San Francisco Bay Area Network
Inventory and Monitoring Program

Field-Testing an Invasive Plant Species Early Detection Protocol in the San Francisco Area Network of National Parks

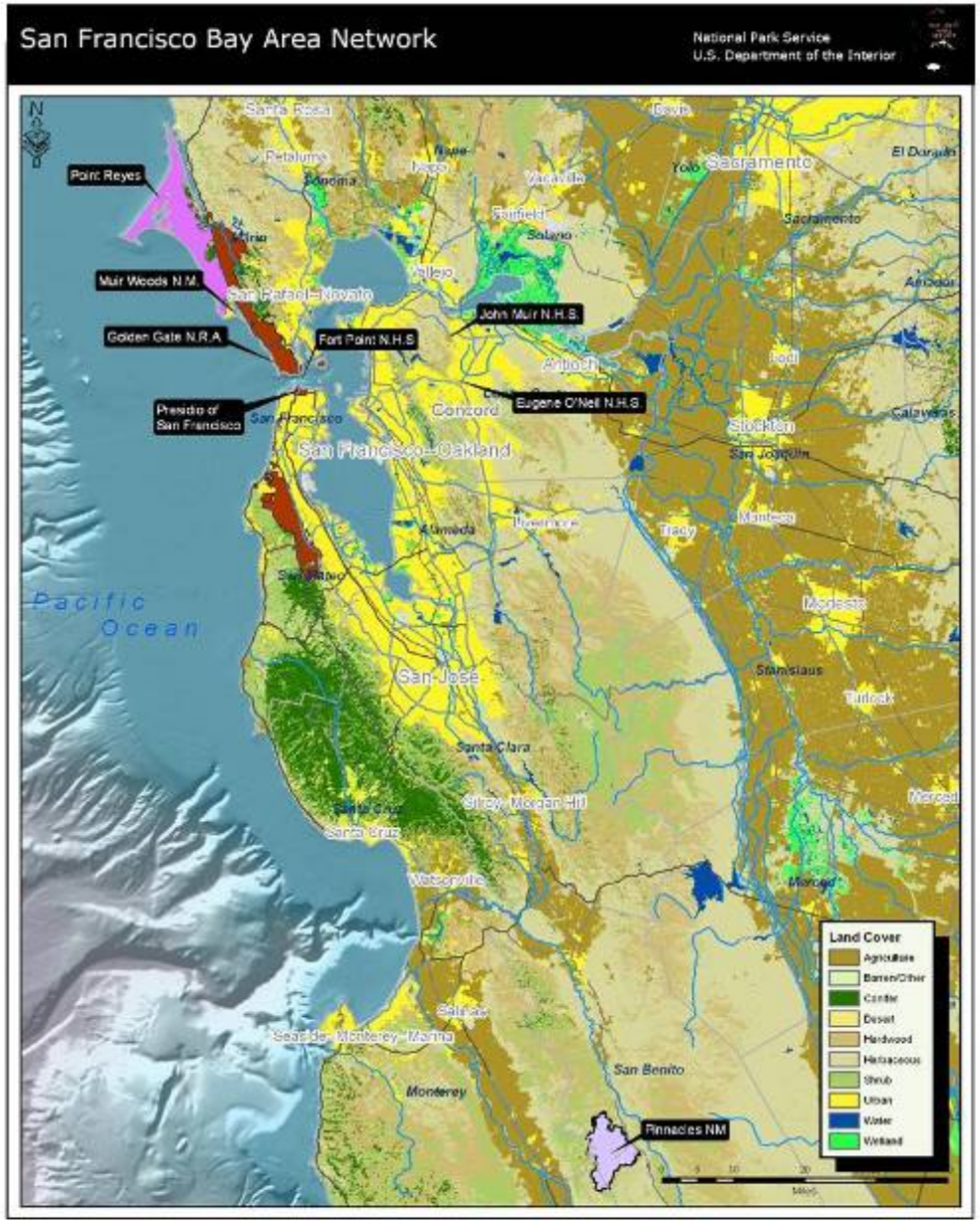
National Park Service
Andrea Williams, Natural Resource Specialist
Andrea_Williams@nps.gov

San Francisco Bay Area Network
Inventory and Monitoring Program

Overview

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

National Vital Signs Program


San Francisco Bay Area Network
National Park Service
U.S. Department of the Interior
Point Reyes
Muir Woods N.M.
Golden Gate N.R.A.
Fort Point N.H.S.
John Muir N.H.S.
Eugene O'Neil N.H.S.
Presidio of San Francisco
Pacific Ocean
Pinnacles NM
Land Cover
Agriculture
Barren/Other
Conifer
Desert
Hardwood
Herbaceous
Shrub
Urban
Water
Wetland

San Francisco Bay Area Network
Inventory and Monitoring Program

Vital Signs

- Weather
- Invasive plant species
- Freshwater quality
- Air quality
- Streamfish assemblages
- Rare plant species
- Spotted owls

San Francisco Bay Area Network
Inventory and Monitoring Program

Vital Signs

Three vegetation-related:

- invasive species
  (early detection and status/trends)
- rare plant species
- plant community change

San Francisco Bay Area Network
Inventory and Monitoring Program

Monitoring Questions

Monitoring questions for invasives early detection:

- Where are new populations of invasive plant species becoming established in SFAN parks?
- What are the main corridors and predictors for invasive species establishment?
- Are invasive species spreading into sensitive or critical park habitat?

Monitoring Objectives

Monitoring objective: Species list

- *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

Monitoring Objectives

Monitoring objective: Identify priority areas

- *Rank* SFAN subwatersheds *by management priority, risk, and current infestation level* to develop priority list. Identify and monitor the top 25% of sites annually, the next 50% of sites biennially, and the remaining 25% within 5 years (55% of all subwatersheds visited each year) noting presence and absence of priority weed species.

San Francisco Bay Area Network
Inventory and Monitoring Program

Monitoring Objectives

Monitoring objective: Survey roads and trails

- *Inventory* all public *roads and trails* in SFAN Parks at least once per year for the next 5 years using visual assessment and GPS technology to detect and accurately *map incipient populations* of the top-priority plant species on the SFAN Invasive Plant list. Monitoring and mapping will be conducted by *trained volunteers and interns using the Weed Information Management System (WIMS) platform*.

San Francisco Bay Area Network
Inventory and Monitoring Program

Monitoring Objectives

Monitoring 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 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

Field Test

- Test at Golden Gate, revise and expand
- Location, strong tradition of volunteerism make program feasible

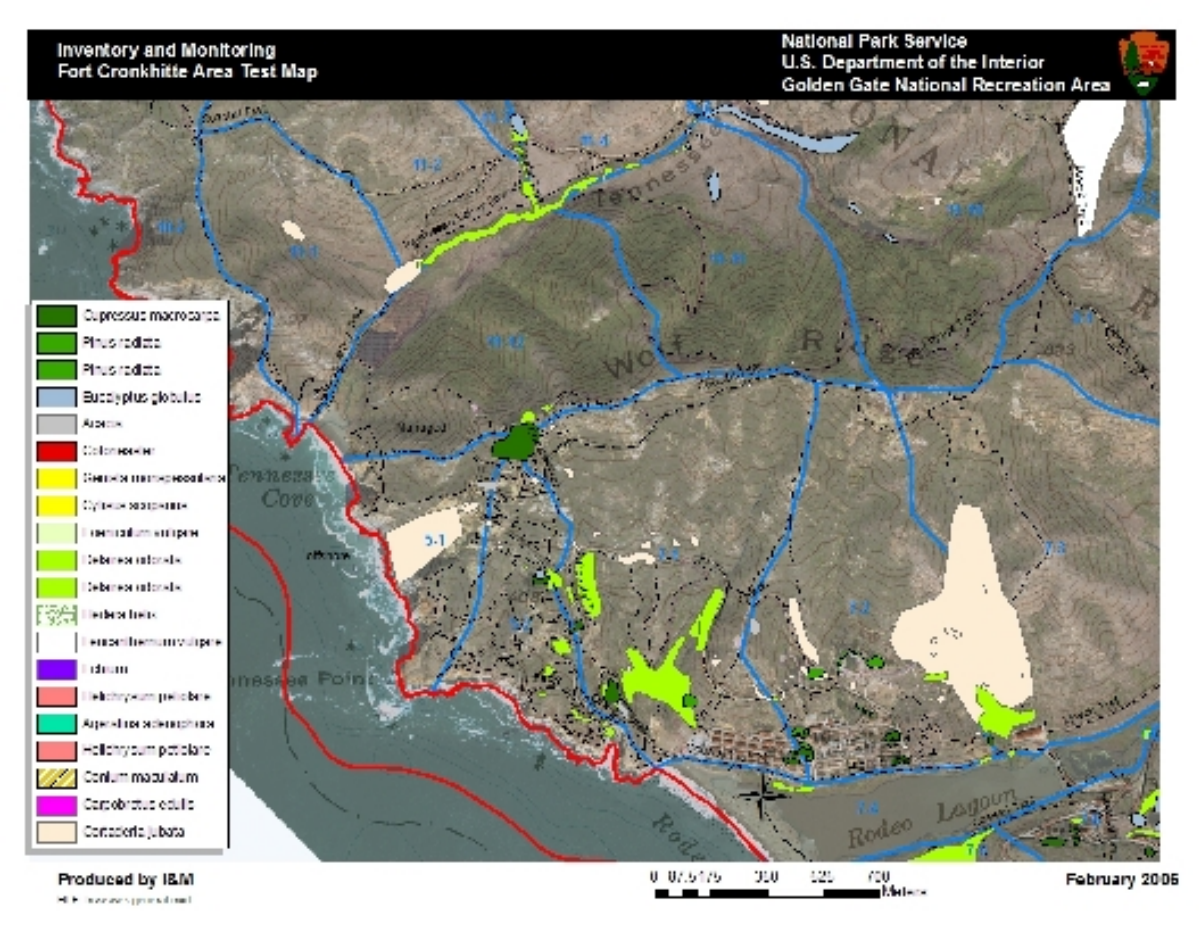
25,000 hours of exotics removal annually

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

Prioritizing Locations



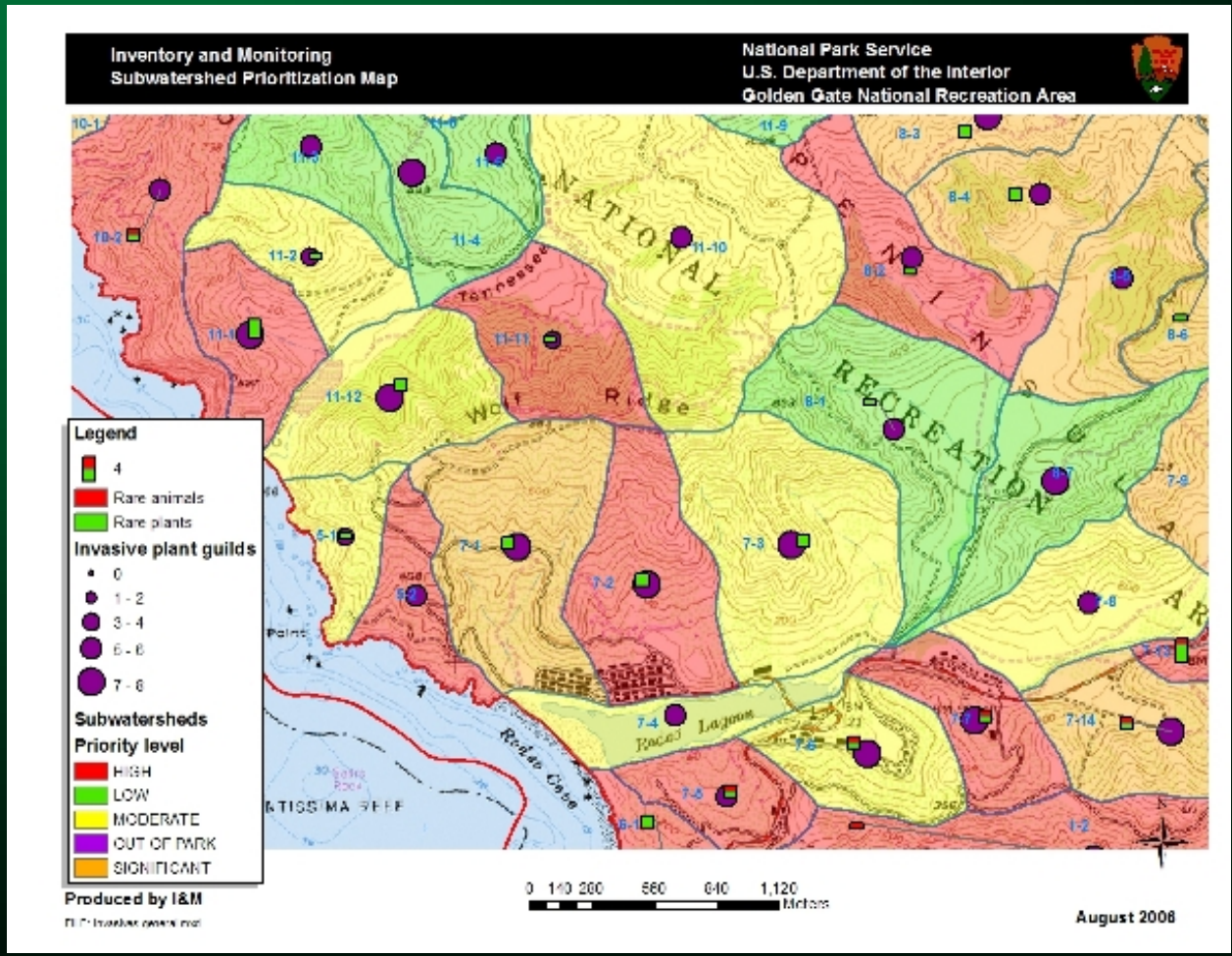
Priority factor: Invasive plants present

SubwatershedCode	FullSpeciesName	Guild
GGNRA7-1	Acacia melanoxylon	tree
GGNRA7-1	Acacia sp.	tree
GGNRA7-1	Ageratina adenophora	shrub/subshrub
GGNRA7-1	Albizia lophantha	tree
GGNRA7-1	Arctotheca calendula	vine/groundcover
GGNRA7-1	Avena sp.	grass
GGNRA7-1	Carpobrotus edulis	vine/groundcover
GGNRA7-1	Cirsium vulgare	thistle
GGNRA7-1	Conium maculatum	herb
GGNRA7-1	Cortaderia jubata	grass
GGNRA7-1	Cotoneaster pannosa	shrub/subshrub
GGNRA7-1	Cotoneaster sp.	shrub/subshrub
GGNRA7-1	Crocosmia crocosmiiflora	forb
GGNRA7-1	Cupressus macrocarpa	tree
GGNRA7-1	Cytisus scoparius	broom
GGNRA7-1	Delairea odorata	vine/groundcover
GGNRA7-1	Eucalyptus globulus	tree
GGNRA7-1	Foeniculum vulgare	forb
GGNRA7-1	Genista monspessulana	broom
GGNRA7-1	Hebe franciscana	shrub/subshrub
GGNRA7-1	Helichrysum petiolatum	shrub/subshrub
GGNRA7-1	Leptospermum laevigata	shrub/subshrub
GGNRA7-1	Leucanthemum vulgare	herb
GGNRA7-1	Paspalum dilatatum	grass
GGNRA7-1	Phalaris aquatica	grass
GGNRA7-1	Pinus radiata	tree
GGNRA7-1	Pinus sp.	tree
GGNRA7-1	Pyracantha angustifolia	shrub/subshrub
GGNRA7-1	Raphanus sativus	forb
GGNRA7-1	Ulex europaea	broom
GGNRA7-1	Zantedeschia aethiopica	forb
GGNRA7-4	Ageratina adenophora	shrub/subshrub
GGNRA7-4	Carpobrotus chilensis	vine/groundcover
GGNRA7-4	Carpobrotus edulis	vine/groundcover
GGNRA7-4	Conium maculatum	herb
GGNRA7-4	Cortaderia jubata	grass
GGNRA7-4	Cupressus macrocarpa	tree
GGNRA7-4	Delairea odorata	vine/groundcover
GGNRA7-4	Genista monspessulana	broom
GGNRA7-4	Pinus radiata	tree
GGNRA7-4	Pittosporum crassifolium	shrub/subshrub

SubwatershedCode	FullSpeciesName	Guild
GGNRA7-2	Acacia sp.	tree
GGNRA7-2	Ageratina adenophora	shrub/subshrub
GGNRA7-2	Amaryllis belladonna	forb
GGNRA7-2	Arctotheca calendula	vine/groundcover
GGNRA7-2	Carex sp.	grass
GGNRA7-2	Carpobrotus chilensis	vine/groundcover
GGNRA7-2	Carpobrotus edulis	vine/groundcover
GGNRA7-2	Centaurea calcitrapa	thistle
GGNRA7-2	Conium maculatum	herb
GGNRA7-2	Cortaderia jubata	grass
GGNRA7-2	Cotoneaster pannosa	shrub/subshrub
GGNRA7-2	Cotoneaster sp.	shrub/subshrub
GGNRA7-2	Cupressus macrocarpa	tree
GGNRA7-2	Delairea odorata	vine/groundcover
GGNRA7-2	Festuca arundinacea	grass
GGNRA7-2	Genista monspessulana	broom
GGNRA7-2	Helichrysum petiolatum	shrub/subshrub
GGNRA7-2	Holcus lanatus	grass
GGNRA7-2	Leucanthemum vulgare	herb
GGNRA7-2	Pennisetum clandestinum	grass
GGNRA7-2	Phalaris aquatica	grass
GGNRA7-2	Pinus radiata	tree
GGNRA7-2	Silybum marianum	thistle
GGNRA7-2	Zantedeschia aethiopica	forb
GGNRA7-3	Ageratina adenophora	shrub/subshrub
GGNRA7-3	Arctotheca calendula	vine/groundcover
GGNRA7-3	Cirsium vulgare	thistle
GGNRA7-3	Conium maculatum	herb
GGNRA7-3	Cortaderia jubata	grass
GGNRA7-3	Cortaderia selloana	grass
GGNRA7-3	Cotoneaster pannosa	shrub/subshrub
GGNRA7-3	Cotoneaster sp.	shrub/subshrub
GGNRA7-3	Crocosmia crocosmiiflora	forb
GGNRA7-3	Delairea odorata	vine/groundcover
GGNRA7-3	Festuca arundinacea	grass
GGNRA7-3	Helichrysum petiolatum	shrub/subshrub
GGNRA7-3	Leucanthemum vulgare	herb
GGNRA7-3	Phalaris aquatica	grass
GGNRA7-3	Pinus radiata	tree
GGNRA7-3	Sonchus sp.	thistle
GGNRA7-3	Ulex europaea	broom
GGNRA7-3	Zantedeschia aethiopica	forb

San Francisco Bay Area Network
Inventory and Monitoring Program

Prioritizing Locations



FullLatinName	CalIPC Status (05)	Cal-IPC Score	CDFA Score	TNC ESA	TNC Score	Alterer Score	Endanger er Score	Ease of Control	Control Score	Feasibility of Control	WMA Score	Total Score
Acacia decurrens		0	0	*G*	1	1	0	*M*	1	*H*	0	3
Acacia melanoxylon	*Low*	1	0	*Y*	2	1	0	*L*	2	*M*	1	7
Acacia verticillata		0	0	*G*	1	1	0	*M*	1	*M*	0	3
Ageratina adenophora	*Moderate*	2	0	*N*	1	0	0	*L*	2	*L*	1	6
Ailanthus altissima	*Moderate*	2	0	*Y*	2	1	0	*L*	2	*H*	1	8
Albizia lophantha		0	0	G	1	0	0	*M*	1	*H*	0	2
Allium triquetrum		0	0		0	0	0	M	1	*M*	0	1
Alopecurus pratensis		0	0	N	1	0	0	M	1	L	0	2
Amaryllis belladonna		0	0		0	0	0	*H*	0	*H*	0	0
Ammophila arenaria	*High*	3	0	*Y*	2	1	1	*L*	2	*L*	1	10
Aptenia cordifolia	*Not listed*	0.5	0	*N*	1	0	0.75	*M*	1	*H*	0	3.25
Arctotheca calendula	*Moderate--Alert*	3	2	*N*	1	0	1	*L*	2	*H*	0	8
Arrhenatherum elatius		0	0		0	0	0	*L*	2	*M*	0	2
Arundo donax	*High*	3	0	*Y*	2	1	0	*L*	2	*H*	1	9
Bellardia trixago	*Low*	1	0		0	0	0	*M*	1	*L*	0	2
Berberis darwinii		0	0	*G*	1	0	0	*M*	0	*H*	1	2
Brassica nigra		0	0	*N*	1	0	0	*M*	1	*L*	1	3
Brassica rapa	Low	1	0	N	1	0	0	*M*	1	*L*	1	4
Calendula arvensis		0	0		0	0	0	H	0	*H*	0	0
Carpobrotus edulis	*High*	3	0	*N*	1	1	1	*M*	1	*L*	1	8
Centaurea calcitrapa	Moderate	2	1	*N*	1	1	0	*L*	2	*H*	1	8
Centaurea melitensis	*Moderate*	2	0	*N*	1	1	0	*M*	1	*L*	1	6
Centaurea solstitialis	*High*	3	1	*Y*	2	1	1	*L*	2	*H*	1	11
Centranthus ruber		0	0		0	0	0	M	1	*L*	1	2
Cestrum aurantiacum		0	0		0	0	0		0	H	0	0
Cirsium arvense	*Moderate*	2	1	*Y*	2	1	0.75		2		1	9.75
Conicosia pugioniformis	*Low*	1	0		0	0	0	*M*	1	*H*	1	3
Conium maculatum	*Moderate*	2	0	*Y*	2	0	1	*M*	1	*L*	1	7
Coprosma repens	*Not listed*	0.5	0		0	0	0	*M*	1	*H*	0	1.5
Cortaderia jubata	*High*	3	0	*Y*	2	0	1	*L*	2	*H*	1	9
Cortaderia selloana	*High*	3	0	*N*	1	0	1	*L*	2	*H*	1	8
Cotoneaster franchetii	*Moderate*	2	0		0	0	0	*M*	1	*L*	1	4
Cotoneaster pannosus	*Moderate*	2	0		0	0	0	*M*	1	*H*	1	4
Cotula coronopifolia	Low	1	0		0	0	0	*M*	1	*L*	0	2
Crataegus monogyna	*Low*	1	0		0	0	0	*M*	1	*H*	0	2
Crocosmia X crocosmiiflora	*Low*	1	0	*N*	1	0	0	*M*	1	*M*	0	3
Cupressus macrocarpa		0	0		0	1	0	*H*	0	*L*	1	2
Cynodon dactylon	Moderate	2	1	Y	2	0	0	L	2	H	0	7
Cytisus scoparius	*High*	3	1	*Y*	2	1	0	*M*	1	*M*	1	9
Cytisus striatus	*Moderate*	2	0	*G*	1	1	0	*M*	1	*H*	1	6

INVASIVE NESS

[Biological] Ease of Control

[Budgetary] Feasibility of Control

San Francisco Bay Area Network
Inventory and Monitoring Program

Feasibility

Rejmánek and Pitcairn: When is eradication a realistic goal?

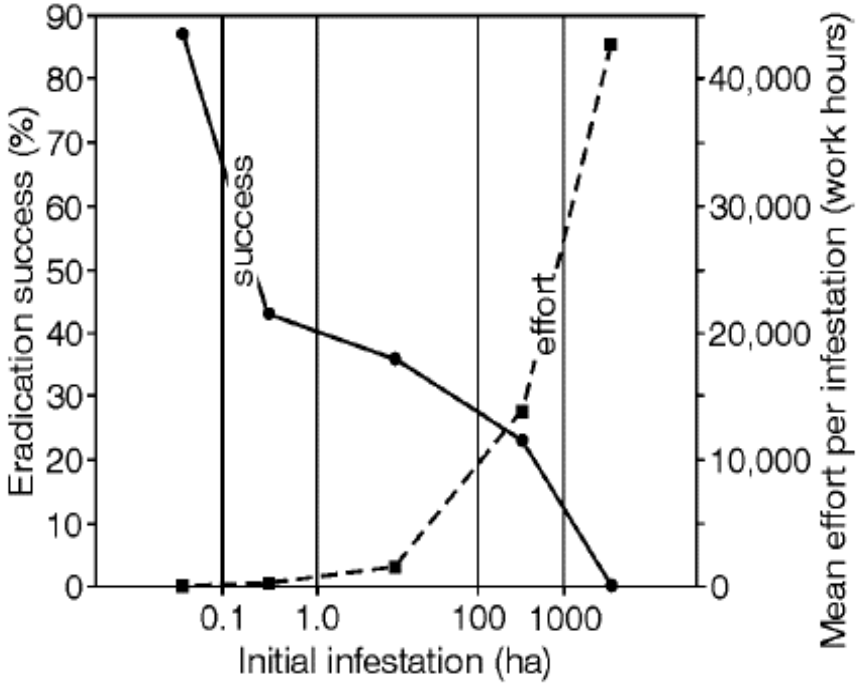


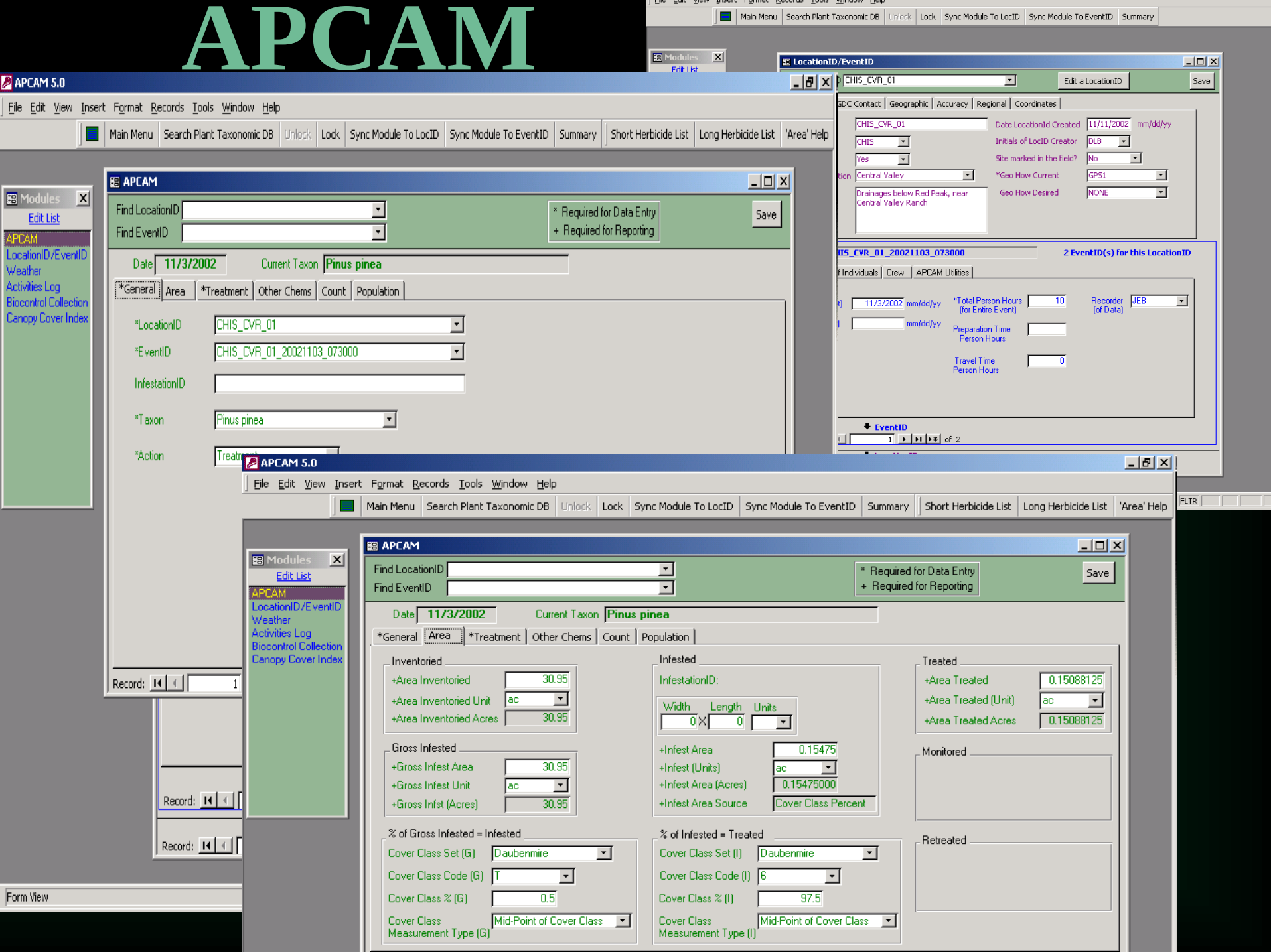
Fig. 1 The dependence of the eradication success (%) and the mean eradication effort per infestation (work hours) on the initial size of infestations. Based on the data for eradication projects of 18 noxious weed species and 53 independent infestations in California (see Table 1).

FullLatinName	CommonName	Priority	Family	SpCode
Ailanthus altissima	tree-of-heaven	1	Simaroubaceae	AIAL
Arctotheca calendula	capeweed	1	Asteraceae	ARCA45
Arundo donax	giant reed	1	Poaceae	ARDO4
Carduus acanthoides	plumeless thistle	1	Asteraceae	CAAC
Carthamus lanatus	woolly distaff thistle	1	Asteraceae	CALA20
Centaurea calcitrapa	purple starthistle	1	Asteraceae	CECA2
Centaurea solstitialis	yellow starthistle	1	Asteraceae	CESO3
Cirsium arvense	Canada thistle	1	Asteraceae	CIAR4
Cortaderia jubata	Andean or purple pampas grass, jubata grass	1	Poaceae	COJU2
Cortaderia selloana	Uruguayan pampas grass	1	Poaceae	COSE4
Cotoneaster pannosus	silverleaf cotoneaster	1	Rosaceae	COPA14
Cynodon dactylon	Bermudagrass	1	Poaceae	CYDA
Cytisus striatus	Portugese broom, striated broom	1	Fabaceae	CYST7
Digitalis purpurea	purple foxglove	1	Scrophulariaceae	DIPU
Dittrichia graveolens	stinkweed	1	Asteraceae	DIGR4
Ehrharta calycina	perennial veldt grass	1	Poaceae	EHCA
Ehrharta erecta	panic veldt grass	1	Poaceae	EHER
Hypericum perforatum	Klamathweed	1	Clusiaceae	HYPE
Mentha pulegium	pennyroyal	1	Lamiaceae	MEPU
Rubus discolor [procerus]	Himalayan blackberry	1	Rosaceae	RUAR9
Spartium junceum	Spanish broom	1	Fabaceae	SPJU2
Ulex europaea	gorse, furze	1	Fabaceae	ULEU
Vinca major	periwinkle	1	Apocynaceae	VIMA
Acacia melanoxylon	blackwood acacia	2	Fabaceae	ACME
Ageratina adenophora	thoroughwort, crofton weed	2	Asteraceae	AGAD2
Carduus tenuiflorus	slender-flowered thisle	2	Asteraceae	CATE2
Carpobrotus chilensis	sea fig	2	Aizoaceae	CACH38
Carpobrotus edulis	hottentot fig, freeway iceplant	2	Aizoaceae	CAED3
Centaurea melitensis	Napa thistle, tocalote	2	Asteraceae	CEME2
Conium maculatum	poison hemlock	2	Apiaceae	COMA2
Cynara cardunculus	artichoke thistle, cardoon	2	Asteraceae	CYCA
Cytisus scoparius	Scotch broom	2	Fabaceae	CYSC4
Delairea odorata	cape ivy	2	Asteraceae	DEOD
Dipsacus fullonum	common teasel, Fuller's teasel	2	Dipsacaceae	DIFU2
Eucalyptus globulus	bluegum eucalyptus	2	Myrtaceae	EUGL
Euphorbia oblongata	eggleaf or oblong spurge	2	Euphorbiaceae	EUOB4
Foeniculum vulgare	sweet fennel	2	Apiaceae	FOVU
Genista monspessulana	French broom	2	Fabaceae	GEMO2
Hedera canariensis	Algerian ivy	2	Araliaceae	HEDCA
Hedera helix	English ivy	2	Araliaceae	HEHE
Helichrysum petiolare	licorice plant	2	Asteraceae	HEPE8
Hirschfeldia incana	shortpod mustard	2	Brassicaceae	HIIN3
Holcus lanatus	velvet grass, Yorkshire fog	2	Poaceae	HOLA
Ilex aquifolium	English holly	2	Aquifoliaceae	ILAQ80
Leucanthemum vulgare	ox-eye daisy	2	Asteraceae	LEVU
Mesembryanthemum crystallinum	ice plant	2	Aizoaceae	MECR3
Nicotiana glauca	tree tobacco	2	Solanaceae	NIGL
Oxalis pes-caprae	Bermuda buttercup	2	Oxalidaceae	OXPE
Phalaris arundinacea	reed canary grass	2	Poaceae	PHAR3
Pinus radiata	Monterey pine	2	Pinaceae	PIRA2
Robinia pseudoacacia	black locust	2	Fabaceae	ROPS
Rumex acetosella	sheep sorrel	2	Polygonaceae	RUAC3

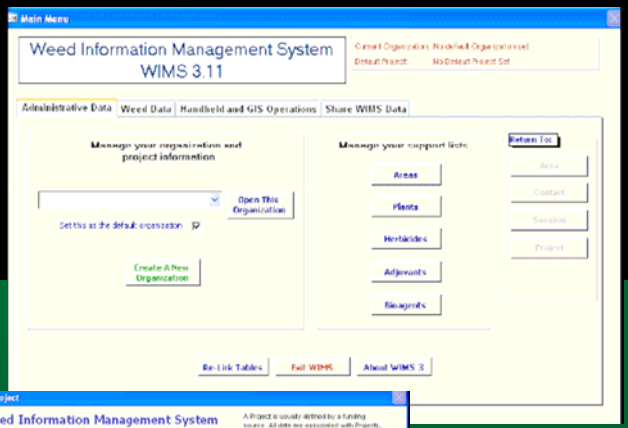
List 1: ED everywhere

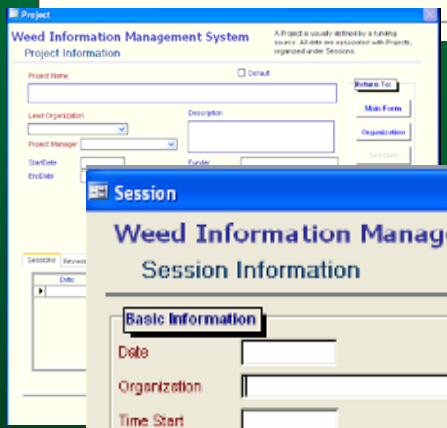
List 2: ED for new populations, plus moderate priority+high feasibility species

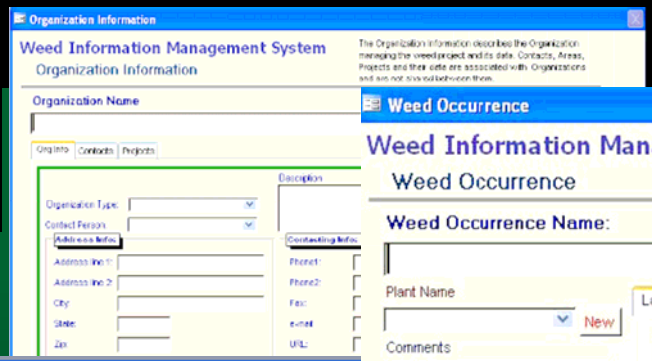
APCAM

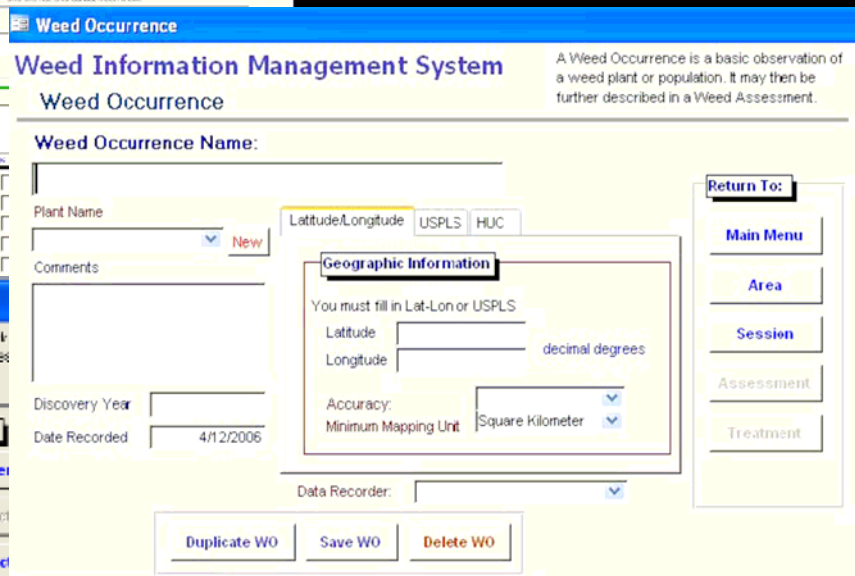

APCAM 5.0
File Edit View Insert Format Records Tools Window Help
Main Menu | Search Plant Taxonomic DB | Unlock | Lock | Sync Module To LocID | Sync Module To EventID | Summary | Short Herbicide List | Long Herbicide List | 'Area' Help
Modules
Edit List
APCAM
LocationID/EventID
Weather
Activities Log
Biocontrol Collection
Canopy Cover Index
Find LocationID
Find EventID
* Required for Data Entry
+ Required for Reporting
Save
Date 11/3/2002
Current Taxon Pinus pinea
*General | Area | *Treatment | Other Chems | Count | Population
*LocationID CHIS_CVR_01
*EventID CHIS_CVR_01_20021103_073000
InfestationID
*Taxon Pinus pinea
*Action
Inventoried
+Area Inventoried 30.95
+Area Inventoried Unit ac
+Area Inventoried Acres 30.95
Infested
InfestationID:
Width Length Units
+Infest Area 0.15475
+Infest (Units) ac
+Infest Area (Acres) 0.15475000
+Infest Area Source Cover Class Percent
Treated
+Area Treated 0.15088125
+Area Treated (Unit) ac
+Area Treated Acres 0.15088125
Gross Infested
+Gross Infest Area 30.95
+Gross Infest Unit ac
+Gross Infst (Acres) 30.95
Monitored
% of Gross Infested = Infested
Cover Class Set (G) Daubenmire
Cover Class Code (G) T
Cover Class % (G) 0.5
Cover Class Measurement Type (G) Mid-Point of Cover Class
% of Infested = Treated
Cover Class Set (I) Daubenmire
Cover Class Code (I) 6
Cover Class % (I) 97.5
Cover Class Measurement Type (I) Mid-Point of Cover Class
Retreated
LocationID/EventID
CHIS_CVR_01
Edit a LocationID
Save
GDC Contact | Geographic | Accuracy | Regional | Coordinates
Date LocationId Created 11/11/2002 mm/dd/yy
Initials of LocID Creator DLB
Site marked in the field? No
*Geo How Current GPS1
Geo How Desired NONE
Drainages below Red Peak, near Central Valley Ranch
2 EventID(s) for this LocationID
Individuals | Crew | APCAM Utilities
*Total Person Hours (for Entire Event) 10
Recorder (of Data) JEB
Preparation Time Person Hours
Travel Time Person Hours 0
EventID
1 of 2
Record: 1
Form View

WIMS 3 beta


Weed Information Management System
WIMS 3.11


Weed Information Management System
Project Information


Weed Information Management System
Organization Information


Weed Occurrence
Weed Information Management System
Weed Occurrence
Weed Occurrence Name:
Plant Name
New
Comments
Latitude/Longitude
USPLS
HUC
Geographic Information
You must fill in Lat-Lon or USPLS
Latitude
Longitude
decimal degrees
Accuracy:
Minimum Mapping Unit
Square Kilometer
Discovery Year
Date Recorded
4/12/2006
Data Recorder:
Duplicate WO
Save WO
Delete WO
Return To:
Main Menu
Area
Session
Assessment
Treatment
Assessments and Treatments
Areas
Other Types of Geographic Information
Session Date
Occurence
Phenology
Treatment Type
Cover %
New Assessment
View and Edit Treatment
View and Edit Assessment
Delete Assessment

Session
Weed Information Management System
Session Information
Basic Information
Date
Organization
Time Start
Time End
Project
Instructions
Import Data from Handheld
Save Session
Delete Session
Return To:
Crew
Area Surveys
Occurence Visits
Treatments
Session Date
Crew Member

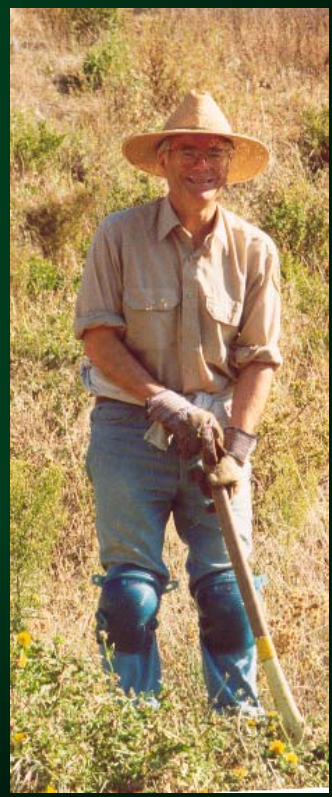
Area Survey
Weed Information Management System
Area Survey

San Francisco Bay Area Network
Inventory and Monitoring Program

Volunteer Program

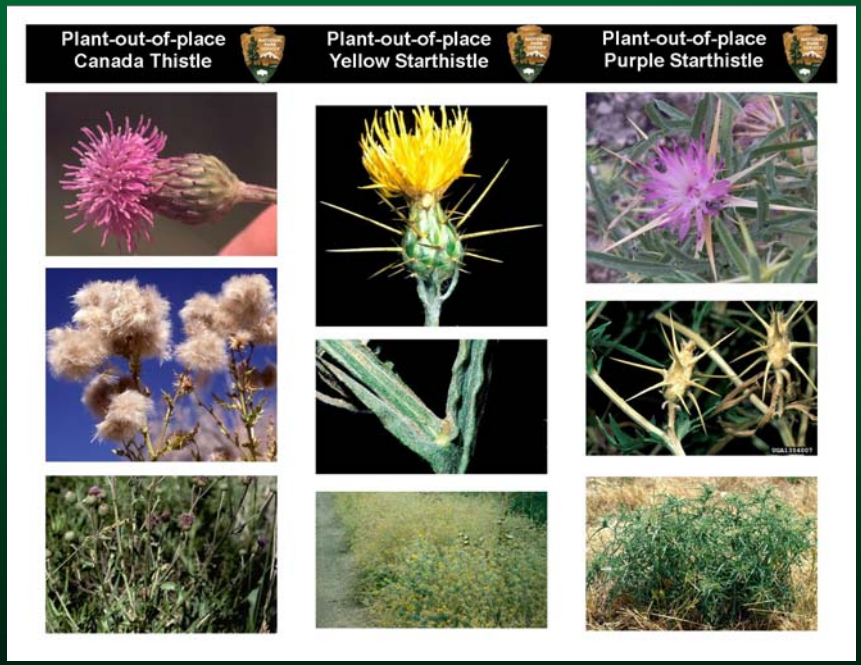
Levels for volunteers

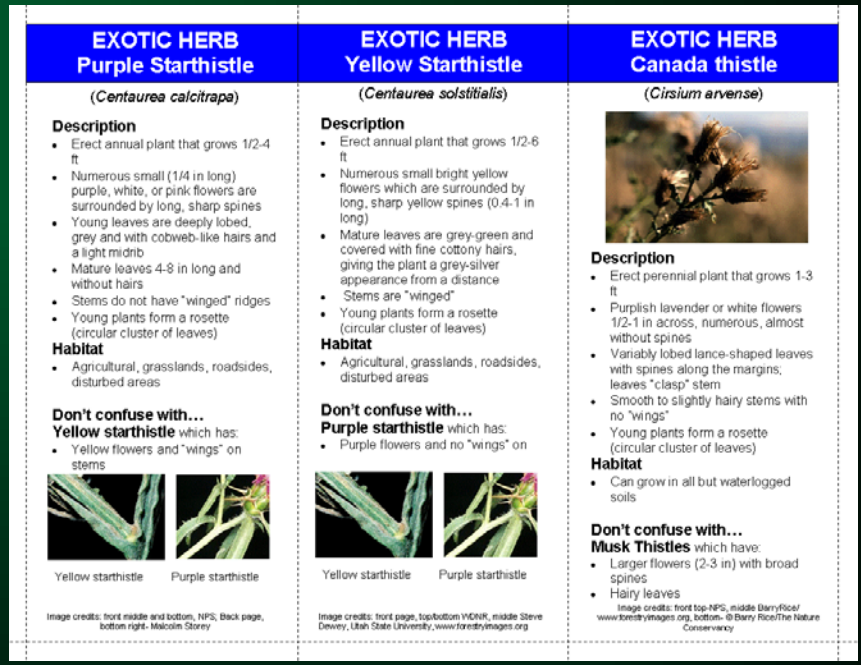
- Increasing number of species to ID
- Increasing level of technology and information gathered
- Increasing survey independence



San Francisco Bay Area Network
Inventory and Monitoring Program

ID Cards





San Francisco Bay Area Network
Inventory and Monitoring Program

Datasheets

Golden Gate Weed Watchers
Invasive Species Early Detection Survey Form

Going for a walk in the park? While you are out, keep your eye out for these park invaders. If you see a plant from the list, let us know by returning this form to the address at the bottom of the page. If you are unsure if the plant is the one on the list, see the instructions on the back of this page. **Happy Hunting!**

Name _____ Phone_____ Email _____ Date _____

Plant	Scientific Name	Seen (Y/N)?	# Occurences	Comments
Tree of Heaven	*Ailanthus altissima*			
Capeweed	*Arctotheca calendula*			
Giant Reed	*Arundo donax*			
Plumeless Thistle	*Carduus acanthoides*			
Wooly Distaff Thistle	*Carthamus lanatus*			
Purple Starthistle	*Centaurea calcitrapa*			
Yellow Starthistle	*Centaurea solstitialis*			
Canada Thistle	*Cirsium arvense*			
Jubata Grass	*Cortaderia jubata*			
Uruguayan Pampas Grass	*Cortaderia selloana*			
Silverleaf Cotoneaster	*Cotoneaster pannosus*			
Bermuda Grass	*Cynodon dactylon*			
Portuguese Broom	*Cytisus striatus*			
Purple Foxglove	*Digitalis purpurea*			
Stinkweed	*Dittrichia graveolens*			
Perennial Veldt Grass	*Ehrharta calycina*			
Panic Veldt Grass	*Ehrharta erecta*			
St. John's Wort	*Hypericum perforatum*			
Pennyroyal	*Mentha pulegium*			
Himalayan Blackberry	*Rubus discolor [procerus]*			
Spanish Broom	*Spartium junceum*			
Gorse	*Ulex europaeus*			
Periwinkle	*Vinca major*			

Weed Watchers
Golden Gate National Recreation Area
SFAN I&M
Fort Cronkhite Bldg 1063
Sausalito, CA 94965

(415) 331-5023 (415) 331-5530
espeith@parksconservancy.org
www.parksconservancy.org/volunteer
www.nps.gov/goga/vip

Entered in WIMS ___(date)____(int)

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 (3ft) GPS2 (10ft)
MARKED ON PAPER MAP? Y N
MINIMUM MAPPING UNIT hect km2
TREATMENT? Y N
WO:USDAPC+SUBW+YYYYMMDD+U#
ASSESSMENT (OPT)
LOCATION COMMENTS
COVER CLASS 1-10% 11-25% 26-50% 51-100% PER m2 / Infested area / hectare
_____ (#) OF INDIVUDALS PER infested area / m2

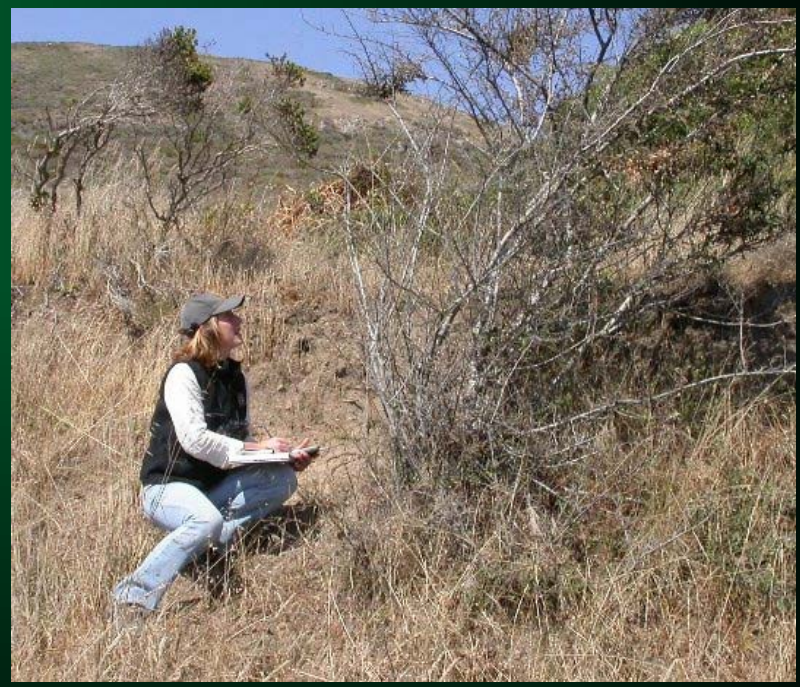
WEED OCCURRENCE NAME PLANT NAME LATITUDE LONGITUDE
ACCURACY GPS1 (3ft) GPS2 (10ft)
MARKED ON PAPER MAP? Y N
MINIMUM MAPPING UNIT hect km2
TREATMENT? Y N
WO:USDAPC+SUBW+YYYYMMDD+U#
ASSESSMENT (OPT)
LOCATION COMMENTS
COVER CLASS 1-10% 11-25% 26-50% 51-100% PER m2 / Infested area / hectare
_____ (#) OF INDIVUDALS PER infested area / m2

Please return these survey forms to National Park Service SFAN Inventory and Monitoring, Bldg 1063 Fort Cronkhite, Sausalito, CA 94965 Phone (415) 331-5023 Fax (415) 331-5630

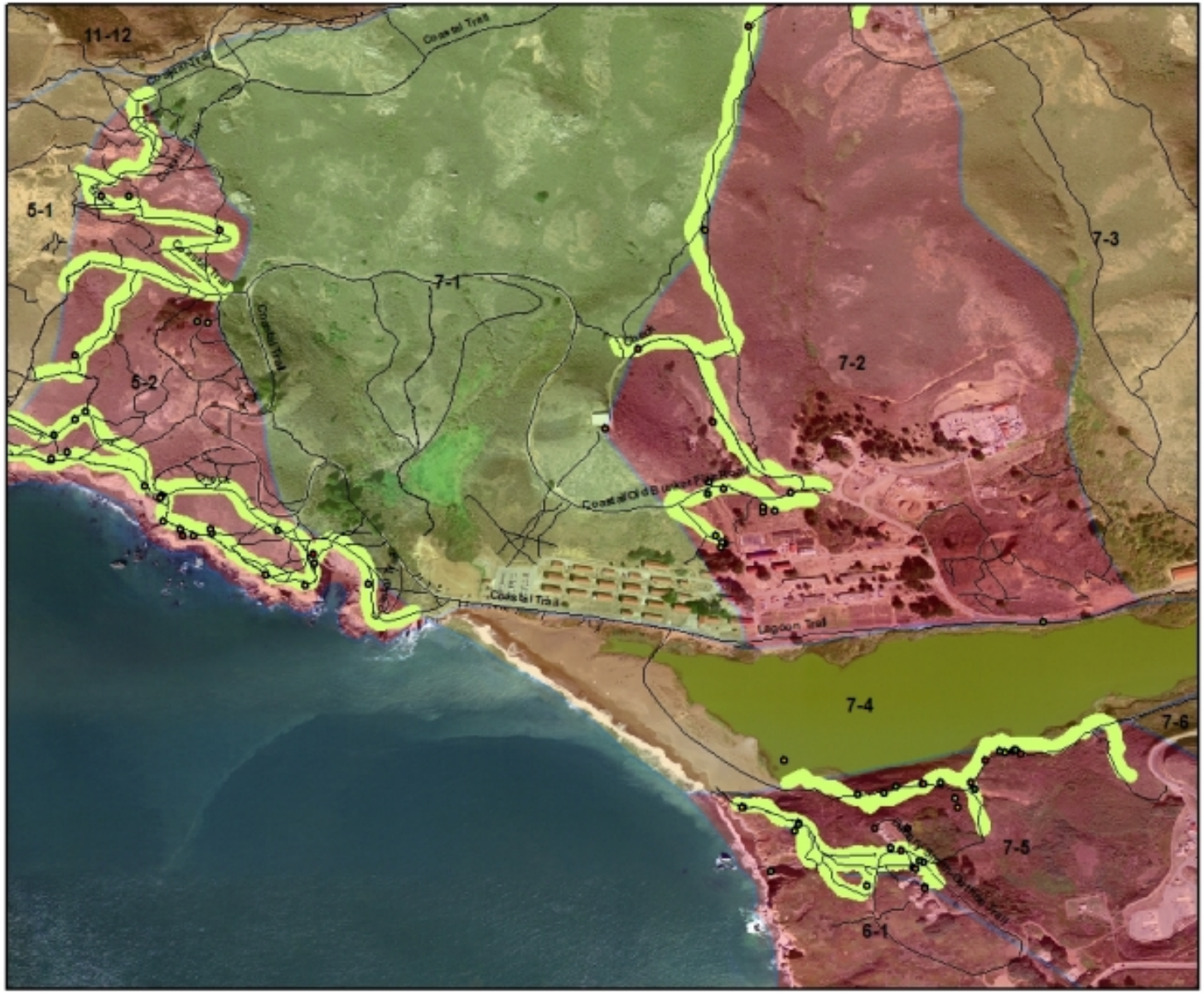
San Francisco Bay Area Network
Inventory and Monitoring Program

Equipment

Trimble GeoXT



Garmin iQue



Legend

sub_watersheds2001

Subwatershed Boundary

Risk Level

HIGH

MODERATE

SIGNIFICANT

LOW

survey070520060910elsp

survey070220060928elsp

Weedoccurrences

- <all other values>

SNAME

- Briza maxima
- Bromus diandrus
- Bromus hordeaceus
- Carpobrotus edulis
- Cotoneaster species
- Cupressus macrocarpa
- Eucalyptus globulus
- Festuca arundinacea
- Foeniculum vulgare
- Holcus lanatus

0 0.001 0.002 0.004 0.006 0.008 Kilometers

N

Rapid response

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

Lessons learned

- Definitions and cutoffs:
  the problem with patches
- Everything takes longer than you think
- Good directions are hard to write

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

Review

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

San Francisco Bay Area Network
Inventory and Monitoring Program

Acknowledgements

Elizabeth Speith, our test pilot

Park and network staff: Sue Fritzke, Maria Alvarez, Jane Rodgers, Kim Cooper, Dave Schirokauer, Dave Press, Marie Denn, Marcus Koenen, Craig Scott, Lew Stringer, Susan O'Neil, Sharon Franklet, Bobbi Simpson

Deanne DiPietro and Kasey Allen (SEC/WIMS 3)

Sharon Farrell and Kyla Dahlin (Parks Conservancy Partners)

Dan Glusenkamp (BAEDN co-founder)