

FORESTRY TECHNICAL NOTE

Results of Reseeding a Fire Impacted Area in Western Montana

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Abstract

The Bucksnot fire (outside Helena, Montana) reseeded evaluation was established in February 2001 on a disturbed forestland site in Western Montana to study the effectiveness of seeding in relation to understory plant succession. The herbaceous vegetation could be used to stabilize disturbed sites, maintain soil productivity, manage noxious weeds and provide forage. The site, a Douglas-fir/common snowberry habitat-type, had received a light to severe burn from a wildfire (approximately 14,364 acres) that occurred in July 2000. Approximately 5,000 acres of the severely burned areas were seeded. Those acres were considered the most critical. Those sites had been densely forested and correspondingly had little vegetation growing on the forest understory before the fire. On such sites the fire had consumed the nearly continuous litter/duff layer that covers the soil surface. A seeding mix was designed based on the land managers' objectives and the site conditions. The seed mix consisted of 90% 'Pryor' slender wheatgrass and 10% 'Critana' thickspike wheatgrass. A comparison study was established to compare the seeded versus unseeded responses in the plant communities. Permanent plots and transects were established and monitored for plant adaptation and percent canopy cover over ten years.

The seed mix of 'Pryor' slender wheatgrass and 'Critana' thickspike wheatgrass showed good stand establishment, plant vigor, forage production and percent canopy cover. The seeded sites substantially reduced erosion not only the first year but at the end of the evaluation period as well. Slender wheatgrass provided the most cover and production. The seeded sites did not add significantly to total canopy coverage in any given year and for the period average. Seeded sites have an impact on the number of species occupying the site over time. There were less species present on the seeded versus the unseeded sites. Clearly, the seeded sites are occupied by more desirable plant species from a forage stand point and reduce the amount of noxious weeds present on the site. As a result of this information, land managers will be able to make more informed decisions about whether to seed herbaceous species on disturbed forestland sites.

History – The Bucksnot fire, south and east of Helena, Montana, started July 23, 2000, and burned seven days. A total of 14,364 acres of rangeland and forest burned. Most of the land (approximately 70 percent) impacted by the fire was privately owned (approximately 10,000 acres). Parts of the severely burned sites were helicopter seeded in February 14-16, 2001.

The major justifications for moving forward with the project related to water quality entering Canyon Ferry Reservoir, soil erosion reduction, and control the spread of noxious weeds, such as spotted knapweed and Dalmatian toadflax, which was present on the site before the fire. Grass seeding was needed to: 1) reduce sediment delivery to Canyon Ferry Reservoir, thereby reducing the impacts to water quality and fish populations, 2) reduce adverse impacts to the productivity of the soil resource, and 3) reduce the incidence of noxious weeds.

Resources – Approximately 5,000 acres of the severely burned areas were seeded. Those acres were considered the most critical. Those sites had been densely forested and correspondingly had little vegetation growing on the forest understory before the fire. On such sites, the fire had consumed the nearly continuous litter/duff layer that covers the soil surface. Slopes are steep to very steep with little to no area to filter sediment before reaching Canyon Ferry Reservoir.

Treated sites were mostly steep northerly and easterly facing slopes covered with a mixed saw-log and pole-sized Douglas-fir and ponderosa pine. Typical forest habitat-types identified are Douglas-fir/common snowberry and Ponderosa pine/bluebunch wheatgrass. Soil parent material is primarily residuum derived from limestone and weathered coarse granitic material. Soils of the seeded areas are often moderately deep with moderate moisture-holding capacity. Soil surface textures are typically loamy. Soil series are Winkler and Amor.

Seed Mix – The seed mix consisted of 12 lbs./ac. Pure Live Seed (PLS) ‘Pryor’ slender wheatgrass (90 percent) and 2 lbs./ac. PLS ‘Critana’ thickspike wheatgrass (10 percent). The seed mix was based on the land manager’s objective(s) of species suited to the site, forage values, erosion control and their ability to compete with noxious weeds. The mix was applied at the rate of about 50 PLS per square foot.

Sites – The effectiveness of the seeding was monitored in relation to erosion/sediment control and understory plant succession. Two pairs of sites representative of the area were selected. Each pair is of similar soil, aspect, elevation and slope steepness. One unit of each pair was seeded and the other unit was not seeded to serve as a control. Each site was monitored in 2001, 2002, 2003, 2005 and 2010.

Site 1 (Cliff Cox – seeded) and Site 2 (Cliff Cox – unseeded) are on strongly sloping 12 to 14 percent slopes. Aspect ranged from 0 to 23 degrees. Elevation is 4,406 feet (seeded) to 4,625 feet (unseeded) above mean sea level. Habitat-type is Douglas-fir/common snowberry. Soil series is Amor loam on seeded site and Winkler loam on unseeded site.

Site 3 (West-Shore Drive – seeded) and Site 4 (West-Shore Drive – unseeded) are on strongly sloping 9 to 18 percent slopes. Aspect is 338 degrees for both sites. Elevation is 4,118 feet (seeded) to 3,972 feet (unseeded) above mean sea level. Habitat-type is Douglas-fir/common snowberry. Soil series is Winkler loam.

Results – Attached are various tables that show the results from the data that was collected over the ten-year period. Each of the sites evaluated the impacts on: 1) ground and canopy cover; 2) number of species in a plant community; and 3) plant succession.

Cover – On the seeded sites, slender wheatgrass provided the most ground cover and forage production. Maximum cover recorded was 37 percent. The seeded sites did add significantly to total canopy coverage in years two, three and five. The unseeded sites provided canopy coverage, but the sites were occupied by invasive plants, weeds and other less desirable plants.

Erosion – The seeded sites substantially reduced erosion not only the first year, but at the end of the evaluation period as well.

Plant Community Succession – The seeded sites have an impact on the number of species occupying the site over time. There is less species diversity on the seeded sites. Depending on the objectives of the seeding, the seeded sites are occupied by more desirable plant species from a forage stand point and reduce the amount of noxious weeds present on the site. The presence of the seeded species fades with time allowing the long-term natives to occupy the site.

Tree Regeneration – Lack of a seed source around the plots influenced the number of tree seedlings present. The fire consumed any existing seedlings and did not leave any trees as a seed source. No new tree seedlings were found in the plots or near them. It will be a long time before the site is re-occupied with trees again.

Summary

- The seed mix of ‘Pryor’ slender wheatgrass and ‘Critana’ thickspike wheatgrass showed good stand establishment, plant vigor, forage production and percent canopy cover.
- The seeded sites substantially reduced erosion not only the first year, but at the end of the evaluation period as well.
- Slender wheatgrass provided the most cover and production. The seeded sites did add significantly to total canopy coverage in years two, three and five.
- Seeded sites have an impact on the number of species occupying the site over time. There were less species present on the seeded versus the unseeded sites.
- Clearly, the seeded sites are occupied by more desirable plant species from a forage stand point and reduce the amount of invasive plants, noxious weeds and other less desirable plants present on the site.
- There was little to no tree regeneration at the site due to a lack of a seed source being present on the site.

As a result of this information, land managers will be able to make more informed decisions about whether to seed herbaceous species on disturbed forestland sites. Selecting the appropriate seed species for the site and the intended purposes cannot be overstated. In many cases, selecting the appropriate species can make a difference between success and failure of the seeding establishment.

Where to get help

For more information, contact the local office of the USDA Natural Resources Conservation Service, or your local Soil and Water Conservation District.

BUCKSNORT FIRE (continued)
FIRE IMPACTED WATERSHED MONITORING DATA SUMMARY

	SEEDED					UNSEEDED				
	Year					Year				
	2001	2002	2003	2005	2010	2001	2002	2003	2005	2010
Canopy Cover (Species %)										
Forbs										
Annual forbs					T					1
Stinging nettle							6			
Prickly lettuce		7			T		8			
Flannel mullein					2					
Lambsquarter goosefoot							1			
Common dandelion					T					1
Tansy mustard							4		T	4
Wild onion					T					
Knotweed							1	T		
American vetch					T					
Subtotal	0	7	0	0	3	0	20	T	T	6
Canopy Cover (Species %)										
Shrubs										
None										
Subtotal	0	0	0	0	0	0	0	0	0	0
Trees										
None										
Subtotal	0	0	0	0	0	0	0	0	0	0
Total	1	25	15	37	21	0	43	14	76	22
Total No. of Species	1	3	1	2	9	0	6	2	2	6
Adjusted No. of Species	0	1	0	0	7	0	6	2	2	5

BUCKSNORT FIRE (continued)
FIRE IMPACTED WATERSHED MONITORING DATA SUMMARY

	SEEDED					UNSEEDED				
	Year					Year				
	2001	2002	2003	2005	2010	2001	2002	2003	2005	2010
Canopy Cover (Species %)										
Forbs										
Golden rod				T	1	T		T	1	
Prickly lettuce		2	1				4			
Golden aster									T	
Canada thistle								T		
Musk thistle									3	
Common salsify					T		2		T	T
Common dandelion	T					T	T			T
Fanweed			2							
Flannel mullein										
Forb			T		T		1	1		T
Franklin phacelia						T		T		
Field filago			T	1				T		
Horseweed				1						
Dalmatian toadflax										1
Leafy spurge										T
Spotted knapweed							2	T	12	
Marestail							17	6		
Mustard							2	3		
Pepperweed				T						
Phylox					T					
Western yarrow				T	1					
Yellow sweetclover							T			
Subtotal	T	2	4	3	3	1	29	11	17	2
Canopy Cover (Species %)										
Shrubs										
Common snowberry										T
Silver sagebrush							T			
Subtotal	0	0	0	0	0	0	T	0	0	T
Trees										
None										
Subtotal	0	0	0	0	0	0	0	0	0	0
Total	2	37	29	36	15	1	41	48	95	21
Total No. of Species	2	3	7	11	12	3	13	12	10	12
Adjusted No. of Species	1	2	5	9	10	3	13	12	9	11