



# San Francisco Bay Area Network Inventory and Monitoring Program



## **STEAL THIS PROTOCOL: The Invasive Species Early Detection Protocol for the San Francisco Bay Area Network of National Parks**

**National Park Service**

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# San Francisco Bay Area Network Inventory and Monitoring Program

# Overview



- **Inventory and Monitoring Program**
- **Protocol objectives**
- **Prioritizing areas and species**
- **Materials and methods for volunteer program**
- **Results and next steps**



# San Francisco Bay Area Network

National Park Service  
U.S. Department of the Interior

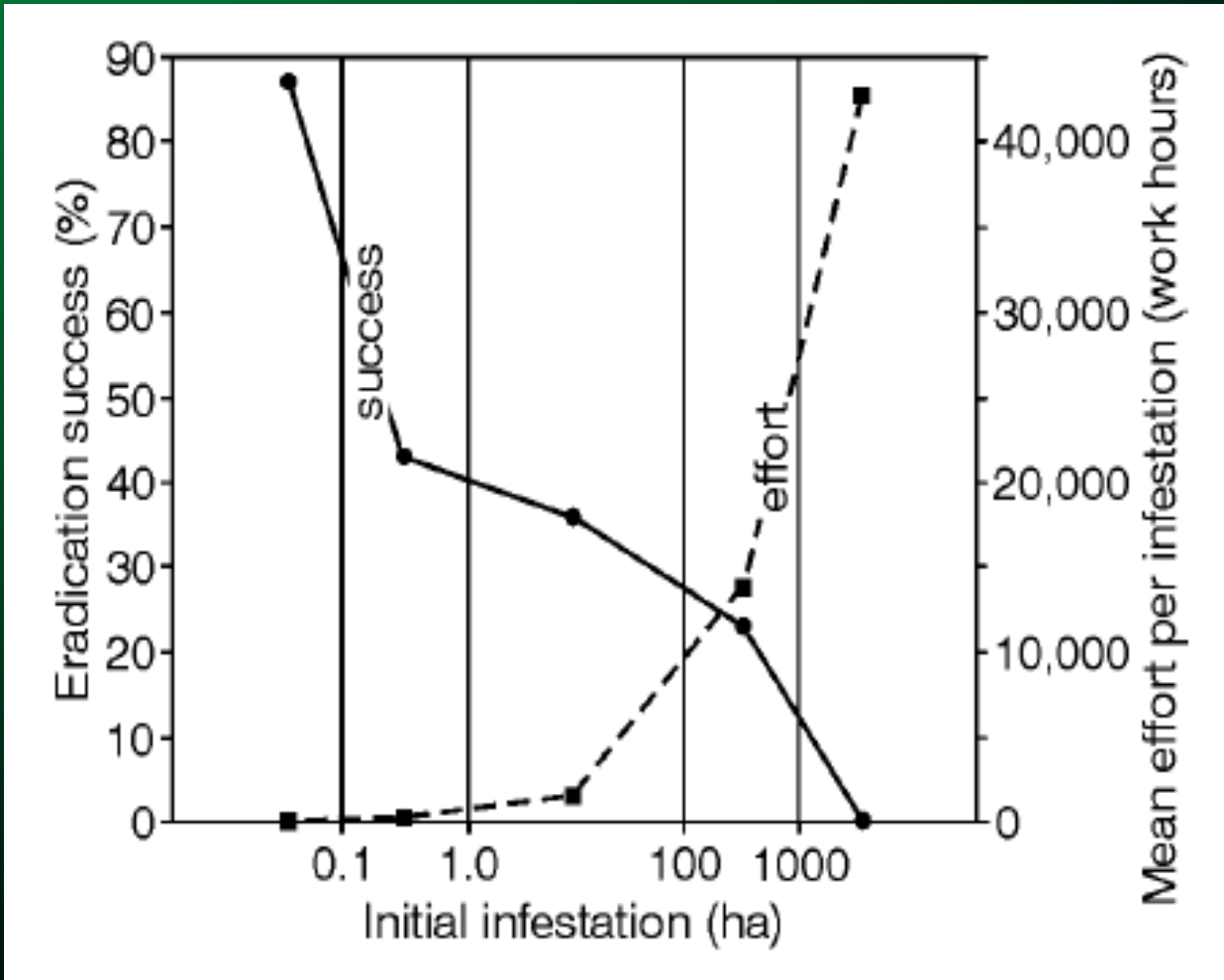




# San Francisco Bay Area Network Inventory and Monitoring Program

# Feasibility

Rejmánek and Pitcairn: When is eradication a realistic goal?





# San Francisco Bay Area Network Inventory and Monitoring Program

# Early Detection: It's a good thing.

We all know

Need detailed, 1  
or at least recon

vs HOW?

g Procedures...  
a collection.

## Early Detection Monitoring of Invasive Plant Species in the San Francisco Bay Area Network

### Standard Operating Procedure (SOP) 3: Field Data Collection, Version 1.1 (May, 2008)

#### Revision History Log:

Prev. Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #
1.0	5/20/07	Elizabeth Speith	Changed WIMS to GeoWood, Updated Weed Watcher instructions	Database name change, Database interface changes	1.01
1.01	5/1/2008	Andrea Williams	Changed Appendix A to 2008 updated version, added detectability index and inventory sheet	Updated plants lists, forms and contact info; add information	1.1

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Objective: Species list (park-by-park)

- ▼ *Develop and revise as needed a list of target species that do not currently occur in the parks, occur in localized areas of parks, or are extremely rare, but that would cause major ecological or economic problems if they were to become established in SFAN parks.*



# San Francisco Bay Area Network Inventory and Monitoring Program

## Site Target



Objective: Identify and survey roads and trails in priority areas

- Rank SFAN subwatersheds *by management priority, risk, and current infestation level* to develop priority list. Within the park, identify and inventory all roads and trails in the top 25% of subwatersheds annually, the next 50% biennially, and the remaining 25% within 5 years (55% of all subwatersheds visited each year), noting presence and absence of priority weed species over the next 5 years. Use visual assessment and GPS technology to detect and accurately map incipient populations of the top-priority plant species on the SFAN Invasive Plant list.



## Objective: Evaluate and refine

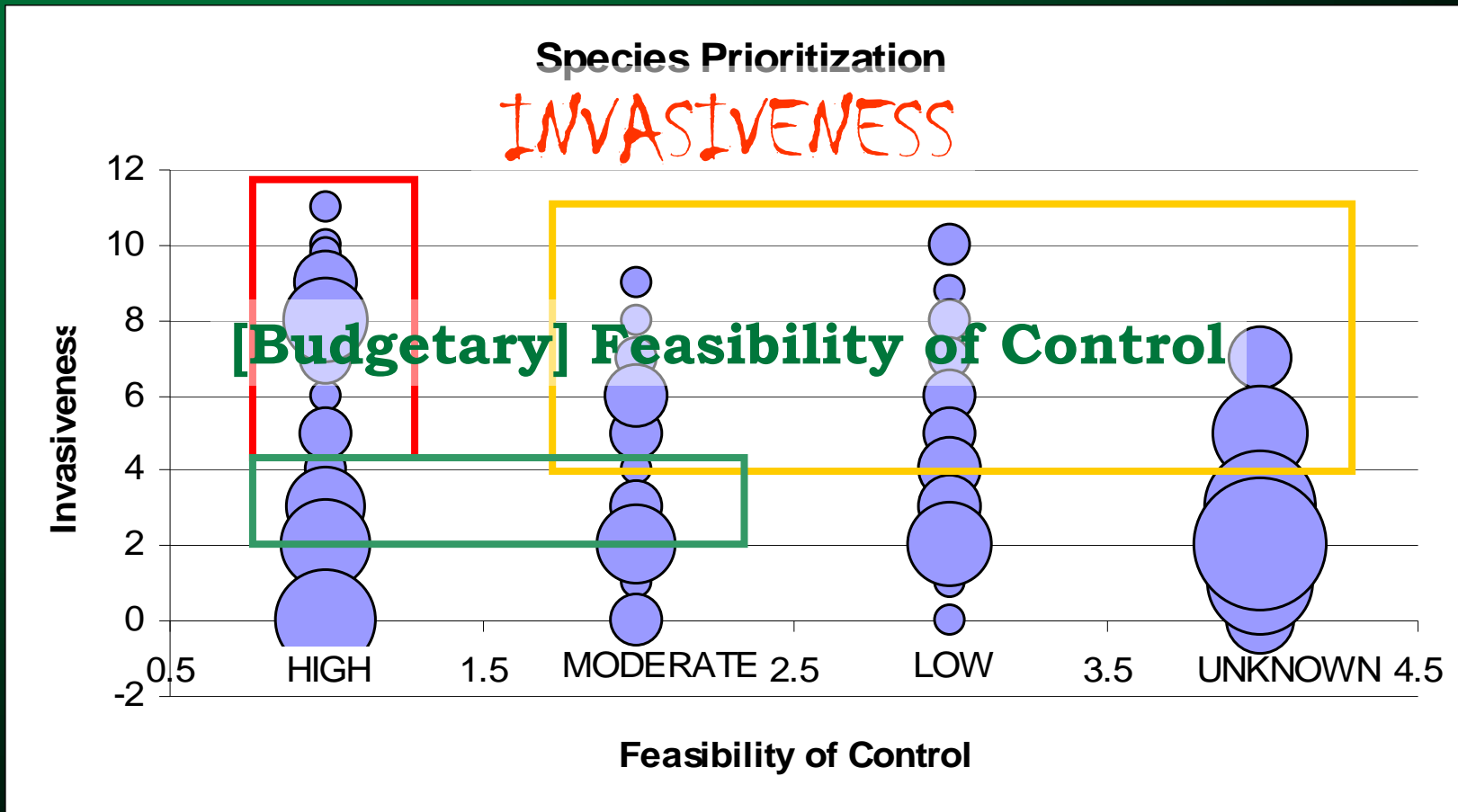
- ✦ Every 5 years, *evaluate invasive plant monitoring and mapping data* collected to *determine* the primary pathways and *predictive factors* leading to new invasions along roads and trails in the park. Use this data to *refine* subwatershed *rankings* for search priority. *Identify possible management actions* to prevent new infestations.





# San Francisco Bay Area Network Inventory and Monitoring Program

# Prioritizing Species





# San Francisco Bay Area Network Inventory and Monitoring Program

# Prioritizing Species



Photo by Forest & Kim Starr

List 1: ED everywhere  
point and polygon collected



List 2: ED for new populations  
point collected; polygon if  $<100\text{m}^2$



## San Francisco Bay Area Network Inventory and Monitoring Program

# Prioritizing Species



List 3: ED for new populations  
point collected if  $<100\text{m}^2$ ;  
otherwise presence/absence

William & Wilma Follette @ USDA-NRCS  
PLANTS Database / USDA NRCS. 1992

List 4: Dishonorable mention  
presence/absence





# San Francisco Bay Area Network Inventory and Monitoring Program

# Prioritizing Species



List 3.1: ED everywhere

→ *Advanced observers*

point and polygon collected

List 3.2: ED for new populations

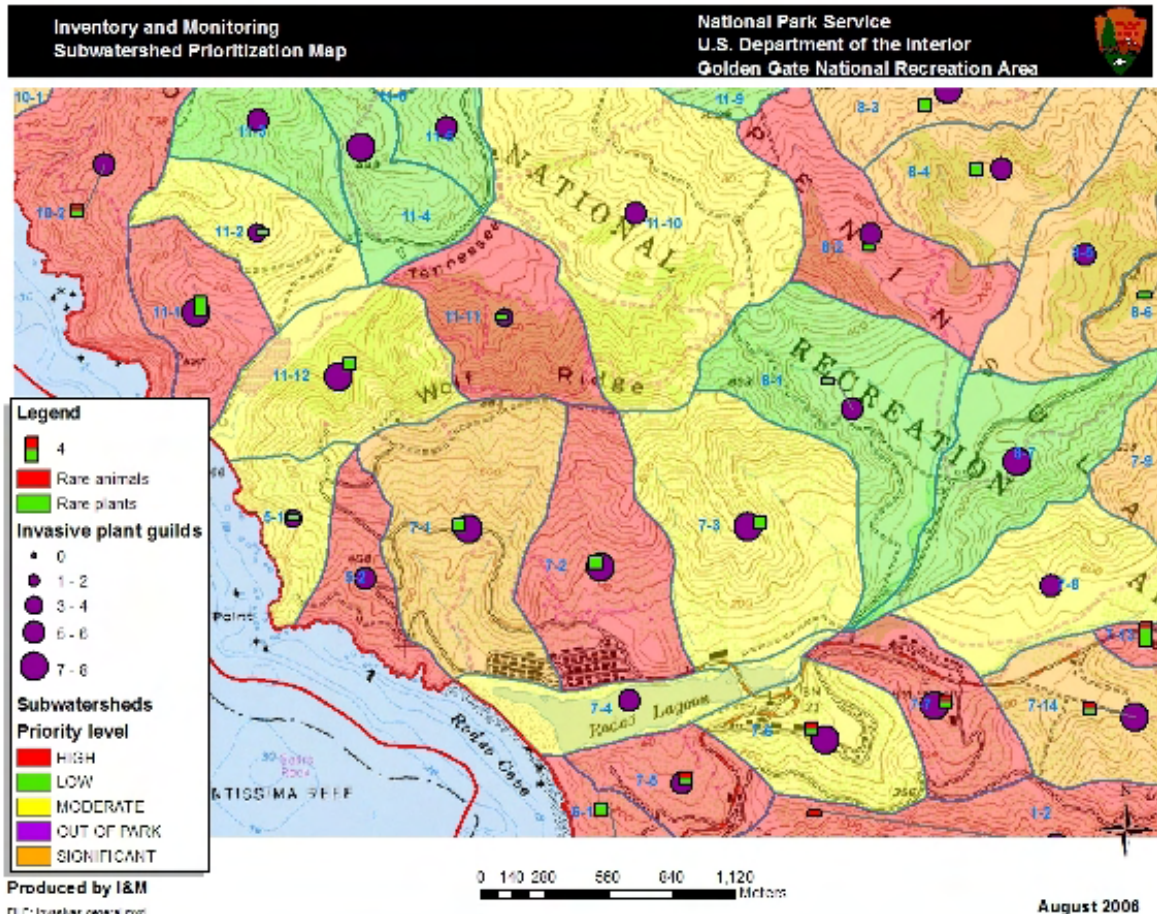
→ *Advanced observers*

point collected; polygon if  $<100\text{m}^2$



# San Francisco Bay Area Network Inventory and Monitoring Program

# Prioritizing Locations





# San Francisco Bay Area Network Inventory and Monitoring Program

# Field Test



- ✔ Tested at Golden Gate, revised and expanded to Point Reyes
- ✔ Location, strong tradition of volunteerism make program feasible

25,000 hours of exotics removal annually

150,000 hours of natural resource stewardship annually



- ✔ Habitat Restoration Team
- ✔ Native Plant Nurseries
- ✔ Presidio Site Stewards
- ✔ Site Stewardship
- ✔ Invasive Plant Patrol
- ✔ Fort Funston Green Team
- ✔ Muir Woods
- ✔ Crissy Field



# San Francisco Bay Area Network Inventory and Monitoring Program

# Volunteer Program



## Levels for volunteers

- Increasing number of species to ID
- Increasing level of technology and information gathered
- Increasing survey independence

















Training-intensive: Look for quality/long-term volunteers



# San Francisco Bay Area Network Inventory and Monitoring Program

# ID Cards

Plant-out-of-place Canada Thistle	Plant-out-of-place Yellow Starthistle	Plant-out-of-place Purple Starthistle
		
		
		

EXOTIC HERB Purple Starthistle	EXOTIC HERB Yellow Starthistle	EXOTIC HERB Canada thistle
<i>(Centaurea calcitrapa)</i>	<i>(Centaurea solstitialis)</i>	<i>(Cirsium arvense)</i>
<p><b>Description</b></p> <ul style="list-style-type: none"> <li>Erect annual plant that grows 1/2-4 ft.</li> <li>Numerous small (1/4 in long) purple, white, or pink flowers are surrounded by long, sharp spines</li> <li>Young leaves are deeply lobed, grey and with cobweb-like hairs and a light midrib</li> <li>Mature leaves 4-8 in long and without hairs</li> <li>Stems do not have "winged" ridges</li> <li>Young plants form a rosette (circular cluster of leaves)</li> </ul> <p><b>Habitat</b></p> <ul style="list-style-type: none"> <li>Agricultural, grasslands, roadsides, disturbed areas</li> </ul> <p><b>Don't confuse with...</b>  <b>Yellow starthistle</b> which has:</p> <ul style="list-style-type: none"> <li>Yellow flowers and "wings" on stems</li> </ul>	<p><b>Description</b></p> <ul style="list-style-type: none"> <li>Erect annual plant that grows 1/2-6 ft.</li> <li>Numerous small bright yellow flowers which are surrounded by long, sharp yellow spines (0.4-1 in long)</li> <li>Mature leaves are grey-green and covered with fine cottony hairs, giving the plant a grey-silver appearance from a distance</li> <li>Stems are "winged"</li> <li>Young plants form a rosette (circular cluster of leaves)</li> </ul> <p><b>Habitat</b></p> <ul style="list-style-type: none"> <li>Agricultural, grasslands, roadsides, disturbed areas</li> </ul> <p><b>Don't confuse with...</b>  <b>Purple starthistle</b> which has:</p> <ul style="list-style-type: none"> <li>Purple flowers and no "wings" on stems</li> </ul>	 <p><b>Description</b></p> <ul style="list-style-type: none"> <li>Erect perennial plant that grows 1-3 ft.</li> <li>Purplish lavender or white flowers 1/2-1 in across, numerous, almost without spines</li> <li>Variably lobed lance-shaped leaves with spines along the margins, leaves "clasp" stem</li> <li>Smooth to slightly hairy stems with no "wings"</li> <li>Young plants form a rosette (circular cluster of leaves)</li> </ul> <p><b>Habitat</b></p> <ul style="list-style-type: none"> <li>Can grow in all but waterlogged soils</li> </ul> <p><b>Don't confuse with...</b>  <b>Musk Thistles</b> which have:</p> <ul style="list-style-type: none"> <li>Larger flowers (2-3 in) with broad spines</li> <li>Hairy leaves</li> </ul>
  <p>Yellow starthistle      Purple starthistle</p>	  <p>Yellow starthistle      Purple starthistle</p>	
<p><small>Image credits: front middle and bottom, NPS; Back page, bottom right, Malcolm Storey</small></p>	<p><small>Image credits: front page, top/bottom VGNK, middle Steve Dewey, Utah State University, www.raretyeimages.org</small></p>	<p><small>Image credits: front top-NPS, middle Berry/foce/ www.kinistymagnum.org, bottom- © Barry Rice/The Nature Center-nexsy</small></p>





# San Francisco Bay Area Network Inventory and Monitoring Program

# Datasheets



**Golden Gate Weed Watchers**  
Invasive Species Early Detection Survey Form 1 and Site Description

Going for a walk in the park? While you do keep your eye out for these park invaders. If you see a plant from this list, let us know by returning this form to the address at the bottom of the page. All it takes is one visit every other month to the trail of your choice to become a Golden Gate Weed Watcher. Instructions on the other side of this page. Happy Hunting!

Priority 1 Plant	Scientific Name	# Occurrences	Location details (grid #s) and/or plant description
Capeweed	<i>Ancrotheca calendula</i>		
Purple Starnthistle	<i>Centaurea calcitropa</i>		
Tecolote, Napa Starnthistle	<i>Centaurea melitensis</i>		
Uruguayan Pampas Grass	<i>Cortaderia selloana</i>		
Scotch Broom	<i>Cytisus scoparius</i>		
Portuguese Broom	<i>Cytisus striatus</i>		
Purple Foxglove	<i>Digitalis purpurea</i>		
Oblong Spurge	<i>Euphorbia oblongata</i>		
Licanice Plant	<i>Helichrysum petiolare</i>		
English Holly	<i>Ilex aquifolium</i>		
Sense	<i>Ulex europaea</i>		
Peniwinkle	<i>Vinca major</i>		

Priority 2 Plant	Scientific Name	# Occurrences	Location details (grid #s) and/or plant description
Blackwood Acacia	<i>Acacia melanoxylon</i>		
Thoroughwort	<i>Ageratina adenophora</i>		
Poison Hemlock	<i>Conium maculatum</i>		
Cape Ivy	<i>Delairea odorata</i>		
Common or Fuller's Teasel	<i>Dipsacus fullonum</i>		
Bluegum Eucalyptus	<i>Eucalyptus globulus</i>		
English Ivy	<i>Hedera helix</i>		
Shortpod/Summer Mustard	<i>Hirschfeldia incana</i>		
Velvet Grass	<i>Holcus lanatus</i>		
Pennyroyal	<i>Mentha pulegium</i>		
Oxeye daisy	<i>Leucanthemum vulgare</i>		
Himalayan Blackberry	<i>Rubus discolor</i>		

**Weed Watchers**  
Golden Gate National Recreation Area  
SFAN I&M  
Fort Cronkhite Bldg 1083  
Sausalito, CA 94965


(415) 331-6023 (415) 331-5530  
Jenn\_Jordan@nps.gov  
www.parksconservancy.org/volunteer  
www.nps.gov/gogalvip  
www.weedwatcher.org



Entered in WIMS \_\_\_(date)\_\_\_(m)

Golden Gate Weed Watchers Invasive Species Early Detection Survey Form		SURVEY AREA ID: DATA RECORDER: OTHER OBSERVERS:		DATE: TIME START: TIME FINISH:	
WEED OCCURRENCE NAME	PLANT NAME	LATITUDE	LONGITUDE	ACCURACY GPS1 (2M) GPS2 (10M)	MARKED ON PAPER MAP? Y N
ASSESSMENT (OPT) COVER CLASS 1-10% 11-25% 26-50% 51-100% PER m2 / infested area / hectare (#) OF INDIVIDUALS PER infested area / m2		LOCATION COMMENTS		MINIMUM MAPPING UNIT: neet km2 TREATMENT? Y N WGS84P+C+SUBW+YYYYMMDD+U	
WEED OCCURRENCE NAME	PLANT NAME	LATITUDE	LONGITUDE	ACCURACY GPS1 (2M) GPS2 (10M)	MARKED ON PAPER MAP? Y N
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Weed Watchers- Invasive Species Early Detection Citizen Science Program



**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.

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



Weed Watchers- Invasive Species Early Detection Citizen Science Program



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# San Francisco Bay Area Network Inventory and Monitoring Program

# Maps

## National Park Service San Francisco Bay Area Network Inventory and Monitoring Weed Watchers Symbology



### Legend

#### Weed Occurrences

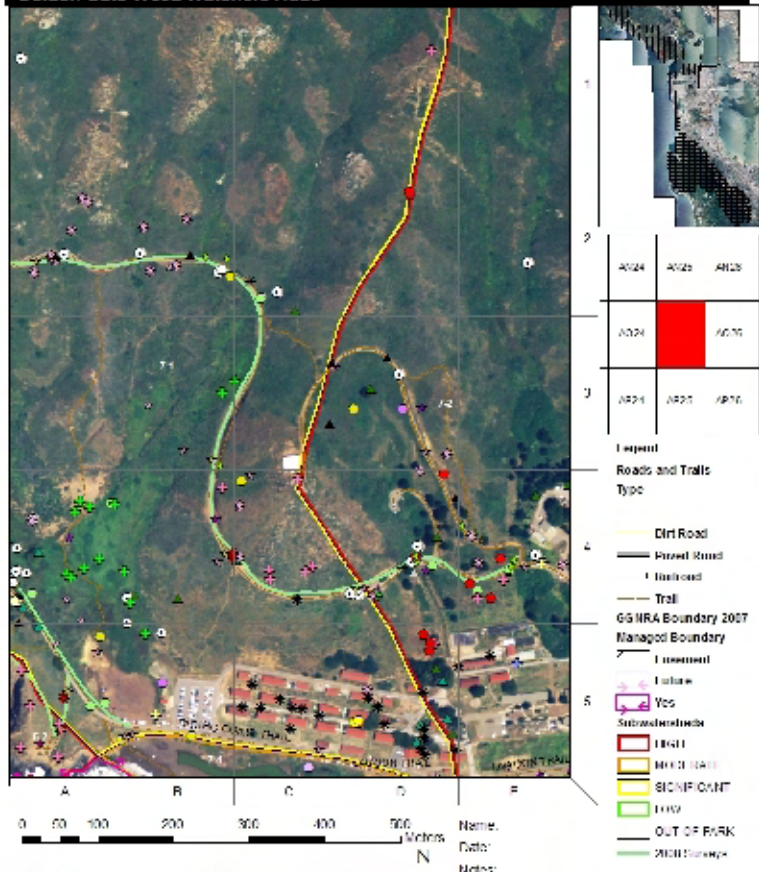
##### Species Name

- |  |                                      |  |
|--|--------------------------------------|--|
| <i>Acacia decurrens</i> /ACDE          | <i>Conium maculatum</i> /CDMA2       | <i>Ilex aquifolium</i> /IAQ20          |
| <i>Acacia longifolia</i> /ACLO         | <i>Cortaderia jubata</i> /COJU2      | <i>Lathyrus latifolius</i> /LALA4      |
| <i>Acacia melanocoryn</i> /ACME        | <i>Cortaderia selbiana</i> /COSE4    | <i>Leptospermum laevigatum</i> /LELA20 |
| <i>Acacia reoliens</i> /ACRE9          | <i>Cotoneaster franchetii</i> /COFR3 | <i>Leucanthemum maximum</i> /LEMA8     |
| <i>Acacia verticillata</i> /ACVE2      | <i>Cotoneaster lacteus</i> /COLA     | <i>Leucanthemum vulgare</i> /LEVU      |
| <i>Ageratina adenophora</i> /AGAD2     | <i>Cotoneaster pannosus</i> /COPA14  | <i>Linum bienne</i> /LBI5              |
| <i>Allium triquetrum</i> /ALTR4        | <i>Cotoneaster species</i> /COTON    | <i>Mentha pulegium</i> /MEPU           |
| <i>Ammophila arenaria</i> /AMAR4       | <i>Crataegus monogyna</i> /CRMO3     | <i>Myoporum laetum</i> /MYLA5          |
| <i>Anthoxanthum odoratum</i> /ANOD     | <i>Cupressus macrocarpa</i> /CUMA2   | <i>Myosotis latifolia</i> /MYLA4       |
| <i>Arotheca calendula</i> /ARCA45      | <i>Cynodon dactylon</i> /CYDA        | <i>Oxalis pes-caprae</i> /OXPE         |
| <i>Arundo donax</i> /ARDO4             | <i>Cytisus scoparius</i> /CYSC4      | <i>Parapholis incurva</i> /PAIN        |
| <i>Berberis darwinii</i> /BEDAXX       | <i>Cytisus striatus</i> /CYST7       | <i>Pennisetum clandestinum</i> /PECL2  |
| <i>Brassica rapa</i> /BRRA             | <i>Dielsirea odorata</i> /DEOD       | <i>Phalaris aquatica</i> /PHAQ         |
| <i>Briza maxima</i> /BRMA              | <i>Digitalis purpurea</i> /DIPU      | <i>Phalaris arundinacea</i> /PHAR3     |
| <i>Bromus diandrus</i> /BRDI3          | <i>Dipsacus fullonum</i> /DIFU2      | <i>Pinus radiata</i> /PIRA2            |
| <i>Bromus hordeaceus</i> /BRHO2        | <i>Echium californicum</i> /ECCA5    | <i>Frunus avium</i> /FRAV              |
| <i>Bromus madritensis</i> /BRMA3       | <i>Ehrharta erecta</i> /EHER         | <i>Pyracantha angustifolia</i> /PYAN   |
| <i>Bromus rubens</i> /BRRU2            | <i>Erechtites glomerata</i> /ERGL8   | <i>Raphanus sativus</i> /RASA2         |
| <i>Bromus tectorum</i> /BRTE           | <i>Erechtites minima</i> /ERMI8      | <i>Rosa eglanteria</i> /ROEG           |
| <i>Calandula arvensis</i> /CAAR        | <i>Eucalyptus globulus</i> /EUGL     | <i>Rubus discolor</i> /RUDI2           |
| <i>Carduus pycnocephalus</i> /CAPY2    | <i>Euphorbia oblongata</i> /EUOB4    | <i>Rumex acetosella</i> /RUAC3         |
| <i>Caprotrotus edulis</i> /CAED3       | <i>Festuca arundinacea</i> /FEAR3    | <i>Schinus molle</i> /SOMO             |
| <i>Centaurea californica</i> /CECA2    | <i>Foeniculum vulgare</i> /FOVU      | <i>Silybum marianum</i> /SIMA3         |
| <i>Centaurea melitensis</i> /CEME2     | <i>Fumaria parviflora</i> /FUPA      | <i>Solanum nigrum</i> /SONI            |
| <i>Chamaenerion floribundum</i> /CHFL9 | <i>Genista monspessulana</i> /GEMO2  | <i>Sparaxis triolor hybrid</i> /SPTR   |
| <i>Cirsium vulgare</i> /CIVU           | <i>Hedera helix</i> /HEHE            | <i>Ulex europaeus</i> /ULEU            |
| <i>Conicosia pugioniformis</i> /COPU18 | <i>Helichrysum patiolare</i> /HEPE5  | <i>Vinca major</i> /VIMA               |
|  | <i>Hirschfeldia incana</i> /HIIN3    | unknown/Unknown                        |
|  | <i>Holcus lanatus</i> /HOLA          |  |

Please refer to your Weed Watcher manual for priority levels and common names.

Print Date: Sep 09, 2008

## National Park Service San Francisco Bay Area Network Inventory and Monitoring Golden Gate Weed Watchers Atlas



GGCA\_MapBook.mxd created by Andrea Williams 2008/06/26  
Print/Export Date: Sep 29, 2008



# GeoWeed

**GeoWeed Top Menu**

**GeoWeed**      GeoWeed Database Name: NPS Training June 11 2007      Current Org Group: GOGA Vegetation Management  
 Run version: 3.1.15      Database version: 3.1      Default Project: Invasive Plant Management

**Data Navigation** | **Handheld and GIS Operations** | **Administrative Functions**

History: 16:39:20 Editing Photos      Jump Back

**Manage your data**

All 459 Occurrences      All 46 Work Sessions

All 402 Assessments      All 275 Regions

All 9 Treatments      All 27 Contacts

All 3 Surveys      All 2 Projects

All 3 Photos      All 1 Organizing Groups

Exit GeoWeed

**Manage your support lists**

Plants

Herbicides

Adjuvants

Bioagents

About GeoWeed  
 Reports  
 Check and Clean

Data: C:\GeoWeed\GeoweedData3.1-NPS\_Training\_June\_11\_2007.mdb  
 Run: C:\GeoWeed\GeoWeedRun3.1.13g.mdb

**ArcPad/GIS Export**      version: 3.1 - 03/08/07      Generate ESRI shapefiles, which may optionally copied directly to your handheld device.

**GeoWeed**      ArcPad/GIS Export      Top

Go for it?

**Your Current Export Criteria:**

AREA: SEC Parking Lot      Modify these criteria...      Help

PLANT: All Plants for Area(s)

DATA:  
 Occurrences: ONLY Active  
 Assessments: ONLY Current  
 Treatments: All  
 Area Surveys: None

Output Directory for Shapefiles  
 C:\NW3\GIS\export\      Change Directory...

Export shapefiles to my ArcPad handheld PDA  
 \* This option requires the PDA to be connected to the computer (and ArcPad NOT running).

Create shapefiles...

**Confirm GIS Export parameters**      X

Ready to do Export NOW?

Yes      No      Cancel

**GeoWeed editing Assessments**      15:06:29 Editing Assessments

GeoWeed 3.1.11f Assessments      1 of 1

Filter      View as Table      ReCalc      Top      Back      Jump

**for Occurrence:**      Current Assessment

Occurrence: Sonoma Creek 1

Species: Arundo donax

Region: SEC Parking Lot

Phenology: Mature

Vegetation:      Distribution:      Notes:

Session: 5/30/2007 (13:00 - 16:00) SEC Pre-Training  
 My Time: 5/23/2007 (14:01 - 16:00) SEC Pre-Training  
 5/23/2007 (13:00 - 14:00) SEC Pre-Training

Recorded By: DiPietro, Dearnie

**Related Records**

My Occurrence  
 My Treatment  
 My Work Session

**Size of Assessment**

Area (size) Source: LxW 10x20 m desk      Gross: 200.0 m<sup>2</sup>

CoverClass: 75 - 95%      times % cover: 85      Assessed:      # Plants: 0

Infested: 0.0 m<sup>2</sup>

**Treatment for this Assessment (optional)**

times % treated: 100      Treated: 0

Treated: 0.0 m<sup>2</sup>

Treatment:      ReTreatment:

Info      Size Calc      Density and Misc      Photos      Current Assessment Coordinates

**Area (Size) Calculation**

Calculate from Polygon      Calculate

10 X 20 m      Calculate

CoverPercent: 85

Size in Hectares  
 Gross: 0.02000000  
 Infested:      Calculate

**GeoWeed editing Occurrences**      13:55:48 Editing Occurrences

GeoWeed 3.1.11f Occurrences      1 of 1

Filter      View as Table      ReCalc      Top      Back      Jump

**Occurrence Name:**      Date Recorded:      Discovery Year:      New      Undo      Save      Cancel

Plant Name:      Recorded by:      Latitude:      Longitude:      decimal degrees

State: CA      County:      Primary Region:      Location Description:      Comments:      My Current Assessment      My 1 Assessment      My Primary Region      My 1 Region

Info      Regions      USPLS and other Geographic Info      Ident Confidence      Recheck

An Occurrence is a basic observation of a weed plant, patch or population, concentrating on identification and general location. Its status at given times may be further described in 1 one or more Assessments.



# San Francisco Bay Area Network Inventory and Monitoring Program

# Equipment

## Trimble GeoXT



## Garmin iQue

## Rangefinder



## Trimble Juno ST

Not shown: digital camera and binoculars



# San Francisco Bay Area Network Inventory and Monitoring Program

# Results

- 50-60 miles of trail surveyed
- 1000-1200 infestations mapped
- Monthly summaries to exotics staff
- Weed Atlas
- Detectability index

Weed Watchers- Invasive Species Early Detection Citizen Science Program



## What *SNOO* in the Park?

**Golden Gate Weed Watchers**  
**Invasive Species Early Detection**  
**Significant New Observations and Occurrences**  
**August 2008**

### Importance of Early Detection of Invasive Species

Aggressive non-native plants threaten to change the landscape of our national parks. These plants can alter entire ecosystems, reducing habitat for the unique plants and animals of the San Francisco Bay Area in the very places set aside to protect them. Often, by the time a plant is noticed as a problem it has 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.

**August** was once again a very productive month for the Weed Watcher Program. ~~Unfortunately all of our interns had to go back to school this month, but not before putting in many hours out on the trails surveying and treating our priority species.~~

The Weed Watchers left the trails to do a road survey along the entire one-way portion of **Conzleman Road**. This survey went through **Subwatershed 1-2**, where several patches of **tocalote** (*Centaurea melitensis*), one patch of **thoroughwort** (*Ageratina adenophora*), and one patch of **kikuyu grass** (*Pennisetum clandestinum*) were mapped.

Parts of **Old Bunker Road Trail** and the **Coastal Trail** were surveyed in August. In **Subwatershed 7-1**, six separate patches of **licorice plant** (*Helichrysum petiolare*) were mapped. **Pennyroyal** (*Mentha pulegium*) was the only previously unmapped high priority plant that was found in **Subwatershed 7-2**.

The Weed Watchers returned to the **Bobcat Cut-off trail** in August to finish a survey started in July. In **Subwatershed 7-10** a small patch of **thoroughwort** that had not previously been mapped was recorded in GeoWeed. **Licorice plant** and **capeweed** (*Arctotheca calendula*) were discovered and mapped in **Subwatershed 7-9**. In **Subwatershed 8-6** several Priority 1 and Priority 2 species were mapped, including three patches of **capeweed**, two patches of **pennyroyal**, and one patch of **English Ivy** (*Hedera helix*). Two patches of **Scotch broom** (*Cytisus scoparius*) and one patch of **purple foxglove** (*Digitalis purpurea*) were also mapped as well as manually treated.



# San Francisco Bay Area Network Inventory and Monitoring Program

# Results

[http://science.nature.nps.gov/im/units/sfan/vital\\_signs/Invasives/weed\\_watchers.cfm](http://science.nature.nps.gov/im/units/sfan/vital_signs/Invasives/weed_watchers.cfm)

<http://www.weedwatcher.org>

## Web page:

➤ ID cards

➤ Data sheets

➤ Maps

➤ Contact info

➤ Protocol and Annual Reports

**National Park Service**  
Inventory & Monitoring Program

National Park Service  
U.S. Department of the Interior

**San Francisco Bay Area Network**

NPS » Nature & Science » Inventory & Monitoring » San Francisco Bay Area Network » Monitoring » Vital Signs: Invasive Plant Species

**WEED WATCHERS - Become a citizen scientist**  
A volunteer-based invasive plant early detection program

As a weed watcher you will learn to identify invasive plants of the region and report your findings. Weed Watchers patrol the roads and trails of the national parks in San Mateo, San Francisco, and Marin counties, detecting weeds as they first invade. Discovering weeds before they become well-established is critical to reducing damage to ecosystem integrity, preventing the loss of habitat for rare plants and animals, and preventing costly natural resource management. Deepen your understanding of the natural world while playing an important role in the protection of the unique resources at the park.

**Become a Weed Watcher**

To participate in this program, contact the Weed Watcher Volunteer Coordinator to find out about the next training courses in invasive plant identification and mapping. Trained volunteers conduct at least one survey a month for six months. Reap the benefits of a flexible independent schedule, weekly exercise, family-friendly volunteer experiences and extended levels of training in California plants, resource management and mapping technologies. Sign up today!

Volunteers are given a special "Weed Watchers Kit" which contains the following:

- A set of "Plants Out of Place" ID cards
- A personalized map of your survey route
- Instructions for conducting a survey
- Weed Watcher report forms

**What We Look For**  
Target Invasive Plants

**Where To Look**  
Maps of survey areas

**Reporting**  
Download data sheets  
Become a Weed Watcher

**Network Home :**  
About Us  
Inventories  
Monitoring  
Reports & Publications  
Network Contacts  
SFAN Intranet (NPS only)

**Vital Signs**  
Air Quality  
Amphibians and Reptiles  
Butterflies - T & E  
Fish  
Landbirds  
Landscape Dynamics  
Pinnipeds  
Plants - Communities  
Plants - Invasives  
Plants - Rare  
Raptors  
Riparian Habitat  
Snowy Plover, Western  
Spotted Owl, Northern  
Stream Flow  
Water Quality  
Weather and Climate  
Wetland Habitat

**Parks: Nature & Science**



# San Francisco Bay Area Network Inventory and Monitoring Program

## Rapid response



- All using same system (GeoWeed)
- Summaries to exotics staff
- Grant writing



# San Francisco Bay Area Network Inventory and Monitoring Program

## Next steps



- Revise and refine protocol
- Expand to other parks
- Build BAEDN:  
the Bay Area Early  
Detection Network





## San Francisco Bay Area Network Inventory and Monitoring Program

# Key features



- Prioritized search areas
- Levels for species and data collection
- Tracking negative data and survey routes
- Refining priorities based on results



# San Francisco Bay Area Network Inventory and Monitoring Program

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