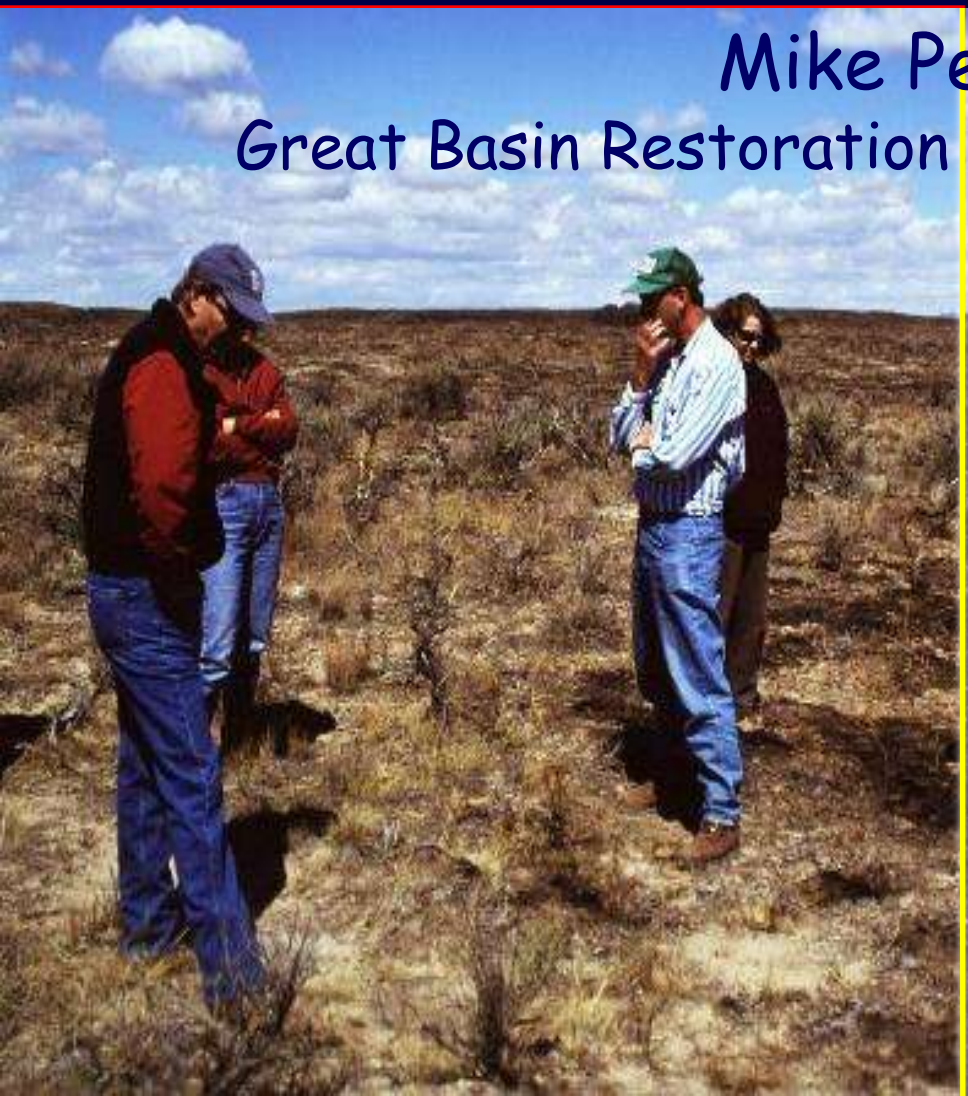
Assessing the Need for Rehabilitation or Restoration and Monitoring Effectiveness: Describing Triage and Where and Where Not to Seed

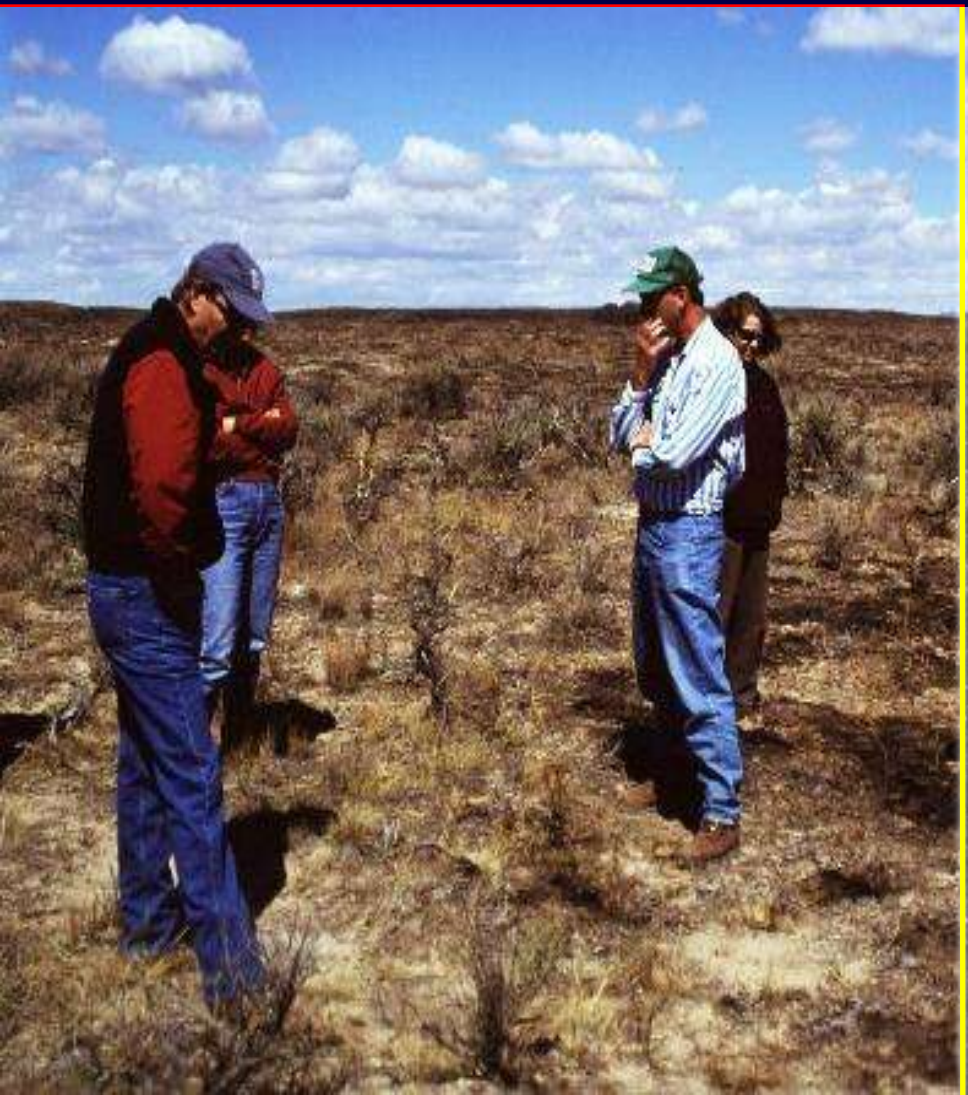
Mike Pellant
Great Basin Restoration Initiative Coordinator



GREAT BASIN
Restoration Initiative

"To Seed or Not to Seed, That Is the Question?"

If You Seed, What Species Will be Applied?



Topics

- State & Transition Model
- Tools to Aid in Seed/No Seed Decision
- Summary

Seed or Not Seed Decision

- Meet Land Use Goals
- Federal Agency Policy & Funding
- Ecological & Social Implications

Seed or Not Seed Decision

Ecological & Social Implications

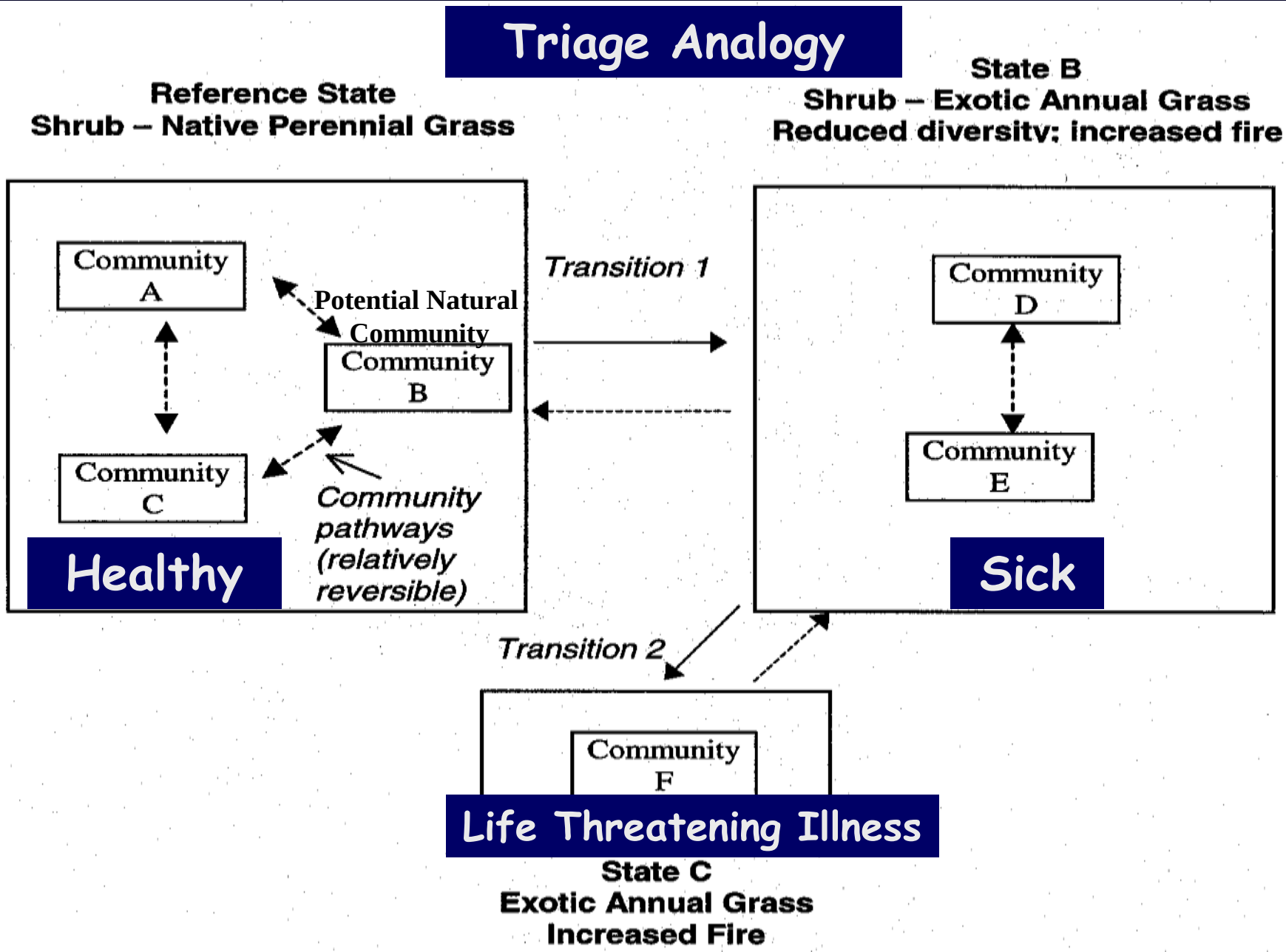
GOOD DECISION
Apply seed where appropriate
Don't seed and natural recovery occurs

Seed or Not Seed Decision

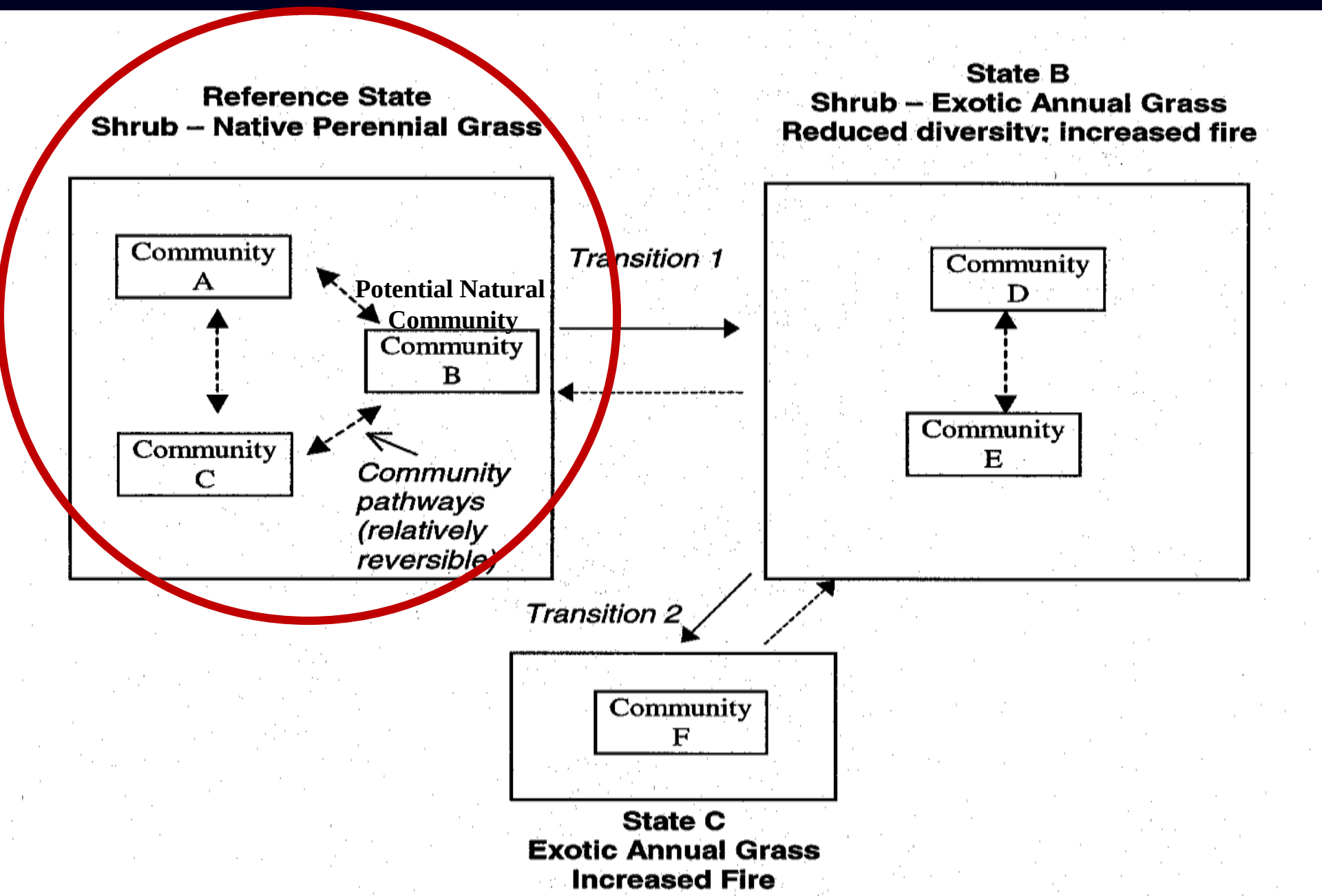
Ecological & Social Implications

GOOD DECISION	BAD DECISION
Apply seed where appropriate	Don't seed and invasives take over
Don't seed and natural recovery occurs	Apply seed (introduced species) where natural recovery would occur

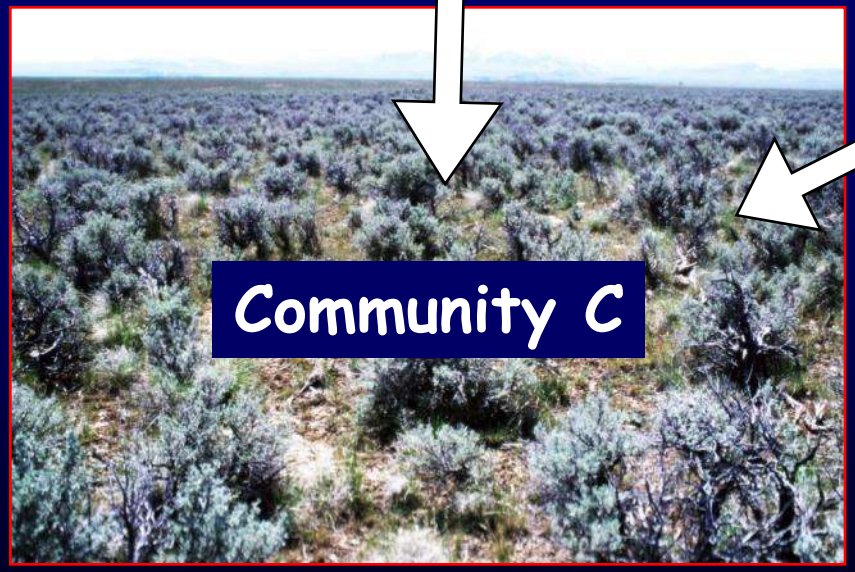
Shrub Steppe State and Transition Model



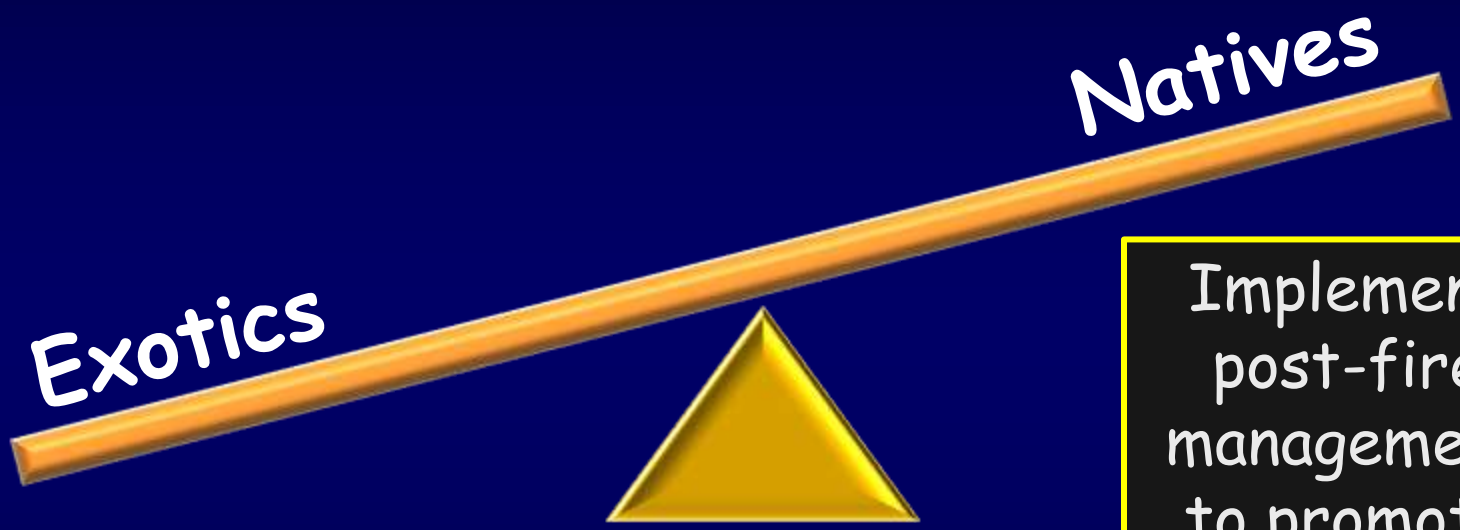
Shrub Steppe State and Transition Model



Reference State
Shrub Steppe

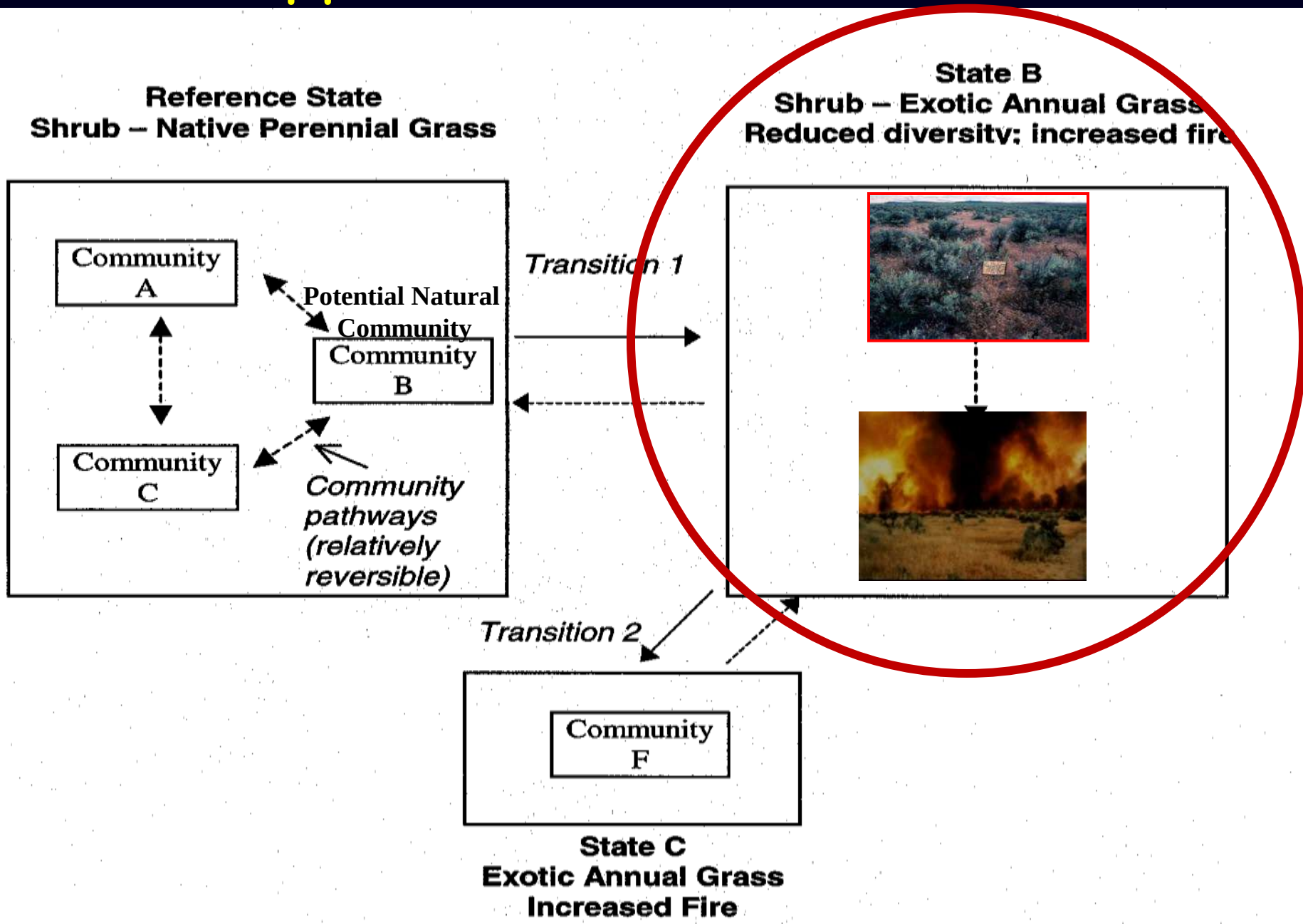


Decision Model—Seed or Not Seed

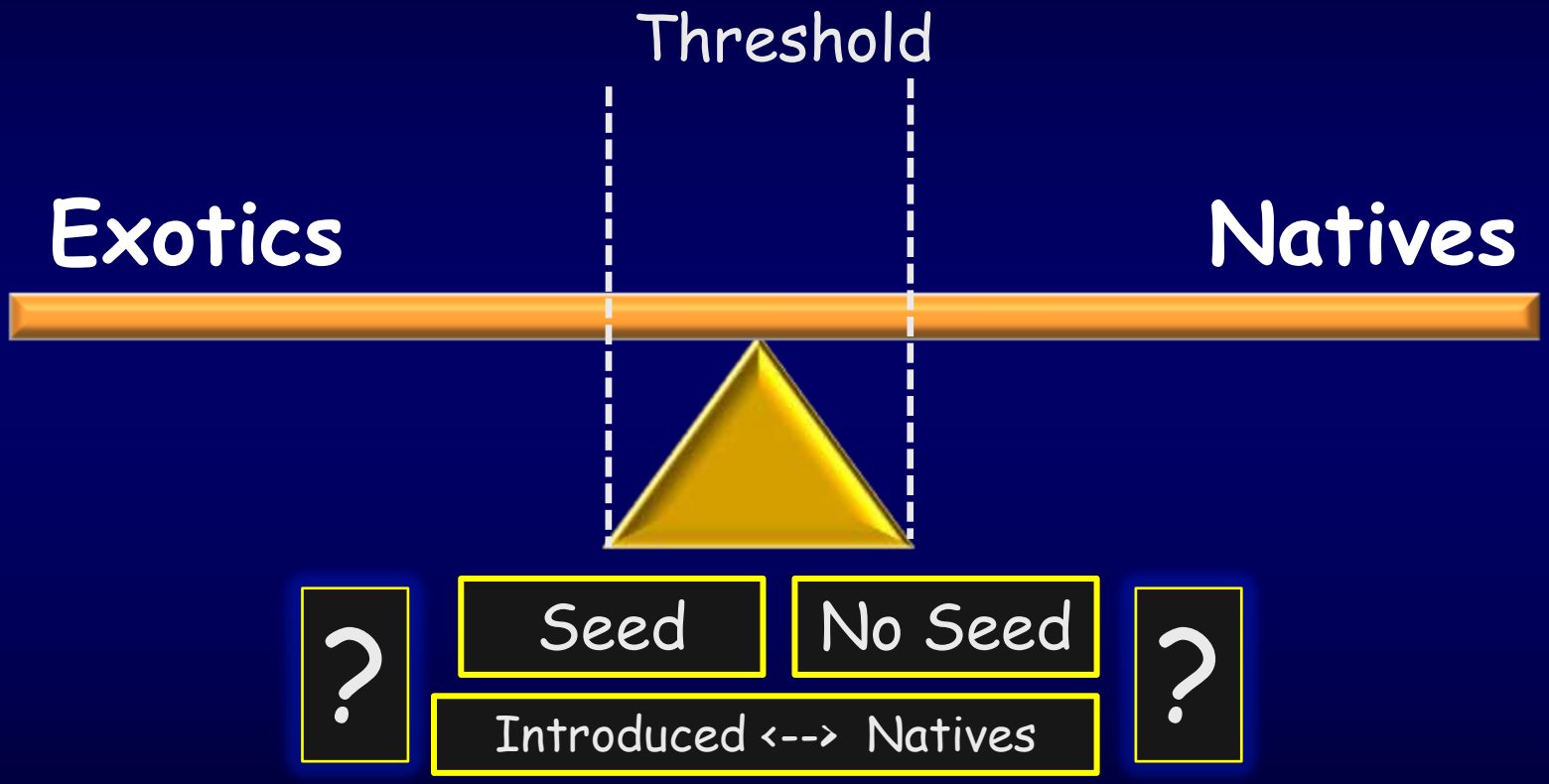


Implement post-fire management to promote native plant recovery

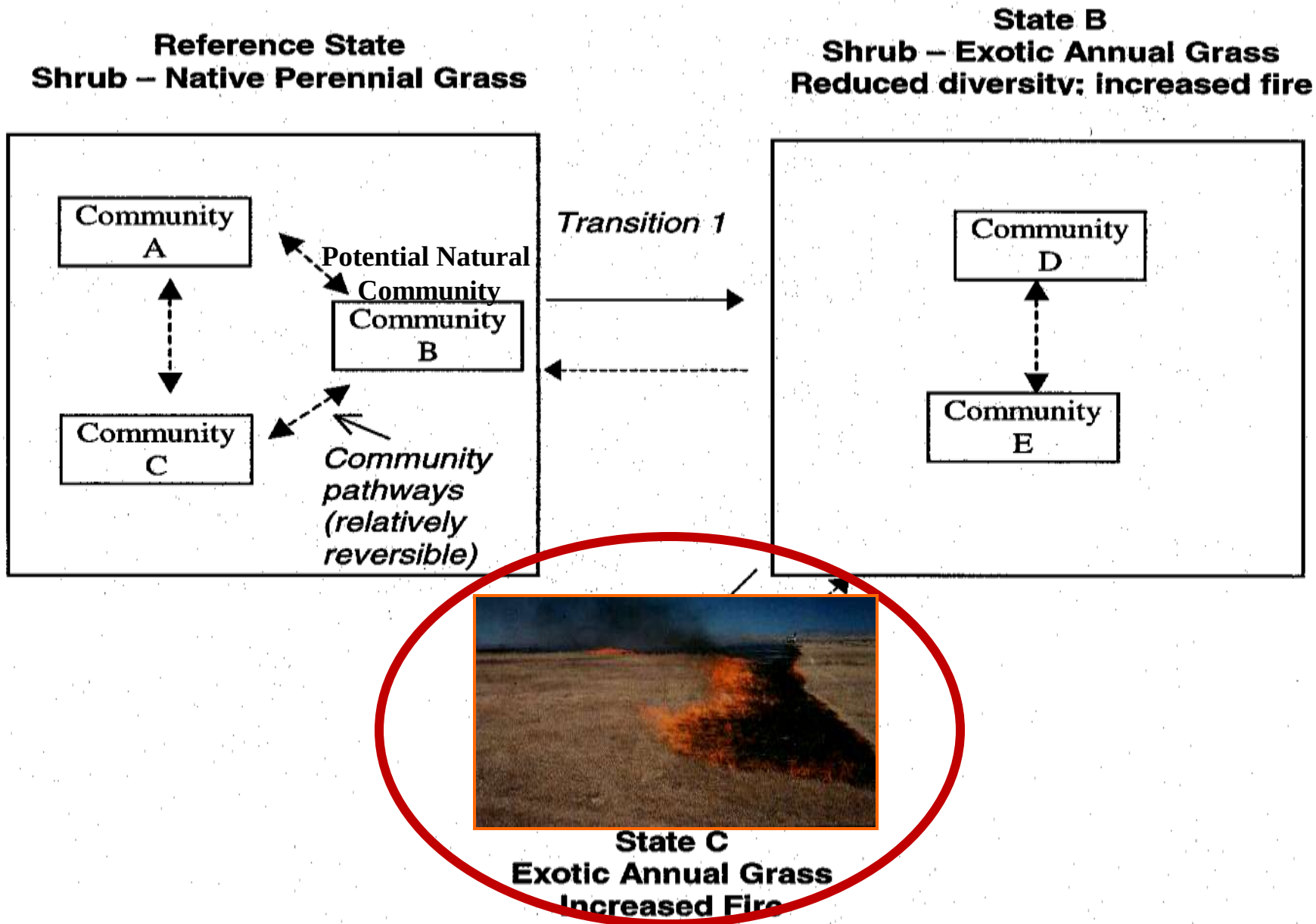
Shrub Steppe State and Transition Model



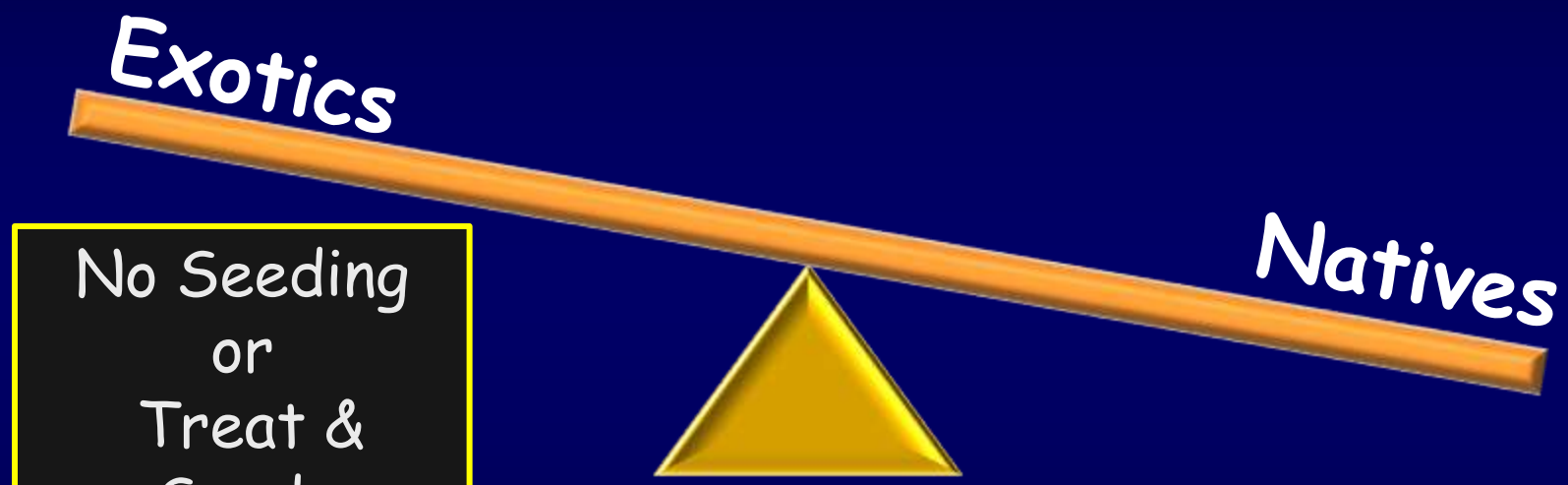
Decision Model—Seed or Not Seed



Shrub Steppe State and Transition Model



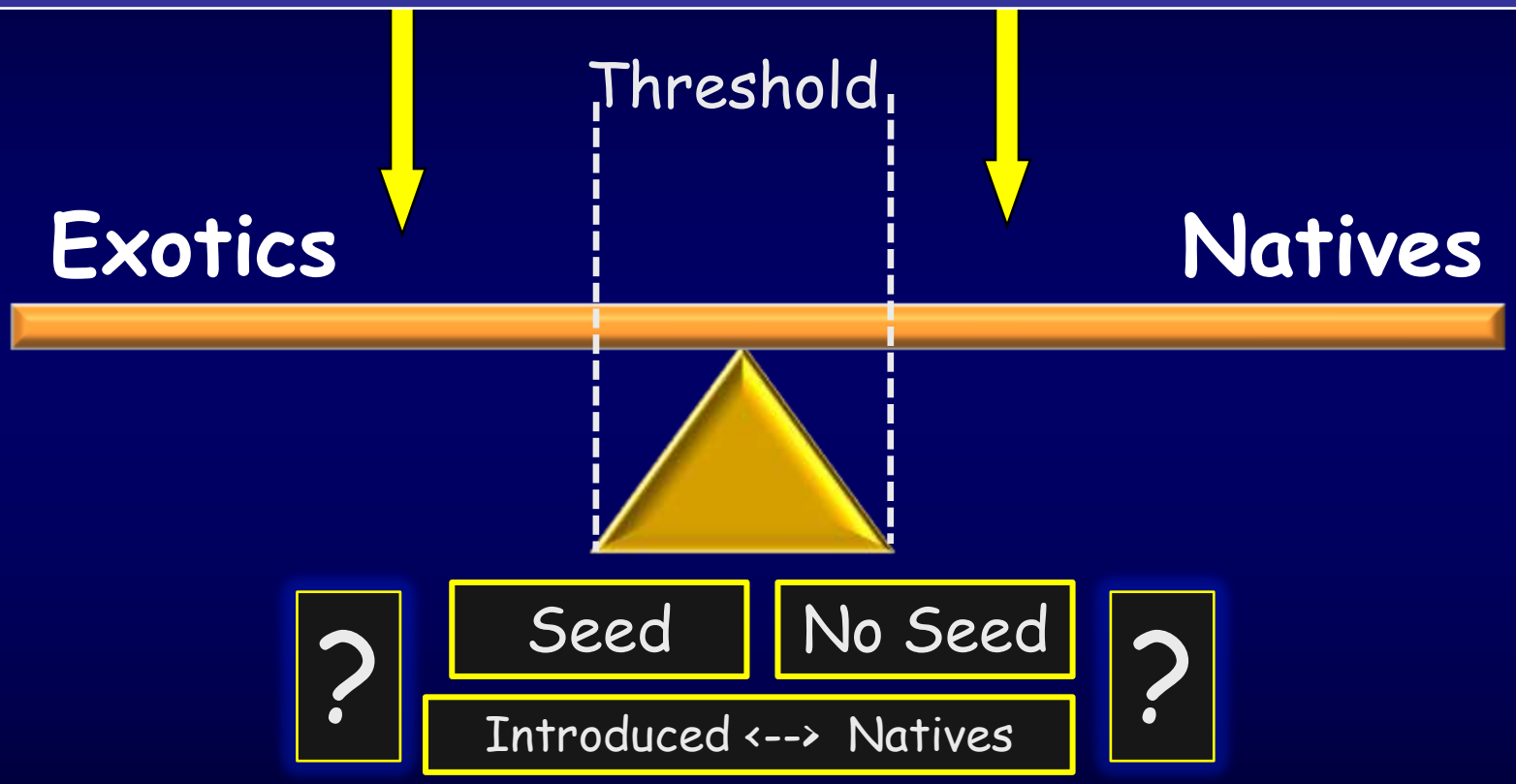
Decision Model—Seed or Not Seed



No Seeding
or
Treat &
Seed-
Strategically

Decision Model—Seed or Not Seed

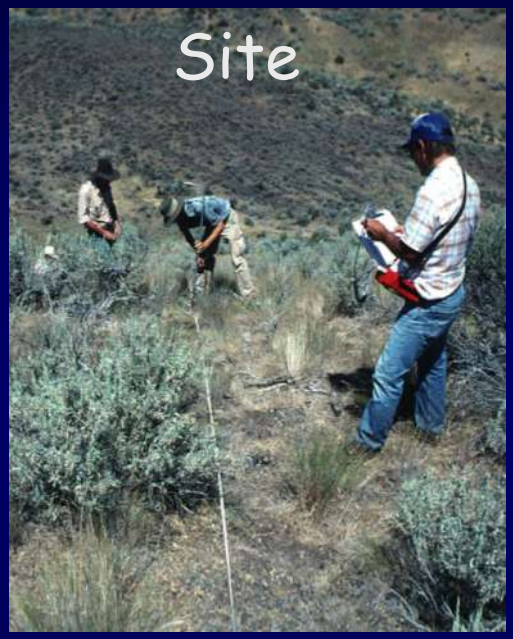
Decision depends on (in part):
Ecological Site—Climate—Fire Effects--Post-treatment Mgt.

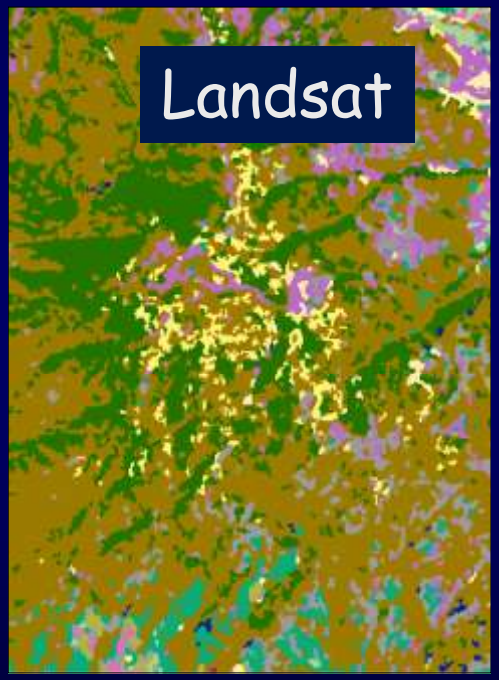


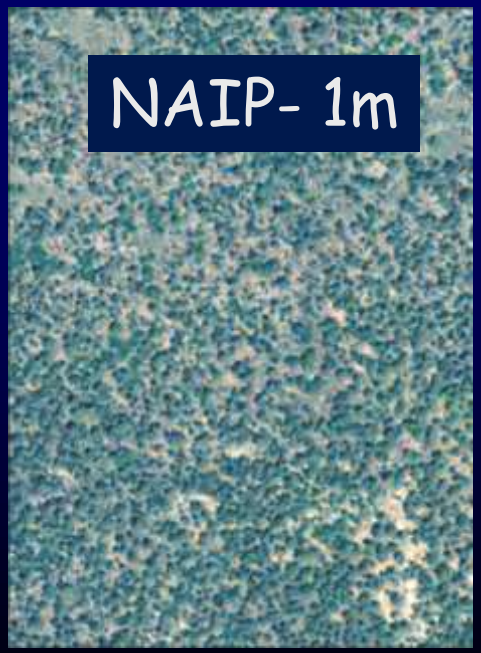
Tools to Assist in the Seed or Not Seed Decision

- Pre-fire vegetation information
- Burn severity
- Effectiveness monitoring on seeded and unseeded areas
- Experience

Decision Tool- Pre-fire vegetation information



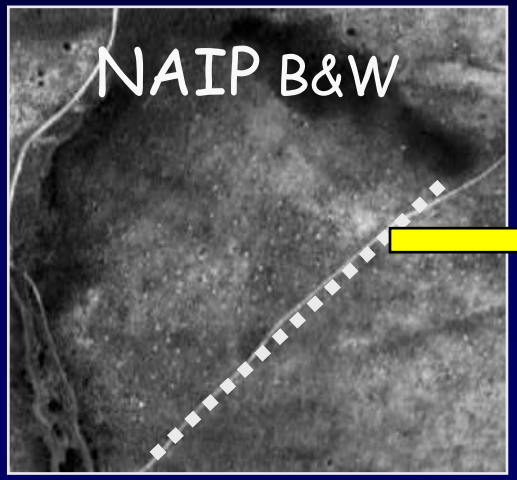


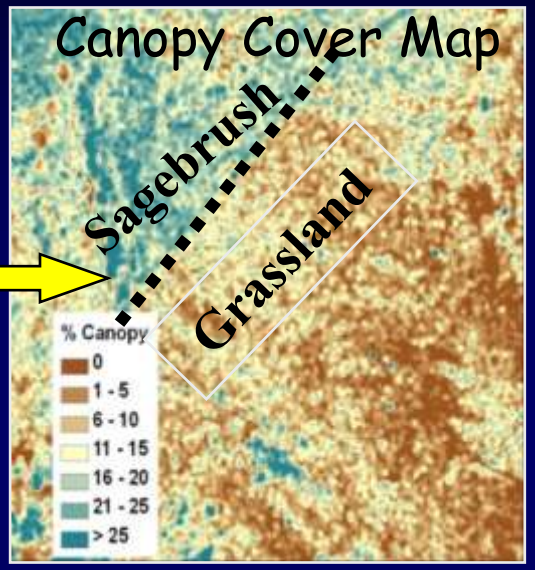


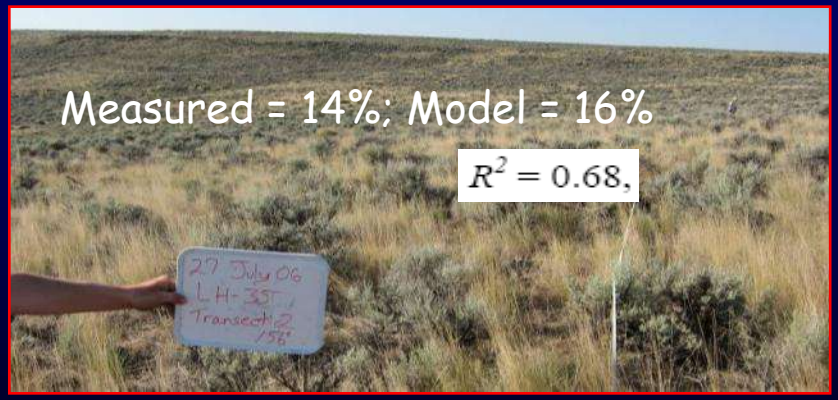
Decision Tool- Pre-fire vegetation information

Big Sagebrush Canopy Cover Mapping

Pacific NW Regional Collaboratory

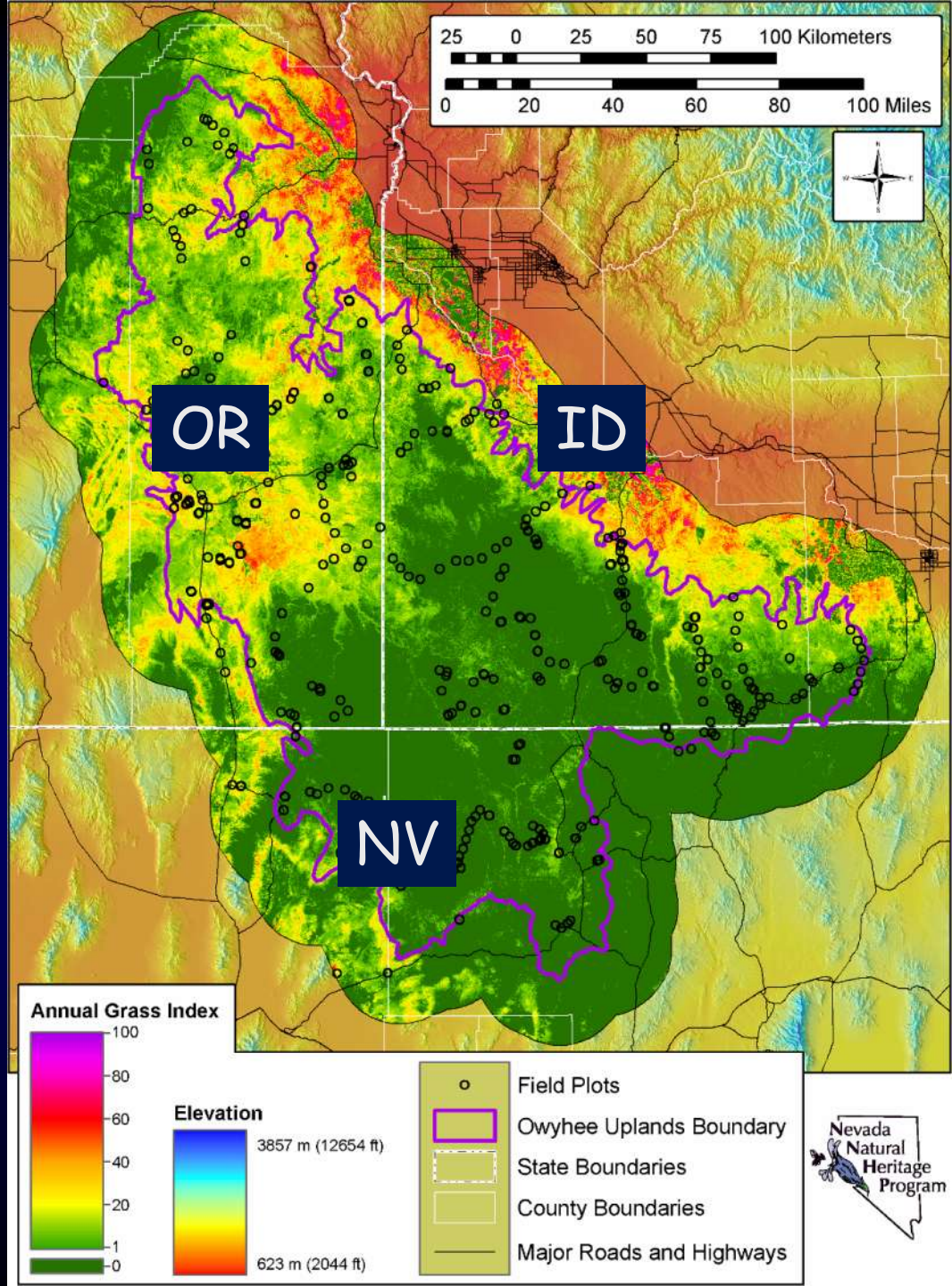






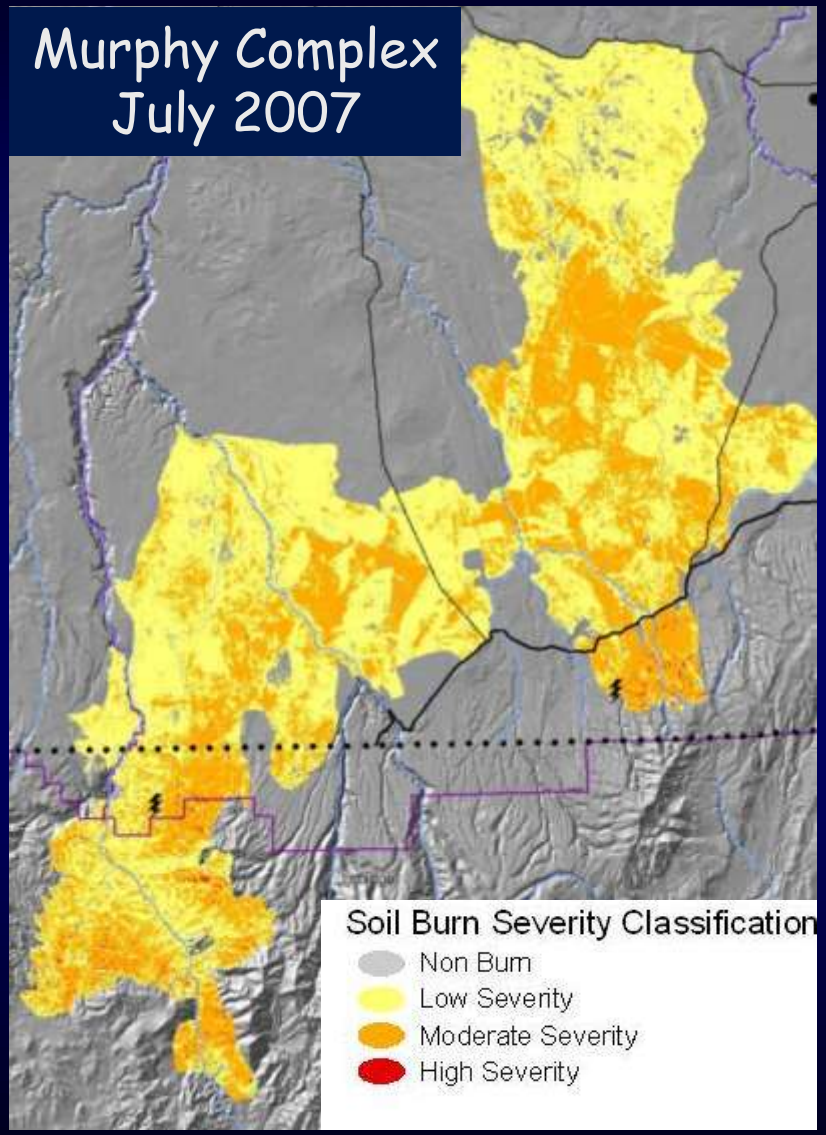
Cheatgrass Distribution Map for the Owyhee Uplands

Current range of cover of cheatgrass-- Nevada Natural Heritage Program



Decision Tool- Burn Severity

- Measure of fuel consumed
- Useful in mapping where fire was hot enough to kill cheatgrass seeds
- Not a good tool to determine native plant survival



Decision Tool- Burn Severity

- Potential for desired plants to survive a fire (direct effect) varies by species, pre-fire vigor, nearby fuel loads, and herbivory.

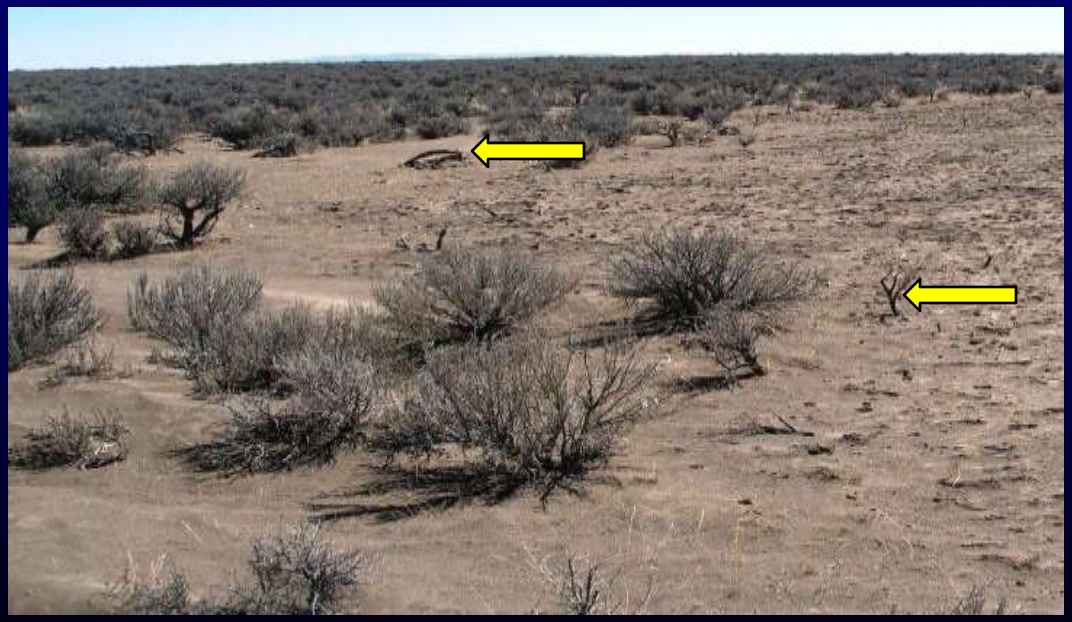
Decision Tool- Burn Severity

- Plant survival may change after the burn severity evaluation…Erosion (secondary effect).

Temporal Changes in Post-Fire Erosion

Murphy Complex Wildfire (7/15)

8/16/08



8/27/08

Decision Tool- Burn Severity

Seeding success related, in part, to cheatgrass seedbank after the fire

Seed Introduced Species →

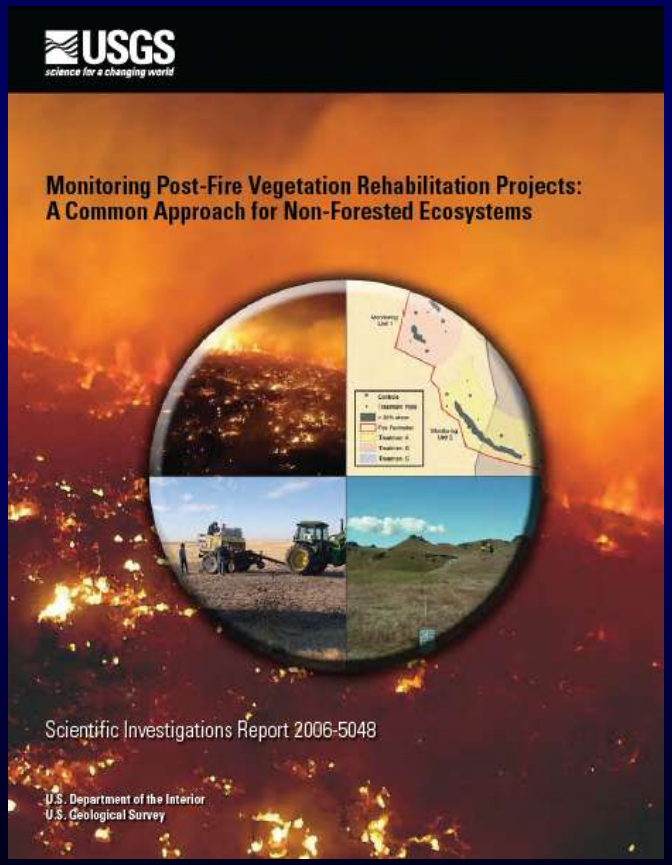
Seed Natives →

Decision Tools- Effectiveness Monitoring

- Standardized protocol and database
- Need seeding treatment and control comparisons

Decision Tools- Effectiveness Monitoring

http://fresc.usgs.gov/research/esrmonitoring/



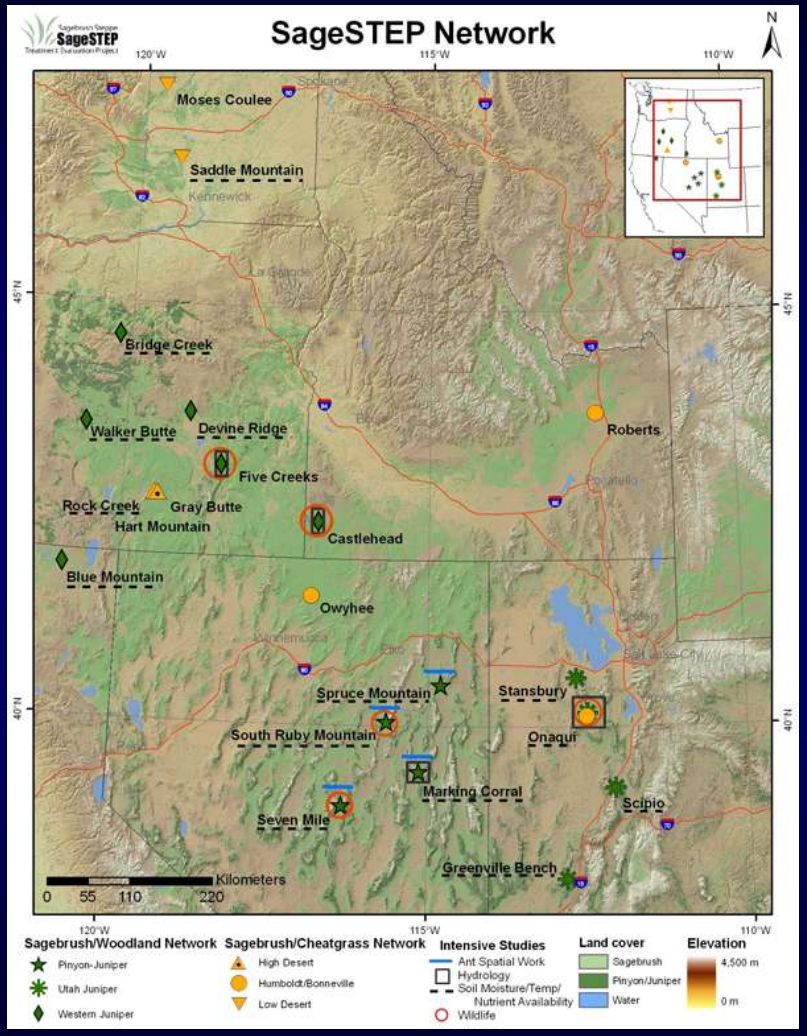
Decision Tools- Effectiveness Monitoring

Joint Fire Science Program

Sagebrush Steppe
SageSTEP
Treatment Evaluation Project

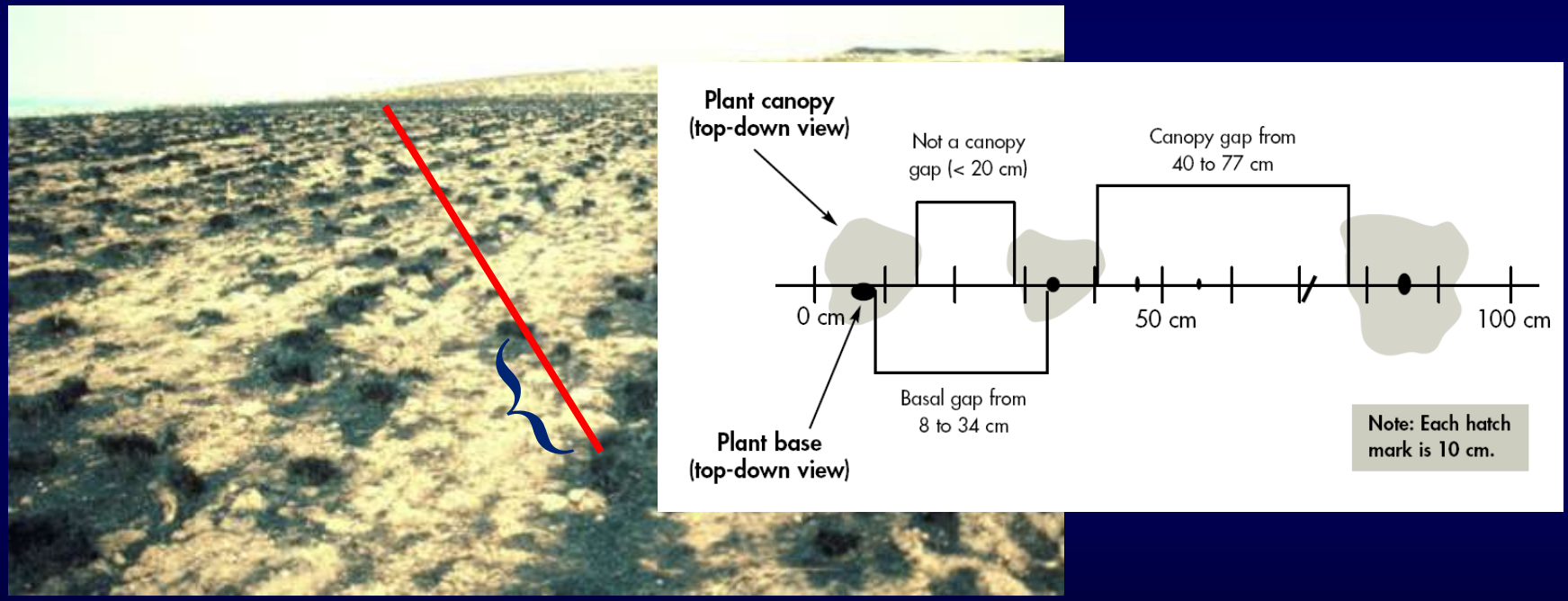
SageSTEP Research Team

http://www.sagestep.org



SageSTEP-Cheatgrass Network

Canopy and/or Basal Gap Intercept



http://usda-ars.nmsu.edu/JER/Monit_Assess/monitoring.php

Decision Tools-Effectiveness Monitoring Seed or Natural Recovery?

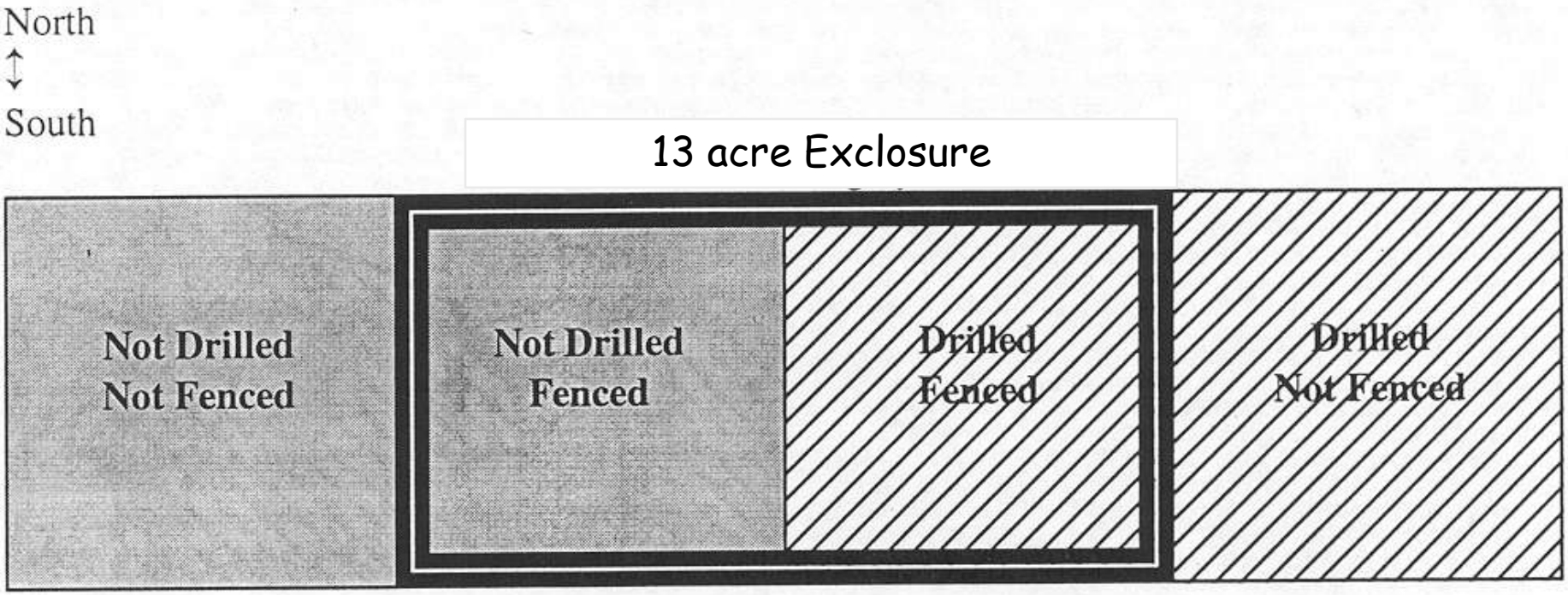
Pre-fire study on Loamy 8-10" PZ (Wyo. Big sagebrush/Thurbers needlegrass) ecological site

Seed Mixture

Species	Application	Seeding Rate (#'s/ac)
Crested Wheatgrass	Drill	4.5
Russian Wildrye	Drill	1.5
Fourwing Saltbush	Drill	1.0
WY Big Sagebrush	Aerial	2.0
Alfalfa	Aerial	3.0
Yellow Sweetclover	Aerial	0.5
	Total	12.5

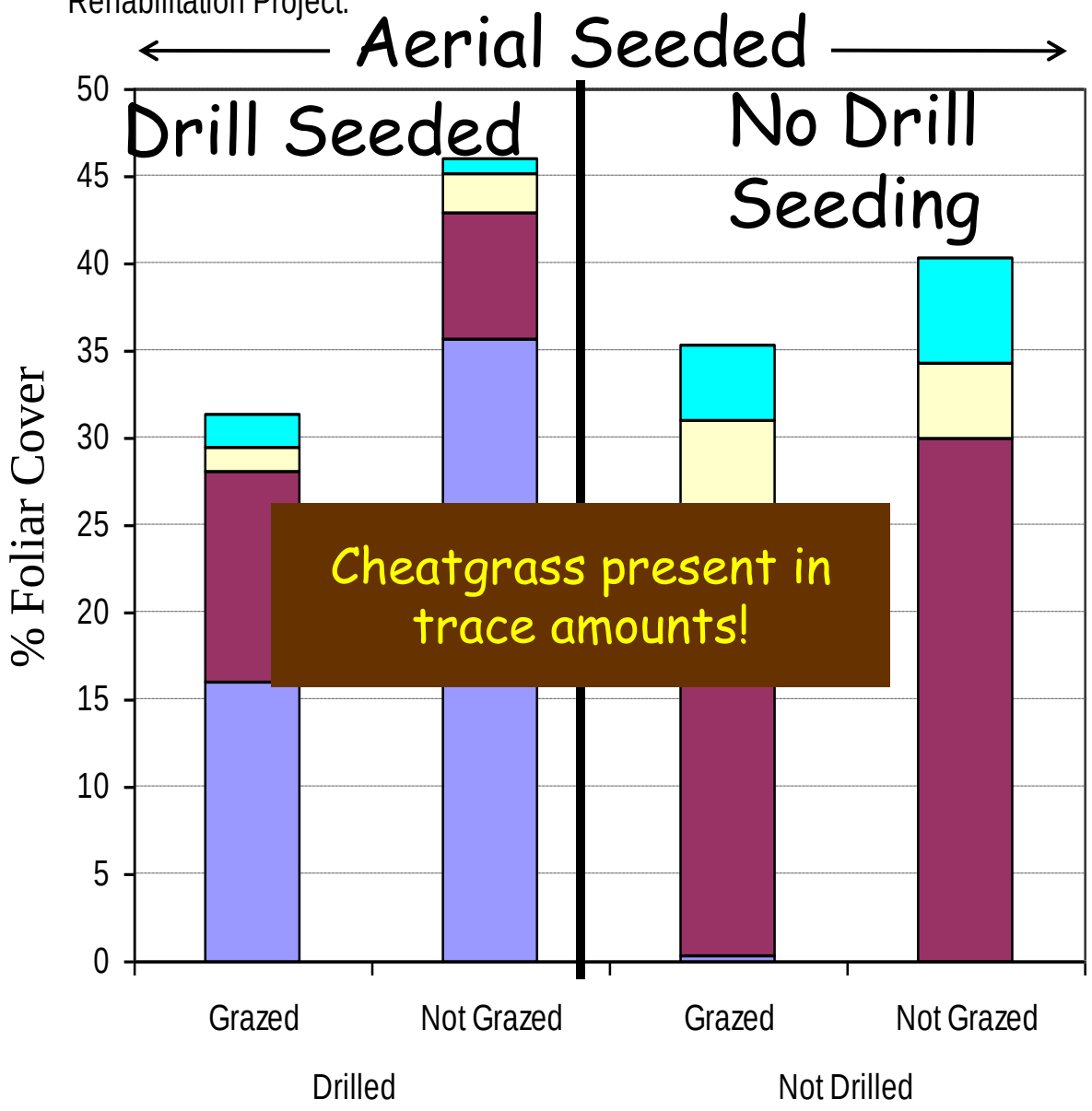
83 seeds/ ft^2

Study Design for Evaluating Grazing-Seeding Treatments



This study design allows evaluating drill seeding and no drill seeding (semi-natural recovery) and long-term effects of livestock grazing on seeded and control plots

Figure 2. Cover of residual native plants, seeded grasses, and seeded sagebrush in the Green STP-2 Rehabilitation Project.



Data from Summer 1998 (four growing seasons)

- Sagebrush
- Native forbs
- Native grasses
- Seeded grasses

Livestock grazing resumed in Spring of 1998

June 2000

Aerial Seeded Only- Grazed

Six growing seasons after seeding and at end of third year of livstock use

Drill & Aerial Seeded-Grazed

Decision Tools-Effectiveness Monitoring More Than Just Vegetation Data

Observe and document!

Decision Tools- Experience

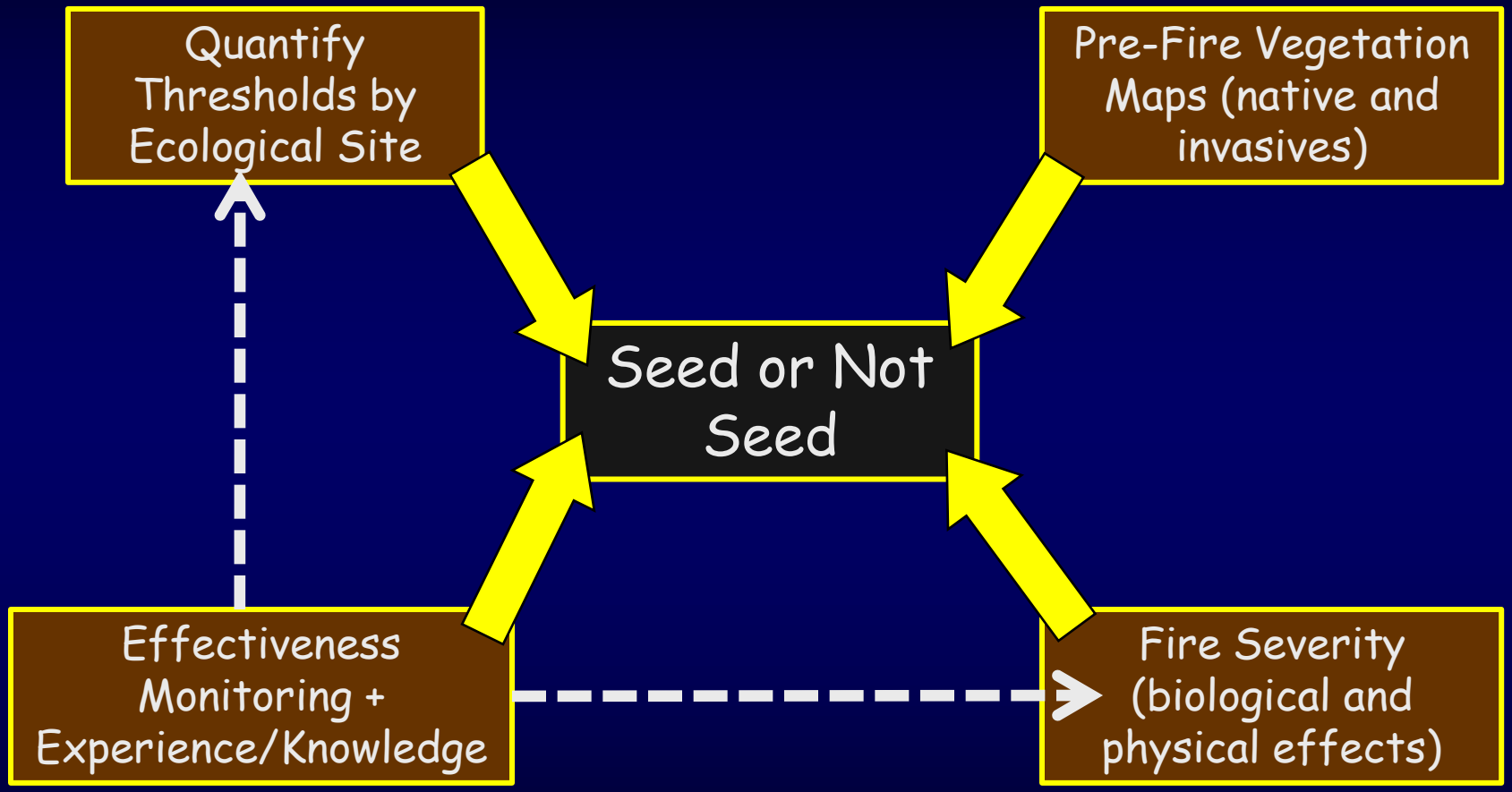
UNIVERSITY OF IDAHO
AGRICULTURAL EXPERIMENT STATION
Department of Agronomy

Grasses and Cultural Methods for Reseeding Adandoned Farm Lands in Southern Idaho

R. H. STARK, J. L. TOEVS, AND A. L. HAFENRICHTER

March 1946

Summary


Quantify Thresholds by Ecological Site
Pre-Fire Vegetation Maps (native and invasives)
Seed or Not Seed
Effectiveness Monitoring + Experience/Knowledge
Fire Severity (biological and physical effects)

"We are surrounded by insurmountable opportunities" Pogo