Invasive Plant Management in the West – A Scientific Assessment

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We asked:

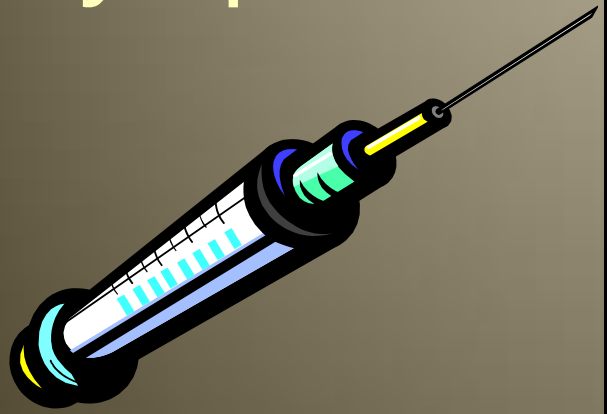
Is the science available to achieve our conservation goals during invasive plant management?

Conservation goals

- Protect non-infested rangeland
- Enhance quality and quantity of goods
- Control undesirable vegetation
- Create desired plant communities
- Repair the underlying cause of invasion
- Restore vegetation to protect soils
- Protect and enhance wildlife
- Protect life and property from wildfires
- Minimize negative impacts

Stop treating

Symptoms



What are we going to do about this?

What is Ecologically Based Invasive Plant Management?

Plant communities are always changing

What caused this?

What can we do to cause this?

Prioritizing Management

No/Light Infestation	Moderate Infestation with Some Desired Plants	High Infestation without Desired Species
Management Focus		
Prevention/Protection	Control infestation & increase desired species	Revegetation/Restoration
Develop prevention plan & gain adoption with adjacent land owners	Detailed mapping combined with environmental data & local knowledge	Highly accurate mapping with max environmental data & local knowledge
Prioritize prevention program. Implement the program	Develop control methods to favor desired species using EBIPM	Contain large infestations
Assess and improve	Design Adaptive Management program and implement	Develop an Augmentative Restoration plan
	Assess and improve	Implement restoration plan & establish adaptive management program
		Assess and improve

SUCCESS

SUCCESS

Highest — Priority Level & Likelihood of Success — Lowest

Management Focus – Prevention

No/Light Infestation

Management Focus

Prevention/Protection

Develop prevention plan & gain adoption for adjacent land owners

Prioritize prevention program. Implement the program

Assess and improve

Prevention Plan

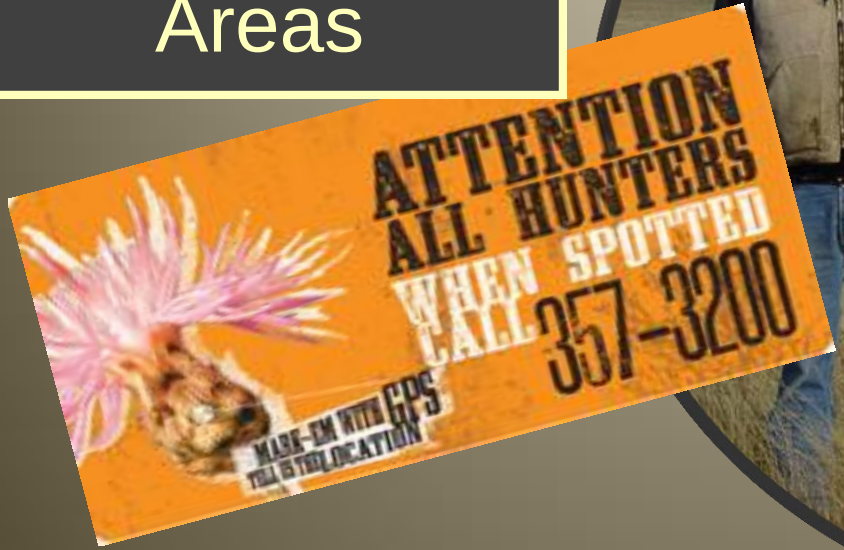
Education

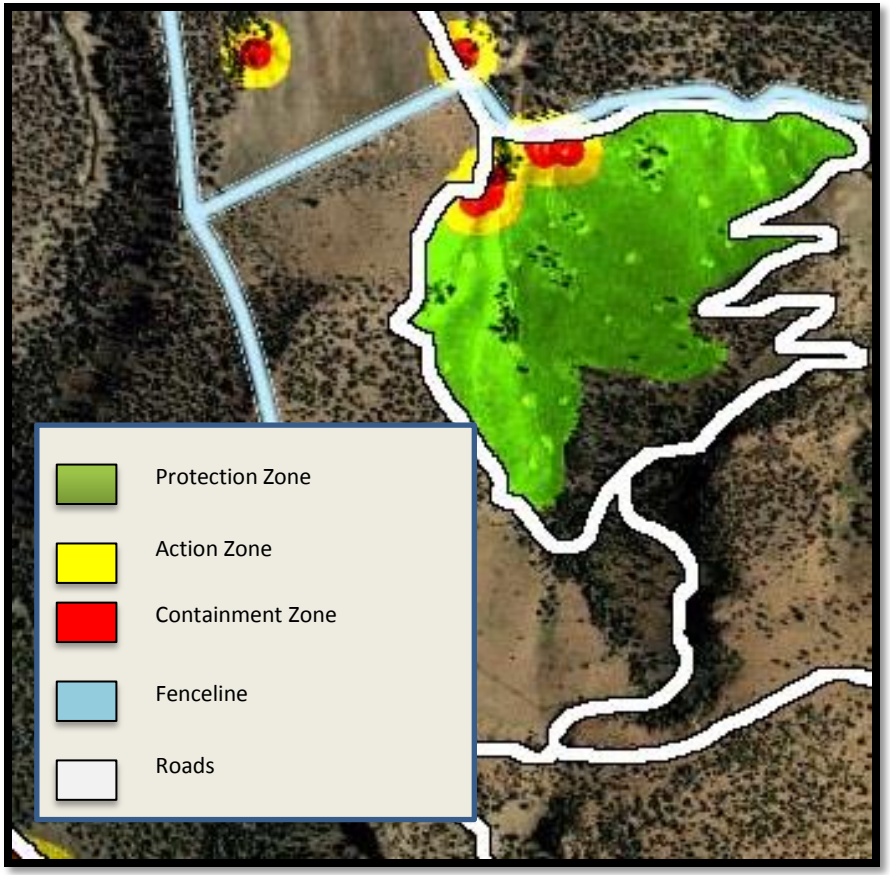
Interruption of Movement

Early Detection & Eradication

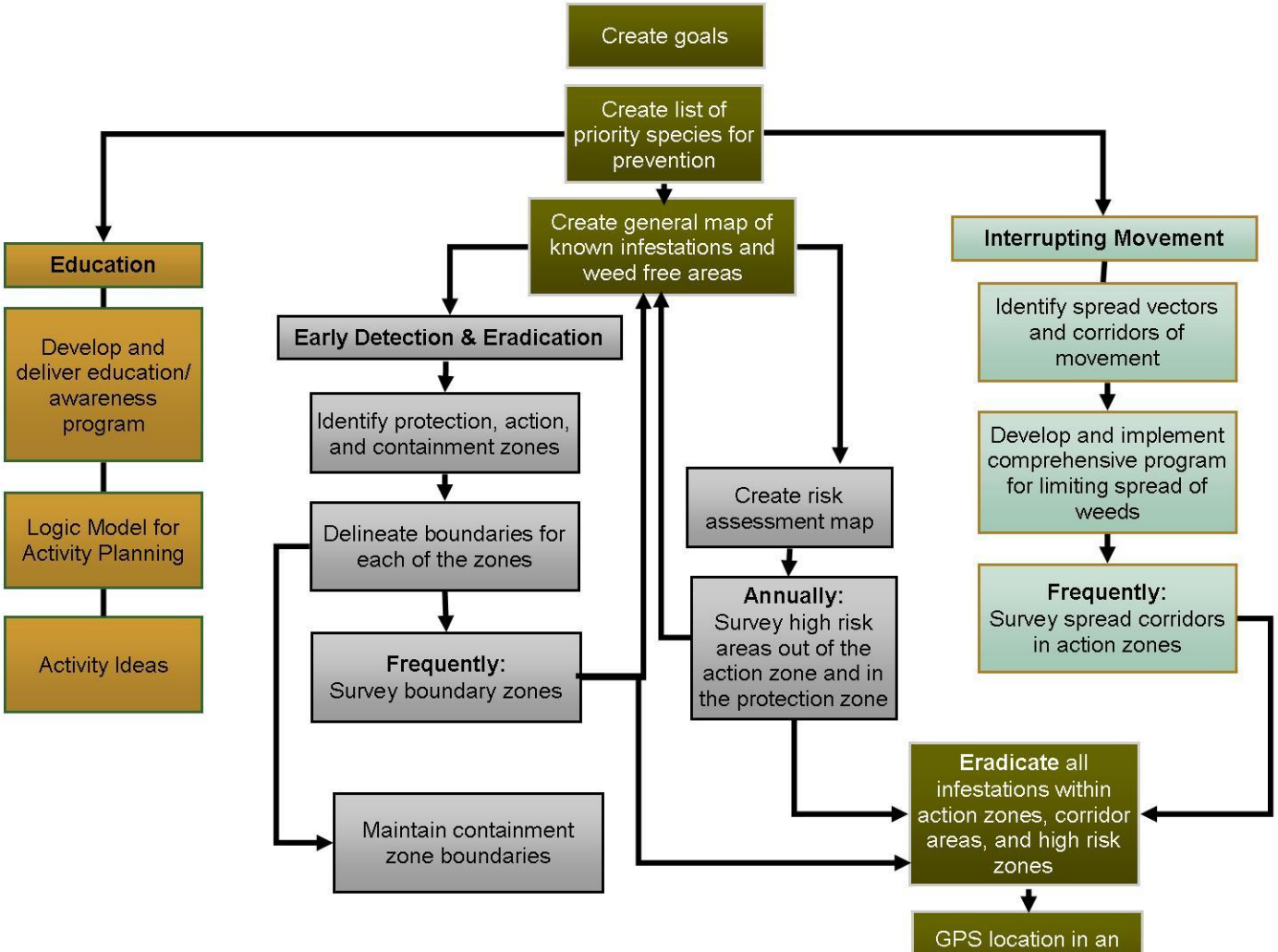
Education

WEED Prevention Areas




Protection Zone
Action Zone
Containment Zone
Fenceline
Roads

Weed Prevention Framework



Management Focus – Control infestations and increase desired species

Moderate Infestation with Some Desired Plants

Management Focus

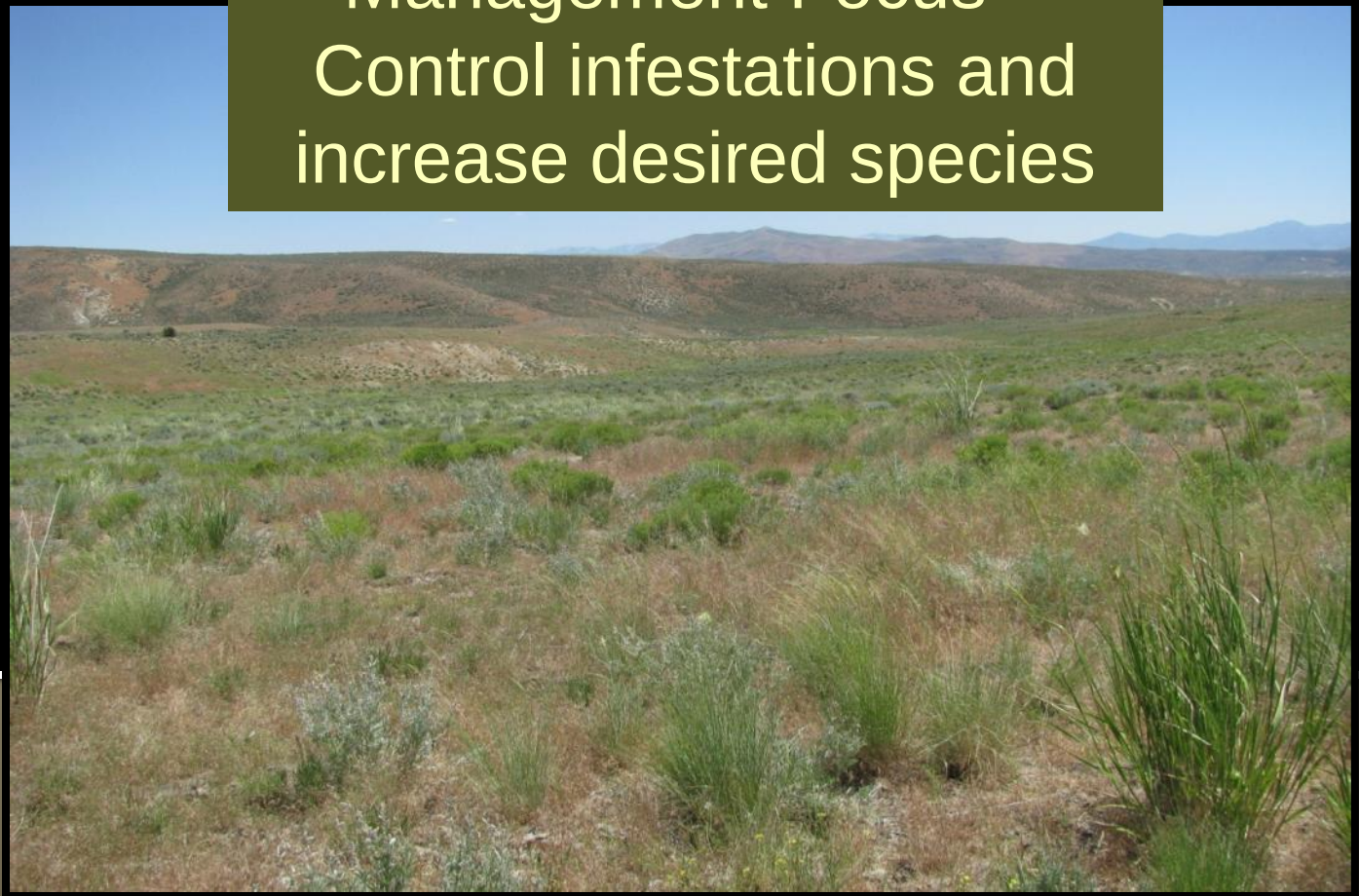
Control infestation & increase desired species

Detailed mapping combined with environmental data & local knowledge

Develop control methods to favor desired species using EBIPM

Design Adaptive Management program and implement

Assess and improve



Prescribed Burning Options

Considerations

- High amount of combustible forage increases fire intensity and greater seed mortality.
- Shown more effective in low elevation, warm winter areas with high biomass production generally not as successful in semi-arid cool winter areas.
- Can be used prior to herbicides to remove thatch buildup

Herbicide Options

Control is highly variable;
Gives about 2 years control
Herbicides and burning better control;
more risky and expensive

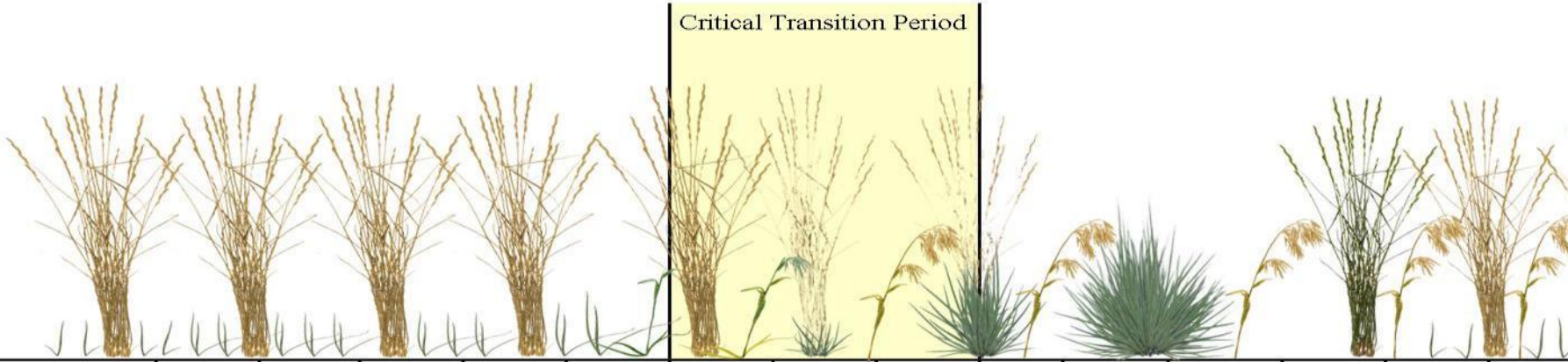
Weeds return rapidly if niches are not filled


Grazing
Options

Principle 1:
Keep Annual Grasses from Flowering

Principle 2:
Keep Perennial Desired Species Strong and Healthy

"Green and Brown"
Grazing Strategy for Invasive Annual Grasses



Grazing Period	Yes	Yes	Yes	Yes	Yes	Maybe	No	No	No	Maybe	Maybe	Maybe	Yes	Yes
Perennial Grasses	Senescence		Dormancy				Growth initiation	Leaf growth	Boot stage & seed head emergence		Flowering & seed development		Seed hardening & senescen	
Annual Grasses	Germination		Growth initiation			Leaf growth	Boot stage	Flowering & seed development		Seed hardening & scatter		Death	Germination & initiatio	
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov

Management Focus - Revegetation

High Infestation without Desired Species

Management Focus

Revegetation/Restoration

Highly accurate mapping with max environmental data & local knowledge

Contain large infestations

Develop an Augmentative Restoration plan

Implement restoration plan & establish adaptive management program

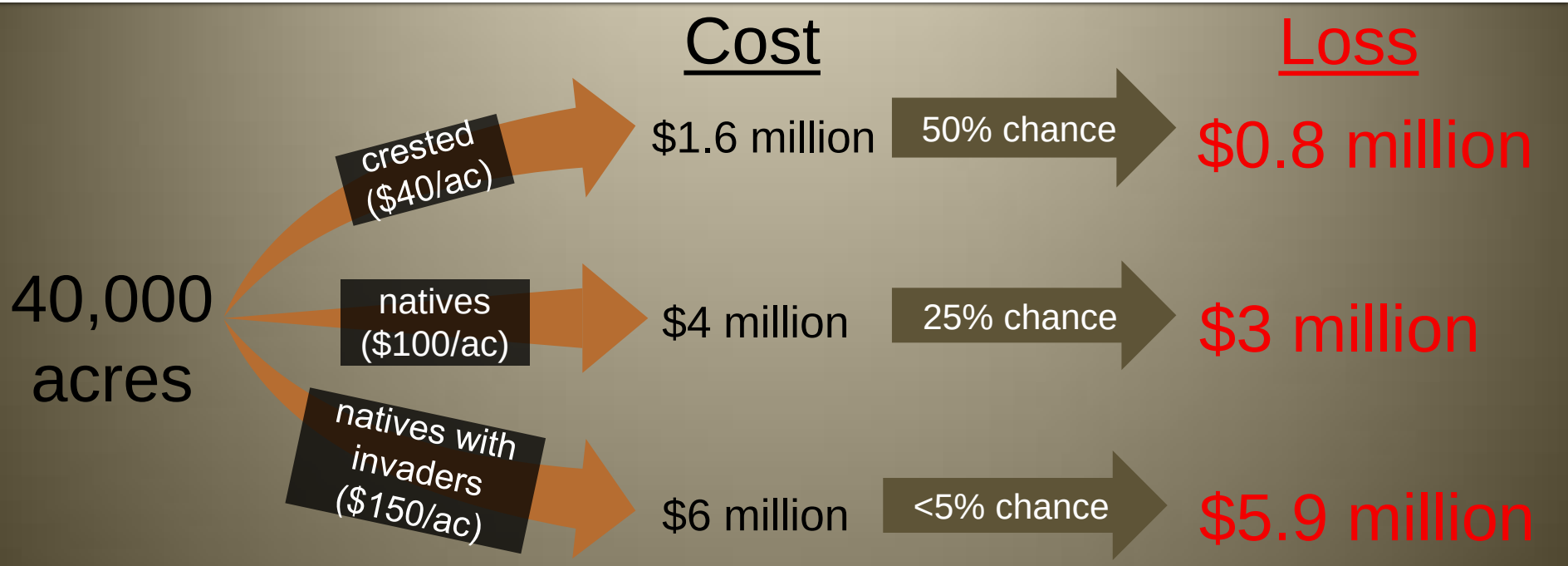
Assess and improve

The goal is to:

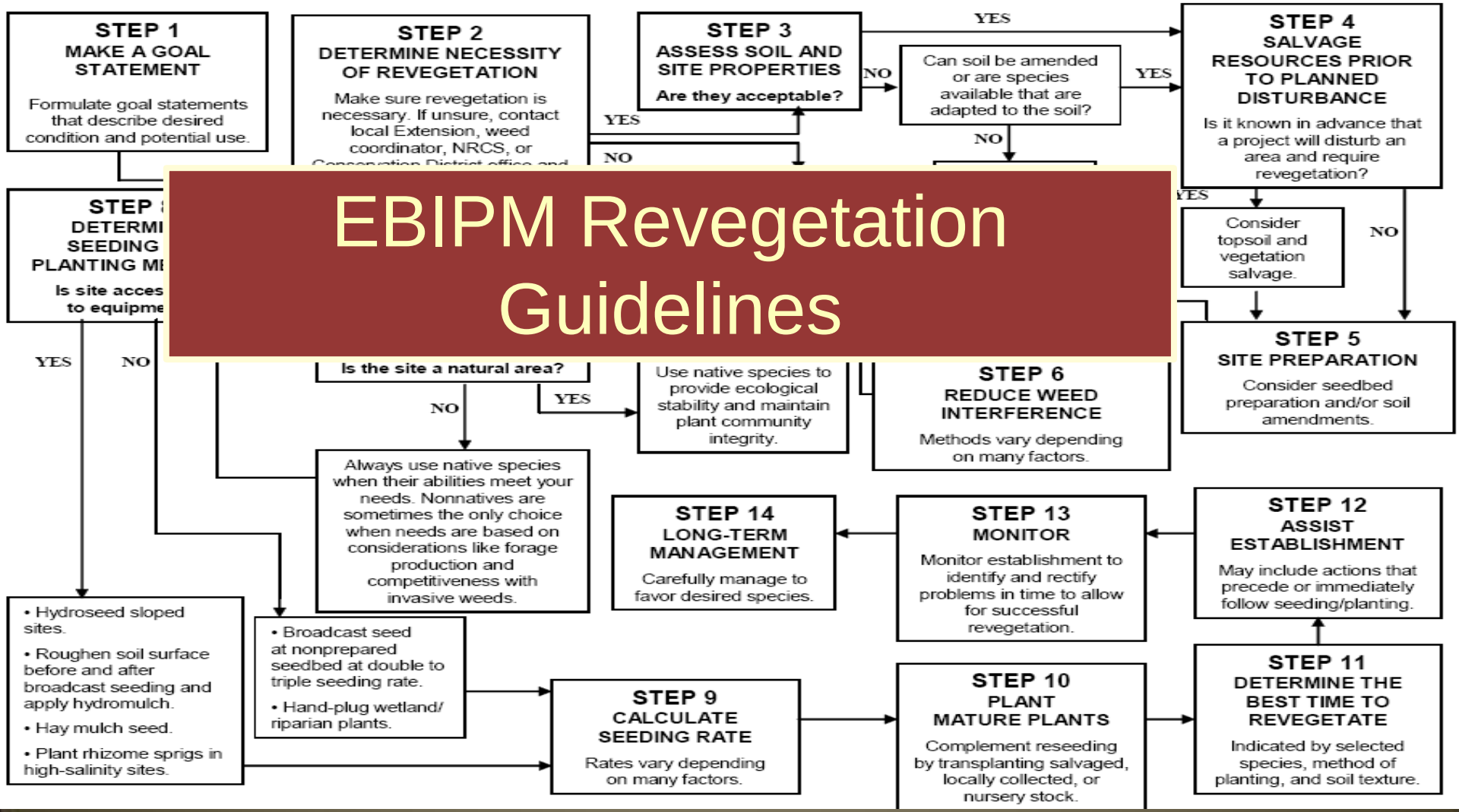
- **Maximize productivity**
- **Maximize diversity**

Leads to:
Healthy functioning plant communities that are invasion resistant and meet other land use objectives

Restoration costs and outcomes



EBIPM Revegetation Guidelines



Determine if revegetation is necessary

YES

NO

YES= < 15% cover of desired plants

NO= > 15% cover of desired plants

DETERMINE SEEDING OR PLANTING METHOD

Is the site accessible to equipment ?

No

- **Broadcast seed at non-prepared seedbed at double to triple seeding rate.**
- **Hand-plug wetland riparian plants.**

Yes

- **Hydroseed sloped sites.**
- **Roughen soil surface before and after broadcast seeding and apply hydromulch.**
- **Hay mulch seed.**
- **Plant rhizome sprigs in high-salinity sites.**

DESIGN A SEED MIX

Create seed mix based on goals and site characteristics.

Is the site a natural area?

Yes

Use native species to provide ecological stability and maintain plant community integrity.

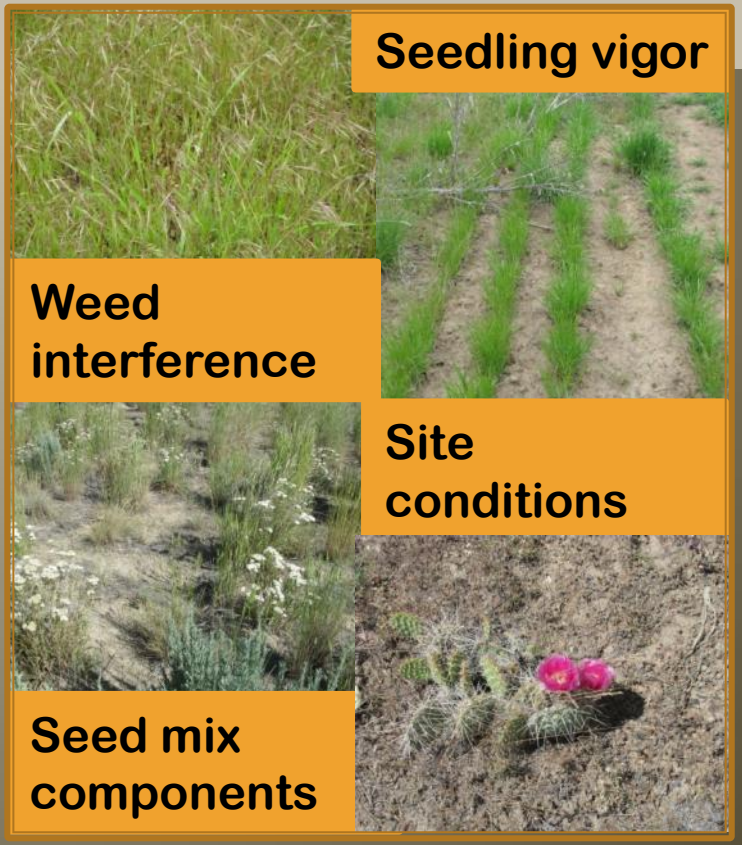
No

Always use native species when their abilities meet your needs. Non-natives are sometimes the only choice when needs are based on considerations like forage production and competitiveness with invasive weeds.

CALCULATE SEEDING RATE

Rates vary depending on many factors.

Factors

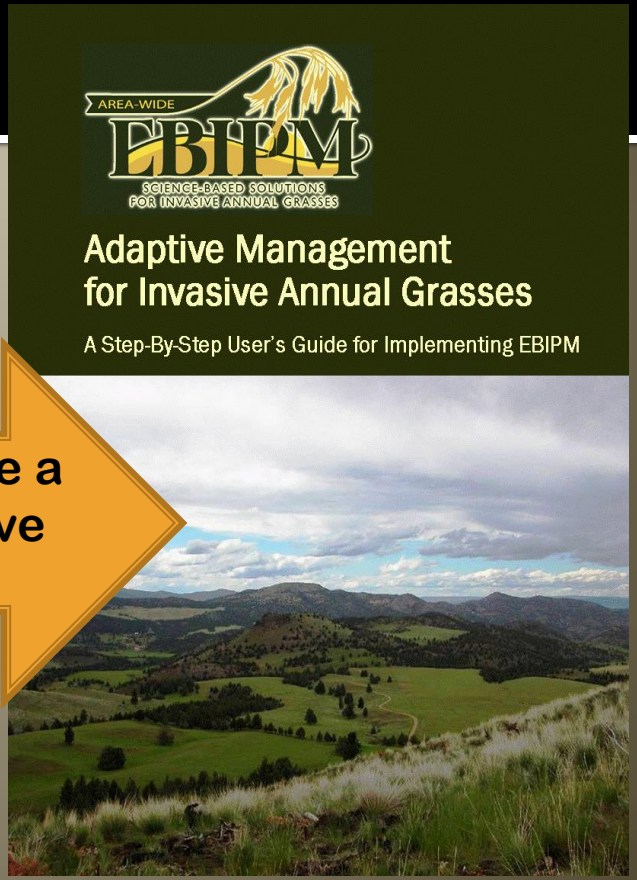


Ecological Principles: Increase dispersal frequency and increase amounts of desired species increases establishment

Adaptive Management

Create controls and replication to identify and rectify problems in time to allow for successful revegetation.

Design and Execute a Plan Using Adaptive Management



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