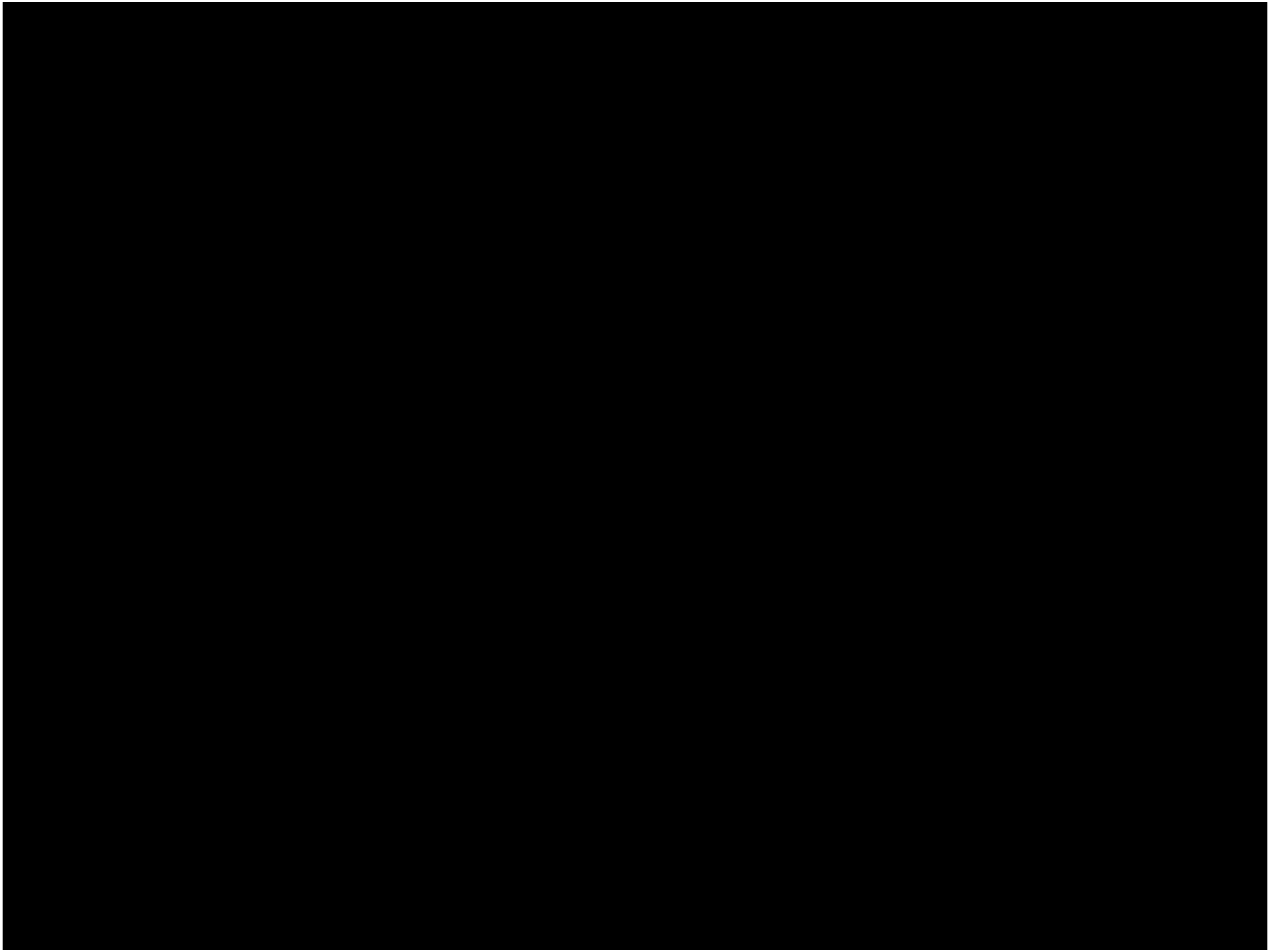


Invasive Plants in the Pacific Northwest: Where to from Here?

John M. Randall

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Global Invasive Species Initiative

&

UCDAVIS
UNIVERSITY OF CALIFORNIA

jrandall@tnc.org

http://tncweeds.ucdavis.edu

<u>Atlantic</u> saltmarsh cordgrass on the Pacific!

Who Cares?

UNIVERSITY OF WASHINGTON BOTANIC GARDENS
Plants for Life

USDA Forest Service
Caring for the Land and Serving People

INVASIVE PLANT COUNCIL OF BC

USDA

WASHINGTON STATE DEPARTMENT OF Natural Resources

University of Washington
OLYMPIC NATURAL RESOURCES CENTER

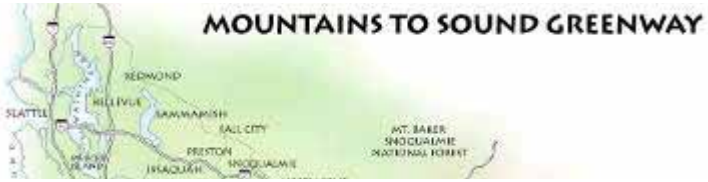
USGS
science for a changing world

NORTH CASCADES INSTITUTE
CELEBRATING 20 YEARS IN THE FIELD

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Dow AgroSciences

CALIFORNIA EXOTIC PEST PLANT COUNCIL



University of Idaho

Assessment
Prevention
Early Detection
Control & Restoration

(& Learning to Live With The Incorrigibles)

Continental **Ecoregion** **Landscape** **Small Park**

RESEARCH

Assessment
Prevention
Early Detection
Control & Restoration

(& Learning to Live With The Incorrigibles)

COMMUNICATION

Continental **Ecoregion** **Landscape** **Small Park**

Assessment
Prevention
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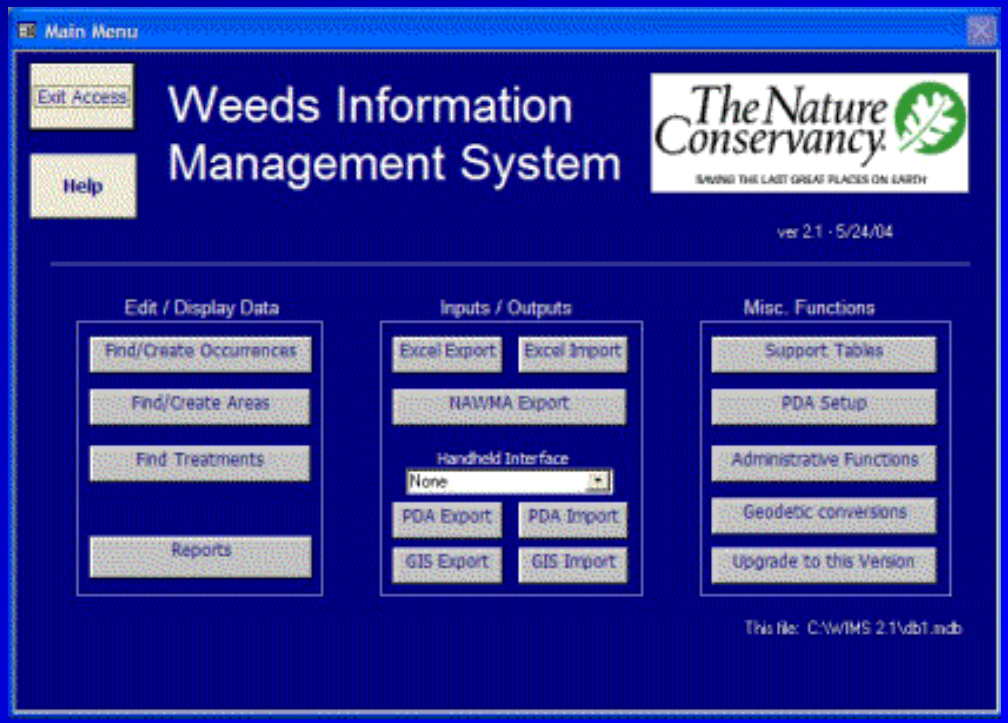
(& Learning to Live With The Incorrigibles)

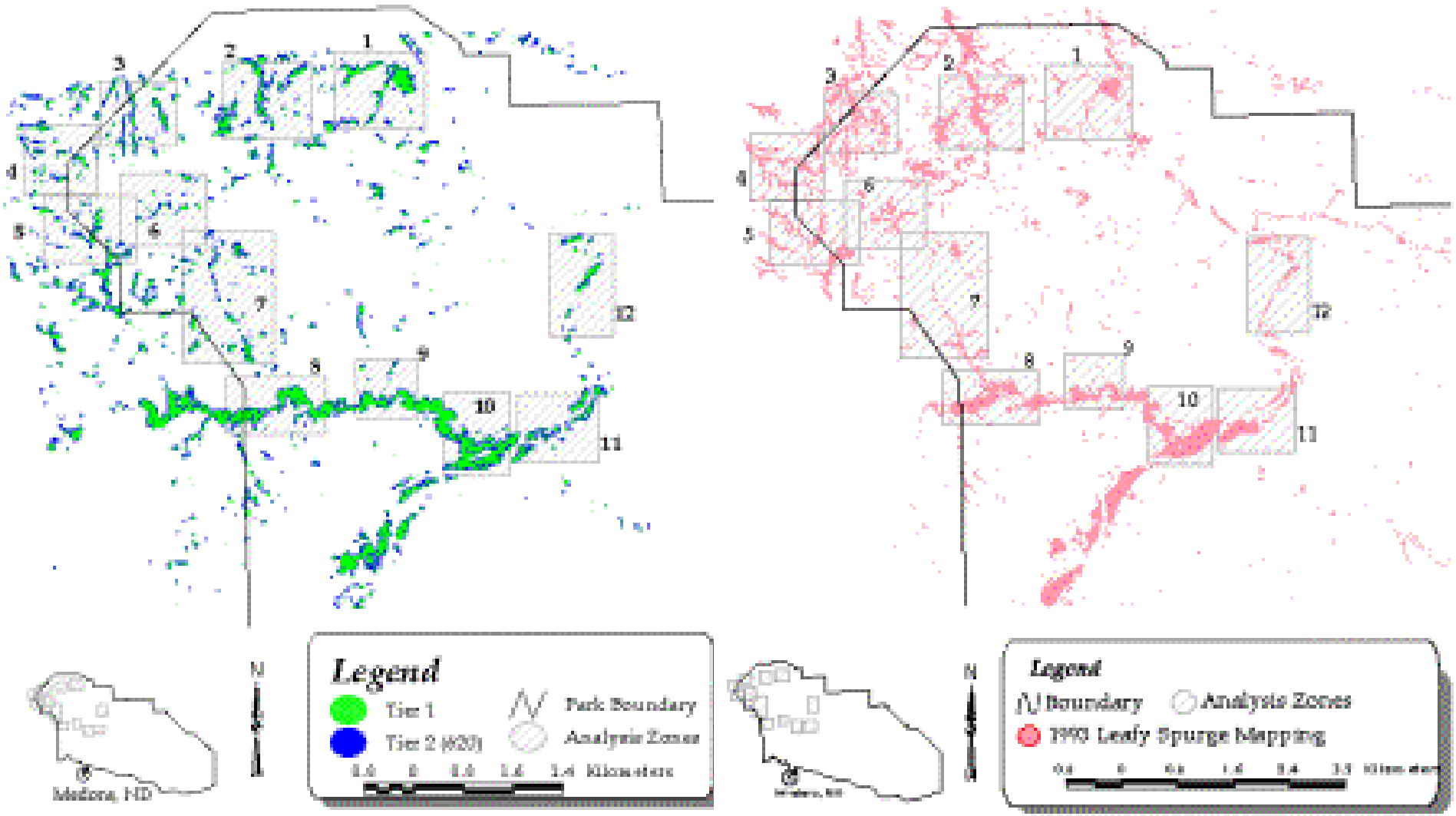
Continental **Ecoregion** **Landscape** **Small Park**

Weed Information Management System (WIMS)



- Installation and downloads
- User's Manual
- FAQ sheet

http://tncweeds.ucdavis.edu/wims.html



Comparison Between
1999 AVIRIS Leafy Spurge Classification and 1993 Leafy Spurge Map
Theodore Roosevelt National Park, North Dakota

Ralph Root[1], Steve Hager[2], Gerald Anderson[3], Susan Ustin[4], Larry Costick[4], Jim Smith[5] and Robert Green[6]

http://biology.usgs.gov/npsveg/apps/vegapp.html

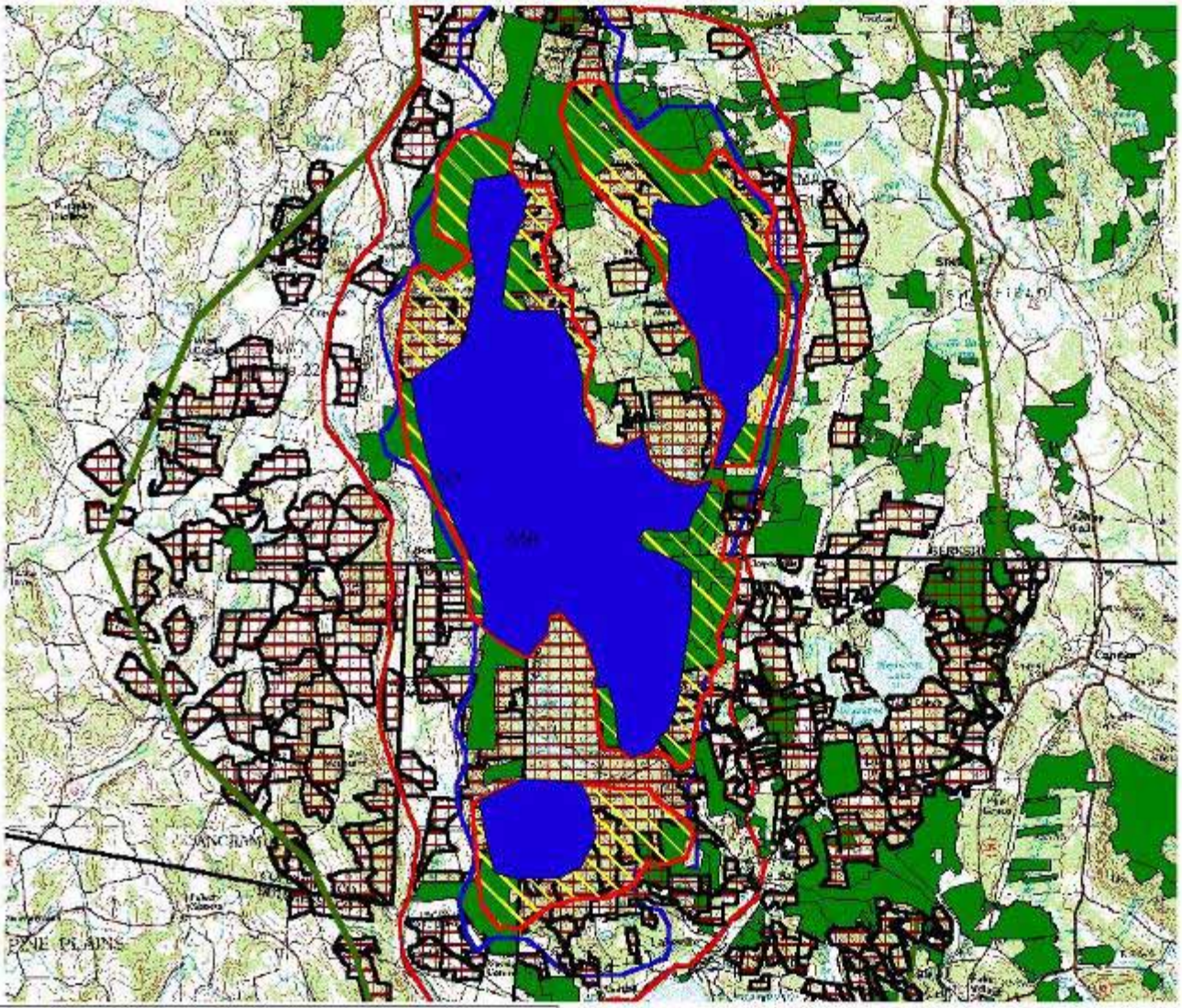
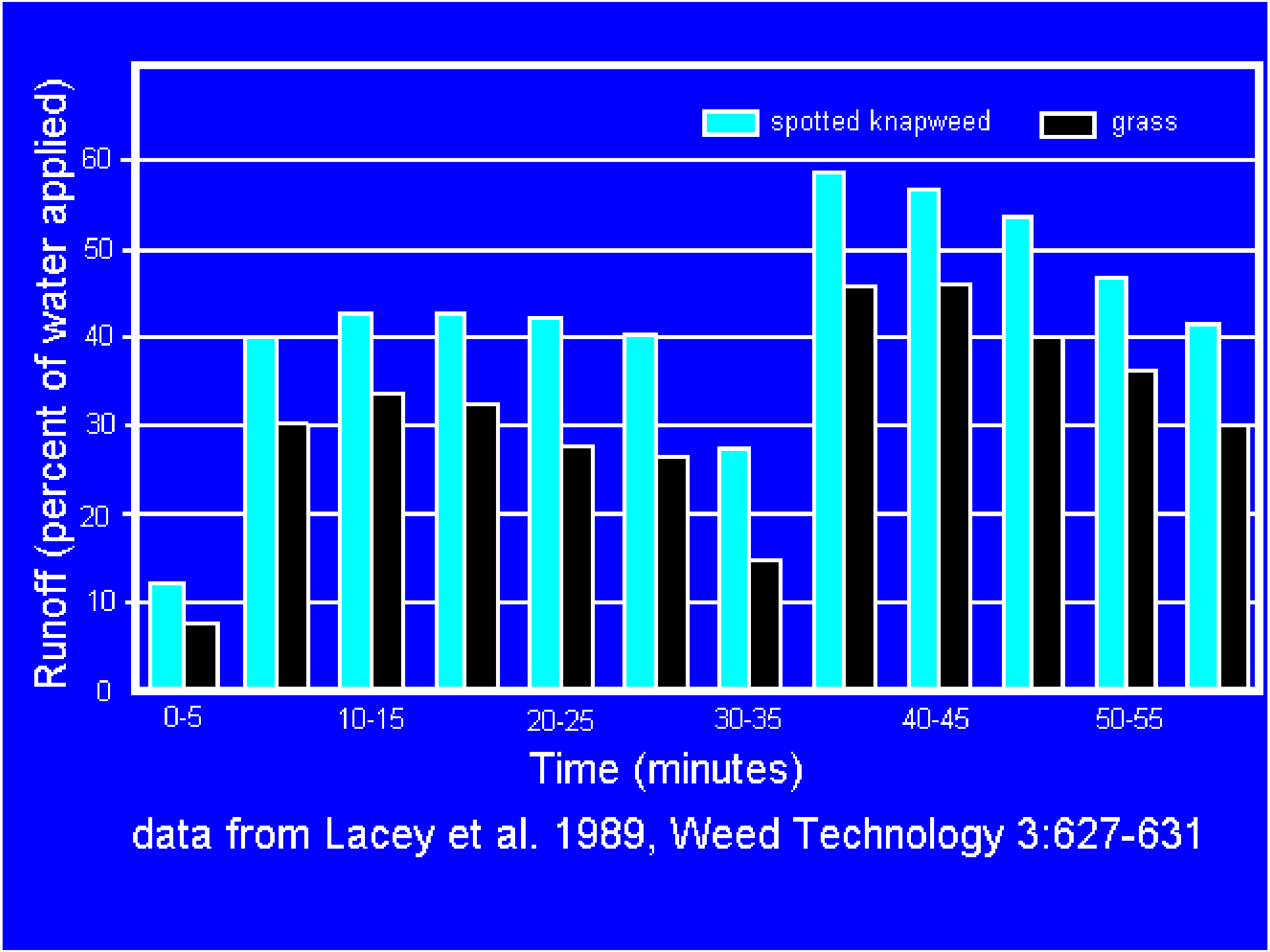


Figure 4. Uninvaded portions of proposed core conservation areas.

Berkshire Taconic Landscape

MA-CT-NY


spotted knapweed
grass
Runoff (percent of water applied)
0
10
20
30
40
50
60
0-5
10-15
20-25
30-35
40-45
50-55
Time (minutes)
data from Lacey et al. 1989, Weed Technology 3:627-631

Assessment

Prevention

(& Prediction)

Early Detection

Control & Restoration

(Learning to Live With The Incorrigibles)

Continental **Ecoregion** **Landscape** **Small Park**

Cosumnes River Preserve, California





Collaboration with Business and Institutions to Voluntarily Change Practices.

Voluntary Codes of Conduct with Horticulture

- Nurseries
- Landscape Architects
- Botanical Gardens

Linking Ecology & Horticulture to Prevent Plant Invasions
Workshop held at Missouri Botanic Garden, December, 2001

St. Louis Declaration

Voluntary Codes of Conduct for

Nurseries, Landscape Architects,
Botanical Gardens, Garden Clubs

http://www.centerforplantconservation.org/invasives/home.html

Federal Agency Policies & Programs

USDA-APHIS

(Animal & Plant Health Inspection Service)

is developing revisions for Q-37

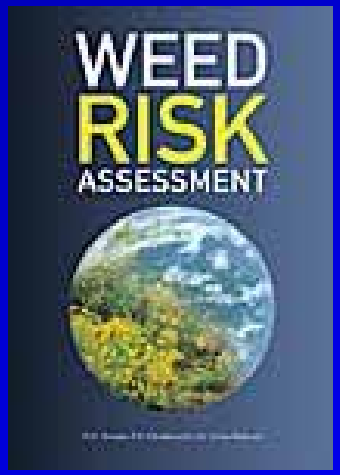
The Quarantine Rules for
Plants Imported for Planting
(nursery stock, etc.)

Screen Proposed New Introductions for Invasiveness

Australian Government
Department of Agriculture, Fisheries and Forestry

Biosecurity Australia

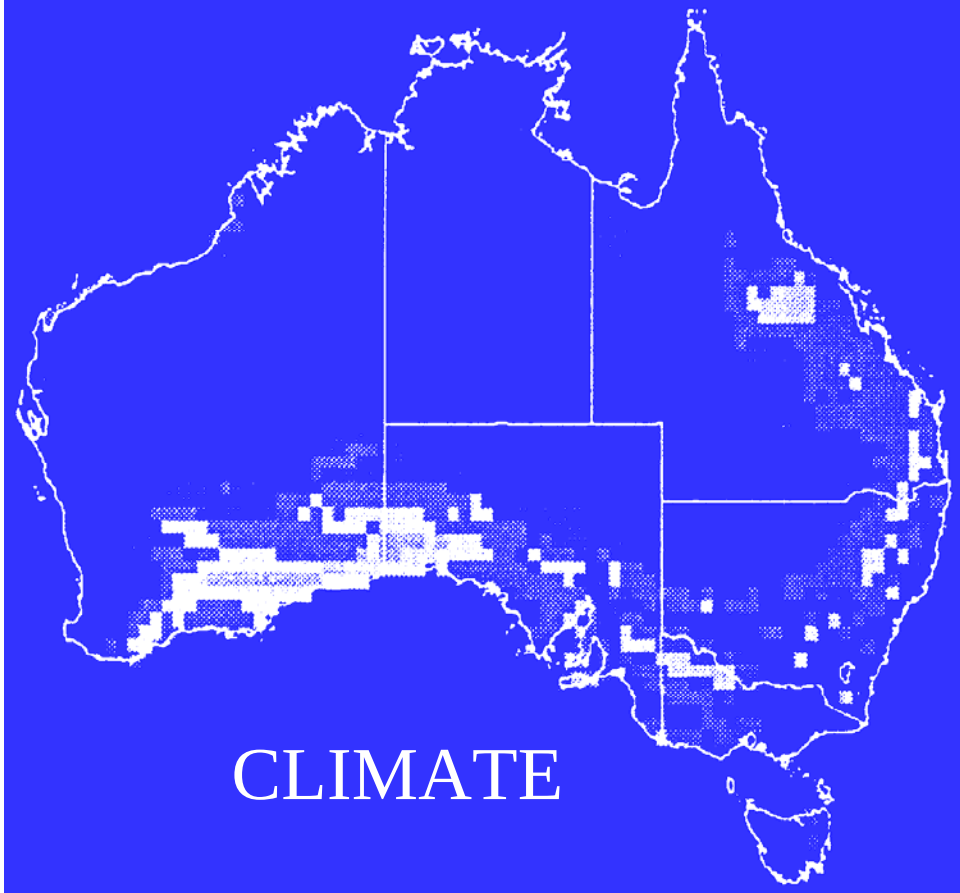
Weed Risk Assessment System (WRA)



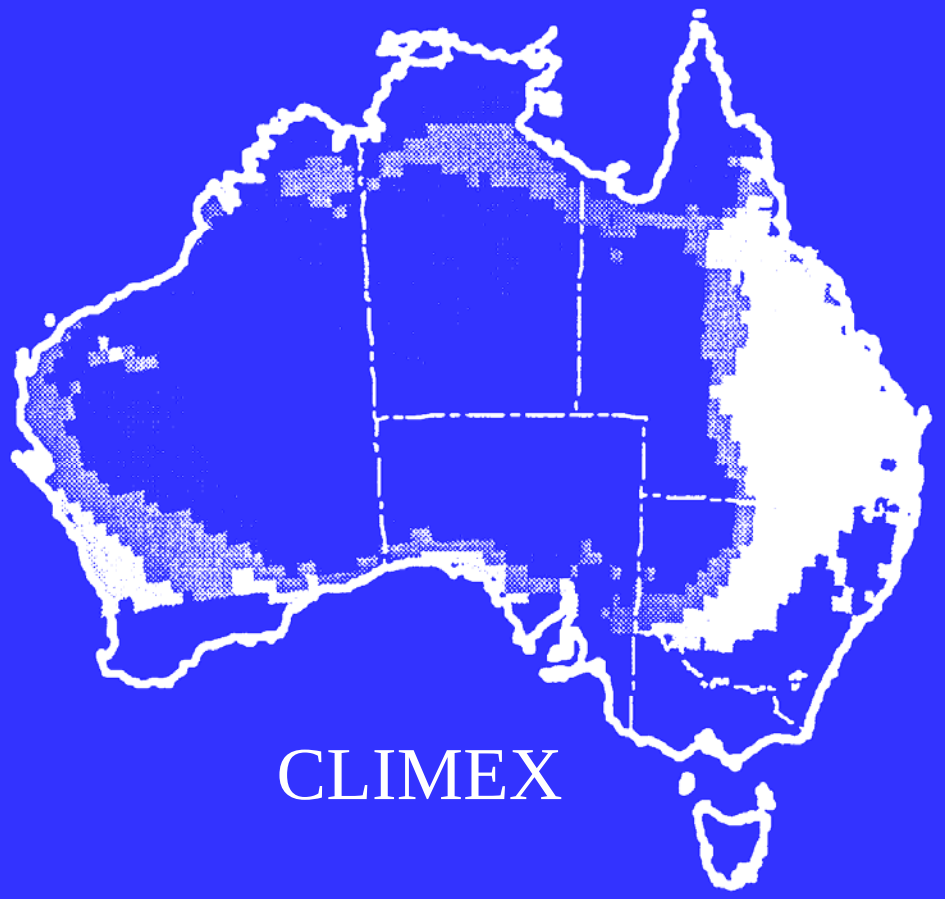
2001
R.H. Groves, F.D. Panetta & J.G. Virtue (editors)

Weed Risk Assessments for Hawaii and Pacific Islands

http://www.botany.hawaii.edu/faculty/daehler/WRA/



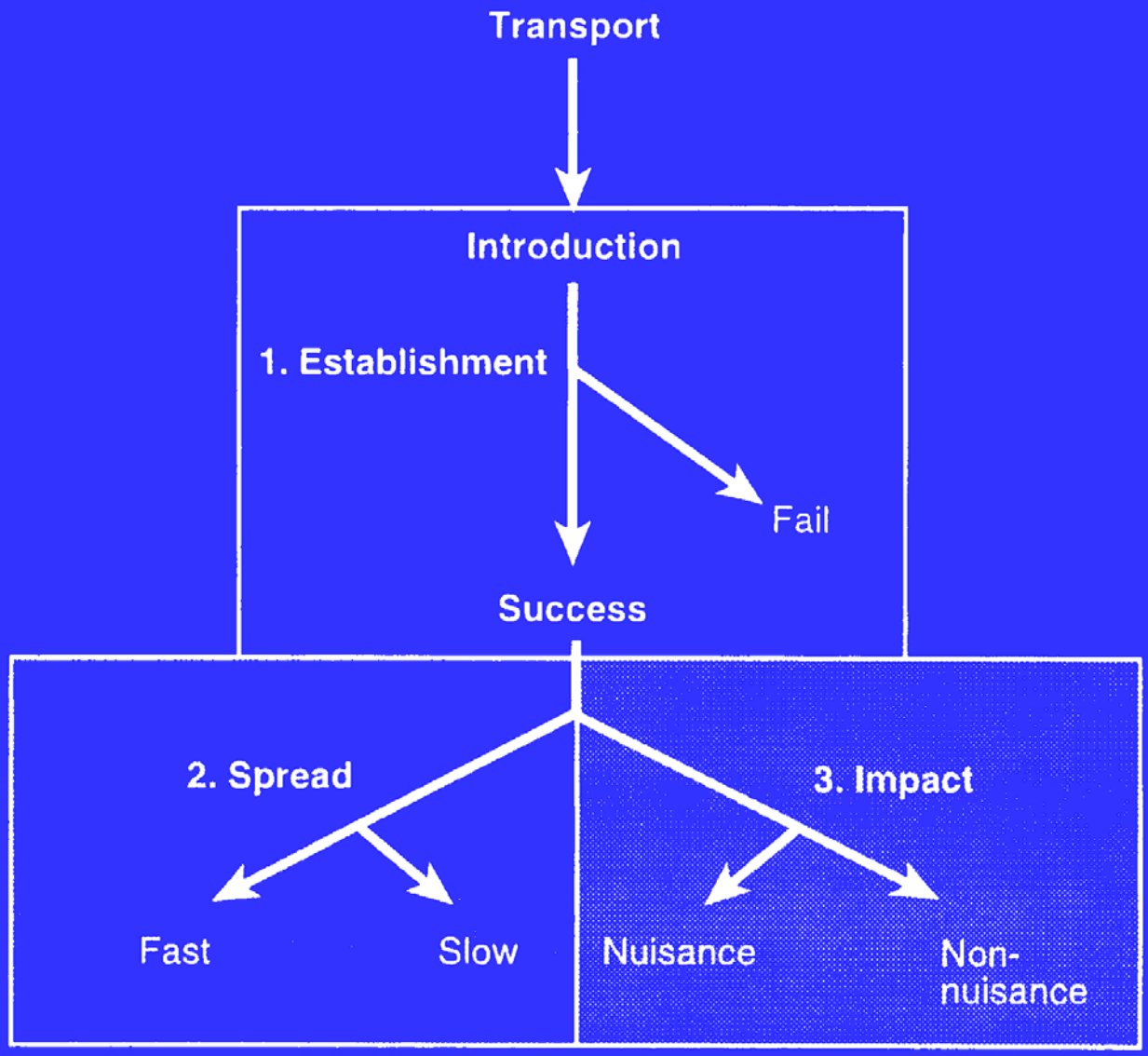
CLIMATE



CLIMEX

Predicted Australian distribution of *Cereus jamacaru* (a cactus native to Brazil) based on climatic factors

From: Kriticos, D.J. and R.P. Randall. 2001.
A comparison of systems to analyse potential weed distributions.
http://www.nrm.qld.gov.au/pests/maps/predictive_mapping/weeds.html



From: Kolar, C.S. and D.M. Lodge. 2002. Science 298 (8): 1233-1236

Assessment

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(Learning to Live With The Incorrigibles)

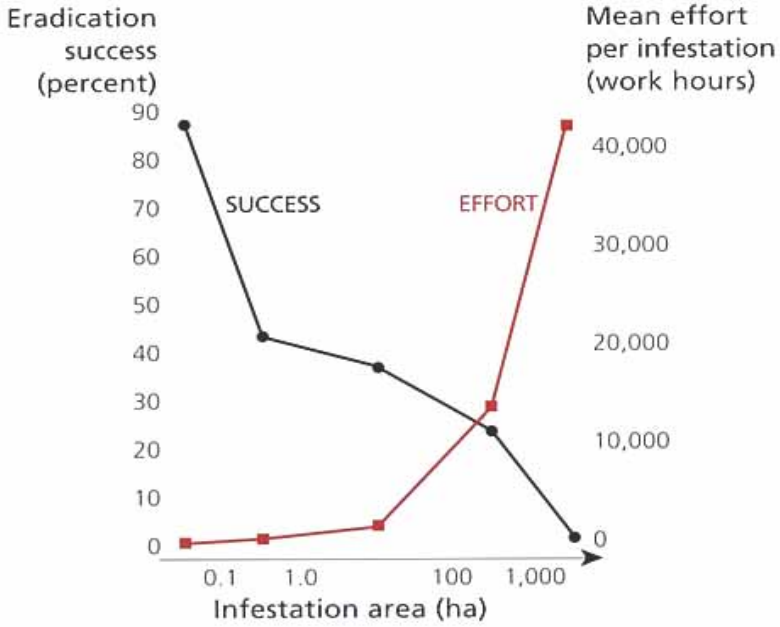
Continental **Ecoregion** **Landscape** **Small Park**

***Solanum viarum* (Tropical Soda Apple)**

First report in California Monday Sept. 11th (not yet positively identified)

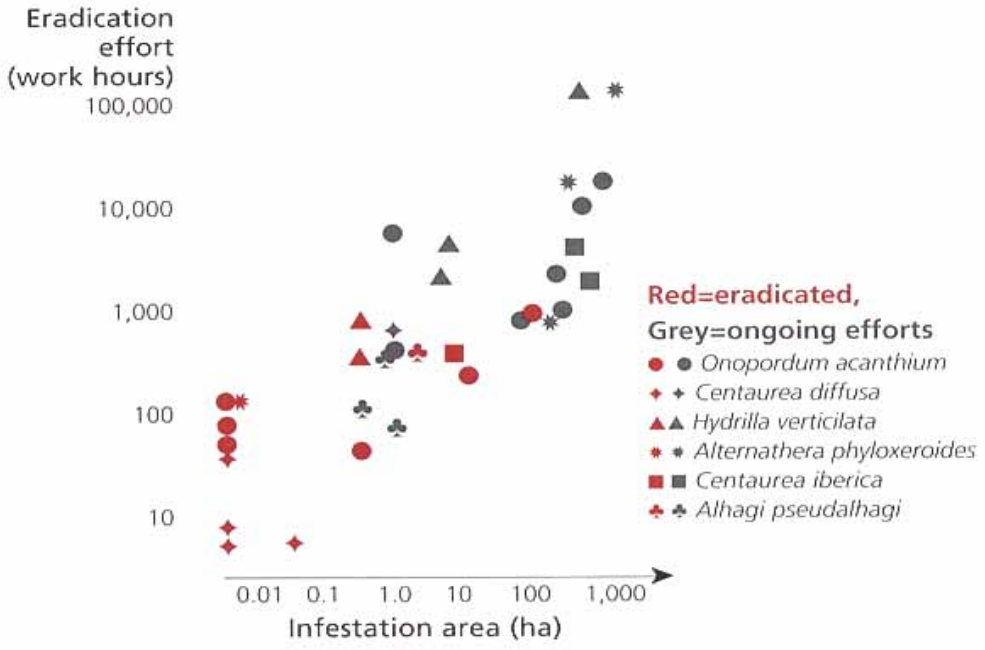
Early detection makes all the difference.

In this dataset, infestations larger than 1000 ha were unlikely to be eradicated using a realistic investment of resources.



Evaluating the battlefield: Attack or defend?

Early offensive strategies pay off regardless of species; six different noxious weeds in California were successfully eradicated when efforts started early.



Based on a 28-year data set of eradication attempts by the California Department of Food and Agriculture on 18 species and 53 separate infestations targeted for eradication between 1972-2000. Adapted from Rejmánek, M. and M.J. Pitcairn. 2002 (**2**).

McNeely, J, LE Neville, and M Rejmanek. 2003. When is eradication a sound investment? Conservation In Practice, 4:30-31.

National Framework for Early Detection, Rapid Assessment, & Rapid Response to Invasive Species

A. Identification and Validation
B. Reporting
C. Expert Verification
D. Occurrence Databases
E. Rapid Assessment
F. Planning
G. Rapid Response

http://edrr.nbii.gov/portal/server.pt

Lag Times?
(For establishment of some species)

Table 1. Duration (in years) of known time-lags between the introduction and first spread and pest status in tropical invasive woody plants (updated from Binggeli, Hall, and Healey, 1998).

Species	Region	Year of Initial Introduction	Noticed after (yrs)	Perceived as problem or pest after (yrs)
Acacia nilotica	N. Australia	1890s	c. 30	c. 60
Casuarina equisetifolia	Florida	c. 1900	c. 56	c. 65
Cecropia peltata	Ivory Coast	1920	<48	69
	Cameroon	c. 1910	c. 23	c. 36
	Zaire	1911	19	40
	Malaysia	1953	19	35
Chromolaena odorata	Ivory Coast	c. 1955	c. 7	c. 20
Cinchona succirubra	Galapagos	1946	26	40
Lantana camara	Galapagos	1938	32	40
Maesopsis eminii	East Africa	1913	14	65
Miconia calvescens	Hawaii	1961	c. 30	c. 30
	Tahiti	1937	c. 30	c. 35
Mimosa pigra	N. Australia	c. 1880	c. 36	c. 90
Psidium guajava	Galapagos	1858	?	<90
Rubus sp.	Galapagos	1983	3	4
Schinus terebinthifolius	Florida	1898	50	75

Binggeli P. (in press) Time-lags between introduction, establishment and rapid spread of introducedenvironmental weeds. In Proceedings of the III International Weed Science Congress. International Weed Science Society, Corvallis.

http://members.tripod.co.uk/WoodyPlantEcology/publication.htm

Assessment
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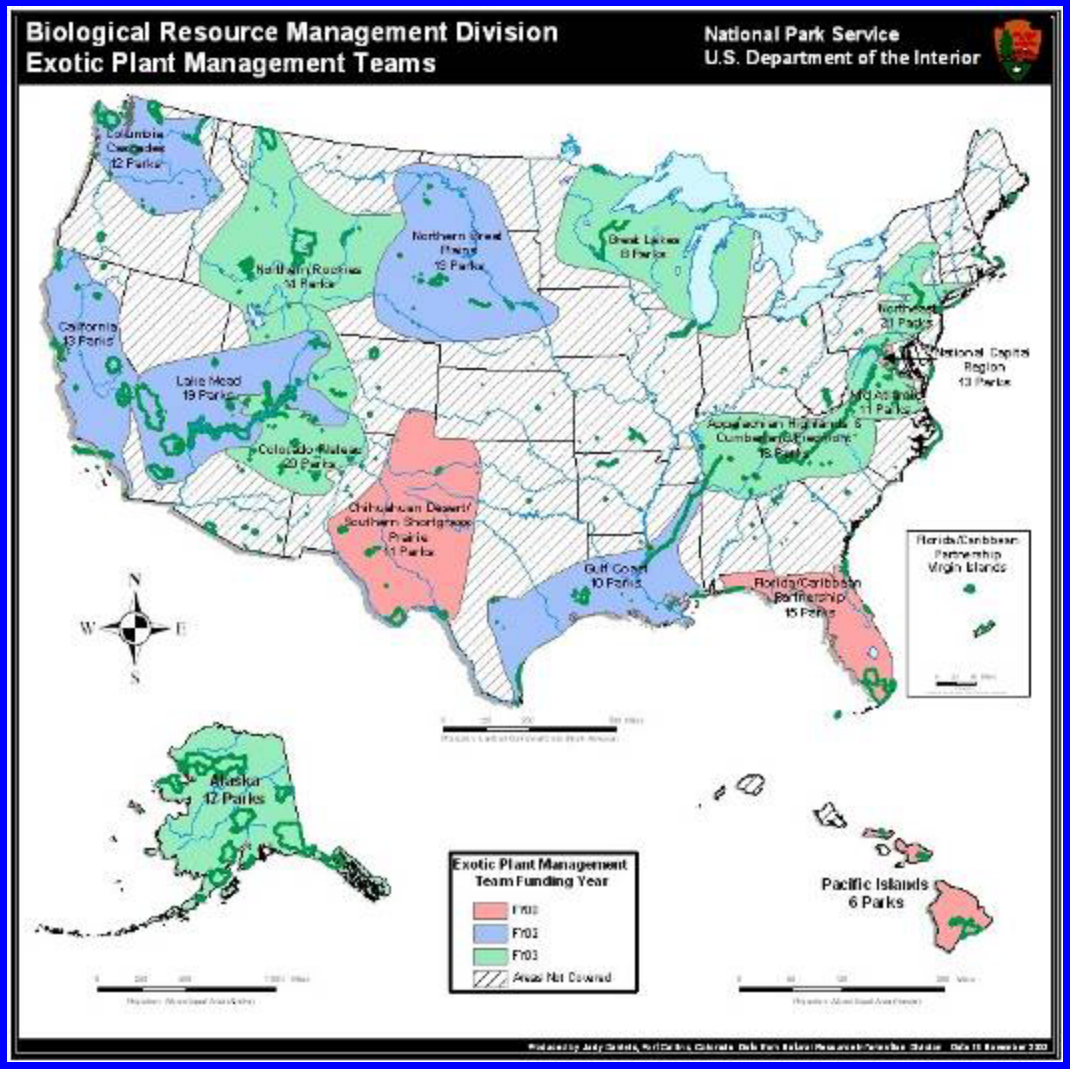
Continental **Ecoregion** **Landscape** **Small Park**

The National Park Service has created
17 Exotic Plant Management Teams nationwide



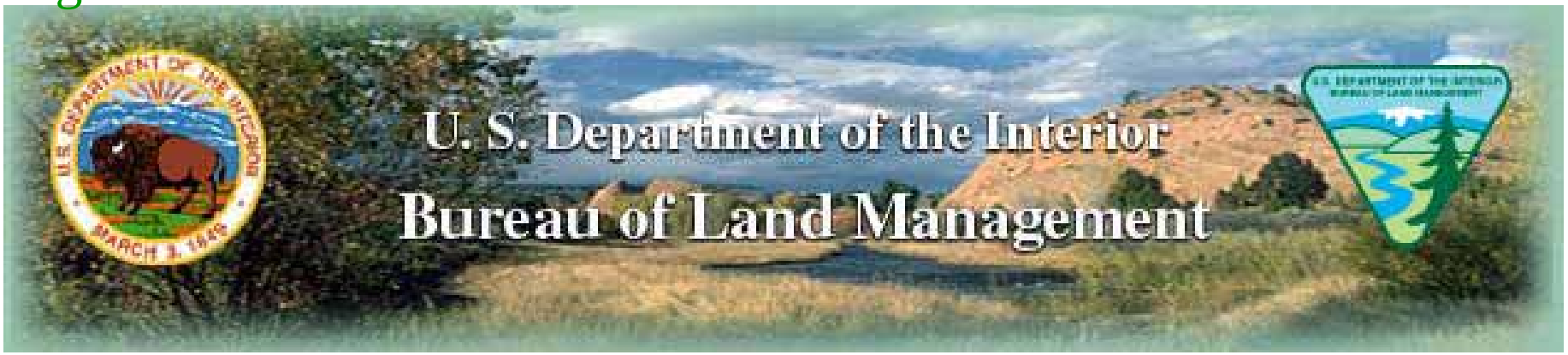
ONE EXAMPLE:

The North Coast and Cascades EPMT covers 14 parks in ID, OR & WA with most work in smaller Parks.

Larger parks (e.g. Olympic, Yosemite) spend hundreds of thousands more each year on invasive plant control.

Other Federal Agencies that Manage Land…….

e.g.



Participating in Cooperative Weed Management Areas (e.g. 50% in California)
DRAFT EIS on Vegetation Management

USDA Forest Service

Caring for the Land and Serving People

3.9 million acres infested of ~200 million acres

- Region 6 EIS *****
- $$ available for post-fire weed surveys, control
- Weed Free Hay/Forage program

U.S. Federal Legislation

Recently Passed

- **Noxious Weed Control Act of 2004**
  S. 144

Proposed

- **National Aquatic Invasive Species Act (NAISA)**
  H.R. 1591; S. 770

- **Salt Cedar & Russian Olive Control Demonstration Act**
  H.R. 2720; S. 177

U. S. Federal Appropriations

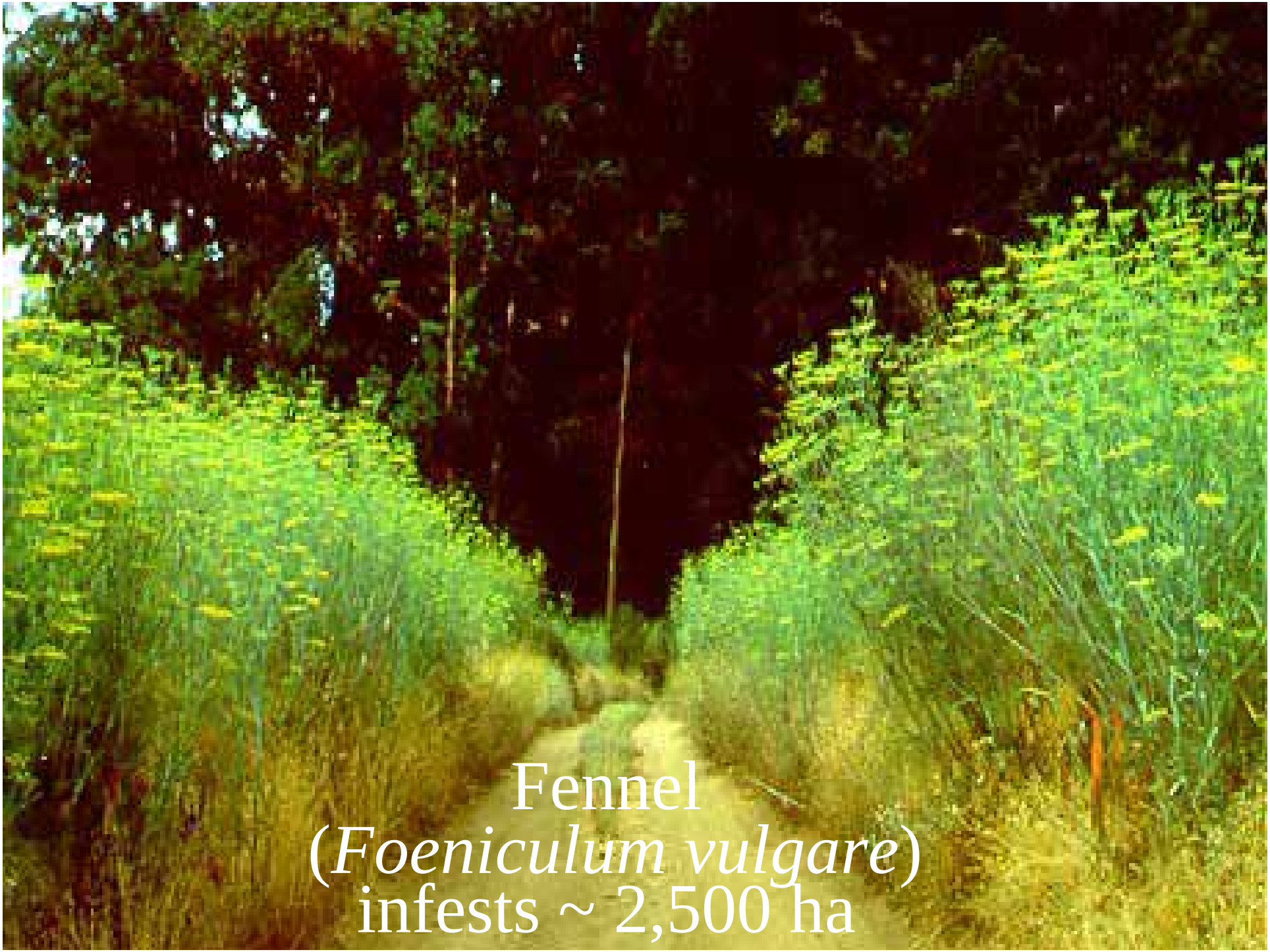
- **Funding for Noxious Weed Control Act of 2004 sought**
  $15 million per year authorized
  BUT not yet appropriated

Santa Cruz Island, CA 18,624 ha

457 native plant species
Many endemic species and subspecies



170 non-native plants
Some dominate large areas



Fennel
(*Foeniculum vulgare*)
infests ~ 2,500 ha

Impacts of Large-Scale Fennel Control on Santa Cruz Island

HYPOTHESES

1. Prescribed fire and two herbicide applications (triclopyr amine) will significantly reduce abundance of fennel
2. This treatment will increase abundance and diversity of native species in treated areas.

    a. plants; b. lizards; c. insects.


N5006Y

Results

1. Treatment causes significant decrease in fennel cover
2. Some decrease in fennel cover in untreated areas

3a. Side-blotch lizard (*Uta stansburiana*) increases with treatment (and fennel decline)

b. Alligator lizard (*Elgaria multicarinata*) decreases

4. Native plant diversity has not increased significantly in treated fennel

5. Evaluation of data lead us to revise conservation goals (desired future condition)

Assessment
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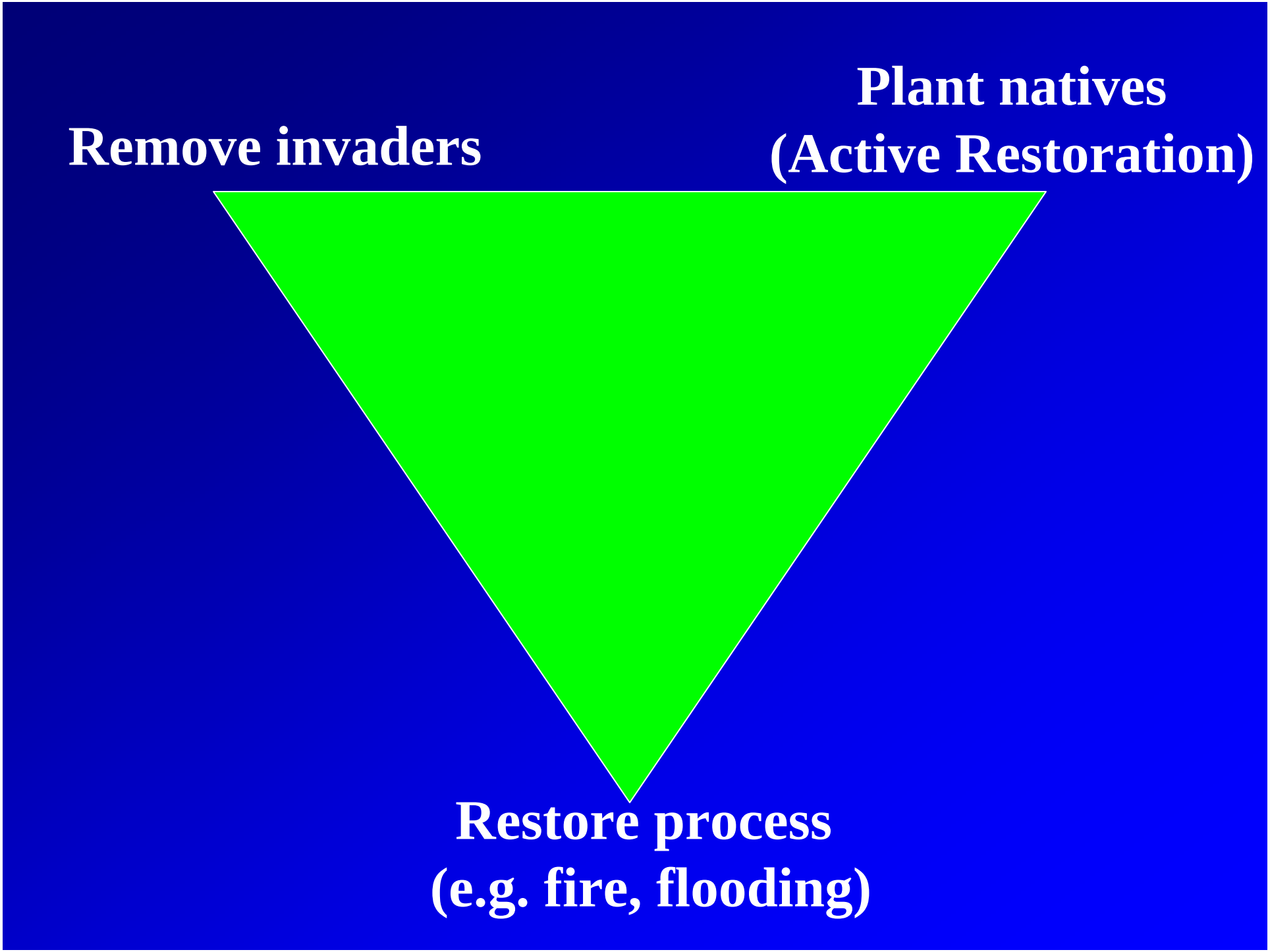
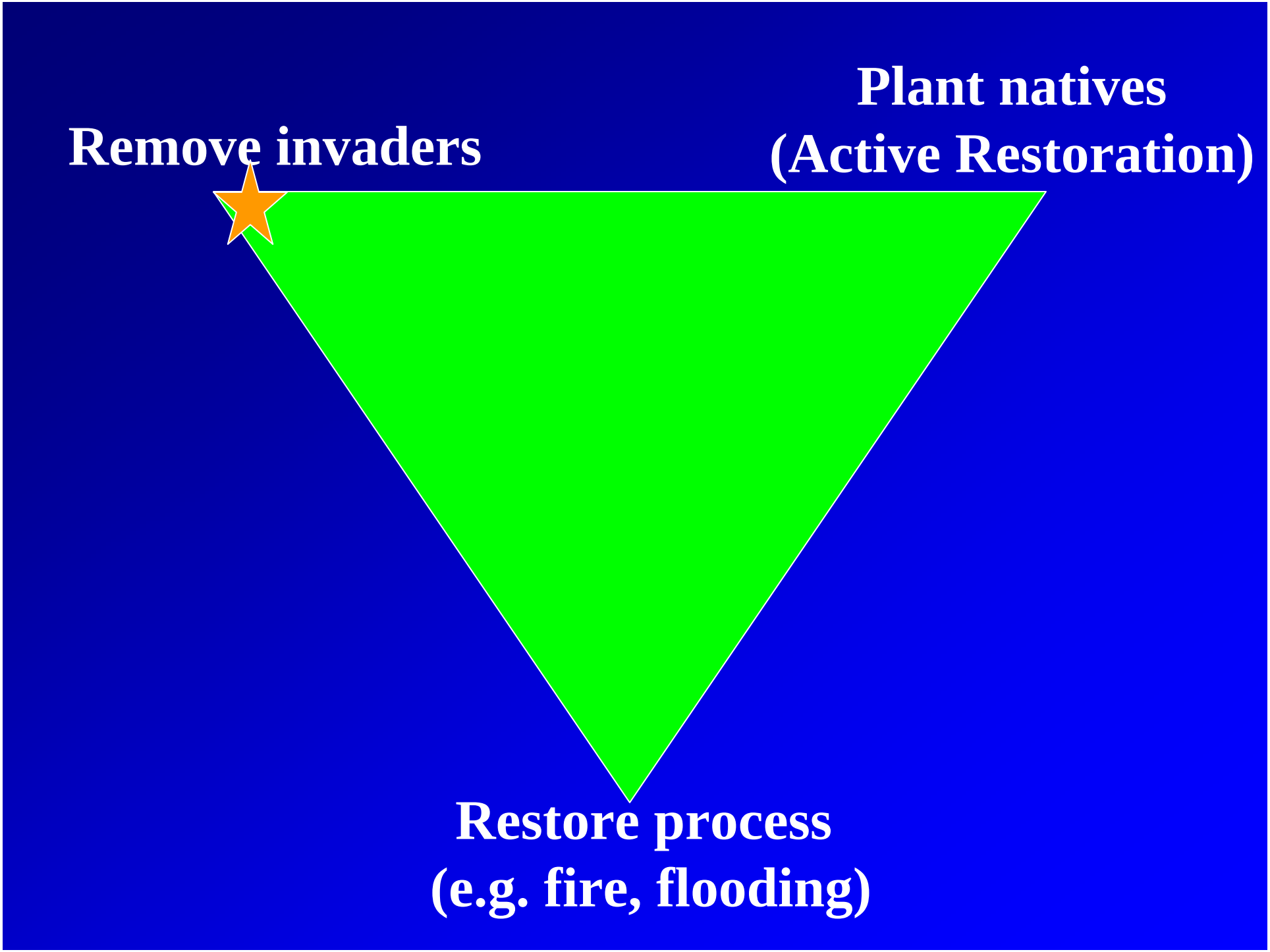
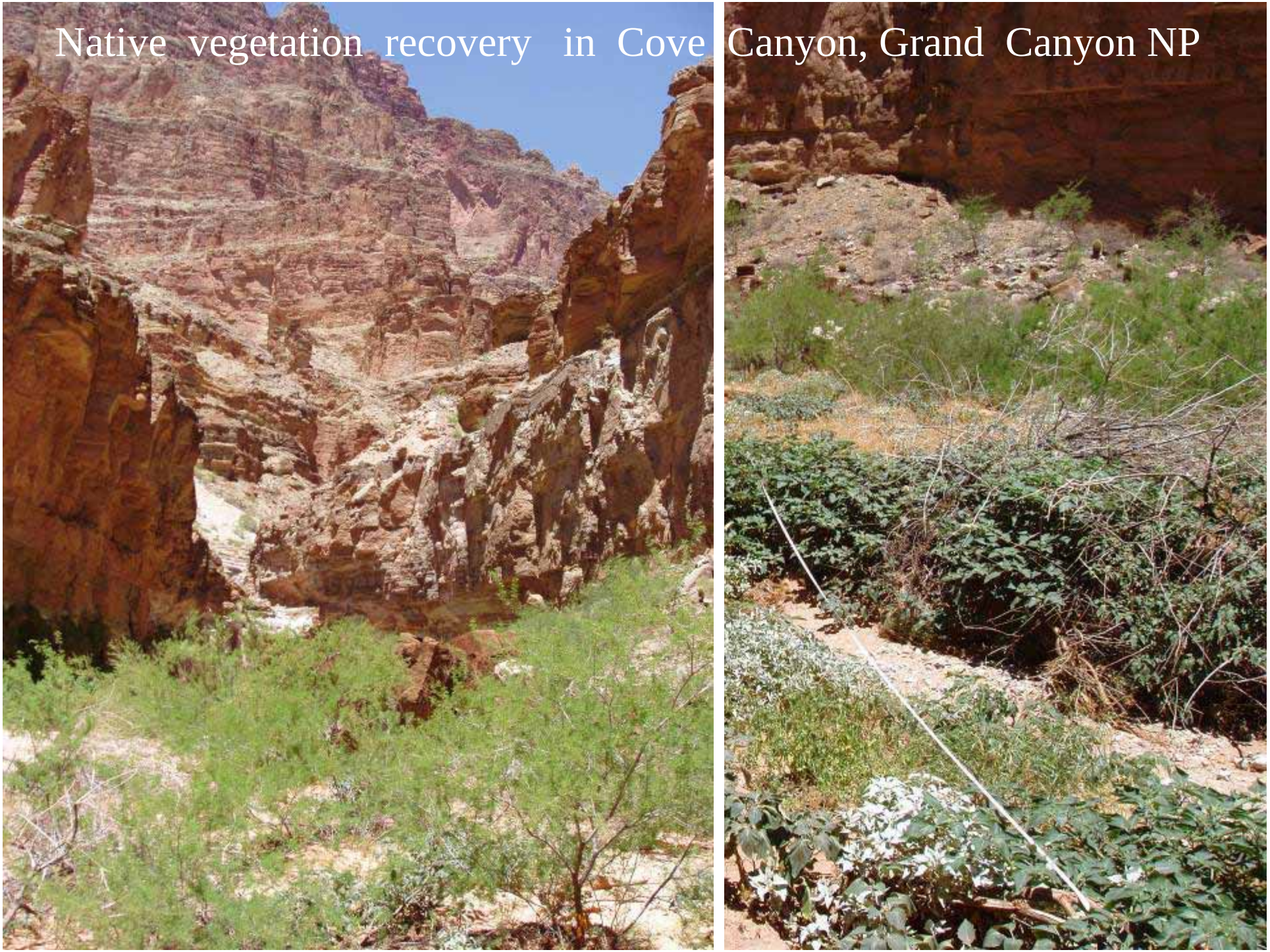
Continental **Ecoregion** **Landscape** **Small Park**

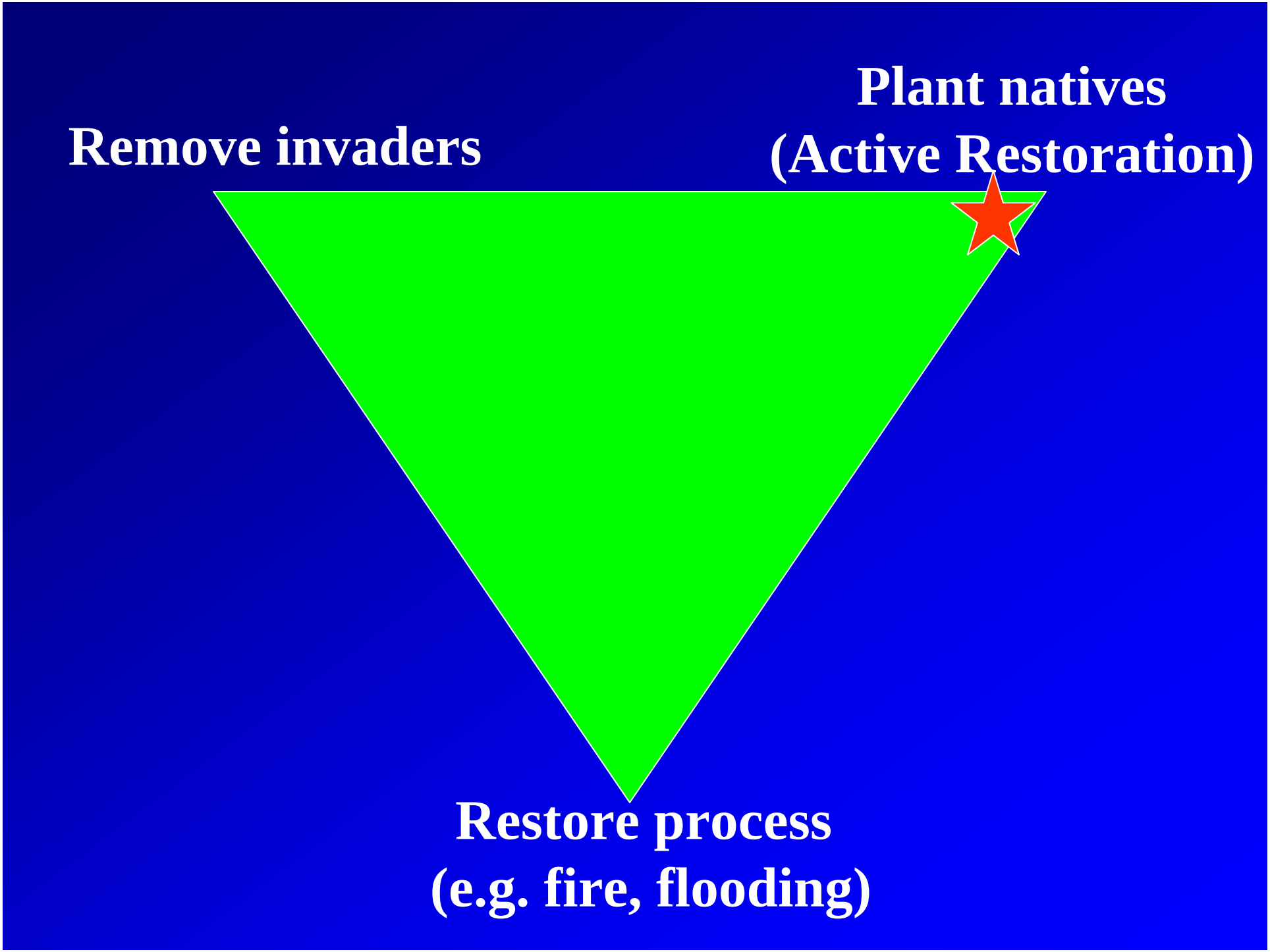

Plant natives
(Active Restoration)
Remove invaders
Restore process
(e.g. fire, flooding)


Remove invaders
Plant natives
(Active Restoration)
Restore process
(e.g. fire, flooding)

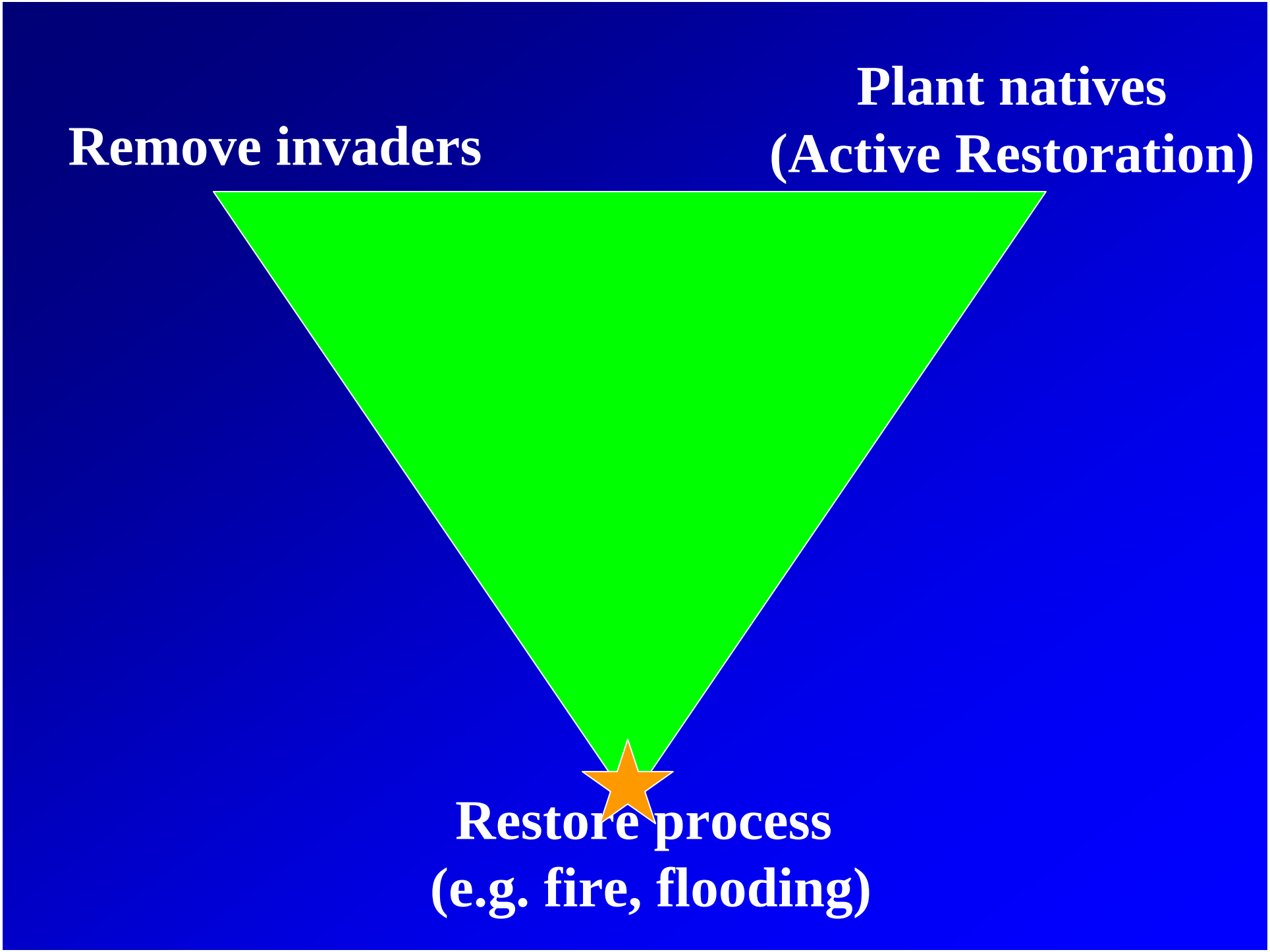
BEFORE: *Ammophila arenaria* dominated dunes
n. Calif. coast, Lanphere Dunes, Humboldt Bay NWR

AFTER: native species return and dominate the dunes


Native vegetation recovery in Cove Canyon, Grand Canyon NP


Plant natives
(Active Restoration)
Remove invaders
Restore process
(e.g. fire, flooding)

Cosumnes River Watershed Project, CA
Valley oak (*Quercus lobata*) riparian forest


Remove invaders
Plant natives
(Active Restoration)
Restore process
(e.g. fire, flooding)

Prescribed fire kills invasive vines, restores sandhill pinelands

Cottonwood regeneration following a flood

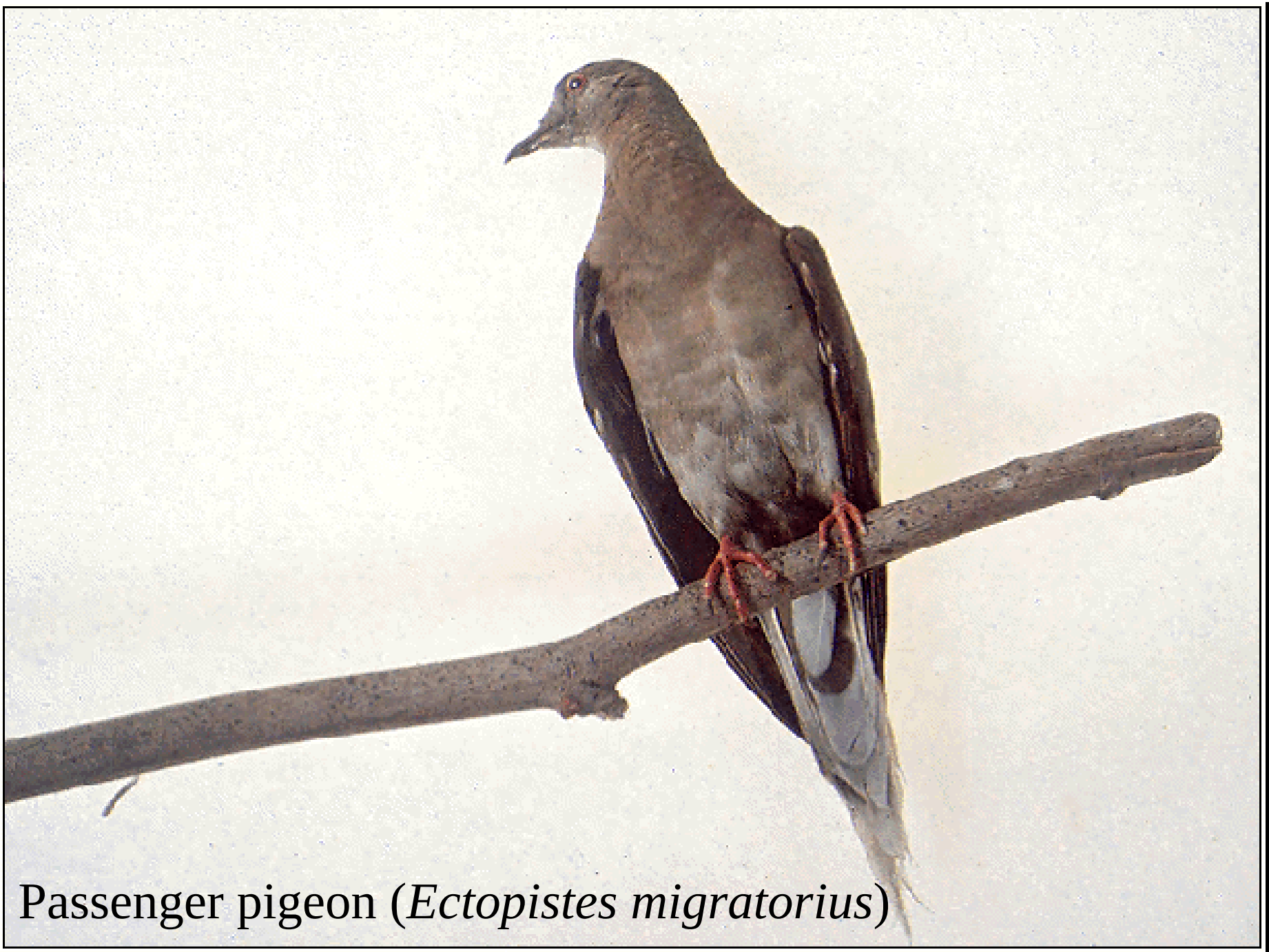
Plant natives
(Active Restoration)

Remove invaders

Restore process
(e.g. fire, flooding)

Cheat grass (*Bromus tectorum*),
Dinosaur National Monument, Utah


CALIFORNIA REPUBLIC



Passenger pigeon (*Ectopistes migratorius*)

HEALTH

Hippocratic –

Equilibrium of the body's four Humors.
Harmony among body, environment and habits.

Biomedical –

Lack of deviation from biochemical norms.
Absence of disease.

Holistic –

Defined positively, relative to the subject's potential to achieve life goals.
Incorporates differences in norms for different cultures, ages, societal roles, etc.


B.A.A. BOSTON MAR.


Roan Mountain, North Carolina –Tennessee border

REHABILITATION (?)

Setting goals, objectives

Developing techniques

Hawaii Volcanoes National Park

lava crosses road and meets the sea

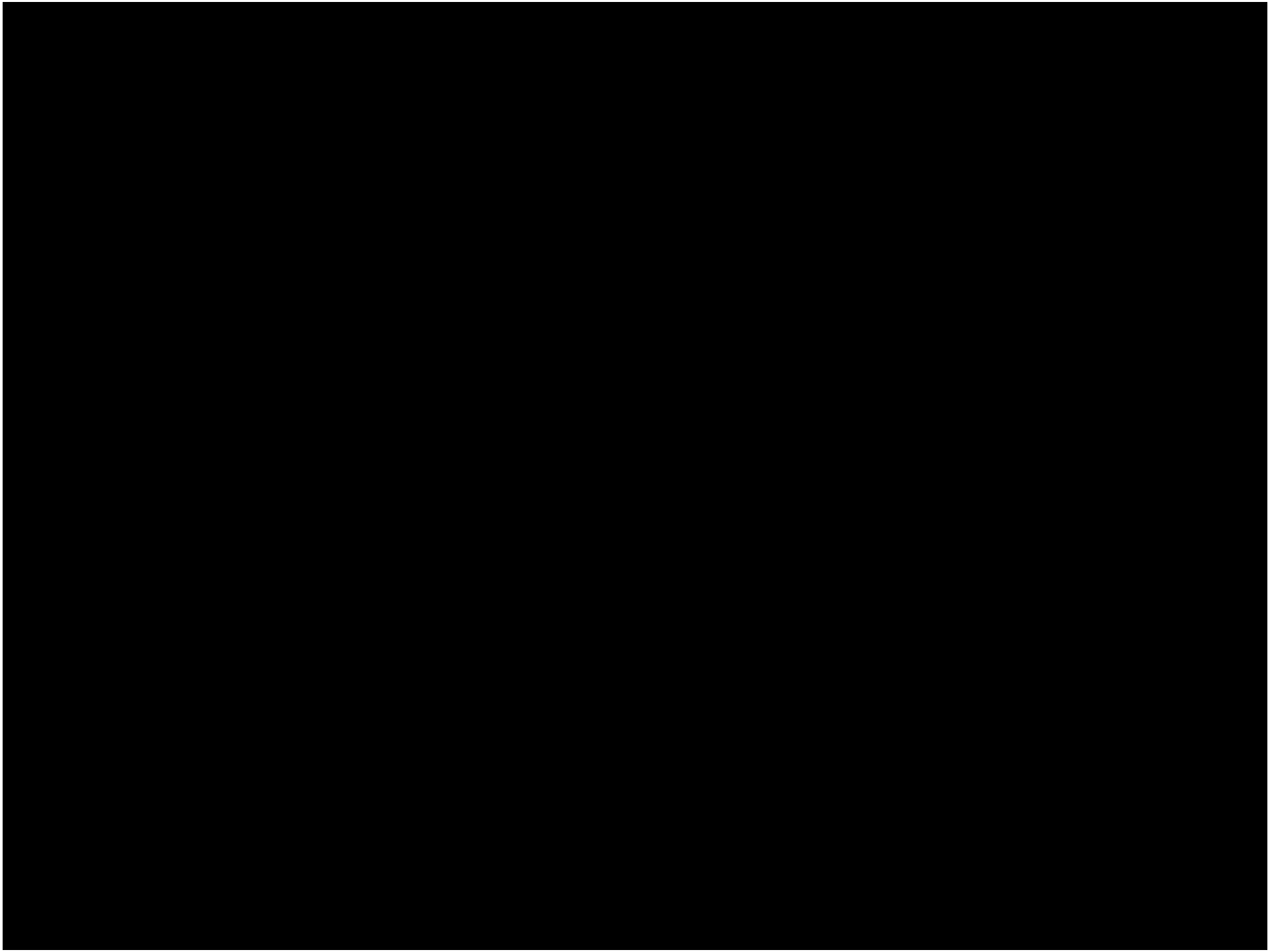
Dry forest invaded by fire-promoting grasses

Myoporum sandwicense; fire tolerant native, seasonally dry forest

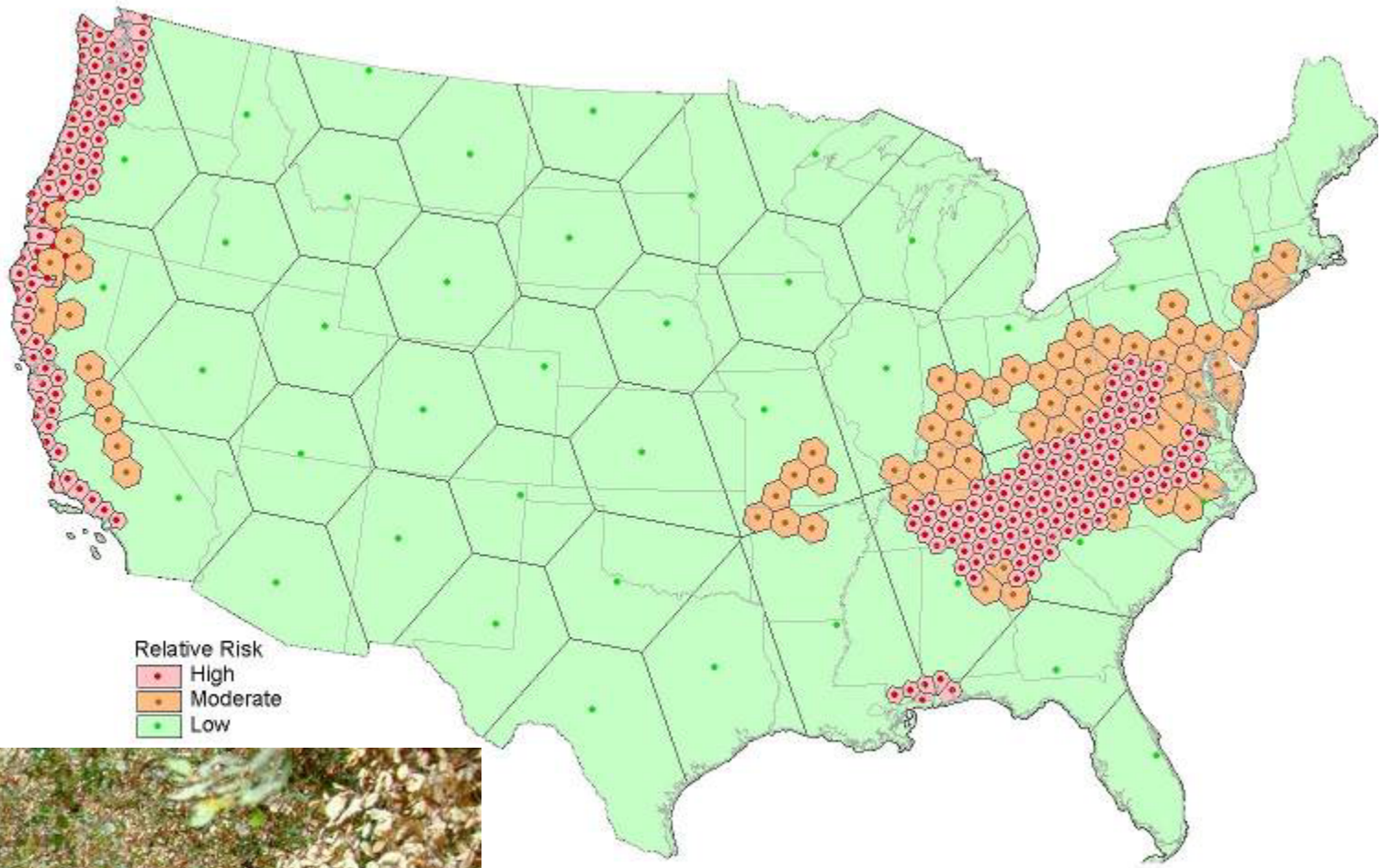
Sesbania tomentosa; fire tolerant native, coastal vegetation


Isla Guadalupe, Mexico

RECOVERY - *Ceanothus arboreus* !



US Forest Service Preliminary Sudden Oak Death Risk Map



Sudden Oak Death – Big Sur, Calif.

Phytophthora ramorum* on *Lithocarpus densiflorus

State Invasive Species Councils

Arizona
Delaware
Hawaii
Idaho
New York
Oregon
Pennsylvania
Washington

and others…..

Invasive Species Assessment Protocol:

Evaluating Non-Native Plants for Their Impact on Biodiversity

NatureServe is currently using the Protocol create a U.S. National List

http://www.natureserve.org/getData/plantData.jsp