

Debbie Hughes is the executive director of the New Mexico Association of Soil & Water Conservation Districts. She has served on a variety of community organizations including chairperson of the Pecos Valley Water Users Organization, secretary-treasurer of the Pecos River Native Riparian Restoration Organization, secretary of the Sureste Resource and Conservation District, a member of the Interstate Stream Commission's Template Group, and the New Mexico Water Planning Dialogue Board of Directors.



WATERSHED MANAGEMENT ISSUES

Debbie Hughes
New Mexico Association of Soil & Water Conservation Districts
163 Trail Canyon Road
Carlsbad, NM 88220

Watersheds—the land that water flows across or under on its way to a stream, river, lake or ocean—are complex ecological systems at the very core of the mission of the Soil and Water Conservation Districts. Everyone lives in a watershed and everyday activities influence what happens in a small or large watershed. Conserving the entire watershed is important since humans, plants, animals, microorganisms, soil and water interact and depend on one another to survive and thrive. Water quality and quantity are a result of how effective the interdependence is and that requires stewardship of the land and natural resources. (This quote was taken from *Corriente* - the annual report of Tierra y Montes Soil & Water Conservation District.)

Soil & Water Conservation Districts (SWCD) are involved in several aspects of watershed management

in New Mexico. The following are examples of ongoing projects throughout the state.

Historic Increases in Woody Vegetation

A study of the historic increases in woody vegetation as documented by comparing photographs dating from 1889 to 1997 in Lincoln County, New Mexico is being conducted by the Carrizozo SWCD and the Natural Resources Conservation Service (NRCS). Knowledge of historic changes in rangeland vegetation is important for understanding the dynamics of the indigenous plant communities in the Southwest, throughout the United States, and elsewhere. The objective of this study is to use as many old historic landscape photographs as possible to document noticeable changes in vegetation, if any, in Lincoln County.

The methods used in this study involve finding old landscape photographs, locating and photographing each old photo site to show precisely the same scene,

comparing the past and present photographs, and recording noticeable changes in vegetation. Forty-two old photos have been found, dating from 1889 to 1912 in private collections and U.S. Geological Survey archives. To date, 32 sites have been found, representing approximately 500,000 acres. In every case, from past to present, the comparison photographs show an obvious increase in woody or shrubby vegetation. In many cases, the proliferation of trees and shrubs have overwhelmed the landscape. Grass cover appears to have increased in some cases and decreased in others. Several factors, including little or no livestock grazing on some sites and the lack of wildfires over the past 100 years, are most likely the causes of this historic change in vegetation.

Value Added Juniper Chipping Demonstration Project

Another ongoing SWCD project is the Value Added Juniper Chipping Demonstration Project conducted by South Central Mountain Resource Conservation and Development (RC&D). Brian Greene, a cooperater from the Claunch-Pinto SWCD, combines brush management activities with potential economic development. This project is a cooperative project with the RC&D, NRCS, U.S. Forest Service, Rycare, Inc., Boise, Idaho and P&M Signs, Inc., Mountainair, New Mexico. Testing is being conducted in the Kaibab National Forest District in Arizona.

Cooperators are pleased with initial results. Porcupines had been destroying signs but since porcupines do not like the taste of cedar, the new cedar signs remain intact. The U.S. Forest Service has contracted for \$10,000 worth of signs and the potential exists for a \$100,000 order in the near future. Signs will be placed in various regions of the country. This is a win-win project for the environment and economic development.

The Gila Monster Project

The Gila Monster Project, a watershed and stream bank restoration project, is underway in southwestern New Mexico and Arizona. Historic records and the existence of deep fertile soil, indicate the Gila River was very stable for many years. Beginning in the early 1970s, the farming valleys of the Gila River began experiencing destructive flooding; 135 acres of

deep soil was lost in two months of 1995. Rainfall and streamflow records show that average rainfall has increased by one inch in the past 70 years but runoff has doubled. Causes of the runoff problem are being studied but early indications are that logging has had an insignificant effect on the watershed. Grazing impacted the watershed from the 1890s-1930s but no longer plays a significant role. Fire control, however, has allowed the proliferation of woody vegetation, through which competition for light and water has seriously reduced herbaceous vegetation. A healthy ground cover of grasses and broad-leaved forbes retain water, slow sheet erosion and allow the watershed to function.

The Gila Monster Project is an interstate effort to deal with the runoff problem. Resident landowners and 27 governmental agencies are cooperating in an effort to reintroduce fire to the ecosystem of the Gila watershed. The project also is building erosion control structures, stabilizing stream banks, and promoting Best Management Practices with the goal of lowering the high flow runoff events and raising the low flow runoff.

The project is spearheaded by the three effected SWCDs in New Mexico: Grant, Hidalgo and San Francisco. In Arizona, the effort is led by the Safford-Duncan-San Carlos Natural Resource Conservation District and the Bureau of Land Management.

Gallinas Watershed Restoration Project

This project has 17 landowners enrolled in the Stewardship Incentive Program Focused Grant Project. Many of these landowners have started work in the areas of riparian restoration, grade stabilization, thinning and other practices which will improve water quality and watershed health. Approximately 3,000 informational booklets on the project have been distributed.

The Upper Pecos Watershed Project

This project initially will be funded by 319 water quality and private foundation grants. The project is a cooperative effort with New Mexico's Forestry Division, State Highway and Environment departments, the Pecos Watershed Association, Tierra y Montes SWCD, and the National Park Service.

Pecos River Native Riparian Restoration Project

Another effort aimed not at the top of the watershed but rather in the river basin itself is the Pecos River Native Riparian Restoration Project. The Board of Directors for the project comprises the Carlsbad Irrigation District, Carlsbad SWCD, Central Valley SWCD, Chaves SWCD, Dexter-Hagerman SWCD, Pecos Valley Artesian Conservancy District, and Peñasco SWCD. The objectives are to demonstrate native wetlands and wildlife habitat improvement through salt cedar management; demonstrate effective, economical and environmentally sound salt cedar control; and monitor possible hydrologic effects from salt cedar control and management. The project area is approximately 5,000 acres. The area had to be mechanically cleared for the baseline studies and ten monitoring wells were drilled. Clearing was done around the existing groves of cottonwood and black willow. Roots were then sprayed with a herbicide mixture of Arsenal and Round-Up, with die mixed in so that treated areas could be seen. Some re-sprouting occurred and was treated with a carpet-roller attached to a tractor.

The wildlife part of the study focused on all types of animals from birds to mammals to reptiles. The day finally came to treat the large areas and we used a fixed-wing airplane, carefully excluding the cottonwood areas. Much of the area was covered with a canopy of salt cedar. Other areas did not support much of any type of vegetation because of the soil quality. Herbicide was very cautiously applied in the demonstration area, leaving a 100-foot buffer zone along the river (Figure 1). We think we did a pretty good job. The cottonwood-black willow groves still look healthy and should thrive without the competition from the salt cedar that was killing them (Figure 2).

The project is in its fifth year of a ten-year project period. This spring clearing, control burns and re-seeding in the area will take place. Cooperators are very excited about the re-vegetation phase, but realize they are dealing with poor quality soil and water.

New Mexico has a tremendous brush problem. Northern New Mexico has piñon/juniper and big sagebrush; western New Mexico has piñon/juniper and rabbitbrush; southern New Mexico has mesquite and creosote and eastern New Mexico has chinney oak. Studies at Oregon State University found the



Figure 1. One-hundred foot buffer zone along the Pecos River.



Figure 2. Cottonwood-black willow groves within the restoration area.

consumptive water use of Western Juniper for a 12-inch diameter tree to be 14 gallons/day (average spring day) and 32 gallons/day (average summer day). Using that data, and assuming winter use to be 7 gallons/day, average daily consumptive use would be 17.7 gallons/day/tree. The following water use

figures are interesting indicators of brush impacts on rangelands: one hundred trees per acre at 17.7 gallons/day is 1,770 gallons/day/acre or 646,050 gallons/acre/year or 413,472,000 gallons/section/year. We have 500 trees per acre in several places in New Mexico instead of the 100 trees per acre. The water consumed by the junipers is pretty astounding.

As you see, we have a lot of work to do to improve our watersheds and bring them back to their proper function. We have water development opportunities in our desert state, but we must first restore our watersheds.