

Introduction

The accidental introduction and subsequent invasion of cheatgrass has contributed significantly to the conversion of millions of acres of wildlife habitat to cheatgrass dominance.

- These habitats are critically important to sagebrush obligates such as sage grouse and mule deer.
- Each wildfire season, more and more shrub communities are lost with larger wildfires occurring more frequently.
- In 2018, the Martin Fire burned 435,000 acres of rangelands significantly impacting grazing and wildlife resources (Fig. 1).



Figure 1. The Martin Fire of 2018 swept across the landscape burning critical wildlife habitats and grazing resources, as well as threatening life and property and destroying critical rangeland infrastructure.

A massive collaborative rehab effort took place between U.S. Government and state agencies which included the Bureau of Land Management (BLM), USDA-Agricultural Research Service (ARS), and Nevada Department of Wildlife (NDOW) as well as wildlife and conservation organizations.



Figure 2. Seeding following the Martin Fire was a major collaborative effort with the Nevada Department of Wildlife (NDOW) taking the lead.

Approach

One of the challenges in post-fire rehabilitation is prioritizing habitats to treat for restoration activities, especially when thousands of acres have been disturbed in these large wildfires and limitations exist in seed availability and funding resources.

- Goals
 - enhance food and cover resources for wildlife and livestock
 - suppress cheatgrass and associated fuels with established perennial grasses
- over 60,000 acres were seeded in late 2018 and early 2019 (Fig. 2)
- another 65,000 acres were treated (late 2018) with pre-emergent herbicide (imazapic 6oz/acre rate) to decrease cheatgrass competition for follow-up seeding efforts (fall 2019)
- majority of acres seeded were aerially seeded due to terrain limitations. (Tables 1 & 2)
- 7,614 acres were aerially seeded to a roadside green strip of Siberian wheatgrass and 'Immigrant' forage kochia to reduce future wildfire threats

Post-Seeding Monitoring

Treatments were given a rating of 1 (poor) to 10 (excellent)

- Aerial Elko Upland Seed Mix (rating 10)
- Green Strip Mix (rating 9)
- Aerial Winnemucca Seed Mix #2 (rating 8)
- Drill Winnemucca Seed Mix #1 (rating 7) (Fig 3.)
- Other seed mixes rated (< 5)
- Wyoming big sagebrush and western yarrow had the greatest establishment in aerial seed mixes. (Fig 4.)
- 'Immigrant' forage kochia established the greatest in the green strip mix
- Herbicide treated areas reduced cheatgrass densities (competition) however follow-up seeding efforts (fall 2019) had little success due to drought in 2020



Figure 3. Drill seeding of perennial grasses increased perennial grass density nearly 5-fold. Drill seeding perennial grasses (left) compared to unseeded area (right).



Figure 4. Sagebrush 4 years after seeding effort (Photo 2022)

Table 1. Aerially Applied Seed Mixes

Seed Mix	Species	Lbs.	Acres Seeded
Elko Seed Upland	Wyoming Big Sagebrush	24,040	
	Western Yarrow	2,400	24,035
Elko Seed Watershed	Basin Big Sagebrush	3,280	
	Snake River Wheatgrass	10,200	
	Thickspike Wheatgrass	35,800	
Winnemucca Seed Mix #1	Great Basin Wildrye	9,850	6,575
	Wyoming Big Sagebrush	4,080	
	Thickspike Wheatgrass	1,100	
Winnemucca Seed Mix #2	Western Yarrow	500	4,080
	Mountain Big Sagebrush	520	
	Thickspike Wheatgrass	100	
Winnemucca Seed Mix #3	Western Yarrow	100	520
	Mixture of all these species	174,000	17,963
	Non-Native		
	Siberian Wheatgrass	14,950	
	'Immigrant' Forage Kochia	4,120	
	'Snowstorm' Forage Kochia	3,460	4,091
	Total	288,500	57,364

Table 2. Drill Seeding Seed Mixes

SEED MIX	Species	Lbs.	Acres Seeded
Winnemucca Seed Mix #1	Snake River Wheatgrass	11,700	
	Siberian Wheatgrass	11,400	
	Thickspike Wheatgrass	4,400	
	Indian Ricegrass	1,800	
Winnemucca Seed Mix #2	Sandberg's Bluegrass	1,150	3,400
	Thickspike Wheatgrass	9,300	
	Snake River Wheatgrass	8,700	
Winnemucca Seed Mix #3	Great Basin Wildrye	1,500	
	Sandberg's Bluegrass	1,000	2,250
	Snake River Wheatgrass	1,112	
	Siberian Wheatgrass	1,106	
	Four-wing Saltbush	404	
	Thickspike Wheatgrass	300	
	Sandberg's Bluegrass	260	
	'Snowstorm' Forage Kochia	202	
	Bottlebrush Squirreltail	135	
	Great Basin Wildrye	101	337
	Total	54,570	5,987

Partnerships

One of the most noteworthy benefits of this successful project was the collaborative partnerships. They provide an opportunity to combine and stretch available resources further, making largescale timely efforts possible. Managing the landscape through collaboration ensures a more resilient environment and is a key element for successful rangeland restoration and rehabilitation.