

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?





Sage-Grouse Habitat Restoration Symposium Proceedings

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#### 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





# Halogeton Control Act of 1952

Early use of biological control of a poisonous rangeland weed



# Sagebrush Reinvasion

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

MIKE PELLANT



"Where domestic livestock or wildlife do not need sagebrush for feed or cover, or where it is not needed for erosion control, <u>all the brush should be</u> <u>killed</u>."

# Sagebrush Reinvasion

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

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Technical Bulletin No. 1483 JUL 2 6 '974 JUL 2 6 '974 Bureau of Land Management Bolise District 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







## Everyone was <u>Happy</u>...

## ...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 <u>selected</u> 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/m<sup>2</sup> (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

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









## 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



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#### Glyphosate

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DIRECTIONS FOR USE of Posterie and Accessible





## Use of Herbicides to Reduce Crested Wheatgrass Competition



**Complete Directions for Use** 

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#### DIRECTIONS FOR US



- 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

## Use of Mechanical Equipment to Reduce Crested Wheatgrass









## 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 <u>SUCCESSFUL</u> Crested Wheatgrass Control





#### Equipment to Reduce Competition and Plant: Seedlings Seed









## **Risk of Enhancing Diversity?**



#### Seeded to Crested WG's @6 lbs/ac.



## Southern Idaho Fire Rehab Project

Not seeded to Crested WG- native grass recovery

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



## 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