

Rangeland Revegetation Revisited: Do short-term results predict long-term outcomes of revegetation?

Need for revegetation: Highly degraded rangeland may be dominated by invasive weeds. When weeds are controlled via herbicides, grazing, mowing, or biocontrol, open niches are created in the plant community. Desirable species, released from the competitive effects of the weed, often respond to re-occupy the site. However, on rangeland that has been dominated by weeds for many years, desirable species may be exceedingly rare or even completely absent from existing vegetation and the seed bank. If weeds are controlled, but desirable species are not present to occupy open niches, weeds are likely to re-establish. In some cases the same weed re-establishes, but in other cases a different, but no less troublesome, weedy plant becomes dominant. Combining weed control measures with revegetation may be the best long-term method for suppressing weeds and re-invasion.

Field study: Researchers from Montana State University, USDA-Agricultural Research Service, and Natural Resources Conservation Service teamed up to revisit four revegetation studies that were applied to rangeland in western Montana in the 1990s. Three of the four studies occurred near Hamilton where rangeland was dominated by spotted knapweed. A fourth study occurred near Ronan where spotted knapweed and sulfur cinquefoil co-dominated. The sites had been treated with an array of weed control methods (herbicides, mechanical disturbance, biocontrol) then revegetated with various seeding techniques (native vs. introduced grasses; different seeding rates; drill vs. broadcast seeding; cover crop vs. no cover crop, etc.).

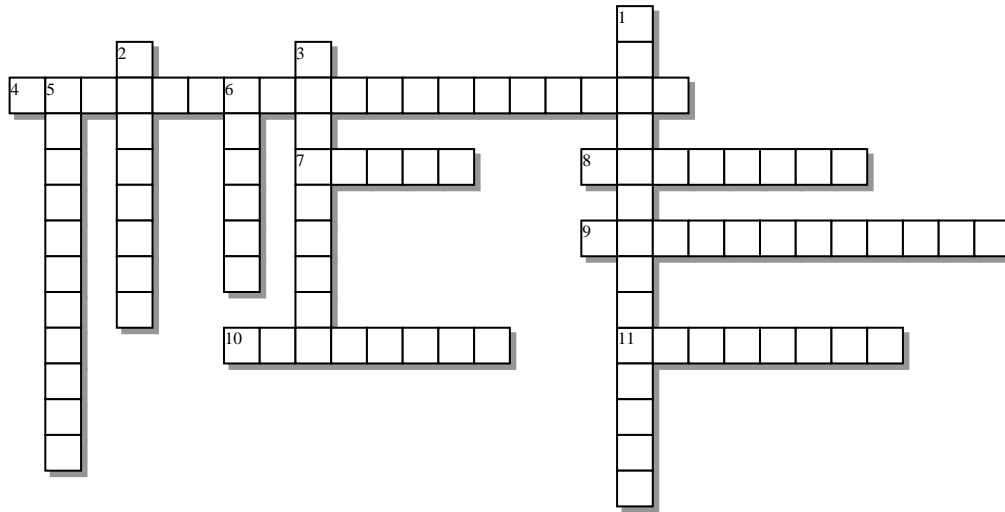
Results: In the Hamilton studies, short-term (2-4 years) results of revegetation were not very promising with only small and sparsely distributed seedlings occurring while spotted knapweed remained dominant. Fifteen years later two of the seeded grasses, intermediate wheatgrass and bluebunch wheatgrass, were thriving and greatly suppressing spotted knapweed. In one of the revisited studies, seeded grass biomass increased from about 27 lb./A in year 2 to about 1780 lb./A in year 15. In another study, intermediate wheatgrass reduced spotted knapweed biomass by 93% 15 years after seeding. In general, different weed control treatments did not appear to play a large role in the long-term success of revegetation. However in one study, an application of picloram at the time of seeding increased seeded grasses and decreased spotted knapweed. At the Ronan study, short-term results falsely suggested that seeded species were well-established; however, when the study was revisited nine years after seeding, very few seeded species could be found and the site remained dominated by a suite of exotic grasses and forbs.

Management implications: At three of the four sites certain seeded grasses greatly suppressed spotted knapweed. Although revegetation can be expensive up front, seeding desirable grasses can be a one-time event that suppresses weeds for a long time. Revegetation compares favorably to repeated applications of other weed control techniques like herbicides or grazing. Although seeded species sometimes persist and suppress weeds for a long time, short-term data cannot predict if, when, or where this will occur. Because short-term results are not indicative of long-term outcomes, more long-term monitoring is needed to find revegetation practices that successfully restore weed-infested rangeland. Read the entire journal article by clicking the link below:
http://www.msuextension.org/invasiveplantsMangold/documents/Publications_Mangold/Rinella%20et%20al_2012.pdf



Bluebunch wheatgrass growing on study site near Hamilton, MT. Note prevalence of bunchgrass and absence of spotted knapweed compared to non-seeded plot on lower left side of photo.

Weed Post Puzzle: Test your knowledge of rangeland revegetation revisited



Across:

- 4 - This native grass established successfully at the Hamilton site
- 7 - Seeded grasses did not do well at this site over the course of nine years
- 8 - In one of the revisited study sites, this herbicide appeared to improve the outcome of revegetation
- 9 - This wheatgrass species was especially successful at suppressing knapweed
- 10 - One of two locations in Montana where revegetation studies occurred
- 11 - This type of monitoring is needed to identify revegetation practices that are most successful (two words)

Down:

- 1 - One of two seeded grasses that did not persist at the Hamilton site*
- 2 - Pesky weed seeds wait in the _____ (two words), ready to emerge when given the opportunity
- 3 - _____ (two words) results were not indicative of long-term outcomes
- 5 - In another study similar to the one described in the Weed Post, this invasive forb was also suppressed by intermediate wheatgrass (two words)*
- 6 - What ecologists like to call open spaces in a plant community, often created by eliminating weeds

*Refer to journal article for answer

Solutions are posted to the MSU Extension Invasive Rangeland Weed website:
<http://www.msuextension.org/invasiveplantsMangold/extensionsub.html>

