

MANAGEMENT IMPACTS ON FISHERY AND RECREATION

IN THE RIO GRANDE

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The New Mexico Department of Game and Fish is charged with protecting and managing game mammals, game birds, raptors, song birds, game fish, and select nongame species including some mammals, birds, fish, reptiles, amphibians, mollusks, and crustaceans. This responsibility is shared with the U. S. Fish and Wildlife Service, especially as regards migratory waterfowl, raptors, and federal endangered species.

Chapter 17 of the State's Statutes establishes the department's general powers to protect and manage the state's wildlife and fishery resources and embodies most of the state laws protecting these resources. Most broad reaching habitat protection laws are administered by other agencies; however, habitat issues are commented on routinely by my agency as provided by the National Environmental Policy Act, the 404 Dredge and Fill permitting procedure, the Endangered Species Act, etc.

Water management decisions affect all animal groups over which the New Mexico Department of Game and Fish has

jurisdiction. However, my comments will be restricted to fishes as they are most immediately affected by water management decisions. Emphasis will be placed on watershed conditions and how these influence water management decisions; and finally, how the interplay of these factors affect fish and water-based recreational activities in general.

New Mexico is an inhospitable place for fishes. Averaging only 13 inches of rainfall each year, it is the third most arid state in the nation. In spite of this, New Mexico supports one of the most diverse ichthyofaunas of any of the interior southwestern states. Some 69 species of native fish are known to have occurred in New Mexico's waters and approximately 40 species of exotic fish have been successfully introduced here by man. The diverse native ichthyofauna exists because six of the seven life zones exist in New Mexico and six biogeographic provinces converge in the state. As such, New Mexico represents a series of ecotones with many species of fish existing here peripherally and many are sensitive to environmental change.

Within the Rio Grande, 27 species of native fish (representing 12 families) are known to have occurred here, many of which are obligate or facultative big river fishes, including: shovelnose sturgeon, blue sucker, gray redhorse, longnose gar, freshwater drum, phantom shiner, and bluntnose

shiner. All of these and many others are presently extirpated in the Rio Grande of New Mexico; however, their former presence is evidence of more prosperous times. Testimony to this effect is provided by Spaniards as they entered the Mesilla Valley during the 1550s. At that time, they found the Rio Grande to be a perennial system composed of a series of large lagoons and marshes flanked by gallery forests of cottonwoods, willows, and shrubby phreatophytes - all in stark contrast to today's ephemeral condition.

After the Civil War, immigration by Anglo-Europeans into the Rio Grande Valley of New Mexico accelerated. Irrigation activities intensified and the grazing industry emerged - all of which brought about dramatic changes in hydrologic conditions. By 1880, every piece of available irrigable land was under development and people began to complain of water shortages. The river is known to have gone dry during 1879, 1891, 1894, and 1896. Keep in mind that this desiccation of the river occurred nearly 40 years before the construction of any large reservoir on the river. Degradation of the watershed continued and by 1907, army engineers described the Rio Grande as a storm water system subject to large oscillations in flow.

The effects of overgrazing are graphically represented in the Rio Puerco Valley where seeps and occasional storm waters flow through a 30-foot deep, vertically walled

arroyo. But before 1885, this incised arroyo did not exist. The period of its cutting coincides with the maximum grazing of livestock in the valley. The increased sediment load of the Rio Puerco was deposited in the Rio Grande within a section of the river that is naturally aggrading, which in turn increased the incidence of flooding and required more and elaborate water projects to compensate.

Most ranchers cut back stocking allotments by the 1920s, adopting modern grazing practices. However, the impacts of those early days remain with us. Over the years, 11 of the 27 native species of fish in the Rio Grande have become extirpated; and only 11 others can be classified as stable. Likewise, of 41 species of exotic fish that fisheries managers attempted to establish in the Rio Grande, only 13 have become established and an additional 11 are localized.

Obviously, many factors have contributed to the degraded condition of the Rio Grande. However, the same factors of a degraded watershed that work to endanger native forms are often the same factors that frustrate the efforts of fishery managers to establish a desirable sport fishery. These factors include: increased erosion and sedimentation rates (New Mexico is the only state in the nation with total erosion rates from rangeland exceeding five tons per acre per year), altered nutrient loading, altered temperature

regimes, decrease of cover, alteration of stream morphology, alteration of food base, and reduced primary productivity. Impacts within watersheds have also affected decisions and actions in water management as these impacts often directly affect man and his livelihood. For example, the deteriorated condition of rangeland in the Rio Puerco Valley led to the abandonment of six towns and numerous ranches there and increased the incidence of flooding. Efforts to remedy these and similar problems elsewhere in the Rio Grande drainage have often been directed at treating the symptoms rather than the causes. As a result, we build dams to alleviate water shortages and we construct levees to contain flood waters, both of which can be but are not necessarily detrimental to a fishery. Dams will change a natural flowing stream into a ponded water system, a condition that cannot be tolerated by all fishes. In addition, the periodicity and volume of flows are altered, predicated upon the needs of agriculturalists. Finally, dams block the migration of fishes and they alter water temperatures and sediment loads.

Dams also serve as a nutrient trap. Although New Mexico reservoirs are among the most productive in the nation, a high fraction of this production is diverted to rough fish. High annual fluctuations of runoff contribute vast quantities of organic detritus to reservoirs, which in

turn allows for rapid growth of those species of fish which feed on the detritus, i.e., detritivores such as carp and shad. The detritivores quickly grow to such large sizes which are unavailable to predation by piscivores, such as bass and walleye; and with their larger size, they are often very fecund. The result is that populations of fish soon become dominated by detritivores with a net low production of game fish.

However, there are many good points about dams. If located correctly, they do not have to infringe upon rare or otherwise sensitive fish; and as mentioned earlier, they are very productive - as are their tailwaters. A case in point is the San Juan River where rainbow trout readily grow to 20 inches in length, supporting one of the most prized trout fisheries in the entire nation. In addition, dams provide for diverse recreational opportunities, including: boating sports, swimming, camping, and fishing. In New Mexico, there are approximately 250,000 licensed anglers who contribute between \$100 and \$130 million annually to the state's gross receipts revenue. Roughly 65 to 70 percent of this comes from reservoir anglers. This may seem like an infinitesimal amount when compared to the \$850+ million in gross revenues from the livestock industry and \$273+ million from crop receipts. However, when you consider that the income from sport fishing is ancillary to other water uses

and that it is produced with no subsidy, its contribution suddenly appears very significant.

A leisure audit conducted in 1985 by the Gallup Poll indicated that the second most popular leisure activity in the nation was angling, and that angling was shown to be the number one activity among adult males. However, in New Mexico, it appears that the percent of people who fish is less than the national average and the total days fished per angler per year is also less. This, of course, means that New Mexico realizes far less revenues from sport fishing than do most other states. There are many reasons for this, among them is the possibility that it is too far to travel to preferred fishing sites or because of poor recreational facilities. The latter scenario is aptly illustrated by Abiquiu Reservoir where anglers are denied access to much of the shoreline.

The history of man's occupation in New Mexico is characterized by exploitation of natural resources. Impacts by man and his animals in the watershed have been devastating and lethal to fishes and have influenced or forced decisions in water management that are also deleterious to fishes. All of this occurs at considerable cost to the public, including the cost of water projects and the cost of tourist dollars lost. There is a need to implement management practices to increase perennial

sustained yield of surface and ground water supplies. If the national forests within the Rio Grande were managed to maximize sustained yield of water, there could be an increase of 16 to 18 percent to the base flow of the Rio Grande. This could reduce, by 60 percent, the 450,000 acre-foot deficit projected for the Rio Grande basin by 2025.

To appreciate the need for a more equitable allocation of resources, one needs to contemplate the future with a 28 percent increase in New Mexico's population each decade. These people will compete at increasing rates for the limited water resources. The demand for surface water is likely to increase most in the Rio Grande basin where 63 percent of the population now lives. Eventually, water will go to the highest bidder and perhaps may be sold to out-of-state users. Without provisions for instream rights, we may lose even ancillary uses of water as it is piped out of state.

Water-use practices will change as municipalities are forced to procure more water and as industry is willing to pay more and more for water. Increasingly, instream flows will become predicated on uses other than agricultural; and as this occurs, it is hoped that concessions will be extended to fishery and other water-based recreational uses. Generally, water-based recreation, including fishing, can be

compatible with other uses and will contribute to the long-term economic and environmental health of the state.