

FREQUENT QUESTIONS

United States Interagency Elevation Inventory

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NOAA Office for Coastal Management

coast.noaa.gov



FEMA



US Army Corps
of Engineers®



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What is the United States Interagency Elevation Inventory?

The inventory is a nationwide listing of known publicly available high-accuracy topographic and bathymetric source elevation data for the United States and its territories. The inventory provides a single resource for information about all known completed and in-progress broad-area public domain elevation data.

The [United States Interagency Elevation Inventory](#) raises awareness of and increases access to existing elevation data, thereby reducing data duplication efforts. It helps to identify data gaps and informs and encourages collaboration on future data collection efforts. The inventory displays data set boundaries and provides information about the elevation data but does not host the data itself. If available, links to access the data, metadata, and reports are included.

The information in the inventory may also be accessed via map services, and the terrestrial information is available as a GIS layer for download. The United States Interagency Elevation Inventory is a dynamic catalogue maintained by a partnership of federal agencies and supports the [federal elevation theme](#).

What is the purpose of the inventory?

The elevation inventory is designed to be a broadly applicable resource for elevation data information. Users can find out what data sets are available for their area, find more information about a particular data set, or use the information in the viewer to plan a future collection.

How is the inventory maintained?

The elevation inventory is maintained by the Federal Emergency Management Agency (FEMA), U.S. Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Agriculture (USDA) National Resources Conservation Service and Forest Service, U.S. Army Corps of Engineers (USACE), and National Park Service (NPS). These agencies work together to collect footprints of data from federal, state, regional, and county groups that have topographic or bathymetric data available. Where possible, 29 attributes are provided for topography and up to 10 attributes are provided for bathymetry to give users a better idea of data set quality. This information is updated through the efforts of these agencies. The topographic portion of the elevation inventory is updated approximately quarterly. The bathymetric information and the USACE Hydrographic Surveys are kept up to date dynamically using web map services. Links to these services are provided on the viewer home page.

What data are included in the inventory?

The elevation inventory focuses on high-accuracy elevation data like lidar, IfSAR, and multibeam bathymetry. The inventory includes all known publicly available data sets with a significant coverage area, but may not include very small data sets (e.g., 10 square miles). A small number of restricted data sets are included in the Inventory. These may require a small fee for access or may only be available to certain types of users free of charge. Additionally, the shapes shown in the inventory are simplified and may not show the exact project or data boundaries.

What types of elevation data are included in the inventory?

Topographic, bathymetric, and topobathy data sets are included.

Topographic Lidar

Lidar data are a densely spaced network of highly accurate georeferenced elevation points—often called a point cloud—collected using a laser, that provide a representation of the Earth's surface. For this data type,

lidar technology is used to collect topographic (land) elevations. These data are displayed in the United States Interagency Elevation Inventory via the NOAA Office for Coastal Management map service:
<https://coast.noaa.gov/arcgis/rest/services/USInteragencyElevationInventory/USIElv2/MapServer>

Topobathy Lidar

Lidar data are a densely spaced network of highly accurate georeferenced elevation points—often called a point cloud—collected using a laser, that provide a representation of the Earth’s surface. For topobathy data, both topographic and bathymetric elevations are collected to provide a seamless representation of the Earth’s surface across the land–water interface. The bathymetric lidar system typically uses a green laser for water penetration. These data are displayed in the elevation inventory via the NOAA Office for Coastal Management map service:

<https://coast.noaa.gov/arcgis/rest/services/USInteragencyElevationInventory/USIElv2/MapServer>

IfSAR/InSAR

IfSAR or InSAR is an acronym for “Interferometric Synthetic Aperture Radar.” The data collected by this technology are used to produce topographic elevation information as digital elevation models (DEMs). A DEM consists of terrain elevations at regularly spaced horizontal intervals. These data are displayed in the elevation inventory via the NOAA Office for Coastal Management map service:

<https://coast.noaa.gov/arcgis/rest/services/USInteragencyElevationInventory/USIElv2/MapServer>

Bathymetric Lidar

Lidar data are a densely spaced network of highly accurate georeferenced elevation points—often called a point cloud—collected using a laser, that provide a representation of the Earth’s surface. For this data type, lidar technology is used to collect bathymetric (undersea) elevations. This data are displayed in the elevation inventory via the NOAA Office for Coastal Management map service:

<https://coast.noaa.gov/arcgis/rest/services/USInteragencyElevationInventory/USIElv2/MapServer>

NOAA Hydrographic Surveys

NOAA hydrographic surveys collect water depth data to support nautical charting, port and harbor maintenance, coastal engineering, coastal zone management, and offshore resource development. NOAA Office of Coast Survey hydrographic survey data collection methods include lead lines, single-beam echo sounders, multibeam sonar, side-scan sonar, and lidar. These data are displayed in the elevation inventory via the National Centers for Environmental Information map service:

https://gis.ngdc.noaa.gov/arcgis/rest/services/web_mercator/nos_hydro_dynamic/MapServer

Multibeam Surveys

Multibeam surveys are water depth data collected using a multibeam sensor. These surveys are conducted by various organizations. These data are displayed in the elevation inventory via the National Centers for Environmental Information map service:

https://gis.ngdc.noaa.gov/arcgis/rest/services/web_mercator/multibeam_dynamic/MapServer

Trackline Surveys

Tracklines are water depth data collected by various organizations during marine cruises. These data are displayed in the elevation inventory via the National Centers for Environmental Information map service:

https://gis.ngdc.noaa.gov/arcgis/rest/services/web_mercator/trackline_combined_dynamic/MapServer

USACE Hydrographic Surveys

Hydrographic surveys that have been processed and uploaded by USACE districts. These footprints only display in the viewer when zoomed in to approximately a county-level scale. These data are displayed in the

elevation inventory via the USACE eHydro map service:

https://services7.arcgis.com/n1YM8pTrFmm7L4hs/arcgis/rest/services/eHydro_Survey_Data/FeatureServer

Other Bathymetry Surveys

Bathymetric surveys collected by academic and other nongovernmental sources. These data are displayed in the elevation inventory via the NOAA Office for Coastal Management service:

<https://coast.noaa.gov/arcgis/rest/services/USInteragencyElevationInventory/USIElv2/MapServer>

Are these the authoritative boundaries for the data collection?

No, the footprints represented in the inventory are slightly generalized to represent the coverage of the collection. This generalization is necessary to achieve acceptable draw times for the service.

The data set footprints provided in the downloadable Esri geodatabase and Open Geospatial Consortium GeoPackage may have more detail. They are not necessarily authoritative as an authoritative footprint may not exist. For more information regarding the detailed footprints,

see <https://geozoneblog.wordpress.com/2022/12/09/elevation-inventory-footprint-improvements>.

What information can I find out about a data set?

Where possible, 29 attributes are provided for topography and up to 10 attributes are provided for bathymetry to give users a better idea of data set quality. The attributes for topography and bathymetry are listed below.

Topography Attributes

Data Set Type, Data Set Name, Collection Date, Status, Collection Year, Data Access, Metadata Access, Additional Resources, 3D Point Viewer, Entwine Point Tiles, Record Owner, For More Information Contact, Web Service Link, 3D Elevation Program (3DEP) Quality Level, Meets 3DEP, Reason Data Does/Does Not Meet 3DEP, Meets 3DEP - Lidar Point Cloud (LPC), Vertical Accuracy, Horizontal Accuracy, Point Spacing, Vertical Datum, Horizontal Datum, Products Available, Restrictions, Notes, Point Classes, Contract Spec, Data Collected Leaf On/Off, Alternate Name

Bathymetry Attributes

- NOAA Hydrographic Surveys – Data Set Name, Collection Date, Status, Collection Year, Data Access, Record Owner, Ship Name
- USACE Hydrographic Surveys – Data Set Name, Collection Date, Status, Collection Year, Data Access, Survey Plot Sheet, Record Owner, Survey ID, District
- Multibeam Bathymetry – Data Set Name, Collection Date, Status, Collection Year, Data Access, Record Owner, Ship Name, Chief Scientist, Instrument, Notes
- Trackline Bathymetry – Data Set Name, Collection Date, Status, Collection Year, Data Access, Record Owner, Ship Name, Chief Scientist

How do I get started?

From the inventory home page, you have four options for starting your search:

- Enter an address, city, county, state, island, location, latitude/longitude point, GeoJSON coordinates, WKT coordinates, or a hydrologic Unit Code (HUC) in the text search bar to navigate to the map page
- Click the magnifying glass button to go directly to the map page at the full conterminous US extent
- Click the point button to go directly to the map page with the single point search enabled
- Click the polygon button to go directly to the map page with the polygon search enabled

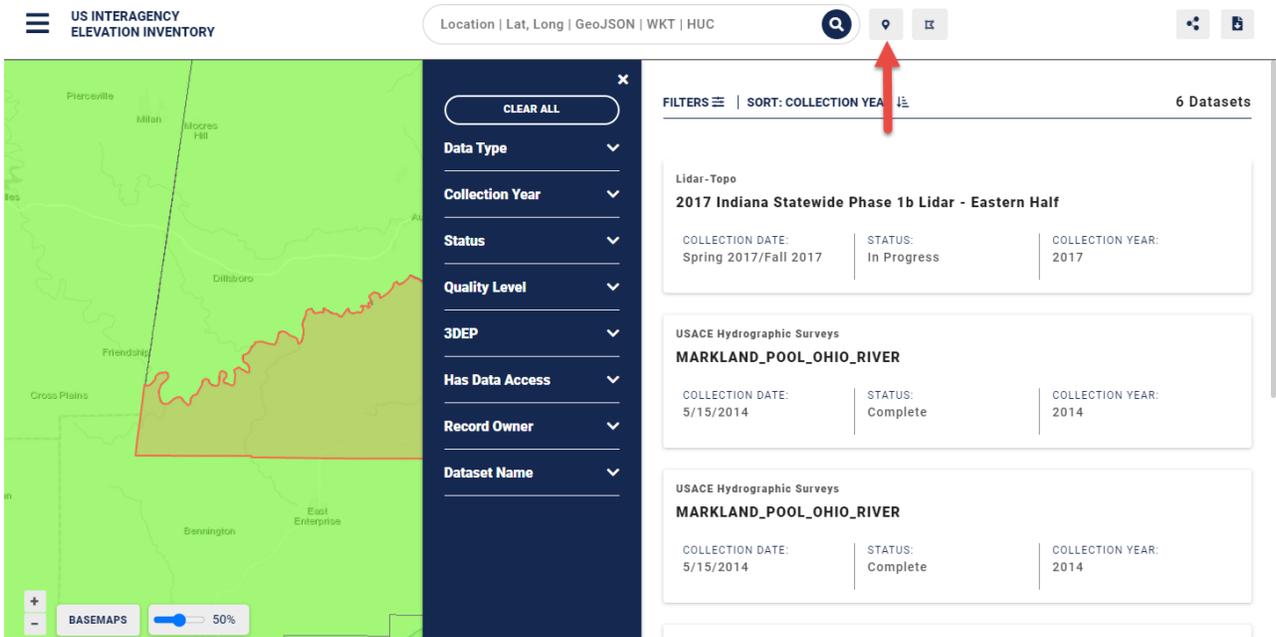
What are the required formats to search by a single latitude/longitude point, GeoJSON or WKT coordinates, or a HUC?

To search by these options in the text search bar,

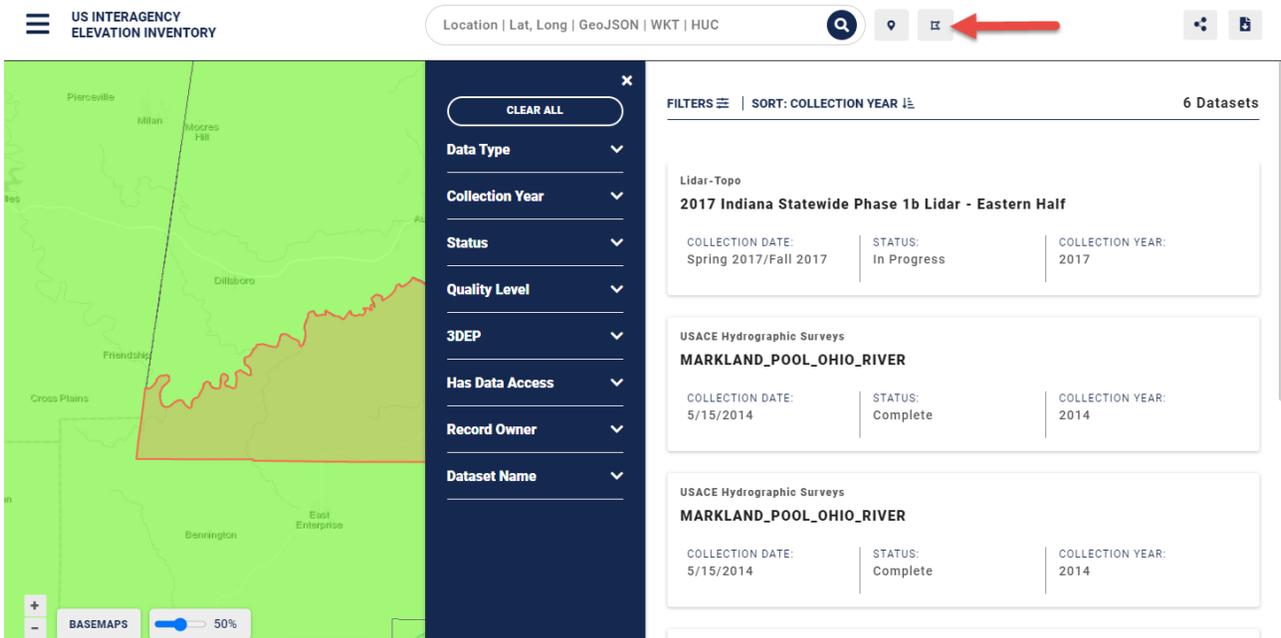
- Enter a latitude and longitude coordinate for a specific point search
 - Example: 32.8, -79.9
- Enter [GeoJSON](#) format coordinates
 - Example for a point:
`{ "type": "Point", "coordinates": [-115.7, 40.1] }`
 - Example for a polygon:
`{ "type": "Polygon", "coordinates": [[[-81, 28], [-81, 28.5], [-81.5, 28.5], [-81.5, 28], [-81, 28]]] }`
 - Example for a line:
`{ "type": "LineString", "coordinates": [[-81, 28], [-81, 28.5], [-81.5, 28.5], [-81.5, 28]] }`
- Enter [Well Known Text \(WKT\)](#) format coordinates
 - Example for a point:
POINT (-115.7 40.1)
 - Example for a polygon:
POLYGON ((-81 28, -81 28.5, -81.5 28.5, -81.5 28, -81 28))
 - Example for a line:
LINESTRING (-81 28, -81 28.5, -81.5 28.5)
- Enter an 8-, 10-, or 12- digit [Hydrologic Unit Codes \(HUC\)](#)
 - Example for a HUC8:
04030201
 - Example for a HUC10:
0403020101
 - Example for a HUC12:
040302010101

How do I search by dropping a point or drawing a polygon?

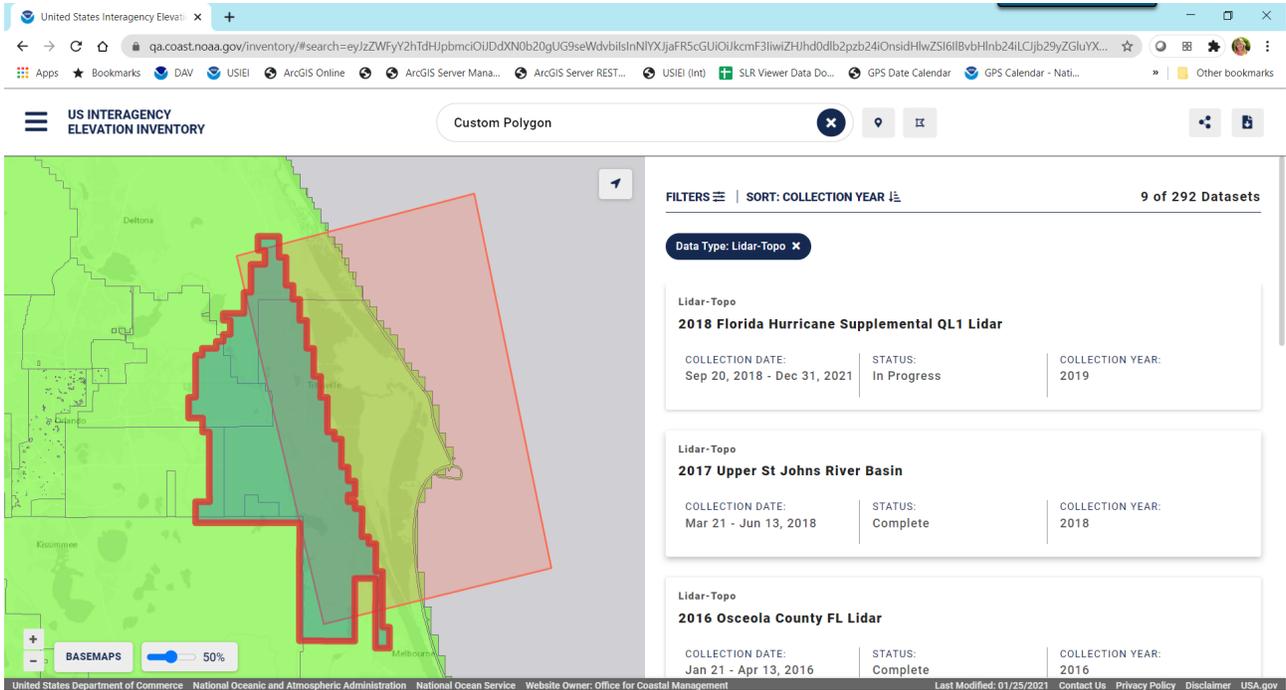
- Click on the Drop Custom Point tool to place a point for a single location search.



- Click on the Draw Custom Polygon tool to draw a polygon (up to 30 vertices) for a custom area search.



After your search, you will see the data sets that fall within your search listed on the right side of the window. You can hover the cursor over the data set in the results pane to see the corresponding data set footprint highlighted in the map.



How do I use the filters?

The filters can help narrow down the results of your geographic search. To filter your search results, click on the FILTERS at the top of the results pane and choose the attribute(s) to filter by. Hovering over each of the filters will provide a short description. Once you have clicked on a filter, you will see options within that filter. The numbers listed in parenthesis by each filter option are the number of results from your initial search. The options within the Data Type, Status, and Quality Level filters also have hover text that provide short descriptions. If a filter has an All checkbox, you can use that to select or deselect all the sub-filters. Check the desired option(s) within your chosen filter(s). You will see the results of your filtered search in the right side of the window.

Filters available are:

- Data Type – display data sets of a specific type(s) or service origins.
 - Topographic Lidar
 - Topobathy Lidar
 - IfSAR
 - Bathymetric Lidar
 - NOS Hydrographic Surveys
 - Multibeam Surveys
 - Trackline Surveys
 - USACE Hydrographic Surveys
 - Other Bathy Surveys

- Collection Year – display data sets collected in a certain range of years. If a specific year, type that year in both boxes.

- Status – display data sets of a specific status.
 - Planned/Funded – Project has not flown yet, but the funding is in place or contract has been signed.

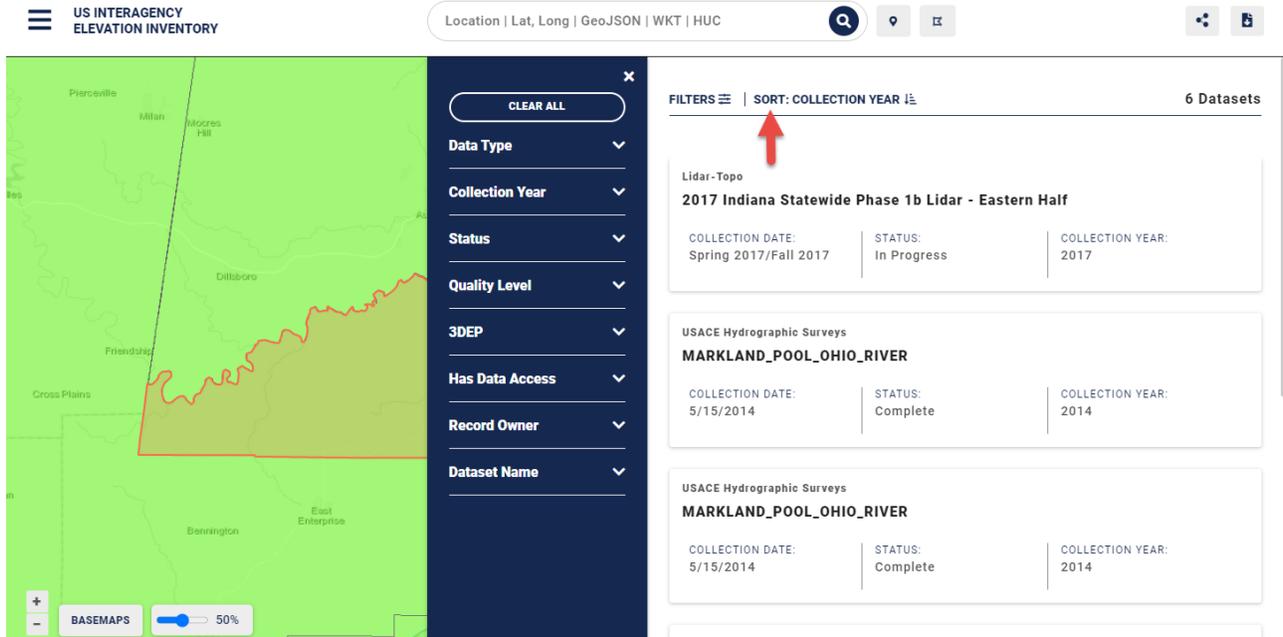
- In-Progress – Project is currently being flown or is still in QA/QC. Data are not yet available to the public.
- Complete – data are ready and available to the public.
- Quality Level – display data sets of specific quality levels.
 - QL0 – spacing \leq 0.35 m, vertical accuracy \leq 5 cm root mean square error (RMSE)
 - QL1 – spacing \leq 0.35 m, vertical accuracy \leq 10 cm RMSE
 - QL2 – spacing \leq 0.71 m, vertical accuracy \leq 10 cm RMSE
 - QL3 – spacing \leq 1.41 m, vertical accuracy \leq 20 cm RMSE
 - QL4 – spacing $>$ 2 m or vertical accuracy $>$ 18.5 cm RMSE
 - QL5 – spacing = 5 m, vertical accuracy 92.7 cm – 185 cm RMSE (IfSAR)
 - N/A – data considered bad/unusable, bathymetry, unknown
- 3DEP – display data sets that were or are being collected according to 3DEP.
 - Meets 3DEP – display data sets where all elevation products comply with 3DEP criteria.
 - Meets 3DEP LPC – display data sets where the lidar point cloud complies with 3DEP criteria.
- Has Data Access – display data sets that have information for data access.
- Record Owner – display data sets that are maintained by a specific federal agency.
- Data Set Name – display data sets that have specific words in their title.

The screenshot displays the US Interagency Elevation Inventory web application. At the top, there is a header with the logo and a search bar containing coordinates (-77.0178, 36.0982). Below the header is a map of North Carolina. To the right of the map is a sidebar with various filter categories: Data Type, Collection Year, Status, Quality Level, 3DEP, Has Data Access, Record Owner, and Dataset Name. On the right side of the interface, there is a list of datasets. The list is titled '3 Datasets' and includes a 'FILTERS' button (indicated by a red arrow) and a 'SORT: COLLECTION YEAR' option. The datasets listed are:

- Lidar-Topo**
2020 Hurricane Florence NC Lidar
COLLECTION DATE: Dec 10, 2019 - Apr 30, 2022 | STATUS: In Progress | COLLECTION YEAR: 2020
- Lidar-Topo**
2014 NC Statewide Lidar Phase 1
COLLECTION DATE: Jan - April 2014 | STATUS: Complete | COLLECTION YEAR: 2014
- Lidar-Topo**
2003 North Carolina Floodplain Mapping Program (NCFMP) Lidar - Phase II
COLLECTION DATE: Jan 3 - Mar 23, 2003 | STATUS: Complete | COLLECTION YEAR: 2003

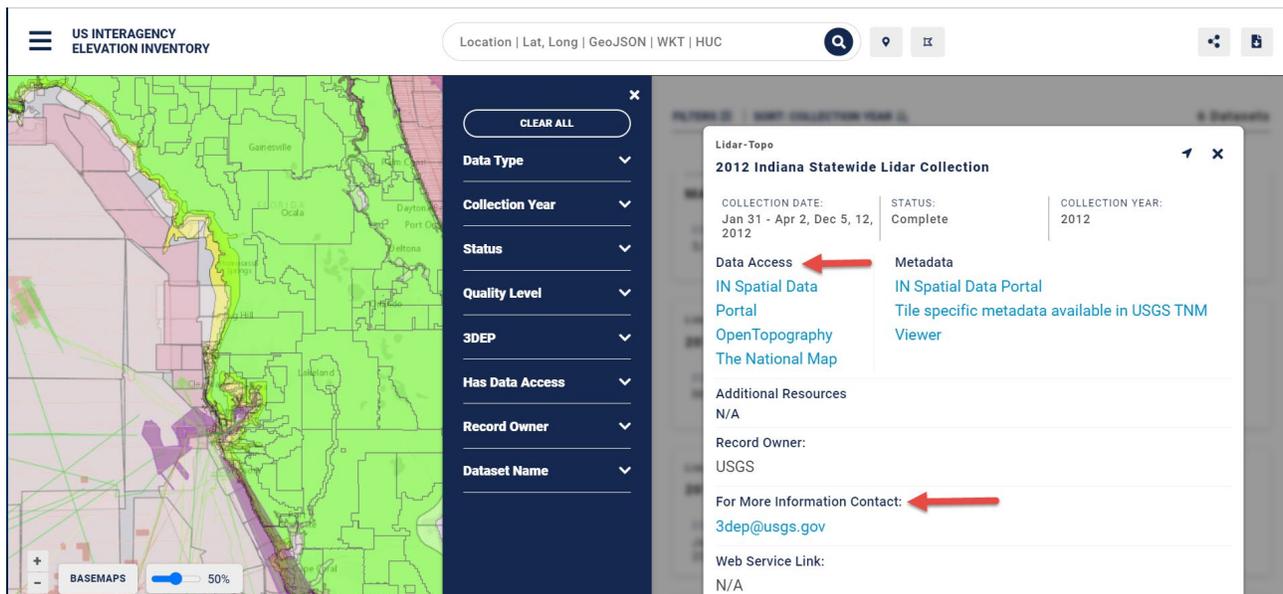
How do I use the sort?

The sort functionality allows you to sort your results by Collection Year, Point Spacing, Data Type, or Quality Level in either ascending or descending order. Collection Year in descending order is the default sort criteria. To sort, click on SORT at the top of the results pane and choose which attribute to sort by. To change between ascending and descending order, click the down arrow located beside the sort attribute.



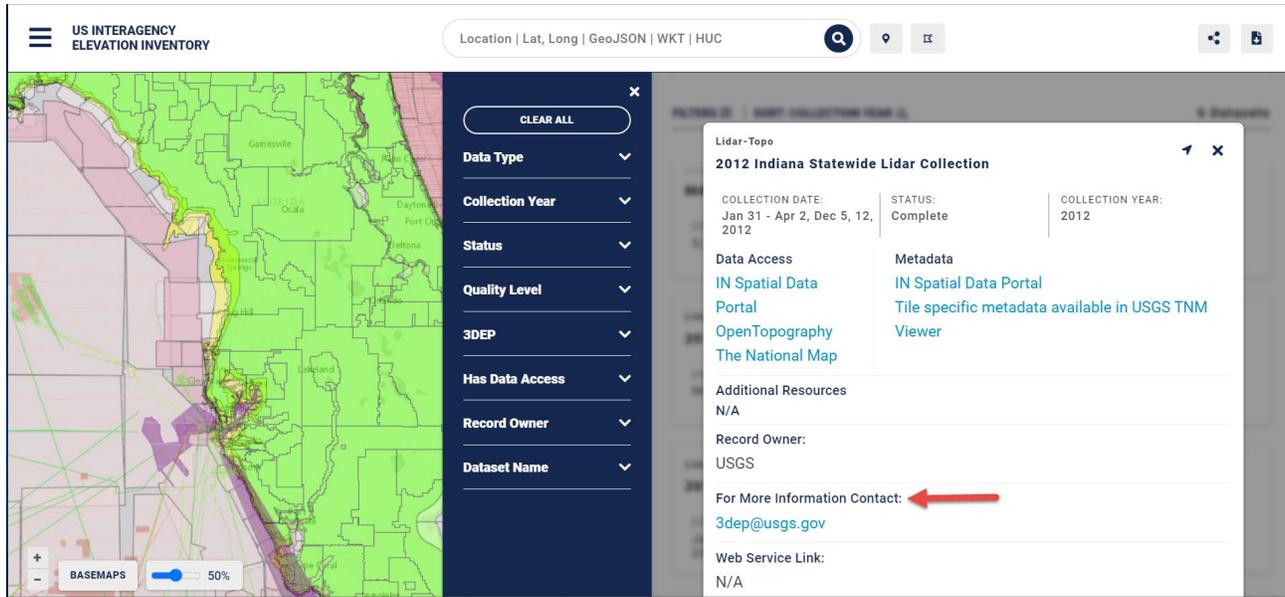
How do I access a particular data set?

If available, a direct link to access the data can be found in the field titled Data Access. If there is no direct link to the data available, an email address, telephone number, or source agency is provided in the For More Information Contact field. Some data sets will have multiple links for data access.



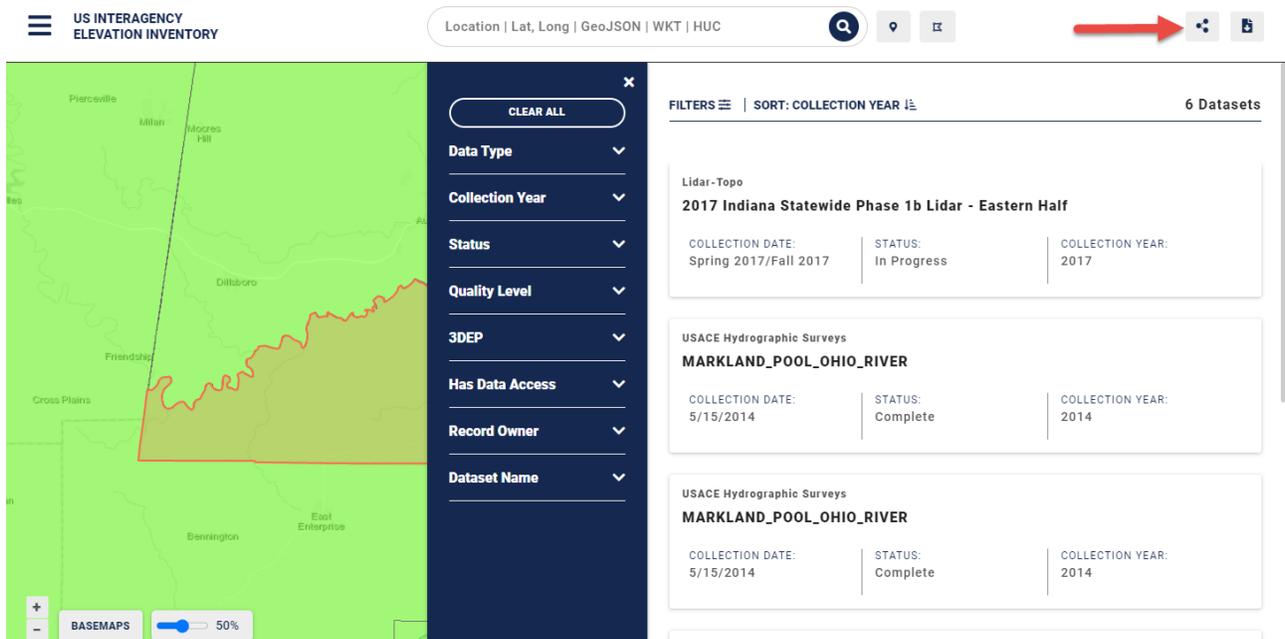
How do I find out more information about a data set?

If you need to find additional information about a particular data set, send an email to the address or call the phone number listed in the For More Information Contact field.



How do I share the results of my search?

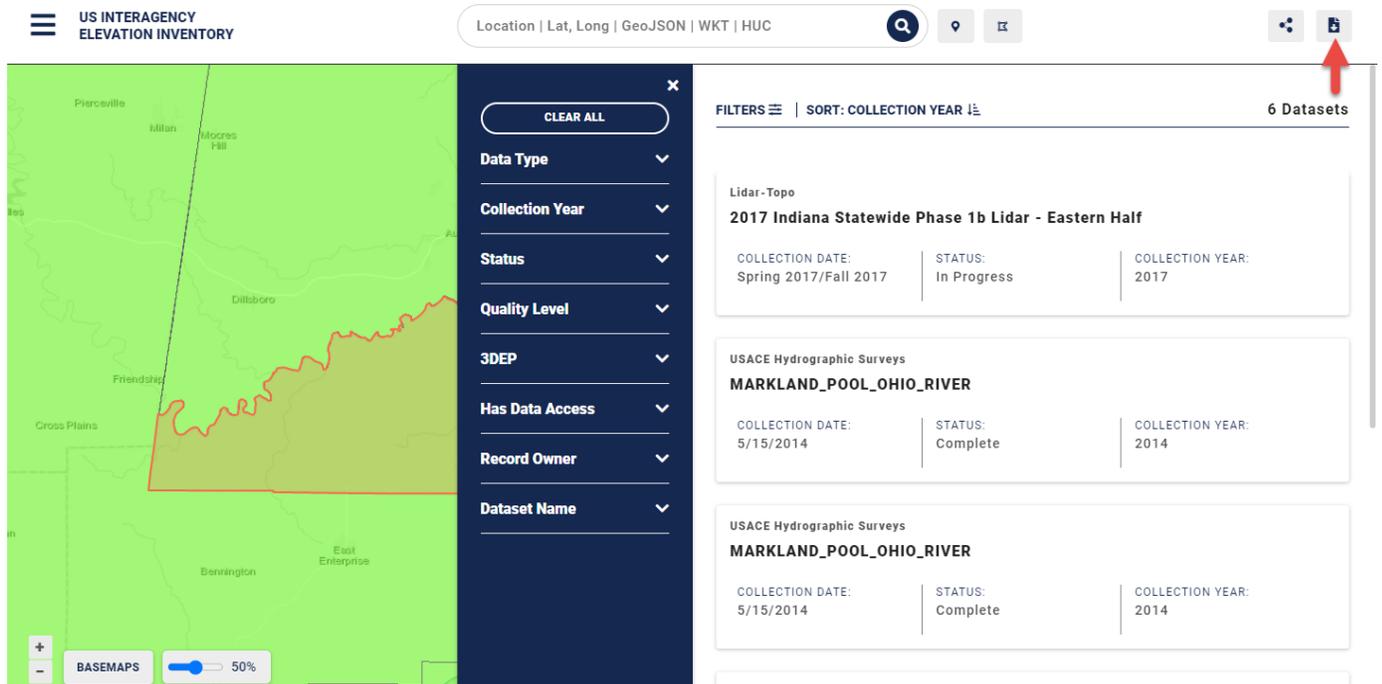
If you need to share the results of your search, click on the Share button in the upper right of the viewer to copy a link that will display the map and data list results of your search.



Can I access or download the information that is displayed in the inventory?

Yes, there are two ways that the inventory information can be accessed. Note that this does **not** download the elevation data itself.

- Download the topographic, topobathy, and bathymetric lidar, IfSAR, and other bathy survey data set footprints and attribute information in ESRI geodatabase and Open Geospatial Consortium GeoPackage formats by clicking on the Download button in the upper-right corner of the viewer. A link to download the data is also provided on the viewer splash page.



- Access the map services that the inventory uses to display the information. Links to these services are provided on the viewer home page.
 - United States Interagency Elevation Inventory Service
 - Topographic, topobathy, and bathymetric lidar, IfSAR, other Bathy Surveys
<https://coast.noaa.gov/arcgis/rest/services/USInteragencyElevationInventory/USIEIv2/MapServer>
 - National Centers for Environmental Information Services
 - NOAA Hydrographic Surveys
https://gis.ngdc.noaa.gov/arcgis/rest/services/web_mercator/nos_hydro_dynamic/MapServer
 - Multibeam Bathymetry
https://gis.ngdc.noaa.gov/arcgis/rest/services/web_mercator/multibeam_dynamic/MapServer
 - Trackline Bathymetry
https://gis.ngdc.noaa.gov/arcgis/rest/services/web_mercator/trackline_combined_dynamic/MapServer
 - U.S. Army Corps of Engineers Service

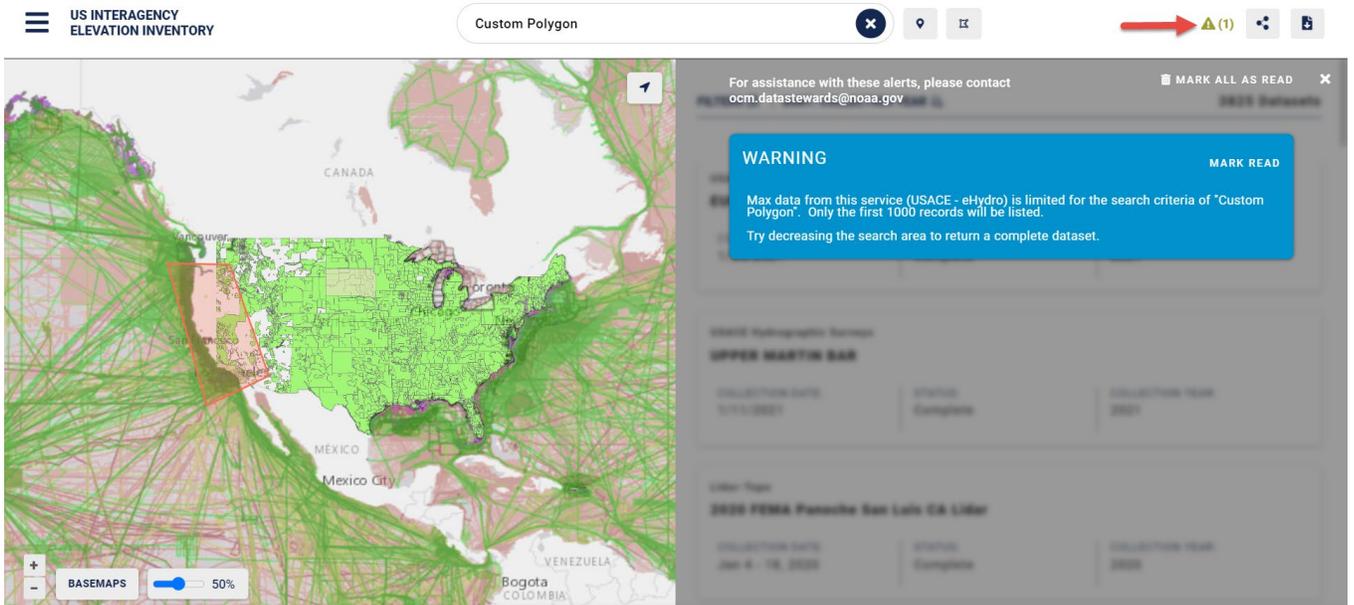
- Hydrographic Surveys
https://services7.arcgis.com/n1YM8pTrFmm7L4hs/arcgis/rest/services/eHydro_Survey_Data/FeatureServer

What are the errors and warnings listed at the top of viewer?

The errors and warnings that are listed in the upper-right corner of the viewer let you know if there may be issues that affect the results of your search. You can click the Mark Read text to remove the warnings from the screen. These are the errors and warnings and when they occur:

- Potential Errors
 - Search locator suggestion errors:
This error displays when there is an issue retrieving search “suggestions” from online geocoder services for the user’s entered search string.
 - Search geocode errors:
This error displays when there is an issue retrieving polygons/points for the user’s selected locator “suggestion” value.
 - Data service query errors:
This error displays when there is an issue retrieving attribute data from a service for search results list and the selected data set details view. This usually indicates that the data service is unavailable.
 - Data service map display errors:
This error displays when there is an issue retrieving a polygon/geometry from a service for the selected data set details view. This usually indicates that the data service is unavailable.
- Potential Warnings
 - Max data from this service is limited for the search criteria
This warning displays when your search area results exceed the max transfer limit for data services that set a maximum number of records that can be returned from a query. (This is set to 1,000 features by default for “typical” Esri services, including the National Centers for Environmental Information and USACE-managed services. The Office for Coastal Management-managed data service currently has a customized max transfer limit of 4,000 records.)

To resolve the warning, decrease the size of your search area or zoom in closer.



I know about a data set that is publicly available but not included in the inventory. Can it be added to the inventory?

Please contact the NOAA Office for Coastal Management (coastal.info@noaa.gov) so that this data set can be included.