NOVA SCOTIA
DATA LOCATOR ELEVATION EXPLORER
USER'S GUIDE

Table of Contents

Overview

The DataLocator – Elevation Explorer is a mapping application developed to provide an easy way to discover and download LIDAR data from the Province of Nova Scotia.

The data projection of the map and downloadable data is NAD83(CSRS98) / UTM Zone 20N.

Questions and/or comments about the DataLocator – Elevation Explorer may be submitted directly by clicking the *Feedback* link.

Responsiveness

The DataLocator – Elevation Explorer is now supported in desktop and mobile settings. When in mobile, the application has been optimized for both portrait and landscape orientations. The left panel, containing the *Search*, *Layer List*, *Selection Results*, *Legend* and *Downloads* widgets, is only visible when in desktop. When in mobile, these widgets will be modular and appear over the map.

Screen Overview

The image below shows the main components of the DataLocator – Elevation Explorer and identifies the key functions and features available to the user.
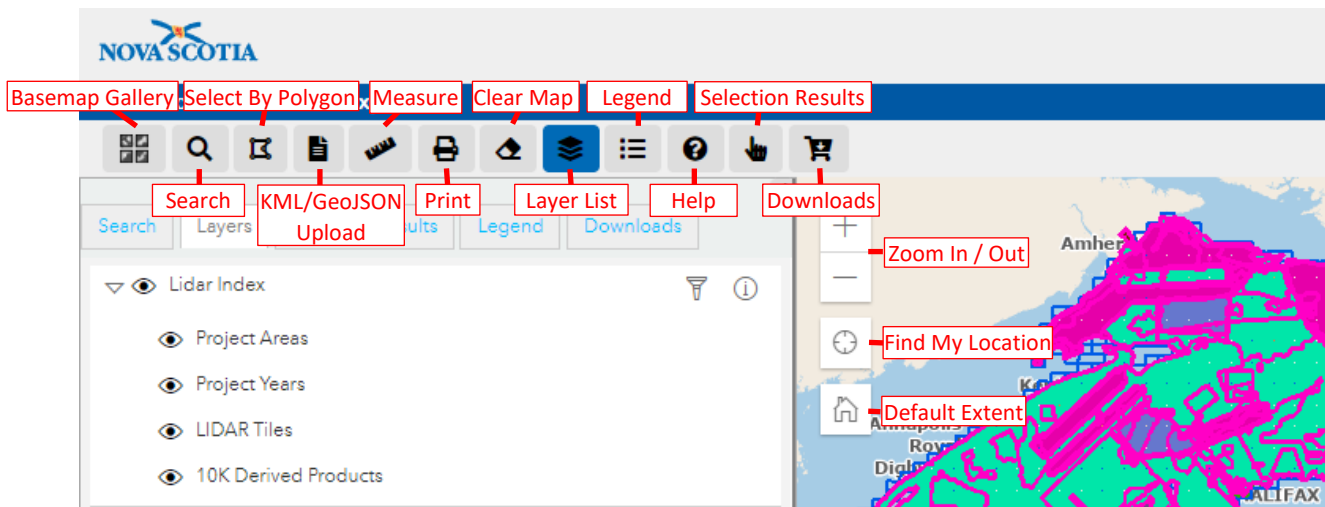
Mobile Screen Overview

This image shows the main components of the DataLocator while in mobile mode. Within the *More Options* button are the buttons for the *Basemap Gallery*, *Legend*, *Print*, *Measure*, *Clear Map*, *Help*, *KML/GeoJSON Upload* and all links in the footer.
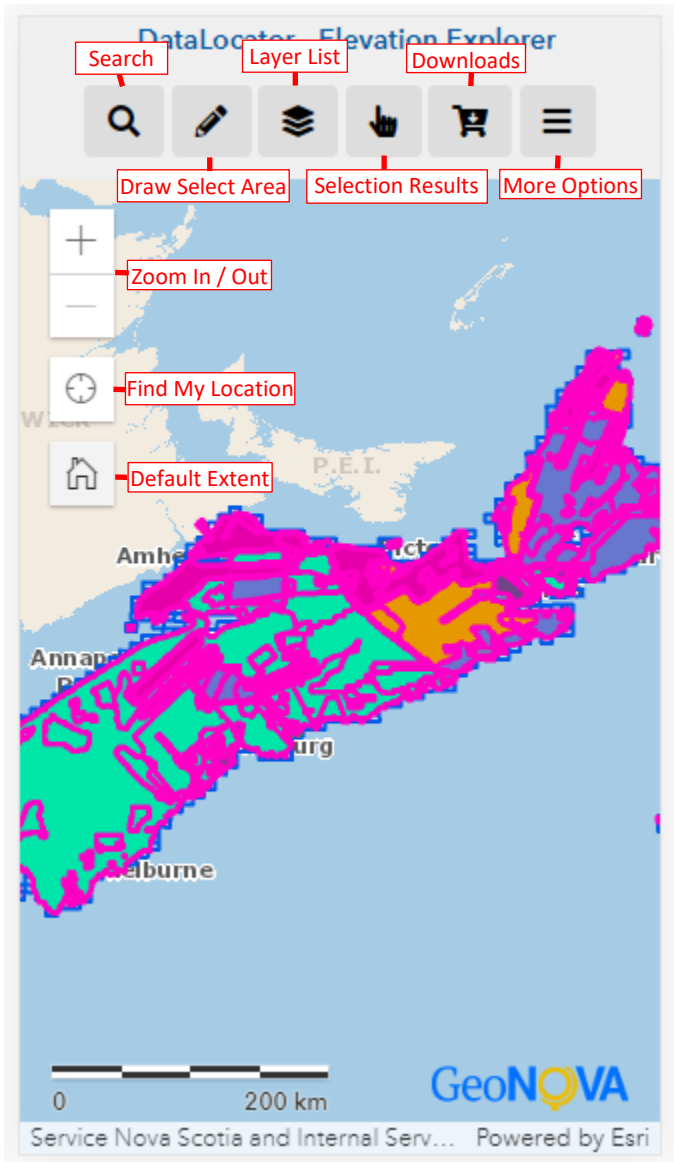
Navigation

Zoom In/Out will incrementally zoom the map in or out with each click.

Find My Location will place a marker pin on the map at the user's current location. This functionality takes advantage of HTML5 Geolocation. When connected to the internet this feature will use the network to determine the location. When connected to a cellular network, it will use the GPS receiver on the device to determine the location. The accuracy of the location varies based on the browser, device, and network.

Default Extent returns the map to its original extent, a full, centred, map of Nova Scotia.

On Screen Navigation

Clicking the *Zoom To* in a popup window, or on the 📍 button in the *Selection Results* widget, will zoom to and centre the item on the map.

Navigation Short Cuts

Desktop:

To pan the map: Click and hold the left mouse button and drag the map to a new location.

Zoom In: Shift + Click – Drag This allows the user to draw a box, which will become the new extent.

Zoom Out: Ctrl + Shift + Click – Drag This allows the user to draw a box and zoom out.

Mouse Wheel: Zooms in and out.

Mobile:

To pan the map: Put a finger on the map and drag to a new location.

Zoom In: Put two fingers on the map and pinch in.

Zoom Out: Put two fingers on the map and pinch out.

Layer Information

Layer Name	Description
Lidar Index	Map Service displaying the indexes for Nova Scotia LIDAR coverage and LIDAR derived products.
Project Areas	Index showing LIDAR project areas for data maintained by the province.
Project Years	Index showing LIDAR acquisition areas labeled by year.
LIDAR Tiles	Index of LIDAR 1km x 1km tiles along with associated tile information/metadata.
10K Derived Products	Index of LIDAR derived products in 1:10,000 map sheet windows along with associated derived product information/metadata.
Property	This map service displays the Nova Scotia Property Records Database (NSPRD) property boundaries and limited attribution.
NSPRD.Property	NSPRD Property.
Delimiter Boundaries	This map service contains NSTDB Delimiter features such as Game Management areas, National Historic Sites, First Nations, Military Reserves, and Parks and Protected Areas. Provincial, County, and Municipal boundaries are not included in this layer as they are part of the NSTDB basemap map service.
Game Management Areas	Game Management Areas.
National Historic Sites	National Historic Sites
First Nations	First Nations
Military Reserves	Military Reserves
Parks and Protected Areas	Parks and Protected Areas
Hillshade	Map Service displaying the hillshades from LIDAR derived DEM's.
10K Orthos	Map Service of the most current ISD Colour 1:10000 Orthophoto maps that cover the province of N.S.
Photo_Date	Orthophoto layer in colour.

Application Tools

Specialized widgets are available along the top of the application.

Change Basemap

 This widget allows the user to choose between various basemaps.

 Topo Roads: Roads basemap map service of the Nova Scotia Topographic Database (NSTDB). (Default)

 Topo Colour: Colour basemap map service of the Nova Scotia Topographic Database (NSTDB).

 Topo Grey: Greyscale basemap map service of the Nova Scotia Topographic Database (NSTDB).

Select By Polygon

 The *Select By Polygon* widget allows the user to draw an area to select tiles of data. Once selected, selected tiles appear in the *Selected Results* widget, where they can be added to the *Downloads* cart.

Upon opening the widget, select the option to draw either a polygon, rectangle, or circle.

Search

 The *Search* widget allows the user to search for various types of data.

 First, select a type of data to search for. The options are *Placename*, *Civic Address*, *Coordinate Location*, *Index*, and *PID*.

Placename Search: Allows the user to input a placename to locate (example: James Lake). Upon typing, a dropdown of suggestions will appear in a drop-down menu. Upon selecting an option by either clicking on it or by using the arrow and enter keys, the map will zoom to and centre at the selected placename.

Civic Address Search: Allows the user to input a civic address to locate (example: 160 Willow St, Amherst, Town of Amherst, Cumberland County). Upon typing, a drop-down menu of suggestions will appear. Upon selecting an option by either clicking on it or by using the arrow and enter keys, the map will zoom and centre at the selected civic address.

Search for an area of interest by:
Civic Address

Civic Address Search

Clear

Coordinate Location Search: Allows the user to input a pair of coordinate values to locate. The user must select which coordinate type to search for; X/Y (NAD 83 UTM 20N), Decimal Degrees (WGS84), or Degrees Minutes Seconds (WGS84).

Search for an area of interest by:
Coordinate Location

Coordinate Type:
X/Y (NAD 83 UTM 20N)

X (Easting):
Y (Northing):

Clear   Zoom to Location

Index Search: Allows the user to search from the *Lidar Index* layer, for a specific feature of either the *LIDAR Tiles* or *10K Derived Products* sublayers. Enter the desired index tile number or sheet number. Upon clicking *Search* or pressing the enter key, the map will zoom and centre at the appropriate feature.

Search for an area of interest by:
Index

LIDAR Tiles Search
Search by index tile number / sheet number

Clear   Search

PID Search: Allows the user to input a PID (Parcel Id) to locate (example: 25384173). Upon pressing the *Search* button, the map will zoom and centre at the selected parcel. If the *Property* layer is not visible, a disclaimer will be shown first, and if *Accept* is chosen, the layer will become visible.

Search for an area of interest by:
PID

PID Search

Search the property layer by PID and zoom to the location. *Note, the property layer is turned off by default. Please turn it on in the Layers list to view the property polygons.

Search   Clear

KML/GeoJSON Upload

The *KML/GeoJSON* tool allows the user to select or drag and drop a KML or GeoJSON file containing point, polyline, or polygon geometry. The geometry will be drawn on the map, and the map will zoom and centre to the geometry extent. Click Select to select all intersecting of visible LIDAR Tiles and 10K Derived Products and add them to the *Selection Results* widget. Click Clear to remove the KML/GeoJSON graphics. Note that the max file size is 25MB.
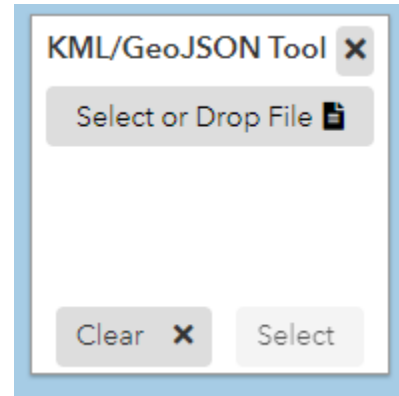
Measure

The *Measure* widget allows the user to draw on the map to measure distances and areas.

Upon opening the widget, a dialog appears allowing the user to select either distance or area. Distance is selected by default.

Distance: Draw a line by placing two or more points on the map. Double-click to stop drawing the line. The distance will be displayed in the dialog box. The units can be chosen from the drop-down menu.
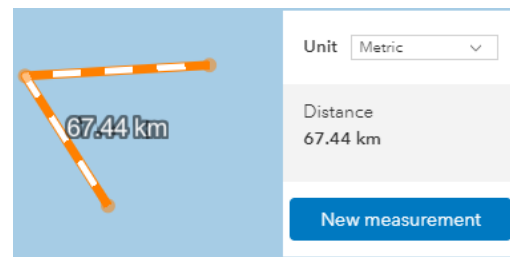
Area: Draw a polygon by placing three or more points on the map. Double-click to stop drawing the polygon. The area and perimeter will be displayed in the dialog box. The units can be chosen from the drop-down menu.
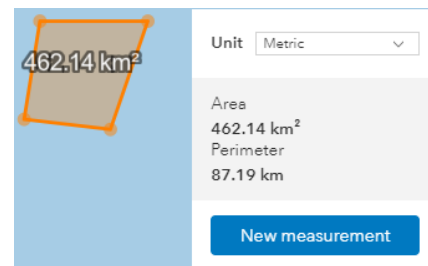
Coordinate Viewer: By selecting *XY* on the drop-down menu, results will be displayed in WGS 84 (Decimal Degrees). By selecting *BASEMAP*, results will be displayed in NAD 83 UTM 20 N (Northing and Easting).
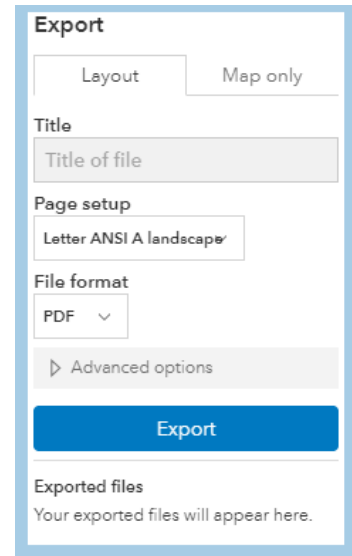
By clicking on the button on the right, capture mode can be toggled. When this is enabled, the user can select a point on the map and it will be saved – by clicking on the saved coordinates, the *Copy* button appears. When clicked, the *Copy* button will copy the coordinates to the clipboard.

Close: This will close any active measure tools.

Print

The *Print* widget allows the user to export the current map view to an easily accessible format. The file name, format, and page orientation can also be set. Through *Advanced options*, additional options such as scale, author, copyright, DPI, and legend visibility can be set. Once satisfied with the map extent and settings, click *Export*. Exported documents will appear at the bottom of the widget for download.

Export

| Layout | Map only |

Title

Title of file

Page setup

Letter ANSI A landscape

File format

PDF ∨

▷ Advanced options

Export

Exported files
Your exported files will appear here.

Clear Map

The *Clear Map* button will clear any selection overlay on top of the map view, as well as any graphic features drawn from KML/GeoJSON files.

Legend

The *Legend* widget describes what each symbol/colour on the map represents.

Some layers visibilities are scale dependent and will only be visible if you are zoomed in far enough. The legend only shows currently visible layers.
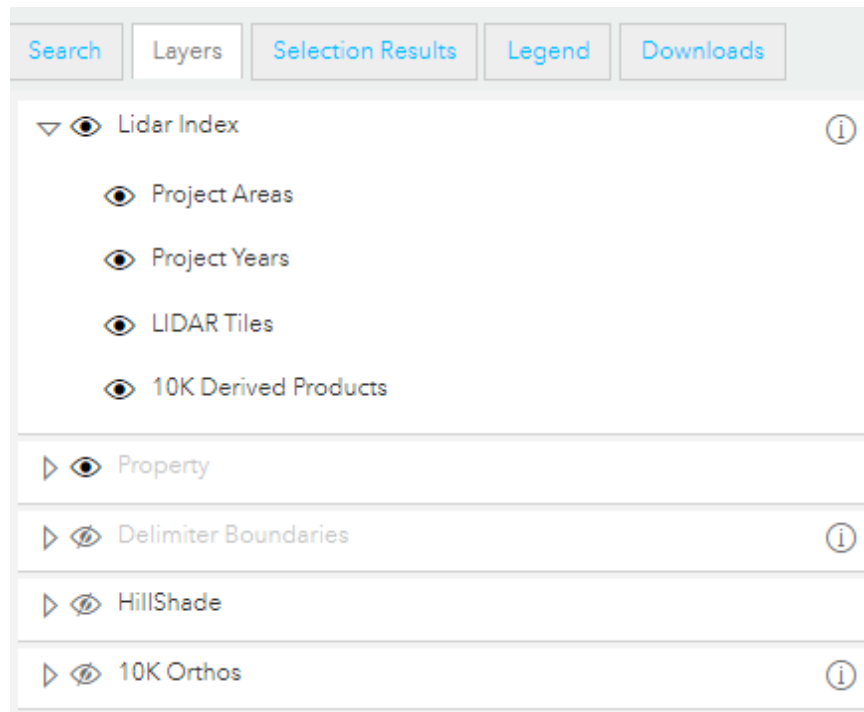
| Search | Layers | Selection Results | Legend | Downloads |

Lidar Index
Project Areas

Project Years

LIDAR Tiles
☐ 2007
☐ 2010
☐ 2011

Layer List

The layers listed in the *Layer Information* section are all available for display by clicking the eye visibility icon next to the layer the user desires to see. Individual layers, or all layers in a layer group (such as *Lidar Index*), can be turned on or off this way.

On the left are arrow buttons that collapse or expand the group of layers. Note that these do not affect the layer visibility but allow the widget contents to be simplified.

| Search | Layers | Selection Results | Legend | Downloads |

▽ ◉ Lidar Index ⓘ

    ◉ Project Areas

    ◉ Project Years

    ◉ LIDAR Tiles

    ◉ 10K Derived Products

▷ ◉ Property

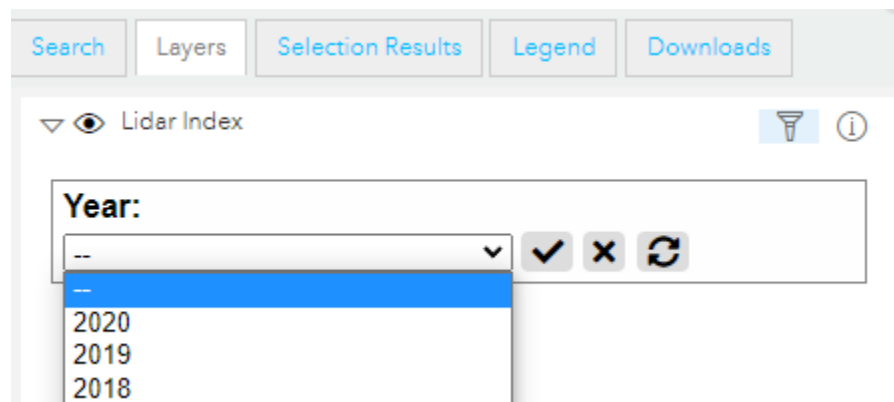▷ ◍ Delimiter Boundaries ⓘ

▷ ◍ HillShade

▷ ◍ 10K Orthos ⓘ

Some layers visibilities are scale dependent and will only be visible if you are zoomed in far enough. A layer's title will be black if visible and grey if not visible. For example, in the image above, *Lidar Index* is visible, and *Property* is not.

Clicking the ⓘ button next to a layer will open the layer information website.

Lidar Index Layer Filter

Clicking the 🜄 button along the top of the application will open the *Filter* panel.

This panel filters all Lidar Index sublayers based on year captured. The drop-down menu is populated when the filter panel is opened or when the

| Search | Layers | Selection Results | Legend | Downloads |

▽ ◉ Lidar Index   🜄 ⓘ

Year:

-- ✔ ✗ ↻

--
2020
2019
2018

Refresh button is clicked, based on Lidar Index features within the map's current extent. To view a subset of Lidar Index features, select a year, and click the *Apply* button.

To reset the filter and show all Lidar Index features on the map, click the *Clear* button.

Help

 The *Help* button opens the DataLocator – Elevation Explorer User's Guide document.

Selection Results

 The *Selection Results* widget allows the user to view and add selected results to the *Downloads* widget. Results can be added by clicking on *Lidar Index/LIDAR Tiles* or *10K Derived Products* features, by using the *Draw Select Area* widget, or by using the *KML/GeoJSON Upload* tool. Clicking *Add All to Downloads* will add all the documents to the *Downloads* widget. The *Clear All* button will remove all documents from the widget. Type in a reference ID in the *Search Selection Results* input to filter documents.

	Photo Year	Plot Format	Ref ID
⊙ 🛒	2019	CHM	1044600063400_201901_CHM.tif
⊙ 🛒	2019	DSM	1044600063400_201901_DSM.tif
⊙ 🛒	2019	INT	1044600063400_201901_INT.tif
⊙ 🛒	2019	RAW_DEM	1044600063400_201901_RAW_DEM.tif
⊙ 🛒	2019	DEM	1044600063400_201901_DEM.tif
⊙ 🛒	2019	HILL	1044600063400_201901_HILL.tif

Showing 6 results

Clicking the ⊙ button will zoom to and centre the map to the tile.

Clicking the 🛒 button will add the associated document to the *Downloads* widget.

The number of selected items will appear in red next to the *Selection Results* widget button.

Downloads

 The *Downloads* widget allows the user to download the desired data. Data can only be downloaded individually due to the large file sizes.

		Photo Year	Plot Format	Ref ID
⬇ ⊙ ⊖		2019	CHM	1044600063400_201901_CHM.tif

Showing 1 result

While the *Clear All* button removes all items from the *Downloads* widget, *Clear Downloaded* removes only the items that have already been downloaded.

Clicking the ⬇ button will initiate the download of the associated file. Once initiated, the icon will change to ✓, indicating that the download has started. If the download fails, the ✓ button can be clicked for another attempt.

Clicking the ⊙ button will zoom to and centre the map to the tile.

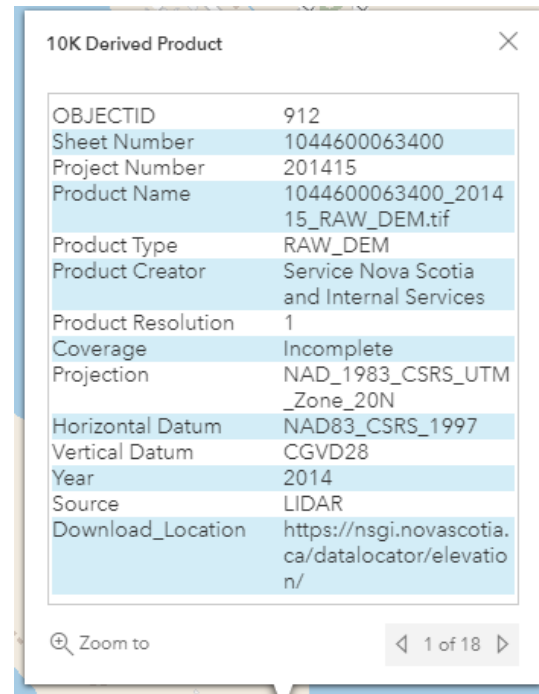Clicking the ⊖ button will remove the item from the *Downloads* widget.

The number of items that have not yet been downloaded will appear in red next to the *Downloads*

widget button.

Popups

Upon clicking on any Lidar Index feature, its popup will open, and the user can view associated metadata.

If multiple features are selected, they can be cycled through by using the arrow buttons in the bottom right corner.

The *Zoom to* button will make the map zoom to and centre at the selected feature.


10K Derived Product	✕
OBJECTID	912
Sheet Number	1044600063400
Project Number	201415
Product Name	1044600063400_2014 15_RAW_DEM.tif
Product Type	RAW_DEM
Product Creator	Service Nova Scotia and Internal Services
Product Resolution	1
Coverage	Incomplete
Projection	NAD_1983_CSRS_UTM _Zone_20N
Horizontal Datum	NAD83_CSRS_1997
Vertical Datum	CGVD28
Year	2014
Source	LIDAR
Download_Location	https://nsgi.novascotia. ca/datalocator/elevatio n/

⊕ Zoom to   ◁ 1 of 18 ▷

Raster Product Descriptions

DEM (Hydro Flattened Version)

An elevation model of regularly spaced X, Y, & Z coordinates of the bare-earth terrain, referenced to the vertical datum. The DEM is void of vegetation and manmade features. Elevation values used to generate the DEM are ground-only returns from the LIDAR sources. The DEM has been hydro flattened to produce water surfaces that appear and behave as they would in traditional topographic DEMs. Roadways over culverts remain in the surface model because they are a part of the landscape. Bridges, manmade structures above the landscape, are removed. A hydro flattened DEM is a topographic DEM and should not be confused with a hydro-enforced or hydro-conditioned DEMs, which are specialized hydrologic surfaces.
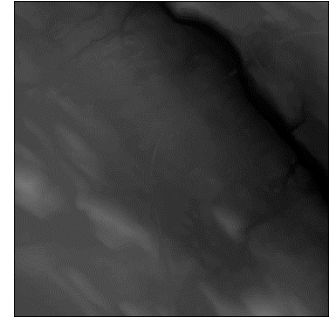
RAW DEM

A bare earth digital elevation model generated from all LIDAR sources using ground-only returns referenced to the vertical datum. No hydro flattening is performed on these datasets. Depending on the LIDAR source, bridges may or may not be removed from the RAW DEM.

Hillshades generated from the Hydro Flattened DEM vs RAW DEM demonstrate the differences between the two.
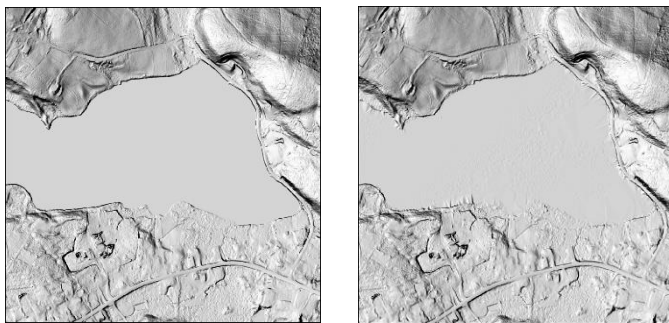
DSM

A Digital Surface Model is an elevation model providing the height of the vegetation, canopies, structures, and other elevated features above the ground, referenced to the vertical datum. The values of the DSM are constructed from the highest LIDAR return within each grid cell. Where there are no features above the ground returns, the DSM is equal to the DEM.

CHM

A Canopy Height Model is an elevation model with values representing forest canopy heights or heights of other elevated features above ground. A CHM is derived by subtracting the raw DEM from the DSM. Where there are no features above the bare-earth terrain the CHM value is 0.
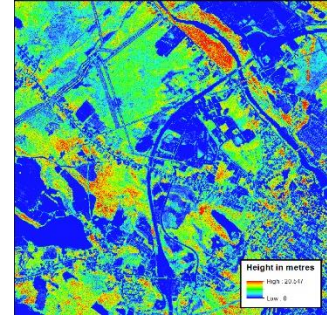

INT (INTENSITY)

An intensity image is a grey scale raster of the LIDAR intensity values. The intensity images are 16-bit rasters that range in value from 0 – 65535 representing the strength of the return LIDAR signal. Intensity images are similar in appearance to black and white aerial photos and may be used for interpretation.


HILL (HILLSHADE)

A shaded relief model of the DEM that can be used for interpretation. A light source is used to illuminate the surface simulating a 3D appearance. Shadow and light are shades of gray associated with integers ranging from 0 to 255 (black to white).
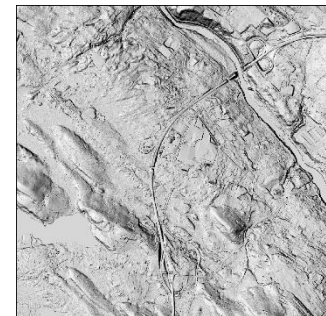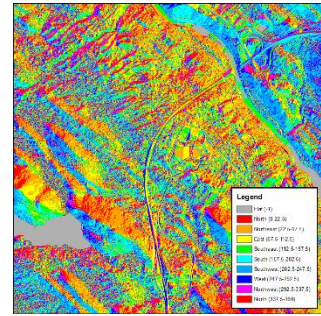

SLP (SLOPE)

The value of each cell indicates the steepness of the DEM surface measured in degrees from horizontal.
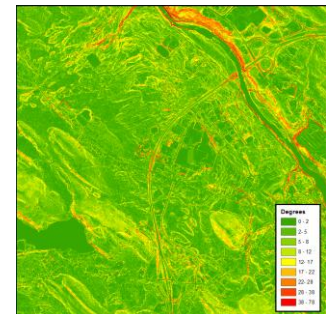
ASP (ASPECT)

The value of each cell indicates the direction the DEM's slope faces at that location. It is measured clockwise in degrees from 0 (due north) to 360 (again due north). Flat areas having no downslope direction are given a value of -1.
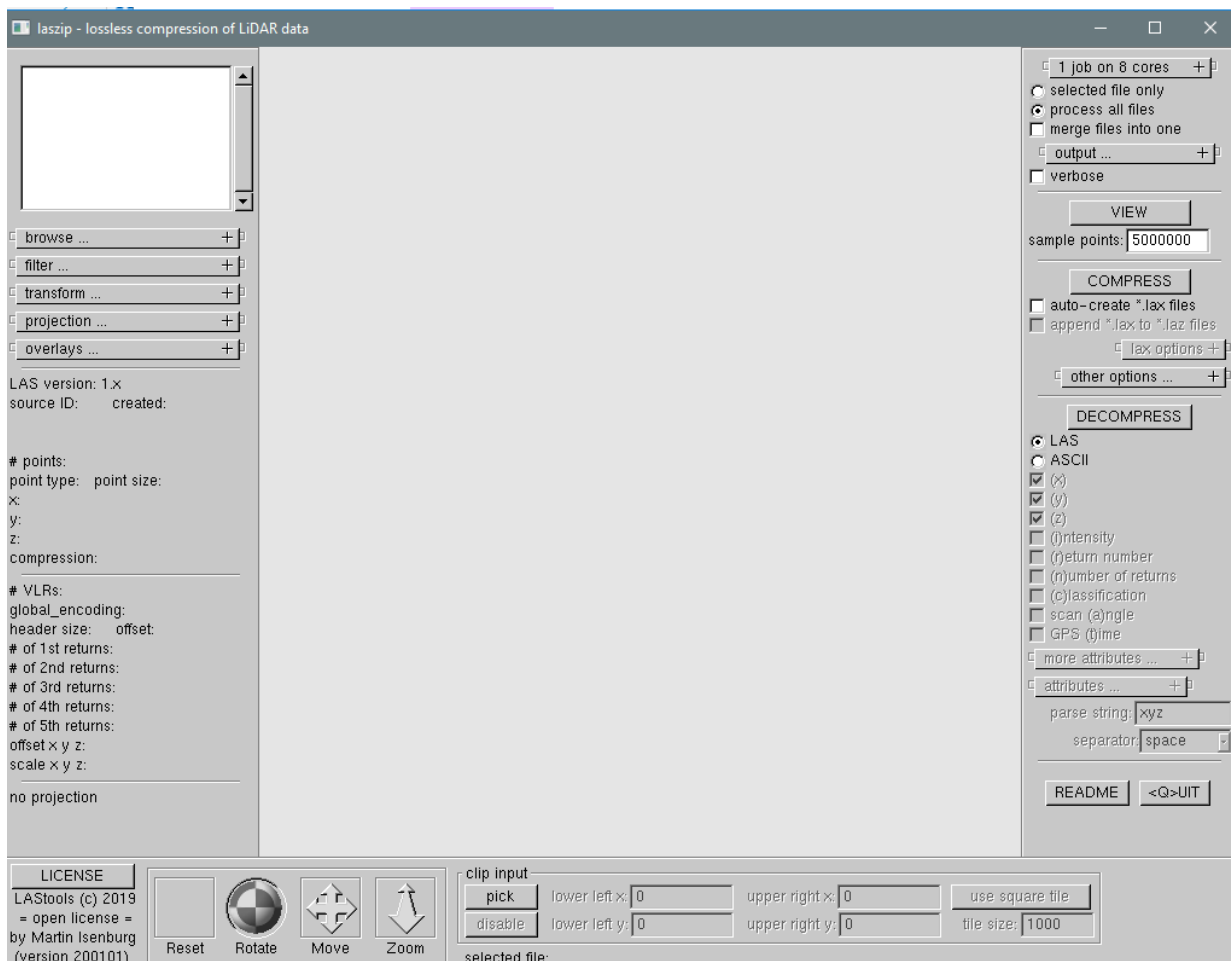
LIDAR Format and Use

LIDAR data available through the DataLocator – Elevation Explorer application is distributed in the LAZ file format. LAZ files are created by LASzip, an open-source compression library that allows for lossless compression of LIDAR point cloud data stored in LAS files. LAZ files compressed with LASzip can be reduced to 20% or less of the original LAS file size.
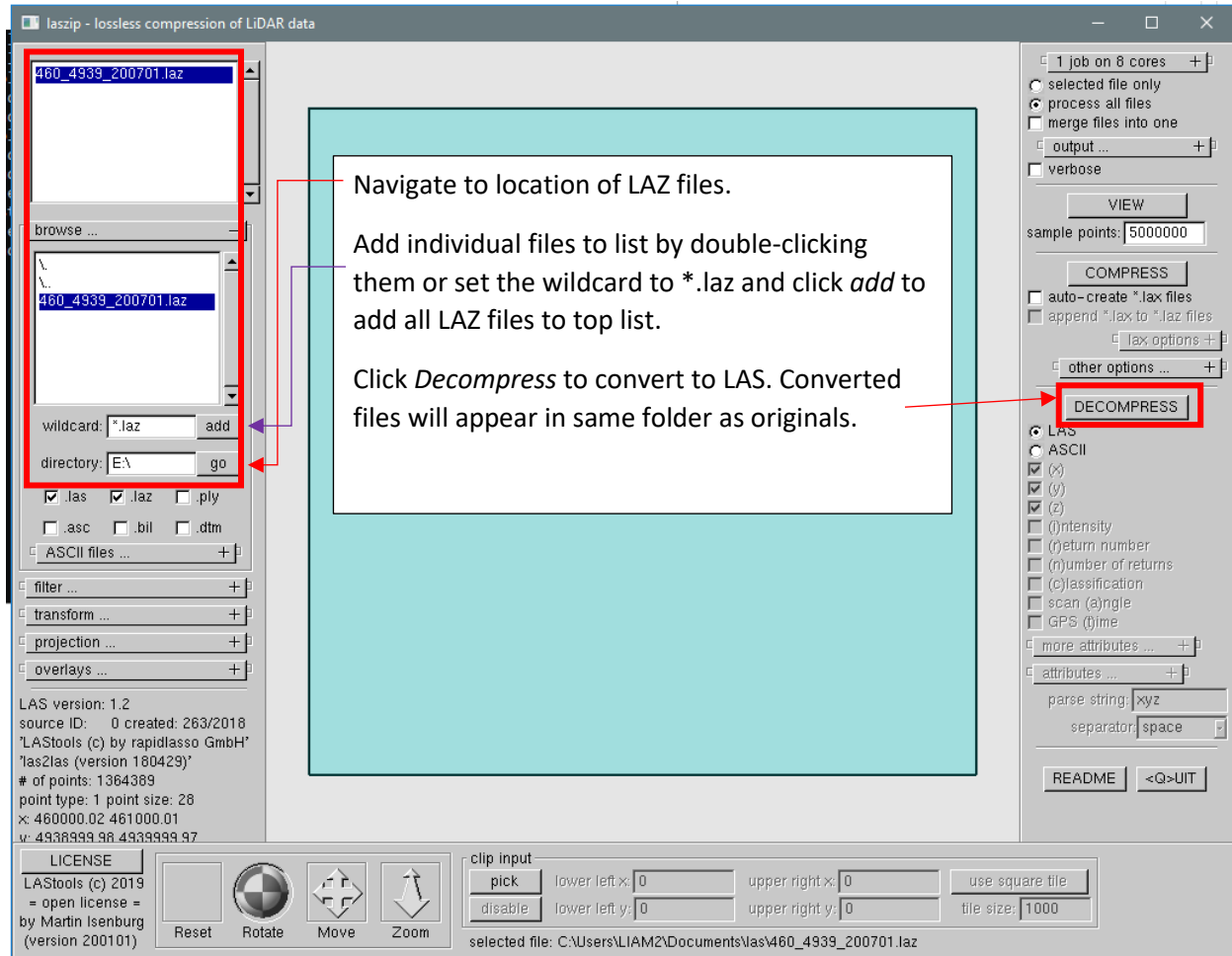
For more information on LASzip, please visit https://laszip.org.

Most programs designed to use LIDAR data support the LAZ format so the LAZ files may be used directly by the application. If needed, the LAZ files can be decompressed to the original LAS file by downloading the LASzip utility for Windows here: https://lastools.github.io/download/laszip.exe.

LASzip.exe is a stand-alone application that can be run in the command line or a GUI application. To run as a GUI application, double-click on laszip.exe and the following interface will be displayed.

GUI Instructions

Navigate to location of LAZ files.

Add individual files to list by double-clicking them or set the wildcard to *.laz and click *add* to add all LAZ files to top list.

Click *Decompress* to convert to LAS. Converted files will appear in same folder as originals.

Command Line Instructions

Open command prompt and navigate to the folder laszip.exe resides in. To decompress all LAZ files in a directory, enter the following:

```
laszip -i [path to LAZ directory]/*.laz
```

A convenient way to run LASzip quickly is with window batch files. In a text editor, save the above command to a .bat file. Double-click on the bat file and the command will automatically execute.

To compress all LAS files in a directory, enter the following:

```
laszip -i [path to LAS directory]/*.las
```

For more help on how to run LASzip see
https://www.cs.unc.edu/~isenburg/lastools/download/laszip_README.txt.