What it means to win:
Strategic approaches to weed work

Invasive Plant Management 101

Cal-IPC Field Course

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Palm Springs, CA

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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 2022.

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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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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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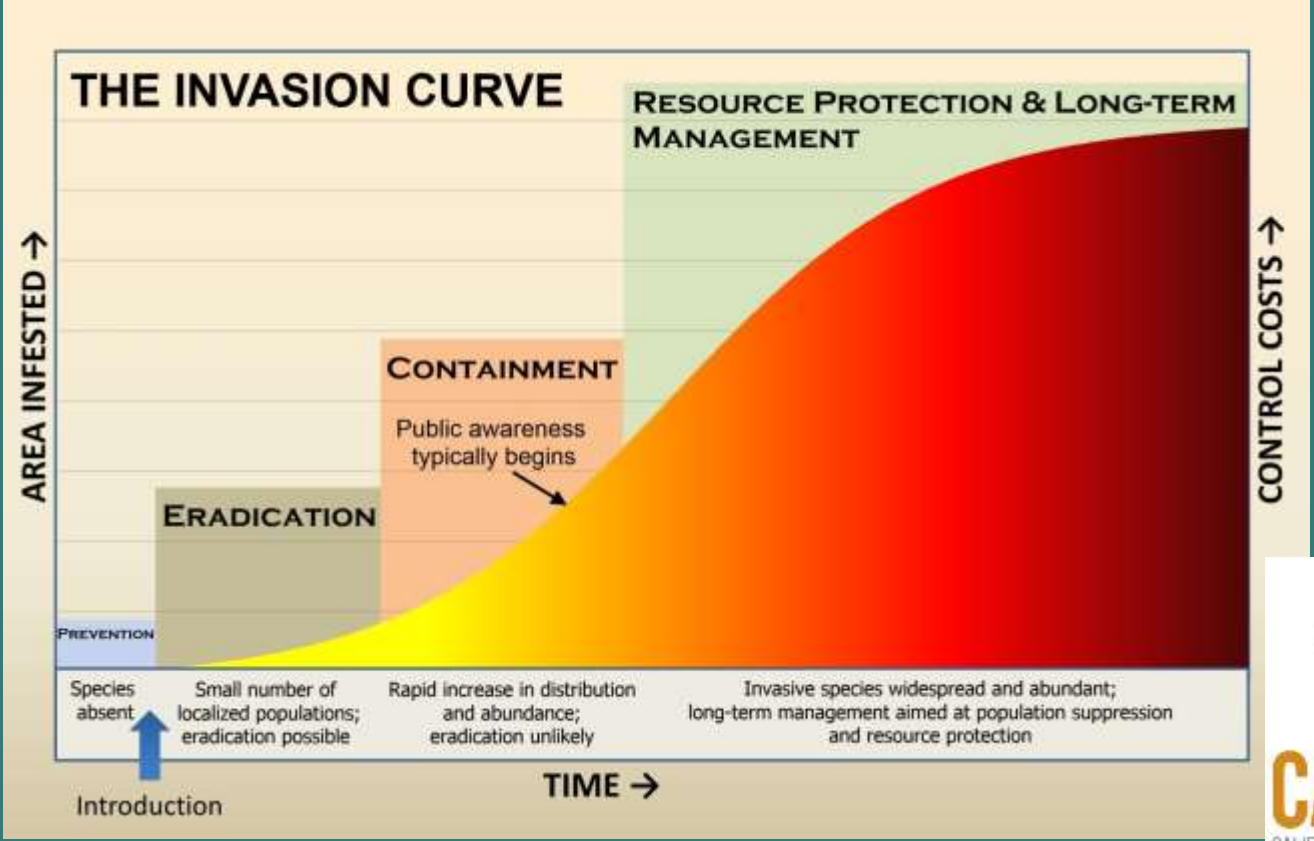
Matching objectives to invasion

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?

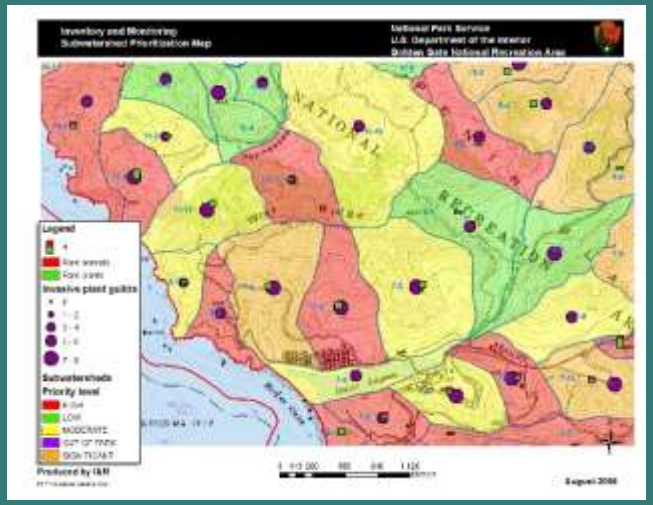
Priority Species Lists

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
List 1 (Highest Priority Plants)	 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.
List 2 (High Priority Plants)	 Cape 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.
List 3 (Medium Priority Plants)	 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.
List 4 (Lower Priority Plants)	 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 waifs.	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



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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 2025. (EDRR)

Maintain ratio of native:non-native species cover at Potrero Meadow at 2012 levels through 2017. (Restoration)

Reduce cover of French broom at Pine Point to 5% by 2022. (Control)

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Prevention objectives

All equipment coming on-site in 2017 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 2018 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)

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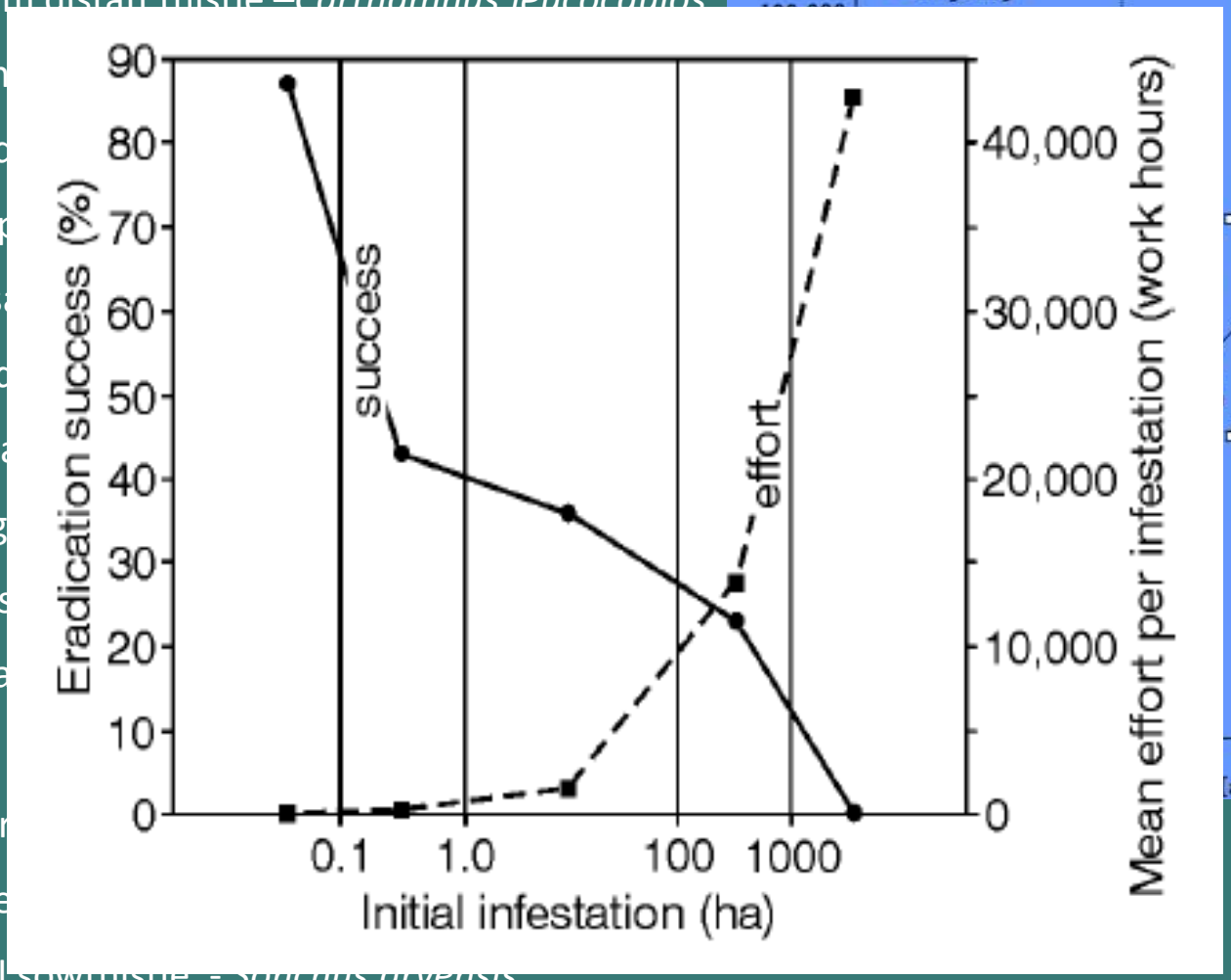
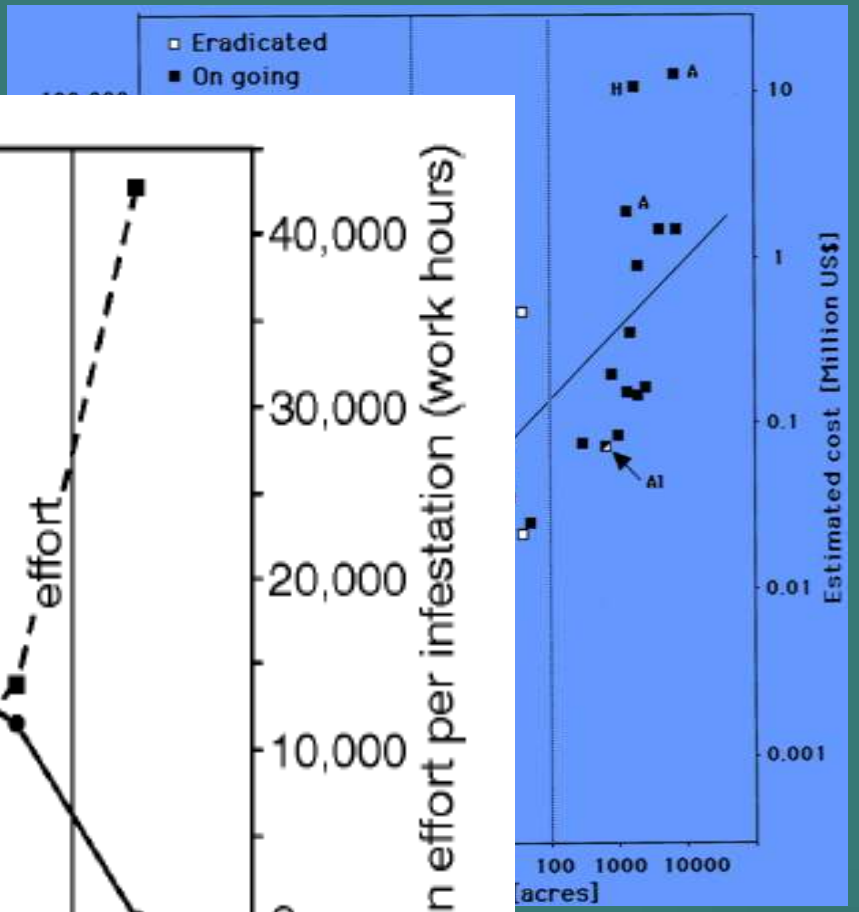
Eradicated Species

1) Whitestem distaff thistle –*Carthamnus leucocaulos*
2) Dudaim m
3) Giant doc
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?

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EDRR objectives

100% of roads, 80% of trails and all construction and staging areas surveyed in 2017 for List 1 weeds.

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

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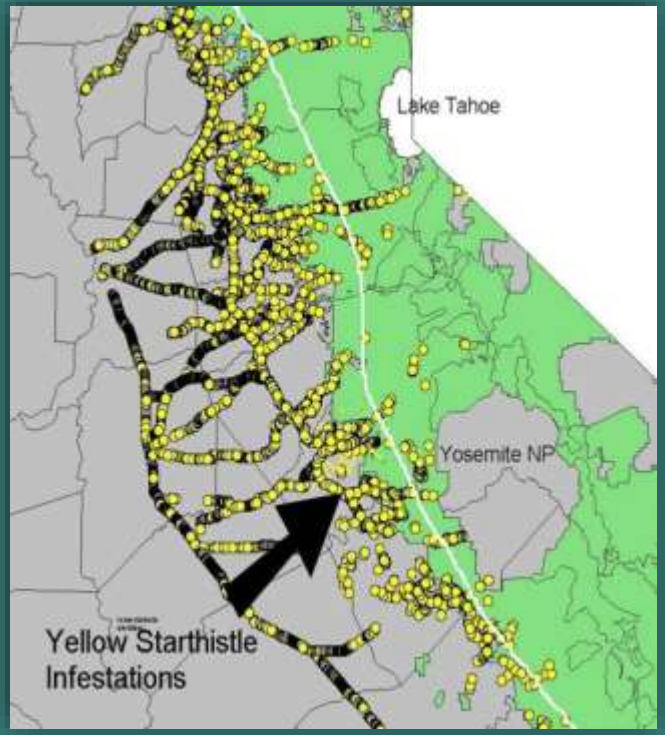
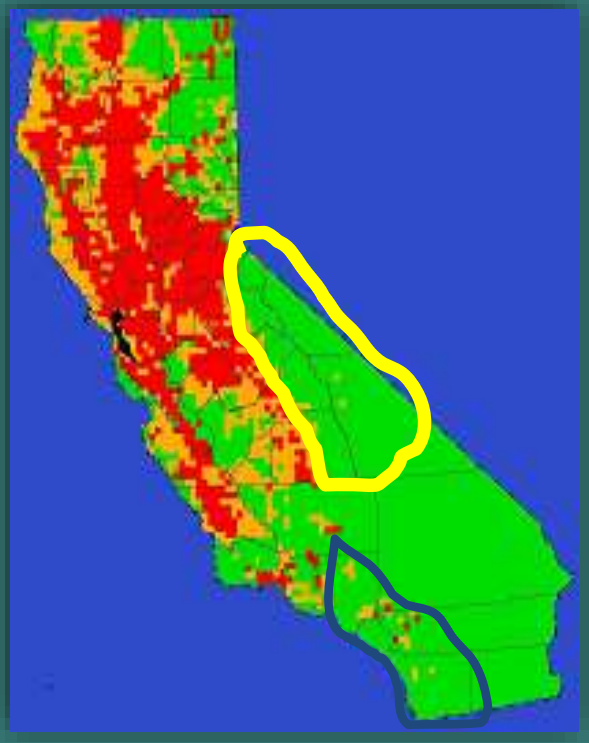
Containment of Spread Corridors & Outlier Control





Suggest some objectives for this project!

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Developing objectives activity

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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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

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Strategies and tactics

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

ADAPTIVE MANAGEMENT

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The Adaptive Management Cycle

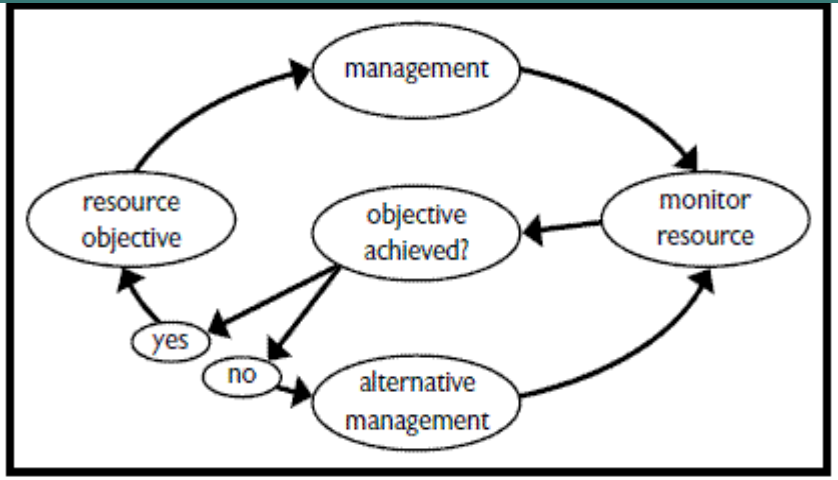

FIGURE 1.1. Diagram of a successful adaptive management cycle. Note that monitoring provides the critical link between objectives and adaptive (alternative) management.

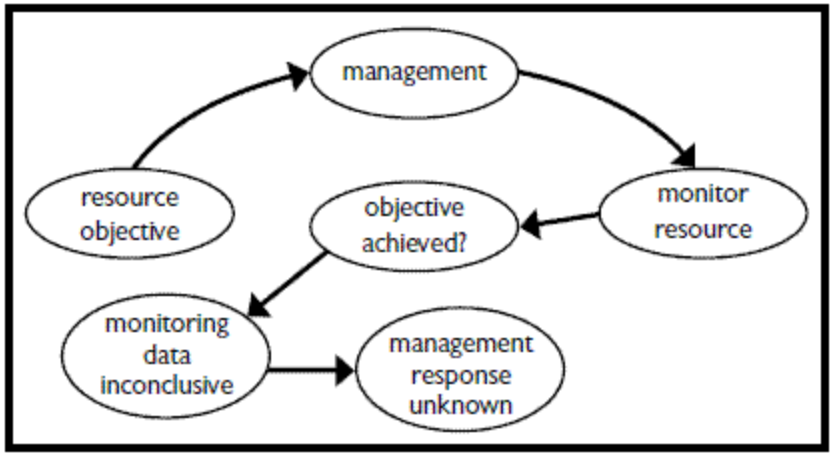

FIGURE 1.2 Diagram of monitoring that fails to close the adaptive management cycle. Because monitoring data is inconclusive, the management response is unknown and the cycle is unsuccessful.

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

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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?

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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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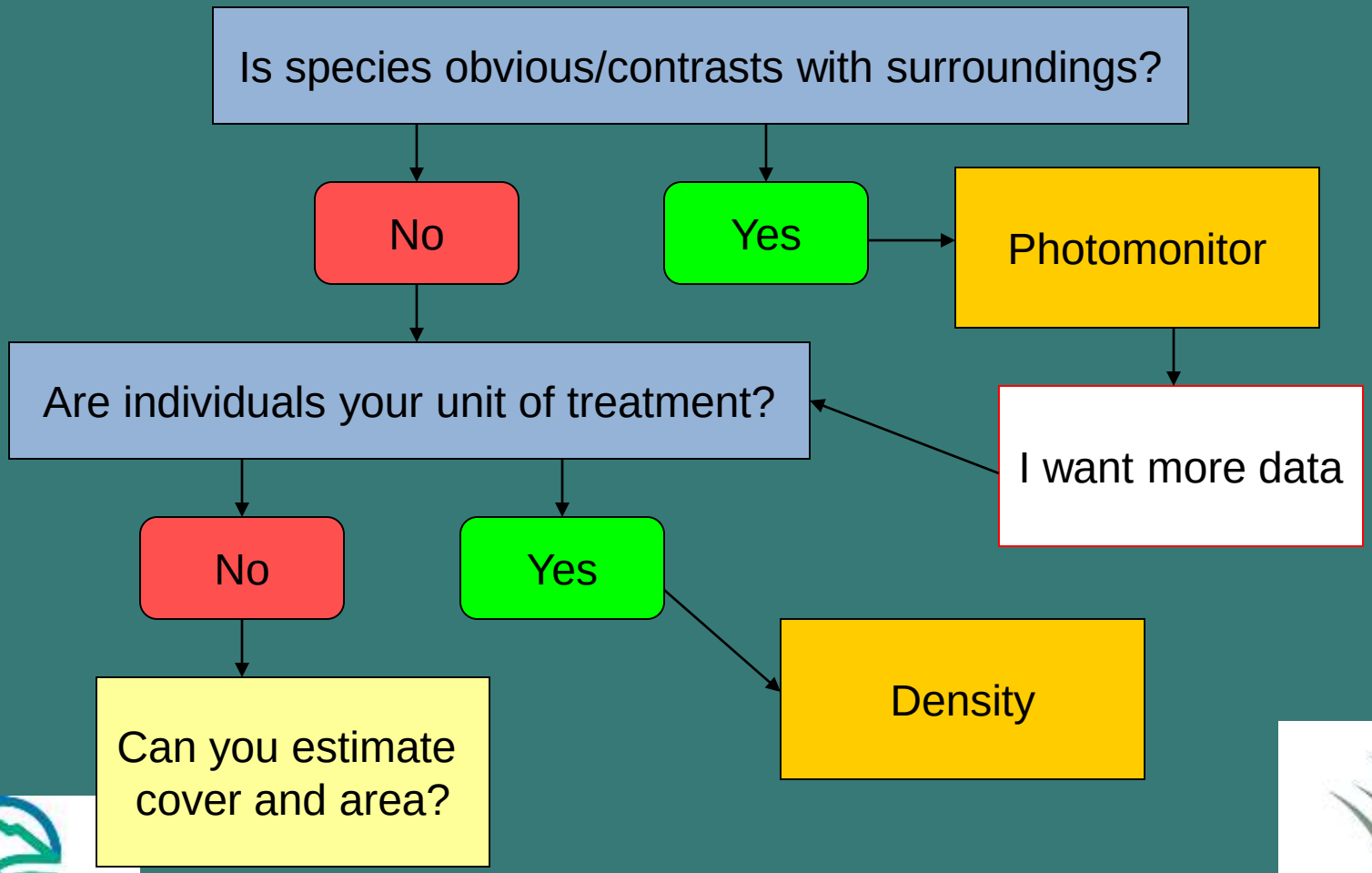
A draft monitoring flowchart



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More monitoring options

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

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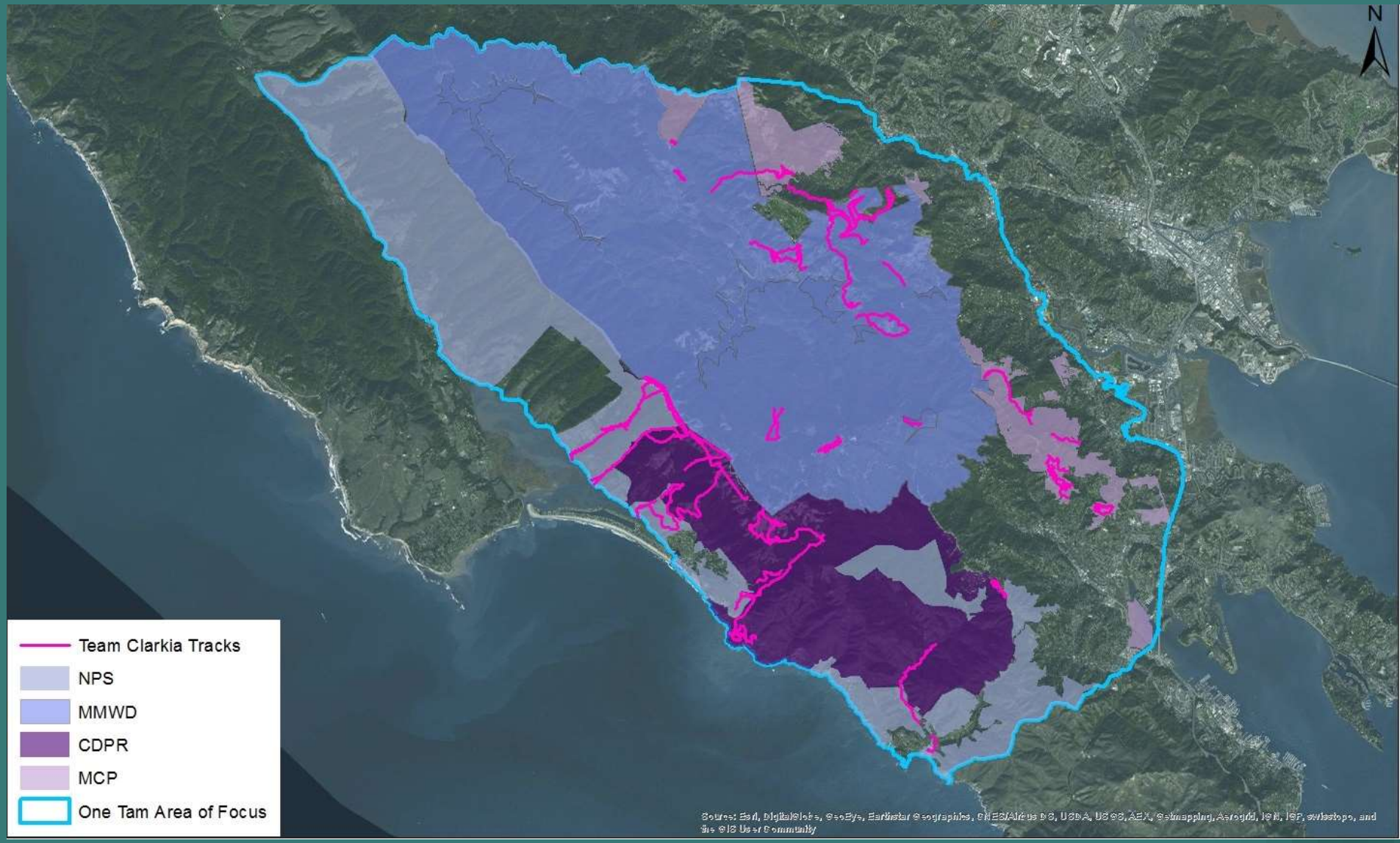
Regional coordination and EDRR

- **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

Survey Geography



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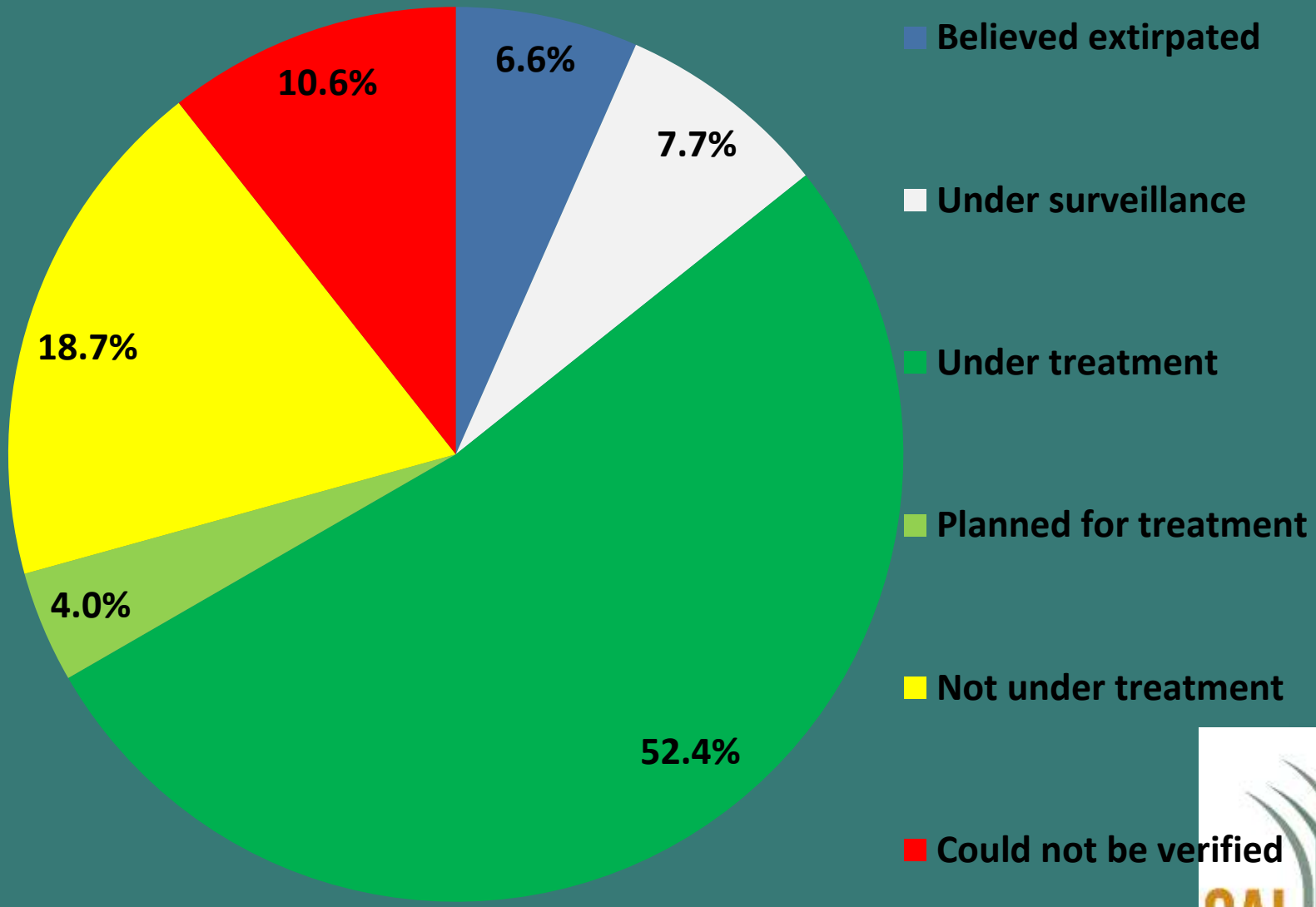
BAEDN Population treatment status as of January 1, 2012



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Cal-IPC Regional Coordination

Collaboration through C

www.cal-ipc.org/solutions/collaboration/

JOIN

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Collaboration through California's WMA Program

What are Weed Management Areas (WMAs)?

WMAs are local stakeholder groups

IN THIS SECTION

Weed Management Areas and Regional Efforts

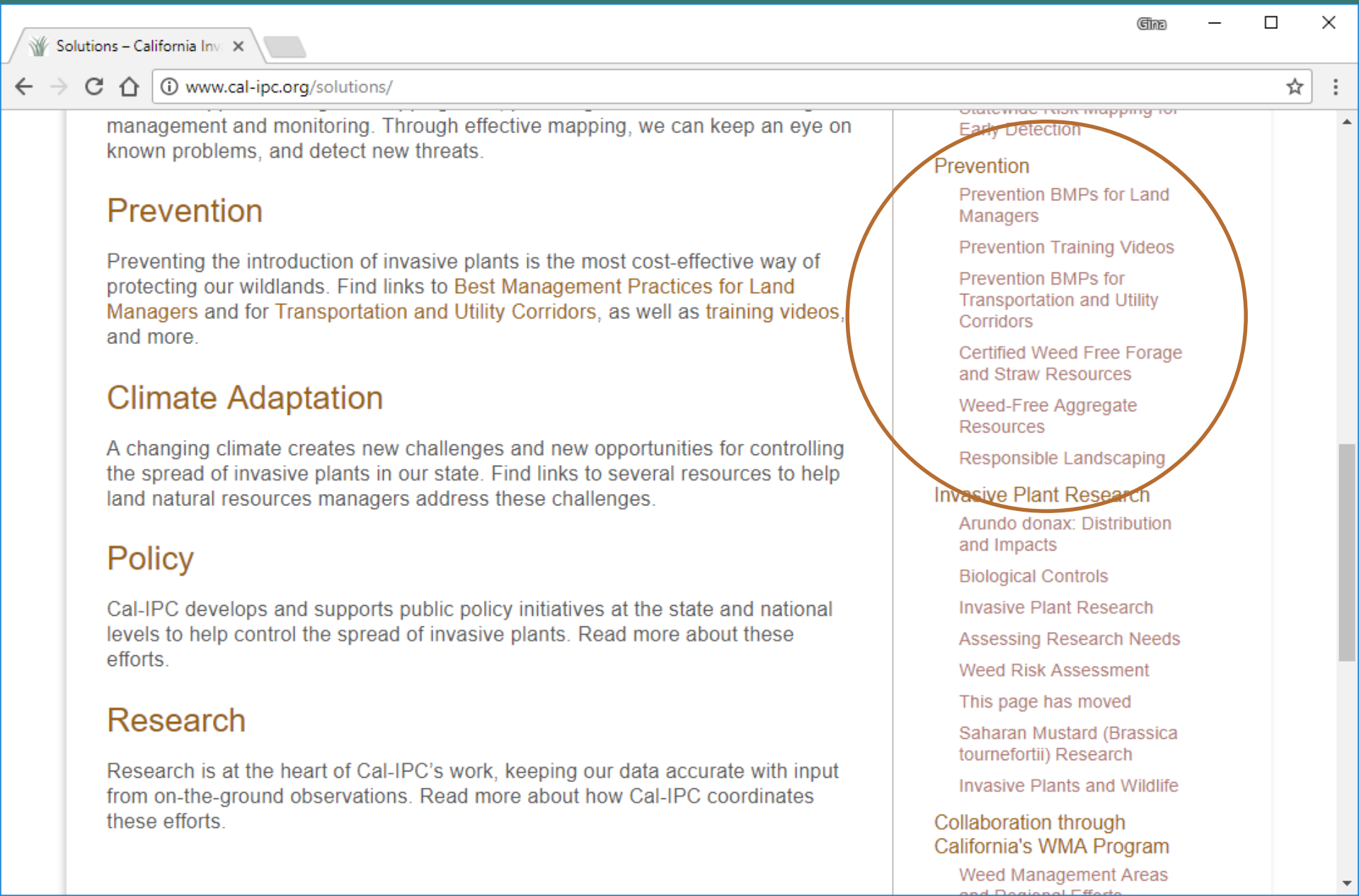
MORE PAGES IN SOLUTIONS

Policy

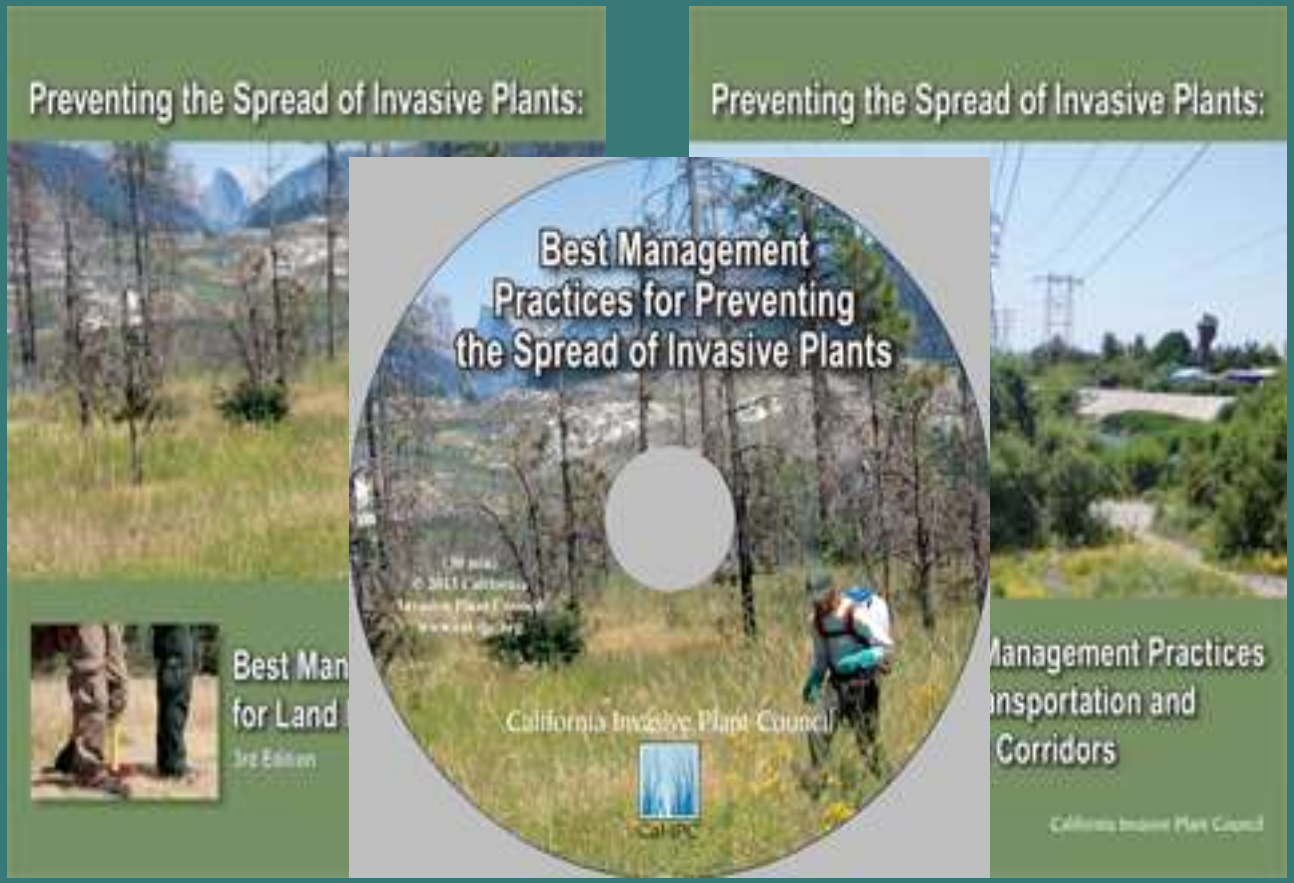
Climate Adaptation

Invasive Plant Management

Cal-IPC Prevention Resources



Cal-IPC Training Manuals



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

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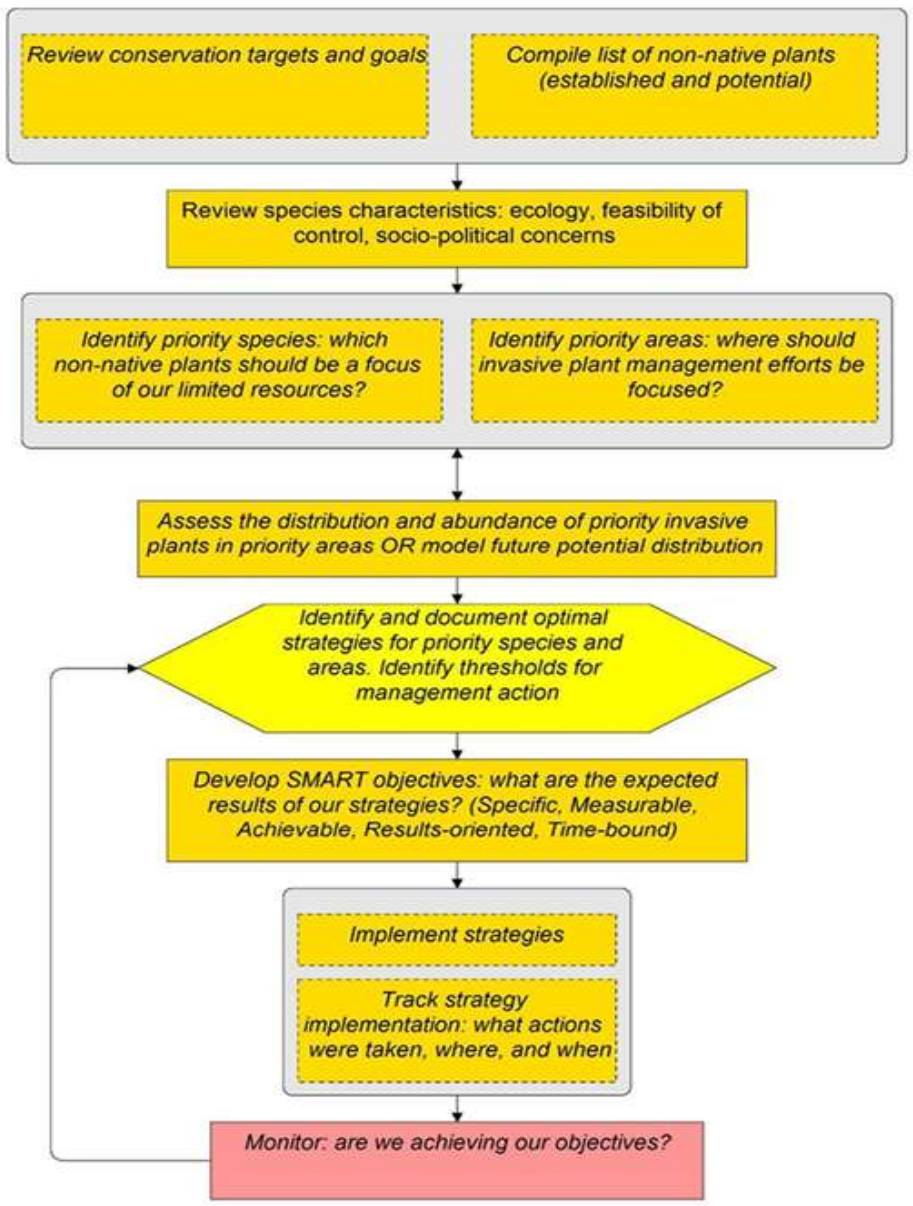
Coming soon…well, next year sometime



The Invasive Plant Management Plan Best Management Practices Manual:

Or, How I Stopped Worrying and Learned to Love to Plan!

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Thank You!