Mechanisms That Facilitate the Resistance to Cheatgrass Invasion in Perennial Grass Communities

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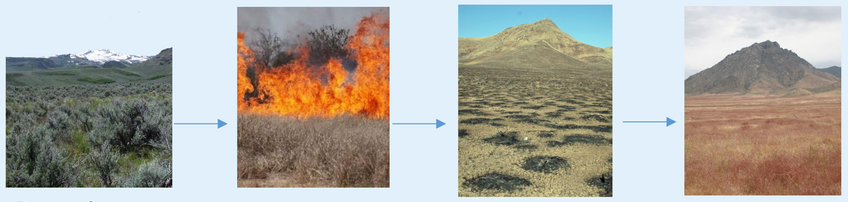
NEVADA SECTION SRM

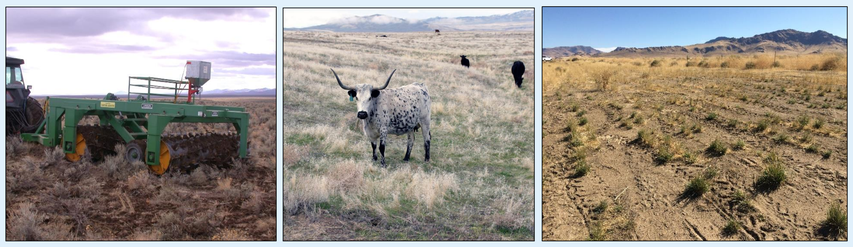
Weed control has existed since humans developed agriculture. From the earliest records of mechanical weed control to the high tech chemical weed control of today, weed management is always a top priority.



Proactive — Reactive

Rangeland weed management can be proactive or reactive .

Cheatgrass (*Bromus tectorum*) invasion, dominance and resulting wildfires are the number one threat to the Great Basin.



Left to right: Shrub control to increase perennial grass. Grazing as a tool to reduce fuels and fire threats. Herbicide use to reduce weed competition and increase perennial grass.

With proper management of plant communities and proactive weed control, resistance to cheatgrass dominance can be achieved.

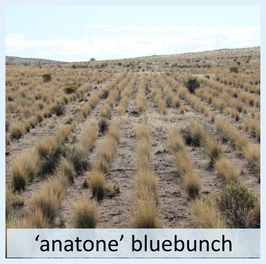
What characteristics of a plant community make it resistant to cheatgrass invasion?

While environmental factors such climate and soils play a large role in determining plant community structure, cheatgrass invades from salt deserts to pine forests.

Stocked stands of perennial grass are the only truly resistant plant communities to cheatgrass invasion.

Perennial grass suppressing cheatgrass

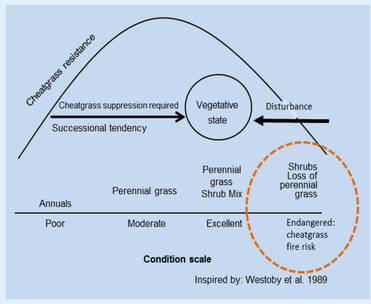
Crested wheatgrass



'anatone' bluebunch

crested and bluebunch

We differentiate between active and passive suppression. Occupying a niche we consider passive suppression. A rock occupying a niche limits cheatgrass presence, however that is not an applied management tool. Perennial grass limiting resources to the detriment of cheatgrass is active suppression and a very effective applied management tool.



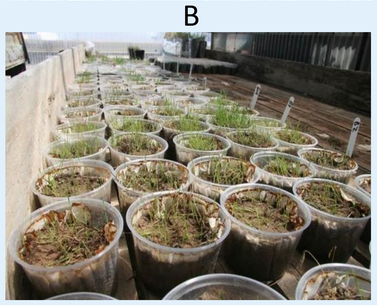
Not all plants utilize resources equally. Shrubs utilize deeper soil moisture and thus do not limit resources at shallower soil depths where cheatgrass is dependent on available resources. Forbs, which also lack a fibrous root system, are not as an effective means of soil resource depletion as a bunchgrass.

Herbicide cheatgrass control is effective, however this is a short term control effect. The immense persistent seed banks of cheatgrass ensure it's return within a few years after herbicide application if perennial grass isn't established.

A

B

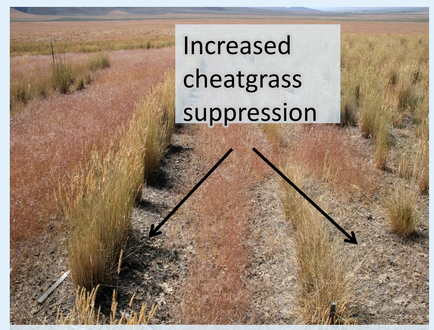
C



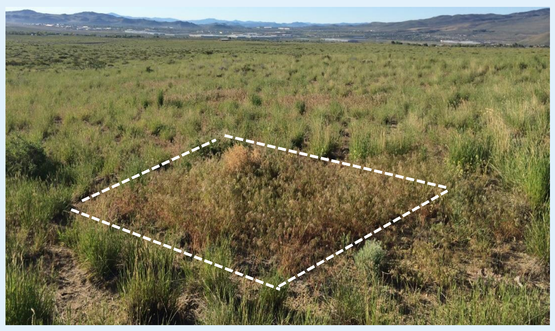
A: Initial cheatgrass herbicide control (Landmark XP) and 3 years later. Without establishing any perennial grass, cheatgrass quickly dominates again from surviving seedbanks.
B: Surviving cheatgrass seedbank after fire and bioassay (measure of seedbanks).
C: Cheatgrass dominated site where after herbicide weed control perennial grasses were established that now suppress the return of cheatgrass.

Resistance is based on soil resource use by the plant community compared to resource supply. If a plant community is using most of the available soil resources then that leaves very little resources for cheatgrass.

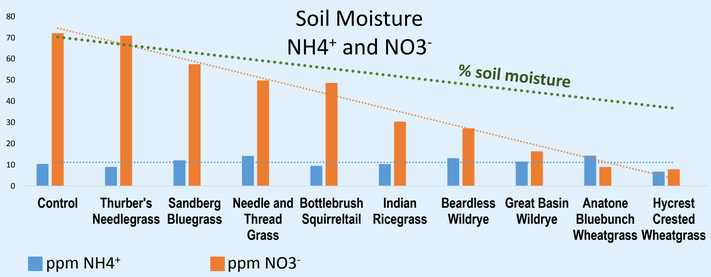
Higher Precipitation year



Low Precipitation year



Cheatgrass establishment 1st year after perennial grass removal (glyphosate)
Cheatgrass density & fuels :
Perennial grass zone (8/ft² and 435 lbs/acre)
Perennial grass removed (41/ft² and 1,313 lbs/acre)



Mean soil moisture and available Nitrogen by species for the growing season April-June. Species best suited to suppress cheatgrass are to the right. * Soil moisture X6 for scale

Summary: Perennial grass is the keystone plant community component to facilitate the mechanisms of resistance. Management should aim to maintain perennial grass dominance or co-dominance.