An Overview on Research and Studies on Diversifying Crested Wheatgrass Seedings

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Topics

• Evolution from conversion to Crested WG to seeding diversification?

• Why is crested wheatgrass diversification difficult?

• How can it be accomplished?
Reference

Sage-Grouse Habitat Restoration Symposium Proceedings
June 4–7 2001, Boise, ID

RMRS-P-38

Strategies to Enhance Plant Structure and Diversity in Crested Wheatgrass Seedings

Mike Pellant
Cindy R. Lysne
1940’s-50’s- Sagebrush was abundant and grass was scarce
Research Met Land Management Agency Needs

1951 BLM Publication

REBUILDING THE FEDERAL RANGE

Sagebrush Eradication and Broadcast Seeding
C. Wayne Cook

Utah State University - Logan
Agricultural Experiment Station Bulletin 404 1958
Early use of biological control of a poisonous rangeland weed
Sagebrush Reinvasion

“Where domestic livestock or wildlife do not need sagebrush for feed or cover, or where it is not needed for erosion control, all the brush should be killed.”
Sagebrush Reinvasion

Yield Of Crested Wheatgrass Under Four Densities Of Big Sagebrush In Southern Idaho

MIKE PELLANT

Technical Bulletin No. 1483

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

Figure 6.—Yields of crested wheatgrass under 4 degrees of sagebrush control at Holbrook, 1965–70. Within each year, any 2 points with the same letter are not significantly different at the 5-percent level.
Sagebrush Retreatment

Improved Crested WG Management

Light Use

Mod. Use

Heavy Use
Everyone was Happy...

...for a while!
1970's-- Wildfires increase and environmental laws enacted:

- National Environmental Policy Act
- Threatened and Endangered Species Act
- Executive Orders
Seedings are Extensive in Areas with a High Fire Frequency
Why improve diversity in selected crested wheatgrass seedings?

- To improve wildlife habitat
- Increase opportunities for livestock use (shrubs = protein content in winter)
- Promote long-term stability (reduce opportunity for disease or system crash)
- Better use of water/resources in soil profile
- Improve rangeland health
Topics

• Evolution from conversion to Crested WG to seeding diversification?

• Why is crested wheatgrass diversification difficult?

• What has been done?
Crested Wheatgrass is resilient in the face of various management actions, climate, and natural disturbances.
Other Competitive Characteristics

- Crested WG seed production: 1,772 (wet year) to 1,037 (dry year) seeds/m² (Pyke 1990).
- Seed retains viability for 1-2 years and up to 20 years in a lab (Ackigoz and Knowles 1983).
- Very competitive for resources in early stages of growth.
- Can be invasive in more mesic environments.
Topics

- Evolution from conversion to Crested WG to seeding diversification?
- Why is crested wheatgrass diversification difficult?
- How can it be done?
Increasing Diversity in Crested Wheatgrass Seedings

1. Reduce Crested Wheatgrass Competition
   - Fire
   - Grazing
   - Herbicide
   - Mechanical
   - Combination(s)

2. Introduce desired plants
Evaluate the Potential for Increases in Invasive Species When Selecting Treatments

- Rush skeletonweed
- Knapweeds
- Cheatgrass
- Halogeton
Use of Fire to Reduce Crested Wheatgrass Competition

- May be difficult to burn
- Fire reduces vigor but rarely causes mortality
- Effectiveness is limited using fire alone, however fire may improve the effectiveness of herbicide or grazing treatments.
Use of Livestock to Reduce Crested Wheatgrass Competition

Numerous studies on management effects of livestock grazing on sagebrush reinvasion of crested wheatgrass seedings.

How can we use this science “in reverse” to reestablish sagebrush and other species in crested wheatgrass seedings?
Grazing management can be used to promote sagebrush establishment

Livestock grazing reduces crested wg root reserves and reduces plant vigor.

Livestock trampling reduces crested wg seedlings in interspaces.
One option to increase sagebrush density in crested wheatgrass seedings:

Heavy use in the Spring during drought periods
Using Livestock to Increase Sagebrush in Crested Wheatgrass Seedings

Frischknecht (1978) - 90% of sagebrush seedlings were within 27 ft of parent plant.
Use of Herbicides to Reduce Crested Wheatgrass Competition

Glyphosate
Use of Herbicides to Reduce Crested Wheatgrass Competition

- Differential effect on different species of crested wheatgrass
- May take multiple applications per year and several years of retreatment for good control
- Seedbank is maintained due to increased seed production from surviving plants
- Burning prior to Glyphosate application improves kill
Van Epps & McKell (1977)- Can successfully establish other species if 3 rows of crested wg removed.
Mechanical Equipment to Reduce Crested Wheatgrass

Pipe harrow

Disk Chain
Mowing to Reduce Competition

• High cost per unit area

• Why not use livestock?

• Multiple clippings during the growing season to a one inch stubble height can reduce vigor and seed production.
Seed Distribution After SUCCESSFUL Crested Wheatgrass Control

Rangeland Drill

Truax RoughRider Drill
Equipment to Reduce Competition and Plant:

Seedlings                           Seed
Risk of Enhancing Diversity?
Southern Idaho Fire Rehab Project

Seeded to Crested WG’s @6 lbs/ac.

Both areas were aerial seeded with sagebrush at two pound/acre (bulk)

Not seeded to Crested WG - native grass recovery
Summary

• Probably require multiple treatments in multiple years

• Don’t forget the seedbank (crested wg and invasives)

• Be opportunistic - droughts, wildfires & grazing pressure

• Don’t create crested wg seedings if natives will recover