



## Golden Gate Weed Watchers Invasive Plant Early Detection Survey Manual

### Introduction

#### Importance of Early Detection of Invasive Species

Aggressive non-native plants threaten to change the landscape of our national parks. These plants can permanently alter entire ecosystems, reducing the habitable area for the unique plants and animals of the San Francisco Bay Area in the very places set aside to protect them. The window of opportunity for detecting these plants before they become established is relatively small, by the time a plant is noticed as a problem it has usually spread throughout an area. The Weed Watchers help patrol the park for some of the newest invaders—and find them when they can still be prevented from becoming a permanent part of the landscape.

#### What can you do?

The Golden Gate National Recreational Area has found areas throughout the park that are considered at high risk for invasion. You can help patrol these areas for new weed invasions by conducting invasive species early detection surveys for some known pest plants. These surveys are part of a scientific monitoring program developed by the National Park Service Inventory and Monitoring San Francisco Area Network. The information gathered, both about the plants that are seen and the ones that aren't seen in an area, will be used to make management decisions and set habitat restoration priorities.

The instructions in this manual will explain how to participate as a Weed Watcher, including how to choose a site to safely conduct Weed Watcher surveys, what plants to look for, what information you need to record during your survey, and how to report your survey results.

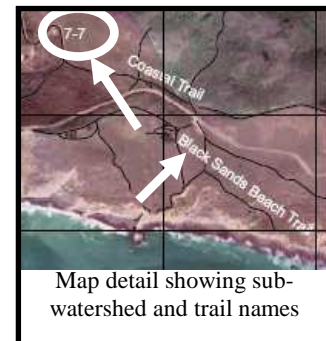
#### Where to look?

The Golden Gate National Recreational Area stretches across 60 miles and seven ecological zones in Marin, San Francisco, and San Mateo counties. Since there is so much land to cover, the park has been divided into prioritized areas based on susceptibility to invasion and the need for special protection. Choose from the available maps of high priority areas included in the Map Appendix of this manual to find an area that you would like to get to know. You will be visiting this site every other month, at a minimum, so make it a place that will be easy for you to return to.

Once you choose the area that you want to survey, visit the site and take a walk around. Fill out the **site description** area on the “Survey Form 1.” Include directions to the site, the name of the trail/road that you are covering, and the sub-watershed name (a four-digit number such as 12-03 found on your survey map). You will fill out this site description each time you conduct a survey.

#### What plants to look for?

Twenty-four plants have been identified as the highest priority for the park to monitor and control. This ranking is based on both degree of invasiveness (status as a known ecosystem alterer) and feasibility of control (degree of existing infestation, cost of control methods). A list of these plants can be found on the “Golden Gate Weed Watcher Weeds List” included in this manual. These plants are divided into List 1 and List 2 categories of priority. ID cards which include images, descriptive features, and look-alike plants are included for the List 1 species.



Map detail showing sub-watershed and trail names

If you are unsure about the identity of a plant that you have found, try one of the following techniques.

- **Take a picture** of the plant in question. Include a leaf, a flower (if available), and something like a quarter or your hand for a size reference. Send your picture to Andrea\_Williams@nps.gov. Many cell phones have cameras and the ability to send images to an email address for the same price as a text message.
- **Write a detailed description** of the plant in question. Include as many details as possible, including details about the leaves (size, shape, alternate/opposite, lobed/entire); the flower (shape, color, size, orientation); size of plant; and habitat found in. Drawing a picture of the plant will help focus your attention on the details.

### Weed Watcher Surveys

The Weed Watcher program is divided into two levels of observer participation. Level 1 surveys focus on locating the 12 highest priority, List 1 plants. The Level 2 survey covers 24 plants from both List 1 and 2 plants. The list of Priority 1 and 2 plants can be found later in this training manual.

When you begin conducting surveys, start with the Priority 1 species. This will allow you to get to know your survey area while focusing on a smaller number of plants. When you feel comfortable with your identification skills for the first 12 plants, you can test your ID skills by going on a guided hike with Weed Watchers program. This skills assessment is required if you would like to conduct the more detailed Level 2 survey.

Plant identification training and Level 2 certification are available from the Golden Gate National Recreation Area Weed Watchers program (contact Jenn\_Jordan@nps.gov or call 415-331-5023).

### Survey Method

After you have selected a survey location and have familiarized yourself with the plants to search for, you are ready to conduct a survey. Surveys are conducted along walking trails and roadways. You will intensively be looking for weeds on 5 meters (15 feet) on either side of the survey route, and also scanning the hills and drainages on either side of the route. Try to stop every 100 meters (328 feet, or about the length of a football field) to scan your surroundings. Many discoveries occur when taking a break.

To reduce your impact on the area, please restrict your survey route to park trails. If you need to investigate a plant further from the trail, use binoculars to get a better look.

### Survey Instructions: What is a plant occurrence?

When you encounter a plant that you identify as one of the targets, take a moment to look around and see if there are more plants around. You will be recording the number of patches, or *occurrences*, of each plant that you find, rather than the number of individual plants that you find. A plant patch consists of all plants of the same species within 20 m of the next closest plant. The number of plants in each patch will vary depending on the species that you come across. Once you find a plant, walk 20 m along the trail in each direction, and just visually survey off trail. Once you are able to go 20m without finding another plant in any direction, then you will be able to call the patch a single occurrence. This convention will help you save time while mapping.

For each plant that you encounter from Priority List 1 and 2 create an **occurrence point** at the center of the patch either with a GPS or on your paper map. At each **occurrence point** create a point on your paper survey map and record the information on the Weed Watcher Survey Form 1 or if you are using a GPS unit then record the information found under the Level 2 Survey Section on Weed Watcher Survey Form 2

### Level 1 Weed Watcher Survey:

**Species name-** Genus and species- find in the 1<sup>st</sup> two columns

**# Occurrences** \_\_\_\_\_ - keep tally marks for each separate occurrence

**Location details-** directions and distinguishing landmarks that will help others find the plant. Use cardinal directions (N,S,E,W) and distances to describe the directions, also include **Grid Location-** refer to the right and bottom of the paper map to determine (for example: D-4). **Other Info-** If it seems appropriate you can also include info about the size of the patch or the number of plants within the patch if they are easy to count.

**Negative Data for Level 1 Weed Watchers:**

Negative data is important so that we know which plants are **NOT** found in certain locations. If you are confident that there are Priority 1 species that were not in your survey area, please note this by putting a 0 in the # of occurrences column on Survey Form 1 for each of these species.

Handheld GPS units are available for use during Weed Watcher survey outings. These GPS units have the mobile geographic information systems (GIS) and field mapping software, ESRI ArcPad, and the GeoWeed programs loaded onto them. These programs make it easy to record the location of the plants you find, and to digitally record your survey data. Contact the Weed Watchers program for more information about learning about GPS units and digital data collection.

**Return your data sheets to:** (A self-addressed stamped envelope is available upon request.)

Weed Watchers  
NPS Inventory & Monitoring San Francisco Area Network  
Fort Cronkhite Bldg 1063  
Sausalito, CA 94965  
Fax: (415) 331-5530  
Phone: (415) 331-0639  
Email: Jenn\_Jordan@nps.gov

**Safety First!**



Poison Oak-  
“Leaves of three, let it be”

- **Poison-oak**, a plant know to cause severe dermal irritation, is found throughout the parks. Avoid contact!
- **Deer ticks**, which potentially can carry Lyme disease, are found throughout the park. Use a repellent containing 40% DEET to help deter ticks and always check yourself thoroughly during and after park excursions.
- **Stay on the trail!** This protects sensitive trailside habitats, and you from hazardous terrain! Carry a **cell phone** if possible. In case of emergency call 911 or Park Dispatch (415-561-5505 or 415-561-5510).

## **Please follow these instructions for your Level 2 (Basic) Weed Watcher survey!**

Instructions for invasive plant surveys for all Priority 1 and Priority 2 Weed Watcher plants, using Survey Form 1 and Survey Form 2, and paper survey maps. Please refer to the Weed Watcher manual introduction for a detailed description of the Weed Watcher program and survey methodology.

1. Make sure that you have the necessary equipment with you.

- Survey Form 1
- Survey Form 2
- Paper map(s) of your area (available from Weed Watcher program)
- ID cards (available from Weed Watcher program) and/or field guides
- Instructions
- Camera (*optional*)
- Binoculars
- GPS (*optional*)
- Field notebook and/or blank paper
- First Aid Kit (*optional*)
- Cell phone (for emergencies)
- Extra pencils or pens

2. For each Priority 1 and 2 plant encountered record an **occurrence point** on your paper map for the center of the patch. Label your point with the first 4 letters of your occurrence name (first 2 letters of the genus and first 2 letters of the species) and the unique occurrence #. Record the following information on Survey Form 2:

- **Weed Occurrence Name:** Consisting of the six-digit USDA plant code found on the plant list; the four-digit subwatershed code; the date in four-digit year, two-digit month, and two-digit day; and the occurrence number of that plant for that survey. For instance, if you found the third patch of *Carpobrotus edulis* on 14 July 2006 in Subwatershed 1-2 you would record caedxx01022006071403 (USDAPC+SUWA+YYYYMMDD+U#).

- **Species name** (Genus species or common)

- **Notes** (location details such as cardinal direction and distance from path; comments on accessibility of plants; size of plants)

- **Latitude and longitude** (in decimal degrees, e.g. -122.12345, 37.12345)

3. For every Priority 1 plant, and Priority 2 plants whose patch size is smaller than 100 m<sup>2</sup> (10m by 10m; your armspan is likely between 1.5 and 2m long), you will also record some information about the density and distribution of the plants in the patch. To do this, create an **assessment polygon**. An **assessment polygon** is an outline of the perimeter of the patch, created either on a paper map or with a GPS unit. Record the following information about the patch on Form 2.

### **Assessment**

-**Location notes**- directions and distinguishing landmarks that will help others find the plant. Use cardinal directions (N,S,E,W) and distances to describe the directions.

-**Cover Class**- (0%, 0-1%/trace, 1-5%, 5-25%, 25-50%, 50-75%, 75-95%, 95-100%)over the entire infested area delineated by the assessment polygon.

**# of individuals per infested area/ m<sup>2</sup>**- count individual plants if possible, especially jubata grass, shrubs, and trees

-**Phenology**- record whether the plant is bolting (bolt), bud, dead/skeleton (dead), flowering (flow.), mature (mat.), rosette (rose.), seed set, seedling

-**Size**- the length and width of the patch, in meters or feet, based on pacing or a measuring tape.

- **Size** (length and width of patch size based on pacing or measuring tape)

- **Cover Class** (0%, 0-1%/trace, 1-5%, 5-25%, 25-50%, 50-75%, 75-95%, 95-100%) for infested area

- **# of plants assessed** (if possible, for jubata grass, trees, thistles, etc.)

- **Treated** (whether the patch was treated mechanically or chemically)

4. At the end of your survey, mark your route on your map with a colored marker and fill out Survey Form 1. Include directions to the site and survey route in the **trip report**, the total number of occurrences for

each of the plants you did and didn't see, and location notes so we can find them on the map. Don't forget to fill out your name and contact information, and time spent on both Survey Forms 1 and 2.

**5. Send us your survey!** Don't forget to send us:

- Survey map
- Survey Form 1
- Survey Form 2



Questions? Comments?

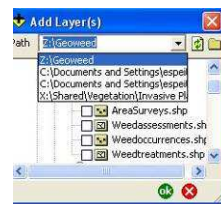
Weed Watchers  
NPS Inventory & Monitoring San Francisco Area Network  
Fort Cronkhite Bldg 1063  
Sausalito, CA 94965  
Fax: (415) 331-5530  
Phone: (415) 331-5023  
Email: [Jenn\\_Jordan@nps.gov](mailto:Jenn_Jordan@nps.gov)



**Please follow these instructions for your Level 2 (Advanced) Weed Watcher survey!**


Instructions for invasive plant surveys for all Weed Watcher plants, using Survey Form 1 and Survey Form 2, paper survey maps, and a GPS unit loaded with GeoWeed. Please refer to the Weed Watcher manual introduction for a detailed description of the Weed Watcher program and survey methodology.


1. Make sure that you have the necessary equipment with you.
  - Survey Form 1
  - Survey Form 2
  - Paper map(s) of your area (available from Weed Watcher program)
  - ID cards (available from Weed Watcher program) and/or field guides
  - Instructions
  - Camera (optional)
  - Binoculars
  - First Aid Kit (optional)
  - Field notebook and/or blank paper
  - Extra pencils or pens
  - Cell phone (for emergencies)
  - GPS with background maps and GeoWeed area data (exported from desktop database)

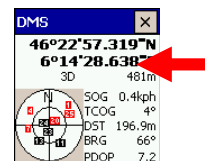
2. Start the ArcPad program on your PDA (**Start> ArcPad 7.01**). Load the GeoWeed occurrence, assessment, survey, and treatment shapefiles (**Add Layers [↓]**). Click on  to open My Computer, click on the  next to **Documents and Settings**, highlight **GeoWeed** and click **OK**, put a check in all 4 boxes  for **AreaSurveys**, **Weedassessments**, **Weedoccurrences**, **Weedtreatments**. Click on **OK**. These layers will take a couple of minutes to load, so just wait without touching the pad. Then, load your background maps (**Add Layers [↓]> Documents and Settings> arcpadimagery> subwatershed#> OK**).



If PDA has an SD card, click on that  SD, then  **arcpad\_imagery** and click on the  of the specific watershed. When it asks if the layers should be in WGS84, click on YES.



3. For the Garmin IQue: Turn on the GPS by lifting up the antenna on the back of the unit by pulling down on the back sliding button and pressing the “GPS Position Window” button ().


For the Trimble Juno ST: Turn on the GPS by clicking the () button. Then answer **Yes** when it asks “Would you like to activate it now?”





You will see a red circle with a yellow cross in the middle of the map when the unit is receiving GPS satellite reception.

You want the GPS points for latitude and longitude to always be in Decimal Degrees. From the GPS Position Window tap on the position coordinate display field until you get drop-down menu. Click on **WGS84 DD GPS**.




4. Start a tracklog to record your survey route. Before activating the tracklog, you need to create a file for the tracklog. Click the  button. Double click on **GPS Tracklog**. Click on  to open Tracklog File. In the **Name** box, put in the same name as the survey area (the naming convention is Survey-Subwatershed-Year-Month-Day-Firstname-Lastname: SURVEYSUWAYYYYMMDDFILA, so the 1/23/06 survey in Subwatershed 7-1 by Andrea Williams would be SURVEY070120060123ANWI. This is similar to invasives mapping naming convention, with substitution of SURVEY for GESPXX plant code)

Click **Save** and then exit , then **OK**. Now you can turn on the tracklog.

Click the down-arrow next to the “GPS Position Window” button () and choose tracklog. The tracklog is enabled if the icon () is outlined in red. This feature can be paused by clicking tracklog once to disable, then again to resume.

**Be certain to complete this step each time a new survey is started.**

5. Enable the GeoWeed toolbar by pressing the GeoWeed key ()

6. For each Priority 1 and 2 plant encountered record an **occurrence point** at the near center of the patch. First activate the GeoWeed occurrence layer (). The point may be taken using your current position by pressing the “Capture Point Using GPS” button () or by using the stylus to draw a point on the map by pressing the “Point” button () and then tapping the point on the map. Record the following information:

#### Basic Tab




- **OCC Name:** (USDAPC+SUWA+YYYYMMDD+U#)
- **Species name** (Genus species, drop-down list)
- **Data Recorder**
- **Location notes** (directions)



#### Regions Tab

- **Region 1** (subwatershed from drop-down list)
- **Primary designation (check)**
- **Region 2** (secondary subwatershed or sitename from drop-down list)

#### Description tab

- **Discovery Year** (if known)
- **Accuracy** (GPS 1 is within 10 feet, GPS 2 is within 30 feet)
- **Confidence in Identificaton/Reason for doubt** (only enter if less than 95% confident in your ID)

7. For each Priority 1 plant patch, and for each Priority 2 plant with a patch < 100 m<sup>2</sup>, record an **assessment polygon** around the perimeter of the patch. First activate the GeoWeed assessment layer (). Then create a polygon using satellite positions by pressing the “Polygon” button () and then the “Add GPS Vertex” button () and pause at each turn you make while walking around the boundary.

Once you have finished collecting points, you must click the  button in order to close the polygon and get to the data entry screen. Alternatively, you can use the stylus to draw a polygon on the map by pressing the “Freehand Polygon” () and then using the stylus to draw a shape around the perimeter of the patch.

Record the following information:

#### Basic Tab

- **Choose Occurrence** (occurrence ID Code from the drop-down list)
- **Data Recorder** (data recorder name from the drop-down list)
- **Notes** (location directions)

#### Time

Time for assessment (mandatory) and treatment (if applicable)

- **Start time** (military time)
- **End time** (military time)

#### Size Tab

**Note: Size is calculated from the polygon; ONLY enter data if you think that polygon may be incorrect—generally, for very small patches.**

(Record accurate patch size, overrides polygon area, use for small patches)

Length x Width  
Unit of Measurement  
Direct Entry (of area in sq m, sq ft, sq mile, hectare)

### Stats Tab



- **GPS Accuracy** (GPS 1 is within 10 feet, GPS 2 is within 30 feet)
- **Area** (Primary subwatershed location)
- **Phenology** (bolting, bud, dead/skeleton, flowering, mature, rosette, seed set, seedling)

### Misc Tab

- **Cover Class** (0%, 0-1%/trace, 1-5%, 5-25%, 25-50%, 50-75%, 75-95%, 95-100%) for infested area  
Also fill out the appropriate spaces on Survey Form 2.

### Distribution

Cover Class Desc: Subjective measure of weed distribution.  
M = Monoculture, there is nothing but the weed there  
U = Uniform distribution and size of weed patches  
SA = Satellite, one main patch with smaller, satellite patches  
SC = Scattered plants within the same patch  
L = Linear distribution  
I = Isolated patch

8. At the end of your survey, create a **survey point** for the site using the GeoWeed survey button () and the "Capture Point Using GPS" button (). You will record the presence or absence of all Priority 1 species encountered on your survey. Record the following information.

### Basic Tab



- **Area** (Primary subwatershed location)
- **Land use type** (Forest)
- **Dominant Veg. Type** (i.e. Coastal Scrub or Annual Gramminoids or Forbs)

### 1-20 Tab

- **Note the absence of any of the following List 1 plants not encountered on your survey** (do not fill out phenology)

<i>Arctotheca calendula</i>	<i>Digitalis purpurea</i>
<i>Centaurea calcitrapa</i>	<i>Euphorbia oblongata</i>
<i>Centaurea melitensis</i>	<i>Helichrysum petiolare</i>
<i>Cortaderia selloana</i>	<i>Ilex aquifolium</i>
<i>Cytisus scoparius</i>	<i>Ulex europaea</i>
<i>Cytisus striatus</i>	<i>Vinca major</i>

**Note: If you are able, record absence information for List 2 or other plants searched for but not seen on your survey, up to 20 plants (see Priority Species List)**

9. At the end of your survey, mark your route on your map with a colored marker and finish filling out the presence/absence data on Survey Form 1 for the plants that you did and didn't see. Turn off the tracklog before leaving your survey site. Click on  ▼ scroll down and click on  **Exit**. Don't forget to completely fill out Survey Forms 1 and 2 including the trip report which describes your survey route, your contact information, and time spent on the survey. Do not record more than one survey before uploading the digital GeoWeed data, as this may lead to data loss.

## **Decision Tree for Priority 1, 2, and 3 plants**

### **Priority 1 plants**

Occurrence and Assessment

### **Priority 2 plants**

Occurrence and Assessment if patch size is less than 100 m<sup>2</sup>  
Occurrence only if patch size is greater than 100 m<sup>2</sup>

### **Priority 3 plants**

Presence/Absence, or Occurrence if patch size is less than 100 m<sup>2</sup>

Questions? Comments?

Weed Watchers  
NPS Inventory & Monitoring,  
San Francisco Area Network  
Fort Cronkhite Bldg 1063  
Sausalito, CA 94965

Fax: (415) 331-5530  
Phone: (415) 331-5023

**Email: [Jenn\\_Jordan@nps.gov](mailto:Jenn_Jordan@nps.gov)**