

Wetland Protection and Beaver Habitat Restoration as Climate Adaptation Tools in New Mexico

Overview

The New Mexico Wetlands Program (NMWP) is taking a unique approach to protecting their wetlands and the services they provide from a changing climate. Key elements of their work include identifying and creating habitat suitable for beaver reestablishment to strengthen wetland resilience, convening a statewide workshop and conducting outreach to disseminate information on the benefits of wetlands and beaver, and coordinating among government agencies and technical experts to achieve wetland and riparian habitat protection. The presence of dam-building beaver reduces high flows and flash flooding that can cause destructive erosion, provides more constant seasonal flows, reduces fire hazard, elevates the water table, and improves riparian habitat. Together, these activities are critical to effective climate change adaptation in the State of New Mexico.

Background

Beavers can provide healthy wetlands that improve adaptation to a changing climate through natural ecological resiliency, connectivity across aquatic and terrestrial ecosystems, and expanded thermal refugia. Ecosystem benefits begin immediately when beaver dams are built and often continue long after dams are abandoned. The current absence of beavers from large portions of their historic range in New Mexico significantly undermines the resilience of aquatic ecosystems, limiting adaptation to climate change. Wetlands and riparian habitats additionally provide important ecosystem services that buffer the [impacts](#) of increasing temperatures and drought, catastrophic wildfires, and flooding associated with climate change.

Before beaver populations could be rebuilt, a systematic and thorough assessment of prospective habitat and possible barriers to population recovery was needed. In 2012, the NMWP undertook the "[Assessing Beaver Habitat on Federal Lands in New Mexico](#)" project. The goals of the project were to: update wetland mapping in a portion of Northern New Mexico where beaver populations are known to occur; identify potential, suitable, and occupied dam-building beaver habitats using a remote sensing model on all federal, public lands; and convene an expert workshop to

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exchange information and promote the recovery of beaver populations. Information collected during the project facilitated both higher success rates in relocating beavers and habitat restoration efforts to encourage natural beaver repopulation in suitable and critical areas on federal lands.

Assessing Beaver Habitat to Help Protect Wetlands and Build Ecological Resilience

A Beaver Habitat Assessment Model was created for federal lands in New Mexico using publicly available GIS data. To inform the Model, a technical steering committee of beaver and wetland ecology experts was convened to identify key habitat features for defining a successful beaver habitat. Habitat conditions were represented in the Model by three GIS layers: suitable, potential, and occupied dam building beaver habitat. Once the GIS layers were applied to federal lands, the model's accuracy was tested by comparing field data at 18 randomly selected sites in the Jemez Mountains to modeled variables of vegetation type, stream gradient, and percent of canopy cover. Aside from identifying locations where beavers can be effective partners in restoring and preserving wetlands on federal lands, the project significantly advanced the knowledge and understanding of wetlands in north-central New Mexico. The NMED Surface Water Quality Bureau currently provides public access to the Model and GIS shape files on their [website](#).

Education and Outreach

A statewide Beaver and Wetlands Workshop was held in 2013, bringing together beaver ecology experts and

participants from State, federal and local agencies, private landowners, non-profits and other key stakeholders. Topics included beaver ecology and ecosystem services, the beaver Habitat Assessment Model, other statewide beaver management plans, and strategies and techniques that private landowners can use to live in harmony with beavers. Ongoing and potential obstacles to the establishment or expansion of functional beaver populations were discussed, as well as actions to eliminate or alleviate these barriers.

Education and outreach is critical to help alleviate the barriers to beaver establishment by strengthening public understanding of the benefits provided by beavers and healthy wetlands; especially during times of drought, limited water supplies, and forest fire events. To this end, the NMWP provides presentations and poster sessions at events for stakeholders and the public. The Program also encourages non-profits and others to conduct beaver habitat restoration projects, which include hands-on education components that teach participants (State Park visitors, students, and teachers) about the importance of wetlands, beaver restoration and management techniques, and wetland habitat monitoring techniques.

Promoting Adaptation by Restoring Wetlands, Headwaters, and Riparian Habitats

The NMWP is pursuing several other innovative practices to improve and restore wetlands, headwater streams, and riparian habitat that help create climate change resilience. As the third driest state, the resilience of New Mexico's high elevation wetlands and headwaters are critical to downstream water resources that provide drinking water and other public benefits. New Mexico has been using innovative techniques to protect and restore riparian areas from overgrazing by allowing native vegetation to recover. Examples of this work include the "[Rio de las Vacas Wetlands Restoration Project](#)," which included the innovative "Hemi-Fences" technique to protect fragile river banks from being over-trampled and grazed, and promote recovery of riparian shrubs. Another innovative technique was developed for the "[Stewart Meadows Waterfowl Improvement Project](#)," which designed and used "Flow Splitters" to rewet natural floodplain and promote wet meadow habitat for migrating waterfowl in a critical area of the State. Other projects using innovative practices to restore headwaters and slope wetlands include the "[Restoring Watersheds](#)

[and Wet Meadows on the Valles Caldera National Preserve](#)" and the "[Innovative Design and Restoration of Slope Wetlands in the Comanche Watershed](#)."

NMWP partners with a number of insightful wetland restoration contractors to develop activities that engage volunteers in using these innovative techniques, which reinforces the State's Wetland Restoration Toolbox. The Program has additionally released a monitoring and maintenance guide for landowners and volunteers called [Healthy Streamside Wetlands](#). The guide is intended to promote public stewardship by providing background information on what constitutes a healthy riparian area or wetland, as well as easy and inexpensive techniques to maintain their health.

Wetland Mapping and Monitoring

Opportunities to restore and protect wetlands are hindered by the lack of up-to date, statewide wetland mapping and classification data. As this information is critical to the Program's growth, NMWP is currently working on wetland mapping, classification, and identifying wetland functions for all State wetlands and riparian areas excluding tribal lands. NMWP has completed mapping and classification in the northeastern and north central parts of the State, covering 214,895 acres of wetlands, riparian, and deep water habitat. They have also identified wetland functions within a total area of 15.1 million acres (about 16% of New Mexico's total land area). Data from these efforts were used to develop several wetlands protection and restoration planning documents: [Upper Pecos Watershed Wetlands Action Plan](#), [Upper Gallinas Watershed Wetland Action Plan](#), [Comanche Creek Wetland Action Plan](#), and Moreno Valley Wetland Action Plan.

Mapped data are also being used to advise ongoing statewide planning efforts, such as the Forest Plan Revisions for the Carson and Santa Fe National Forests. Furthermore, local governments are using the maps to identify wetland resources for planning and NMWP is identifying assessment units for wetlands water quality standards. These mapping efforts also offered unique opportunities to build personal relationships with ranchers, multilateral government agencies, and communities in a tapestry of land ownership. One example of such partnerships includes the Wetland Gems Project, which is presently resulting in the identification of high resource value wetlands in both the Carson and Santa Fe National Forests.

The Program continues to expand its monitoring efforts with the development of [Rapid Assessment Methods](#) for New Mexico's arid region wetlands [New Mexico Rapid Assessment Method (NMRAM)]. To date, the NMWP and its partner Natural Heritage New Mexico have developed NMRAMs for several types of wetlands and are working with the Corps of Engineers to develop a Regulatory Module of NMRAM. For the Montane Riverine NMRAM, active beaver dams within a sample area were found to significantly improve the overall score for the site.



El Rito Creek (Carson National Forest)



Stewart Meadows (Carson National Forest)