Identifying Research Priorities and Implementing Science-Based Management

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October 5-7, 2006
Sonoma CA

Presentation Format

- Example: Defining a Research Framework for Sulfur Cinquefoil
- Overview of Studies and Results
- Closing the Loop---Research, Development and Application
- Moving Towards Using a Science-Based Framework for Prioritizing Invasive Plant Prevention & Management.

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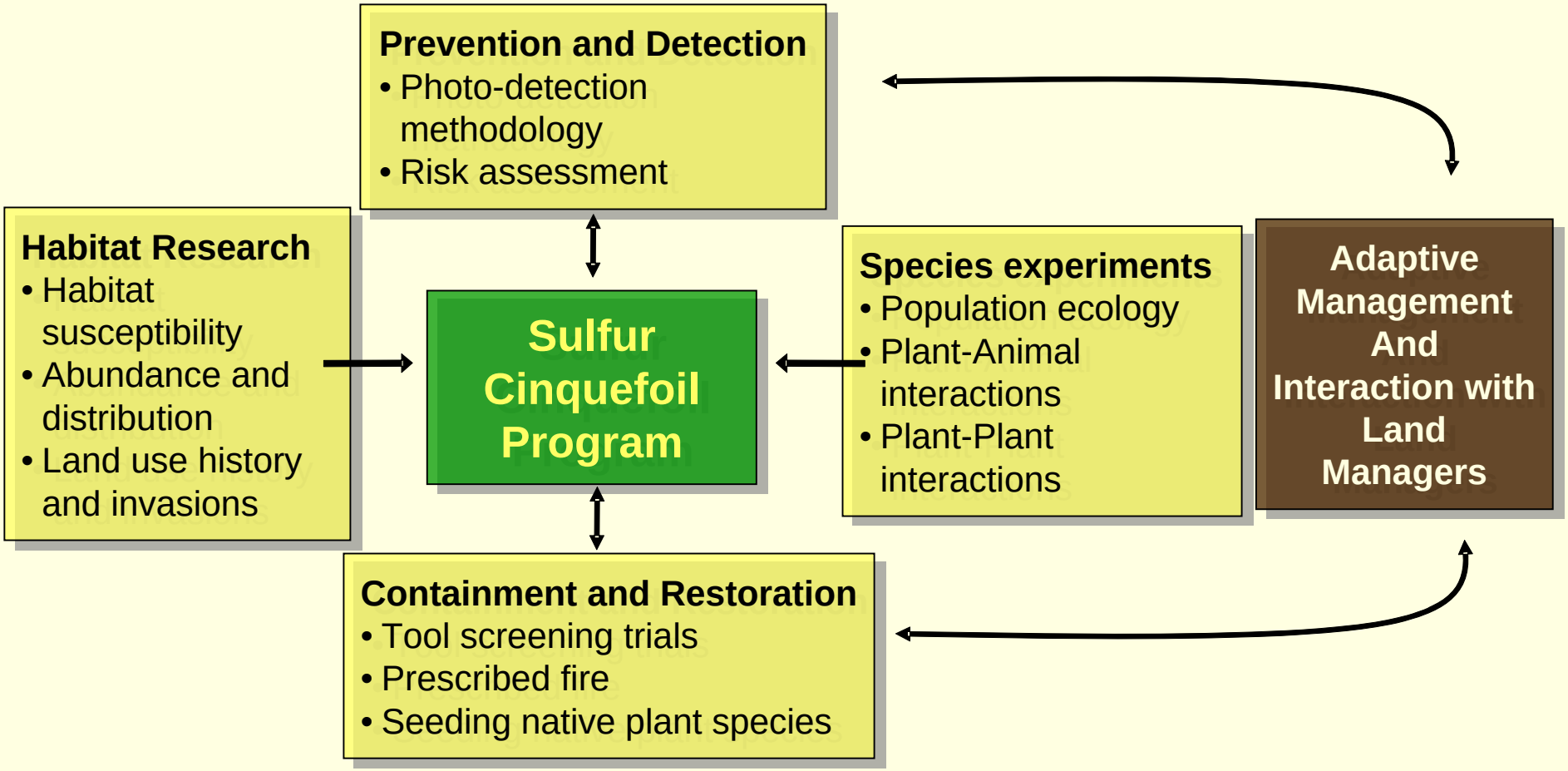
Potentilla recta L.
Sulfur Cinquefoil


Washington
Blue Mountains
Ecoregion
Oregon
Idaho

Wenaha State Wildlife Management Area

- **Winter range habitat for elk, deer, and bighorn sheep**
- **Bunchgrass, ponderosa pine, mixed conifer plant communities**

- **Meadows (old fields) infested with *P. recta, Bromus inermis, Poa bulbusa.***
- **Native species poorly represented and absent in seedbank**


Prevention and Detection
• Photo-detection methodology
• Risk assessment
Habitat Research
• Habitat susceptibility
• Abundance and distribution
• Land use history and invasions
Sulfur Cinquefoil Program
Species experiments
• Population ecology
• Plant-Animal interactions
• Plant-Plant interactions
Adaptive Management And Interaction with Land Managers
Containment and Restoration
• Tool screening trials
• Prescribed fire
• Seeding native plant species

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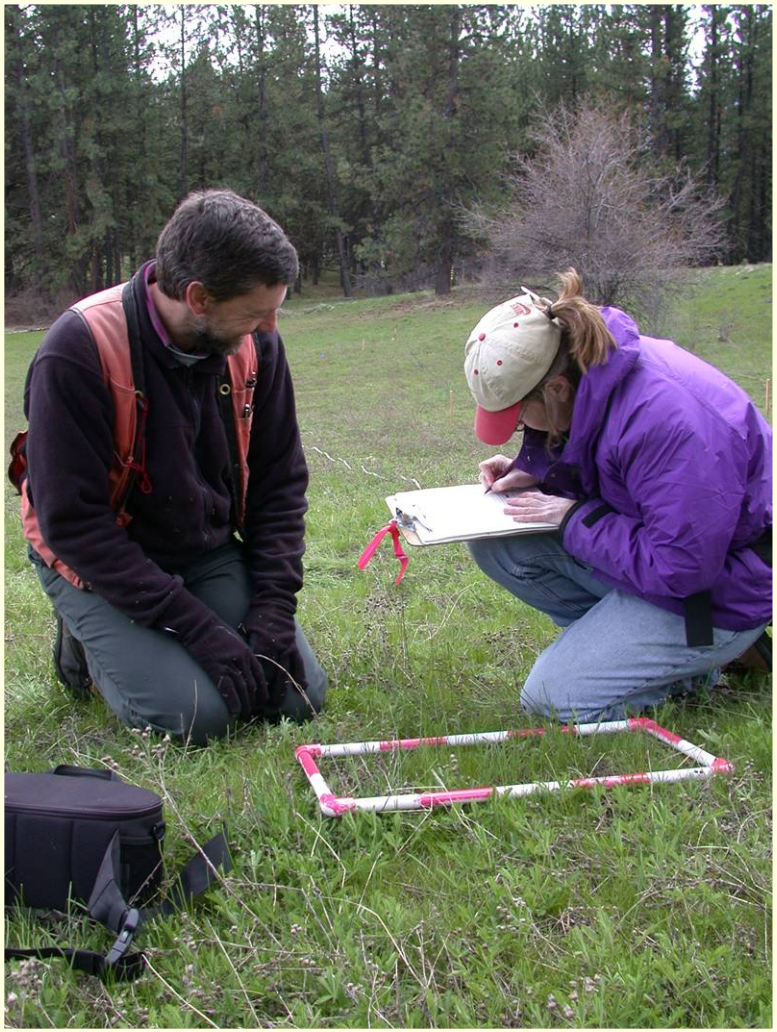
Sulfur Cinquefoil Research Projects



Density

Range and Habitats

Abandoned Ag Field

Bunchgrass

Ponderosa Pine

No Tree Canopy Cover

154 stems/m^2

Canopy Cover

1 stem/m^2

Ecology and Population Dynamics

- Seed dispersal
- Phenology
- Pot and field studies
- Germination and establishment
- Seed production
- Seed rain
- Demography

Seed Dispersal Sticky Trap

Seedlings

Seed Production

Location	# Seeds Per Flower	# Flowers Per Stem	# Stems Per Plant	# Seeds Per Plant
Michigan 1975	62 ± 28	25 ± 11	1 ± 1	*1650*
NE Oregon 2001	107 ± 20	24 ± 16	2 ± 1	*5600*
NE Oregon 2002	95 ± 10	19 ± 6	3 ± 1	*5350*

Pollination

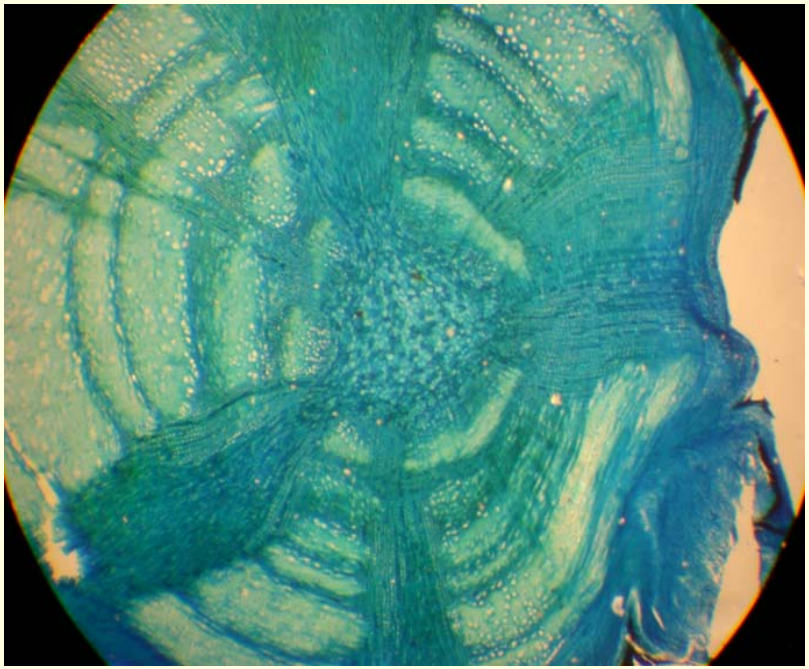
Native Potentilla Flower

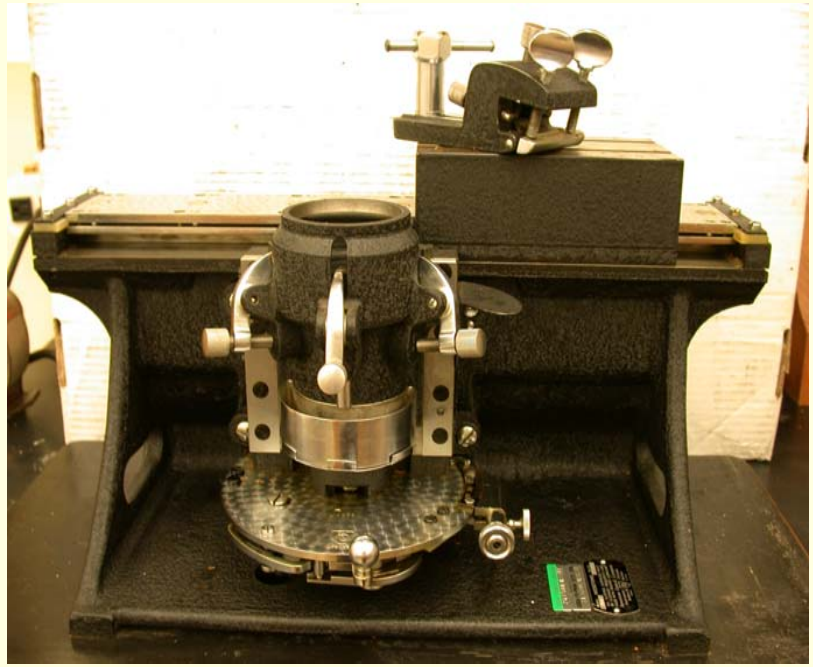
Catching Pollinators in Study Plot

Age Determination

- Characterize age structure within infested sites
- Report age relative to life history characteristics

Aging method development





Effects of Herbicide and Native Plant Seeding

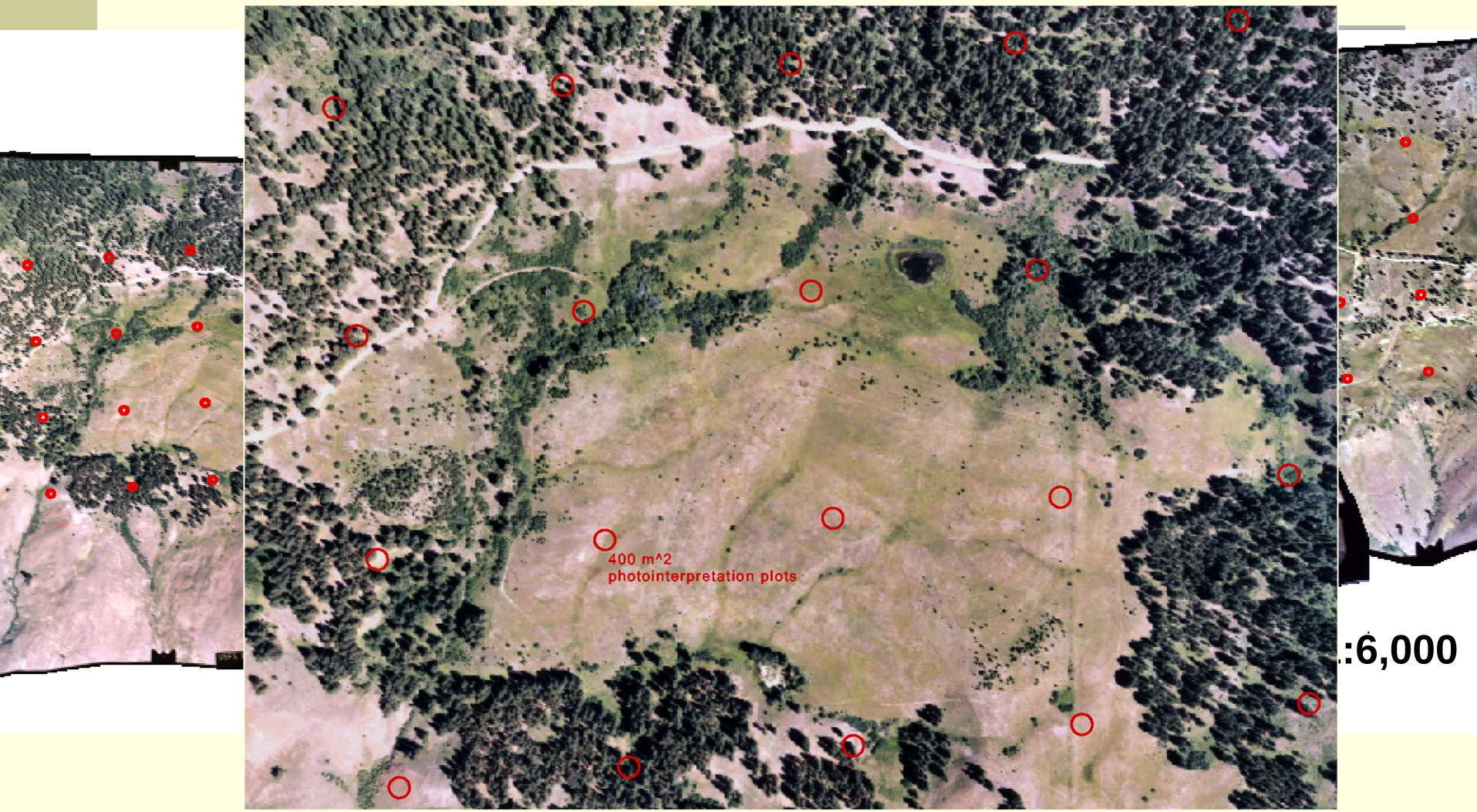
6 herbicides
2 rates
3 application periods
Native seeding or not

Effects of Fire, Herbicide, and Native Plant Seeding

Fall Burn, Troy Oregon

Evaluating Seed Banks of Degraded Meadows

Aerial Photo Detection



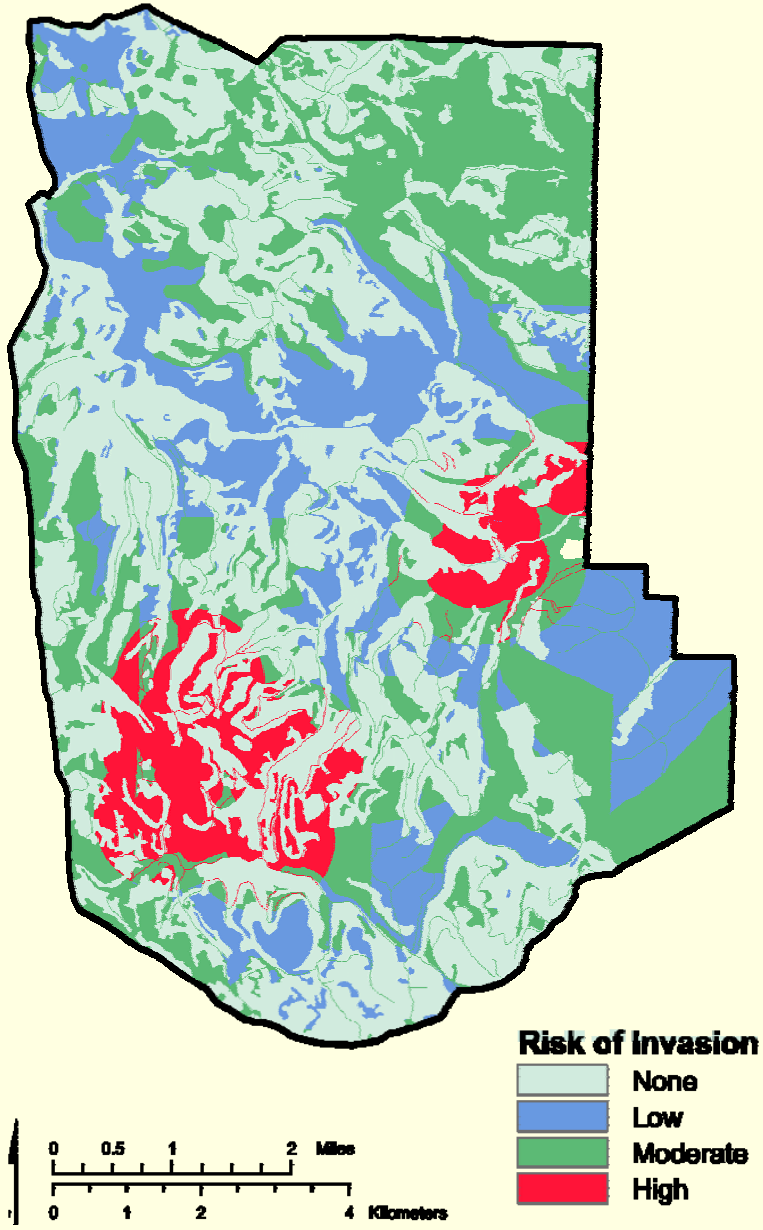
Grazing Study

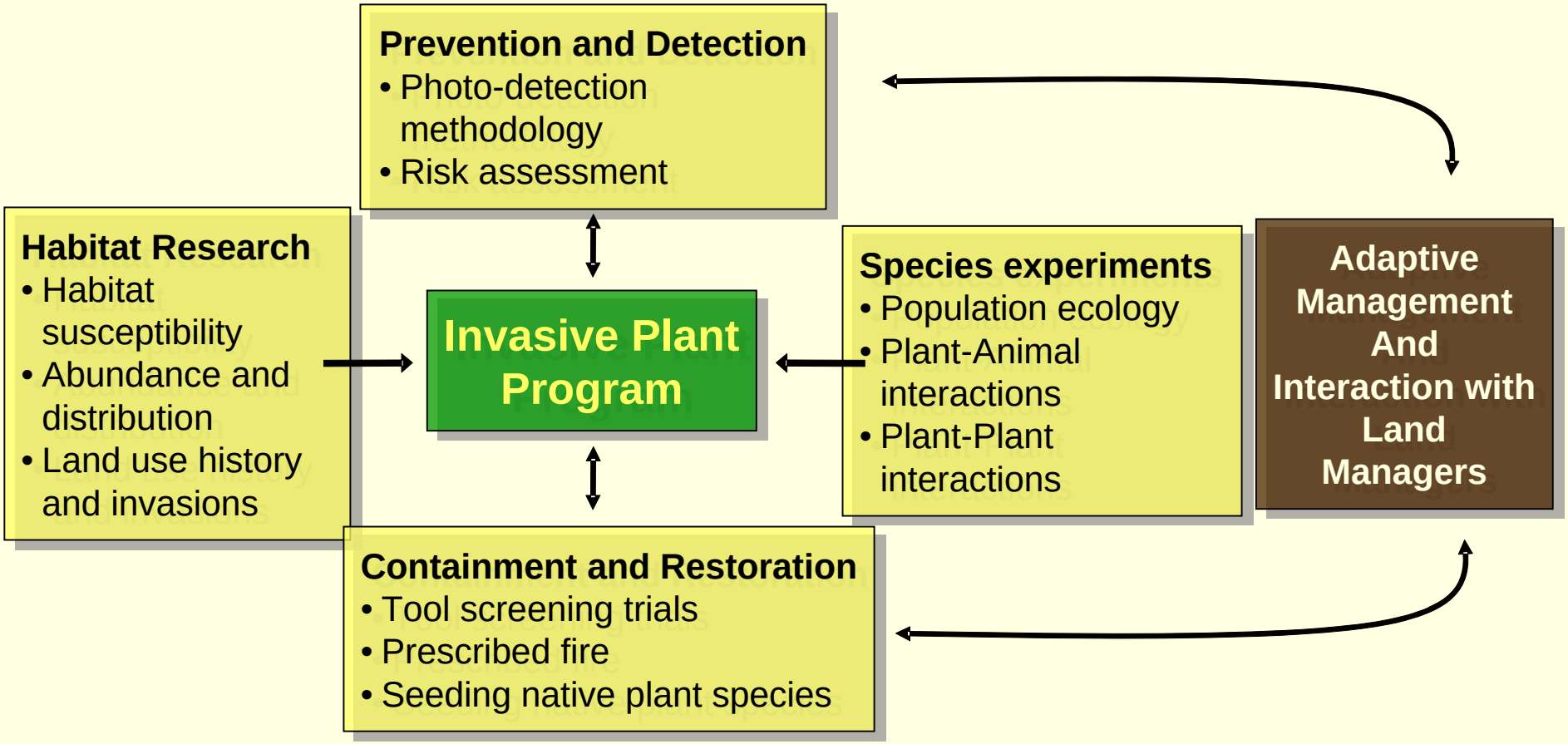
Cattle, elk, and deer all browse Sulfur Cinquefoil!

- *Spring & Summer*- Cattle reduce flower and seed production
- *Fall & Winter*-Elk and deer act as long-distance seed disperers?

Sulfur Cinquefoil--Responses to grazing	**Extant** (available to cattle, deer, & elk)	**Cattle-Excluded** (available to deer & elk)	**Ungrazed** (total exclusion)	Prob > F
Percent (%) of stems grazed	52.5[a]	9.1[b]	0[c]	<0.0001
Number of stems per plot	5.9[a]	12.5[b]	14.0[b]	<0.0001
Height (cm) of stems	16.1[a]	34.0[b]	47.6[c]	<0.0001
Number of seedheads per plot	14.9[a]	133.7[b]	230.1[c]	<0.0001

Risk Model


Risk of Invasion
None
Low
Moderate
High
0 0.5 1 2 Miles
0 1 2 4 Kilometers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Collective Expertise of Ecologists, Economists, & Land Managers

Setting Management Priorities for Research and Management?

- The Role of Scientists
- The Role of Managers
- The Role of Economists

Setting Management Priorities for Research and Management?

- The Role of Scientists

Scientists provide insight into the management priority setting process by providing information on the biology of invasive species, invasibility of habitats, and effectiveness of management tactics.

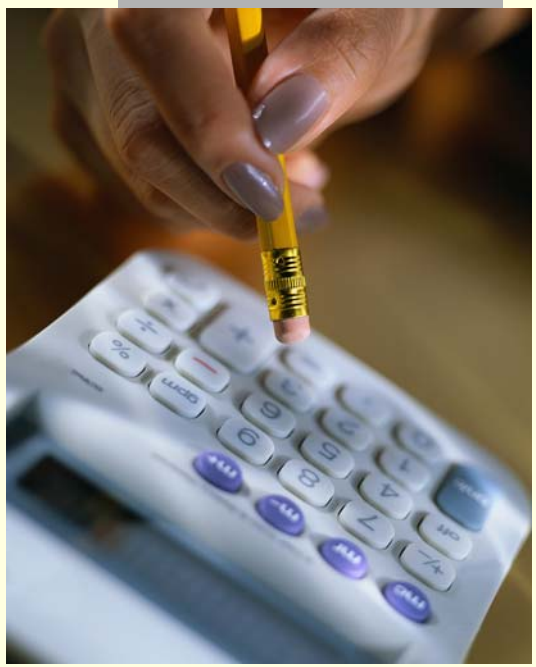
Setting Management Priorities for Research and Management?

- The Role of Managers

Managers help scientists to determine what species to study and how to integrate new information about invasive plant control into day-to-day management operations.

Setting Management Priorities for Research and Management?

- **The Role of Economists**



Economists work with scientists and managers to optimize allocation of resources used for invasive plant management

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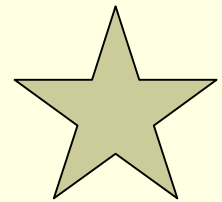
Implementing Science-Based Management – Fundamentals



Designing and conducting experiments in collaboration with local land managers will result in increased applicability of the research. From the onset Managers help set priorities for research and define needed products.

Scientists provide insight into the management priority setting process by providing information on the biology of invasive species, invasibility of habitats, and effectiveness of management tactics.

Experiments, risk assessments, and projections of species and spread across susceptible landscapes after introduction help managers evaluate the economic and ecological consequences of management activities, including doing nothing.

Cooperators on Sulfur Cinquefoil Research

Oregon State University

University of Montana

USFS Rocky Mountain Research Station

USFS Region 6

Bureau of Land Management

Wallowa Resources

Wallowa County and Tri-county Weed Management Areas

Oregon Dept. of Fish and Wildlife

Oregon Dept. of Forestry

Many private land owners

Umatilla National Forest

Wallowa-Whitman National Forest

The Nature Conservancy

Starkey Experimental Forest and Range

City of La Grande, Oregon

Benson Native Seed

McClain Spraying

USFS National Fire Plan

USFS Pesticide Impact Assessment Program

Center for Invasive Plant Management

Questions?