

## Weed Inventory and Mapping

**Subject:** Weed Management

**Grade Level:** 7-12 (adapt as needed)

**Activity Author:** Lovina Roselle, University of Idaho

**Duration:** A minimum of two 1-2 hour sessions

**Group Size:** Variable; Small groups (2-3 students) per team

**Setting:** Field site and classroom (need access to computers with internet)

**Description:** A simple mapping exercise using a GPS unit and Google Maps that can easily be adapted to different age groups.

### Goals:

Students will:

- Apply weed identification skills
- Use a handheld GPS unit to record field locations (and use specific menu functions)
- Use Google Maps display weed locations
- Optional- Attach an image to the weed locations

### Materials Needed:

- GPS
- Field Datasheet
- Computer with internet access
- Weed identification references (e.g., Weeds of the West)
- Camera
- Measuring tape (30 or 50 meter)
- Compass

### Introduction:

Using a handheld GPS unit is a great way to capture weed locations and display them on a map. Creating maps of weed infestations is very useful to communicate a problem. You don't have to purchase and learn to use any special software to make simple and effective maps for a student weed project. Google Maps is a readily accessible web-based mapping tool that can be used to display points collected with a GPS unit. Combining these tools is a great way to create simple maps that can be used for classroom projects.

## Procedures:

The class should brainstorm some possible case studies to explore. Discuss as a class and narrow options down to the best and most feasible. Students should be assigned to work in groups of 2-3 students. *Alternatively, contact your local county weed superintendent (listed by Idaho State Department of Agriculture) for suggestions.*

*Example:*

*You live in a community that has a recently constructed warehouse store on the outskirts of town. After a year or so, you begin to notice a weedy looking plant taking over an undeveloped parcel of land adjacent to the store site. You have some students in your class who have been learning about weed management and would like to inventory this week and compile a report for the local city/county commissioners. The students would like to make a map to display the extent of the weed problem and offer some management suggestions before the infestation spreads into neighboring landscapes.*

### Preparing your GPS unit:

Be sure to check the batteries and have an extra set available to take in the field. Check the settings to prepare for this assignment. The GPS unit should be set up to read coordinates in latitude and longitude in decimal degrees (unit = d.ddddd). The **coordinate system** used by Google Earth is the World Geodetic System of 1984 (WGS84). You can adjust the **datum** to WGS84 under the settings menu of your GPS.

Practice reading the coordinates from the unit prior to sending students to the field.

### Recording Field Data:

One of the most valuable skills a field technician can learn is taking good field data and notes. Be sure to *completely* fill out the fields on your data sheet.

**Waypoint:** You can record waypoints in your GPS unit to double-check your coordinates

**Date:** record day/month/year

**Latitude:** Recorded at the center of your patch/infestation (units = decimal degrees; datum = WGS84)

**Longitude:** Recorded at the center of your patch/infestation (units = decimal degrees; datum = WGS84)

**Weed Name:** Common name (Idaho's Noxious Weeds – University of Idaho Extension)

**Diameter X:** Record the horizontal (north/south) distance from the center of the patch to the edge in meters. *Note: if this is a single plant, enter 0.*

**Diameter Y:** Record the vertical (east/west) distance from the center of the patch to the edge in meters. *Note: if this is a single plant, enter 0.*

**Density:** This is the estimated percentage of the patch/infestation area occupied by the weed. This can be either the actual surface area occupied or estimated canopy cover (grasses, forbs, shrubs), or the number of stems (trees).

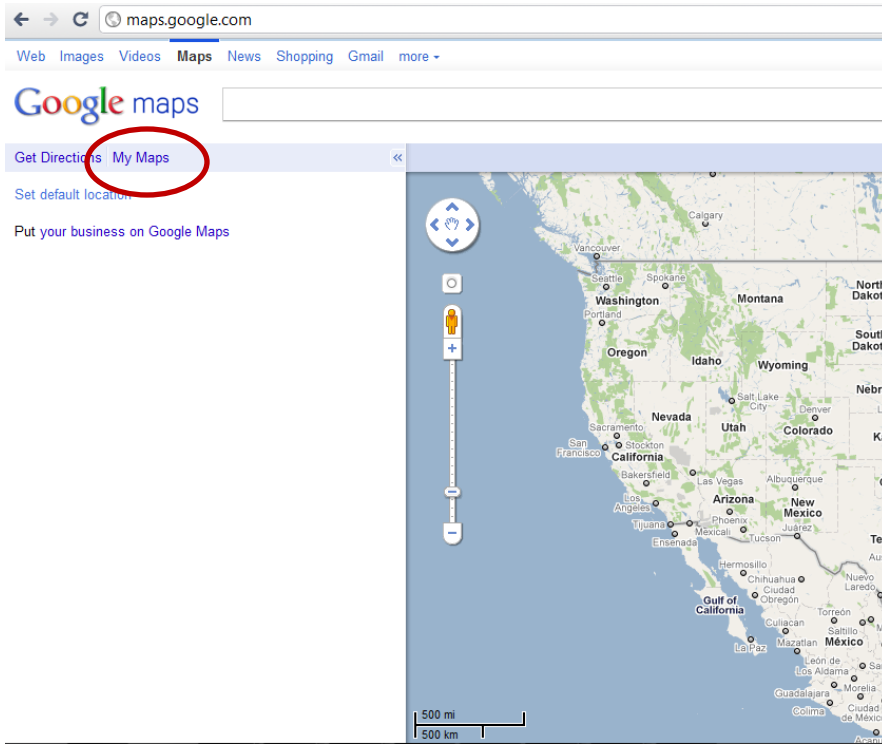
**Photo #:** Record the number displayed on your digital camera screen.

To measure diameter X, team member A should stand at the center of the weed patch and use a compass to take a bearing to the north. Team member A should also hold the end of the measuring tape while team

member B walks out from the center towards the north bearing while unreeling the measuring tape, as directed by team member A. Repeat for diameter Y, using a west bearing.

Inputting GPS coordinates into Google Maps:

- Go to Google Maps <http://maps.google.com>
- Click on “My Maps”



Click on “Get Started”

You will be directed to a page to set up a Google Account. Some students may already have a Google account and can log in. Otherwise, click the “Create an account now” button and set one up.

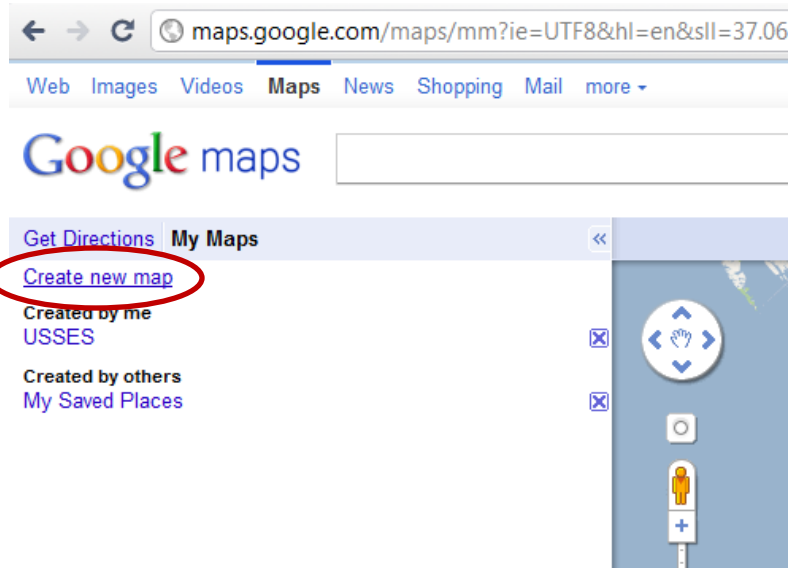
A screenshot of the Google Maps 'My Maps' page. The page title is 'Get Directions My Maps'. Below the title, there is a section titled 'Create and share your own maps' with the text 'Map places and routes you know. Add text, photos, or video, and share the results. Learn more'. Below this text is a video player showing a YouTube video titled 'How to create a "My Map" in Google Map'. The video player has a play button and a progress bar. At the bottom left of the page, a 'Get started' button is circled in red.

A screenshot of the Google Account sign-in form. It has a light blue background. At the top, it says 'Sign in with your Google Account'. Below that are two input fields: 'Email:' with a placeholder 'ex: pat@example.com' and 'Password:'. There is a checked checkbox for 'Stay signed in' and a 'Sign in' button. At the bottom, there is a link that says 'Can't access your account?'.A screenshot of a button that says 'Create an account now'. The button is dark blue with white text. Above the button, the text 'Don't have a Google Account?' is visible. The button is circled in red.

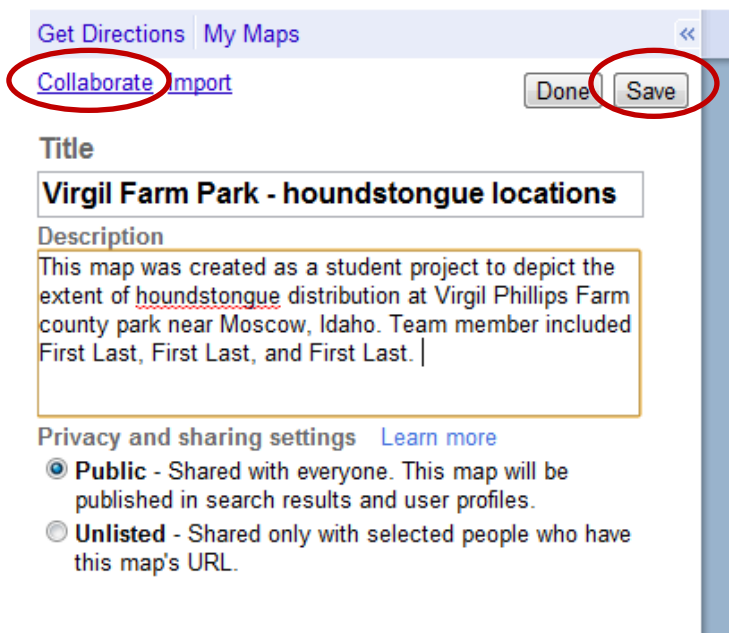
After you successfully log in to your Google account, click on “create new map”.

You will need to provide a title and description for your map. You can also change the privacy settings to make it public or unlisted. In the example below, the map is public, but you can also choose to make the map private and adjust the settings at a later time.

Students can also invite team members to collaborate on the map by selecting “collaborate” and entering their email addresses.



Be sure to save your work often so you don't lose any of your changes.



Now that you have provided information about your map, you can begin to enter the coordinates from your data sheet.

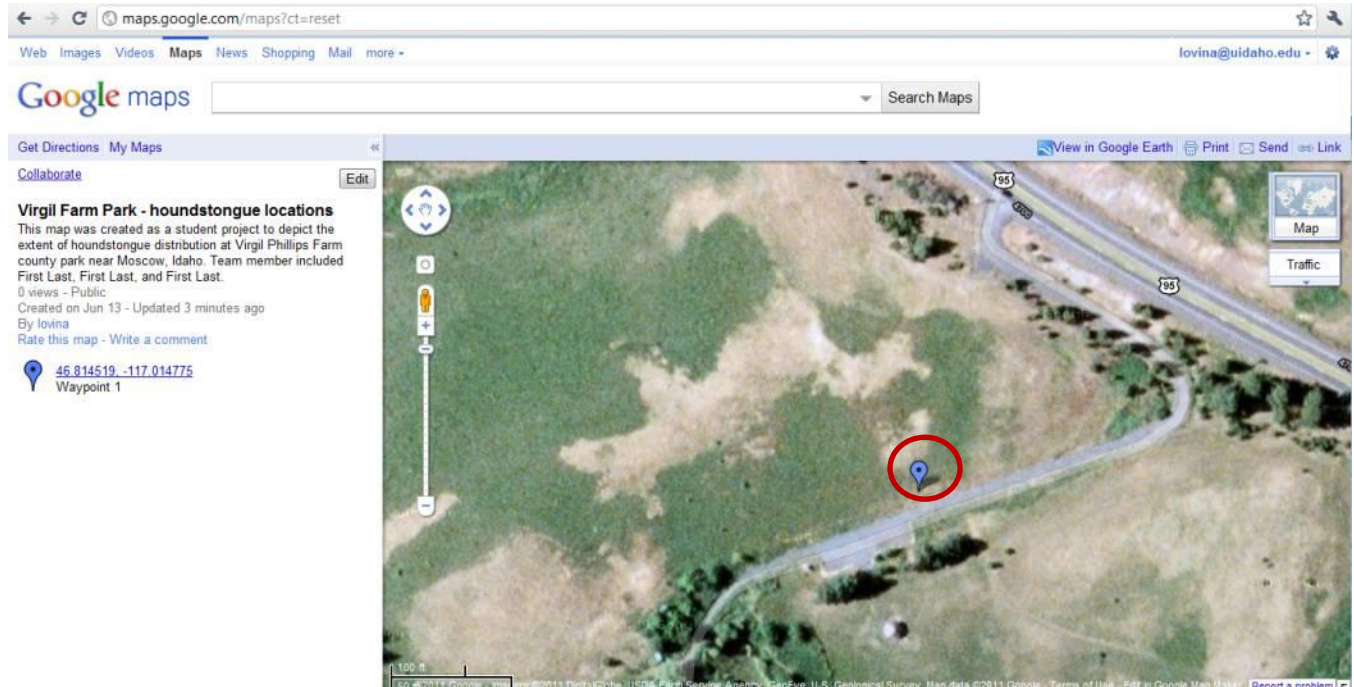
Enter the latitude and longitude for the first location recorded on your data sheet into the browser bar of Google Maps. Click the “search maps” button.



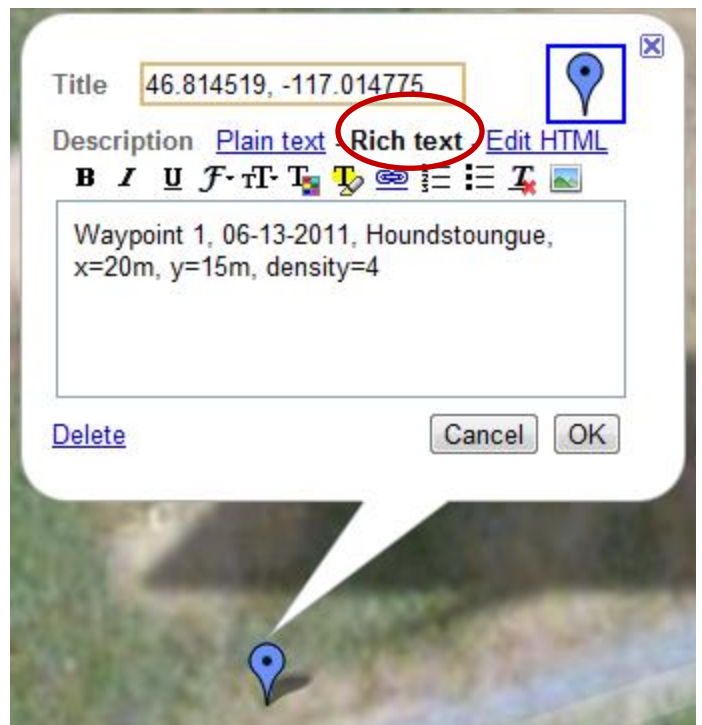
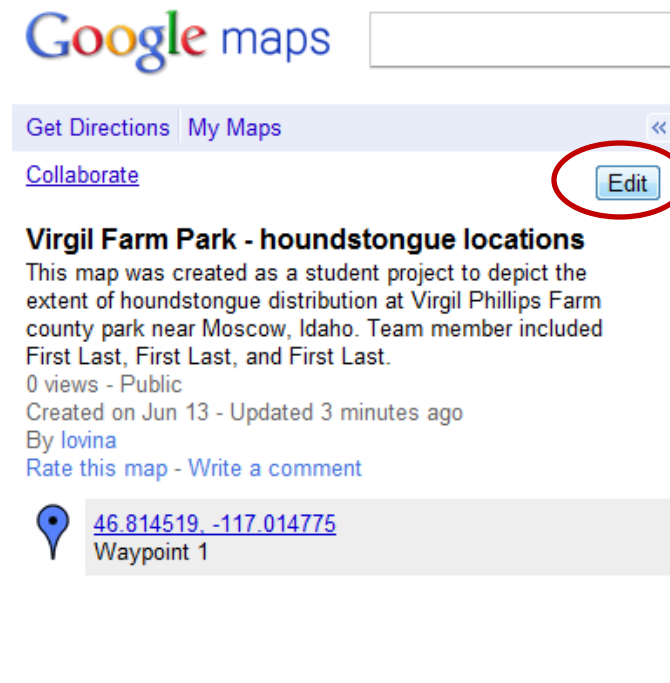
The location you entered is displayed as a small green arrow. Click on the green arrow and select “save to map”. Double-check that your weed map is displayed in the dropdown box and click “save”.



The point is now displayed on the map you created under “My Maps”.



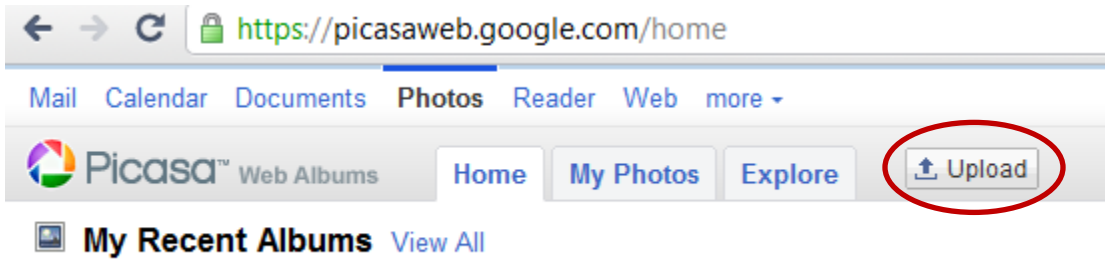
Click on the “edit” button on the menu bar, then click on the blue highlighted text for your point. This will allow you to add information to your point. **Select “rich text”**. Record the waypoint number, date, weed name, distance X, distance Y, and density. Repeat this step for all the points in your datasheet.



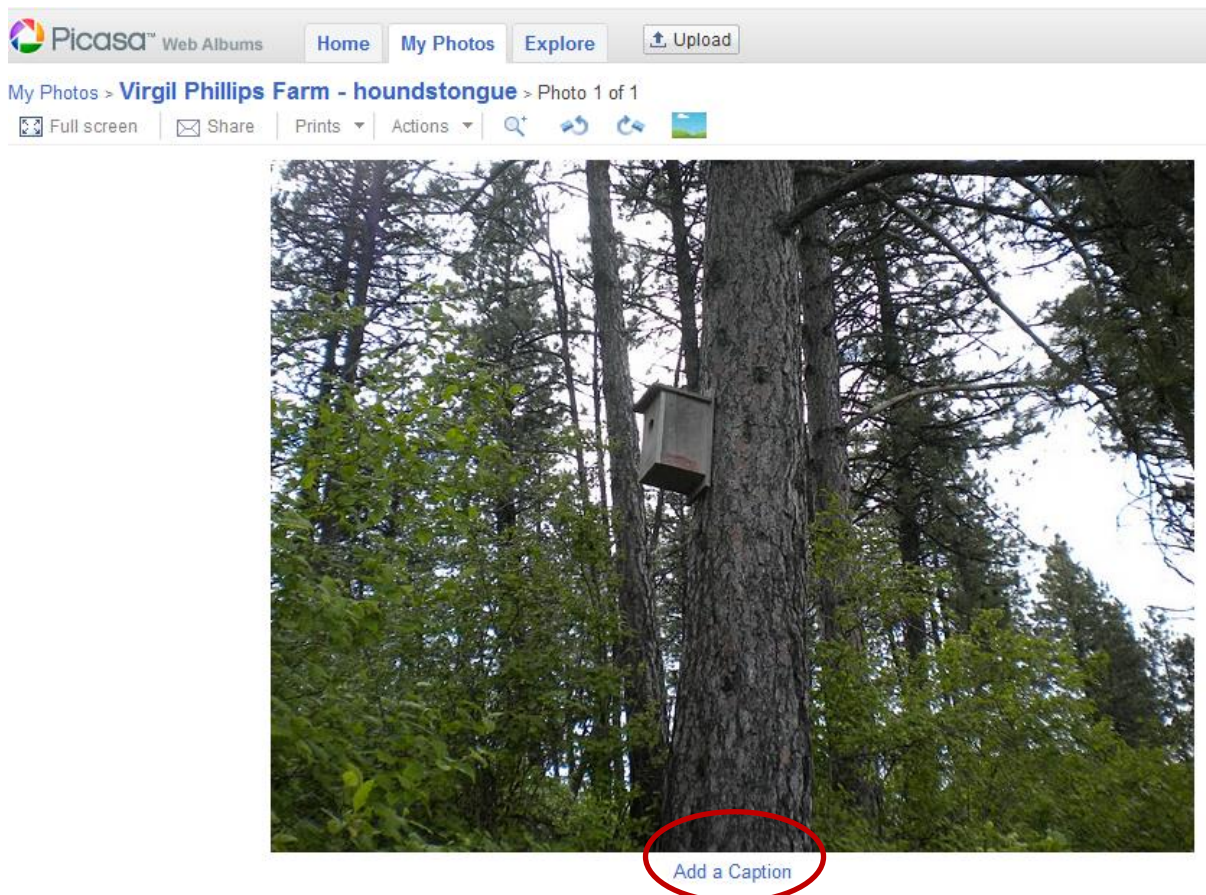
## Variation:

You can also link an image to each data point on your map. Photos can help tell a powerful story when repeated over time. The first step is to upload your pictures to an online photo sharing site, such as Picasa web albums. Open a new tab in your browser and go to <http://picasaweb.google.com> and sign in using your Google account login.

Once you have logged in, click “upload”. Create a title for your album (e.g., Virgil Phillips Farm – houndstongue) and click continue. To add photos to your album, either drag and drop photos from your computer or browse to their location.

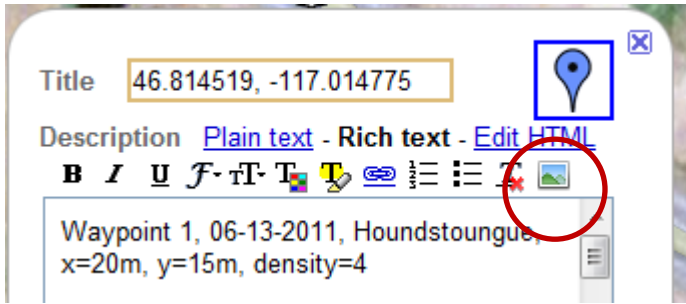
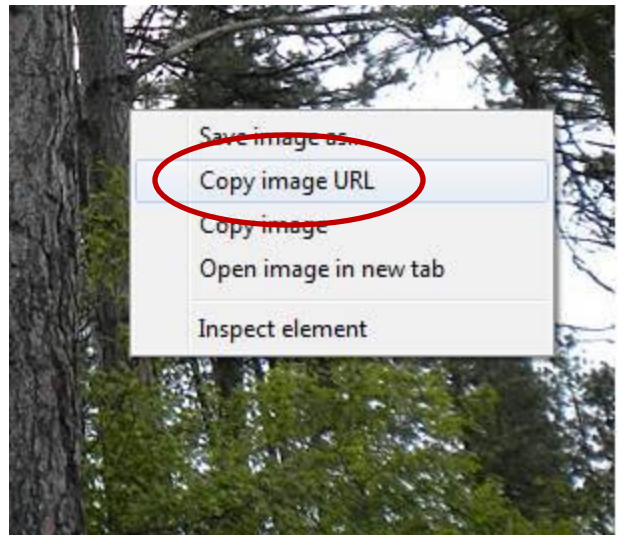


Once your photos have been uploaded, take some time to add the relevant information. Click on “add a caption” at the bottom of your photo. Enter the waypoint name from your data sheet or other specific name (e.g., houndstongue 1, houndstongue 2, etc.).

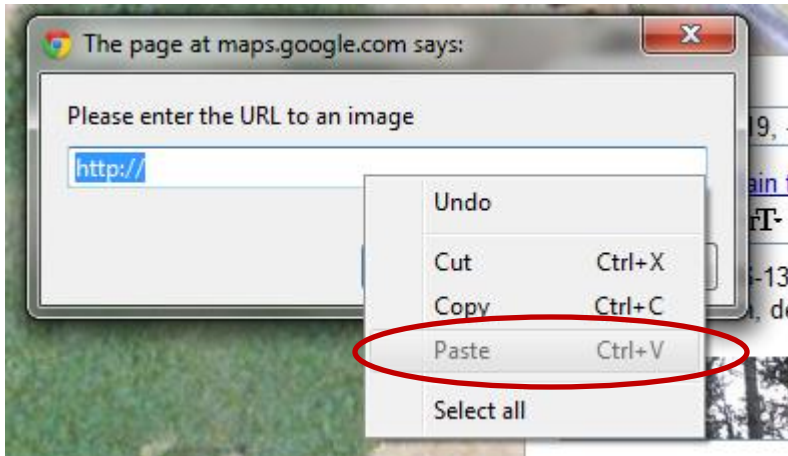


Next, link the photo to your map point. Move your mouse cursor over the image then right click and select “copy image URL”.

Back at your Google Map, click on the edit button and select the point that corresponds to the image you copied. Place your cursor below the text you entered. Click on the blue picture icon on the far right of the menu bar in the location call out box.



Right click inside the URL bar and select “paste”. Select “OK”.



The image will appear inside the callout box for your point. Repeat this process for the remaining points.

Other variations could be done in Google Earth, a free software with more advanced features available.



# Field Datasheet – Weed Mapping

Names: \_\_\_\_\_

Waypoint	Date	Latitude*	Longitude*	Weed Name	Diameter X (m)	Diameter Y (m)	Density**	Photo #
<i>Your reference</i>	<i>6-13-2011</i>	<i>46.814519</i>	<i>-117.014775</i>	<i>Houndstongue</i>	<i>20 m</i>	<i>15 m</i>	<i>4</i>	<i>346</i>

\* This point should be the center of the infestation area. Be sure the datum on your GPS is set to WGS84 using decimal degrees.

\*\* Enter the value for density category:

**1 = absent**

**2 = <1% very little present/sporadic and rare**

**3 = 1-5% occasional**

**4 = 6-10% visibly present**

**5 = 11-25% abundant**

**6 = 26-50% very abundant**

**7 = 51-75% dominant**

**8 = >75% extremely dominant**