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
- Prevention/Protection
  - Develop prevention plan & gain adoption with adjacent land owners
  - Prioritize prevention program. Implement the program
  - Assess and improve

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

High Infestation without Desired Species
- 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

Highest Priority Level & Likelihood of Success
- S

Lowest Priority Level & Likelihood of Success
- S

C

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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

ATTENTION ALL HUNTERS WHEN SPOTTED CALL 357-3200
Weed Prevention Framework

Create goals

Create list of priority species for prevention

Create general map of known infestations and weed free areas

Education

Develop and deliver education/awareness program

Logic Model for Activity Planning

Activity Ideas

Early Detection & Eradication

Identify protection, action, and containment zones

Delineate boundaries for each of the zones

Frequently: Survey boundary zones

Frequently: Maintain containment zone boundaries

Interrupting Movement

Identify spread vectors and corridors of movement

Develop and implement comprehensive program for limiting spread of weeds

Annually: Survey high risk areas out of the action zone and in the protection zone

Frequently: Survey spread corridors in action zones

Eradicate all infestations within action zones, corridor areas, and high risk zones

GPS location in an
Management Focus – Control infestations and increase desired species

- Moderate Infestation with Some Desired Plants
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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

Critical Transition Period

<table>
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<th>Grazing Period</th>
<th>Yes</th>
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<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>Maybe</th>
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<td>Senescence</td>
<td>Dormancy</td>
<td>Growth initiation</td>
<td>Leaf growth</td>
<td>Boot stage &amp; seed head emergence</td>
<td>Flowering &amp; seed development</td>
<td>Seed hardening &amp; senescence</td>
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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

- **Cost**
  - crested ($40/ac) = $1.6 million (50% chance)
  - natives ($100/ac) = $4 million (25% chance)
  - natives with invaders ($150/ac) = $6 million (<5% chance)

- **Loss**
  - $0.8 million
  - $3 million
  - $5.9 million

40,000 acres
EBIPM Revegetation Guidelines

**STEP 1 MAKE A GOAL STATEMENT**
Formulate goal statements that describe desired condition and potential use.

**STEP 2 DETERMINE NECESITY OF REVEGETATION**
Make sure revegetation is necessary. If unsure, contact local Extension, weed coordinator, NRCS, or Conservation District office and service areas.

**STEP 3 ASSESS SOIL AND SITE PROPERTIES**
Are they acceptable?
- Can soil be amended or are species available that are adapted to the soil?

**STEP 4 SALVAGE RESOURCES PRIOR TO PLANNED DISTURBANCE**
Is it known in advance that a project will disturb an area and require revegetation?
- Consider topsoil and vegetation salvage.

**STEP 5 SITE PREPARATION**
- Consider seedbed preparation and/or soil amendments.

**STEP 6 REDUCE WEED INTERFERENCE**
Methods vary depending on many factors.

**STEP 7 SITE PREPARATION**
- Consider seedbed preparation and/or soil amendments.

**STEP 8 CALCULATE SEEDING RATE**
Rates vary depending on many factors.

**STEP 9 PLANT MATURE PLANTS**
- Complement reseeding by transplanting salvaged, locally collected, or nursery stock.

**STEP 10 PLANT MATURE PLANTS**
- Indicated by selected species, method of planting, and soil texture.

**STEP 11 DETERMINE THE BEST TIME TO REVEGETATE**
- Indicated by selected species, method of planting, and soil texture.

**STEP 12 ASSIST ESTABLISHMENT**
May include actions that precede or immediately follow seeding/planting.

**STEP 13 MONITOR**
Monitor establishment to identify and rectify problems in time to allow for successful revegetation.

**STEP 14 LONG-TERM MANAGEMENT**
Carefully manage to favor desired species.

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

**STEP 15 SITE ACCESS TO EQUIPMENT**
- Hydoseed sloped sites.
- Roughen soil surface before and after broadcast seeding and apply hydromulch.
- Hay mulch seed.
- Plant rhizome sprigs in high-salinity sites.

**STEP 16 PLANTING METHODS**
- Broadcast seed at nonprepared seedbed at double to triple seeding rate.
- Hand-plug wetland/riparian plants.

**STEP 17 PLANTING METHODS**
- Complement reseeding by transplanting salvaged, locally collected, or nursery stock.

**STEP 18 PLANTING METHODS**
- Indicated by selected species, method of planting, and soil texture.
Determine if revegetation is necessary

**YES**

YES= < 15% cover of desired plants

**NO**

NO= > 15% cover of desired plants
DETERMINE SEEDING OR PLANTING METHOD

Is the site accessible to equipment?

- **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.

- **No**
  - Broadcast seed at non-prepared seedbed at double to triple seeding rate.
  - Hand-plug wetland riparian plants.
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.

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

Factors

Weed interference

Site conditions

Seed mix components

Seedling vigor
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
Prioritizing Management

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Priority Level & Likelihood of Success

Highest

Lowest