

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?



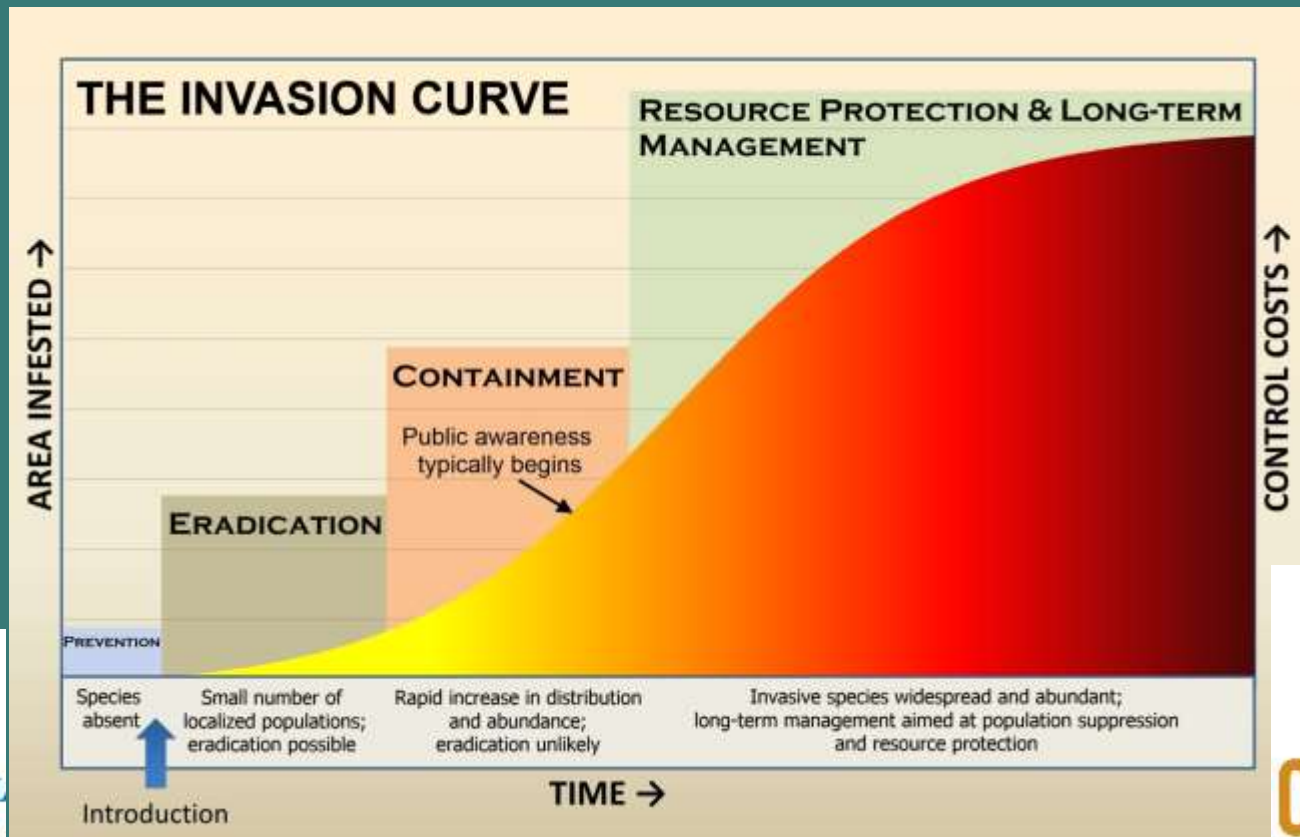
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Matching objectives to invasion

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:

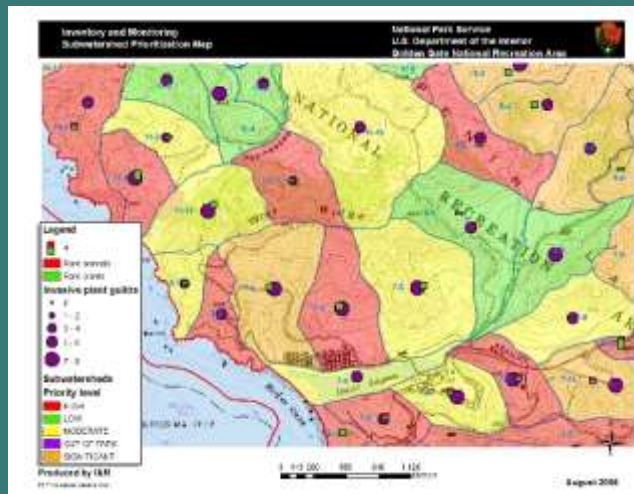
Where are your leading edges and priority sites?

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 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 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

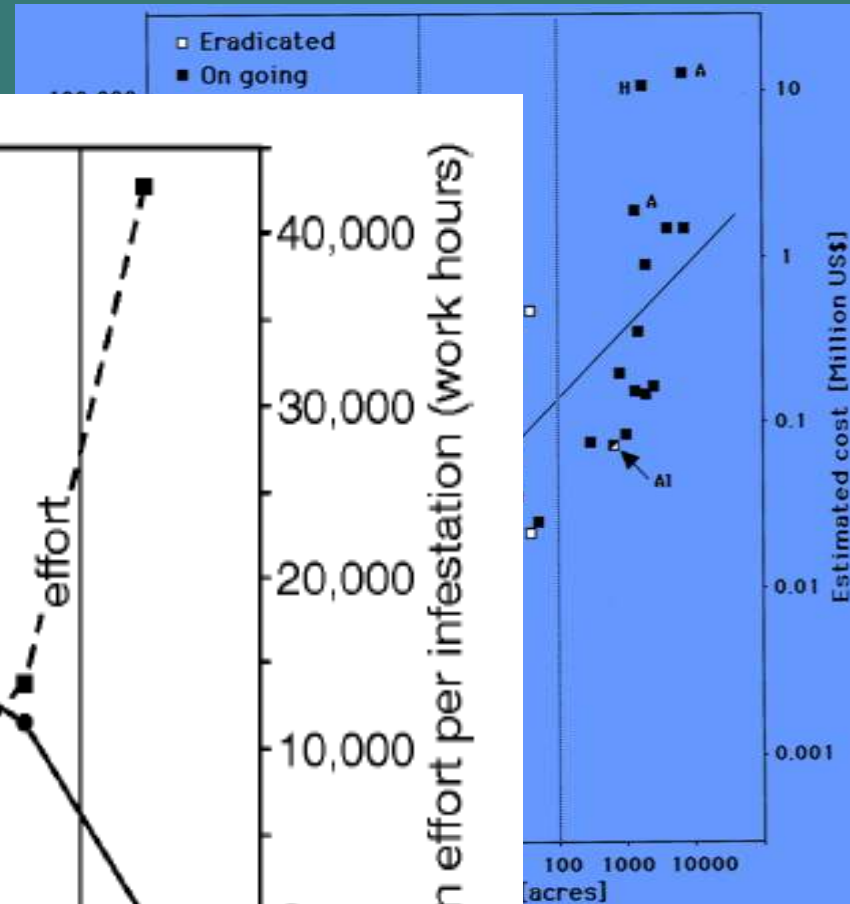
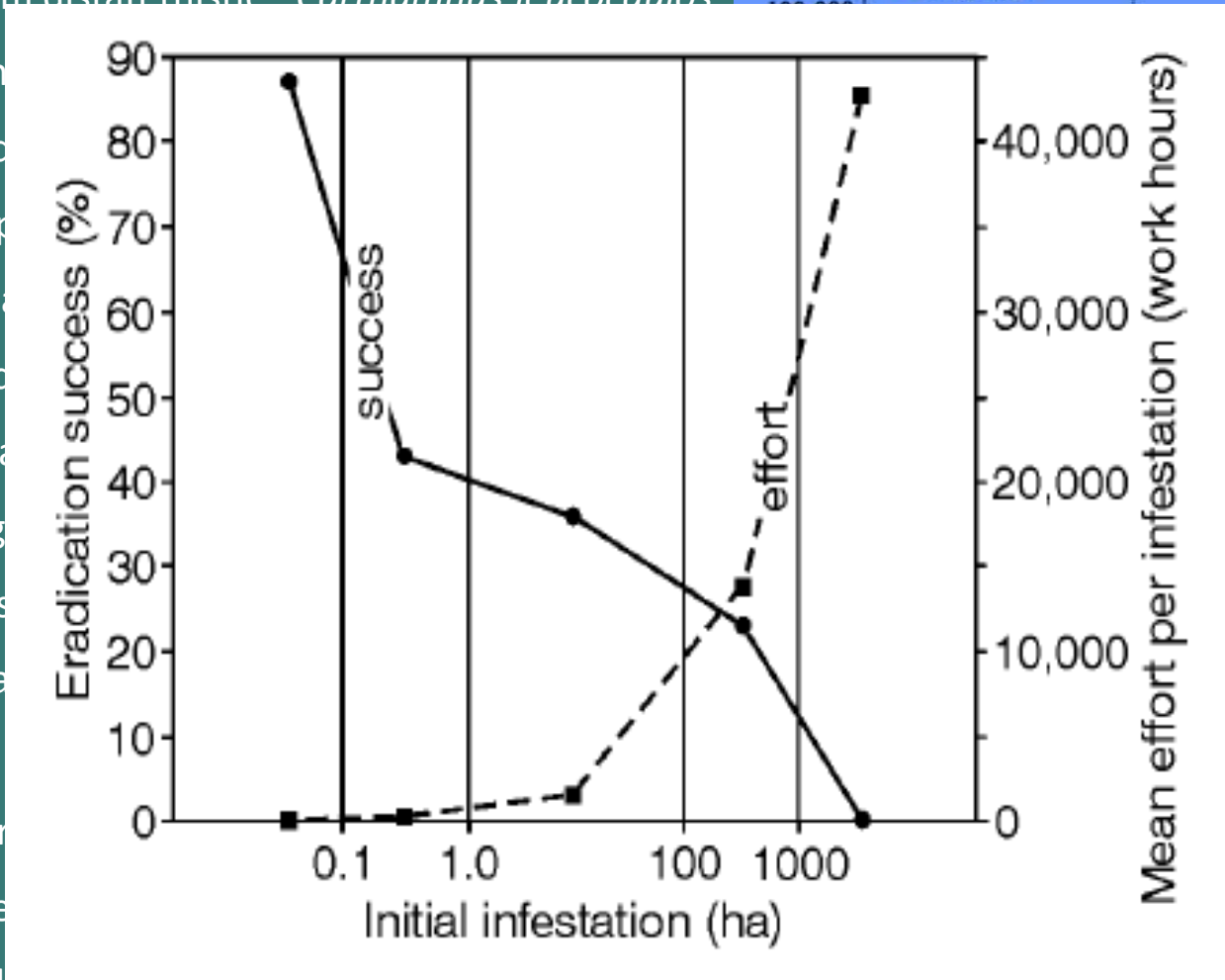
When strict prevention fails

- 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)



Eradicated Species

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



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 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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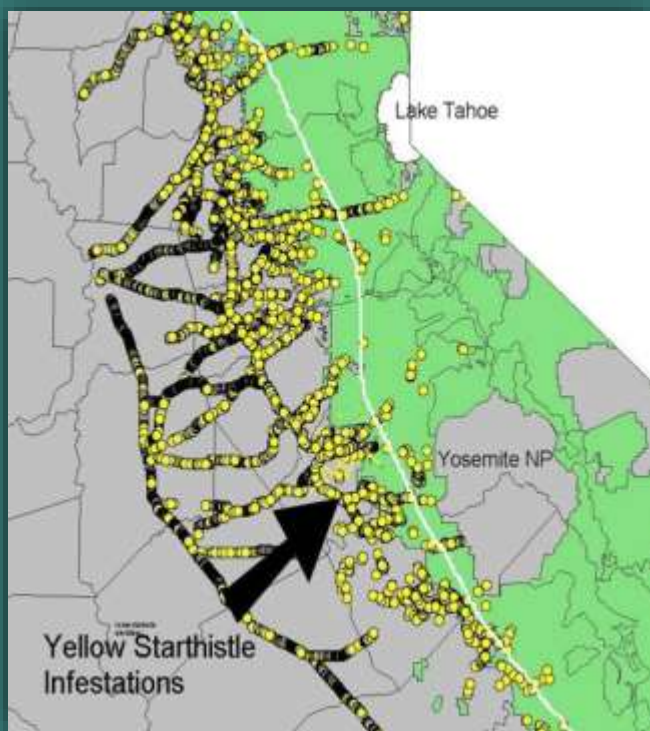
Prevention in Containment Projects

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



Containment of Spread Corridors & Outlier Control



Suggest some objectives for this project!

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?



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

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

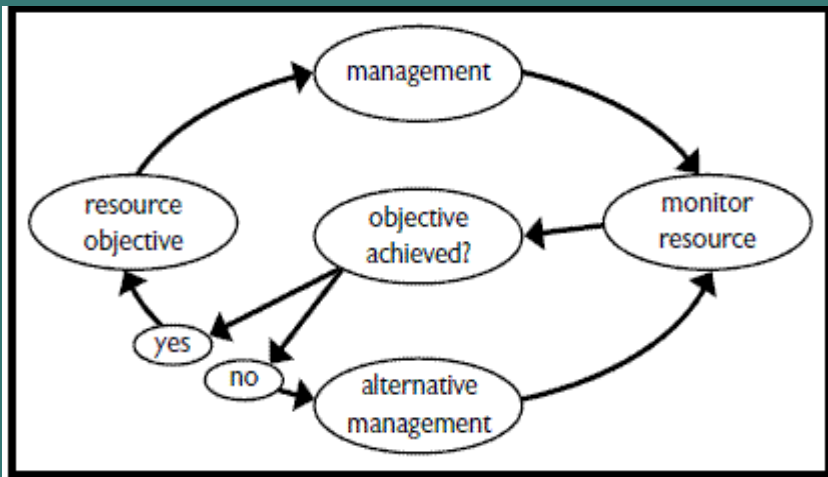


FIGURE 1.1. Diagram of a successful adaptive management cycle. Note that monitoring provides the critical link between objectives and adaptive (alternative) management.

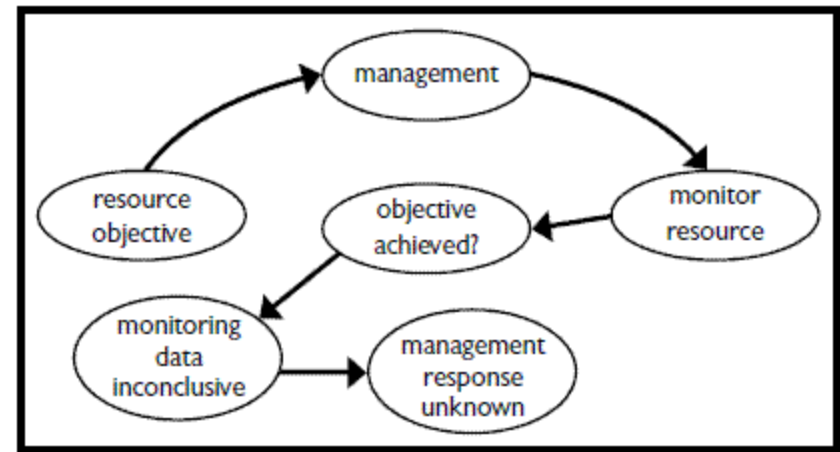


FIGURE 1.2 Diagram of monitoring that fails to close the adaptive management cycle. Because monitoring data is inconclusive, the management response is unknown and the cycle is unsuccessful.

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?

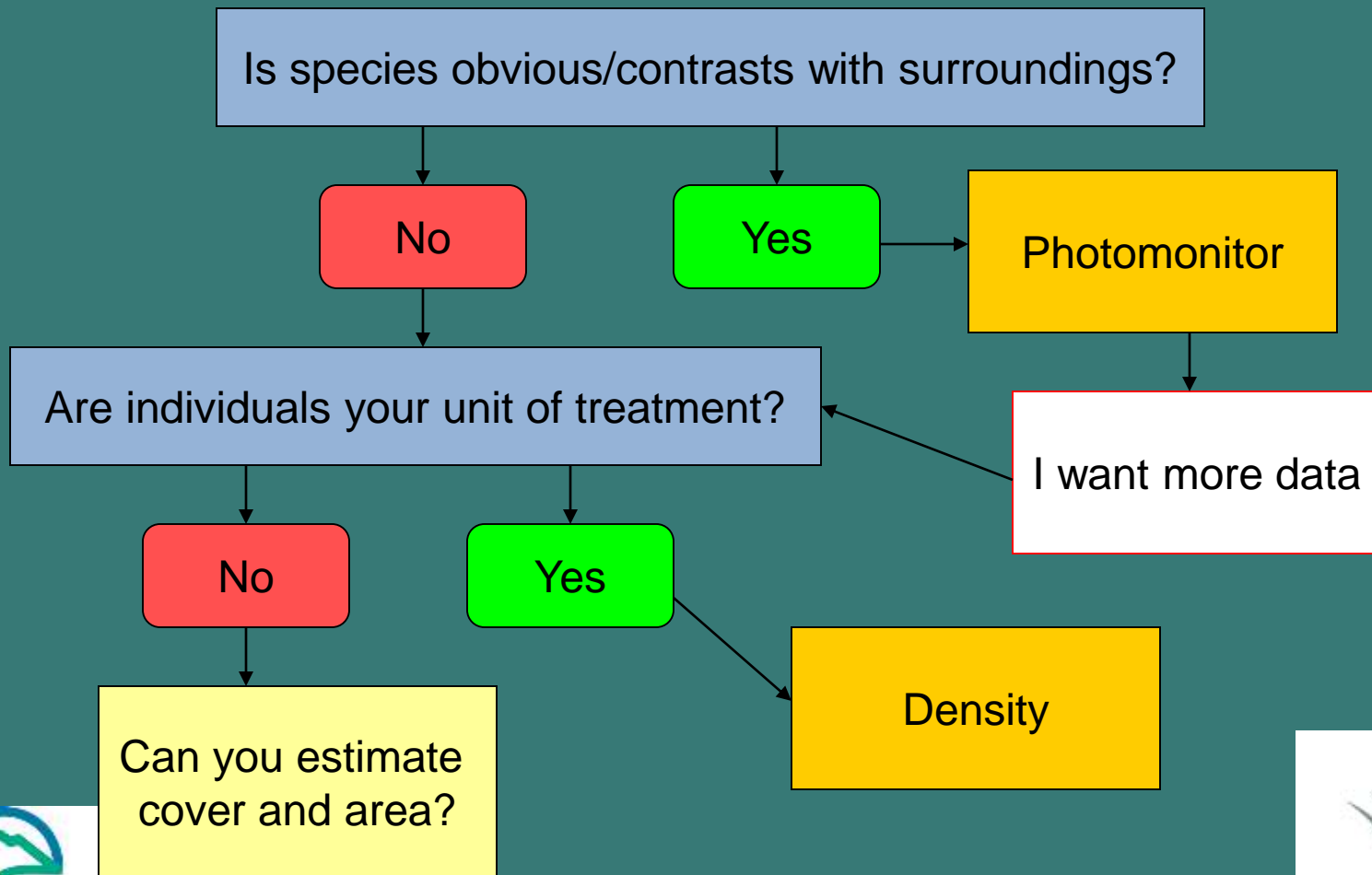
- You're already out there working on the weed
- Management should provide clear signal
- Can subsample and extrapolate
- Photo-monitoring and estimation can be quick



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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 >](#)

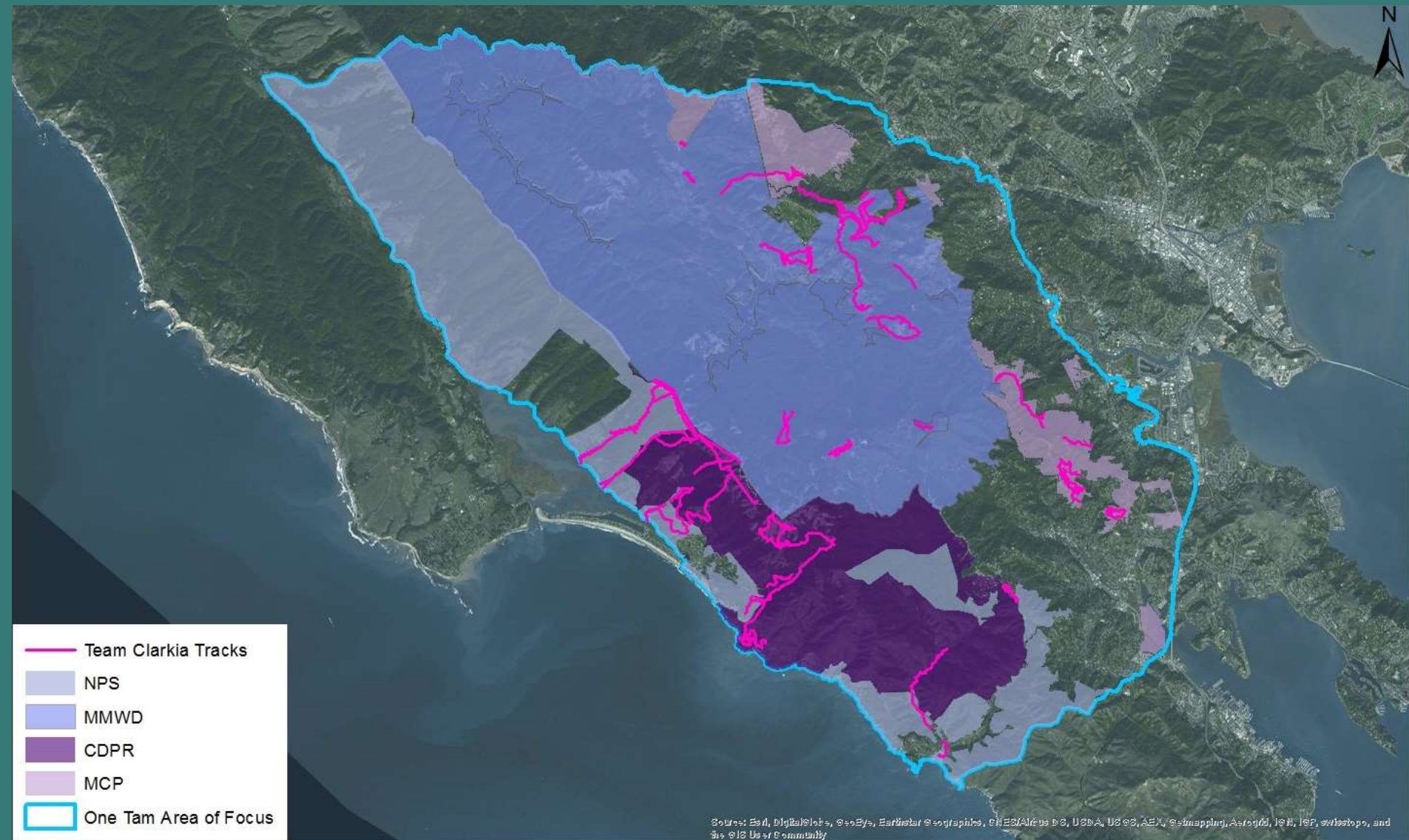


WHAT NEEDS TO BE DONE [see more programs and projects >](#)

Listed below are some of the proposed TLC programs and projects.

 Community Stewardship Program	 Conservation Management Team	 Internship Program	 Rare Plant Program	 Forest Health and Resiliency
 Log Cabin at Plover Lake	 West Peak Restoration Alternatives Assessment	 Cataract Trail Restoration	 Borfen Marsh	 Powers Meadow Restoration

Survey Geography

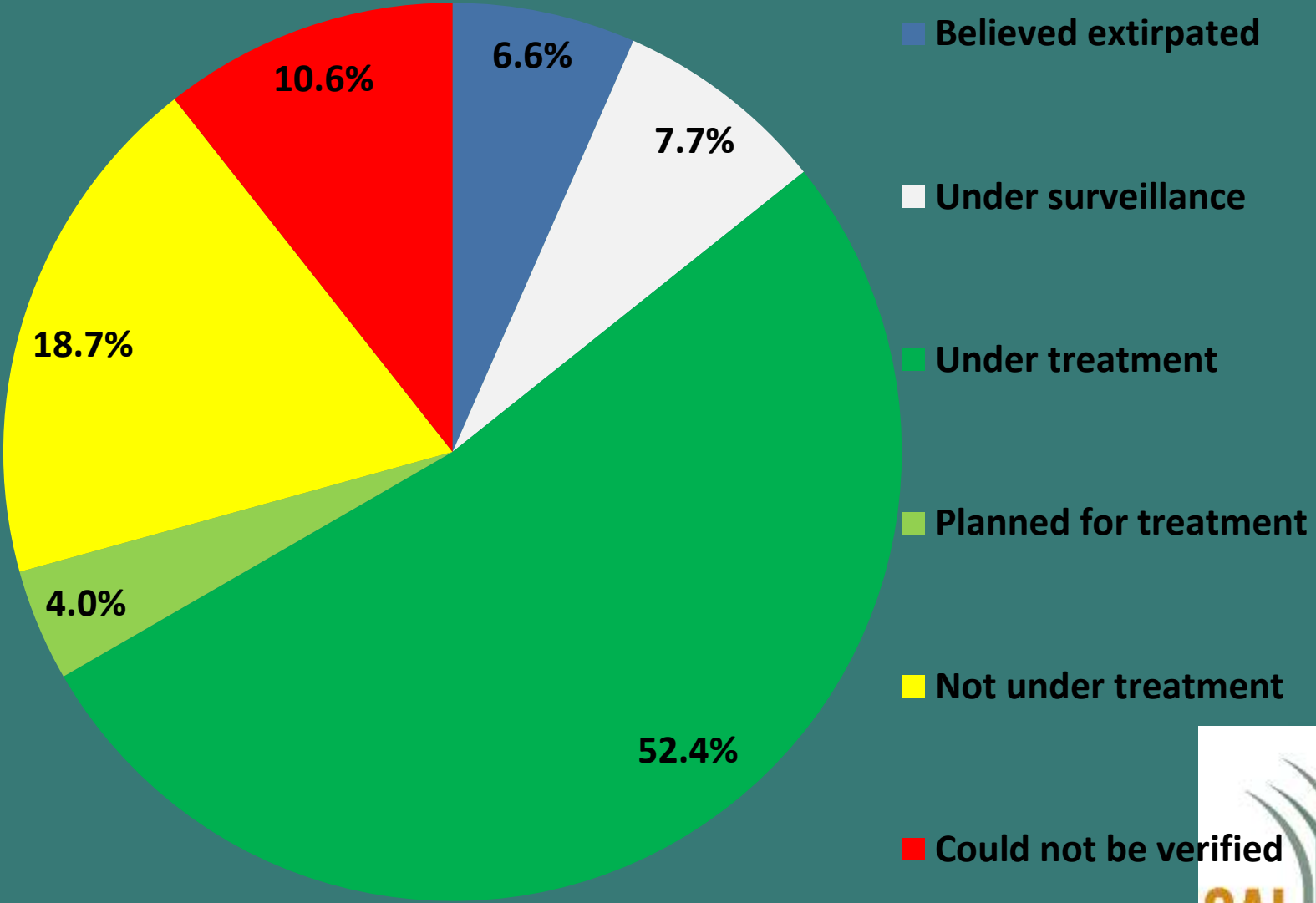




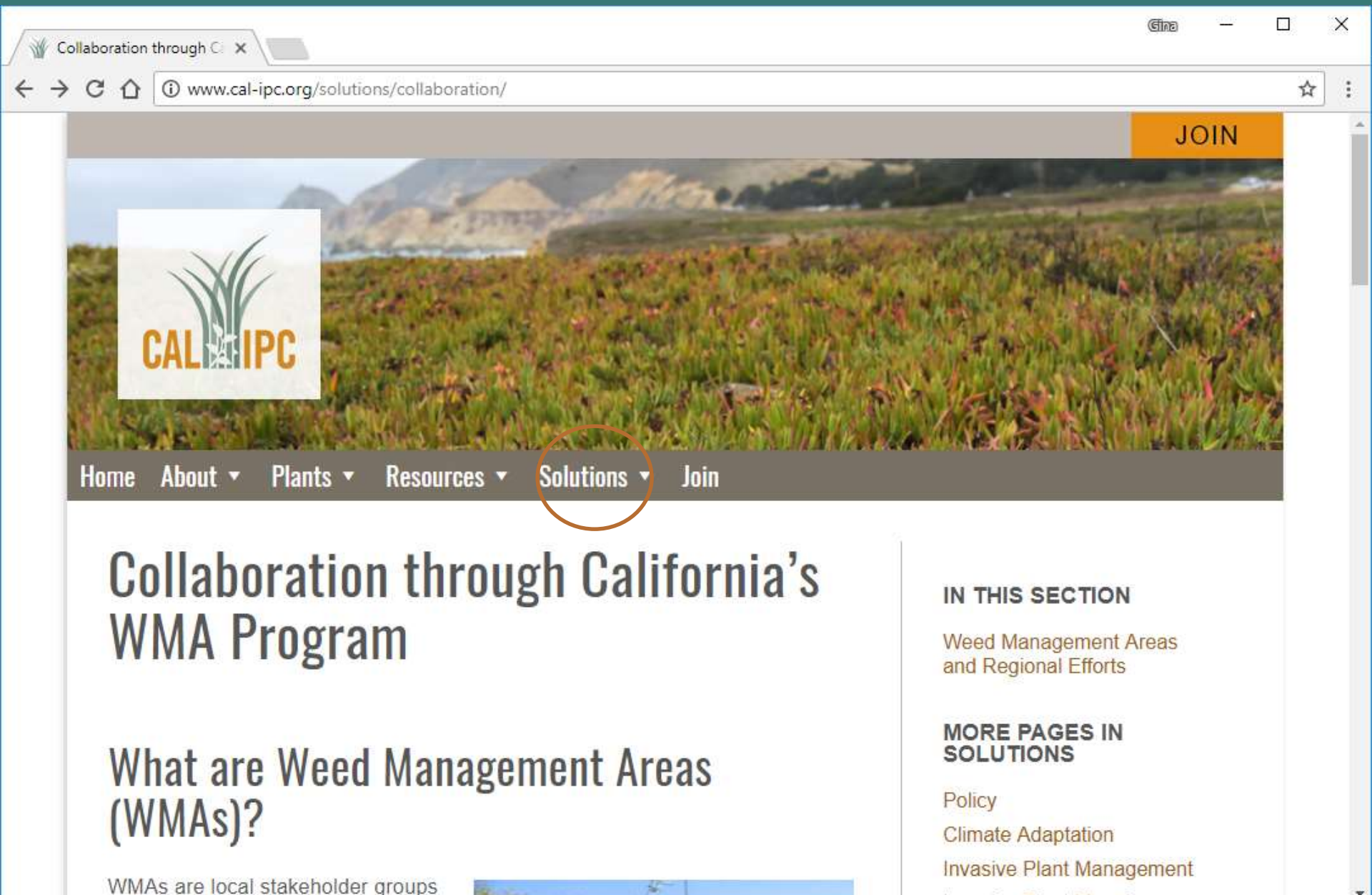
BAEDN High Priority Populations April 15, 2011



BAEDN Population treatment status as of January 1, 2012



Cal-IPC Regional Coordination



The image is a screenshot of a web browser displaying the Cal-IPC website. The browser's address bar shows the URL www.cal-ipc.org/solutions/collaboration/. The website features a header with a navigation menu: Home, About, Plants, Resources, Solutions, and Join. The 'Solutions' menu item is circled in orange. Below the navigation menu, the main content area displays the title 'Collaboration through California's WMA Program' and a sub-heading 'What are Weed Management Areas (WMAs)?'. To the right, a sidebar titled 'IN THIS SECTION' lists 'Weed Management Areas and Regional Efforts', and 'MORE PAGES IN SOLUTIONS' lists 'Policy', 'Climate Adaptation', and 'Invasive Plant Management'. The background of the page is a photograph of a coastal landscape with green and brown vegetation in the foreground and hills in the distance.

JOIN



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

management and monitoring. Through effective mapping, we can keep an eye on known problems, and detect new threats.

Prevention

Preventing the introduction of invasive plants is the most cost-effective way of protecting our wildlands. Find links to [Best Management Practices for Land Managers](#) and for [Transportation and Utility Corridors](#), as well as training videos, and more.

Climate Adaptation

A changing climate creates new challenges and new opportunities for controlling the spread of invasive plants in our state. Find links to several resources to help land natural resources managers address these challenges.

Policy

Cal-IPC develops and supports public policy initiatives at the state and national levels to help control the spread of invasive plants. Read more about these efforts.

Research

Research is at the heart of Cal-IPC's work, keeping our data accurate with input from on-the-ground observations. Read more about how Cal-IPC coordinates these efforts.

Statewide Risk Mapping for Early Detection

Prevention

- Prevention BMPs for Land Managers
- Prevention Training Videos
- Prevention BMPs for Transportation and Utility Corridors
- Certified Weed Free Forage and Straw Resources
- Weed-Free Aggregate Resources
- Responsible Landscaping

Invasive Plant Research

- Arundo donax: Distribution and Impacts
- Biological Controls
- Invasive Plant Research
- Assessing Research Needs
- Weed Risk Assessment
- This page has moved
- Saharan Mustard (Brassica tournefortii) Research
- Invasive Plants and Wildlife

Collaboration through California's WMA Program

- Weed Management Areas and Regional Efforts

Cal-IPC Training Manuals

Preventing the Spread of Invasive Plants:



Best Man
for Land
3rd Edition



Management Practices
nsportation and
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

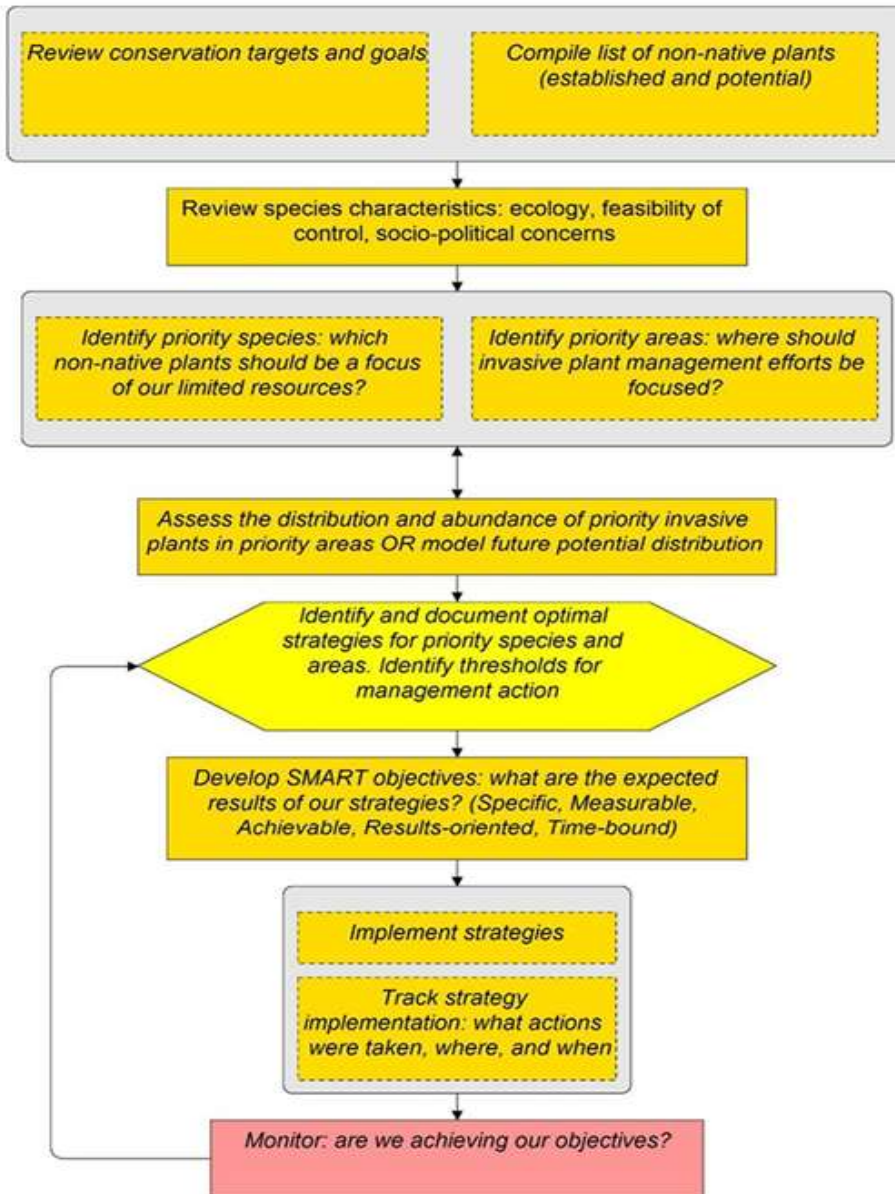
Natural Resource Report NPS/SFAN/NRR—2009/136



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



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!



Thank You!

