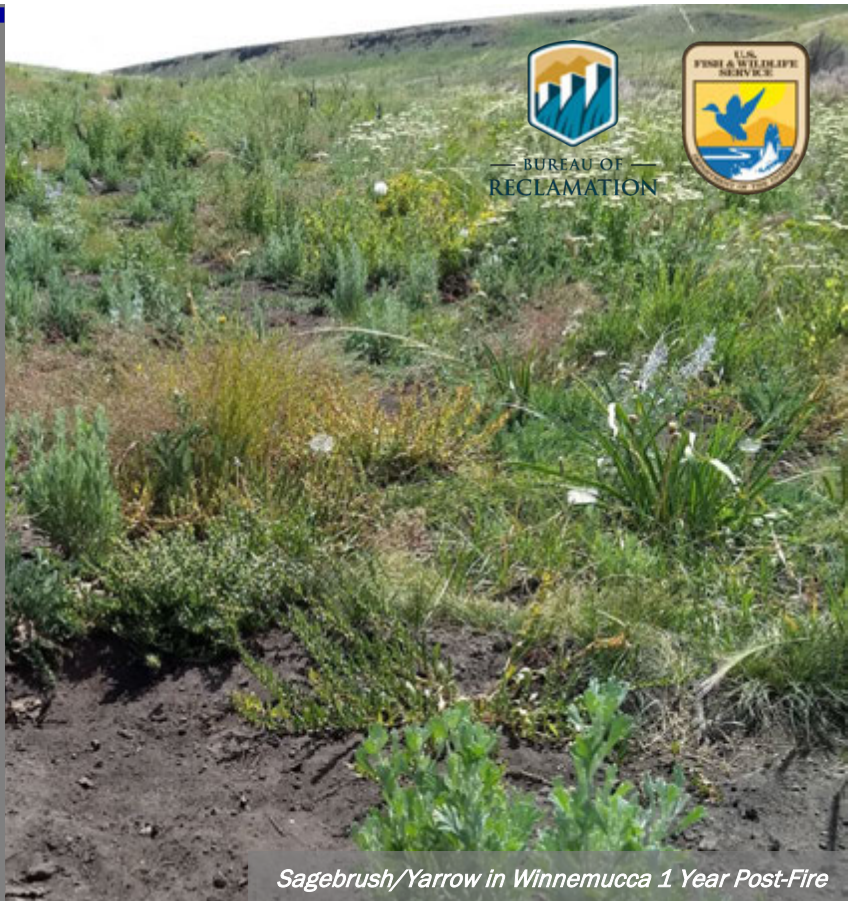
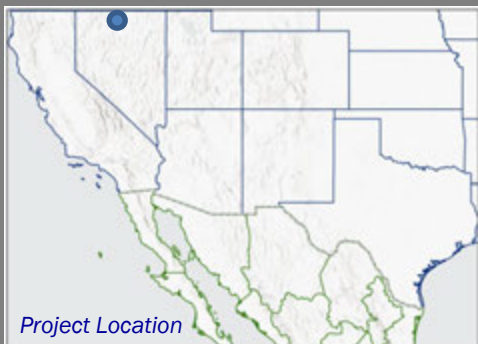


## RESTORATION

# Rangeland Restoration Following the Martin Fire in Reno, Nevada



The Martin Fire of 2018 burned 435,000 acres and is considered one of the largest fires in modern U.S. history. After the fire, the USDA Agricultural Research Service (ARS) of the Great Basin Rangelands Research Unit and the Nevada Department of Wildlife (NDOW) completed a restoration project on public and private land to rehabilitate the burned rangeland. Using herbicide and experimental seed mixes, the project sought to control cheatgrass (*Bromus tectorum*) and establish both native and non-native perennial species to lessen the long-term damage. The collaborative effort seeded 136,182 acres and treated 32,328 acres with herbicide, in addition to treatments implemented by the Bureau of Land Management.



*Sagebrush/Yarrow in Winnemucca 1 Year Post-Fire*

## KEY ISSUES ADDRESSED

Though fires are a natural occurrence in Nevada, the Martin Fire of 2018 was the largest recorded fire in state history. Increasingly dry climatic conditions lead to droughts and leave Nevada vulnerable to devastating wildfires. Following wildfires, rangelands are prone to invasion by cheatgrass, which reduces wildlife habitat quality and limits value for grazing. Furthermore, cheatgrass leads to increased wildfire activity, perpetuating the fire cycle which overwhelms native vegetation regrowth and increasingly degrades wildlife habitat. Sage-grouse, American pronghorn, bighorn sheep, elk, and mule deer rely on these habitats for forage and cover. Management intervention is required to break the cheatgrass-wildfire cycle for recovery of habitat quality and value for rangelands.

## PROJECT GOALS

- Restore rangeland by establishing a high density of native perennial species
- Enhance food and cover resources required for species of concern
- Utilize herbicide where the risk of cheatgrass invasion is high and then seed desirable species at sites that are without cheatgrass after one year
- Annually measure seeded species density and cheatgrass growth to gauge success of restoration

## STATE-FEDERAL PARTNERSHIP

While federal land management agencies cannot operate on private land, state agencies like NDOW can work on public and private land to comprehensively rehabilitate burned landscapes.



*Aerial Seeding Results: 2019 (Left) and 2020 (Right)*

## PROJECT HIGHLIGHTS

**Herbicide:** In the BLM Elko District (ED), herbicide was applied in a line to create a buffer with little vegetation areas to stop the spread of future fires into or near critical habitat areas. A herbicide treatment of 6 ounces of Imazapic and 3 gallons of water per acre was the most successful and cost-effective mixture. In the BLM Winnemucca District (WD), Imazapic was applied aerially in a mixture consisting of 6 ounces of Imazapic, 16 ounces of Infuse, and 5 gallons of water per acre.

**Native Seeding:** Several mixes of perennial native species were seeded after the fire, using both aerial and drill seeding. The various native seed mixes included bluebunch wheatgrass, Snake River wheatgrass, thickspike wheatgrass, Indian ricegrass, squirreltail, Sandberg's bluegrass, and Great Basin wildrye, yarrow, sagebrush species and others. A mix with only yarrow and sagebrush was especially successful.

**Desired Non-Native Seeding:** Mixes composed primarily of non-native seeds were also used due to anticipated high establishment rates in arid sites and capacity to provide food and cover for wildlife. The non-native seeding mixes included seeds of forage kochia, snowstorm kochia, and Siberian wheatgrass.

## Collaborators

- Charlie Clements, USDA ARS
- Mark Freese, NDOW
- Caleb McAdoo, NDOW

CCAST Author: Emily Bickle, SW Drought Learning Network, April 2021.

Photos courtesy of Mark Freese/NDOW

For more information on CCAST, contact Genevieve Johnson ([gjohnson@usbr.gov](mailto:gjohnson@usbr.gov)) or Matt Grabau ([matthew\\_grabau@fws.gov](mailto:matthew_grabau@fws.gov)).

Visit CCAST:



## LESSONS LEARNED

Implementing site-specific prescriptive treatments provides for increased success and allows for evaluation of multiple outcomes.

In both the BLM ED and WD, herbicide effectively suppressed cheatgrass, allowed seedlings to establish without cheatgrass competition. Visual surveys confirmed the success of native seeding. Seeded areas had high cover of seeded perennial plants compared to cheatgrass and bare ground. Seeding sagebrush and yarrow strips across large areas was highly effective. Aerial non-native seeding and drill seeding by NDOW in the BLM WD was moderately to highly successful in providing wildlife with forage and cover.

Monitoring through time was important, as treatment success varied in wet (2018-2019) and dry (2019-2020) years.

Partnerships added durability to the project. Part of BLM's efforts were inhibited by furloughs, so BLM provided 174,000 lbs of seed that NDOW applied to 17,963 acres.

## NEXT STEPS

- Continue to use the test plots to find improved seeding mixes and herbicide treatments
- Adopt herbicide treatment to control cheatgrass on other acres of the rangeland
- Seed in locations where herbicide treatment was administered in 2018 and 2019 but native species have not returned to the landscape
- Use herbicide and fire-resistant plant materials to install green strips and build an improved environment for future fire suppression efforts

For more information on this project, contact Charlie Clements, USDA ARS: [charlie.clements@usda.gov](mailto:charlie.clements@usda.gov)



*Results of Drill Seeding in 2020, 2 Years Post-Fire*