TLS MONITORING SITE ONBOARDING PROCEDURE for DATA PROCESSING – Updated June 2025

This procedure has been developed with USGS as the definitive means to acquire TLS monitoring data processing services through USGS EROS. Please complete the steps in the order below. Email the TLS LiDAR Monitoring Coordinator at TLSCoordinator@newmexicoconsortium.org for assistance.

* NOTE: You must complete approved TLS training either in person or online before you can utilize EROS services.

1. Complete Required TLS Data Collector Training either In-person or Online

- In-Person: Training must be performed by a qualified trainer (an individual that has been trained as a trainer by a member of the TLS training team).
- Online: Data Collector training can be accessed on the Wildland Fire Learning Portal. You need to create an account if you don't already have one. https://www.wildlandfirelearningportal.net/course/view.php?id=3655

2. Request Access to USGS EROS to Upload Scan data

- Send an email to the TLS Lidar Monitoring Coordinator at TLSCoordinator@newmexicoconsortium.org requesting access to upload scan data to EROS.
    a. ** NOTE: Your site must be currently monitoring or actively preparing to begin monitoring in the near future (i.e. the next field season).
- Upon receipt of your request, the TLS Coordinator will send an excel form requesting the following required information. Please return this form promptly.
    a. Site name - this is your site's NWCG unit identifier ("US" deleted) Ex: FLLSR. Unit identifiers can be found at: https://unitid.nifc.gov/ords/prd/f?p=116:101:1465508413831:::RP:
    b. Data collector(s).
    c. Certify that all Data Collectors have completed training by:
        1. Providing the name and contact information of the qualified individual TLS monitoring trainer, or
        2. Providing the date online training was completed.
    d. Site point of contact.
    e. Data manager.
    f. Scanner type (e.g. BLK Gen1, BLK Gen2).
    g. .CSV file of plot locations in WKT format (explained in A below and can be sent at a later date)

A. Formatting Plot Locations

- Before scans can be processed, EROS requires the geometric locations of plots in Well Known Text (WKT). *If the plots are already in the EROS system, you can skip this step. Check with your data manager.*
- **WKT can be calculated via QGIS** (*instructions below in Calculating Plot Location in Well Known Text using QGIS*).
  - **This cannot be done in ArcGIS Pro.** While WKT can be calculated in arcpy, we currently cannot offer support for this.
- Plot locations must be provided in CSV format.
- The delimiter of the CSV file should be a comma. The CSV file should have three columns: (1) 5-letter site, (2) 4-digit plot number, and (3) geom. The values of the geom column must be in WKT (Well Known Text) format point (Longitude Latitude) (in EPSG:3857 projection).
  - Example: FLLSR,0023,POINT (-9254100.5891 3422146.5693999976)

	site	plot	geom
2	FLLSR	0023	POINT (-9254100.5891 3422146.5693999976)
3	FLLSR	2312	POINT (-9241543.7506 3434235.5293999985)
4	FLLSR	2423	POINT (-9253466.068 3419770.9924999997)
5	FLLSR	4124	POINT (-9240608.6669 3427512.3721999973)
6	FLLSR	1245	POINT (-9249636.6776 3422146.5693999976)
7			

3. Create a Globus Account - EROS only uses GLOBUS to transfer and share files. Refer to Globus Protocol on page 11.

a. Acquire a Globus account (refer to Section A - Globus Protocol).
b. Email your Globus ID email to National TLS Coordinator.
c. Once your account has been created, EROS personnel must give permission to that account before you can upload scans.

Do not begin to upload scans until you have received acknowledgement from the TLS LiDAR Monitoring Coordinator that your Globus account is approved AND that EROS has uploaded your plot locations.

4. Upload Scans

- Scans must be uploaded to Globus for transfer to EROS (refer to Section B - Globus Protocol below).
- **All scans must follow the standard naming convention** (refer to the TLS Methods Manual for full description).
    - **Site_name (5 letters) "_" plot_number (4 digits) "_" date(YYYYMMDD) '_' scanner_id (1 or 2) + '.ptx'**
        - **Example: FLSMR_0030_20210704_1.ptx**
- The EROS team has a script that validates if a scan is following all the validations before it gets moved to the GeoEngine input directory for processing.
    - Any errors that occur during validation will generate an email to the site POC and TLS Lidar Coordinator identifying the error type.
    - Site POCs will work with the TLS LiDAR Coordinator to correct the error and determine if the scan will need to be re-uploaded.

5. Accessing Scan data

- Scan data can be accessed via the IntELiMon viewer at https://dmsdata.cr.usgs.gov/lidar-monitoring/viewer

The IntELiMon Viewer serves as a dashboard for users to access the processed TLS data, metadata, and the results of the processing and analyses. Quality control/quality assurance and metadata management is built into the data workflow.

Calculating Plot Location in Well Known Text (WKT) using QGIS

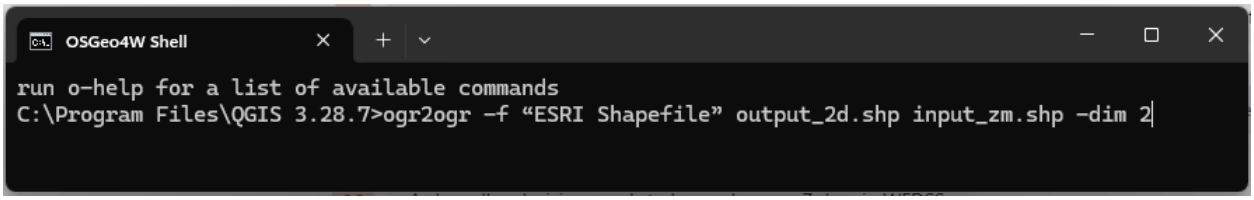
**** This cannot be done in ArcGIS Pro**

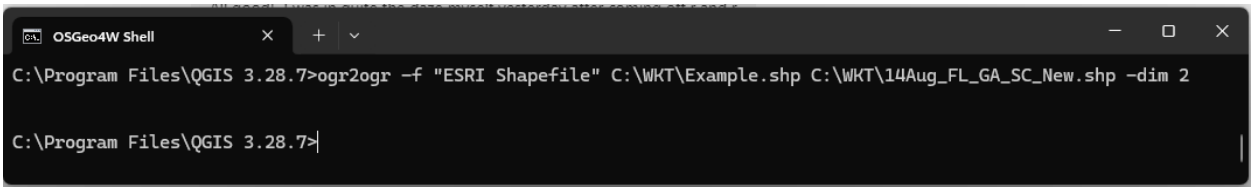
QGIS is a free and open-source software and can be downloaded here at no cost. If you are a federal employee, you may be able to download through your agency (for example FWS employees can download QGIS via FWS-APPS-TO-GO).

Shapefile must be in EPSG 3857, if not, reproject it with methods you are familiar with

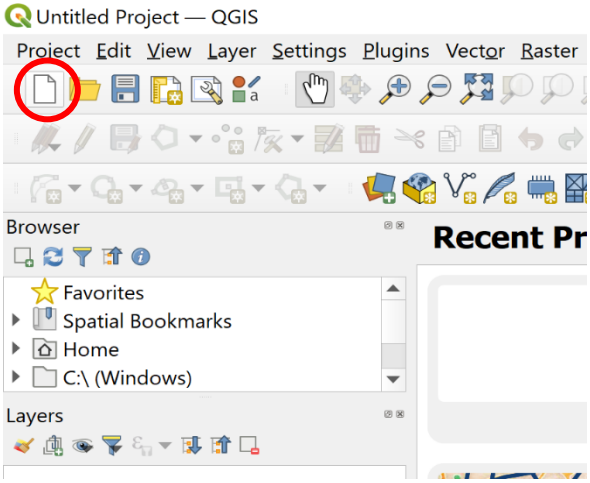
Majority of the time, when you are collecting points with a GPS, an elevation component is being recorded. This **MUST** be removed. QGIS will calculate this a POINTZ instead of the required format of POINT. The Z and the elevation component can be removed manually after calculation. However, if you have many plots (over 50) this may not be the best option. Use the following steps to remove the z component using QGIS:

- A program called OSGEO4W Shell is installed when you install QGIS. From the start menu run the program.
- In the shell type or copy the following command: ogr2ogr -f "ESRI Shapefile" output_2d.shp input_zm.shp -dim 2
    - Replace output_2d.shp with the file location and name you want to new shapefile to be created.
    - Replace input_zm.shp with the file location and name of the original file that has the z component.
    - **NOTE: Files must NOT be stored on a One Drive**
- Next, hit enter.

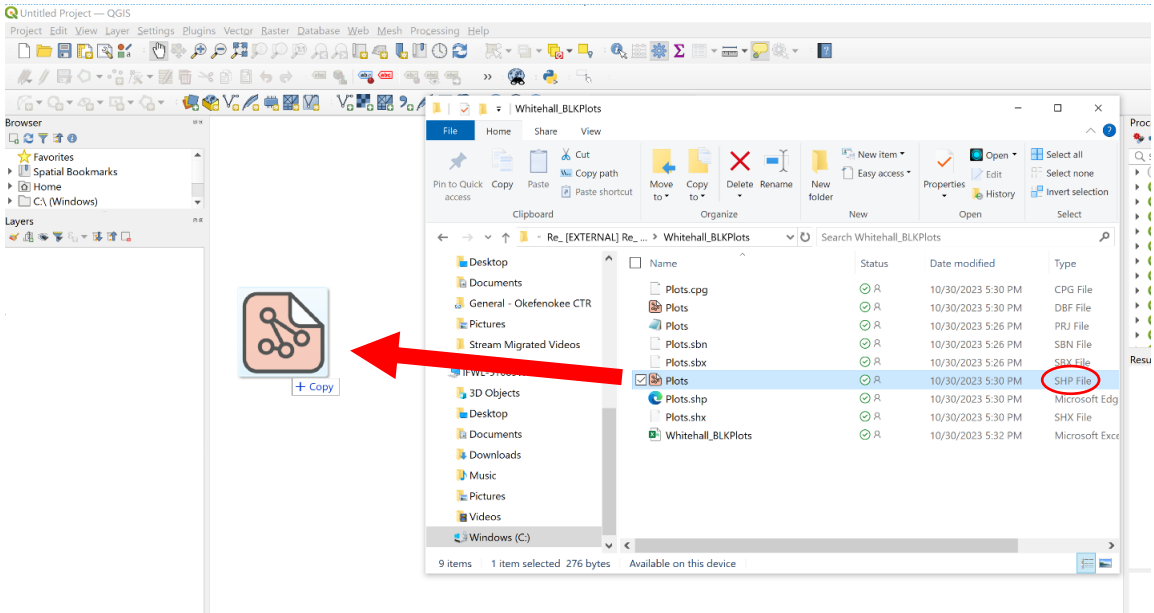




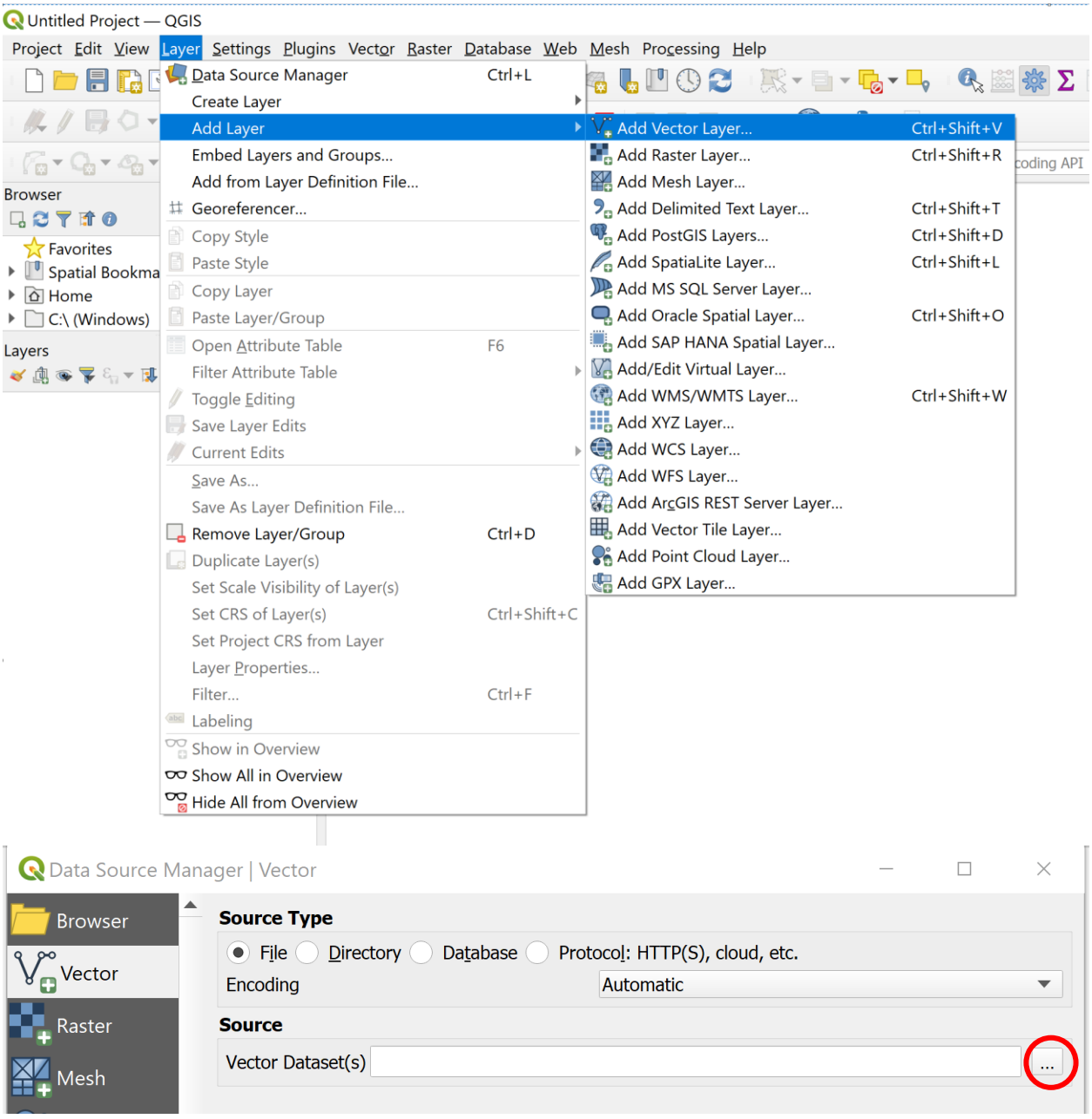
1. Open QGIS and create a new document.



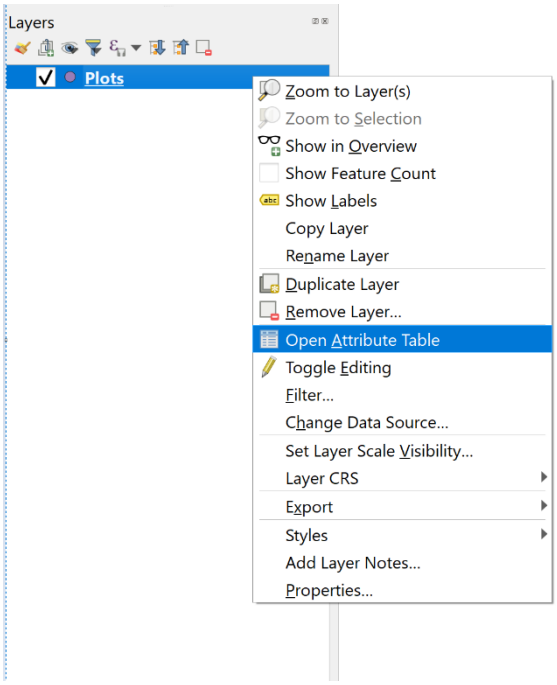
2. Add the shapefile of the TLS plots to the new document.
    a. Can be added by dragging the .shp file into QGIS window.



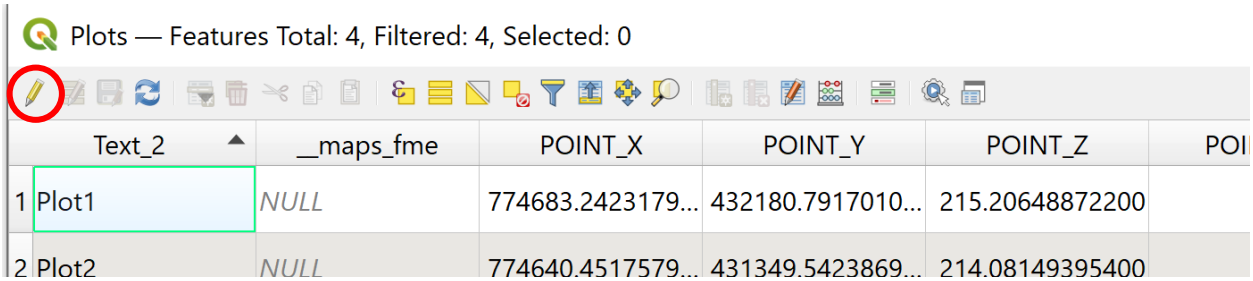
b. Add shapefile by going to Layer -> Add Layer -> Add Vector Layer -> hit the three … -> navigate to shapefile location -> hit Add



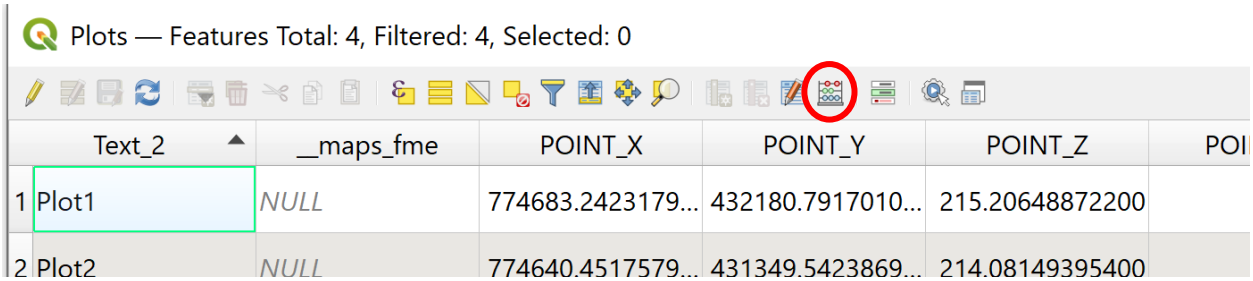
3. Right click on the shapefile in the “Layers” pane then select “Open Attribute Table”



4. Toggle editing on by clicking the pencil icon.

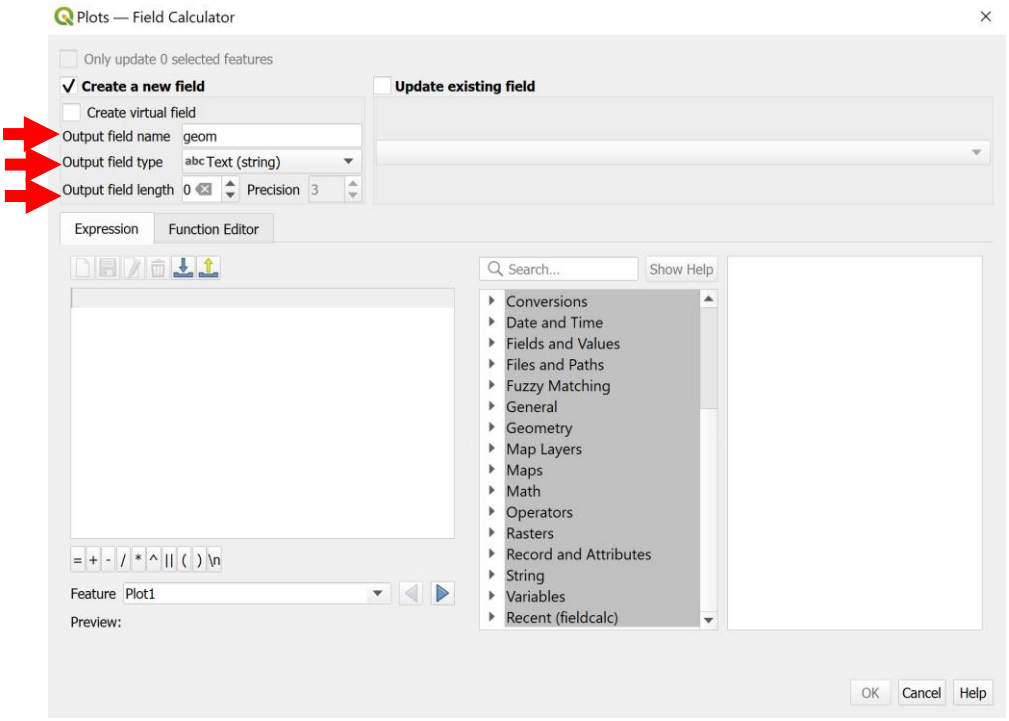


5. Open the field calculator by clicking the abacus icon.

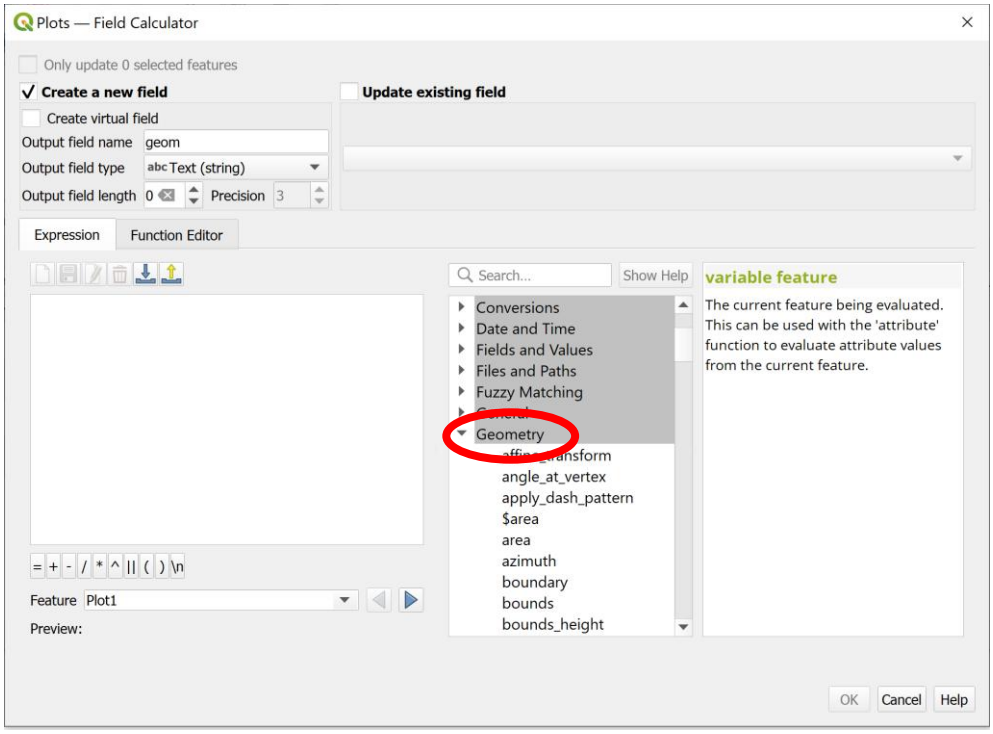


In the field calculator, fill out/change the following fields:

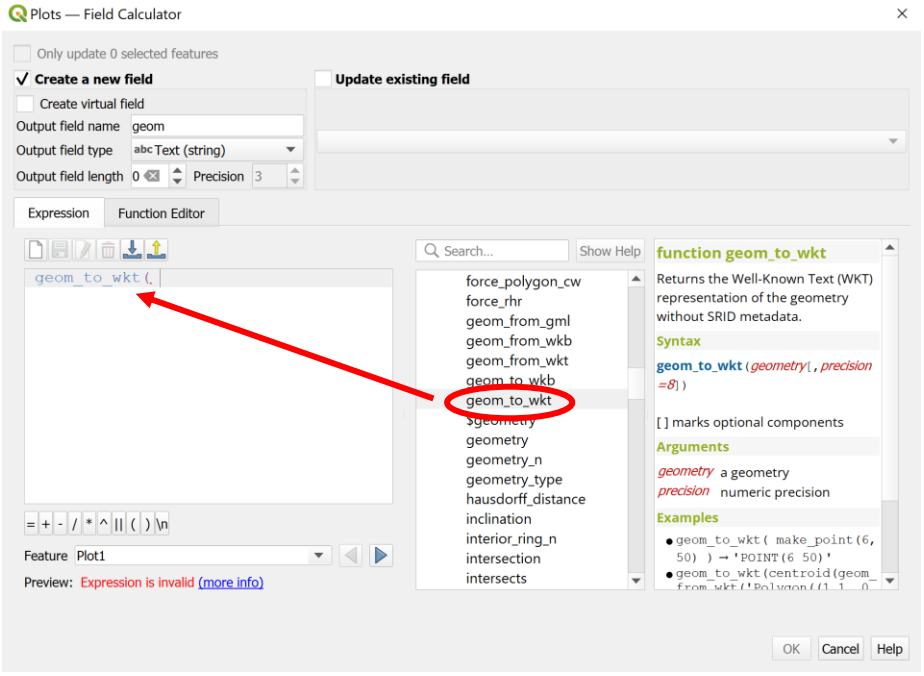
a. Output field name = geom
b. Output field type = abc Text (string)
c. Output field length = 100



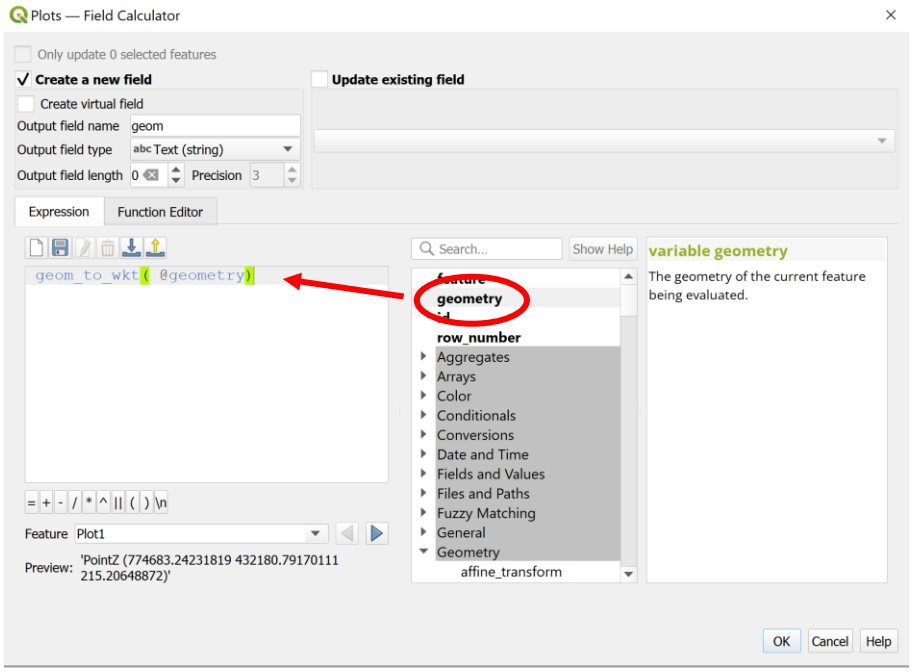
6. Expand out “Geometry”



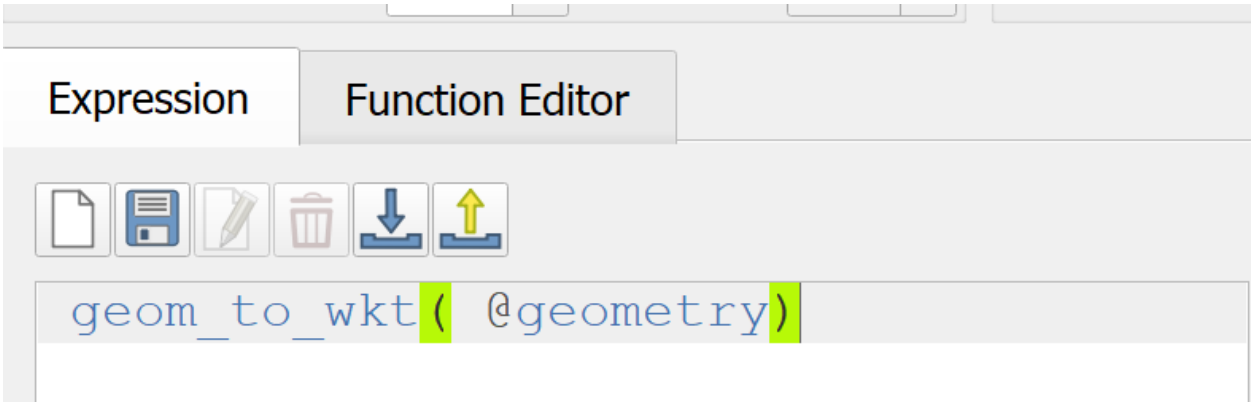
7. Scroll down to geom_to_wkt and double click it. The expression will be added to the “Expression” pane.



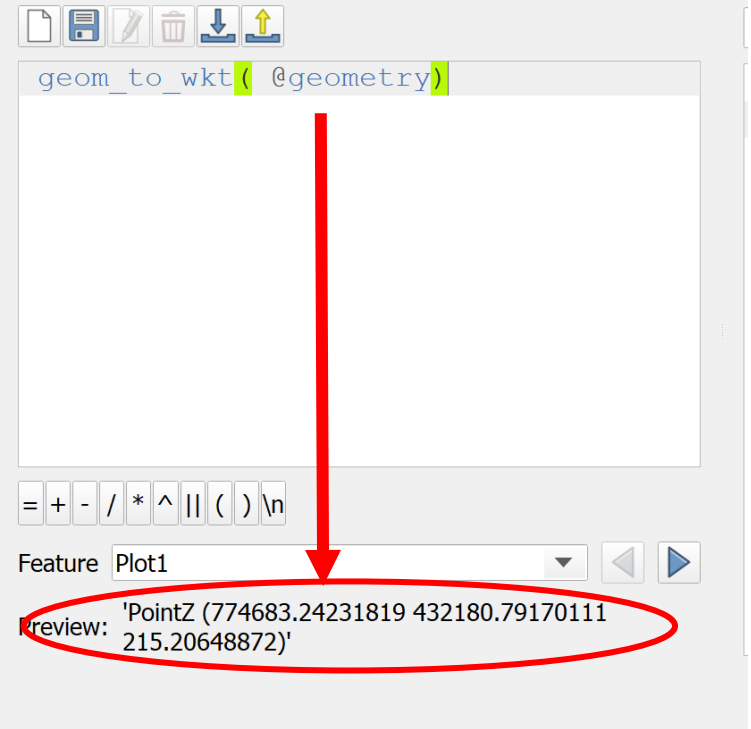
8. Scroll back up to the top and double click on “geometry”, the close the expression with the close parenthesis symbol)



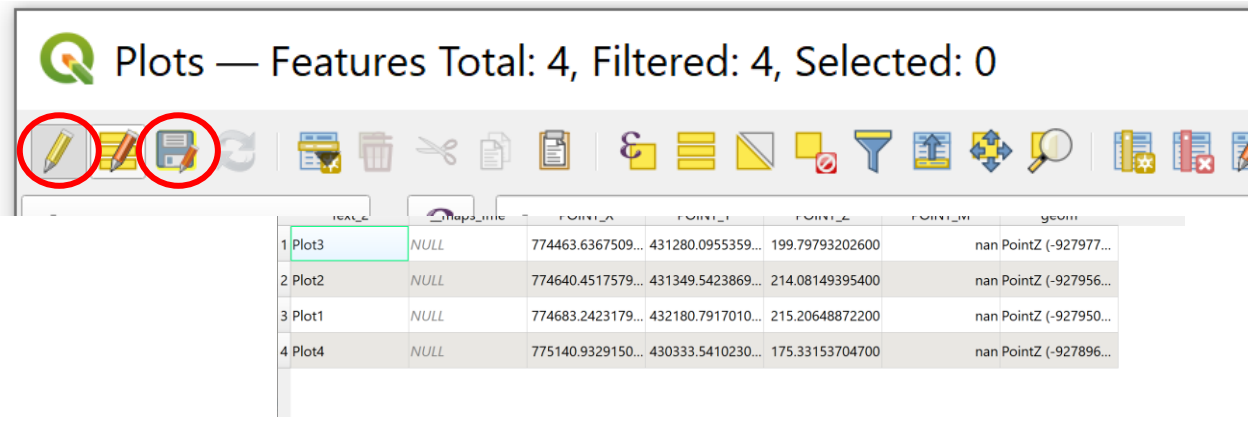
9. The expression should look like this:



10. If it is correct there will be a correctly formatted example WKT at the bottom:



11. Hit OK, the new column will appear like this:
12. Hit the save edit button then toggle off the editor.



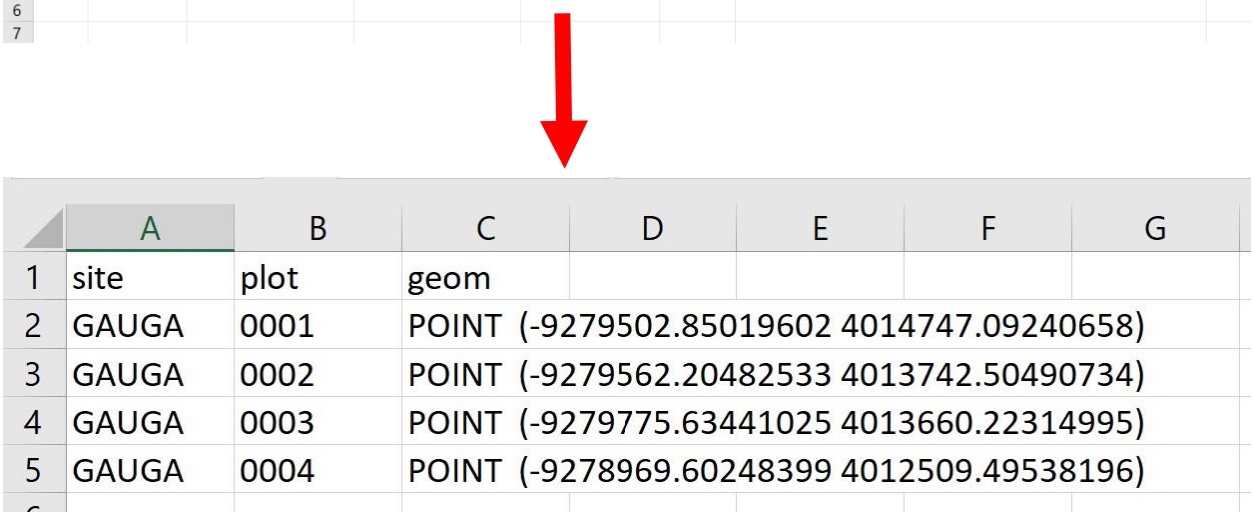
13. Close QGIS

14. Open the dbf file in excel and save a .csv.

15. Format it so there are 3 columns:

a. Site – NWCG site code
b. plot – must be 4 digits (
c. geom – only lat/long, if there is a Z, remove it

	A	B	C	D	E	F	G	H
1	Text_2	__maps_fme	POINT_X	POINT_Y	POINT_Z	POINT_M	geom	
2	Plot2		774640.45175799900	431349.54238699900	214.08149395400		PointZ (-9279562.20482533 4013742.50490734 214.08149395)	
3	Plot3		774463.63675099900	431280.09553599900	199.79793202600		PointZ (-9279775.63441025 4013660.22314995 199.79793203)	
4	Plot4		775140.93291500000	430333.54102300000	175.33153704700		PointZ (-9278969.60248399 4012509.49538196 175.33153705)	
5	Plot1		774683.24231799900	432180.79170100000	215.20648872200		PointZ (-9279502.85019602 4014747.09240658 215.20648872)	
6								
7								



	A	B	C	D	E	F	G
1	site	plot	geom				
2	GAUGA	0001	POINT (-9279502.85019602 4014747.09240658)				
3	GAUGA	0002	POINT (-9279562.20482533 4013742.50490734)				
4	GAUGA	0003	POINT (-9279775.63441025 4013660.22314995)				
5	GAUGA	0004	POINT (-9278969.60248399 4012509.49538196)				

16. Save file and close excel.

Note: Do not open in excel again. Doing so will remove any leading zeros. For example, if the plot is 0002, opening again in excel will remove the first three zeros and it will become 2. If you need to open the file again, do so in a text editor.

Globus Protocol

Overview

The Globus platform enables developers to add robust file transfer, sharing, search, and automation capabilities to research applications and services, while leveraging advanced identity management, single sign-on, and authorization capabilities.

Key Concepts

- What's a Collection?
  - A collection is a named location containing data you can access with Globus. Collections can be hosted on many kinds of systems, including campus storage, HPC clusters, laptops, Amazon S3 buckets, Google Drive, and scientific instruments.
  - When you use Globus, you don't need to know a physical location or details about storage. You only need a collection name.
  - A collection allows authorized Globus users to browse and transfer files. Collections can also be used for sharing data with others and for enabling discovery by other Globus users. Globus Connect is used to host collections.
- What's an Endpoint?
  - An endpoint is a server that hosts collections. If you want to be able to access, share, transfer, or manage data using Globus, the first step is to create an endpoint on the system where the data is (or will be) stored.
  - Globus Connect is used to create endpoints. An endpoint can be a laptop, a personal desktop system, a laboratory server, a campus data storage service, or a cloud service. As explained below, it's easy to set up your own Globus endpoint on a laptop or other personal system using Globus Connect Personal. You can use endpoints set up by others if you're authorized by the endpoint administrator or by a collection manager.
- Fire-And-Forget Data Transfer
  - After you request a file transfer, Globus takes over and does the work on your behalf. You can navigate away from the File Manager, close the browser window, and even logout. Globus will optimize the transfer for performance, monitor the transfer for completion and correctness, and recover from network errors and collection downtime.
  - The Globus service routinely achieves high availability, providing nearly uninterrupted oversight of data transfers taking place on much less reliable networks and collection hosts. When a problem is encountered part-way through the transfer, Globus resumes from the point of failure and does not retransmit all of the data specified in the original request.
  - Globus can handle extremely large data transfers, even those that don't complete within the authentication expiration period of a collection (which is controlled by the collection administrator). If your credentials expire before the transfer completes, Globus will notify you to re-authenticate on the collection, after which Globus will continue the transfer from where it was paused.

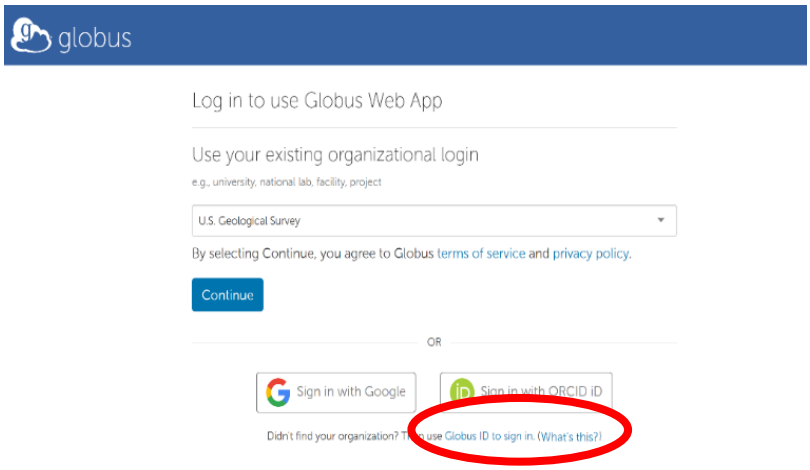
A. Making a Globus account.

1. Go to https://globus.org and click “LOG IN” in the upper righthand corner.

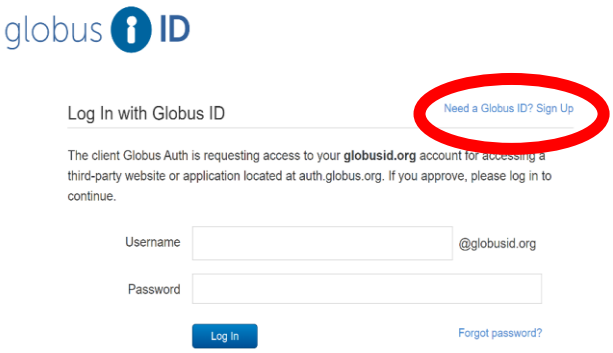
1a. If you do not have a USGS account/email, you will need to create a Globus ID sign-in. Below the sign-in options, select the “Globus ID to sign in. (What’s this?)”

h. If you do not have a USGS account/email, you will need to create a Globus ID sign-in. Below the sign-in options, select the “Globus ID to sign in. (What’s this?)”

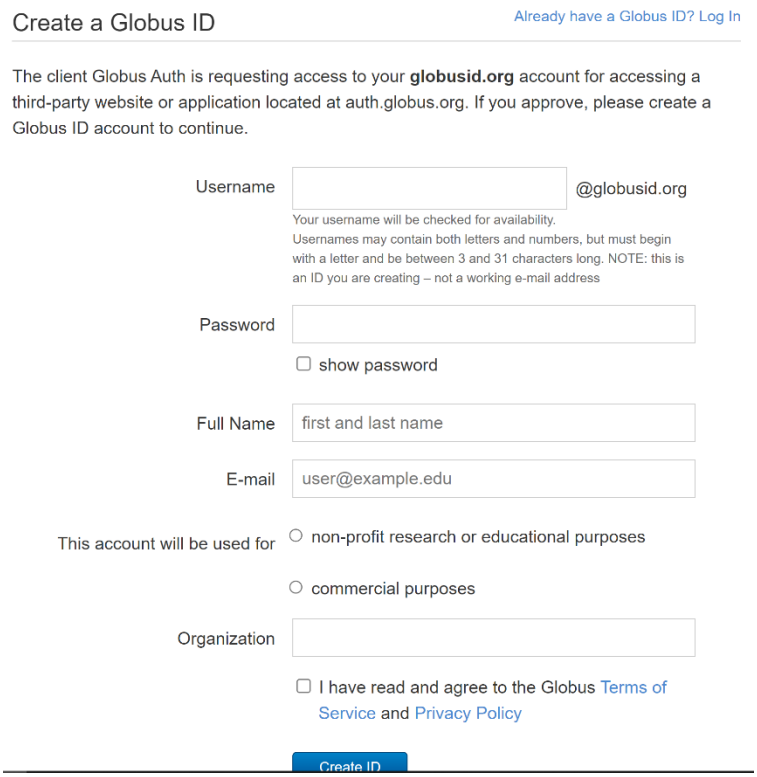
i. **NOTE: In some cases, such as with temporary personnel / interns, etc., it may be best to create a general Globus ID for your site that all personnel uploading scans will use.**



b. Click “Need a Globus ID? Sign Up”



c. Enter account information. The email addressed linked to the GlobusID will receive emails once files have been successfully uploaded.



2. Once the account has been made, EROS personnel must give permissions to that account.

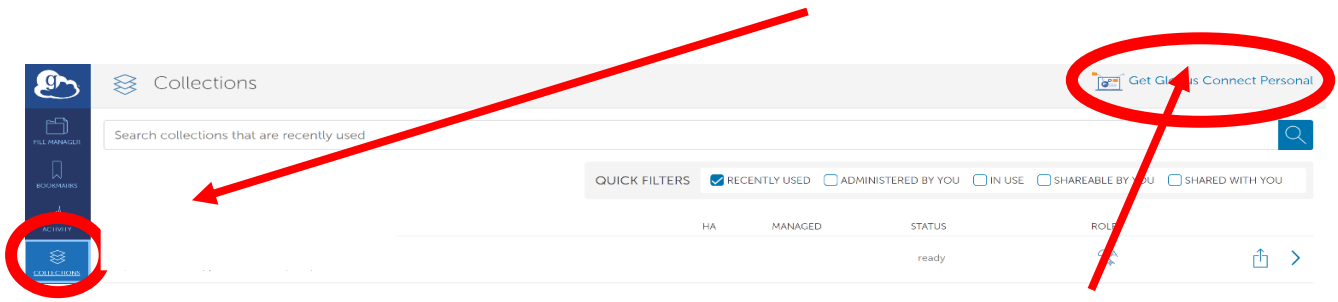
- Email your Globus ID to the TLS Coordinator, TLSCoordinator@newmexicoconsortium.org.

3. Install Globus Connect

- ***Forest Service employees****:* Globus Connect is pre-approved in the USFS CEC Certified Software List. Once downloaded, right-click on the install package and click “Run as Administrator”. Once complete, skip to step “4. Establish computer as endpoint.”

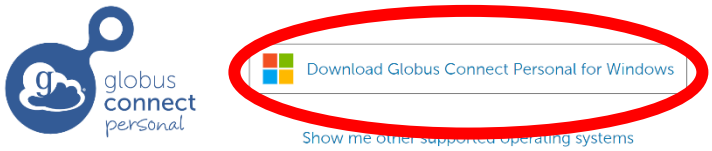
- **Non-Forest Service Employees:**

a. Login to your Globus account. On lefthand panel, select “COLLECTIONS”.

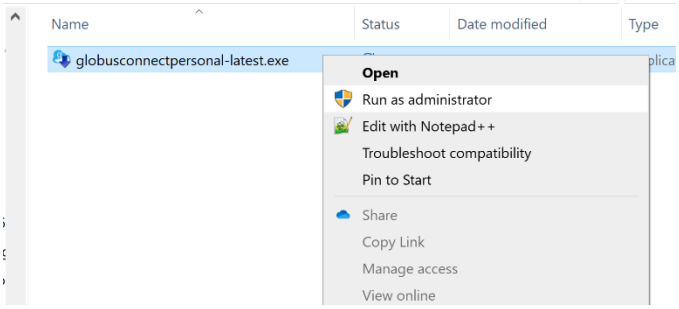


b. In upper, righthand corner of screen, click “Get Globus Connect Personal”.

c. Click “Download Globus Connect Personal for Windows” and install Globus Windows client. This software allows you to establish your laptop as the Globus endpoint to transfer data.



NOTE: When installing, your IT personnel may have to “Run as Administrator” for a successful install.

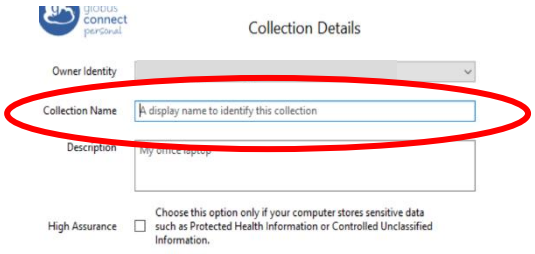


4. Establish computer as endpoint. **NOTE: You cannot be connected to the VPN when making your computer an endpoint.**

****NOTE: A computer can only have one endpoint.** Your site may be best suited to establishing one computer as *the* computer that will be used to upload scans using a general Globus ID (created in Step 1 above).

Once the installation is complete, the software will prompt you through establishing your computer as an endpoint. This will allow the easy file transfer from your documents to the EROS database.

a. Enter a “Collection Name” which is the name for your computer to distinguish in Globus. It does not matter what this name is, as it is for your use only, however, you cannot change it.



b. If the connection was successfully made, a window will appear with the confirmation message.

“Collection Name”

B. Uploading data to EROS

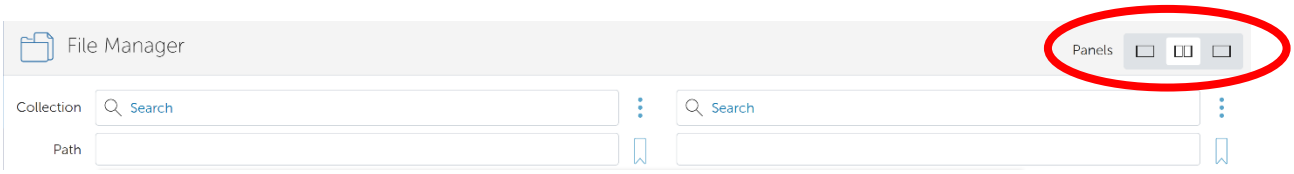
Before you begin, have all the files to be uploaded organized and in an easy-to-find folder/location. These files <u>MUST</u> be .ptx and follow the TLS program nomenclature:

LLLLL_####_YYYYMMDD_#

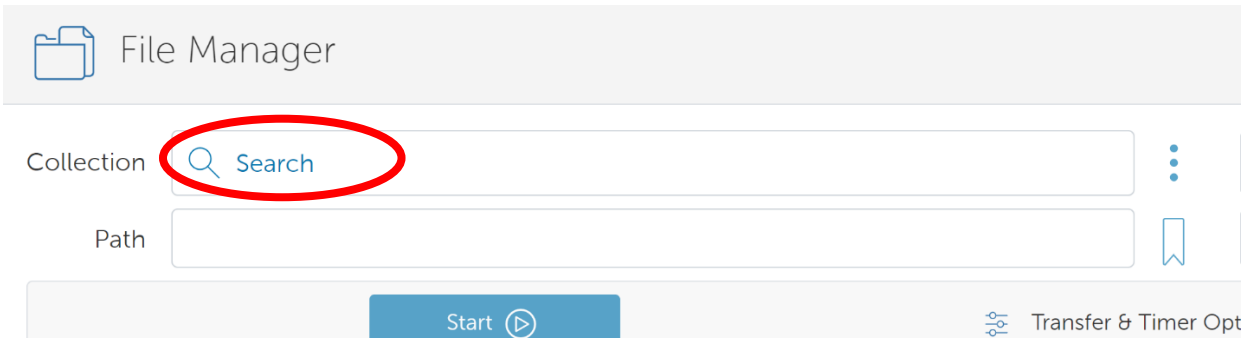
LLLLL= site code ####= plot number(must be 4 digits, e.g. 0002, 0165) YYYYMMDD= date of scan #= laser identification number (BLK360 Gen 1= 1; BLK360 Gen2 = 2)

1. Login to Globus.

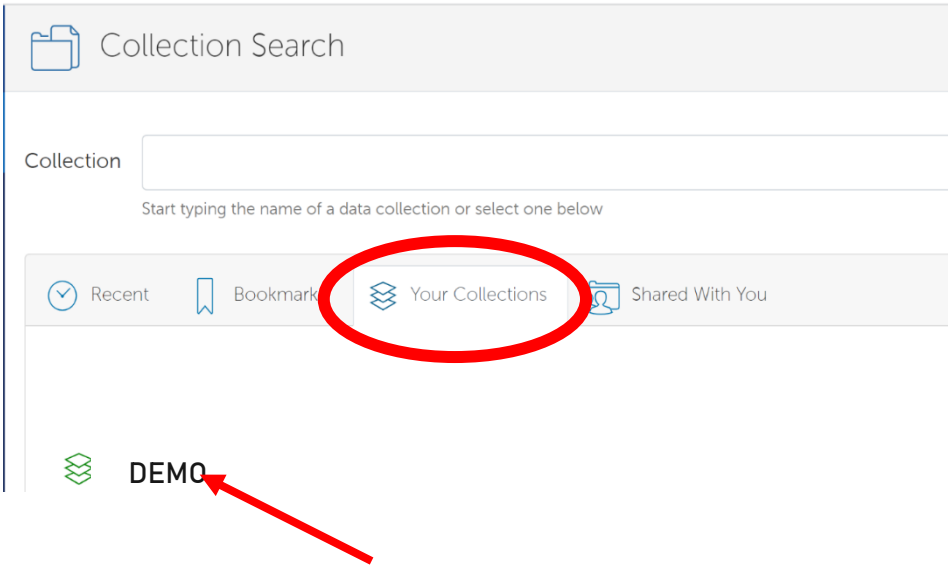
2. Select the view to see two panels simultaneously.



3. To link to your data, beside “Collection” click into the “Search” bar.

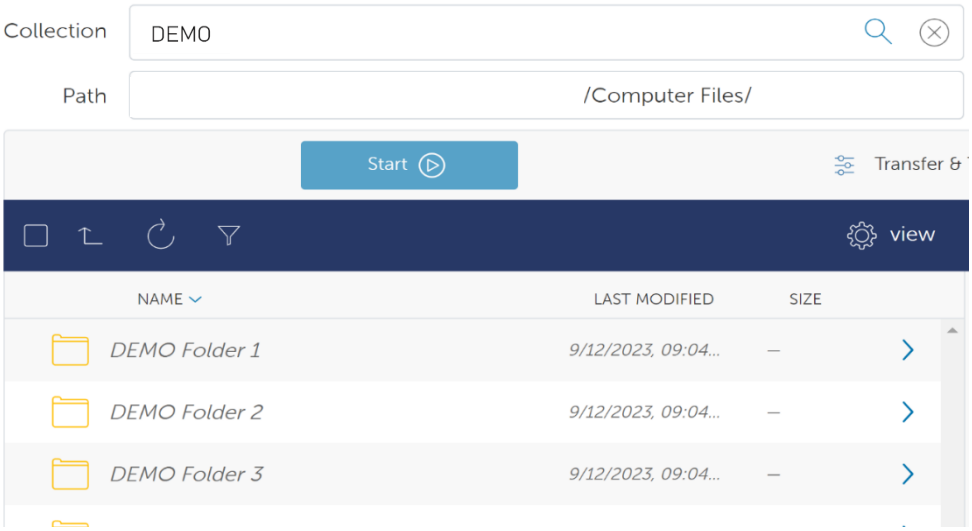


4. If your endpoint was successfully established, you will find your system by selecting, “Your Collections”. It will be listed as whatever you named it during the *Globus Connect Personal* set-up.

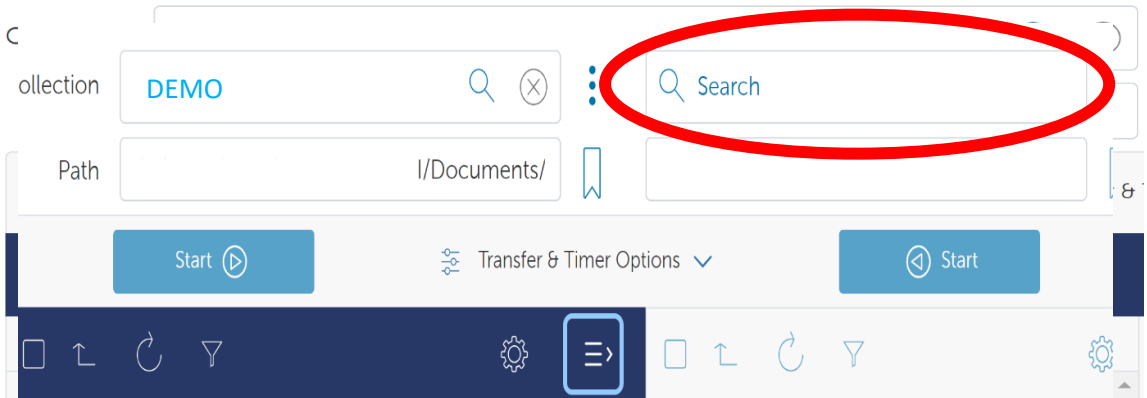


5. Select your computer's Collection.

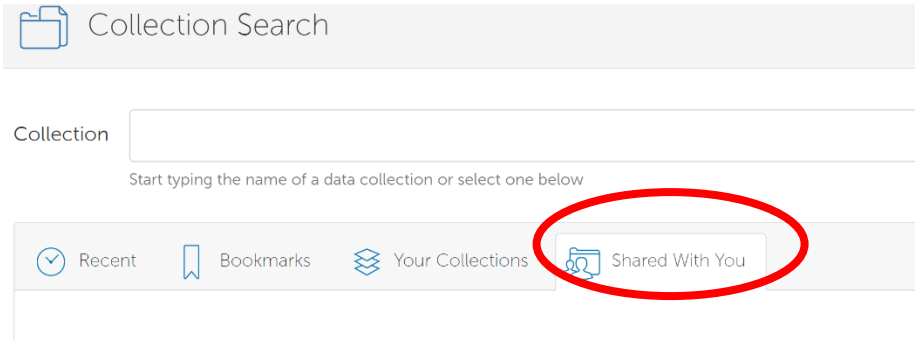
6. All the files on your computer should now appear in the lefthand window of the File Manager page.



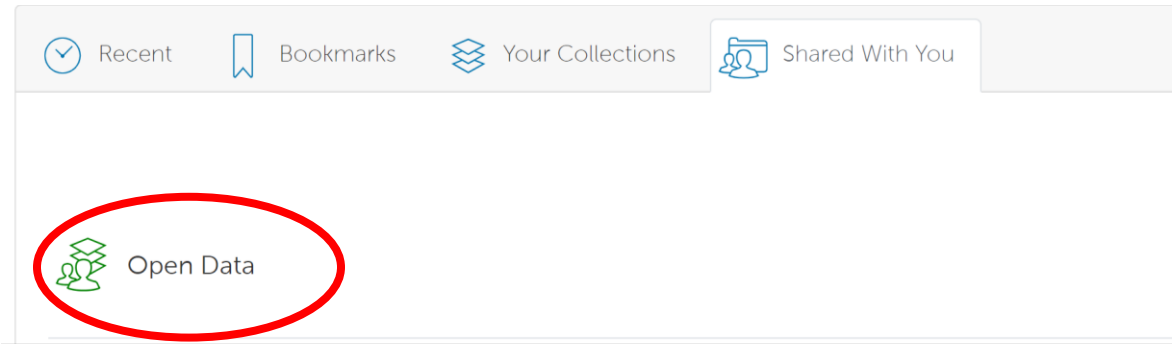
7. To link to the IntELiMon collection to upload, on the other side of the screen, click into the remaining "Search" bar



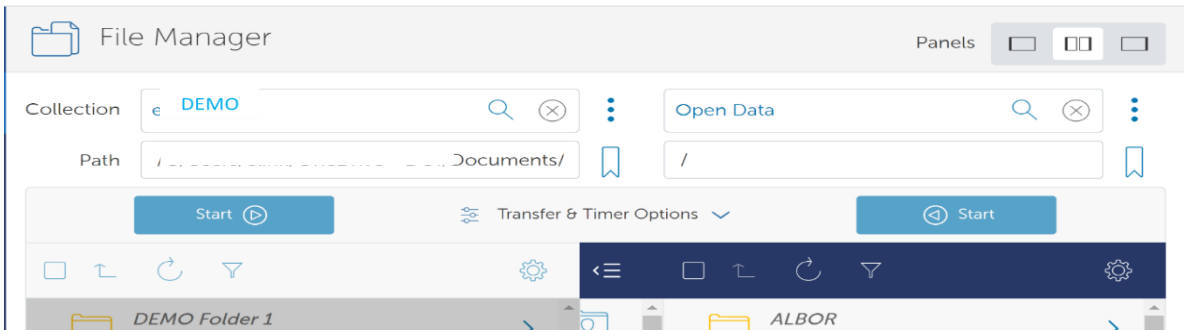
8. If your account has been given access to the IntELiMon database, it will be found under the “Shared With You” tab.



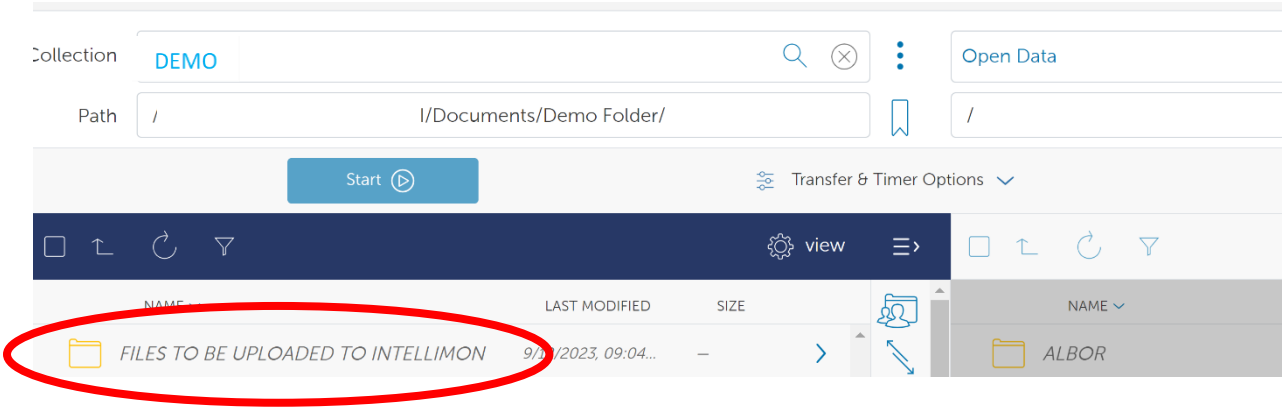
9. The IntELiMon collection you will be uploading to will likely be “Open Data”. If your data has a higher level of security (DoD and Tribes), then your specific site’s collection should be the option. Select the collection.



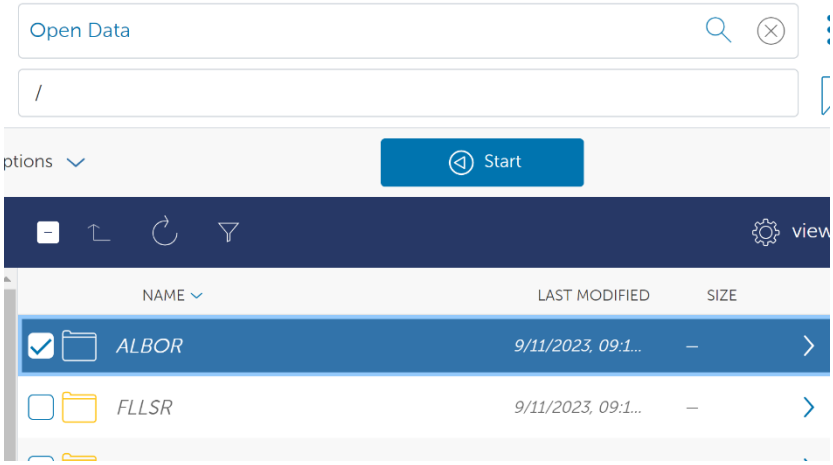
10. Your screen should return to the File Manager, and you should be viewing both your files and the IntELiMon folders for sites to transfer data to.



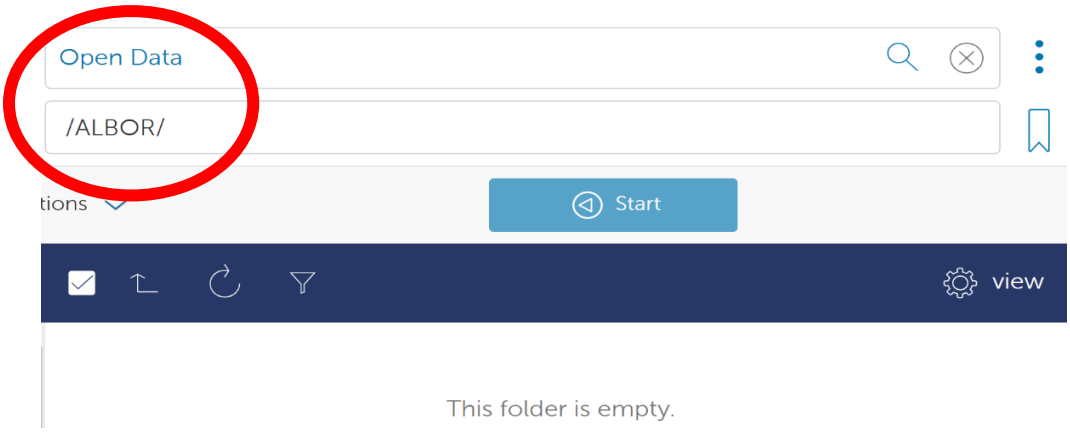
11. In the window that contains the files on your computer, navigate to the folder with your files to be uploaded.



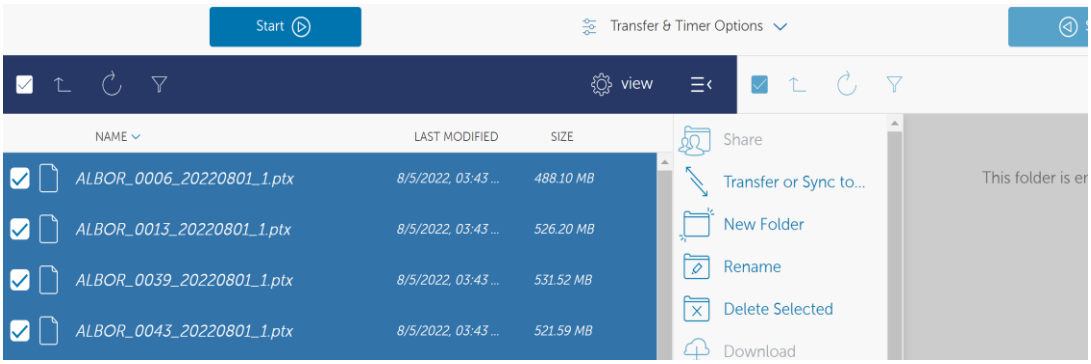
12. Within the IntELiMon collection, locate the folder for your site, double click that site folder so that you are taken into the folder.



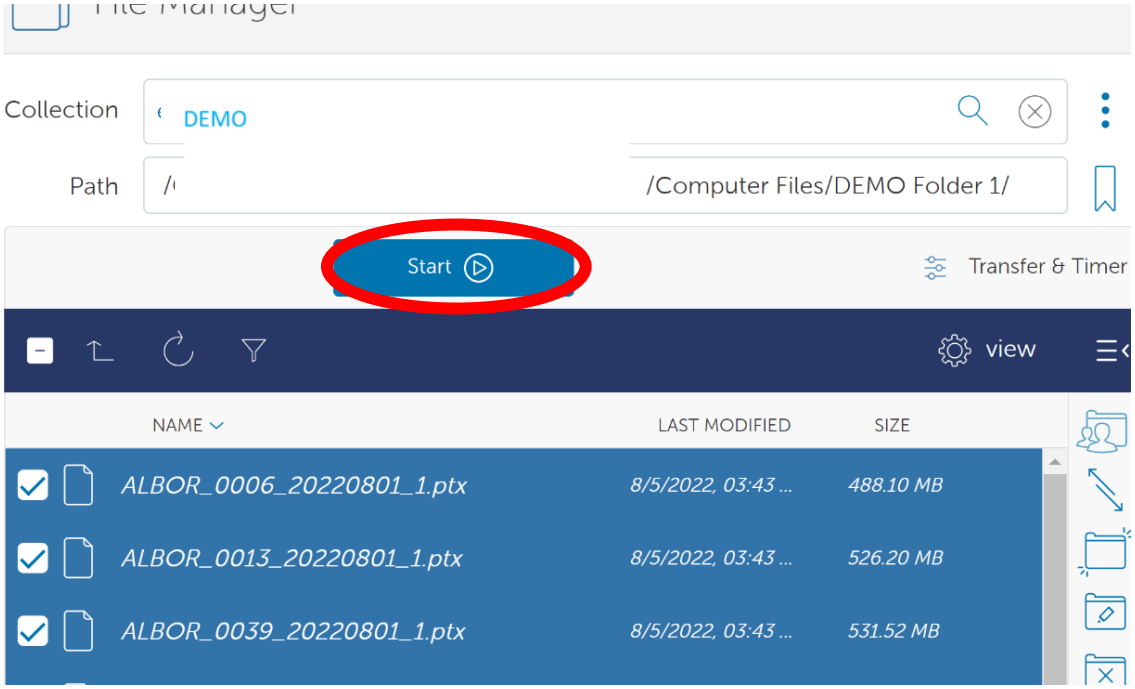
You will not see files that have been uploaded in the past in that folder, it is okay that "This folder is empty." *Double check that you are in the correct folder for your location*.



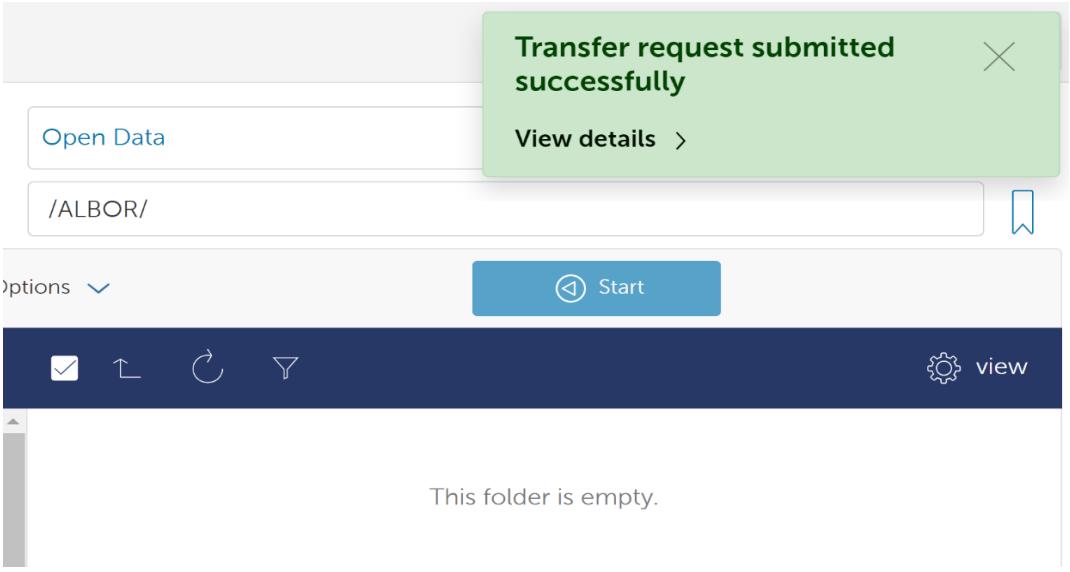
13. In your system's window, select the files that need transferred. **Check to ensure these files are .ptx and follow the proper nomenclature: LLLLL_####_YYYYMMDD_#**



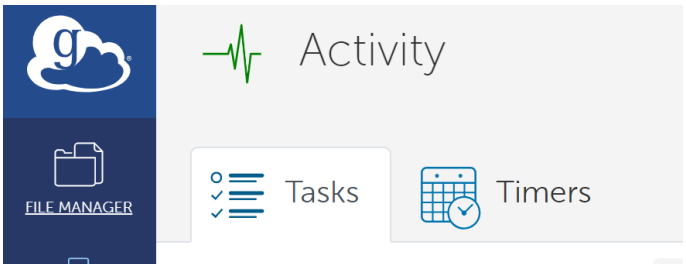
14. Click the "Start" button on the side of your system's collection, above your selected files



A popup should appear, alerting the user that the transfer was begun. The files *will not* appear in that folder under Open Data window for that folder.



15. The status of your transfer can be checked and monitored by selecting the “Activity” tab on the lefthand side of the website.



16. Once a transfer is complete, there will be an automated email sent to the email address linked to the GlobusID account