Appendix (ver 1.0)

(Seagrass Mapper / Seagrass Trainer)

Ministry of the Environment
Government of Japan

Revision records

Version	Uploaded date	Revision parts	Revision details and reasons
Ver1.0	2021/6/18	-	-

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*This manual mostly guides operations on Windows operating system as examples.

1. Installation of QGIS

QGIS is an open source GIS system and enables users to convert KML/KMZ files to shapefiles (Appendix 2) and edit and/or save shapefiles (Appendix 3). This section explains how to install QGIS to a computer.

QGIS website

https://www.qgis.org/ja/site/index.html

1. 1 Downloading QGIS

From the following QGIS webpage, download a suitable version to your computer.

https://www.qgis.org/ja/site/forusers/download.html

There are two versions - Latest release (latest in features) and Long-term release (most stable), and downloading Long-term release is recommended.

1. 2 Installing QGIS

Double-click the downloaded installer file (.exe) to install QGIS.

In case of Mac OS, use the downloaded installer file (.dmg) to install QGIS.

2. Converting KML/KMZ files to shapefiles and zip-compressing them

This section explains how to convert KML/KMZ files to shapefiles by using QGIS and how to zip-compress the converted files with QGIS version 3.4.5 for Windows OS.

KML/KMZ files can be loaded to Seagrass Trainer, but these files cannot be used in Seagrass Mapper as they are. When using these KML/KMZ file information in Seagrass Mapper, these files need to be converted to shapefiles then zip-compressed for uploading to an asset folder in Seagrass Trainer.

2. 1 Converting KML/KMZ files to Shapefiles

i. Start QGIS. Then, drag and drop the KML/KMZ file in the QGIS map canvas. Or, open QGIS pages (menu > layer > adding layer(s) > adding vector) and select the KML/KMZ file and display it on QGIS.

ii. Right click the displayed "layer name" (in alphabet) on the layer panel and select export >　select "Save features As..." (Figure 1).
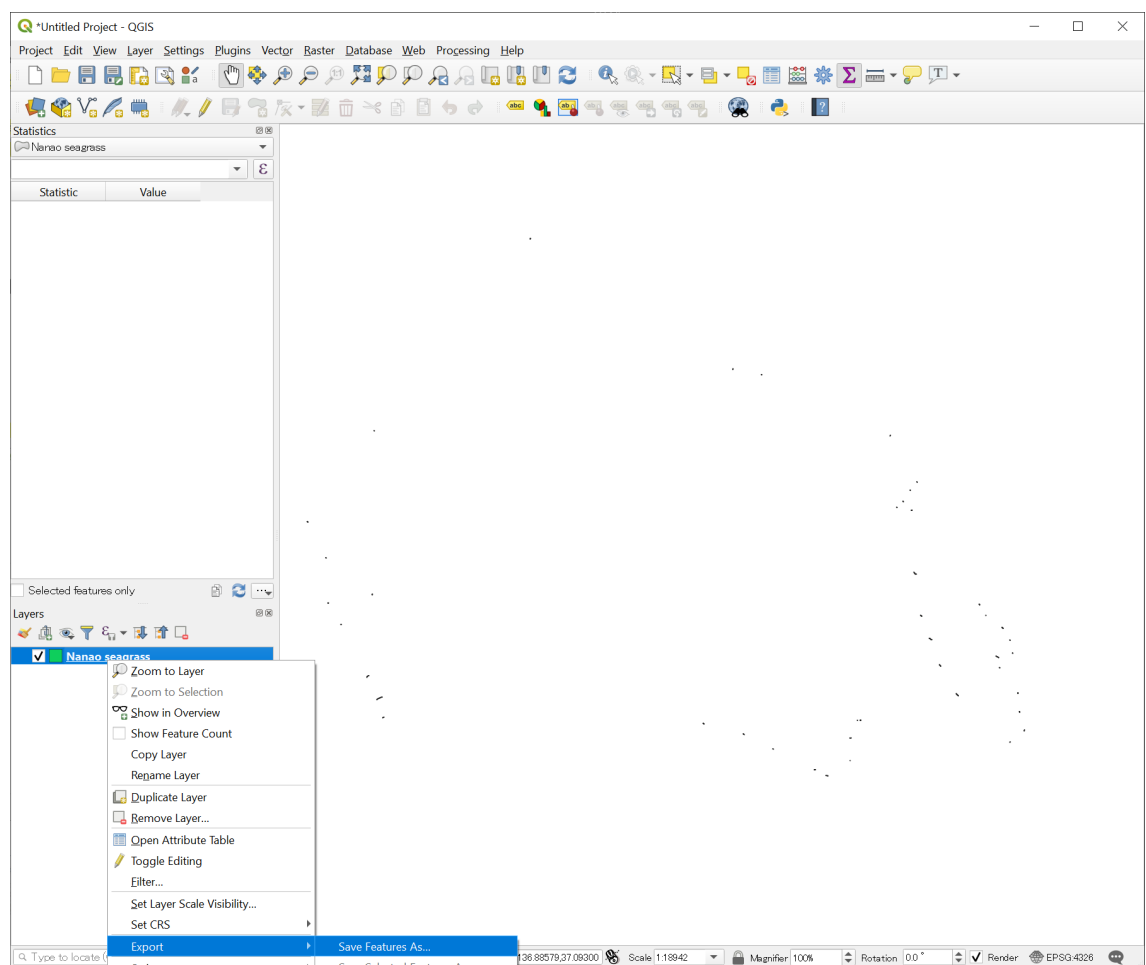
Figure 1. Displaying a KMZ file in the QGIS canvas for saving QSRI shapefile data format

iii. Press OK in the "Save Vector Layer as..." window after selecting ESRI Shapefile from the "Format" pull down menu and specify the file name and its location next to the "File name" column (Figure 2).
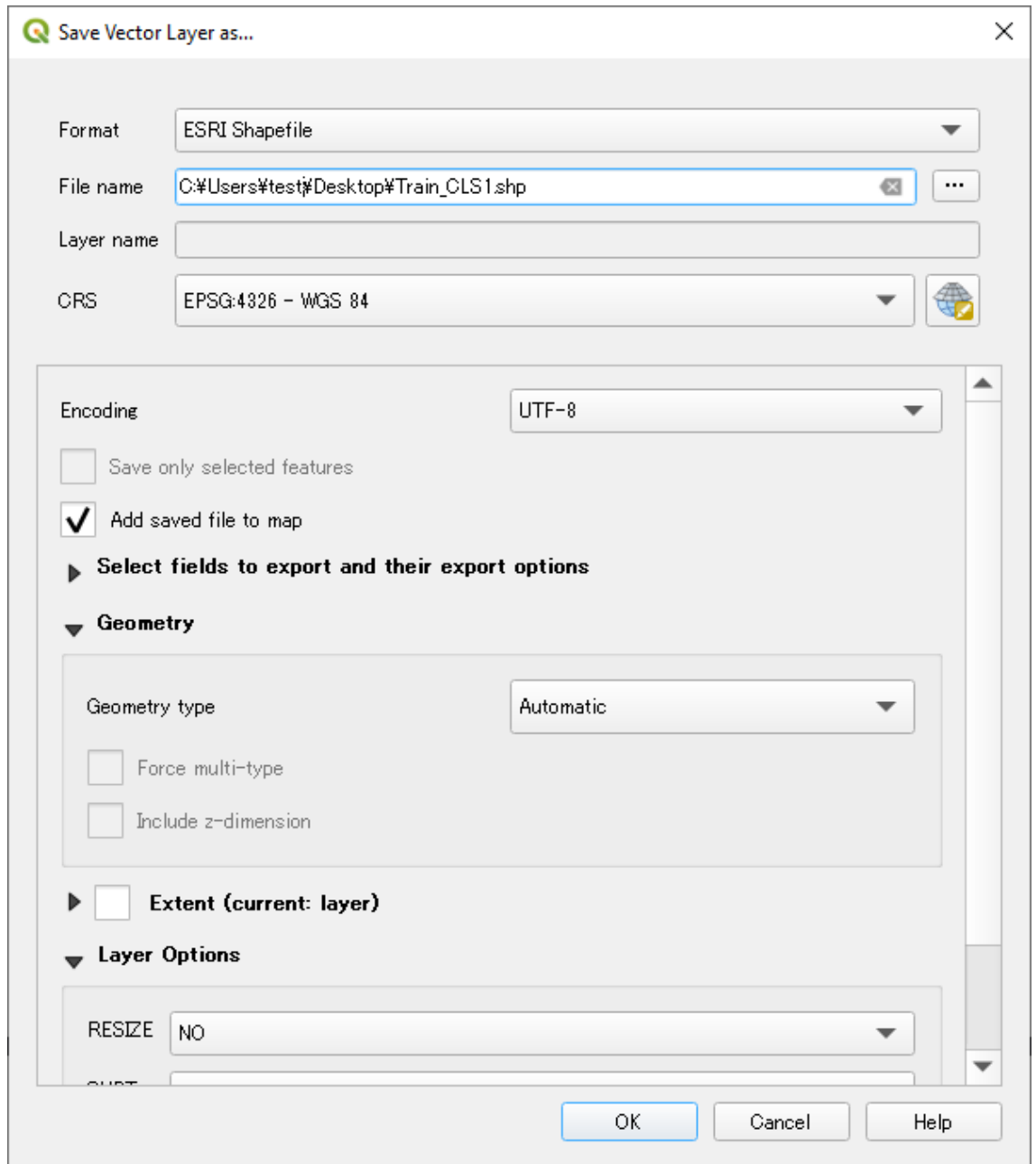

Figure 2. Window for saving the file after specifying the file name.
Format: ESRI Shapefile

2. 2 Filename: file name to be saved Zip-compressing files

Shapefile is composed of several files such as .shp, .shx, and so on. Among them, zip-compress 4 files (.shp, .shx, .dbf, .prj) to be uploaded to Seagrass Trainer/Seagrass Mapper.

i   Locate 4 files (.shp, .shx, .dbf, .prj) in one folder. In this example, make a folder name "Train_CLS1" then copy the 4 files (Train_CLS1.shp/shx/dbf/prj) (Figure 3).
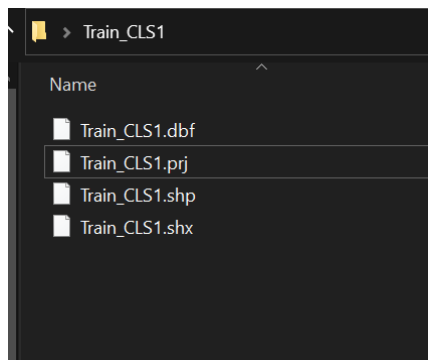

Figure 3. Locating four files (.shp, .shx, .dbf, .prj)

ii   Right click the "Train_CLS1" folder on the Windows explorer, and select "Send to", then "Compressed (zipped) folder" inside the "Send to" menu (Figure 4).
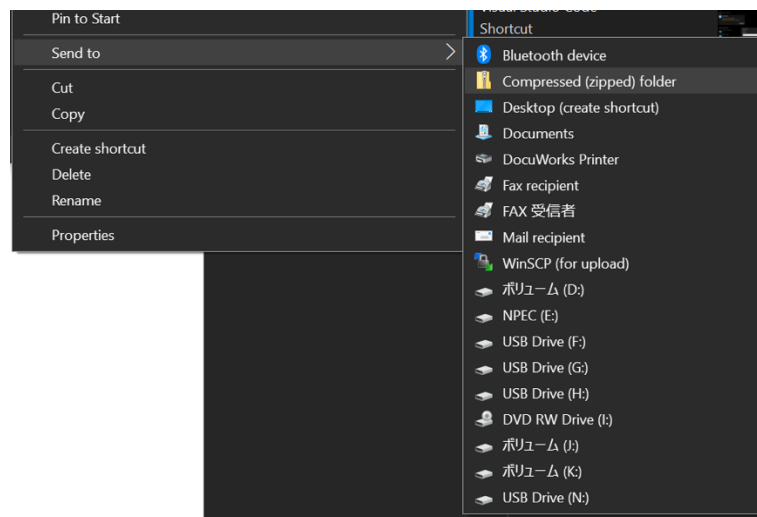

Figure 4. Right-click the folder for zip-compressing

iii   Zip-compressed file will be output by specifying the output folder. Then, upload the output file to Seagrass Trainer/Seagrass Mapper.

3. Editing and saving the existing Shapefiles

This section explains how to edit and save existing shapefiles (e.g. polygon, a point) by

using QGIS.

i   Make a copy of a shapefile (including at least .shp, .shx, .dbf, and .prj files) on Windows explorer (Finder for Mac OS). This copy will be used for editing and saving.

ii   Start QGIS. Drag and drop the copied file from Window explorer (or Mac Finder) to the QGIS map canvas, or display it on QGIS (menu >Layer > Add layers > Add vector Layer).

iii   Right click the "layer name" on the Layer panel and select editing mode.
Or, after clicking the layer name, click the "pencil" icon on the toolbar. Then, User can edit the selected layer (file) (Figure 5).
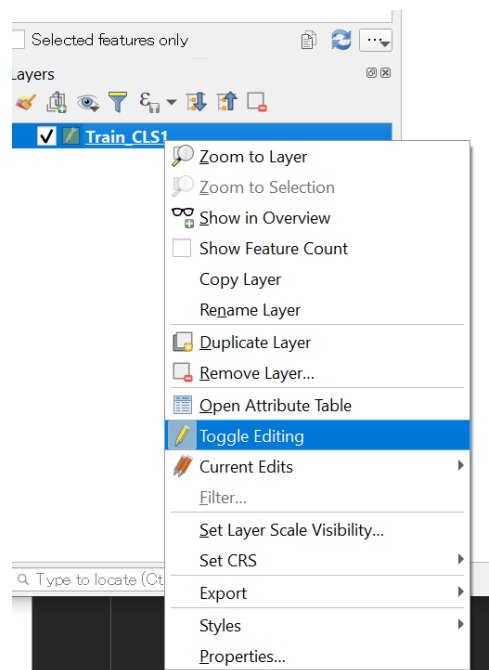

Figure 5. Editing the selected layer (file) from the toggle editing menu.

iv   For editing or deleting the existing item, such as a polygon,
1) Display the area of the item
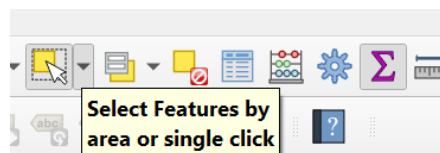2) Click [select features] icon on the tool bar (Figure 6)

Figure 6. Clicking [select features] icon on the tool bar.

3) Click the target item for editing (Figure 7).

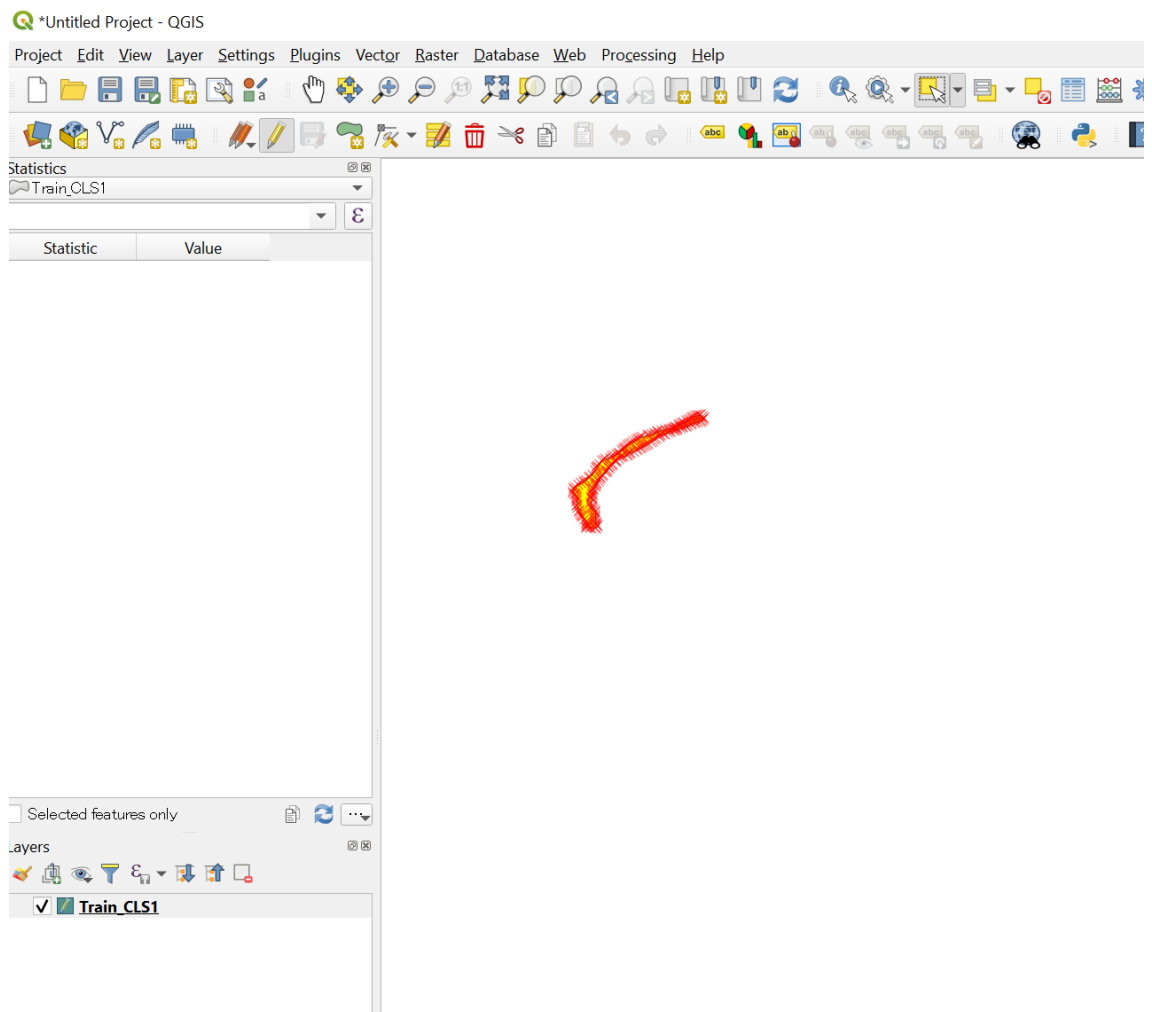Figure 7. Image of the screen (selecting a target polygon)

4) For changing the polygon range/area, click the Vertex tool on the tool bar. Then, click the point that you want to change the position, and click the new position (Figure 8).

5) For deleting an item, click the recycle bin icon on the tool bar (Figure 8).
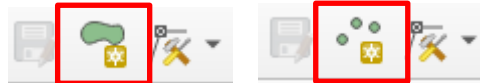

Left: Vertex tool   Right: recycle bin

Figure 8. Vertex tool and recycle bin on the tool bar.

6) For canceling the previous editing work, click Edit (in menu) > Undo.

v For adding items, click "adding polygon features (for polygon)" or "adding point features (for points)" (Figure 9), then draw new polygon(s) or pin points and save them (Figure 10).

Left: adding polygon feature(s)   Right: adding point feature(s)

Figure 9. Adding polygon features (left) or point features(right)

Figure 10. Saving the edited item(s) in the file

vi For saving the result(s) in the file, click the floppy disk icon on the tool bar.

vii Click the pencil icon on the tool bar to stop the editing mode.

4. Converting CSV files to Shapefiles

If you have AOI data or training data in CSV file formats, it is recommended to convert them into shapefiles for ease of overlaying them with other spatial data. This section explains how to convert CSV files to Shapefiles by using QGIS.

i   Start QGIS and click Layer > Add Layer > A Delimited Text Layer

ii When the window for adding Delimited Text Layer, select the field (column) with longitude for X-field and latitude for Y-field. For geometry CRS, set "coordination system" (for example, "Project CRS: EPSG:4326 – WGS 84) (Figure 12).

iii By clicking "Add" button, new layer(s) is shown on QGIS.

iv Right click the layer name to save the layer information as a shapefile (See 2.1 (ii)-(iii) for details)

```
136.8679959,37.09928753
136.8682769,37.09941885
136.868681,37.09924482
136.8683794,37.09992366
136.8681208,37.09973151
```
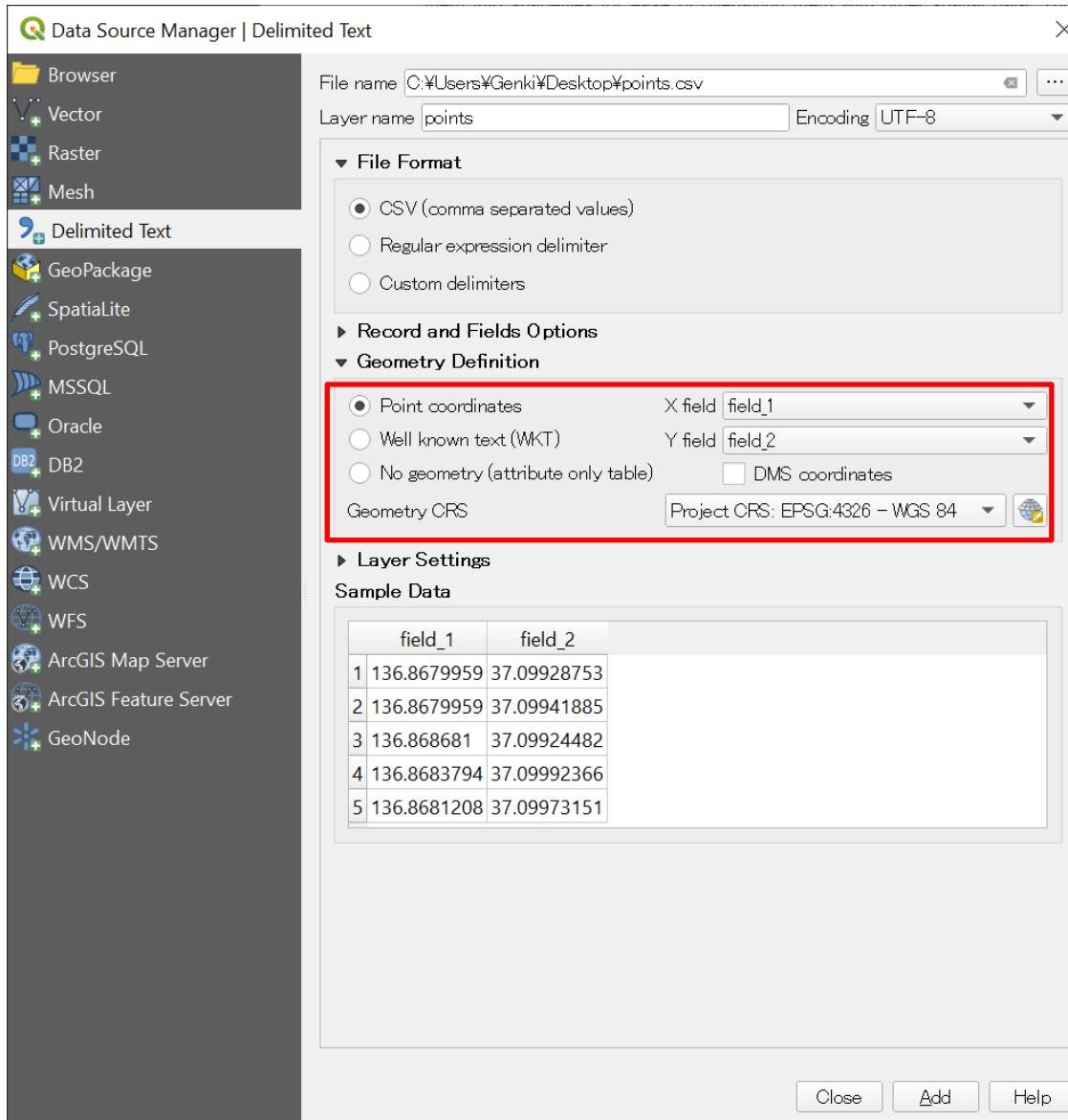
Figure 11. Original CSV file (example)

Figure 12. Set X-field, Y-field, and geometry CRS then Add to add layer in QGIS.

5. Tidal Correction with different data from JMA（Appendix 5）

For tidal correction, tide level data is required.

In Seagrass Mapper and Seagrass Trainer, tide level data of Japan Meteorological Agency (JMA) are already embedded, so user can specify the station code for tidal correction. When using other tide level data (e.g. when the target area is out of Japan) for tidal correction, user has to prepare tide level data on his/her own. Tide level data has to be prepared in CSV file format along with the sample (Figure 13).

	A	B	C	D
1	station_code	date	height	
2	AO	1293807600000	44	
3	AO	1293811200000	46	
4	AO	1293811860000	46	
5	AO	1293814800000	45	
6	AO	1293818400000	41	
7	AO	1293822000000	37	
8	AO	1293825600000	31	

Figure 13. Example of tide level data

Make a "title" row and enter the following information (comma-delimited) to the record.

・station_code: designated code (2 alphabet letters)

・date: observation data and time (UnixTime: millisecond)

・height: sea level data (cm)

CSV files needs to be registered in an asset.

・When using Seagrass Mapper, see Section 3.3.2 of the Seagrass Mapper User Manual for registering an asset with the Google Earth Engine Code Editor.

・When using Seagrass Trainer, please contact Administrator (NPEC), which takes care of uploading data.

When carrying out tidal correction, user needs to specify the tide level observation code with "NN" (2 alphabet letters) in [Nearby Station Code] on the operation panel. Tide level observation code can also be 3 digits by combining alphabet and numerical numbers (e.g. C01). File name for tide Level CSV file needs to be "tidaldata_NN.csv" or "tidaldata_C01.csv".

6. Reuse of Training Data (Appendix 6)

In Seagrass Trainer, create one asset folder every sign-in, which is used to save uploaded training data. However, for a certain period of time, user can reuse the same training data in Seagrass Mapper by reloading the asset folder. See the steps below for reusing data.

i   Remember the name of the asset folder which user will use again.

When setting parameters, an asset folder name is automatically created and displayed in the field of "Asset Folder Name". Record this asset folder name for reusing training data.

(Please note after sign-out, user cannot check the folder name, so take a note of the name before signing out.)

Figure 14. Checking the asset folder name from Satellite Image Analysis Parameters window.

ii   Access to Seagrass Mapper when reusing the data.
https://mapseagrass.users.earthengine.app/view/seagrassmapper

iii   Enter the asset folder name in the field [Enter your Asset folder name previously recorded] and press [Load Assets] to start loading the data (Figure 15).
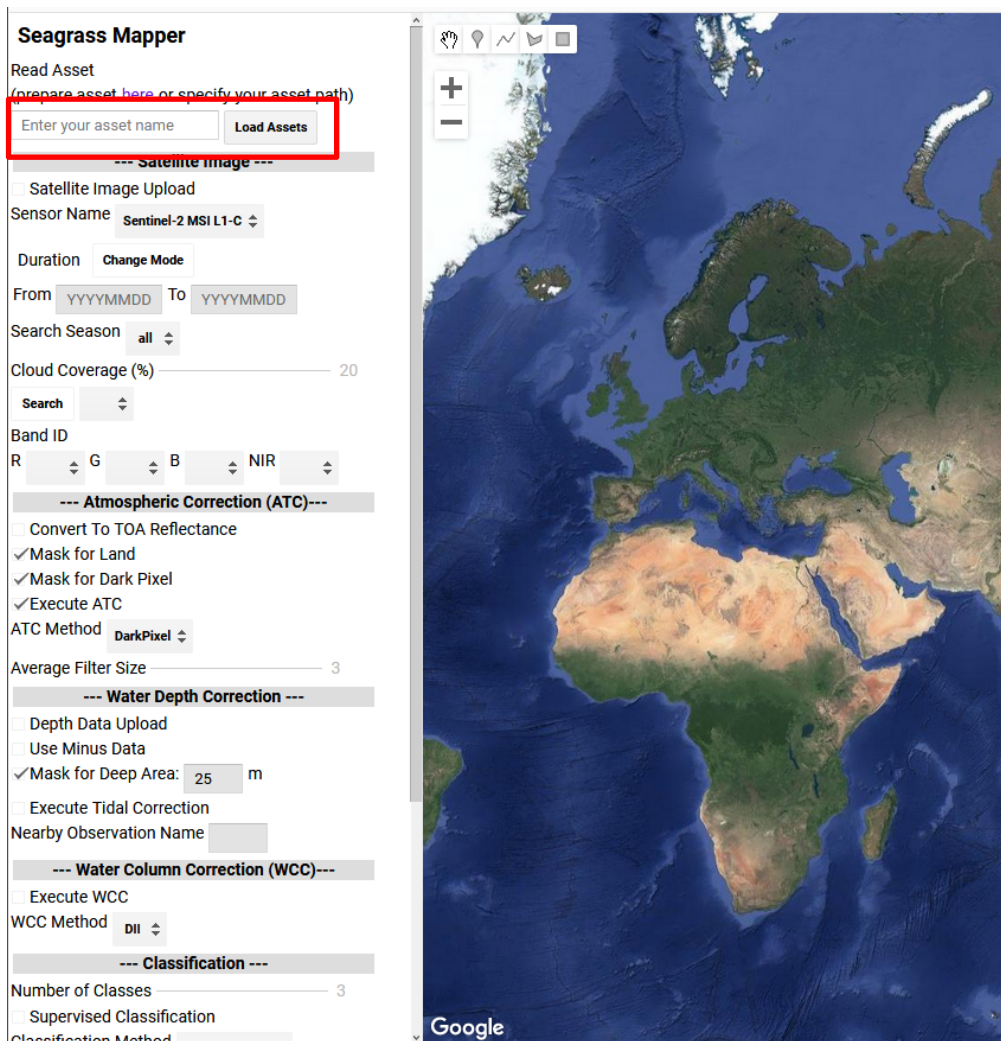
Figure 15. Entering the asset folder name in Seagrass Mapper.

iv   Set parameters for satellite image analysis in Seagrass Mapper, same as in Seagrass Trainer. Please note that processed analysis result cannot be downloaded with this procedure.

- When user saves multiple sets of training data and reusing them, it is necessary to create multiple asset folders and save each training data set in each folder. In such a case, user needs to repeat sign-in and sign-out Seagrass Trainer as one asset folder can be created per sign-in. The following table (Table 1) is the example to use three different data sets.

Table1. showing how three different Asset folders are created and managed.

Sign-in	Asset folder	Saved data
1st time	Automatically created with "username_1st sign-in date and time"	File(s) uploaded during the 1st sign-in*
2nd time	Automatically created with "username_2nd sign-in date and time"	File(s) uploaded during the 2nd sign-in*
3rd time	Automatically created with "username_3rd sign-in date and time"	File(s) uploaded during the 3rd sign-in*

* Any data deleted before sign-out are not saved. If a file with the same name of the existing file is uploaded, the content of the existing file is automatically overwritten.

7. Preparing information for TOA reflectance conversion (Seagrass Mapper)

In Seagrass Mapper, pixel values can be converted into Top of Atmosphere (TOA) reflectance value by preparing a TOA converting parameter file (TOAparam.csv) and registering it into an asset folder. How to create this TOAparam.csv will be explained as follows. To register this file into a private asset, please refer to Section 3.3.2. of the Seagrass Mapper User Manual, 3. 3. 2. Registering Asset by Code Editor of the Google Earth Engine.

<satellite images to be converted into TOA reflectance data>
・Images which user prepares on his/her own and uploads to Seagrass Mapper
    WorldView-2, 3, GeoEye-1, Any (WorldView-4, SPOT-6, Planet)
    ✓ Conversion to TOA reflectance should be in 4 bands (Blue, Green, Red, NIR).
    ✓ Any satellite image which can be searched in Seagrass Mapper is not necessary to be converted into TOA reflectance data because they are already included in Seagrass Mapper.

<File to be created>
 ・File name: TOAparam.csv
 ・File content and format: Under the title row (key, value), enter the following 27 parameters in comma-delimited style.
        ・sensor_Type・gain_B・gain_G・gain_R・gain_N・offset_B・offset_G
        ・offset_R・offset_N・coef_radn_B・coef_radn_G・coef_radn_R・coef_radn_N
        ・coef_radd_B・coef_radd_G・coef_radd_R・coef_radd_N・time・sunelv
        ・esun_B・esun_G・esun_R・esun_N・coef_ref_B・coef_ref_G・coef_ref_R
        ・coef_ref_N
 ・Information source: Variable parameters can be obtained from mete data of satellite images (Table 2).

8. Setting sampling scale

When training data for supervised classification is in a polygon format and its spatial coverage is smaller than the resolution of the satellite, they may not be used as training data for supervised classification. One way to work around this issue is to convert all polygon information into point information as shown in (b) in the following figure. Another way is to narrow sampling scales.

. There are 4 types of sampling scales to be used:

- ✓ Original: same resolution of the satellite (for example: Landsat-8 = 30m)
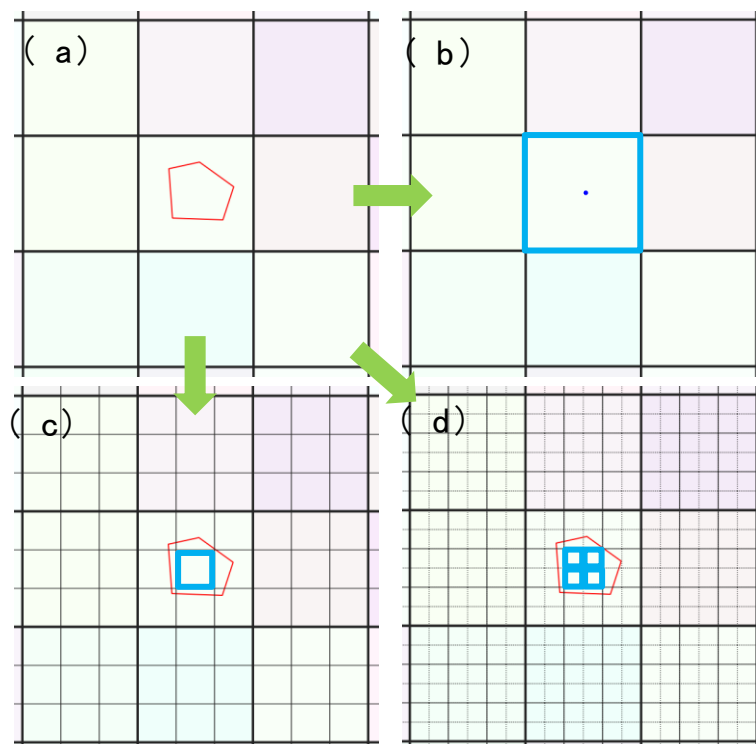- ✓ 10m
- ✓ 5m
- ✓ 1m

Figure 16. An image showing how to work around when training data in a polygon format for classification is smaller than satellite resolution (an example for Landsat 8 OLI)

Figure 16 above shows how to work around when training data in a polygon format for classification is smaller than satellite resolution (here we use Landsat 8 OLI as an example); (a) training data will be ignored when the original sampling scale (30 m) is set, (b) polygon data are converted into point data so as to be used as training data, (c) training data will be used when sampling scale is changed to 10m, and (d) even 4 matching training data are found within the same satellite pixel, and they will be counted as one data.