

# What it means to win: Strategic approaches to weed work

## Invasive Weed Management 101 Cal-IPC Field Course

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Yosemite-ish, CA



# Overview

- Terminology
- Writing objectives
- SMART objectives
- Objectives and prevention, EDRR, control
- Monitoring
- Regional coordination
- Additional resources



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# Terminology for today

**Goal:** How you want the world to be

**Objective:** A measurable, time-bounded statement of what you plan on changing about the world

**Strategy:** The way you plan on changing the world

**Tactic:** A tool/plan for changing the world



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# Terminology

**Goal:** How you want the world to be  
(sometimes called **Vision** or **Mission**)



Example:  
To sustainably manage  
our natural resources  
and provide our  
customers with reliable,  
high-quality drinking  
water at a reasonable  
price.



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# Terminology

**Objective:** A measurable, time-bounded statement of what you plan on changing about the world (sometimes called **Goal**)



Example:  
Reduce cover of French broom at Pine Point to 5% by 2019.



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# Terminology

**Strategy:** The way you plan on changing the world (sometimes called **Objective** or **Alternative**)



Example:  
Control French broom  
populations.



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# Terminology

**Tactic:** A tool/plan for changing the world  
(sometimes called **Strategy**)

Example:  
Hand-pull using  
volunteers and  
crews.



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# Strategies and tactics

*How you achieve your goals and objectives*



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# Terminology for today

**Goal:** How you want the world to be

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# Why write objectives?

Focus on the desired condition of the resource



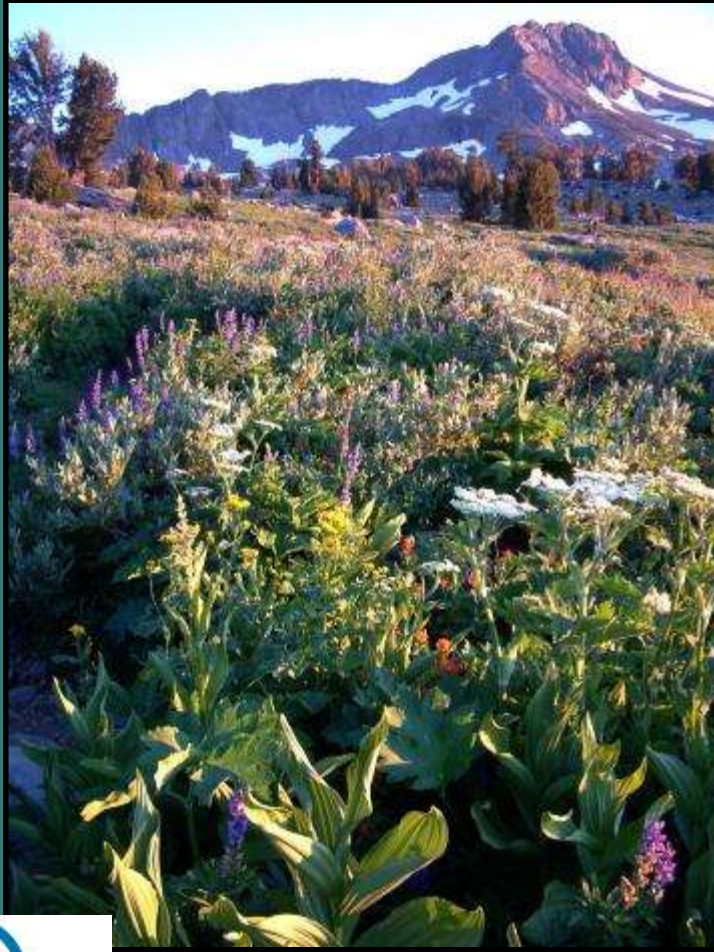
Cal-IPC field course attendees writing goals and objectives



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# Why write objectives?



Describe  
that condition



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# Why write objectives?

Determine strategies and tactics



Example:  
Spray YST with  
herbicide  
Plan for follow-up  
treatment and  
monitoring



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# Why write objectives?

Determine appropriate monitoring



Where's the  
knapweed?



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# Why write objectives?



Provide a measurement for success.

What it means to win!

Example:  
70% native plant cover 3 years post-treatment.



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# SMART objectives

- S trategic
- M easurable
- A chievable/attainable
- R ealistic/results-oriented
- T ime-bounded/timely



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# 5 aspects of an objective

1. What are you changing (species, site), where?
2. What aspect are you measuring?
3. How much change do you want to see?
4. In what direction?
5. Over what time period?



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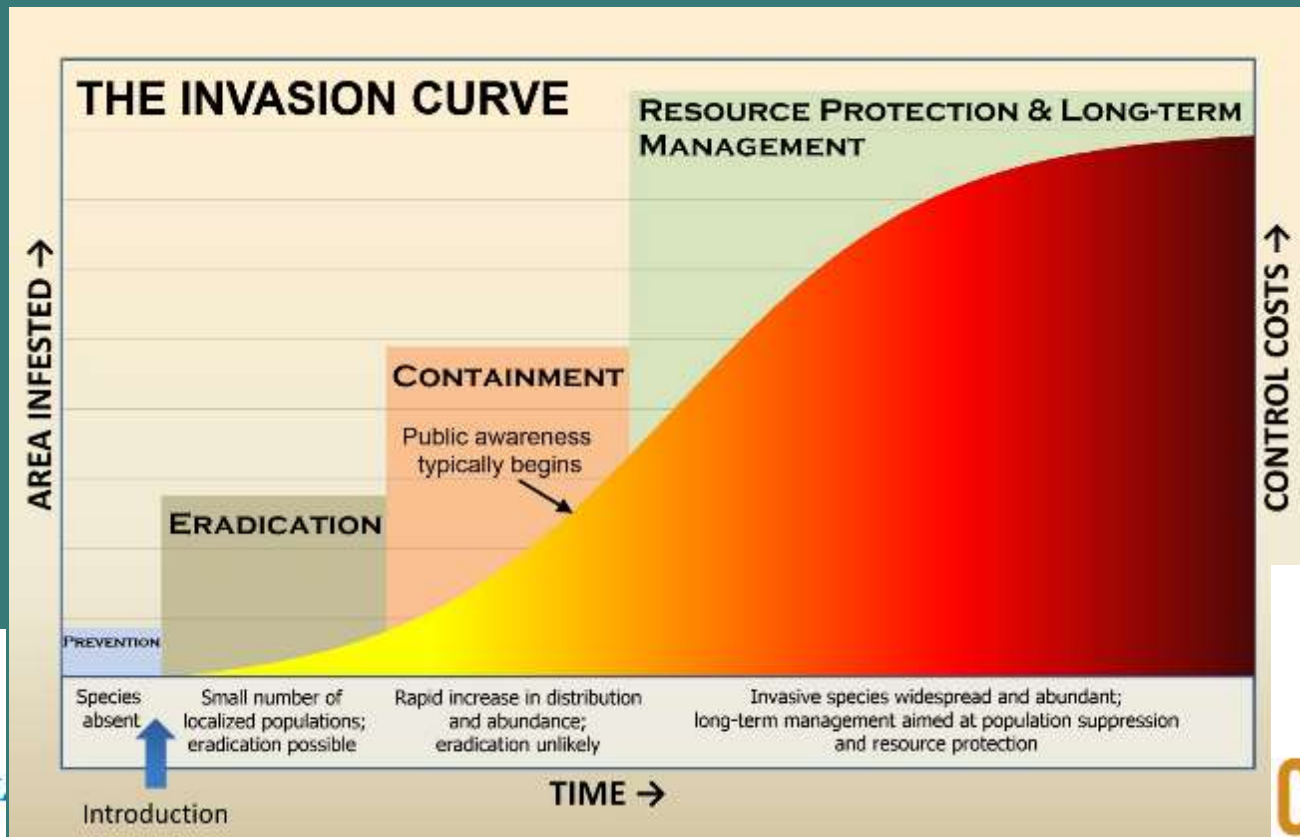




# Matching objectives to invasion

A measurable, time-bounded statement of what you plan on changing about the world

1. Prevention: Keep weeds out
2. EDRR: Find and extirpate while you still can
3. Control: Reduce to a tolerable level (rinse, repeat)
4. Restoration: Massive inputs to improve function



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# Developing objectives

## 1. Prioritize sites and/or species

### Prevention/EDRR:

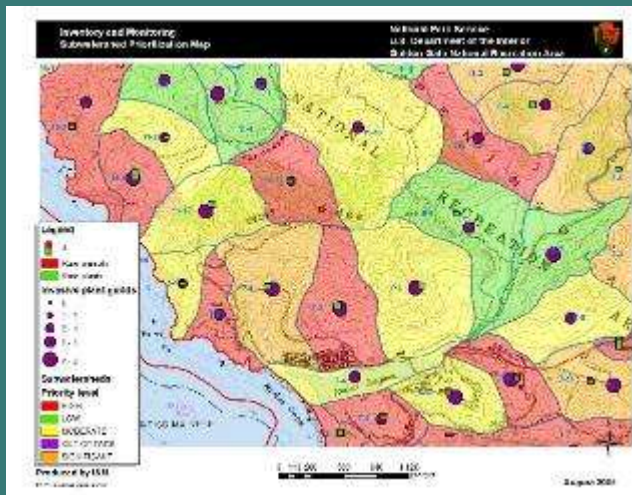
Where are your priority sites?

What species can you still extirpate?

Which ones are likely to show up?

### Containment and control:





Where are your leading edges and priority sites?



### Priority Species Lists

Golden Gate National Recreation Area  
John Muir National Historic Site  
Pinnacles National Park  
Point Reyes National Seashore

See the table below for more information about our priority invasive species and the data that we collect:

Our Priorities	Example	Explanation	Data Collected
<b>List 1 (Highest Priority Plants)</b>	 Fertile capeweed	List 1 plants are highly invasive and are typically not widespread. Control or even eradication is often feasible.	Point occurrences* and polygon assessments** are recorded for all patches, regardless of their size.
<b>List 2 (High Priority Plants)</b>	 Grape ivy	List 2 plants are highly invasive and usually more common than List 1 species, but are still feasible to control in many places.	Point occurrences are recorded for all patches regardless of their size, and polygon assessments are recorded for all patches smaller than 100 square meters.
<b>List 3 (Medium Priority Plants)</b>	 Sweet fennel	List 3 plants are usually widespread and difficult to control at the scale of the park. Uncommon species of concern are also listed here to improve our understanding of their distribution in the park.	Point occurrences are recorded for all patches smaller than 100 square meters.
<b>List 4 (Lower Priority Plants)</b>	 Rattlesnake grass	List 4 plants include all other exotic species that are not captured by Lists 1 – 3. Typically, these are ubiquitous invasive plants and are beyond control, or they are weeds.	These plants are not mapped. Skilled observers may record presence/absence.

\*Point occurrences are individual points recorded to represent an entire patch of invasive plants  
\*\*Polygon assessments describe the size, shape and coverage of a patch



# Developing objectives

## 2. Develop an ecological model (species biology, site history) for sites/species



### **Prevention/EDRR:**

What are your vectors and likely species?

### **Containment and control:**

Where are your leading edges and priority sites?

Are there opportunities for restoration?



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# Developing objectives

## 3. Set targets/thresholds or change/trend



### **Prevention/EDRR:**

Use effort and compliance-based targets as well as number of sites treated

### **Containment and control:**

Have # of sites treated, reduction in cover/density; for control and restoration (site-based work), have resource recovery metrics too!



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# Developing objectives

## 4. Plan management and monitoring

### **Prevention/EDRR:**

How many miles/acres will you survey?

How many new populations can you manage?

### **Containment and control:**

What tactics will you use?

How will you monitor effectiveness?



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# Developing objectives

## 5. Have an alternative response if objectives are not met

Increase survey frequency?  
Change control methods or timing?  
Revise objectives?



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# Good objectives

Extirpate barbed goatgrass from Pine Mountain by 2020. (EDRR)

Maintain ratio of native:non-native species cover at Potrero Meadow at 2010 levels through 2015. (Restoration)

Reduce cover of French broom at Pine Point to 5% by 2019. (Control)



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# Prevention objectives

All equipment coming on-site in 2016 will be cleaned and inspected.

Pack animals at South Entrance are purged in the paddock for three days.

Zero new populations of stinkwort at staging and storage areas in 2017 after staff education program initiated.



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# Early Detection and Eradication

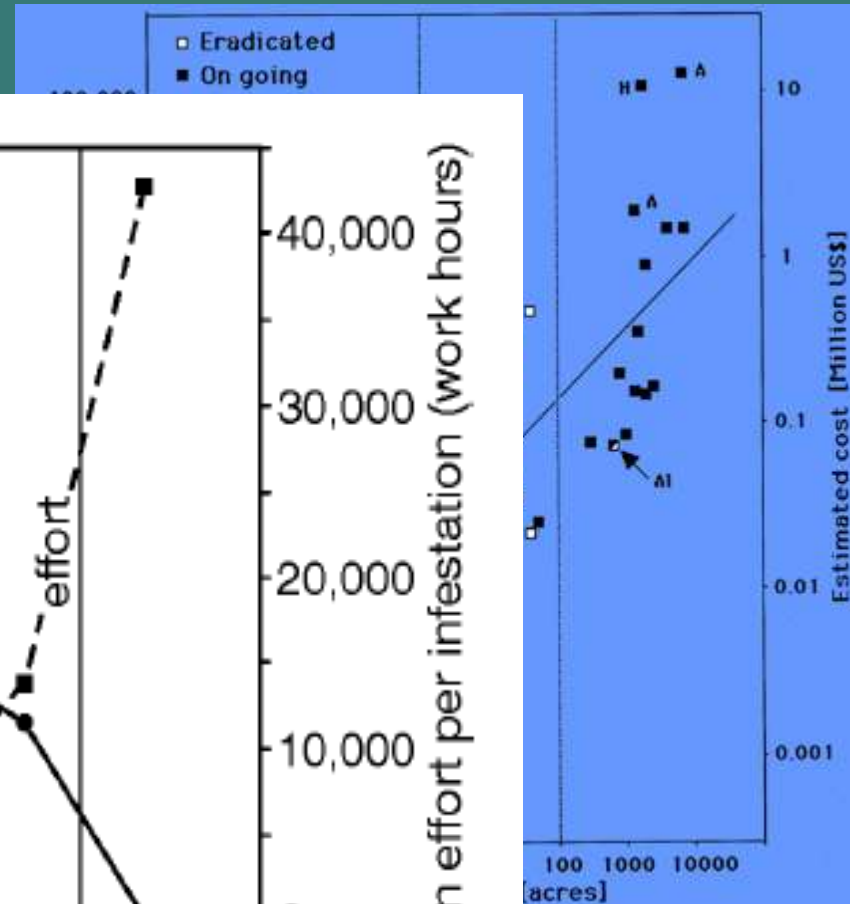
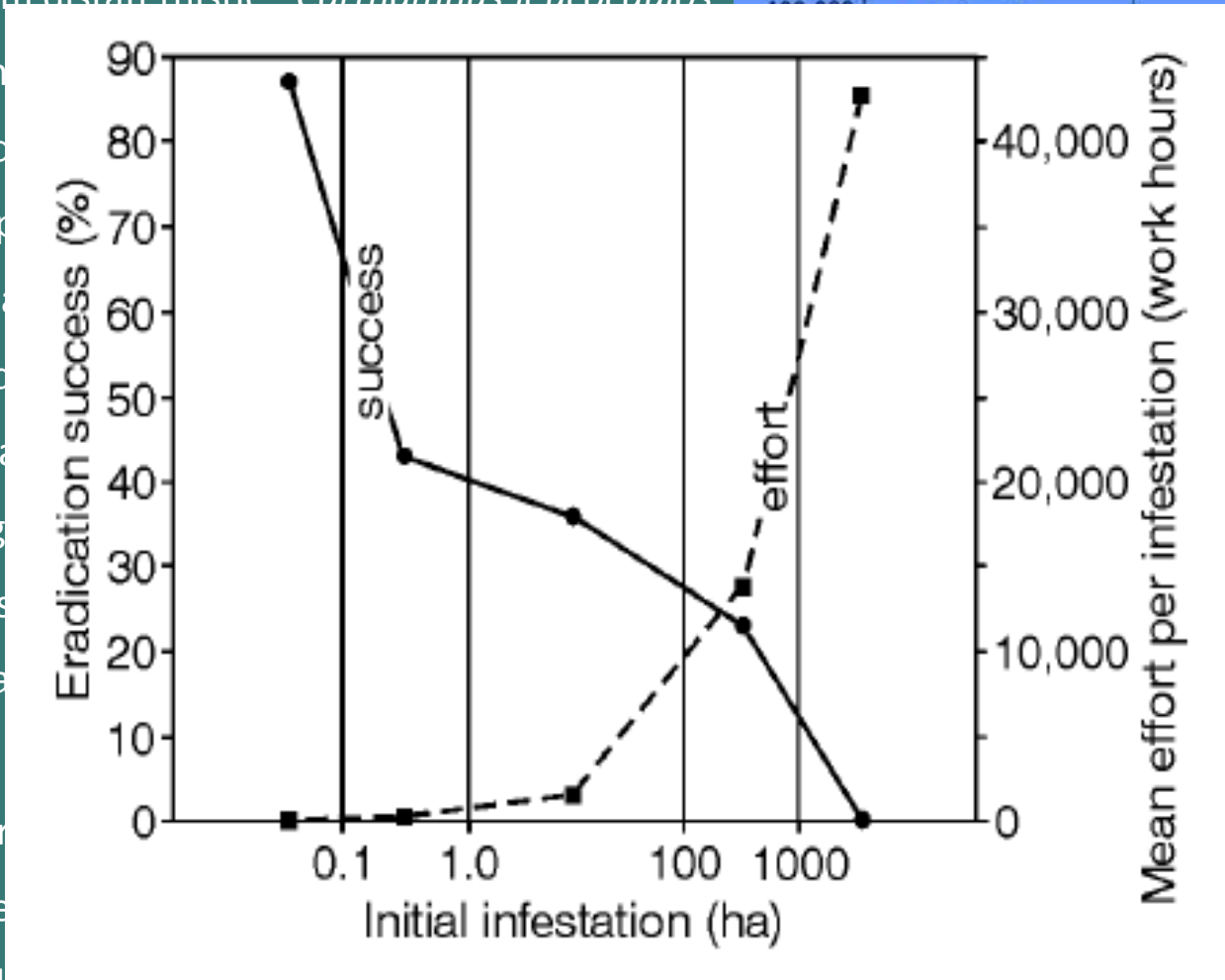
## When strict prevention fails

- Eliminating every individual plant from the population (eradication vs. extirpation - depends on ability to re-invade area of focus)
- Minimum 5 years without any plants up before moving from “surveillance” to “extirpated”
- Best suited for small-scale populations or outliers
- Requires prevention of weed survival and reproduction through very effective tools and people power (kill ‘em all and keep coming back for the survivors/babies)



# Eradicated Species

- 1) Whitestem daisy thistle – *Carthamus leucocaulus*
- 2) Dudaim m
- 3) Giant dock
- 4) Serrate sp
- 5) Russian s
- 6) Blueweed
- 7) Tanglehea
- 8) Creeping
- 9) Meadows
- 10) Heartlea
- 11) Austrian
- 12) Wild mar
- 13) Syrian be
- 14) Perennial sowthistle - *Sonchus arvensis*



Rejmánek and Pitcairn: When is eradication a realistic goal?



# EDRR objectives

100% of roads, 80% of trails and all construction and staging areas surveyed in 2016.

60% of new and 75% of existing small weed populations treated in 2017.

100% of surveillance populations monitored in 2018.



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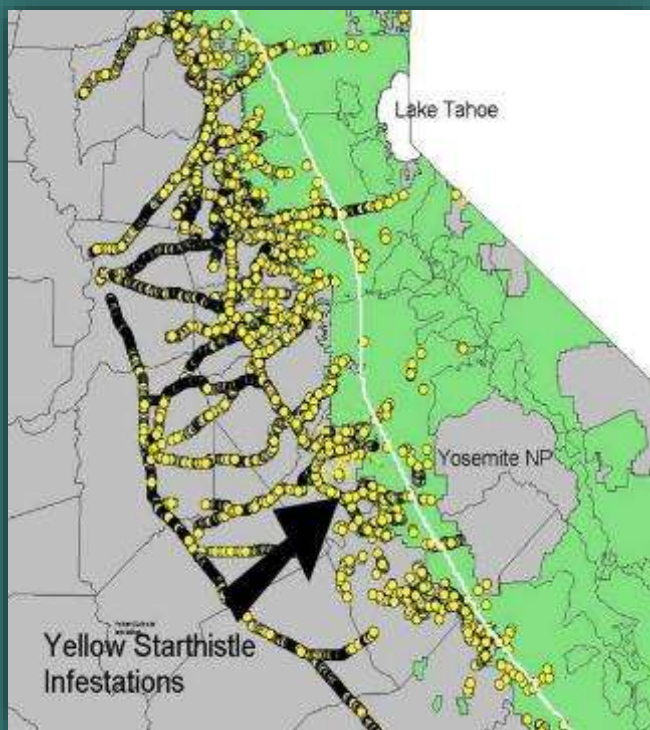
# Prevention in Containment Projects

## *Weed Free Zones and No-spread Lines*

- PREVENTING large infestations from spreading to adjacent weed-free areas
- Treating outer edges of heavy zones
- Variety of treatment methods can be used
- Long-term containment strategy can shrink the infestation or protect weed-free zones



# Containment of Spread Corridors & Outlier Control



Suggest some objectives for this project!

# Developing objectives



1. Prioritize
2. Develop an ecological model
3. Set targets
4. Plan management & monitoring
5. Have an alternative response if goals not met (e.g. hand pulling)

# Strategies and tactics

*How you want to get to your goals/objectives, and having a backup plan, sets you up for*

## ADAPTIVE MANAGEMENT



# The Adaptive Management Cycle

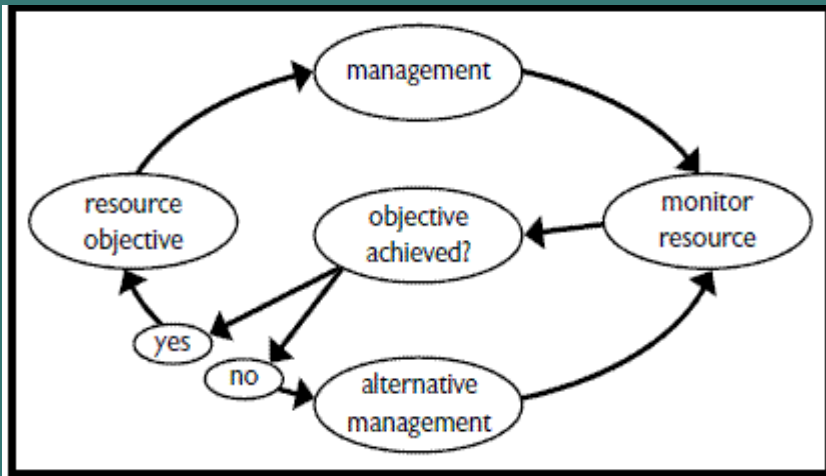


FIGURE 1.1. Diagram of a successful adaptive management cycle. Note that monitoring provides the critical link between objectives and adaptive (alternative) management.

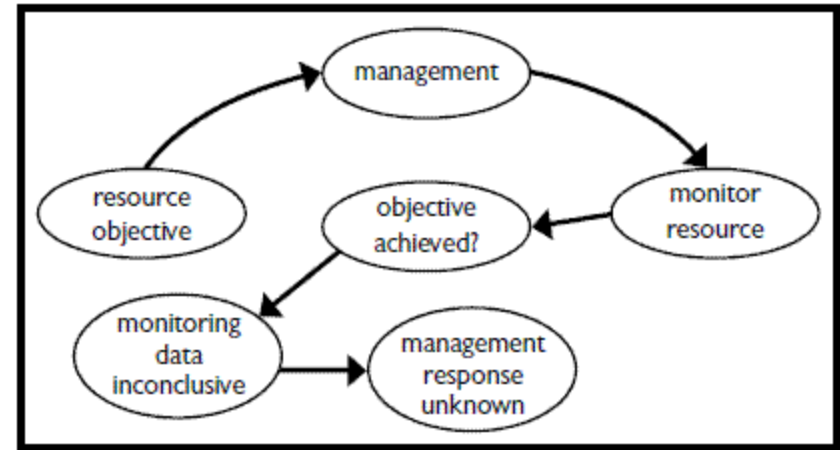


FIGURE 1.2 Diagram of monitoring that fails to close the adaptive management cycle. Because monitoring data is inconclusive, the management response is unknown and the cycle is unsuccessful.

From “Measuring and Monitoring Plant Populations”

BLM Technical Reference available FREE ONLINE

<http://www.blm.gov/nstc/library/pdf/MeasAndMon.pdf>



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# The Adaptive Management Cycle

- Define what you think will happen when you implement management



# The Adaptive Management Cycle

- Measure your identified metric(s)



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# The Adaptive Management Cycle

- Did what you think was going to happen actually happen?
- If so, congratulations! If not, why not/what do you need to change?



# You mean I need to monitor?

## Who has time for that?

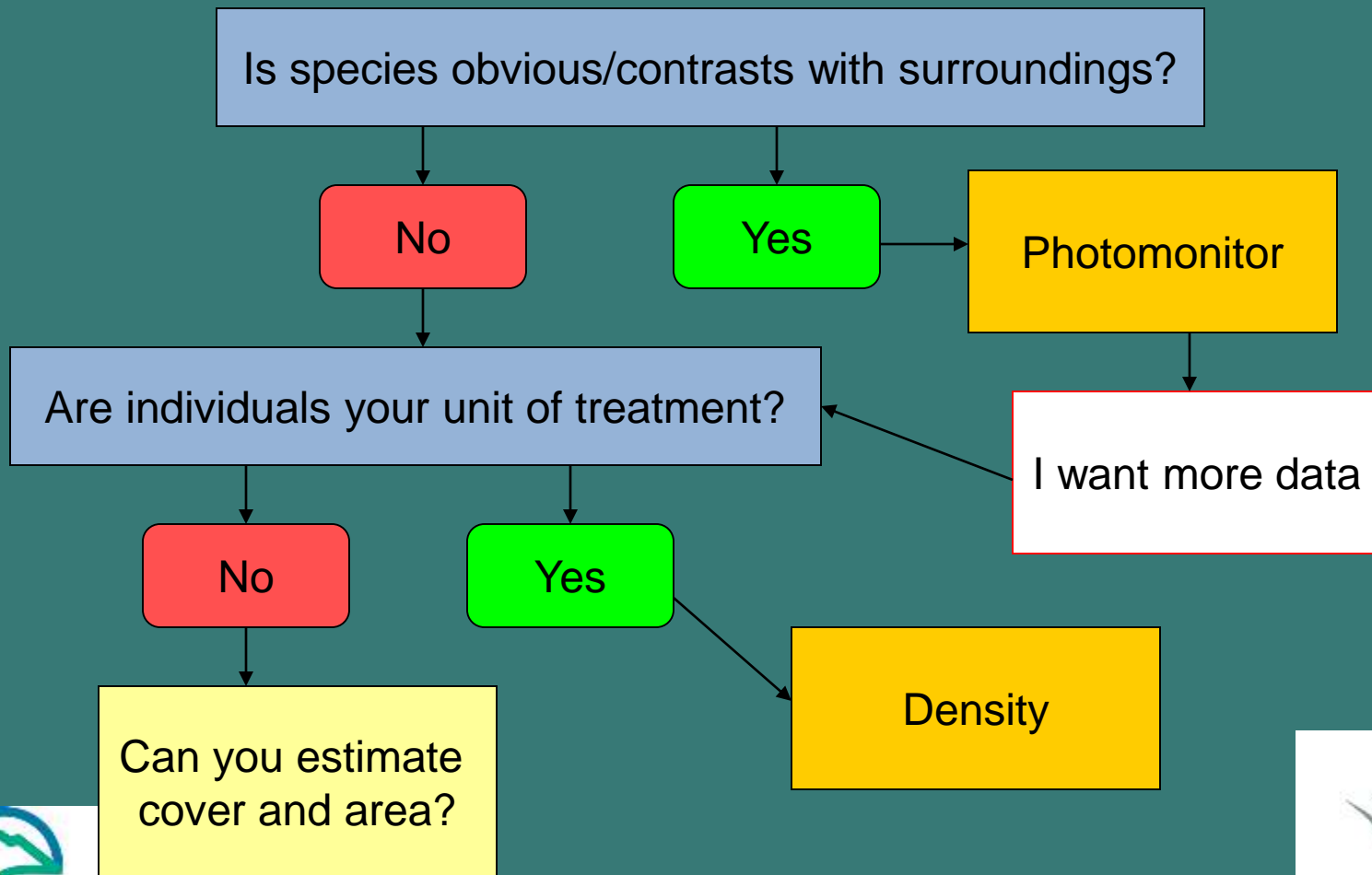
- You're already out there working on the weed
- Management should provide clear signal
- Can subsample and extrapolate
- Photo-monitoring and estimation can be quick



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# A draft monitoring flowchart



# More monitoring options

- Hours of effort (by crew type)
- Active ingredient used and area covered
- Biomass removed
- Regeneration
- GPS track log




# Regional coordination and EDRR

- 70 miles surveyed for EDRR and Rare Plants
- Over 350 hours on the ground surveying for EDRR
- Over 65 hours on the ground surveying for rare plants

ONE MOUNTAIN, ONE TEAM











Creation of the **Tamalpais Lands Collaborative (TLC)** signals a new era of stewardship and support for the mountain **Get the latest information about the TLC** including agreements, reports, financial updates, and agency meetings.

[learn more >](#)

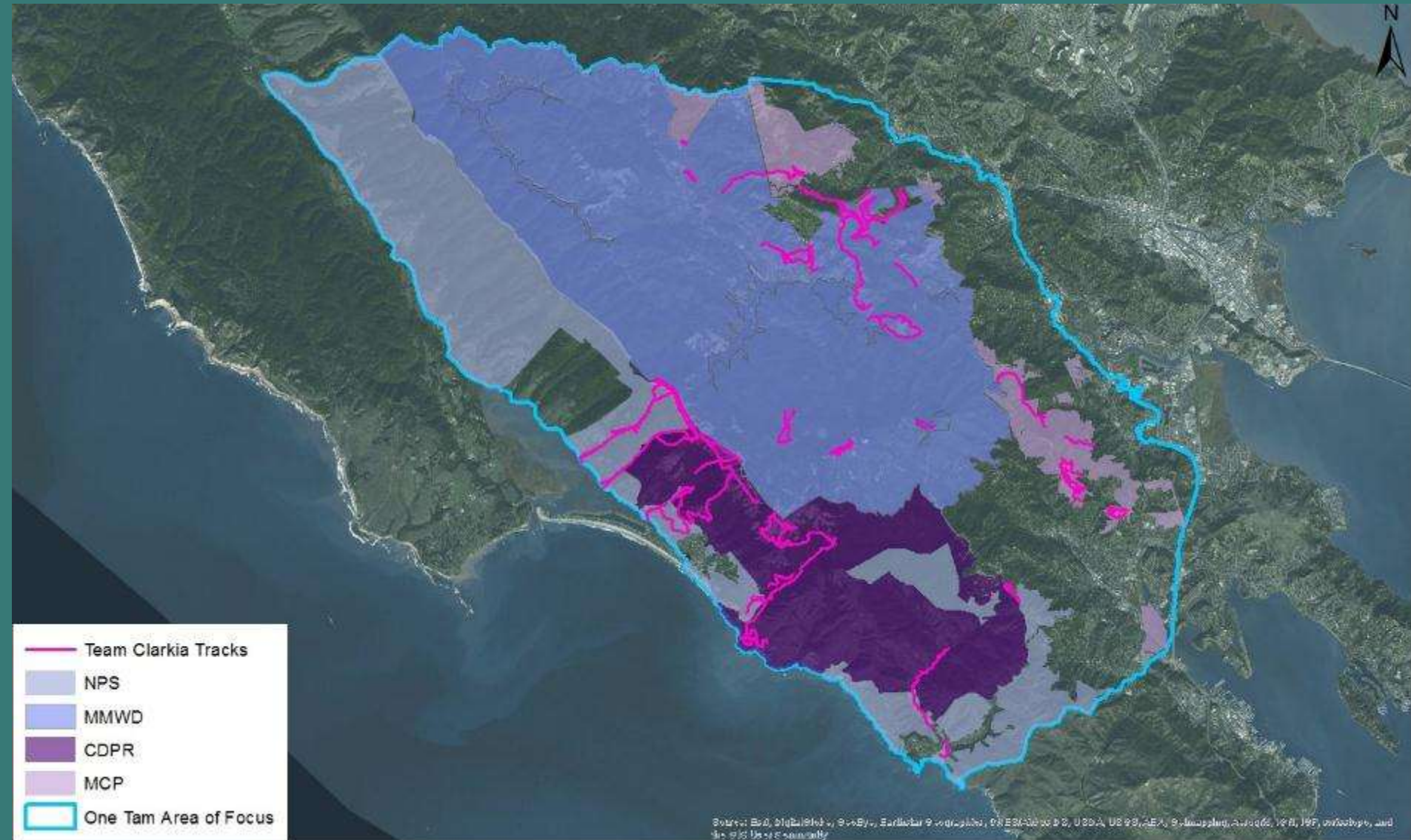


WHAT NEEDS TO BE DONE [see more programs and projects >](#)

Look below and some of the proposed TLC programs and projects.

 Community Stewardship Program	 Conservation Management Team	 Internship Program	 Rare Plant Program	 Forest Health and Resiliency
 Log Cabins at Ptarmigan Lake	 West Peak Restoration Alternatives Assessment	 Cataract Trail Restoration	 Bohemian Marsh	 Ptarmigan Meadow Restoration

# Survey Geography





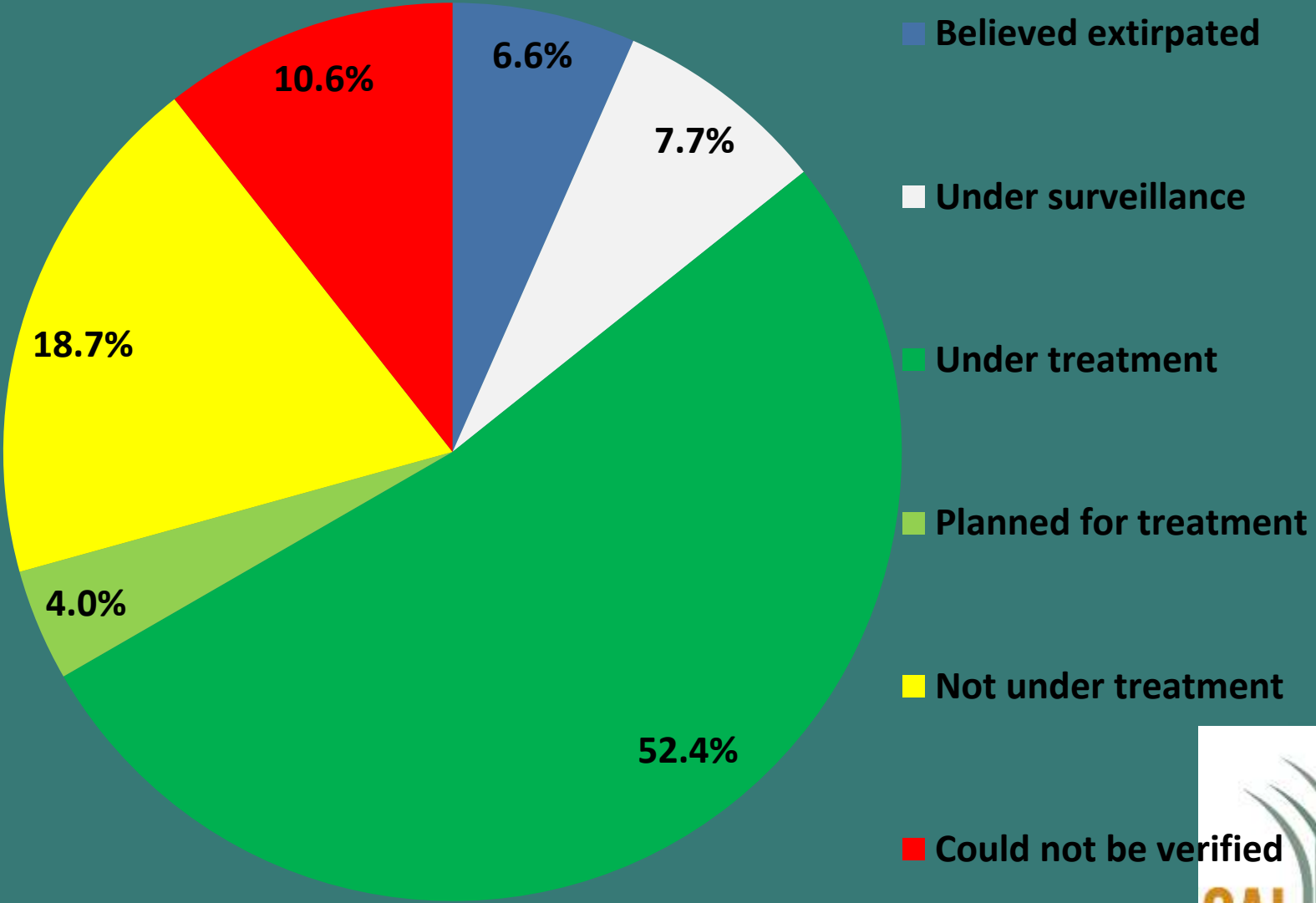


# BAEDN High Priority Populations

## April 15, 2011



# BAEDN Population treatment status as of January 1, 2012



# Cal-IPC Regional Coordination



California Invasive Plant Council  
Cal-IPC  
Protecting California's wildlands through science, education, and policy

Cal-IPC » WMA's » regions » Central Sierra Region

## Central Sierra Region

The Central Sierra Region includes Alpine, Amador, Calaveras, El Dorado, and Tuolumne counties. Meeting participants prioritized 10 eradication and 35 surveillance targets.

Our proposal to the National Park and NHPF Foundation was funded! We will be working to eradicate three priority species:

- *Ceanothus ciliolobus* (purple starbush), rated "Moderate" by Cal-IPC, "B" noxious weed by the California Department of Food & Agriculture (CDFA).
- *Ceanothus diffuse* (diffuse leaved), rated "Moderate" by Cal-IPC, "A" noxious weed by CDFA.
- *Oenothera biennis* (Canada thistle), rated "Moderate" by Cal-IPC, "B" noxious weed by CDFA.

In addition, two "leading edge" populations, which reach into the Sierra Nevada Mountains, were identified as top priority for eradication:

- *Spartium junceum* (Spanish broom), rated "High" by Cal-IPC, "C" noxious weed by CDFA.
- *Trifolium repens* (Dyer's woad), rated "Moderate" by Cal-IPC, "A" noxious weed by CDFA.



Removing Spanish broom.  
Photo by Wendy Wood

### Resources

- [Strategic Plan](#) - Go to file...
- [Eradication Workplan](#) - Go to file...
- [Priority species](#) - Link to illustrated list on CalFlora. Go to link...
- [Track surveillance and eradication species](#) - Link to Observation Hotline on CalFlora. Go to link...
- [Cal-IPC Inventory on CalFlora](#) - Track new locations in the region here. Go to link...
- [Cal-IPC Watchlist on CalFlora](#) - Track new locations in the region here. Go to link...

### Weed Management Areas

- [Alpine and Upper Carson WMA](#) - Go to page...
- [Amador WMA](#) - Go to page...
- [Central Sierra Partnership Against Weeds](#) - Need updated link. Go to page...
- [El Dorado Invasive Weed Management Group](#) - Go to page...
- [Lake Tahoe Basin Weed Coordinating Group](#) - Go to page...

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# Cal-IPC Prevention Resources

The screenshot shows the Cal-IPC website with a navigation menu on the left. A white arrow points from the 'Prevention' menu item to a sub-menu that lists various resources. The main content area features a header with the Cal-IPC logo and a paragraph about invasive plants. A 'Quick Links' box is also visible.

File Edit View History Bookmarks Tools Help

Cal-IPC: California Invasive Pl... X

www.cal-ipc.org

## California Invasive Plant Council

# Cal-IPC

Protecting California's wildlands through science, education, and policy

**Across California, invasive plants damage wildlands.** Invasive plants displace native plants and wildlife, increase wildfire and flood danger, consume valuable water, degrade recreational opportunities, and destroy productive range and timber lands. Cal-IPC works with land managers, researchers, policy makers, and concerned citizens to protect the state from invasive plants. [More...](#)

### Quick Links

- Plant Profiles** - Information clearinghouse by species...
- Membership** - Individual or

Home  
Invasive Plants  
Definitions & Impacts  
California Inventory

**Prevention**  
Early Detection  
Mapping  
Management  
Research  
Symposium  
Training  
Policy & Advocacy  
Responsible Landscaping  
WMAs & Regions  
Outreach & Education  
Publications & Resources

**Prevention**  
BMPs for Land Managers  
BMPs for Transportation & Utility Corridors  
Prevention Training Videos  
Weed Free Forage  
Weed Free Aggregate

### SPONSORS

#### SYMPOSIUM!

Conservation Experience  
Foundation/Cal. Oaks  
University  
Diego Open Space

**BRONZE SPONSORS**  
Aquatic Environments  
Habitat West  
Santa Ana Watershed Association  
Southern California Edison  
US Fish & Wildlife Service

**ACS HABITAT MANAGEMENT**  
A Division of Environmental & Earth Inc.

Dow Agrosciences  
Irvine Ranch Conservancy  
Mission Resource Conservation District  
Moosa Creek Nursery  
National Park Service, Cal. Exotic Plant Management Team  
Sustainable Conservation/  
PlantRight Project  
Urban Corps of San Diego

**New at Cal-IPC.org...**

www.cal-ipc.org/p/prevention/index.php

- Prevention
- BMPs for Land Managers
- BMPs for Transportation & Utility Corridors
- Prevention Training Videos
- Weed Free Forage
- Weed Free Aggregate



# Cal-IPC Training Manuals

Preventing the Spread of Invasive Plants:



Preventing the Spread of Invasive Plants:



Best Management Practices  
for Land Managers  
3rd Edition

California Invasive Plant Council

Best Management Practices  
for Transportation and  
Utility Corridors

California Invasive Plant Council



# EDRR Protocol

National Park Service  
U.S. Department of the Interior



Natural Resource Program Center

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

*A Volunteer-Based Approach*

Natural Resource Report NPS/SFAN/NRR—2009/136



[http://www.sfnps.org/  
invasive\\_plants/protocols](http://www.sfnps.org/invasive_plants/protocols)



Thank You!

