

The Benefits of Restoring Our River Ecosystems

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The residents of New Mexico derive a whole host of benefits from their state rivers, from drinking water to food and fiber production. The purpose of my talk today is to emphasize additional and significant benefits that arise when we conserve and restore the health and ecosystem function of our state's rivers.

A major river restoration effort on the Middle Pecos River is a good illustration. The Pecos River restoration project (Fig. 1) was funded by the State's River Ecosystem Restoration Initiative in 2007. The project's objectives were to restore an active

floodplain and create quality habitat for native fish, birds and plants. The state's restoration funds leveraged significant federal funding and employed private sector contractors. The project enhanced the Pecos River through the Bitter Lake National Wildlife Refuge, which draws 150,000 visitors annually to Roswell. Post-project monitoring suggests a positive response in the abundance of the federally threatened Pecos Bluntnose Shiner, which can help to reduce the likelihood of federal intervention in water management on the Pecos River. The restoration project accomplished all of this without increasing the net depletion of water.



Figure 1. Pecos River Restoration Project-reopening a historic meander and closing a channelized reach (2009) © Ken Stinnett

One of the least recognized but significant benefits of restoring New Mexico's rivers are the jobs and revenue they generate from tourism. Tourism is the world's largest industry. Here in New Mexico, nicknamed the "Land of Enchantment," tourism is our second largest industry, bringing in more than \$5.7 billion annually. Within the tourism industry, ecotourism or nature based tourism is the fastest growing segment. Americans love nature. Wildlife viewing, and that includes birdwatching, is the single largest national recreational activity. For example, one in every five Americans watches birds—that is twice as many golfers and five times as many skiers. In New Mexico, nature based tourism accounts for more than half of the tourism industry's revenue. Sixty-six percent of the state's tourism dollars are generated from fishing, hunting, and outdoor recreation. There is a positive correlation between wages in rural counties and recreational tourism. Wage earners in rural recreational counties earn on average \$2,000 more per worker.

One of the ecotourism success stories in New Mexico is the Bosque del Apache National Wildlife Refuge. The refuge is located on the Central Flyway, a major migratory thoroughfare for ducks and cranes and songbirds; the equivalent of an I-40 for birds. The refuge is located in Socorro County, the second poorest county in New Mexico. Local economic effects associated with recreational visits to the refuge totaled more than \$13 million annually from non-residents across the three counties of Socorro, Bernalillo, and Sierra. More than \$2 million is derived just during the six-day Festival of the Cranes.

If wildlife is the cornerstone of the tourism industry here in New Mexico, healthy rivers keep that industry thriving. Our state's rivers are an important source of the state's biodiversity. Although rivers, lakes, and wetlands comprise a tiny percentage of the earth (one percent of the land), they play an essential role in supporting life on earth. Species richness per unit area is greater in freshwater than marine or terrestrial habitats. In New Mexico, riparian ecosystems support a greater diversity of plants and animals than the state's upland habitats. Eighty percent of all sensitive vertebrate species in New Mexico use riparian or aquatic habitats at some time during their life cycle. When it comes to New Mexico's bird life, two-thirds of the state's Important Bird Areas occur at freshwater sites. Important Bird Areas are Audubon designated sites that provide essential

breeding, migrating, or wintering habitat for one or more species of bird. They are generally discrete sites that support one or more high-priority species, large concentrations of birds, exceptional habitat, and/or have substantial research value.

Restoring the state's rivers promotes long-term sustainable economic growth that extends beyond tourism. Targeted investments in river restoration improve New Mexico's quality of life, which in turn attracts new businesses to the region. With increased mobility of today's businesses, entrepreneurs often decide to locate their companies in areas with high quality of life such as places rich in natural amenities. The same qualities that attract businesses also attract retirees and people with investment income.

River restoration also creates jobs for New Mexicans. The Department of Interior estimates that for every \$1 million invested in restoration, an average of 30 jobs are created—largely in the private sector. During the first two years of the state's River Ecosystem Restoration Initiative, the state's investment of five million dollars created hundreds of employment opportunities over seventeen counties. A total of 222 full-time, part-time, or temporary restoration-related jobs in the private sector were documented.

Restoration also leverages federal and private funding and services from which New Mexico would not otherwise benefit. Grantees of the state's River Ecosystem Restoration Initiative reported more than a two-to-one match from other private, state, and federal funding sources and in-kind services. Twenty-seven river restoration projects matched the state's five million with three million in other funding and three million in in-kind services.

Healthy, functioning river ecosystems also provide ecosystem services that help to sustain and fulfill human life. Figure 2 is a list of commonly recognized ecosystem services. The services listed below are so fundamental to life that they are easy to take for granted, and so large in scale that it is hard to imagine how human activities could disrupt them. Most importantly, these services are performed free of charge. The cost of providing these services through man-made technology would be staggering. And yet, rarely do we acknowledge the value of these ecological services in decisions about water allocation, management, and development.

- Generate and maintain biodiversity
- Source of genetic and biochemical resources
- Purify water
- Retain water and recharge groundwater
- Buffer droughts
- Regulate flood peaks and flow velocity
- Cycle and move nutrients
- Moderate weather extremes

Figure 2. List of ecosystem services provided by rivers

A good example is New York City, which derives most of its drinking water from reservoirs in the Catskill Mountains. As development pressures increased in the Catskill region, water quality began to deteriorate. New York City residents were faced with building a new filtration plant that was estimated to cost \$6 to \$8 billion to construct and over \$300 million annually to operate. Instead of the infiltration plant, the residents passed a \$1.5 billion dollar environmental bond to restore quality to the City's drinking water. The bond proceeds were used to acquire lands, improve local sewage treatment, and pay farmers to forgo streamside production of crops and forage. In this case, investing in the natural asset and paying rural communities to help secure this service, was cheaper than providing the same service using man-made technology.

One ecosystem service in particular, moderation of weather extremes, warrants additional attention. Increased greenhouse gas emissions are projected to increase the temperature of air and surface water, and change the patterns of precipitation and run-off. A recent publication in *Ecological Restoration* concludes that restoring rivers can help humans and animals cope with increased climate variability. According to the authors, river ecosystems are naturally resilient to disturbance like droughts and floods and have a high rate of recovery. This resiliency can promote ecological resiliency to increased variability both within and beyond riparian zones. As the physical environment changes, species will adapt better if they can move between systems and elevations. Rivers by their very nature provide natural wildlife corridors and habitat connectivity for movement and dispersal. Riparian areas also provide thermal refugia as air and water temperatures rise. Water absorbs heat and is a buffer against higher air temperatures. Riparian vegetation provides shade helping maintain cooler water temperatures and blocking searing winds.

As the preceding paragraphs demonstrate, healthy, functioning rivers can reap big benefits for New Mexicans. Unfortunately, evidence suggests that the health of our state's rivers is declining. The greatest stressors to our state's rivers are over-allocation of water, regulated river flows, channelization, and invasive species. The rate of loss of freshwater species in North America is comparable to species loss in tropical rainforests. Here in New Mexico, significantly larger numbers of amphibians (58%) and crustaceans (91%) are recognized as "species of greatest conservation need" than other taxonomic groups. More than half (55%) of New Mexico's native fish species are threatened, endangered, or already extinct. Almost one third (31%) of New Mexico's assessed stream miles have water quality impairments. Habitat conversion along our river corridors is substantial. Ninety percent (90%) of New Mexico's and Arizona's original riparian forests are gone. One-third of the wetlands that existed in New Mexico no longer exist. The state's Comprehensive Wildlife Conservation Strategy identified the state's freshwater habitats as key areas to focus conservation efforts because they contain key habitats, high diversity of species of greatest conservation need, are subject to ongoing habitat alterations, and lack legal constraints or long-term management plans to protect them from future modification.

This brings us back to the central theme of this conference: "How will institutions evolve to meet our water needs in the next decade?" If we hope to continue to derive benefits from healthy living rivers, our institutions will need to address the water needs of rivers. Rivers need water. A river's natural ecosystem function is strongly dependant on the ability to protect or restore a natural flow regime or key attributes of a natural flow regime. Riparian ecosystems are a flood-driven environment, dependant on surface and subsurface stream flow as well as seasonal flows for plant recruitment, growth and maintenance. The importance of natural flow is recognized in the state's Comprehensive Wildlife Conservation Strategy and the New Mexico's Statewide Natural Resources Assessment, Strategy and Response Plan.

New Mexico has lagged behind other western states in dedicating water to rivers, but in the last decade New Mexico has embraced new legal and policy tools for dedicating water to our state rivers. As early as 1998, the New Mexico Attorney General opined that the New Mexico constitution,

statutes, and case law afford legal protection to instream flow for recreational, fish or wildlife, or ecological purposes. (AG Opinion No. 98-01, March 27, 1998). In 2005, the State Engineer amended the regulatory definition of “beneficial use” to include “the use of water . . . for fish and wildlife” (NMAC §19.26.2.7(D)). Currently, there are at least three approaches that are being utilized or proposed to restore some component of natural flow regimes and/or irrigate off-stream riparian habitat in New Mexico.

The first tool is the Strategic Water Reserve, NMSA § 72-14-3.3. Enacted in 2005, the Strategic Water Reserve authorizes the New Mexico Interstate Stream Commission to acquire water or water rights for the benefit of threatened and endangered species or to avoid additional listing of species. To date, the Interstate Stream Commission has used the Strategic Water Reserve to acquire groundwater rights to enhance flows on the Pecos River for the federally threatened Pecos Bluntnose Shiner.

The second tool is a provision under the state’s forfeiture statute that was enacted to remove the perverse incentive of using water to avoid losing it. Under NMSA § 72-5-28(G), forfeiture of water rights is tolled during periods of nonuse when rights are placed in a state engineer approved water conservation program. Recently, the Office of the State Engineer authorized a water conservation program of the Gila National Forest on the Mimbres River to allow placement of private, corporate, and federally held water rights in a program, indirectly preserving instream flow for the federally threatened Chihuahua Chub (Cause 6326).

The third tool is a market based environmental water transaction program that Audubon New Mexico, the Elephant Butte Irrigation District, and the U.S. International Boundary and Water Commission are implementing in the Bureau of Reclamation’s Rio Grande Project below Caballo Reservoir. Under this initiative, water rights or water could be acquired or leased and transferred with District Board approval to benefit streamside restoration. Application of water to these sites would be considered an agricultural use of water; for example, growing a crop of cottonwoods or wild millet. A more far-reaching proposal would be to utilize the Miscellaneous Purposes Act under federal Reclamation law to release a periodic environmental peak flow from Caballo Reservoir to enhance connectivity between the river and the

floodplain at restoration sites. This would require the consent of both irrigation districts within the Rio Grande Project and the Bureau of Reclamation.

Although these tools each have their limitations, we are in a better position today than we were a decade ago to address the water needs of our rivers. Audubon believes the opportunity exists to do more and is working to advance more tools for environmental flows benefiting our river ecosystems in New Mexico.

A related question to meeting the water needs of our rivers is how will our institutions evolve to meet the restoration needs of our rivers? Currently, there are no dedicated reoccurring funds in New Mexico available for river restoration. But public opinion is in support of the state’s investment in restoration and conservation. In a survey conducted in 2004, 61 percent of New Mexicans believed that a permanent, stable source of public funding should be set aside “to protect unique natural lands, wildlife species and drinking water sources.” In an earlier poll conducted in April 2002, 84 percent of New Mexicans strongly favored “preserving land that protects water quality in aquifers, rivers and creeks.” From 2004 to 2010, the state legislature appropriated annual funding for conservation of natural lands and river ecosystem restoration. Those yearly appropriations have accomplished great things for New Mexicans and the state’s rivers and natural heritage. During the four years of funding, the state’s River Ecosystem Restoration Initiative awarded over \$8 million in grant funding to 47 community-based restoration projects. In just the first two years of funding, the initiative benefited over 2000 riparian acres and restored 30 river miles in 17 counties.

There are numerous opportunities at the federal and state level to enhance our ability to restore New Mexico rivers. Here are a few recommended approaches.

- Provide dedicated, recurring state funding for the River Ecosystem Restoration Initiative and the newly enacted Natural Heritage Conservation Act (NMSA § 75-10-1 et al.);
- Reauthorize and secure federal funding for the Army Corps of Engineers Rio Grande Environmental Management Program, Sec. 5056 of the 2007 Water Resource Development Act;

- Update regional water plans to quantify and address the water needs of the region's streams and rivers and how proposed regional water supply solutions will impact the ecological health of these stream segments;
- Coordinate and prioritize river and flow based restoration projects across the state's six natural resource agencies through the New Mexico Water Cabinet;
- Increase Water Trust Board funding for river restoration projects;
- Reauthorize the Middle Rio Grande flood control projects for the multiple purpose of ecosystem restoration and flood risk reduction; and
- Submit a state proposal to the Bureau of Reclamation under the Secure Water Act to develop strategies to address future water shortages and impacts to the environment from climate change on the Rio Grande.

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