

Surveying for Hemlock Distribution and Health

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Purpose: To provide survey steps for volunteers who are part of the SLELO PRISM Volunteer Surveillance Network and collecting hemlock distribution and health data in addition to hemlock woolly adelgid presence/non-presence data.

Goals

1. Survey for Individual Hemlock trees, or
2. Survey to outline a specific Hemlock Tree stand (polygon)
3. Enter data for iMap, Hemlock Hunter, et al, PRNⁱ

Pre-Survey

1. Map out area to search before the trip
 - a. Google Earth or Google Maps
 - b. BaseMap app (Download any maps needed for areas with poor cell phone coverage).
 - c. Trail maps (printed and digital)
 - d. Determine how much surveying is practical for that trip.
2. iMap Project is set to "Hemlock Hunters" ID#1076 (set to default at beginning of survey)
3. Survey Scope
 - a. Layout polygon coordinates of Hemlock Stand or,
 - b. In-depth survey of trees in know Hemlock stand or,
 - c. General search for Hemlock stands (ex: getting a plan for a follow-up survey)

Beginning of Hike/Survey - Procedure

1. Activate PLB and BaseMap app tracking.
2. Mark GPS coordinates of parking area and trailhead.
3. !!! If collecting coordinates for a polygon, select an anchor tree *(see step 2 below for details)*
4. Take photos of parking area, any signs, etc. (GPS Camera app is useful, as the GPS Coordinates show in the photo. See photo example)

Procedure At each Hemlock tree

1. Select tree in the group for iMap Observation
2. If doing a polygon, select an "anchor" tree where the polygon will start and end. Mark "Anchor tree" with tape, if needed.
3. Count Hemlocks in immediate area of the Observed Hemlock

4. Examine at least 3 twigs at different parts of the tree
5. Photo tree and twigs (minimum)
 - a. Twig closeup (GPS Camera app)
 - b. Tree trunk at DBH with "Measure" camera app showing DBH in inches in the photo
 - c. Canopy photo (GPS Camera or Canopy appⁱⁱ)
 - d. Other photos of tree showing any interesting characteristics
6. Create Photo collage using "Layout" app (using pictures cited above)
7. iMap app Observation
 - a. Fill out iMap app
 - b. Upload collage photo
 - c. Add comments; if doing multiple observations, add Obs. #.
8. Survey Notebook & Hemlock Hunters survey form:
 - a. Observation numbers
 - b. Hemlock Hunter questions on individual tree health
 - c. GPS Coordinates of each tree – make note of Anchor Tree location
 - d. Canopy cover (estimate)
9. BaseMap app
 - a. Mark each tree location with same number as the Observation number for that site.
10. Survey123 iMap appⁱⁱⁱ
 - a. Add data for the observation and photos.
11. Proceed to next Hemlock to create a polygon back to Anchor Tree



Figure 1: Collage made with "Layout" app

End of Survey and/or at Home

1. Enter data into Hemlock Hunters from hardcopy to online form (Upload iMap observations)
2. Screenshot BaseMap tracking record.
3. iMap Online follow-up
 - a. Add any additional photos PRN (Pro re nata – as required)
 - b. Draw polygon using iMap drawing tool to determine acres of coverage.
 - c. Take screen shots of the area with polygon
 - d. Update any other information into the online observation, and add information from Hemlock Hunters form (usually entered into the Anchor tree observation)
4. Check **PLB** Tracking map

Tools and Resources

1. Smartphone with iMap; Survey123; CanopyApp; SEEK, BaseMap; GPS Camera; "Layout" app; "Measure" app (
2. Hemlock Hunter survey forms (printed in booklet form)
3. Survey Notebook and Rite in Rain pen or pencil
4. Trail maps (printed and downloaded on BaseMap app)
5. Magnifying lens
6. Personal Locator Beacon (PLB)
7. Throw-rope & bag (to reach branches)
8. Tree marking tape (orange or red) or tags (to delineate boundaries; will be removed after survey, if used)
9. Trekking pole with basket reversed (for pulling down trees out of reach)
10. Battery back-up

Special Apps That Aid Surveys

Websites are given here, the apps are available at Apple Store or Google Play.

- **BaseMap app:** <https://www.basemap.com/> used for tracking my hikes for targeted survey areas and having a downloadable map on my iPhone.
- **GPS Camera App.** Gives a photo with GPS coordinates, date, and location data in the viewable photo.
<https://apps.apple.com/us/app/gps-camera-55-field-survey/id1439730560>
- **Layout:** Creates collages from individual photos. As iMap app currently allows only 1 photo upload per observation, I create a collage to upload the photos of a single observation (described above).
<https://apps.apple.com/us/app/layout-from-instagram/id967351793>
- **Measure app:** <https://support.apple.com/en-us/HT208924> gives an on-screen measurement which then goes into the photo you take of the measurement.

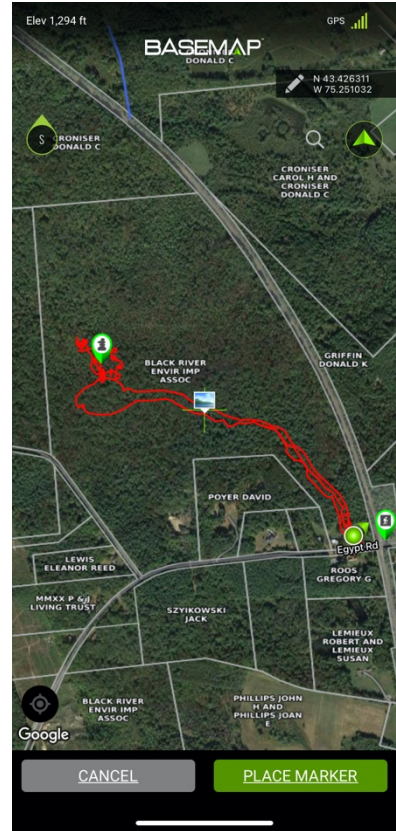


Figure 2: Screen shot "BaseMap" app

i PRN – medical term for "as needed".

ii Need to learn and practice with Canopy App.

iii Need to get more instruction on Survey123 iMap app and practice making entries in it. (Arrangements made with John Marino for early Nov. 2020).



Figure 3: Photo taken with "GPS Camera" app