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## Yellowstone Park restoration work progressing



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A northern corner of Yellowstone National Park degraded by decades of inappropriate use and overrun with nonnative vegetation is showing signs of recovery following the first four years of a 10-year study.

"We think patience will show it to be successful," said Mary Hektner, who oversaw implementation of the project in the Gardiner Basin for the park and is now retired.

The results of a study published in the 2012 issue of the journal *Yellowstone Science* showed that elimination of

nonnative plants with herbicide inside three fenced plots, which were then replanted with barley and winter wheat to rebuild the soil, are responding well. Soil organic matter in the fenced study areas increased 40 percent in two years compared with soil outside the fence, according to a study written by researchers Bill Hamilton, of Washington & Lee University, and Eric Hellquist, of State University New York-Oswego.

The research also showed that soil microbes were more diverse near native species than nonnatives.

### Drastically altered

Used by American Indians for centuries, the Gardiner Basin was settled by Euro-Americans in the late 1800s. The town of Cinnabar was established there in 1883, growing up around the rail terminus for those traveling to newly established Yellowstone National Park. Ten years later, the town was moved, buildings and all, to Gardiner as the rail line extended farther south.

The basin was then used for agriculture, with some of the old irrigation canals still visible on the landscape. Then in 1929 and 1932, the Park Service purchased the property to extend its boundary to encompass wintering areas used by park wildlife -- mainly pronghorns, elk and bison.

The Park Service continued to farm the land for awhile, before seeding it to crested wheatgrass in the 1940s and '50s. Crested wheatgrass was well adapted to the area's arid climate, where only about 10 inches of moisture falls a year, but it was a poor forage base for wildlife.

Since the 1990s, the basin has been overrun by desert alyssum, an exotic mustard plant. The alyssum has formed a monoculture, blocking out native grasses and reproducing quickly through vigorous seed production.

### Righting past wrong

In 2008, after consulting other agencies and experts, the Park Service launched the current project, fencing off three plots totaling about 30 acres at Cinnabar, Stephens Creek and Reese Creek to keep wildlife out while the soil is regenerated and native plants are re-established.

The 10-year period for the study was chosen because it takes years for the soil to be restored and the natives to establish a strong foothold.

"You can't just seed it and walk away and expect it to come back," Hektner said.

The soil was initially planted with barley and winter wheat to rebuild the organic matter. In the third year, native grasses such as bluebunch wheatgrass and needle and thread grass were seeded.

The native seeds are not easy to get. The Bridger Plant Materials Center, an arm of the Natural Resources Conservation Service, is one of three sites in the nation growing native grass seeds for the park. The Bridger center was the first in the United States to develop a cooperative agreement with the National Park Service, said Susan Winslow, an agronomist at the center. The other two sites growing seed for Yellowstone are in Aberdeen, Idaho, and Meeker, Colo.

Because only seed that is collected in Yellowstone is used to reseed the area, the crops at the plant center are confined to a small area. Winslow said less than an acre is seeded right now with the two grasses. From that, less than 100 pounds of seed will be collected.

The plant center also raised eight other species of native grasses to see how they might fare in the arid climate of the Gardiner Basin. Those species were planted last fall and are already poking out of the ground, Winslow said.

### Looking ahead

Hamilton and Hellquist, in their article for Yellowstone Science, referenced previous research that called the Gardiner Basin "the most extensively invaded expanses of grassland in Yellowstone due to its 125-year history of human use, agriculture and disturbance."

Restoring the roughly 700-acre basin will be no quick process.

"The area down there is essentially a desert," Hektner said. "There are only 9 to 10 inches of rain and snow. In some places there is a lot of sodium. And there's a lot of wildlife there in the spring and winter."

Key to restoration is keeping the wildlife out. The 8-foot-high fences are made to be recycled, so once a parcel is restored, the fence can be taken down and moved to a new area where the process can start all over again.

Bit by bit, the area eventually may be returned to a more natural state. Hektner said she can't help but admire the progress of the work she helped start.

"It is a very exciting project," she said. "I go by there and take a lot of satisfaction in having been involved."