GPS Utilization Manual

Ministry of Forestry and Research

Created by: Reforestation Division

Table of Contents

Field Note

For maintaining the field data as reminder, it is important to note each data description when you get in the field like a form below:

PLACE: DATE: SURVEYER: .
GPSmodel: .

No	Description	Note	Photo
KOM1	Start	Boundary survey start point (house)	No.1
	Road	Road crossing point	No.2
	Tree	Shade tree for community people	No.3
KOM10	End	Same to Start point	No.20

GPS etrex10

Garmin Etrex10 is used in the tutorial

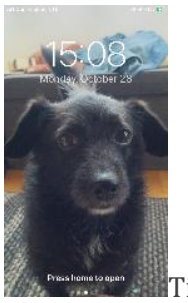
Objective

To know how to use Garmin GPS

Preparation of GPS for field survey

1. Check current status and change settings

1. **Battery, GPS condition and Date and Time**
   Push **the light button**. Then you can see the current status.
   When you use your mobile phone to take photos with coordinates.
   Please check the date and time are the same.

Garmin GPS 

Time on a mobile phone.

What do you need to check before field survey?

2. **Satellite position correction**
   Push **Back(change the screen to see Setup)**
   > Select **Setup** > **System** > Satellite system > Select GPS+GLONASS(Just in case)
   > Select **Setup** > **System** > Select WAAS/EGNOS (Just in case) > ON

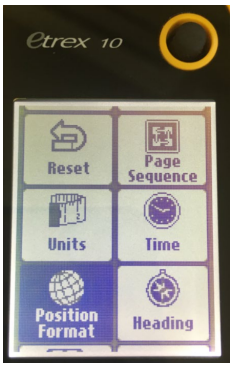
3. **Check the status of the received satellite**
Push light button t see the GPS condition indicator
More detail > Push **Back(change the screen to see Setup)** > Select **Satellite**
Check GPS accuracy: The picture shows 2m

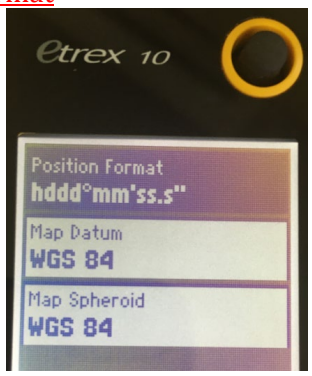
indicator Detail >


4. **Change the formats**
Time and Time zone:24hours > Push **Back(change the screen to see Setup)** > Select **Setup** > **Time** > **Enter** > Select 24-Hours > Quit
If your clock is not correct, please change Time Zone.

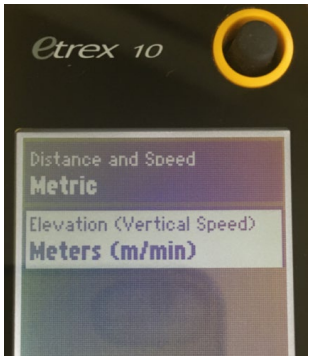
>


Positional Format > Push **Back(change the screen to see Setup)** > Select **Setup** > **Position Format** > **Enter** > Map Datum and Map Spheroid should be WGS84 > Position Format should be your familiar format





5. **Change the unit**
Unit > Push **Back(change the screen to see Setup)** > Select **Setup** > **Unit** > Change the unit which you want to use ;

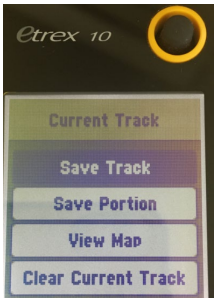


2. Clean up the GPS data on your GPS

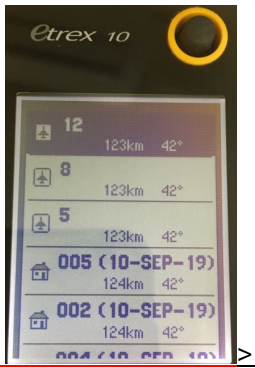
Please backup before you delete the GPS data.

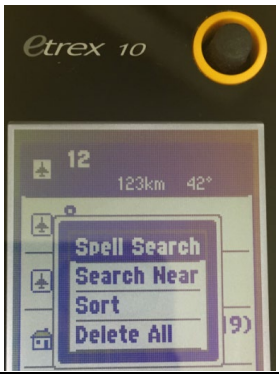
1. **Delete tracks**
   Push **Back(change the screen to see Setup)** > Select **Track Manager** > Current Track > Save Track(It will be stored in Archive) or Clear Current Track > Yes

>

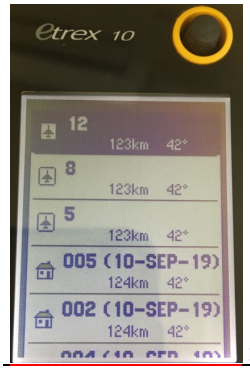

>


2. **Delete waypoints**
   Push **Back(change the screen to see Setup)** > Select **Waypoint Manager >** Menu > Delete All
   Or Push **Back(change the screen to see Setup)** > Select **Waypoint Manager** > select a waypoint > Menu > Delete

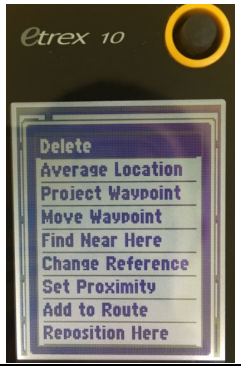


> push menu


> Delete all



> Select one 

> push menu 

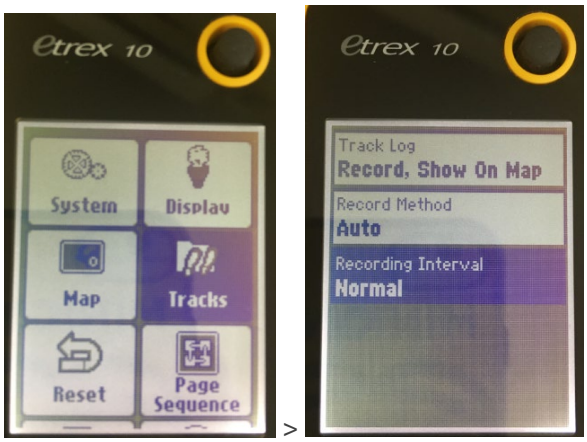
>delete one

Data collection

1. Track

1. **Track Settings**

   Push **Back(change the screen to see Setup)** > Select **Setup** > **Track** > **Change the Record method (Auto is OK)**



   Auto(time and distance) **Time(e.g. 10sec)** **Distance(e.g. 0.1km)**

2. **Record On OFF**

   please select **Record, Show on Map**. Then Tracklog will be recorded automatically when you turn on. But if don't need to record, select Do Not Record.

3. Go to Field survey

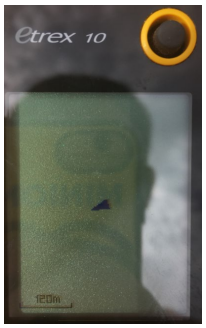
2. Waypoint

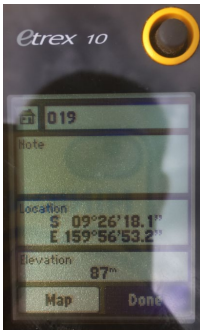
1. **Normal waypoint**

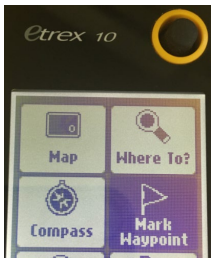
   You must check the accuracy of GPS from Satellite menu(See 1.3) before you get waypoints.

   Push **Back(change the screen to see Setup)** > Select **Map** > > **Long push the button(below)** >

Select Done > push the button(Below)

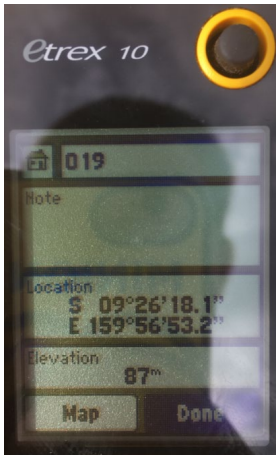
>>>>


>


Or **Use Mark waypoint**


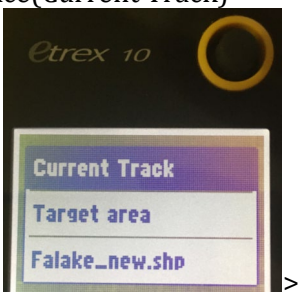
2. **Averaging waypoint (for reliable poin**
   Push **Back(change the screen to see Setup)** > **Waypoint Averaging** > Create Waypoint > then averaged location will be calculated > Save

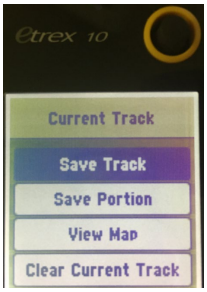
Please make a memo according to point IDs.
Please take photos by your mobile around a waypoint.

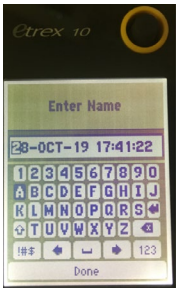


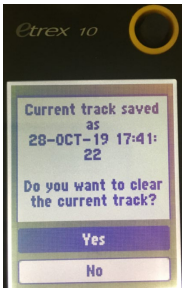
Point ID	Attribute A	Attribute B	Attribute C
019			
020			

3. At the end of field Survey

1. When you finished the survey, please save your track to archive
   Push MENU(change to the screen to see Setup) > Select Track Manager > Enter > Select Current Track > Enter > **Save Track** > Name it > Done > You can choose YES or NO to clear the track on the temporal space(Current Track)
   Track Manager> 

> 

> 

> 

2. Not necessary to save waypoints.

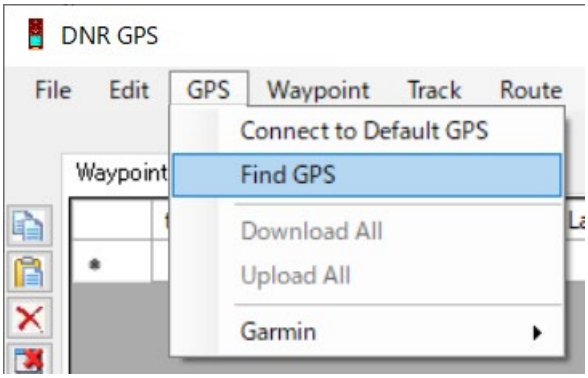
Additional data for field survey

4. Upload points, lines(polygon) using google earth

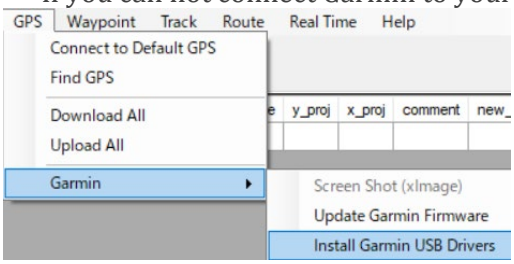
1. Software
   DNRGPS(https://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html).
   Open DNRGPS
   dnrgps.exe

2. Connect Garmin GPS to your PC
   Wait until your GPS is recognized(**you may need to install Garmin driver.**)

3. Find GPS on DNR GPS
   GPS > Find GPS > When you connect to your GPS
   > You can see garmin - eTrex 10 Software Version 340 (your Garmin) and Projection: then Garmin GPS is connected.

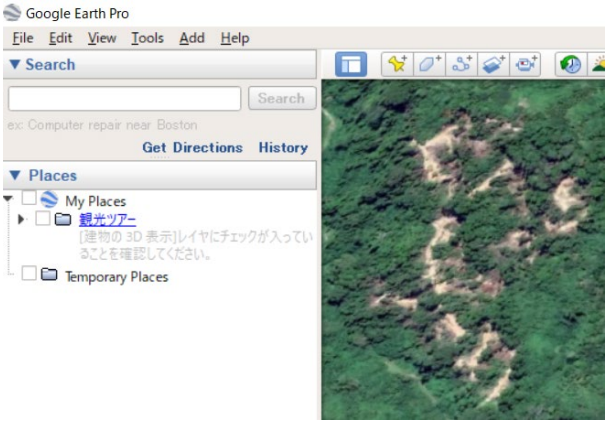


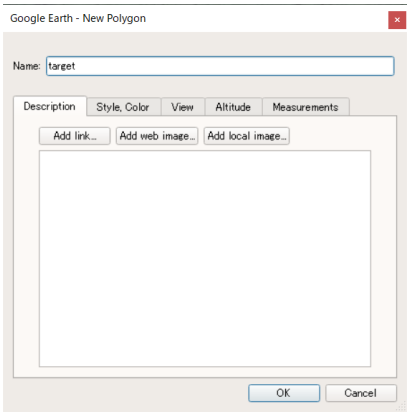
***If you can not connect Garmin to your PC, please install the Garmin USB Drivers.

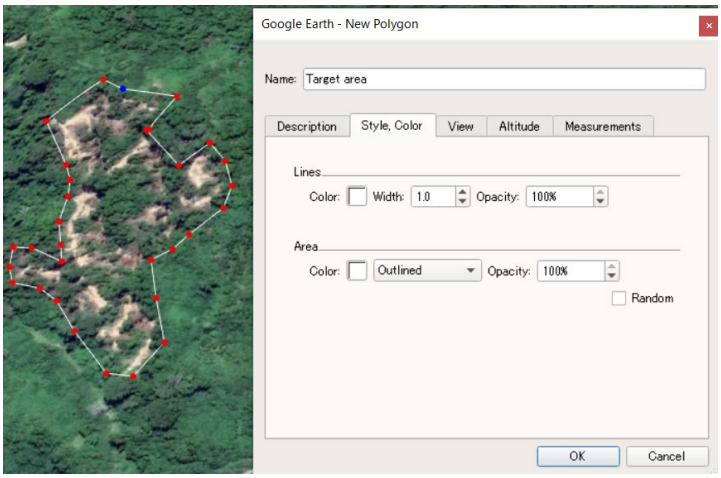


4. Upload polygon, polyline, point using Google earth.

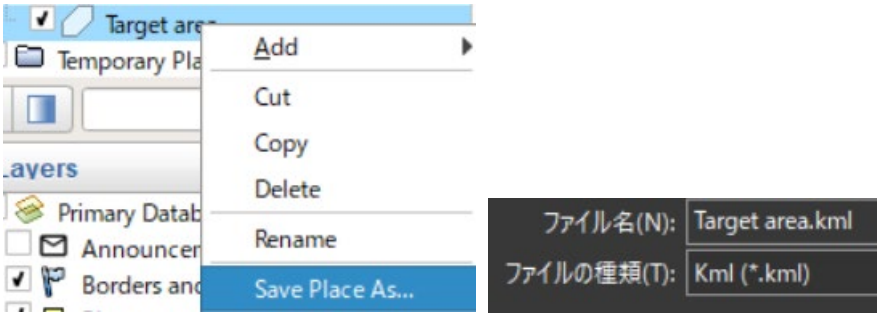
Open Google earth > click one >  point/polygon/polyline > Type Name of the polygon etc. > Then draw polygon:change Style,Color > > OK





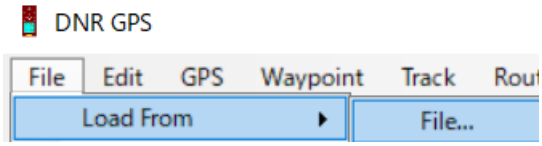


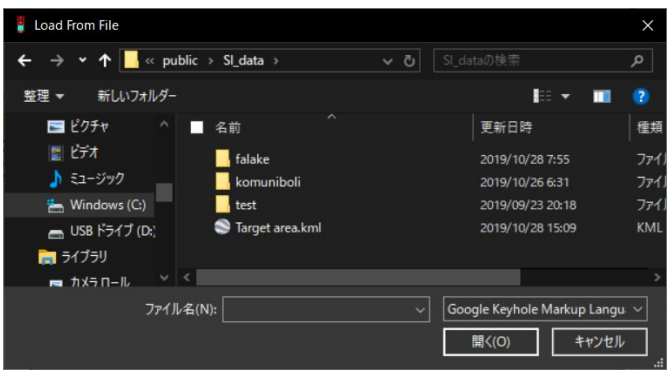
Export the data as KML format. Right click on the Name > Save Place As… > Change the file type to .kml not KMZ.

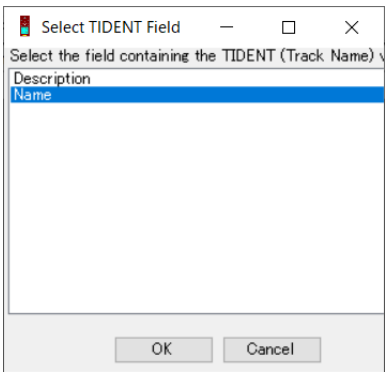


5. Close Google Earth

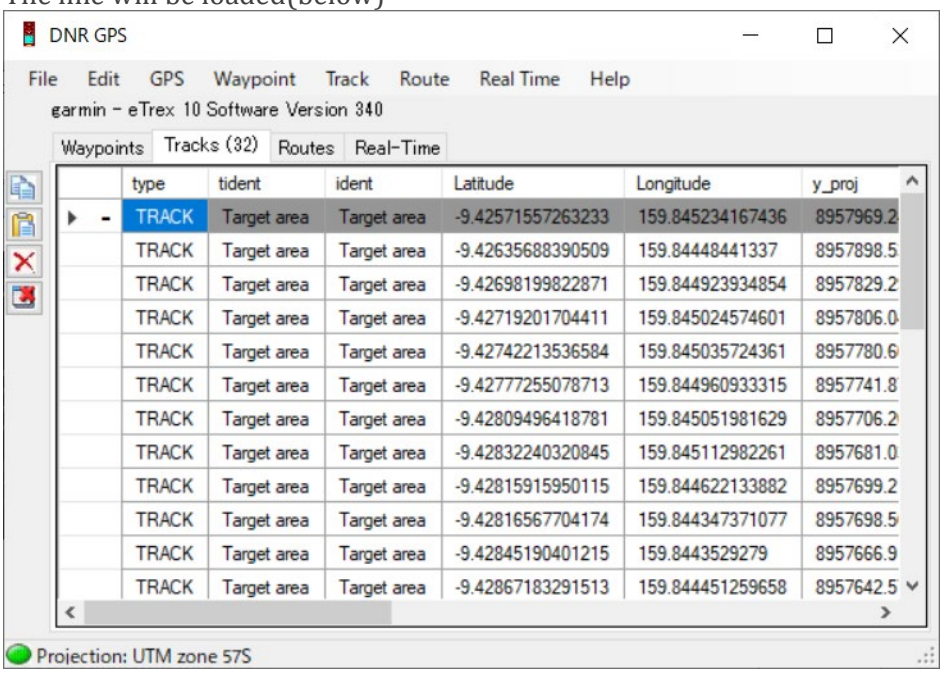
6. Load the polyline shape file(Form1_sample_Psm_line.shp) to DNR GPS
File > Load From > File >Select saved kml > Open > Select Name > OK



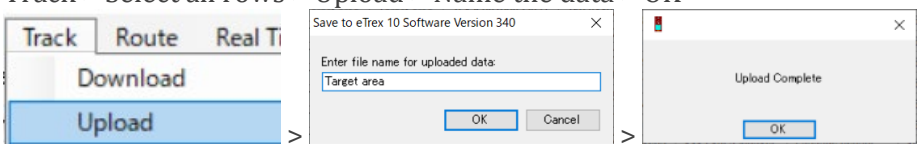




The line will be loaded(below)

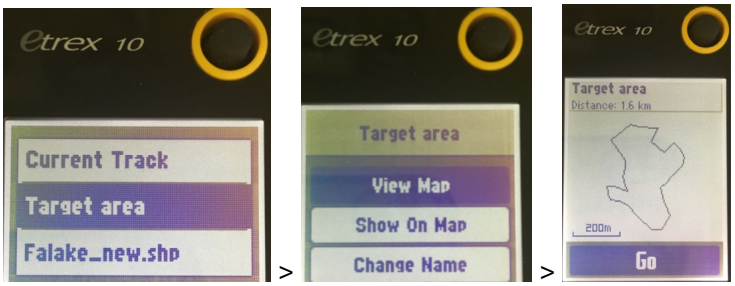


7. Upload the line as a track
Track > Select all rows > Upload > Name the data > OK



8. Check the track on Garmin GPS
Unplug Garmin GPS from your PC.

Turn ON Garmin GPS
Push **Back(change the screen to see Setup)** > Select **Track Manager** > You can see Saved Track > **Select uploaded track > View on Map** in order to check your data



New track is shown > View Map > Check it

When you upload points, please use waypoint on DNR GPS.

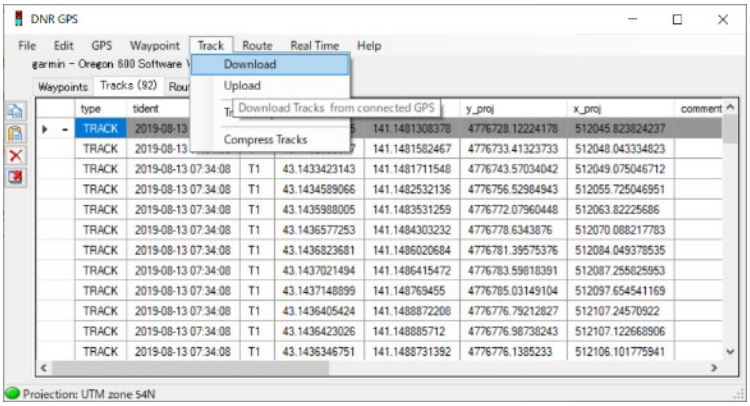
Data management after field survey

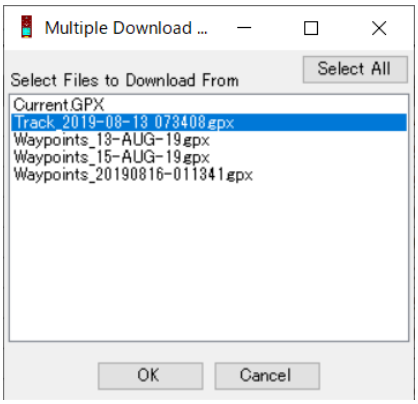
1. Download GPS data

1. Software
   DNRGPS(https://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html).
   Open DNRGPS from
   dnrgps.exe

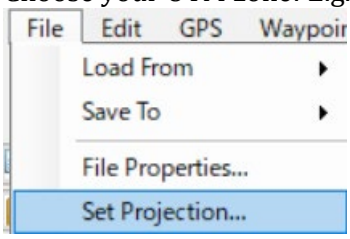
2. Connect Garmin GPS to your PC

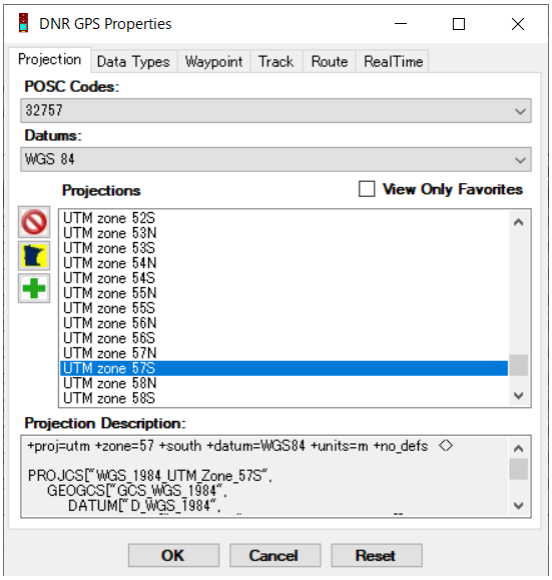
3. Open DNR GPS
   Track: Track > Download > Select a track > OK



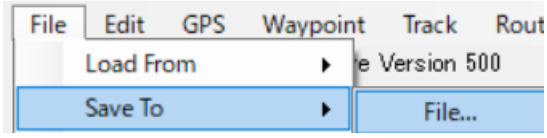


4. Change CRS
   Choose your UTM zone! E.g. UTM zone 57S

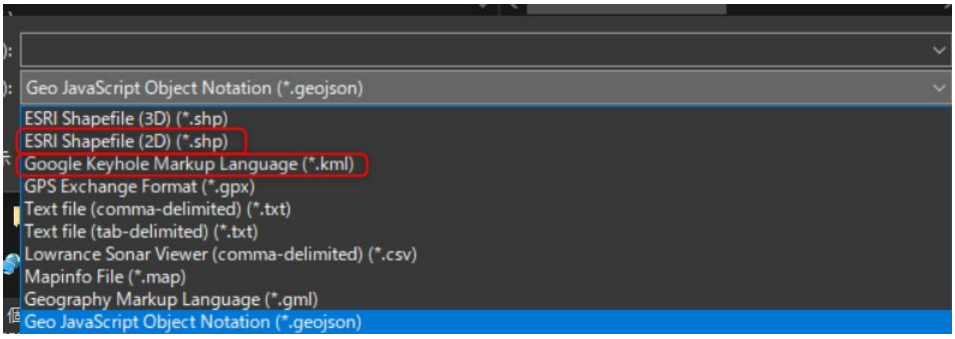




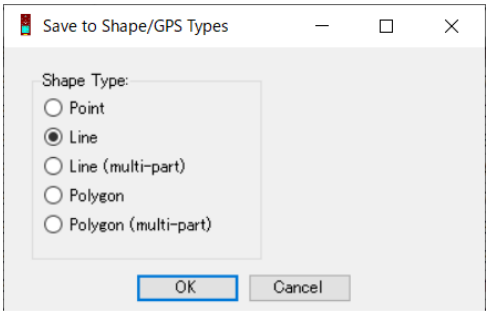
5. Save your GPS data
   DNR GPS



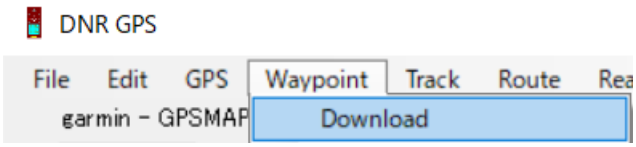
> Name it then select file type.
To visualize by google earth, use kml.
To visualize by QGIS or share by Geonode use shape file



6. Select shape type



Waypoint is the same way to download. Change Track to Waypoint. Then select Point as shape type.

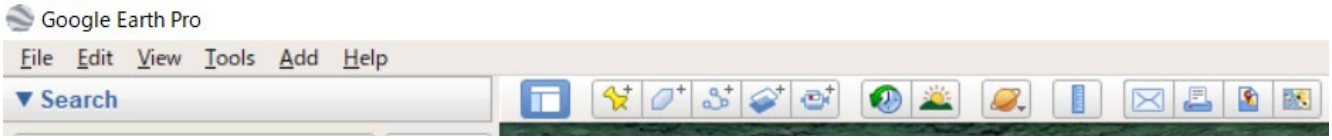


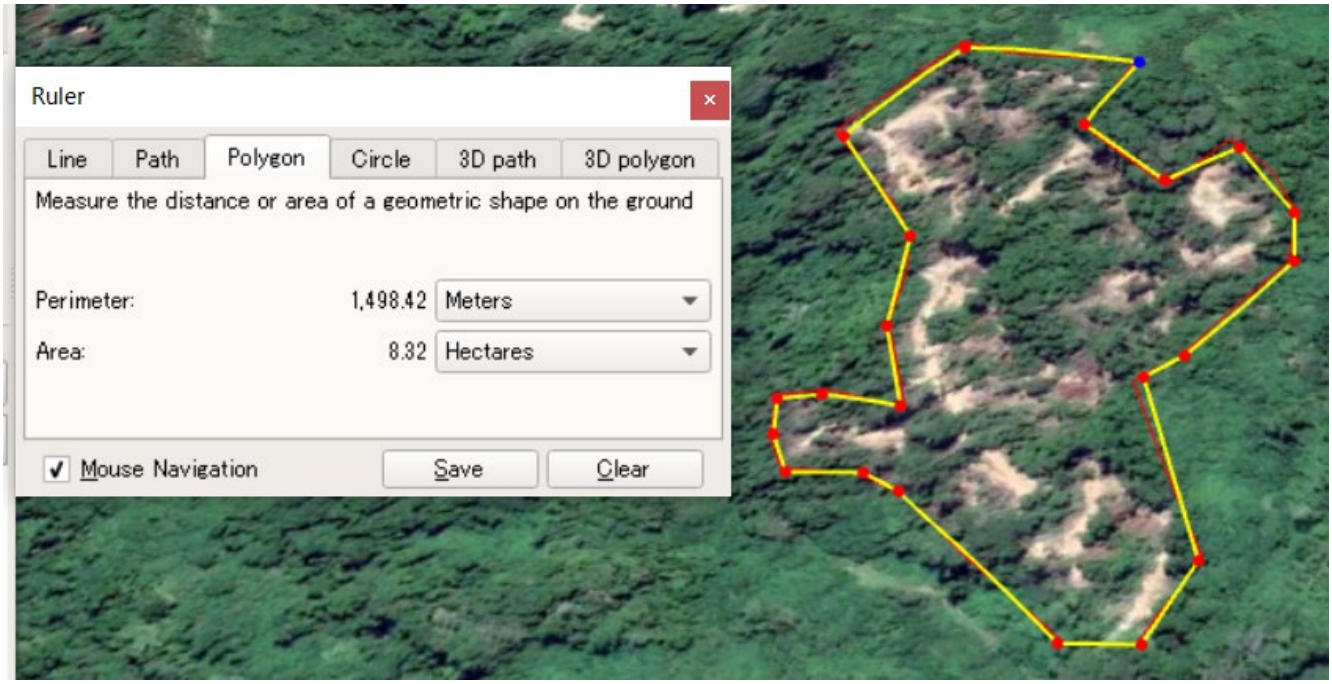
Waypoint > Download

2. Open by Google earth

Open by Google earth : double click on the saved file(.kml)

You can roughly caluculate area.





Calculate area from waypoints

1. Convert waypoints to polygon

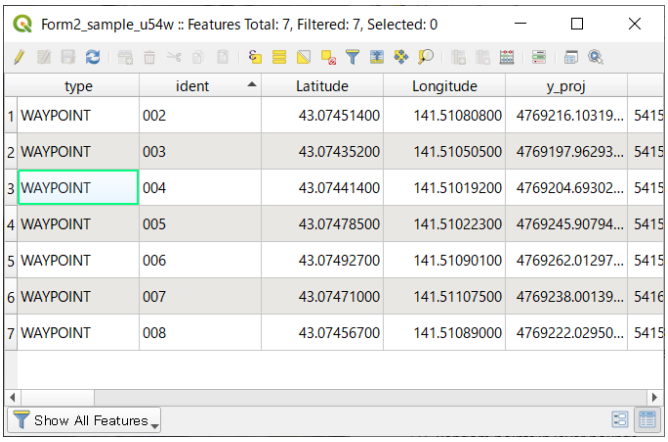
1. Modify the points >  then select unnecessary points using  then delete(key board)

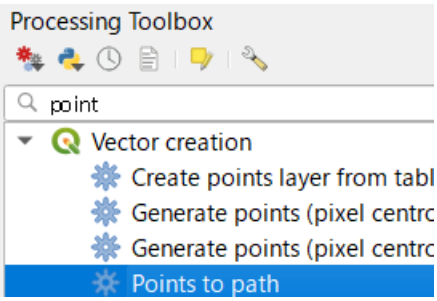

>


2. Stop editing using  .

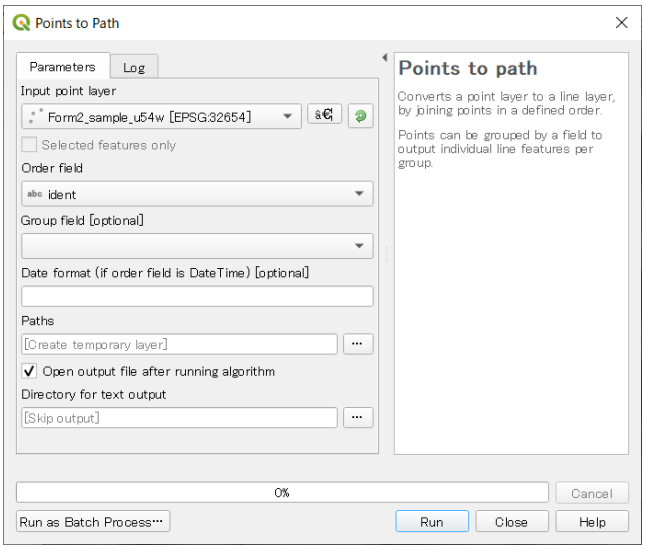
3. Convert to path(line

Check the orde field of the points and group field.





Processing Toolbox > Vector creation > Points to path



Input point layer: points which you remove unnecessary points

Order field: ident

Not necessary to save it.

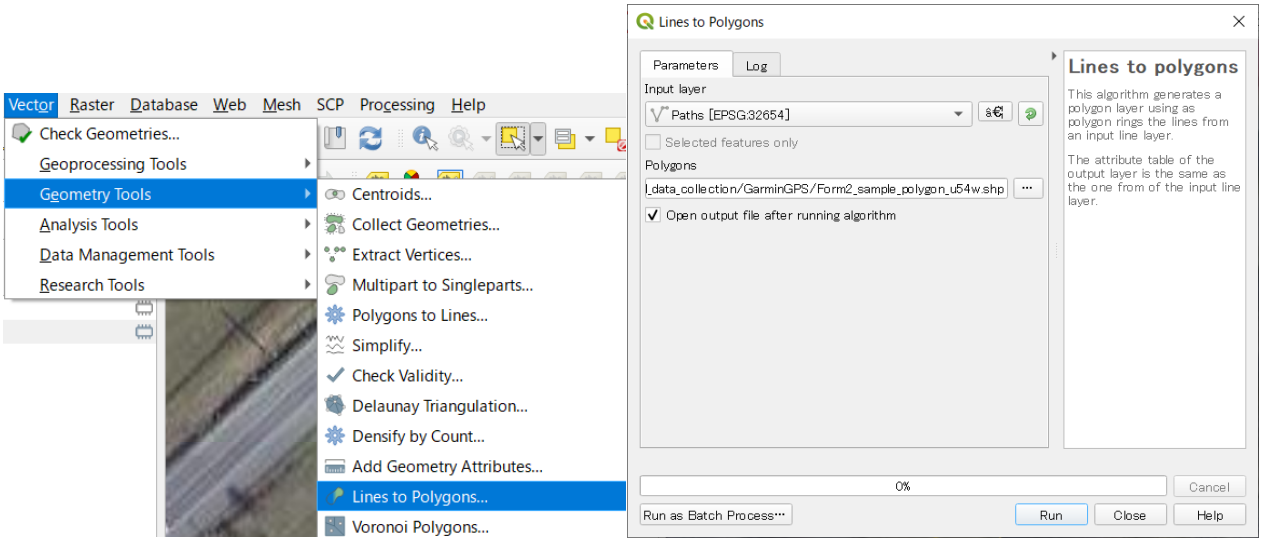
Path convered from point.

4. Convert path to polygon

Vector > Geometry Tools > Line to Polygons

Input layer: Paths

Polygons: output > please name it
Run.

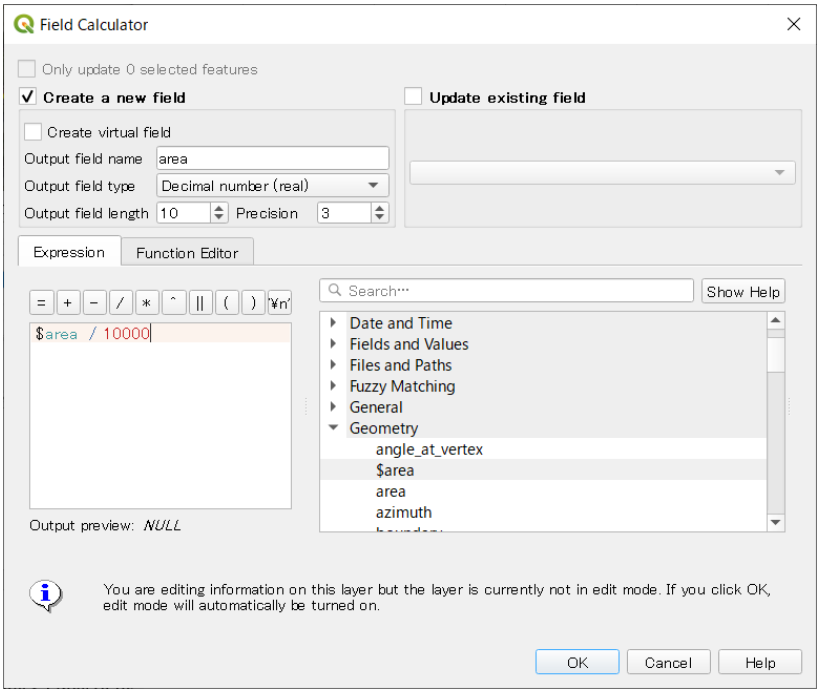


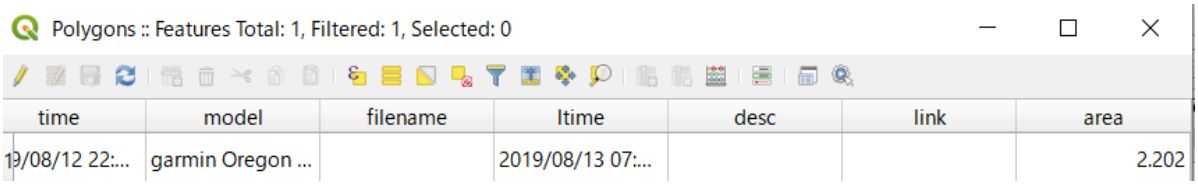

Converted polygon form Paht.

2. Calculate area

Open attribute table of Polygon above > click on then type like below > OK

- Check: Create a new field
- Output field name: area
- Output field type: real
- Expression: $area / 10000 it calculates in ha





Stop editing  .

GPS Garmin62s

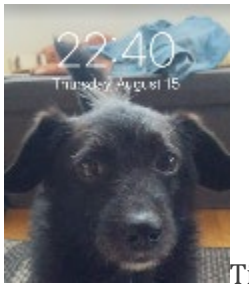
Garmin62s is used in the tutorial

Objective

To know how to use Garmin GPS

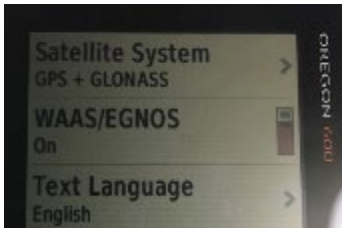
5. GPS current status and change settings

1. **Battery, GPS condition and Date and Time**
   Push the power button. Then you can see the current status.
   When you use your mobile phone to take photos with coordinates. Please check the date and time are the same.



Garmin GPS Time on a mobile phone.

2. **Satellite position correction**
   Push **MENU(change to the screen to see Setup)** > Select **Setup** > **Enter** > **System** > **Enter** > Select WAAS/EGNOS (Just in case) > Quit button >



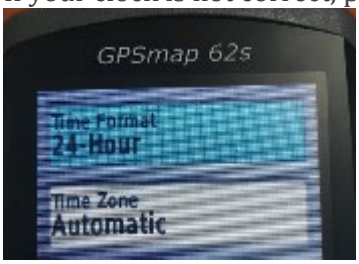
If your GPS has Satellite System, please use GPS+GLONASS etc. This settings is to select the satellites to receive.

3. **Check the status of the received satellite**
   Push **MENU(change to the screen to see Setup)** > Select **Satellite** > **Quit**
   Check GPS accuracy: The picture shows 15m.

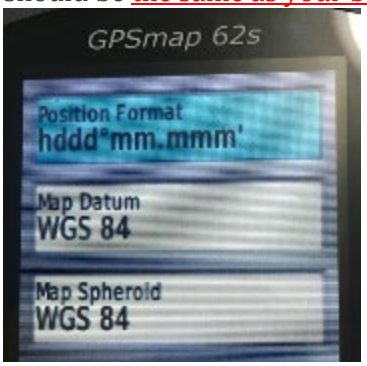
Check number of satellites: The picture shows 7.

4. **Change the formats**

Time and Time zone:24hours > Push **MENU(change to the screen to see Setup)** > Select **Setup** > **Enter** > **Time** > **Enter** > Select 24-Hours > Quit
If your clock is not correct, please change Time Zone.



Positional Format > Push **MENU(change to the screen to see Setup)** > Select **Setup** > **Enter** > **Position Format** > **Enter** > Map Datum, Map Spheroid should be WGS84 > Position Format should be the same as your basemap(hands-out) > Quit



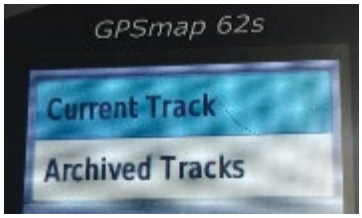
5. **Change the unit**

Unit > Push **MENU(change to the screen to see Setup)** > Select **Setup** > **Enter** > **Unit** > Change the unit which you want to use > Quit

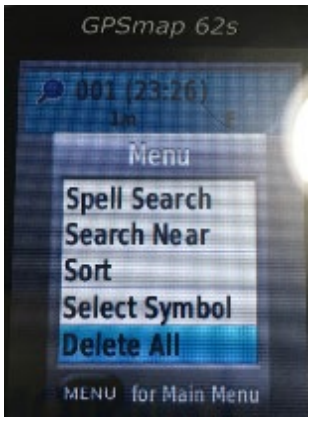
6. Clean up the GPS data on your GPS

Please backup before you delete the GPS data.

3. **Delete tracks**
   Push **MENU(change to the screen to see Setup)** > Select **Track Manager** > Enter > Current Track > Save Track(It will be stored in Archive) and Clear Current Track > Enter > Yes > Enter > **Quit**



4. **Delete waypoints**
   Push **MENU(change to the screen to see Setup)** > Select **Waypoint Manager** > Enter > Menu > Delete All > Enter > Quit. Or Push **MENU(change to the screen to see Setup)** > Select **Waypoint Manager** > Enter > select a waypoint > Enter > Menu > Delete > Yes > Enter > Quit



7. Data Collection

Track

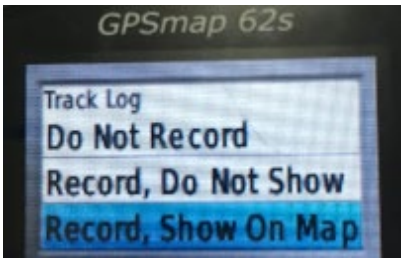
1. **Track Settings**
   Push **MENU(change to the screen to see Setup)** > Select **Setup** > **Enter** > **Track** > **Enter** > Change the Record method (Auto is OK) > Quit button

Auto(time and distance)

Time(e.g. 10sec)

Distance(e.g. 0.1km)

2. **Record On OFF**
   please select Record, Show on Map. Then Tracklog will be recorded automatically when you turn on.

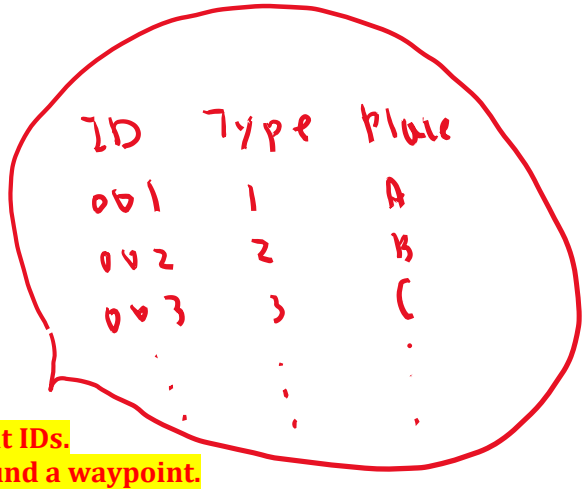


3. Go to Field.

Waypoint

3. **Normal waypoint**
   Please check the accuracy of GPS from Satellite menu(See 2.3).
   Push **MARK** > **Done** (Then Recorded) , **Map** then the waypoint becomes the goal of navigation.

4. **Averaging waypoint (for reliable poin**
   Push **MENU(change to the screen to see Setup)** > **Waypoint Averaging** > **Enter** > Create Waypoint > then averaged location will be calculated > Save > Done

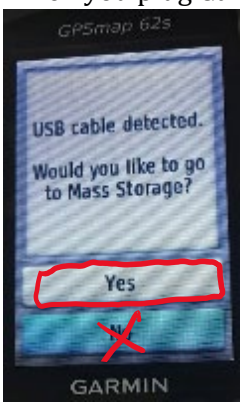


Please make a memo according to point IDs.
Please take photos of your mobile around a waypoint.

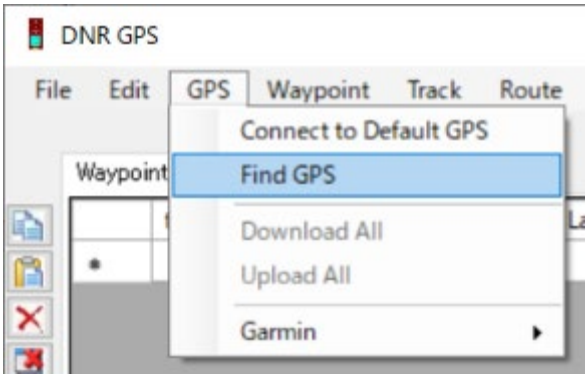
8. Upload points, lines(polygon)

1. Software
   DNRGPS(https://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html).
   Open DNRGPS from SI_training\TR4_Field_data_collection\GarminGPS\dnrgps\dnrgps.exe
   dnrgps.exe

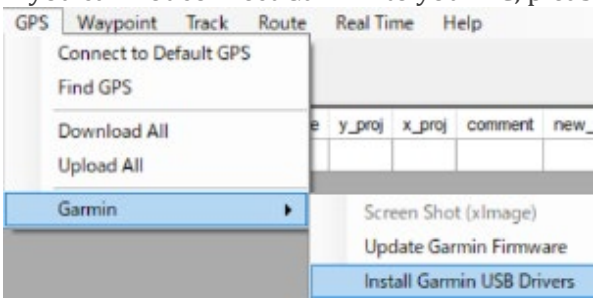
2. Connect Garmin GPS to your PC
   When you plug Garmin GPS to your PC, the message is shown. Please select **Yes**.



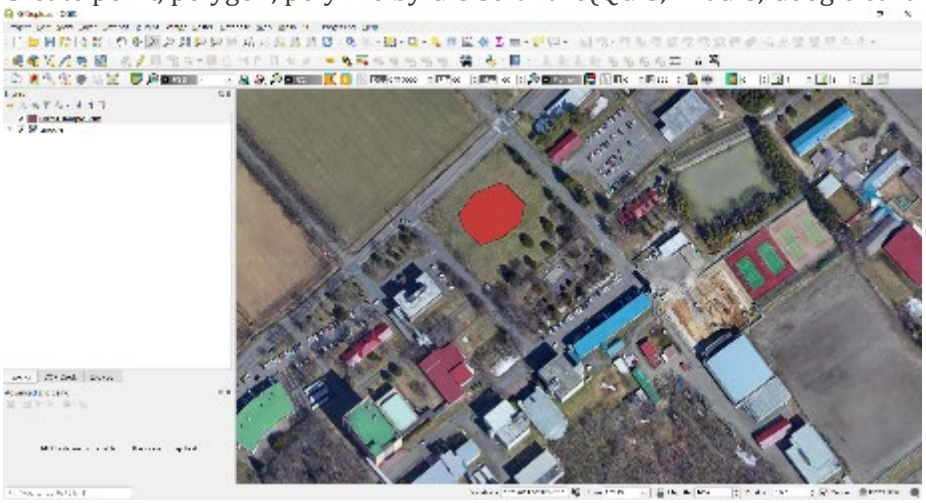
3. Find GPS on DNR GPS
   GPS > Find GPS > When you connect to your GPS
   > You can see garmin - GPSMAP 62s Software Version 5.70 (your Garmin) and
   Projection: No Projection then Garmin GPS is connected.



If you can not connect Garmin to your PC, please install the Garmin USB Drivers.

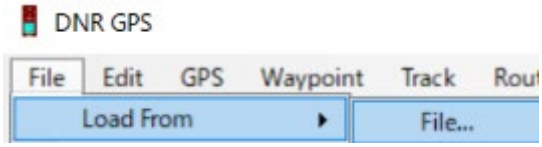


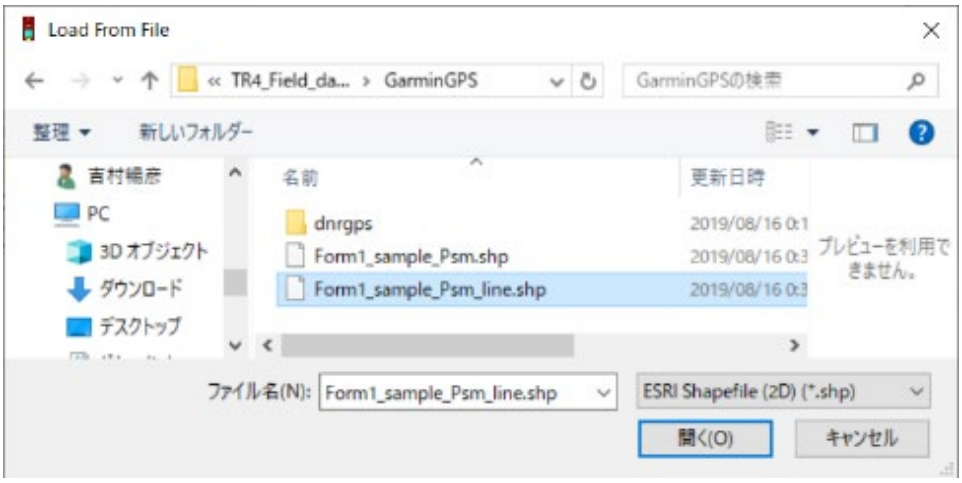
4. Upload point, polygon, polyline
Create point, polygon, polyline by GIS software(QGIS, ArcGIS, Google earth)



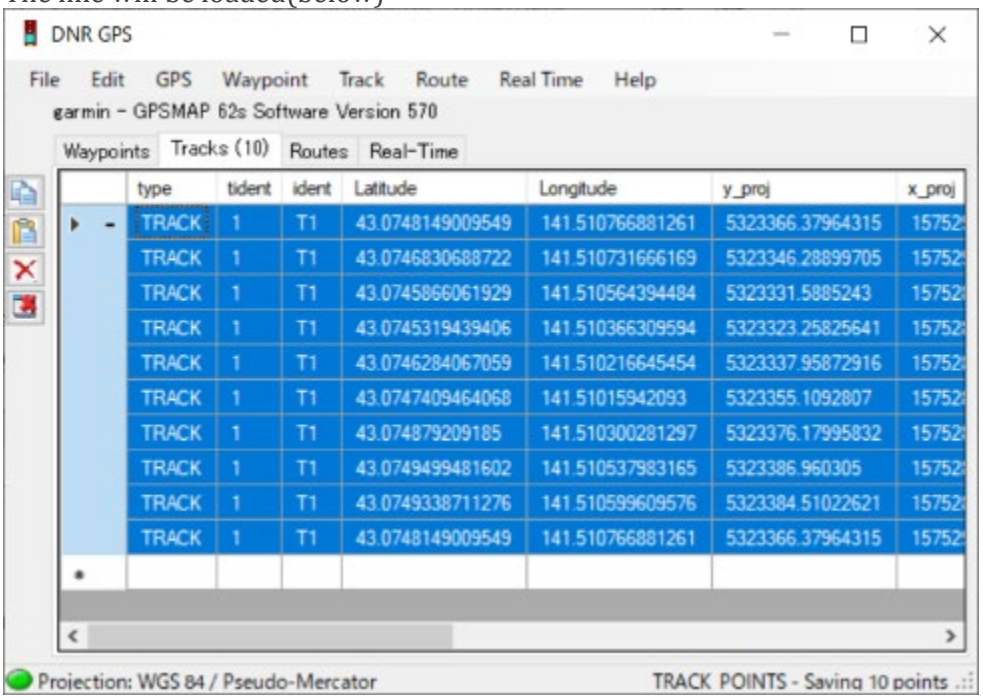
5. Close GIS software

6. Load the polyline shape file to DNR GPS
File > Load From > File > Select a shape file> Click OK

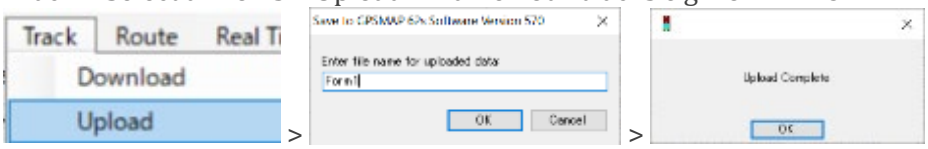




The line will be loaded(below)



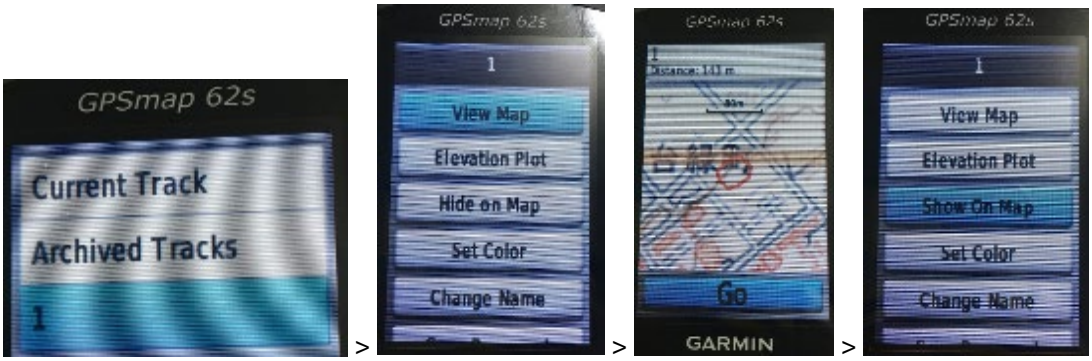
7. Upload the line as a track
Track > Select all rows > Upload > Name Your tracks e.g. Form1 > OK



8. Check the track on Garmin GPS
Unplug Garmin GPS from your PC.

ON Garmin GPS
Push **MENU(change to the screen to see Setup)** > Select **Track Manager** > Enter > You can see Saved Track (In the tutorial, 1) > **Select uploaded track > View on Map.**

If the uploaded track is OK > Quit > Show on Map > You can see it on Map.



New track is shown(e.g.1) can see the track on Map. > View Map > Check it > Show on Map then you

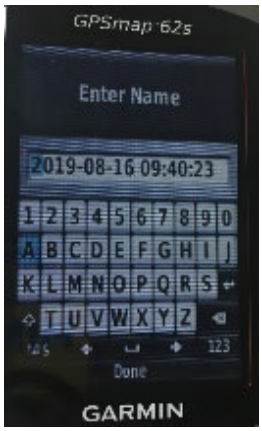
When you upload points, please use waypoint on DNR GPS.

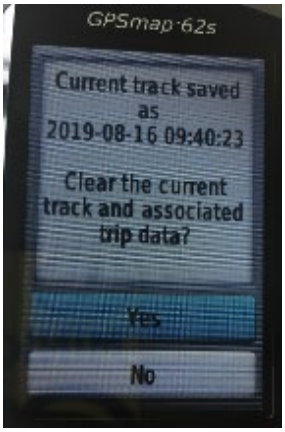
9. At the end of field Survey

1. Collect waypoints and track.

2. When you finished the survey, please save your track to archive
Push MENU(change to the screen to see Setup) > Select Track Manager > Enter > Select Current Track > Enter > Save Track > Name it > Done > You can choose YES or NO to clear the track on the temporal space(Current Track)

>


>


>


GPS data in Garmin Track Manager Save into Archive

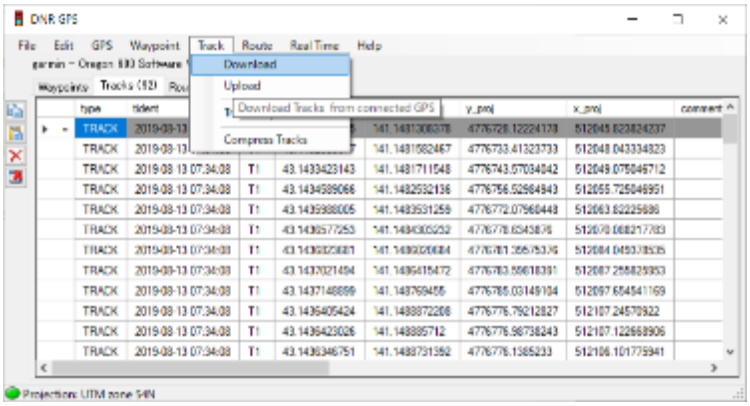
3. Not necessary to save waypoints.

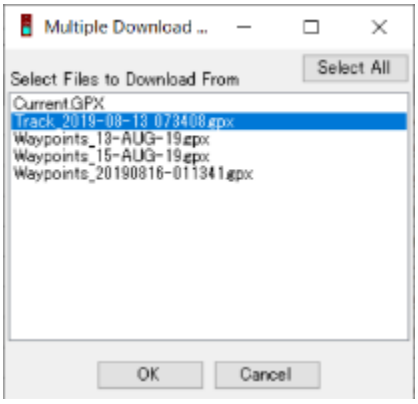
10. Download recorded GPS data

1. Software
DNRGPS(https://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html).
Open DNRGPS
dnrgps.exe

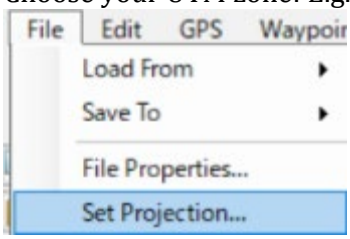
2. Connect Garmin GPS to your PC
When you plug Garmin GPS to your PC, the message is shown. Please select **Yes**.

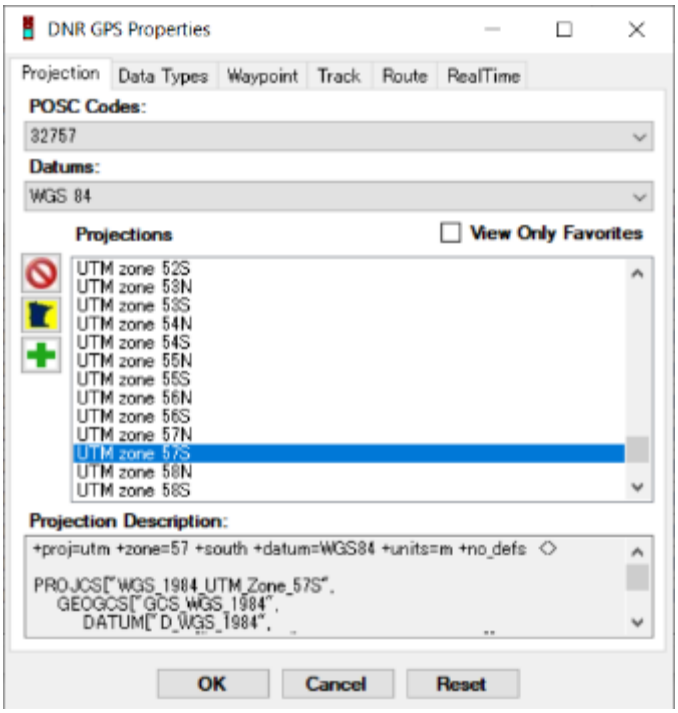
3. Open DNR GPS
Track: Track > Download > Select a track > OK



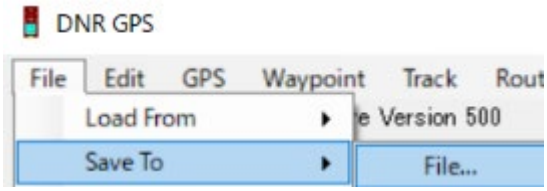


4. Change CRS
Choose your UTM zone! E.g. UTM zone 57S



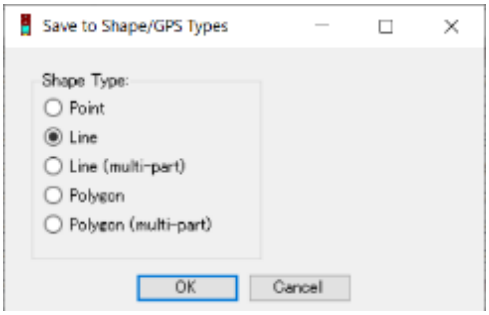


5. Save your GPS data

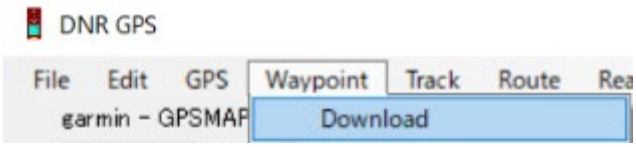


> Name it then select file type. E.g. Form2_sample_line_u54w.shp

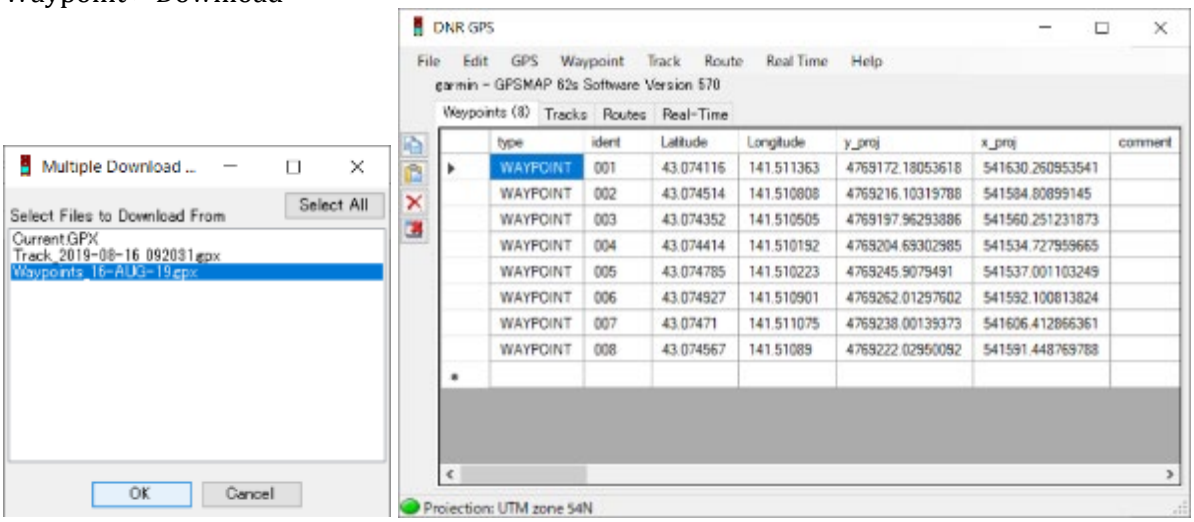
Select shape type.



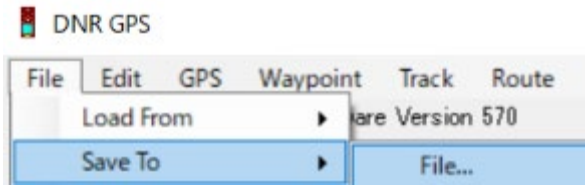
Waypoint is the same way to download. Change Track to Waypoint



Waypoint > Download

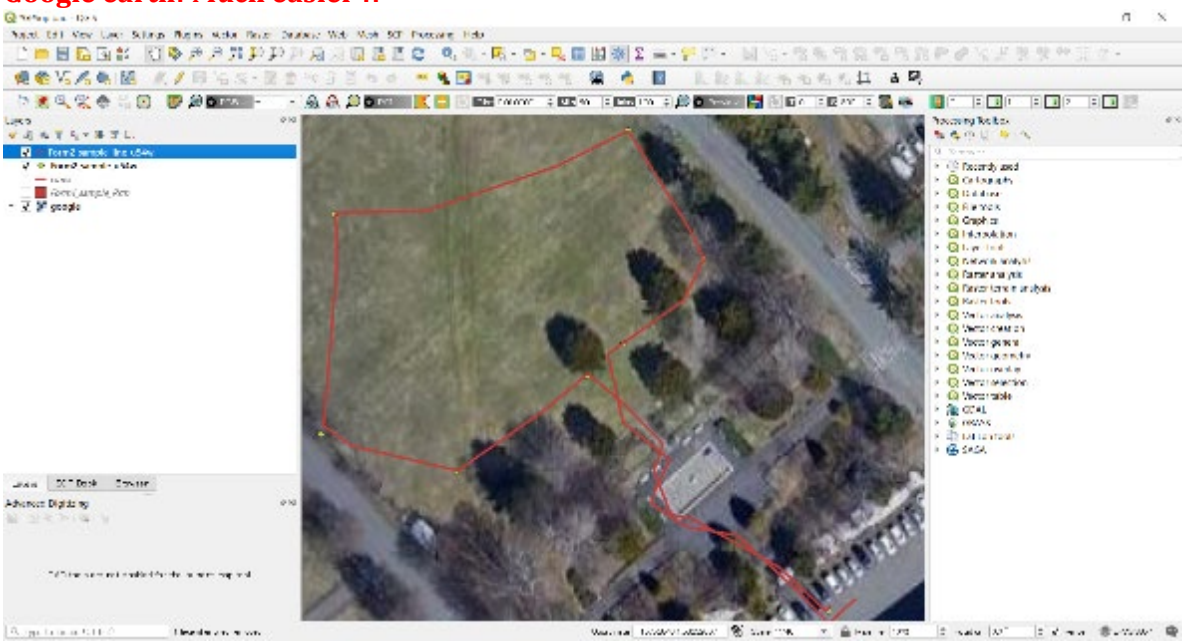


Select Waypoint of the survey date > OK > you will see the list



File > Save to > File… > Name it > Click OK.

Open in QGIS and check result. If you exported the result as kml, it can be opened by Google earth! Much easier !!



Upload field data to Geonode

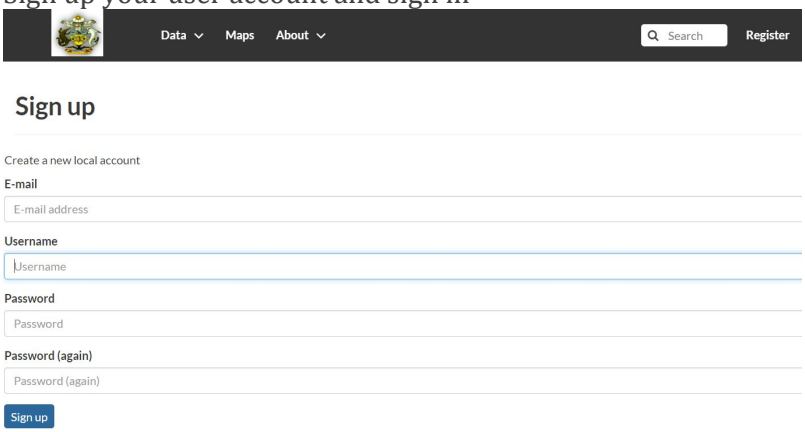
Objective

To know how to upload field data to GeoNode

11. Preparation

REGISTRATION

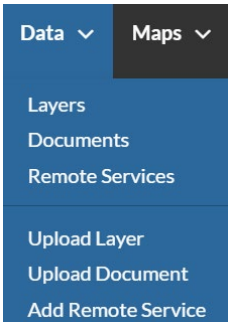
Sign up your user account and sign in



12. Brief introduction of Geonode

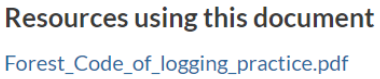
• Upload files

You can upload Layers(Shape file, Geo tif etc.) and Documents(Word, Excel, Power points, PDF, GPX, Zip, kml, kmz etc.)



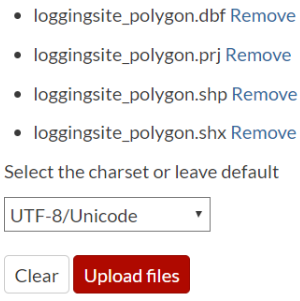
• Make linkages between

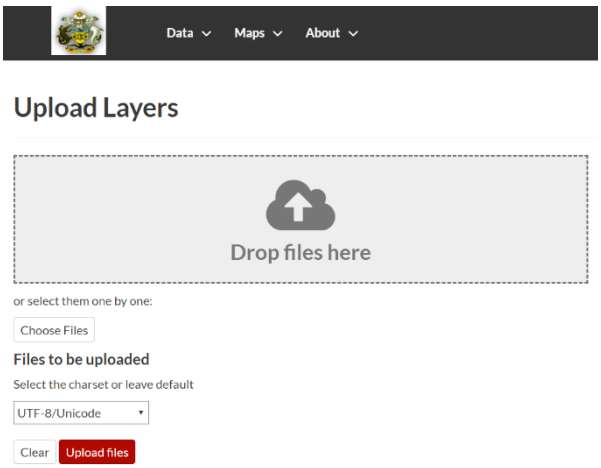
Document and maps can be linked in Geonode.



13. Upload Layer

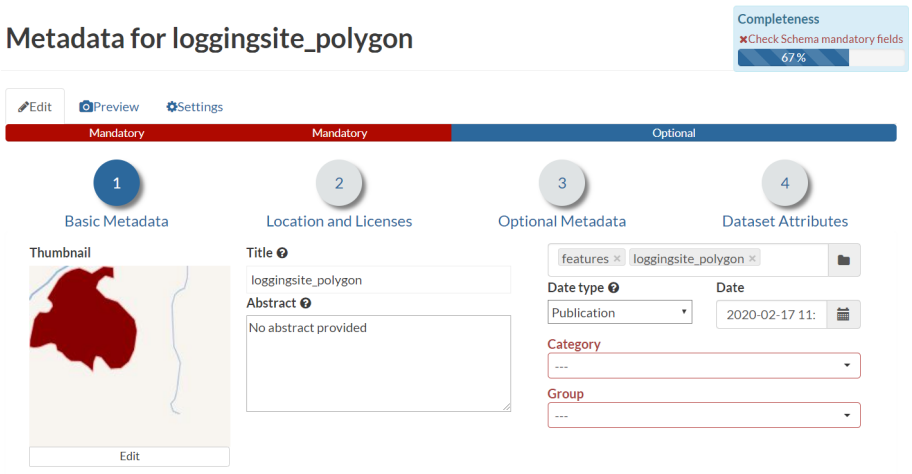
Data > Upload layer > Choose files > Upload files >When you upload shape file > please upload .dbf, .prj, .shp , .shx.



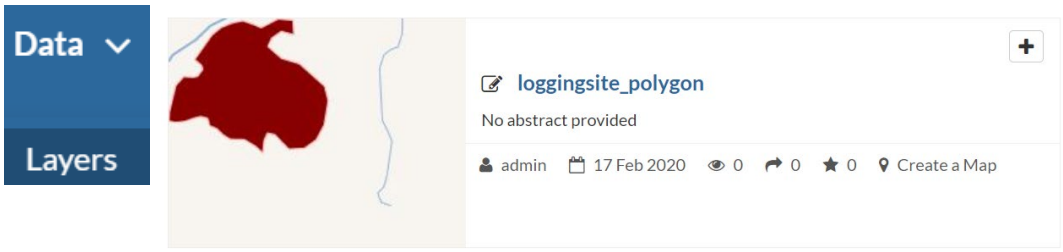


Wait a minute then you can see below. Click Edit Metadata.

Input Metadata and finish uploading

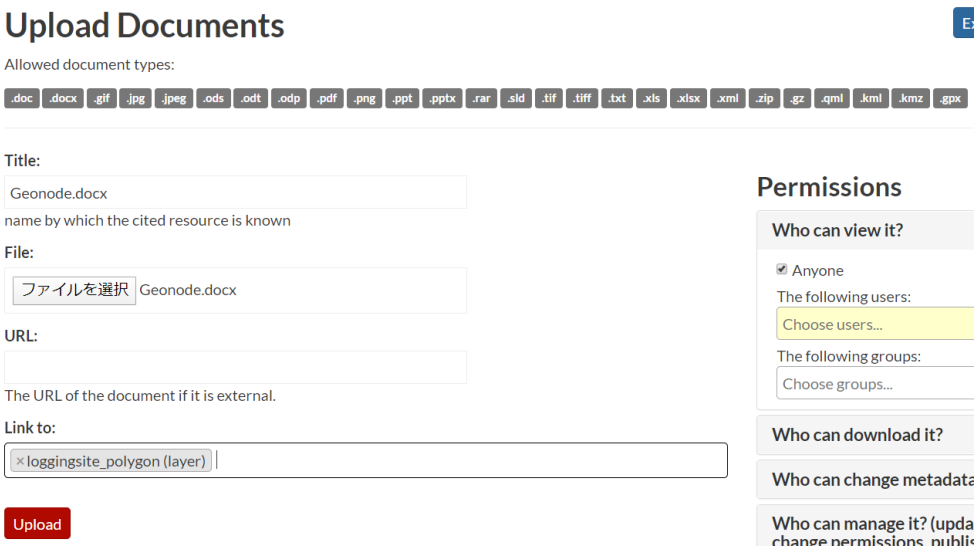


Data > Layers > you can see the uploaded file.

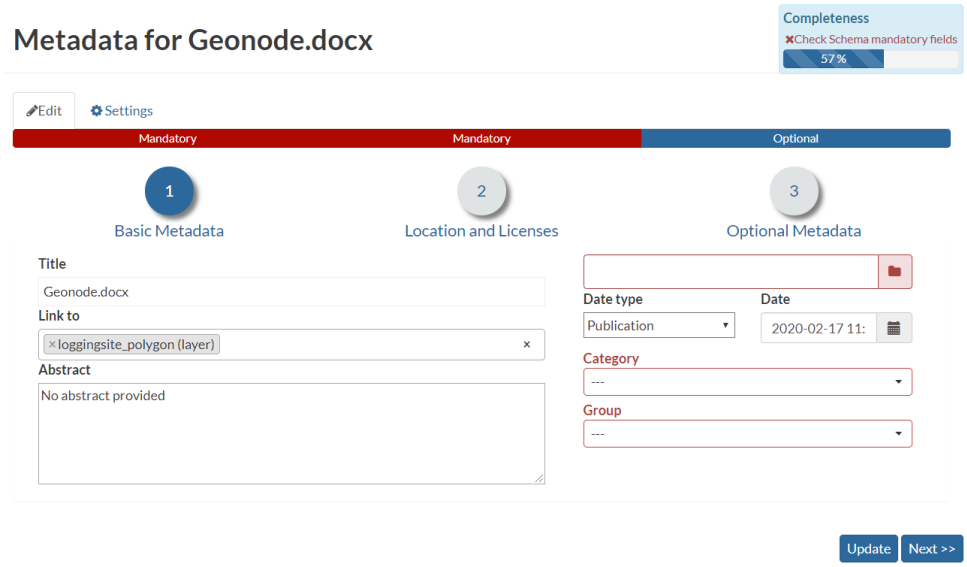


4. Upload document

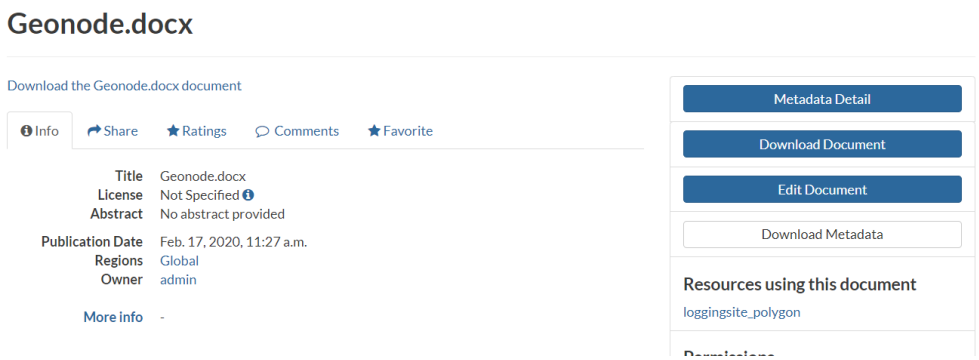
Data > Upload Document > Select Files > Select Link layers or documents > Upload



Input Metadata and finish uploading



Soon, the file will be uploaded to Geonode.
See the related resource(Link)



5. Discussion

What kinds of data do you need to upload?
What kinds of metadata do you need to input?
Don't forget linkages.