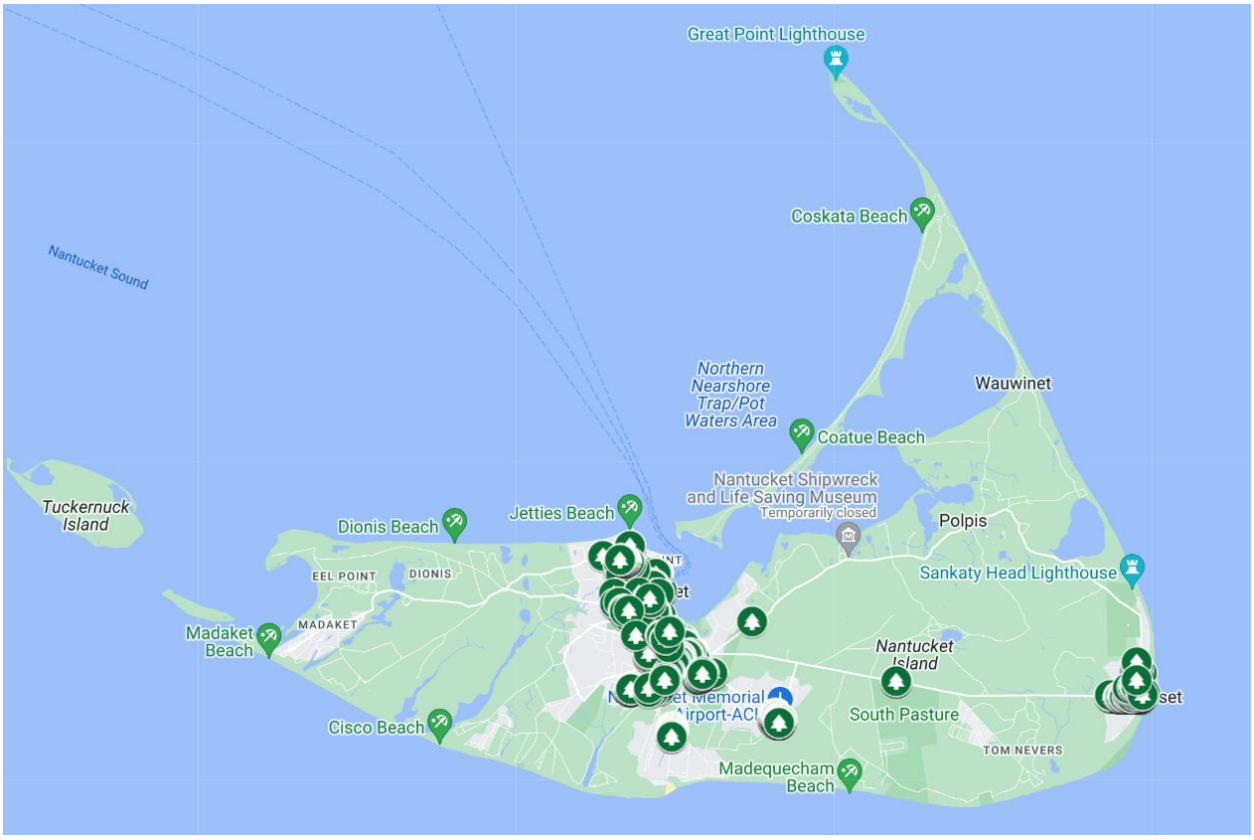
Manual for the Nantucket Town Tree Inventory

Brendan Galvin, Jason Gee, PJ McDonnell, & Alex Santagata

12/11/2024



Preface

This manual outlines usage of the Nantucket town tree inventory Google Sheet and Google My Map system set up by WPI students Brendan Galvin, Jason Gee, PJ McDonnell, and Alex Santagata in the fall 2024 academic term.

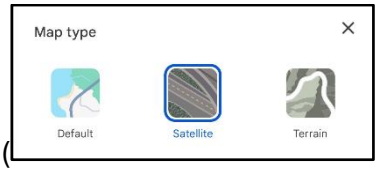
The main piece of software used in this inventory is the Google Sheet "Tree Inventory Main." This spreadsheet has multiple tabs. The primary tab, "Tree Inventory Main," consists of columns representing the data field of the inventory (WKT, Tag#, Tree species, Approximate address, DBH, Condition, and other additional attributes). This spreadsheet can be updated to reflect changes to trees. It also includes other tabs for easy coordinate conversion, archival of removed trees, and addition of private data fields. In this manual, we describe how to **inventory a new tree** (including **taking** and **formatting coordinates**), **mark a tree as a removal**, and **add a new data field**.

The setup includes Google My Map "Tree Inventory Main Map" which uses the Google Sheet and a Google Photos folder as reference. In this manual, we describe how to **merge Sheet data to the Map**, **add a photo to Google Photos**, **add a photo from Google Photos to the Map**, and **Export the Google Map to the GIS**. As of writing, all data fields on the Google Sheet are public (i.e., they will appear on the Tree Advisory Committee page when the Google Map is uploaded there) but we also describe how to **create a private data field**.

If the DPW has any other needs from the inventory not explained here, please reach out to our team at bcgalvin@wpi.edu, jrgee@wpi.edu, pjmcdonnell@wpi.edu, or ajsantagata@wpi.edu.

Google Maps App

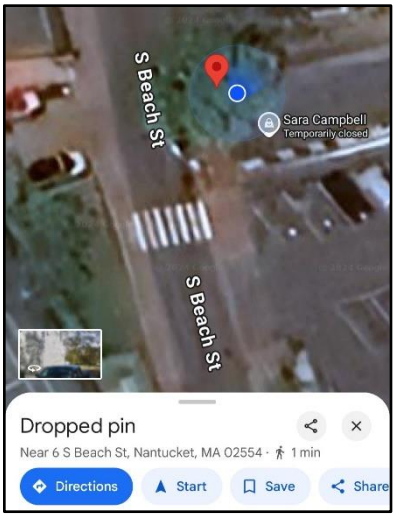
Taking tree coordinates

1. Hold your phone close to the tree.
2. Open the Google Maps app on your mobile device.
3. Tap the “map type” icon ().
4. Tap “Satellite” from the options (

).
5. Zoom in closely on your current location (indicated by a blue dot) by touching the location with two fingers and spreading them apart.
6. Using satellite imagery and your current location, identify the position of the tree on the map.

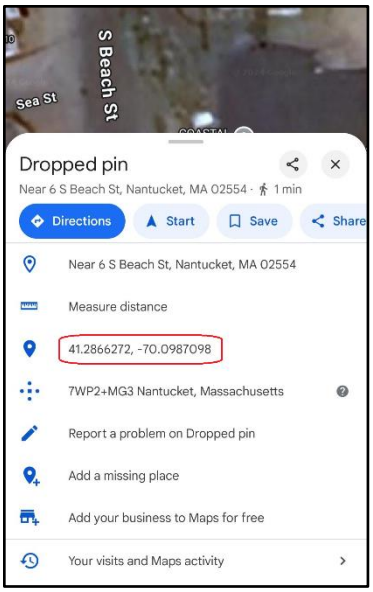
Recently planted trees may not yet be present on satellite imagery. Use neighboring structures and landmarks to best approximate the tree’s position.

7. Press and hold on the position of the tree on the map.



A red pin and a tab labelled “dropped pin” should appear.

8. Swipe up on the tab labelled “dropped pin.”



9. Tap the pair of lat/long coordinates.

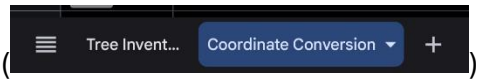
A message reading "Coordinates copied to clipboard" should appear.

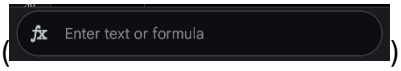
You have now copied the unformatted approximate coordinates of the tree to your clipboard.

10. Tap the × in the top-right corner of the "dropped pin" tab to close
11. Repeat from #1 for additional trees.

Google Sheets

Formatting coordinates with the Google Sheets mobile app

1. Copy the unformatted approximate coordinates of the tree to your clipboard following the steps under “taking tree coordinates” above.
2. Open the “Tree Inventory Main” spreadsheet on the Google Sheets app or website.
3. Locate and tap on the “Coordinate Conversion” tab at the bottom (

).
4. Tap on any **red** cell (A3 to A12) on the “Coordinate Conversion” sheet.
5. Tap on the text entry field (

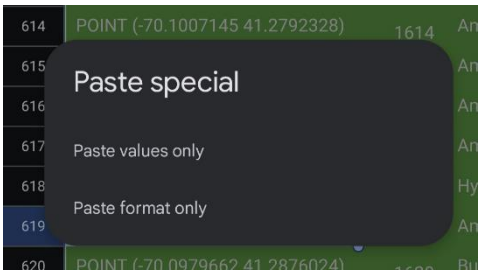
).
6. If needed, remove the contents of the text entry field by pressing and holding “backspace” ( repeatedly.
7. Press and hold on the text entry field. Then, select “Paste.”

The green cell to the right of that cell should automatically update to display coordinates in the following format: 

8. Press and hold on the corresponding **green** cell (B3 to B12) directly to the right of the red cell you selected in step 4.
9. Select “Copy.”
10. Locate the cell where you want to place the formatted coordinates (in most cases, this will be a WKT field on the “Tree Inventory” sheet.)
11. Press and hold on that cell.

A text entry menu should appear: 

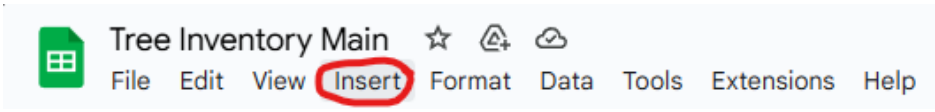
12. Tap “Paste special.”

This menu should appear: 

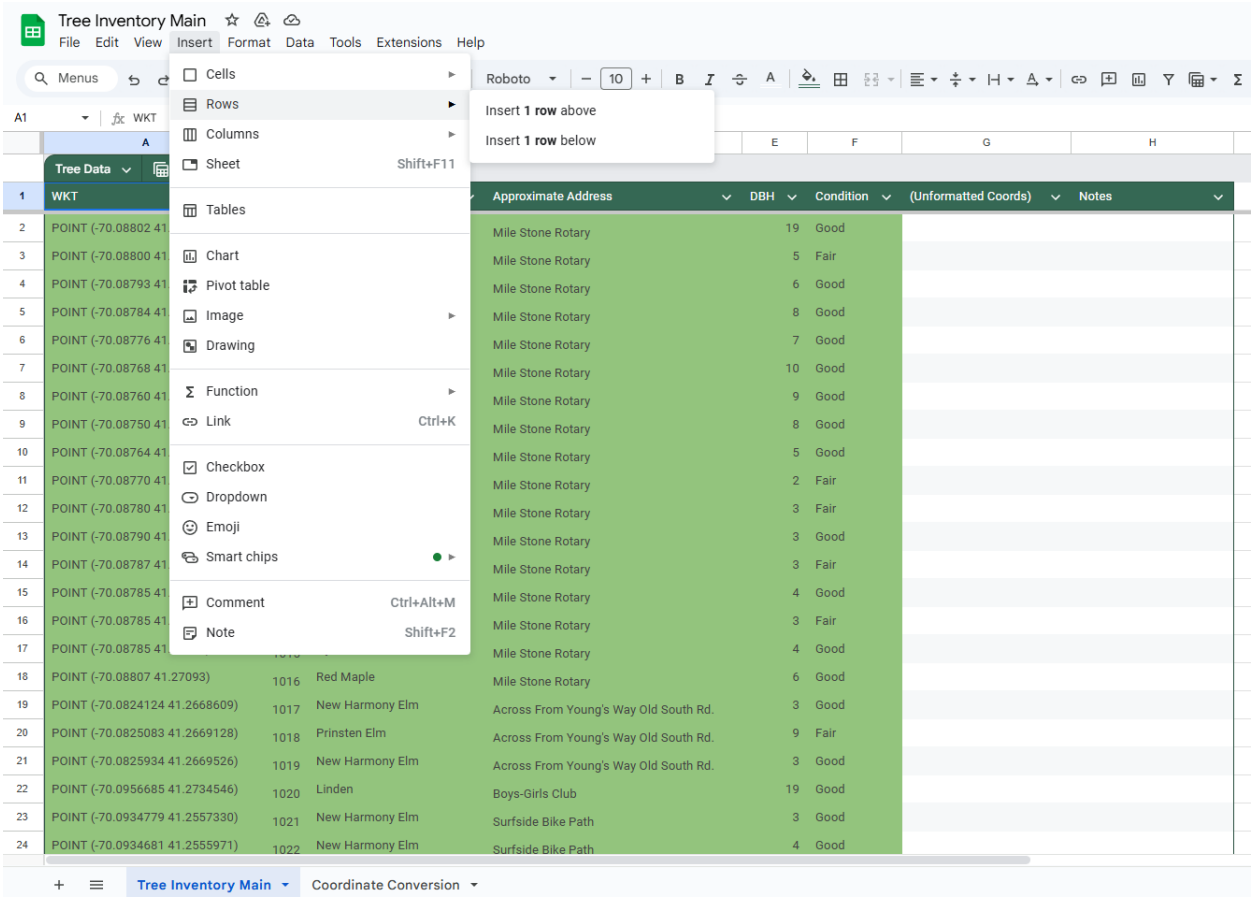
13. Tap “Paste values only.”
14. Follow this process for every tree which the location is collected for.

Inventorying a new tree

1. Open the “Tree Inventory Main” spreadsheet through the Google Drive website or mobile app.
2. Select a cell in the table.
3. Follow one of these steps depending on the device used:
    a. Laptop/Desktop:



        i. Click the “Insert” tab.
        ii. Hover over “Rows”.



        iii. Click “Insert 1 row above” or “Insert 1 row below” to add a row above or below the chosen cell, respectively.

    b. Mobile Device:

        i. Press the “Insert row below” ( ) button to add a row below the chosen cell.

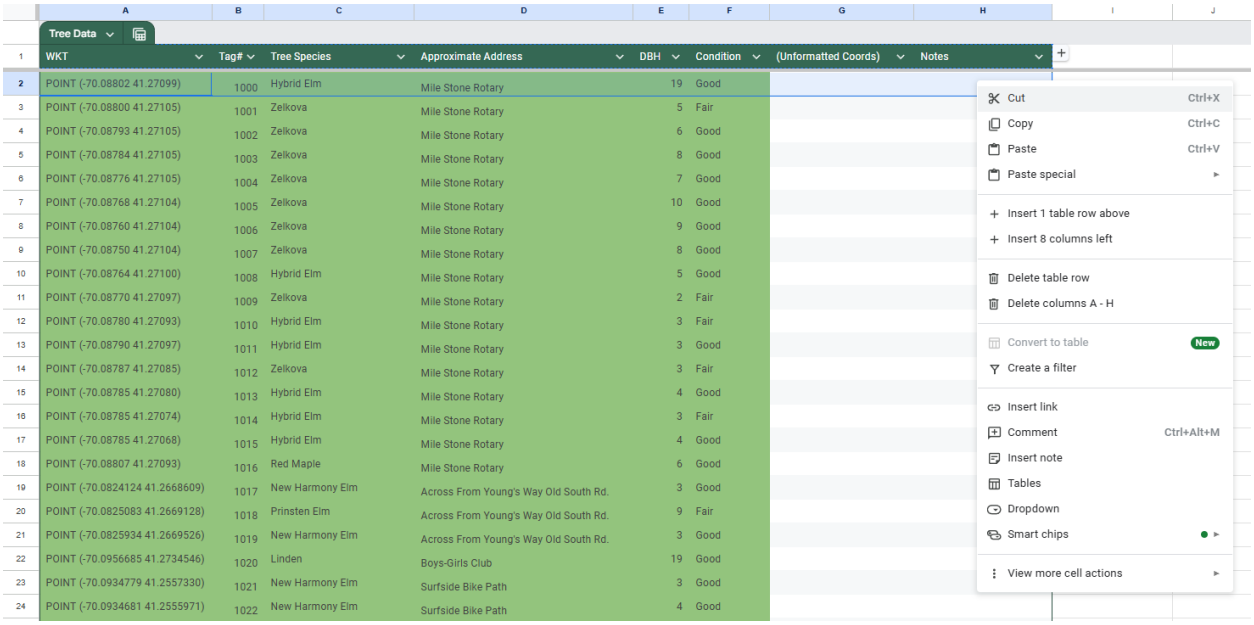
4. Double click (Or double tap on mobile) each field.
5. Enter corresponding information. (If entering coordinates/WKT, see “taking coordinates” and “formatting coordinates.”)

Marking a tree as a removal

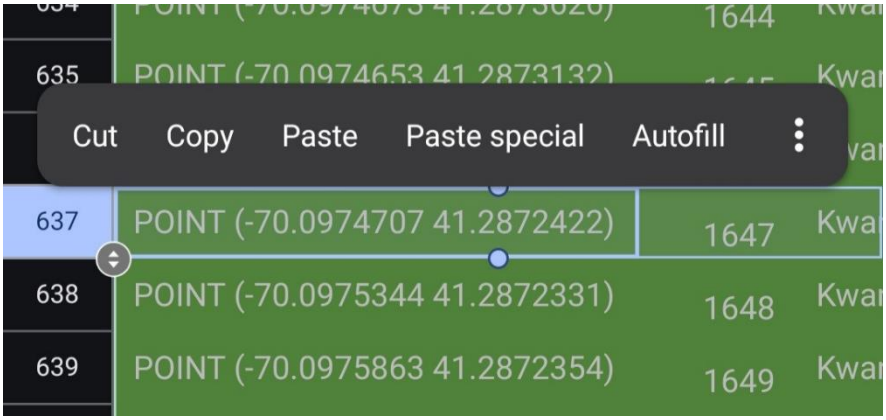
When a tree is removed, its row will be moved from the "Tree Inventory Main" to the "Tree Archive" tab.

1. Open the "Tree Inventory Main" spreadsheet through the Google Sheets mobile app or website.
2. Locate the removed tree in the "Tree Inventory Main" page of the spreadsheet.
3. Select the entire row marked as a removal.
    a. On the mobile app, select the row by tapping on the corresponding number on the left-side (such as "637" here): 

4. "Cut" the row out of the spreadsheet and "delete" the empty row.

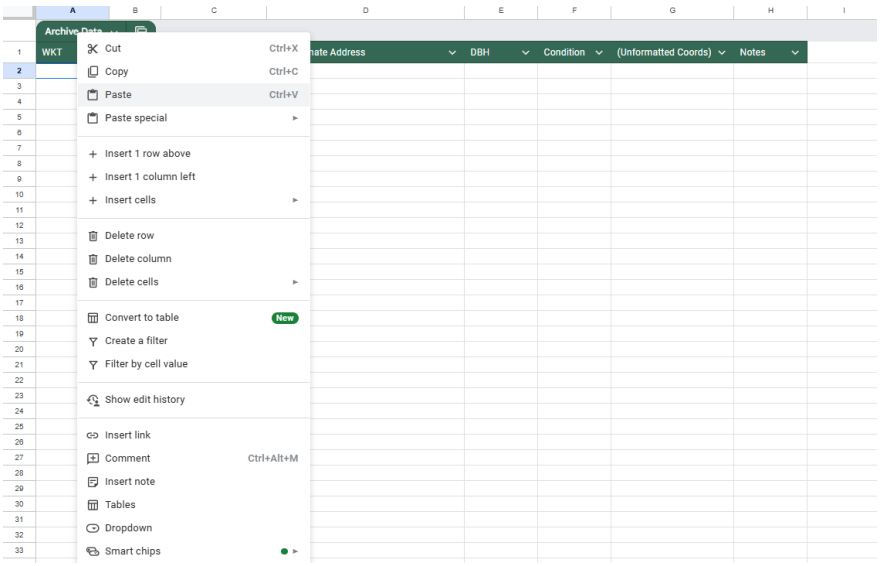


    a. On the mobile app, press and hold on the number, then tap "Cut." Then, press and hold again and tap "Delete" (you may have to tap ⋮ first.)

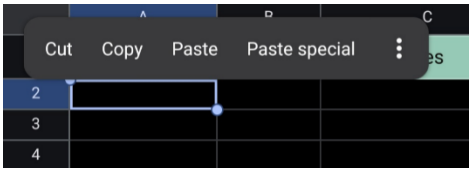


5. Select the “Tree Archive” page at the bottom of the sheets

6. Right click the first empty row of the “Archive Data” tab and press “Paste”



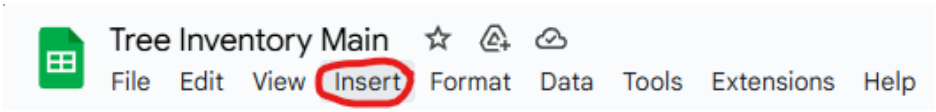
   a. On the mobile app, double-tap the first empty row, then tap “Paste.”



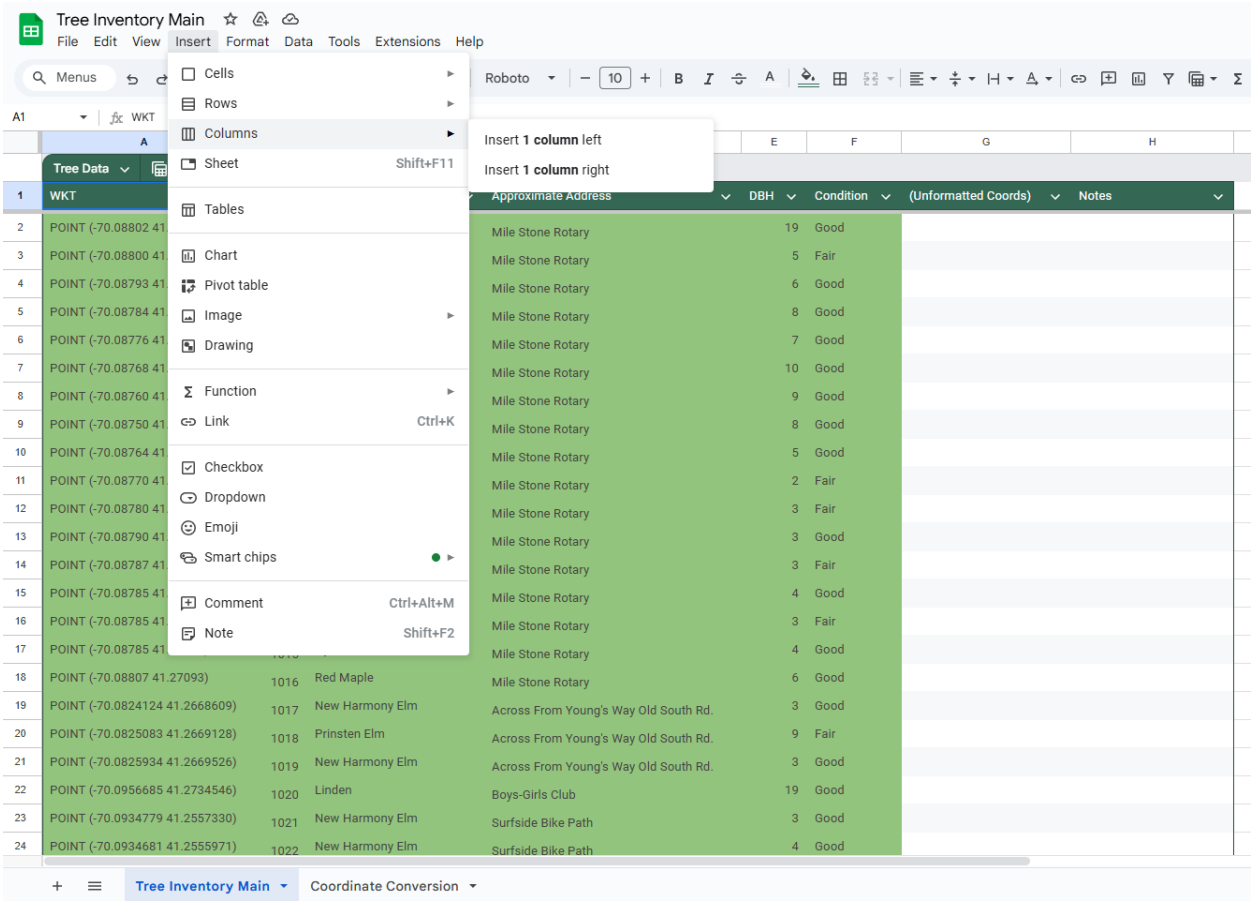
7. Write “Removal” under the Notes section.
8. You have successfully marked a tree in the archive as a removal. This archive will display for any removed, felled, or dead trees in the inventory.

Adding a new data field

1. Open the tree inventory spreadsheet through the Google Drive app/website.
2. Select a cell in the table.
3. Follow one of these steps depending on the device used:
    a. Laptop/Desktop:



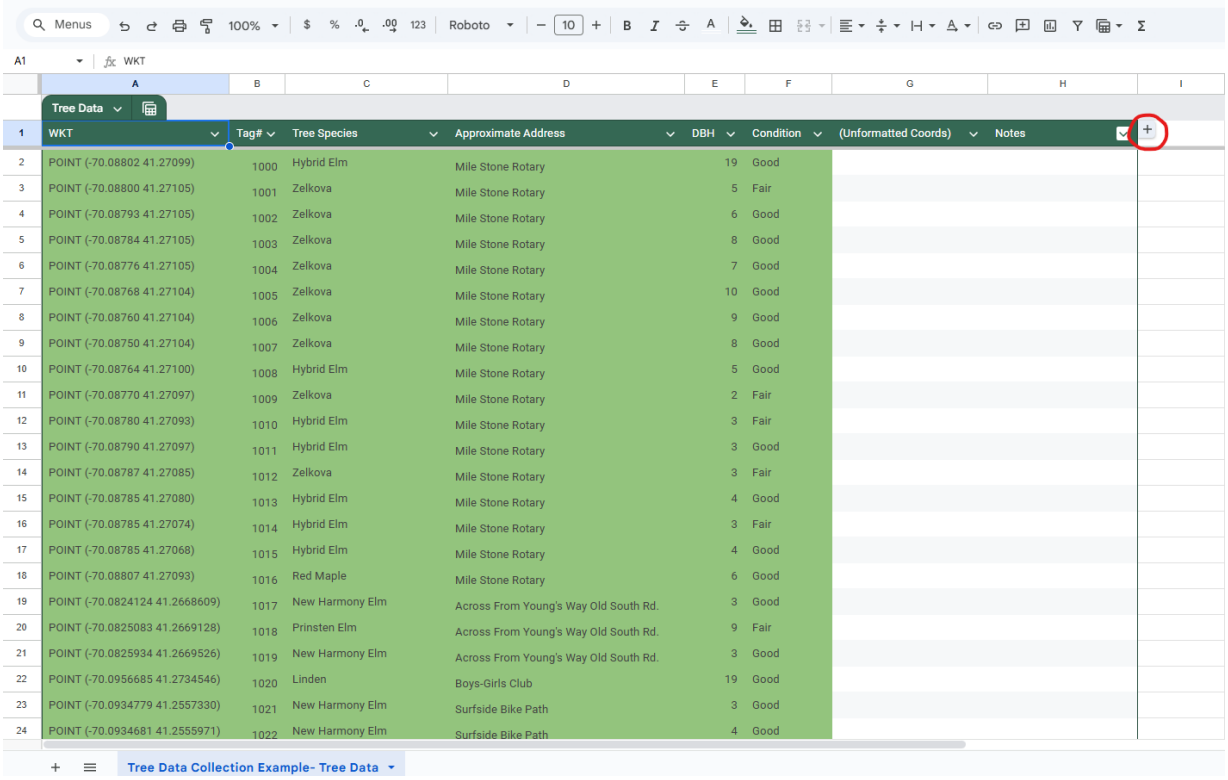
        i. Click the “Insert” tab.
        ii. Hover over “Columns”.



        iii. Click “Insert 1 column left” or “Insert 1 column right” to add a row to the left or right of the chosen cell, respectively.

    b. Mobile Device:

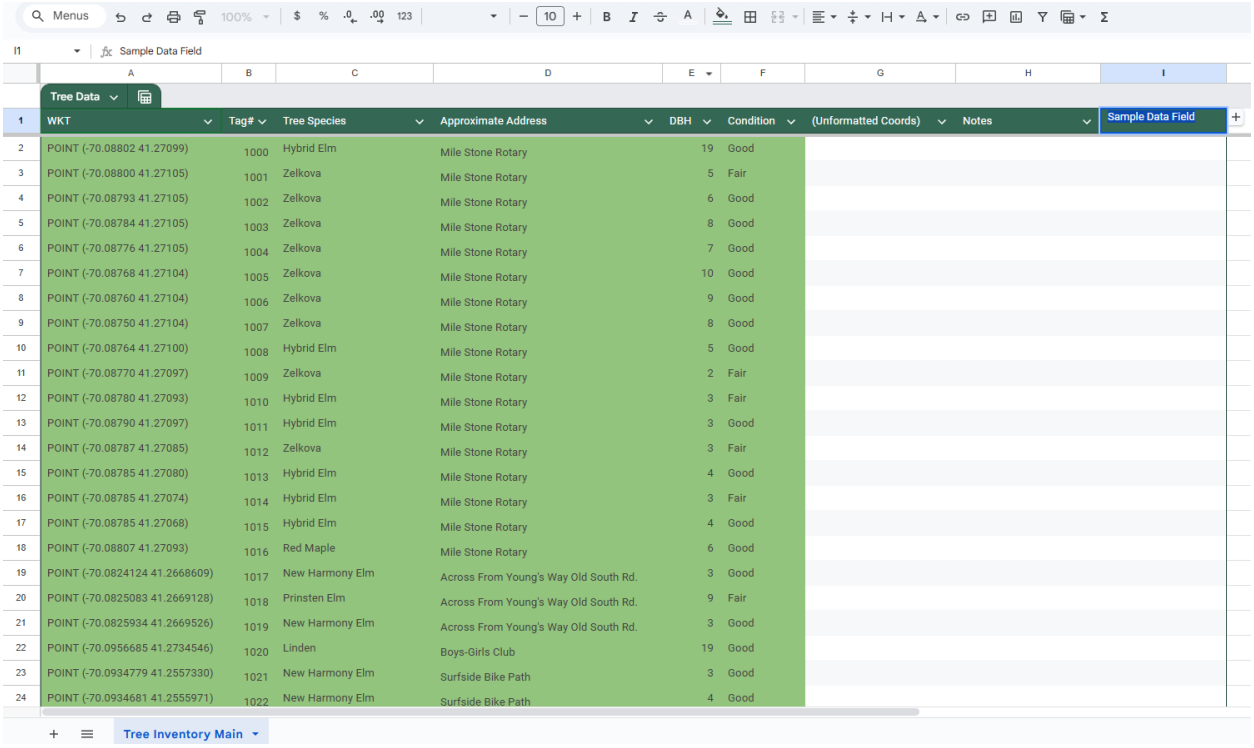
        i. Press the “Insert column right” ( ) button to add a row to the right of the chosen cell.



	WKT	Tag#	Tree Species	Approximate Address	DBH	Condition	(Unformatted Coords)	Notes
2	POINT (-70.08802 41.27099)	1000	Hybrid Elm	Mile Stone Rotary	19	Good		
3	POINT (-70.08800 41.27105)	1001	Zelkova	Mile Stone Rotary	5	Fair		
4	POINT (-70.08793 41.27105)	1002	Zelkova	Mile Stone Rotary	6	Good		
5	POINT (-70.08784 41.27105)	1003	Zelkova	Mile Stone Rotary	8	Good		
6	POINT (-70.08776 41.27105)	1004	Zelkova	Mile Stone Rotary	7	Good		
7	POINT (-70.08768 41.27104)	1005	Zelkova	Mile Stone Rotary	10	Good		
8	POINT (-70.08760 41.27104)	1006	Zelkova	Mile Stone Rotary	9	Good		
9	POINT (-70.08750 41.27104)	1007	Zelkova	Mile Stone Rotary	8	Good		
10	POINT (-70.08764 41.27100)	1008	Hybrid Elm	Mile Stone Rotary	5	Good		
11	POINT (-70.08770 41.27097)	1009	Zelkova	Mile Stone Rotary	2	Fair		
12	POINT (-70.08780 41.27093)	1010	Hybrid Elm	Mile Stone Rotary	3	Fair		
13	POINT (-70.08790 41.27097)	1011	Hybrid Elm	Mile Stone Rotary	3	Good		
14	POINT (-70.08787 41.27085)	1012	Zelkova	Mile Stone Rotary	3	Fair		
15	POINT (-70.08785 41.27080)	1013	Hybrid Elm	Mile Stone Rotary	4	Good		
16	POINT (-70.08785 41.27074)	1014	Hybrid Elm	Mile Stone Rotary	3	Fair		
17	POINT (-70.08785 41.27068)	1015	Hybrid Elm	Mile Stone Rotary	4	Good		
18	POINT (-70.08807 41.27093)	1016	Red Maple	Mile Stone Rotary	6	Good		
19	POINT (-70.0824124 41.2668609)	1017	New Harmony Elm	Across From Young's Way Old South Rd.	3	Good		
20	POINT (-70.0825083 41.2669128)	1018	Prinsten Elm	Across From Young's Way Old South Rd.	9	Fair		
21	POINT (-70.0825934 41.2669526)	1019	New Harmony Elm	Across From Young's Way Old South Rd.	3	Good		
22	POINT (-70.0956685 41.2734546)	1020	Linden	Boys-Girls Club	19	Good		
23	POINT (-70.0934779 41.2557330)	1021	New Harmony Elm	Surfside Bike Path	3	Good		
24	POINT (-70.0934681 41.2555971)	1022	New Harmony Elm	Surfside Bike Path	4	Good		

Alternatively, hovering over the dark green bar on a laptop/desktop should reveal a plus sign on the right side of the table. Click on this to add a column.

4. Double click (or double tap on mobile) the newly created column.



	A	B	C	D	E	F	G	H	I
1	WKT	Tag#	Tree Species	Approximate Address	DBH	Condition	(Unformatted Coords)	Notes	Sample Data Field
2	POINT (-70.08802 41.27099)	1000	Hybrid Elm	Mile Stone Rotary	19	Good			
3	POINT (-70.08800 41.27105)	1001	Zelkova	Mile Stone Rotary	5	Fair			
4	POINT (-70.08793 41.27105)	1002	Zelkova	Mile Stone Rotary	6	Good			
5	POINT (-70.08784 41.27105)	1003	Zelkova	Mile Stone Rotary	8	Good			
6	POINT (-70.08776 41.27105)	1004	Zelkova	Mile Stone Rotary	7	Good			
7	POINT (-70.08768 41.27104)	1005	Zelkova	Mile Stone Rotary	10	Good			
8	POINT (-70.08760 41.27104)	1006	Zelkova	Mile Stone Rotary	9	Good			
9	POINT (-70.08750 41.27104)	1007	Zelkova	Mile Stone Rotary	8	Good			
10	POINT (-70.08764 41.27100)	1008	Hybrid Elm	Mile Stone Rotary	5	Good			
11	POINT (-70.08770 41.27097)	1009	Zelkova	Mile Stone Rotary	2	Fair			
12	POINT (-70.08780 41.27093)	1010	Hybrid Elm	Mile Stone Rotary	3	Fair			
13	POINT (-70.08790 41.27097)	1011	Hybrid Elm	Mile Stone Rotary	3	Good			
14	POINT (-70.08787 41.27085)	1012	Zelkova	Mile Stone Rotary	3	Fair			
15	POINT (-70.08785 41.27080)	1013	Hybrid Elm	Mile Stone Rotary	4	Good			
16	POINT (-70.08785 41.27074)	1014	Hybrid Elm	Mile Stone Rotary	3	Fair			
17	POINT (-70.08785 41.27068)	1015	Hybrid Elm	Mile Stone Rotary	4	Good			
18	POINT (-70.08807 41.27093)	1016	Red Maple	Mile Stone Rotary	6	Good			
19	POINT (-70.0824124 41.2668609)	1017	New Harmony Elm	Across From Young's Way Old South Rd.	3	Good			
20	POINT (-70.0825083 41.2669128)	1018	Prinsten Elm	Across From Young's Way Old South Rd.	9	Fair			
21	POINT (-70.0825934 41.2669526)	1019	New Harmony Elm	Across From Young's Way Old South Rd.	3	Good			
22	POINT (-70.0956685 41.2734546)	1020	Linden	Boys-Girls Club	19	Good			
23	POINT (-70.0934779 41.2557330)	1021	New Harmony Elm	Surfside Bike Path	3	Good			
24	POINT (-70.0934681 41.2555971)	1022	New Harmony Elm	Surfside Bike Path	4	Good			

5. Type in the name of the desired field.

You can now update the new field for any tree, similarly to any other field.

Adding a private data field

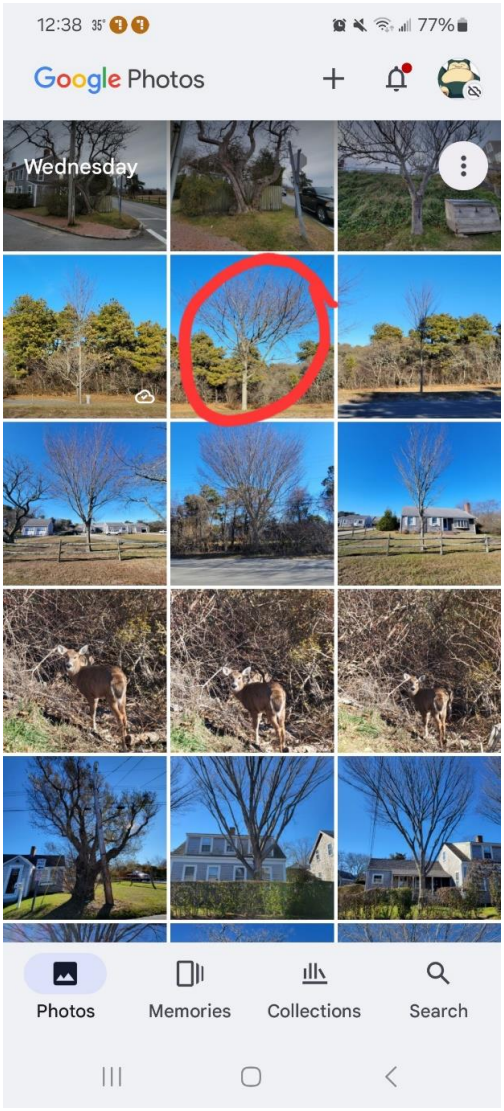
1. To add a private data-field you navigate to the “PRIVATE Tree Inventory Main” sheet at the bottom of the sheet, and simply follow the “Adding a new data field” section of this manual. This sheet will act as a private version for internal use of any private data not seen to the public on the map.

Google Photos

Adding photos to Google Photos via Mobile App

1. Open Google Photos on your device.

Google Photos should display all of the photos across both the device and the photos album, regardless of whether backup is turned on or off.



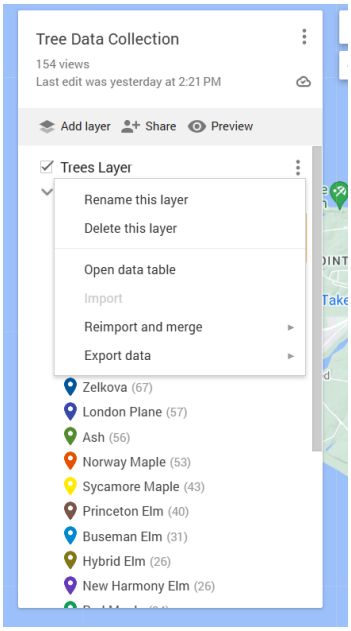
2. Tap on a photo without the “  ” icon.
3. Tap on the “  ” button.

Google My Maps

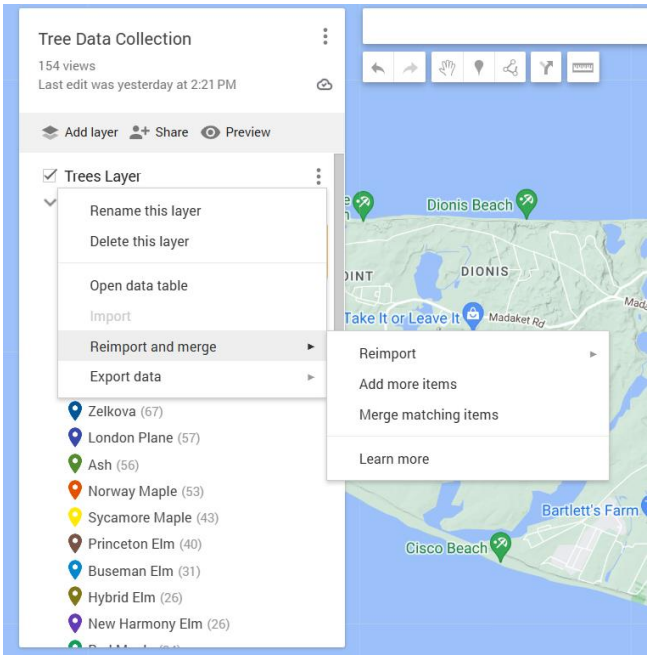
Merging Google Sheets with Google Maps

This merging process will work for any Google Sheet tab and Google My Map layer. Just follow the same process below.

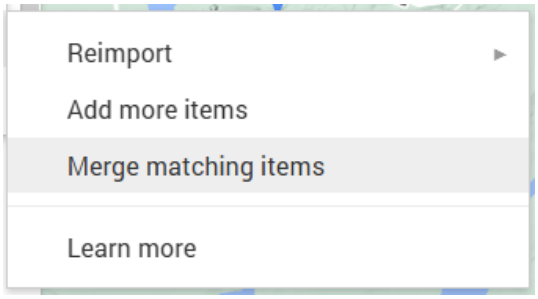
1. Open the Tree Data Collection map through the Google Drive website.
2. Click on the three dots next to the “Trees Layer.”



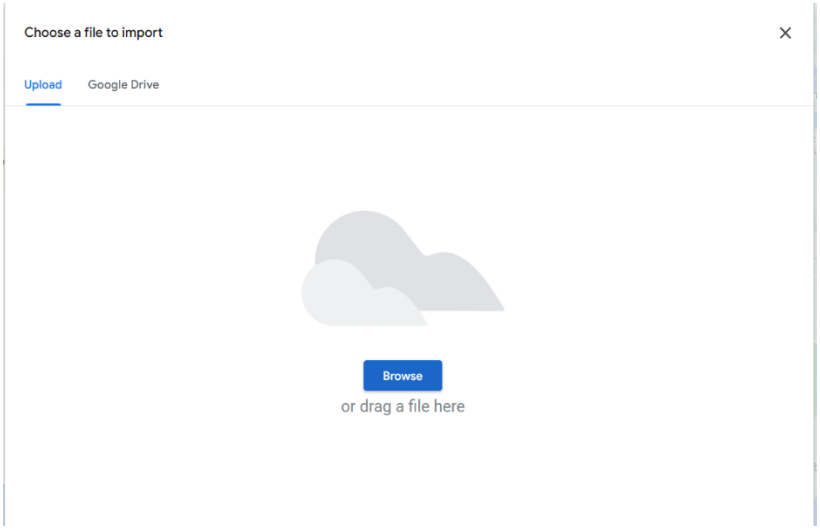
3. Click on “Reimport and merge.”



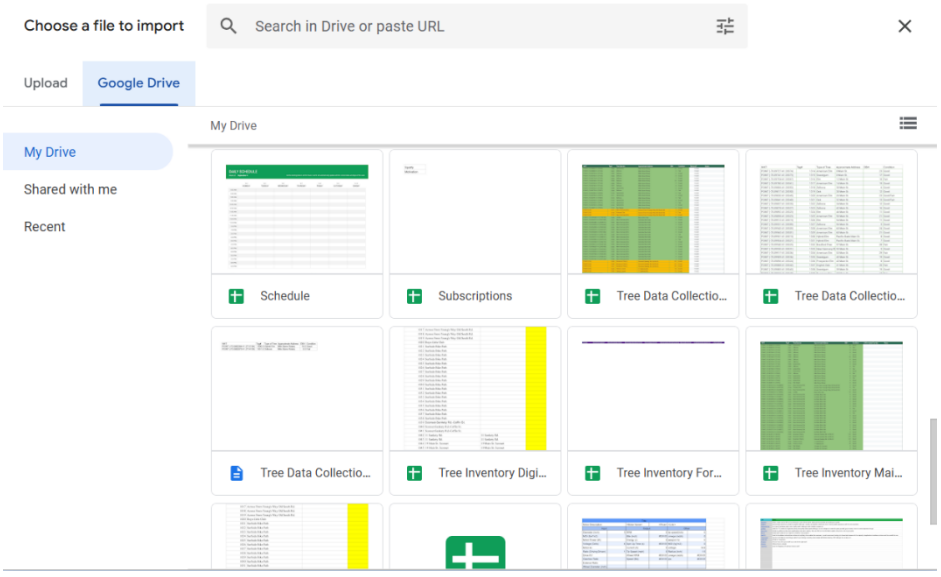
4. Click “Merge matching items.”



5. Click on “Google Drive” on the pop-up menu.

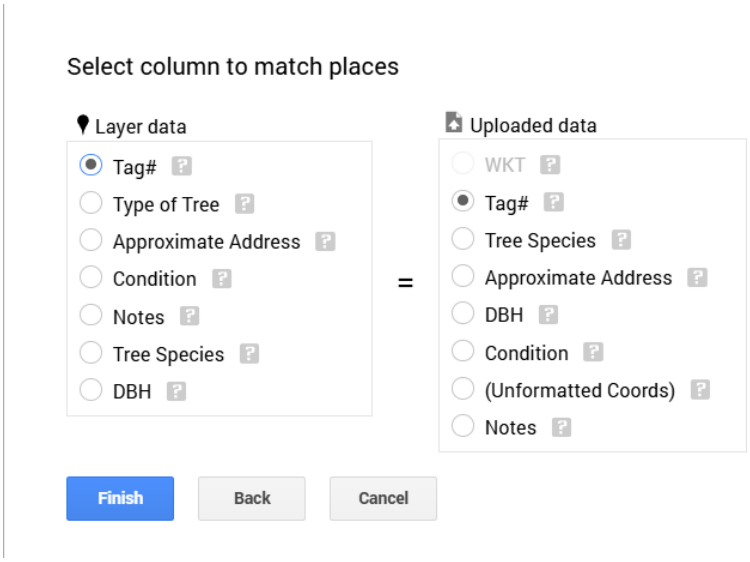


6. Click on “My Drive.”

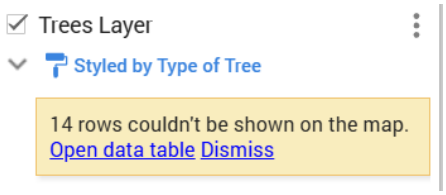


7. Click and open the “Tree Inventory Main” Spreadsheet.
8. Click on “Insert.”

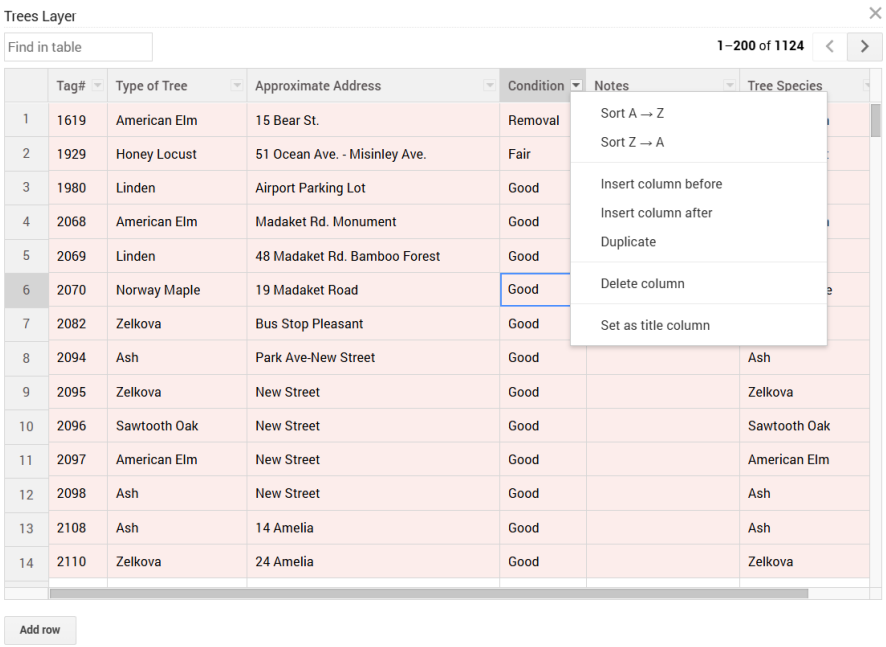
9. Select the “Tag#” field for both the “Layer data” and the “Uploaded data” and press “Finish.”



10. If a new of duplicate layer is created mistakenly, delete the duplicate data fields by on accident, you can delete the duplicate data fields by clicking on the “Open data table.”

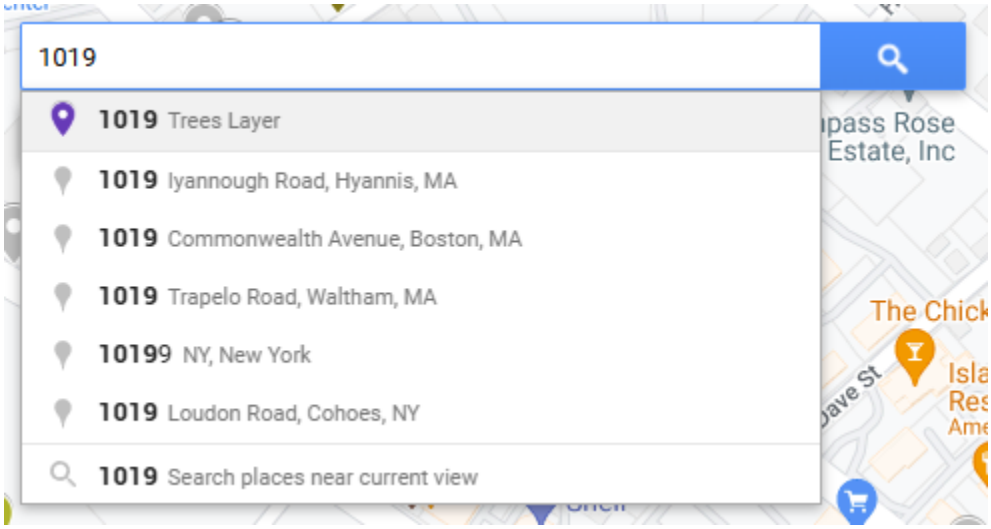


11. Then, select the duplicate column (if there is one) with the triangle dropdown, and press delete column. Most of the time there will not be a conflicting issue, but if there is, this is the easiest solution.

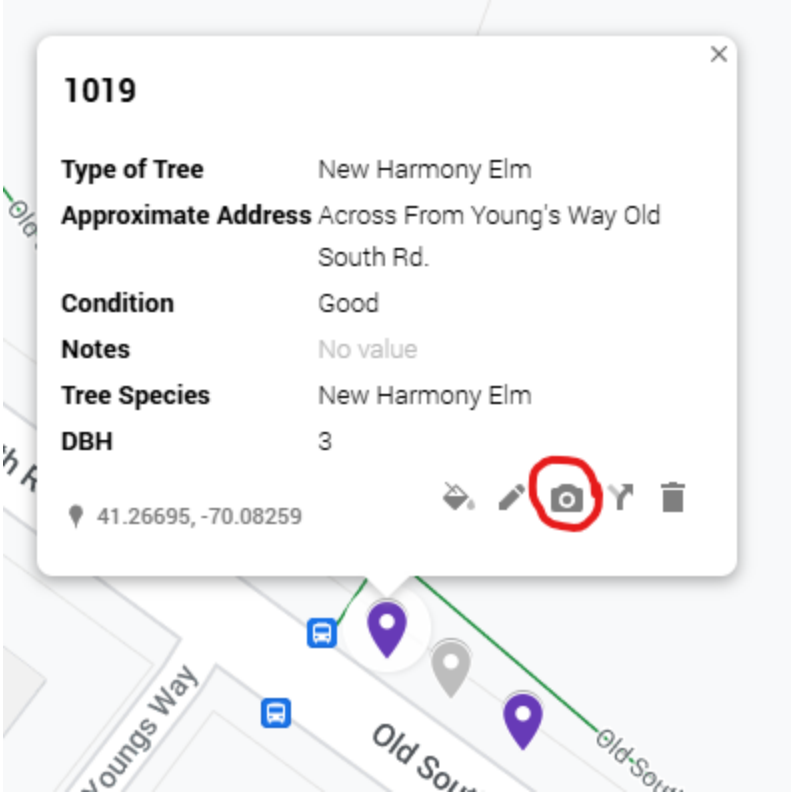


Adding Google Photos to Google Maps

1. Open the Tree Data Collection map through the Google Drive app/website.



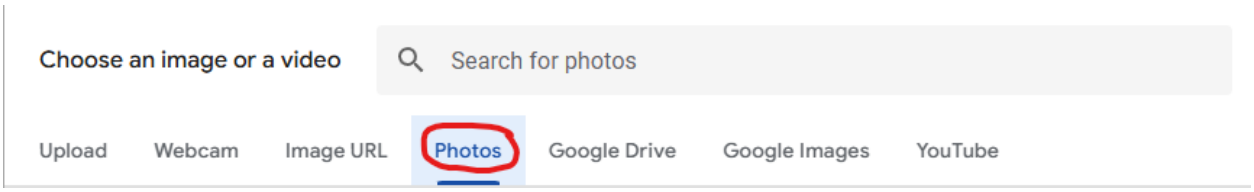
2. Open a point on the map by using the search bar or tapping on a visible point.



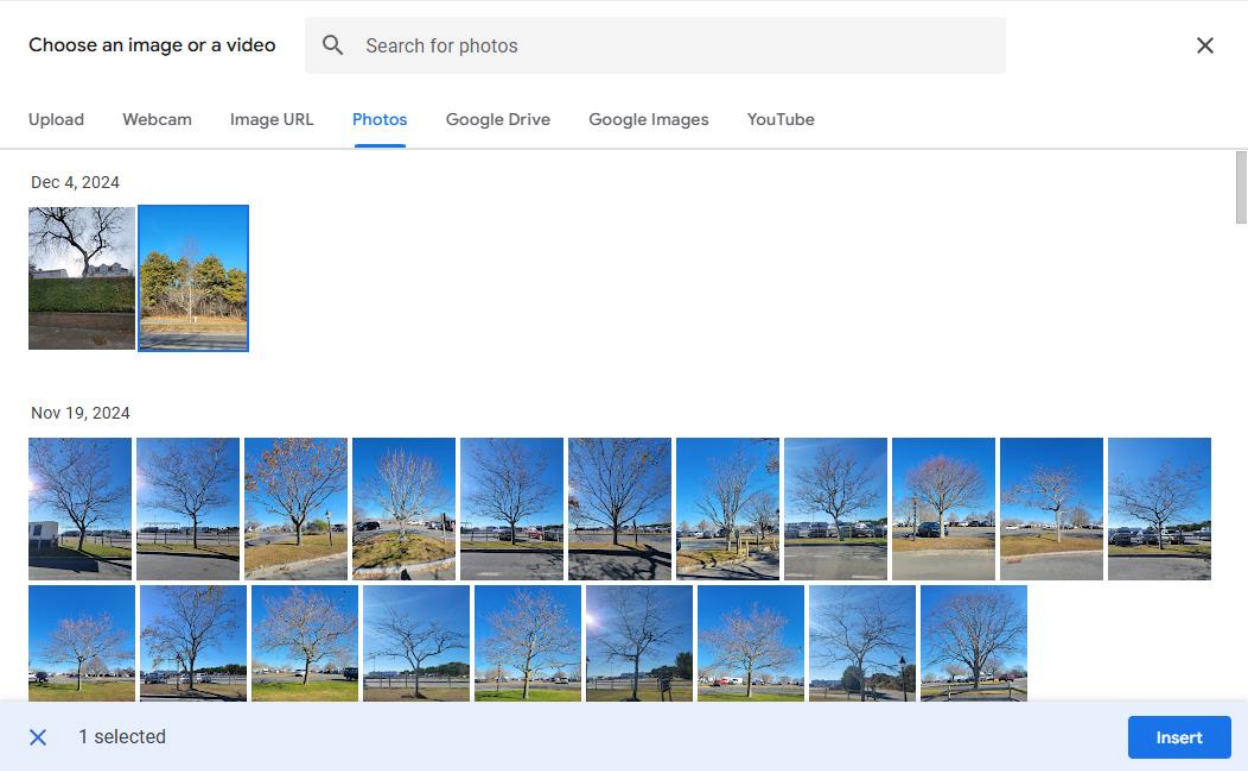
3. Click on the photo icon.

Photos can be added to a tree from either the device's album or the tree inventory album.

4. Follow one of these steps depending on the album of choice:
    a. Google Photos:



        i. Click the tab labeled "Photos".

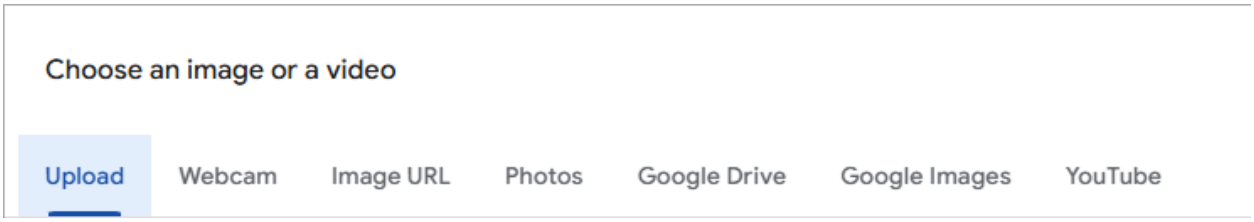


ii. Select the desired photo from the album (See the Google Photos section for information on how to upload photos to an album).

iii. Click the "Insert" (

) button.

b. Device Album:



i. Click the tab labeled "Upload".

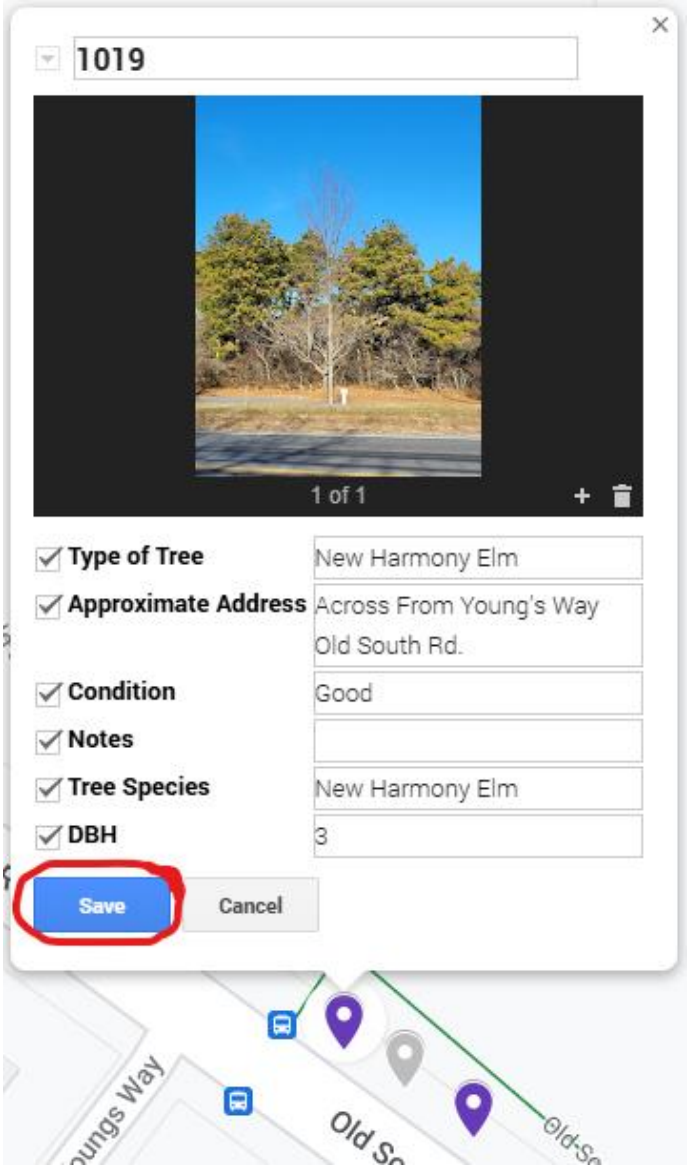
ii. Click the "Browse" (

) button.

The exact steps for choosing a photo will vary based on the type of device used, but another window should open that will prompt the user to select a photo from the device.

iii. Choose a photo.

A progress bar will appear indicating the remaining time needed to upload the photo. If the bar takes too long to begin loading, close out of the window and repeat step four.

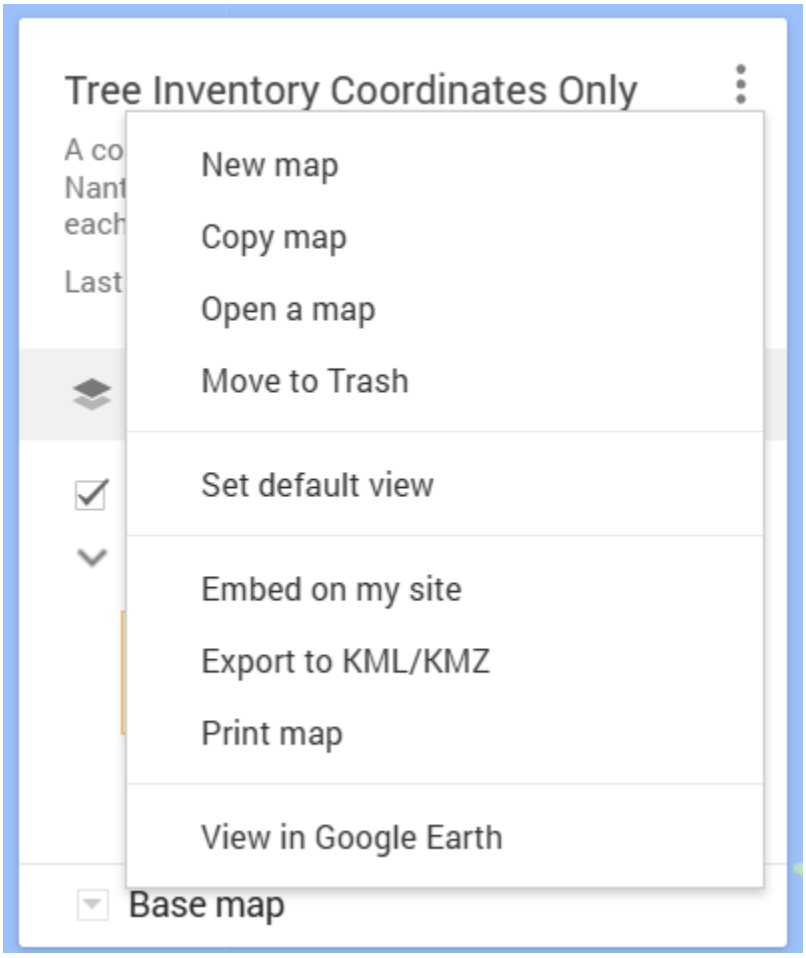


5. Click the “Save” button.

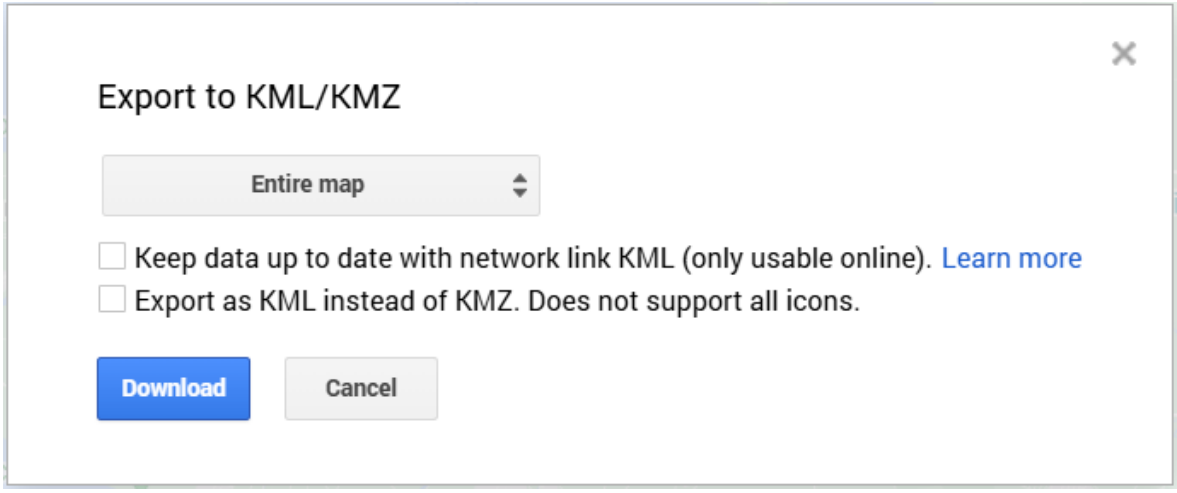
Exporting to GIS

When exporting to GIS you will be using a secondary Google Map which only contains the points of trees and none of the other data fields. This is to ensure the GIS only contains the approximate locations of the trees as opposed to Condition, DBH, etc.

1. Open the secondary Google Map named “Tree Inventory Coordinates Only” in Google Drive
2. Click on the three dots next to the “Tree Inventory Coordinates Only” text



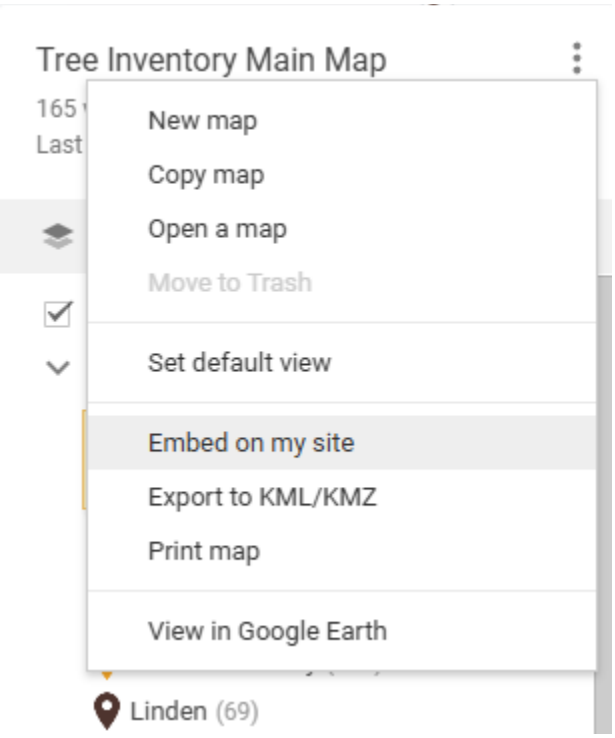
3. Click on “Export to KML/KMZ”
4. Click on “Download”



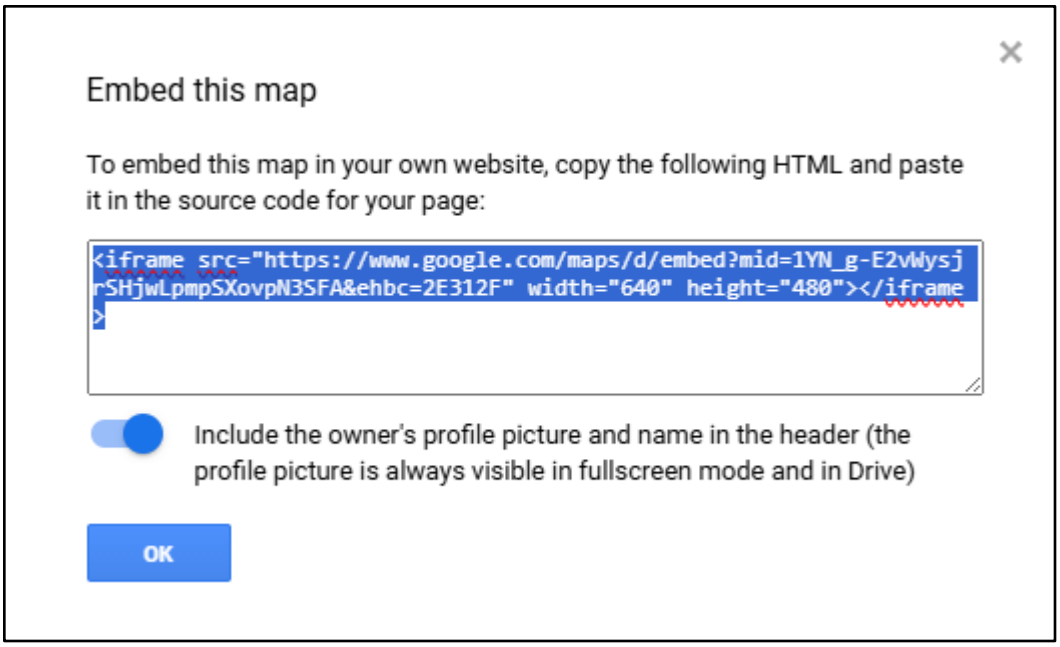
Congratulations! You have successfully downloaded the KMZ map, and it is now ready to email to the GIS coordinator for upload to the town GIS layer.

Embedding the Google Map to a Website

1. You first click on the three dots in the corner



2. You then click on “Embed on my site”



3. You then copy the HTML and follow the provided instructions about pasting it. Click "OK."