circle and a yellow arrow. Below the filter panel, there are three links: "Submit a request for lidar data not available by download", "View lidar projects as a list", and "Submit a lidar data use survey". A yellow arrow points to these links. A central text box with an orange border contains instructions: "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." A yellow arrow points to the left arrow button next to the Quality Level 2 filter. At the bottom of the map, there is a status bar with "Selected features: 0" and "Powered by Esri".

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

Selected features: 0

Powered by Esri

Step 6 – Tools: Measuring

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The screenshot displays the Montana Lidar Inventory web application. The map shows various counties including Pondera, Teton, Cascade, Lewis and Clark, Powell, Granite, Jefferson, Broadwater, and others. A search bar at the top allows for searching by Parcel, Quad, Project, Address, or County. A 'Measure' tool is active, showing a 'Distance' of 4.50 mi in 'Imperial' units. A yellow arrow points to the measurement tool icon in the top right corner. A text box explains the tool's usage: 'Use the Measurement Tool to choose area or distance, then left click on the map to start the measurement. Double click on the map to finish.' Another text box indicates: 'Use the Dropdown Arrow to Change the Unit of Measure'. The 'New measurement' button is highlighted in blue. The bottom of the screen shows a status bar with 'Selected features: 0' and 'Powered by Esri'.

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

Measure

Unit: Imperial

Distance: 4.50 mi

New measurement

Use the Measurement Tool to choose area or distance, then left click on the map to start the measurement. Double click on the map to finish.

Use the Dropdown Arrow to Change the Unit of Measure

Selected features: 0

Powered by Esri

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.

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

Swipe

- 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

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

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

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Step 11 – Identifying Features and Downloading Data

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The screenshot displays the Montana Lidar Inventory web application. The main map shows a grid of parcels with various shades of green and brown. A search bar at the top center contains the text "Search by Parcel, Quad, Project, Address, or County". A popup window on the right side of the map displays details for a project named "CASCADE_2020_CSctyQL1". The popup window has a title bar with a close button and a "2 of 2" indicator. The main content of the popup is a table with the following data:

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 includes a "Zoom to" button and a "Selected features: 1" indicator at the bottom right. A yellow arrow points from the "2 of 2" indicator in the popup window to the text in the text box below.

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 top right 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

Show me

Step 12 – Viewing Layer Attribute Tables

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

Find address or place

Clicking the action button and selecting "View in table" will bring up your selected record in the attribute table.

To open/close the Attribute Table(s) for existing layers click on the arrow at the bottom of the map screen.

Select the down arrow to bring up other attribute tables: Quads with downloadable lidar, Counties, and your currently selected record

Turn column headings on or off by using the show/hide columns button (the button looks like an eye).

Click on the column headings to sort the data.

Attribute table options can be found by clicking the four white dots. Exports, Filters, and Statistics can be found here.

Lidar Projects: CASCADE_2020_CSctyQL1

ExpectedMonthYear	CASCADE_2020_CSctyQL1
Project Description	Completed
Project Data Download	04/25/2020 - 06/23/2020
Report Link	View
Additional Info	View
Month Collected	View
Month Collected	April

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
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