

Cooperative management of riparian forest habitats to maintain biological quality and ecosystem integrity

David Deardorff¹ and Kathryn Wadsworth²

Abstract.-The New Mexico State Land Office has initiated a rare plant survey of state trust land, an inventory and assessment of riparian areas on the trust land, and the development of a biological resources data base and information management system. Some riparian sites that still belong to the trust have been negatively impacted by livestock such that biological quality and ecological integrity of these sites have been reduced. Some sites on state trust land may have high potential for the development or restoration of riparian forests which could serve as essential habitats for neotropical migratory birds. The state land office is currently considering ways to manage trust land and restore riparian sites. This paper reviews potential solutions.

The New Mexico State Land Office manages some nine million surface acres of land in New Mexico on behalf of the beneficiaries of the trust, which primarily are the public schools. One statutory mandate of the trust is to maximize the revenue derived from the trust lands for the beneficiaries. The state trust land is not public land, it is analogous to private land, and, unlike federal land, does not have the same mandate of multiple use for the benefit of the American people as do our national forests and BLM land. Thus, throughout the history of the state land office, the primary emphasis of management of the trust has been revenue generation from a wide variety of activities including oil and natural gas development, livestock grazing, mining, rights of way, and commercial leases, among others. These activities have, over the years, resulted in a permanent fund of some four billion dollars.

A second mandate of the trust, however, is to preserve and protect the trust from waste and degradation and preserve the assets of the trust for future generations of schoolchildren. To that end,

the State Land Office has initiated a rare plant survey of state trust land, an inventory and assessment of riparian areas on the trust land, and the development of a biological resources data base and information management system.

One constraint on the land office as manager of the trust is that none of the revenue derived from the trust may be used for improvements to the trust. Thus, the land office may not plant trees or grass seed or implement erosion control on state trust land. All such improvements must be carried out, if at all, using volunteer labor and donated materials, or using funds derived from sources other than the revenue from the trust.

A graphic example of the dilemma facing the managers of the trust is presented by state trust land in riparian forest habitats under grazing leases. Few such sites remain in the trust because most riparian forests, or bosques, with perennial water are now in private or federal hands. Of the few riparian sites which still belong to the trust, some have been negatively impacted by livestock grazing such that the biological quality and ecological integrity of the site have been compromised. For those sites which have been compromised, how may the situation be rectified, given that under the mandates of the trust: a) it is not

¹ *Biologist, New Mexico State Land Office, P.O. Box 1148, Santa Fe, NM 87504-1148.*

² *3 Aulá Court, Santa Fe, NM 87505.*

desirable for the State Land Office to withdraw the land from grazing through an enclosure since that would interrupt the revenue stream from the land to the beneficiaries of the trust, and b) the State Land Office is not permitted to purchase or install plant materials, livestock water supplies, or fences for ecosystem protection or rehabilitation.

One of the consequences of the deteriorating condition of riparian forests which is becoming of increasing concern to land managers throughout the southwest is the precipitous decline of some species of neotropical migratory songbirds, many species of which use the Rio Grande corridor and its associated riparian forest, the Bosque, either as summer breeding ground, wintering ground, or as stopover points during migration (Crawford, et al 1993; Yong and Finch this issue). The Rio Grande bosque is extremely important habitat for numerous species of migrating songbirds. This habitat has been lost or fragmented through attrition due to alteration of the hydrologic regime through flood control, ground water pumping, and water diversions; agricultural development for grazing or cultivated croplands; or through development for commercial interests or housing. Thus, some species of songbirds have declined.

Three riparian species of songbirds which are known to breed or to have bred in the riparian forest of the middle Rio Grande are Bell's Vireo (*Vireo bellii*), Southwestern Willow Flycatcher (*Empidonax trallii extimus*) and Lucy's Warbler (*Vermivora luciae*). Another species known to breed in the middle Rio Grande valley is Scott's Oriole (*Icterus parisorum*) which is found in upland scrub habitats rather than riparian habitats. All four of these species are declining in numbers as a result of loss of habitat and/or parasitism by cowbirds. Only one of these four species, the SW Willow Flycatcher, is on the federal Endangered Species List at the moment. The other three species have recently been ranked by Partners In Flight/Aves De Las Americas as highly endangered, however, and unless something is done to protect them they may all become listed in the near future (Mehlman and Williams, 1995). Loss of riparian forest habitat is not the sole source of the problem for these species, of course. Deforestation of their winter grounds in Mexico, Central or South America is an additional problem. But available habitat on the breeding grounds in New Mexico is critical for

reproductive success in many species (Yong and Finch, this issue). Lucy's Warbler for example, is a cavity nester and requires large diameter trees with old woodpecker holes for successful breeding whereas SW Willow Flycatcher requires dense willow scrub. Bell's Vireo has wider habitat preferences than the preceding species and may nest in mesquite. Scott's Oriole is found in upland scrub habitats in association with *Yucca* and *Agave* spp. If riparian forests and associated early successional stages were allowed to develop on state trust land they could meet the habitat requirements of a variety of bird species, over time (Warkentin, et al 1995).

Some sites on state trust land may have high potential for the development or restoration of riparian forests which could serve as essential links in the chain of such habitats along the length of the Rio Grande flyway for neotropical migrating songbirds. Historically, these riparian forests of the middle Rio Grande typically were composed of an overstory of cottonwood (*Populus fremontii*), and an understory and edge of willow (*Salix* spp.), New Mexico Olive (*Forestiera neo-mexicana*) and other shrubs. Today, the forests have been invaded by saltcedar (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), and Siberian elm (*Ulmus pumila*). Whether these exotic invaders provide adequate habitat for native birds, insects, and small mammals is currently under investigation by a number of researchers (Thompson, et al 1994). Additional research is investigating whether native cottonwood riparian forests can be re-established and successfully compete with exotics given an altered hydrologic regime (Crawford et al, this issue).

Since the revenue stream from riparian forests on state trust land to the beneficiaries of the trust is generated entirely by livestock grazing and removal of all or a portion of the site from grazing via livestock exclusion will interrupt the revenue stream, it is not possible to not lease the land. As an alternative, it is possible to lease these sites to conservation groups who would be interested in riparian forest restoration. However, if the conservation group wishes to lease only a fraction of a larger lease, that is, only those sections with riparian habitat, the resulting loss of water for livestock may have negative consequences for the leasing of the remainder of the trust lands in the lease.

The following solution to this dilemma is a concept which is currently under consideration at

the state land office. First, lease those riparian areas with the highest potential for the development of forests to conservation groups which can fence the area, exclude grazing and allow a mature forest to develop over time. Second, develop a series of paddocks for a rotational grazing system in the transition zone between the riparian forest and the upland scrub vegetation where grazing cattle can be used as a management tool to control saltcedar, and maintain early successional riparian scrub habitat as proposed in Recommendation number 10, Middle Rio Grande Bosque Biological Management Plan (Crawford et al, 1993). These rotational grazing paddocks would be leased to both the conservation group and to the grazing lessee. The livestock producer pays the lease on the paddock in use and the conservation group pays the lease on the paddocks being rested from grazing. Four paddocks with one year of grazing followed by three years of rest may be a suitable proposal. The livestock producer pays the lease on the remainder of the upland scrub habitat and utilizes it for grazing livestock.

This concept offers several advantages. Of primary consideration is that the revenue to the beneficiaries is uninterrupted and unchanged. In addition, good stewardship of the riparian ecosystem and all of its components, including migratory songbirds, is initiated. And finally, cooperative management to attain a common goal may be obtained through facilitating a forum in which environmentalists and cattlemen can work together.

To date, this project remains a concept only. If a willing environmental group and a willing cattle grower can be found who are able to set their differences aside in order to protect the resources on which we all depend then this project can proceed. When it does proceed, and a site has been identified, then a research project at the site will be initiated. The initial research steps will be to gather baseline data on vegetation composition and structure, hydrology, soil types, and avian species composition and demographics. Determination of the location of the paddocks and the transition

zone, the carrying capacity, the size of the paddocks and the placement of other sources of water for the cattle will depend on the result of this data collection. After that, fencing for exclosures and paddocks can proceed. Whether cattle can be used to control saltcedar at this site, or can serve as a management tool to enhance biodiversity through creating a variety of early successional habitat types, are questions which the study will seek to answer. Monitoring of the vegetation, birds, and hydrology will continue for the duration of the study.

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