Post-Fire Native Species Seed Mixes Are Effective at Keeping Out Cheatgrass in the Great Basin

Choosing a post-fire seed mixture can be challenging

Seeding an area after a fire has long been used to control erosion and suppress problem invasive grasses like cheatgrass. But for managers, choosing the right seed mix to use can be tricky. Seed mixes containing only native species are ideal for areas where natural vegetation recovery is a long-term objective, but there is a question of both cost and whether native species will be as effective as nonnatives in outcompeting invasive species.

After 16 years, little cheatgrass can be seen in both the conventional and the native seed mixes. In the conventional mix, crested/Siberian wheatgrass remains dominant, while in the native mix native shrubs have colonized, suggesting that successional processes are moving in a desired direction (photos: Utah Division of Wildlife Resources Range Trend Crew).

In the Great Basin, introduced forage species such as crested wheatgrass have been widely used for post-fire rehabilitation seedings, but negative long-term effects of these nonnatives on ecosystem functioning, biodiversity, and wildlife habitat have been documented. Native species such as bluebunch wheatgrass, western wheatgrass, and big sagebrush are now playing a bigger role in reseeding projects. Studies comparing the use of native seed mixes versus conventional mixes containing nonnatives have been limited and usually short term, providing little insight for managers into how their decision will affect the site a decade or more down the road.

The first long-term study comparing seed mixes in the Great Basin

A study was set up in 1999 to compare native seed mixes with conventional at two study sites—a higher and lower elevation—following the 1999 Railroad wildfire in Tintic Valley, Utah, and the initial results were reported after 3 years. Rocky Mountain Research Station scientists Jeff Ott and Francis Kilkenny and their collaborators revisited the site to understand the longer-term trajectory of these sites 16 years post fire.

Ott and Kilkenny were interested in documenting changes in cover and density of key plant species to determine how the native versus conventional seed mixes compared at reestablishing perennial cover and suppressing exotic annuals. According to Kilkenny, "While studies have looked at recovery of conventional and native only mixes separately in the Great Basin, we believe—and we looked really hard—that this is the first time anyone has actually directly compared them over the long-term."

Natives are effective at keeping out cheatgrass over the longer term

This longer-term study essentially shows that native seed mixes do well in suppressing cheatgrass in the Great Basin, even when compared to familiar conventional mixes that include the highly competitive nonnative crested and Siberian wheatgrass. The

conventional seed mixes lived up to their reputation and were effective at keeping cheatgrass cover below 2 percent, but the native seed mixes were not far behind, with cheatgrass cover of 3 percent to 6 percent–in contrast to unseeded control treatments where cheatgrass cover reached 9 percent to 15 percent. And using native seed mixes may not be cost-prohibitive anymore—the scientists found that the price of native species seed has come down over the years to be much closer to that of introduced mixes.

Regardless of the seed mix, the initial seeding treatments had an effect on the vegetation cover and species composition that persisted down the road. After 16 years, the species in the original seed mixes were the dominant species on the sites, even when their initial establishment (as measured in the short-term study) was minimal, and they doubled in cover over that time.

Supporting these findings, a recently published study by Rocky Mountain Research Station scientists Andrea Urza, Jeanne Chambers, David Board, and their collaborators that looked at seeding success 14 years post-fire found that a mix of native perennial shrubs, forbs, and grasses was actually more effective at increasing perennial cover and inhibiting cheatgrass invasion than seeding a mix of nonnative perennial grasses.

Currently, Ott and Kilkenny are looking more into some of these questions, such as assessing whether sites with the native-only mixes are significantly closer to desired states than other treatments, and also taking a species-by-species look at cheatgrass suppression to see which seed mixes do the best job at keeping this invasive at bay.

KEY FINDINGS

- In the first long-term experimental study comparing conventional seed mixes to native-only postfire seeding mixes in the Great Basin, native seed mixes were successful in suppressing invasive exotic annuals, with only 3 percent to 6 percent cheatgrass cover compared to 2 percent or less for the conventional seed mixes and 9 percent to 15% for the unseeded controls.

- Native seed has become more readily available and cost competitive in recent years, as compared to introduced mixes.

- Post-fire seeding treatments had a lasting effect on vegetation cover and composition regardless of seed mix. Both the native and introduced seed mix species eventually dominated restoration sites even where initial establishment had been minimal.

SCIENTISTS / MANAGER LEADS

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FURTHER READING

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