USA: New Mexico, Ohkay Owingeh (San Juan Pueblo) Riparian Restoration

Overview

The Ohkay Owingeh riparian restoration project is a series of coordinated projects reaching back to the 1990s that now encompasses over 700 acres of restored ecological mosaic including wetlands, cottonwood gallery forest, grassland, shrub cover, open water, and dense emergent willow thicket that is ideal for bird habitat, particularly Southwestern Willow Flycatcher.

Project Details

Lead entity types:

- Other

Adaptive management

Describe adaptive management processes and mid-course corrections taken to address unforeseen challenges and improve outcomes in each of the following categories:

State of Progress:

- Implementation

Project Start:

1997-01-01

Project End:

2008-01-01

Total budgeted expenses:

- USD 1-2 million

Main source of funds:

- National government and public institution

Global Regions:

- Northern America
- Americas
- World

Countries:

- United States of America

Ecosystem Functional Groups / Biomes:

- Temperate-boreal forests and woodlands biome
- Rivers and streams biome

Extent of project:

- Other

Extent of restoration:

- Other

Degradations:

- Agriculture & Livestock
- Deforestation
- Other

Description:

Two major problems have created a need for ecological restoration: flood control and invasive trees. Flood control channelization in the 1950s prevented springtime flooding and has stopped natural channel meandering ever since. Resulting higher flow velocity further eroded the river channel, lowering water tables and cutting the river off even more from its floodplain. Geomorphological alterations seriously disrupted riparian ecology, and greatly accelerated the spread of invasive plants. Cottonwood and willow bosque were decreasing while salt cedar and Russian olive were increasing. Salt cedar and Russian olive were recorded in the early 1930s and were spreading from the southern reaches of the Middle Rio Grande Valley. Today tamarisk and Russian olive are the dominant species in many floodplain areas.. They spread dramatically following the disruptions of channelization and flood control of the 1950s, and have largely replaced native plant species in many places. Besides reducing diversity and wildlife habitat, they are more fire-adapted and burn much more readily than native species. Fires became more frequent and more damaging - and every fire further accelerated the spread of the invasive trees. What happened to the Middle Rio Grande was a loss of channel complexity and a loss of channel-floodplain connectivity. The inability of the river to rework the channel on a bi-annual basis supported the development of a monoculture salt cedar and Russian olive riparian system on the floodplain. Both aggradation and degradation in response to reduced sediment loads and decreased peak flows have been documented.

Planning and Review

Goals and Objectives

Was a baseline assessment conducted:

unsure

Was a reference model used:

RM5

were_goals_identified:

YES

Goals and objectives:

- Other

Goals Description::

The project had several specific goals: 1) Mimic pre-channelization conditions in the floodplain as much as possible as an interim measure to preserve biotic communities until natural geomorphology can be restored. 2) Remove invasive plants, re-create lost wetlands, provide conditions for native plant recruitment, and maintain diversity in native vegetation. 3) Provide a diverse mosaic of wildlife habitat types. Help re-create aspects of a cultural landscape remembered by older Pueblo residents. 4) Work with government agencies towards restoration of the river and floodplain to pre-channelization conditions where possible, so that natural geomorphological processes can once again provide appropriate abiotic disturbance necessary for sustainable ecosystem function.

Stakeholder Engagement

Were Stakeholders engaged?:

unsure

Description of Stakeholder Involvement:

Ohkay Owingeh pueblo (formerly known as San Juan Pueblo) straddles the Rio Grande 25 miles north of Santa Fe. The project is entirely on tribal land and involves a multigenerational approach, involving the entire community from school children to elders. Tribal natural resource managers were responsible for implementation with assistance from private consulting firms to partnerships with the City of Española, Eight Northern Indian Pueblos Council, and Rio Grande Restoration, a non-profit river advocacy organization. Other partners involved in various aspects of the project include EcoSolutions, Four Corners Institute, Conely Sawmill, and the USDI Bureau of Indian Affairs Northern Pueblos Agency.

Ecosystem Activities and Approaches

General Activities: 1. Remove invasive trees and noxious weeds Invasive, non-native trees were cut and mulched in place with mechanical brush cutting machinery where there was machine access, the ground was dry enough, and there were few native trees or shrubs to save. Where machine removal was unworkable, trees were cut by hand with chainsaws and cut slash was either burned in winter or mechanically mulched later. Stump and root sprouts (which are very vigorous) were treated with Garlon 4Â® herbicide, carefully applied only to cut sprouts with a hand sprayer. Hand-cut stumps were treated when cut, and sprouts from machine-cut areas were treated when they emerged the next growing season. Follow-up sprout treatments were made twice more, for a total of at least three herbicide applications. Other invasive plants besides trees cause problems too: purple loostrife (Lythrum salicaria) and non-native thistles (Cirsium vulgare and C. arvense) are locally abundant and require control by cutting before seed production and treatment with spot application of herbicide. 2. Re-create lost wetlands New or enhanced channels and waterways are excavated in bosque areas, primarily in existing former river channels. Flows in arroyos have been re-routed into shallower, more meandering channels and spread out over wider areas of former floodplain. Irrigation ditches are maintained and expanded when necessary. Excavation is done with a combination of a trackhoe or backhoe along with a bulldozer or other appropriate equipment, such as dump trucks, to spread excavated soil, minimize slope angles, and avoid large "levees"□ of excavation spoil at the edge of re-created or enhanced channels and open areas. Hand crews may be involved in these processes. Most excavated soil will remain very near its origin, but some occasionally has to be relocated using dump trucks to adjacent areas in the bosque. Soil erosion control measures have been unnecessary in project areas because they are all located in former (and hopefully future) floodplains where topography is very flat and soil permeability is high. For these reasons, transport of silt from restoration areas into the rivers is essentially impossible. Fill material has been placed appropriately in some projects to ensure that flows are diverted into new channels and flash floods do not revert back to the old channels. All fill placement has been and will be done in accordance with Clean Water Act section 404 permits as required. 3. Plant and encourage native vegetation Cut poles, when needed, are planted as early as possible (typically in February or March) immediately after excavation is complete so that roots have time to develop before buds sprout. Extensive pole planting was done in earlier projects, to provide shade and multi-layer vegetation structure as soon as possible, but after 2002 or 2003 we have done little pole planting. Instead, we have created saturated, bare soil conditions where cottonwood seeds can sprout abundantly, and have developed techniques for transplanting local coyote willow root crowns. Willow root crowns are typically excavated using a backhoe to assist technicians, after the willows to be transplanted have been cut off six to ten inches above the ground using chain saws. The willow roots are loaded into pickup trucks and placed immediately in water for storage, unless they can be transplanted to their new locations within a few hours. They are kept as moist as possible during transportation and planting. Willow root crowns are sometimes planted with the help of mechanical excavation if it is available and can access the transplant site; and sometimes are planted entirely by hand with shovels. Typical planting density is about one half to one meter between plants when the intent is to create habitat for willow flycatchers, and may be less when coyote willow is included in a restoration plant mix primarily for biodiversity. Rooted seedlings and herbaceous transplants are planted wherever soil moisture is adequate, which often means beginning as soon as irrigation water is available, usually in April. Transplanting continues throughout the summer. Coyote willows, transplanted from within the Ohkay Owingeh bosque, can be planted almost year-round where soil is moist. Grass seed for drier areas is planted when moisture and soil temperature conditions seem likely to encourage sprouting; sometimes in the spring if adequate precipitation is anticipated, and sometimes in summer when thunderstorms are expected. Equipment in these instances could include tractors, tractor-mounted augers, backhoes, discs, hand crews and tools, seed broadcasters, and potentially grazing animals. Chicken wire or hardware cloth may be used to protect desirable vegetation from grazing animals or beavers in appropriate areas. Fences are repaired or newly constructed where necessary. Fuels Reduction/Prescribed Burning Another aspect to the project is the reduction of fire danger in order to restore ecological functions on 210 acres of riparian forest along the Rio Grande River within the San Juan Pueblo and on contiguous municipal property owned by the city of Española. Russian olive and other invasive species was removed and native woody species will be planted. The project was an aspect of encouraging collaborative riparian restoration among neighboring communities and working towards a local consensus on what constitutes successful riparian restoration. The project managers also explored the usefulness and marketability of products made from Russian olive, a common riparian invasive species with little or no market value to date. Pile burning is sometimes used as necessary, when other methods of removing or mulching cut woody debris are unfeasible. Generally pile burning is done in the winter, when temperatures are low, wind is minimal, and the surrounding soil and plant material is relatively wet. If possible, pile burning is done when there is snow on the ground or snow is falling. Prescribed burning in the normal forestry sense of intentionally burning standing trees or plant material is not done. Irrigation ditches, agricultural fields, and targeted small areas of vegetation may also be maintained with controlled burning. Hand crews use drip torches and other hand equipment for these procedures. Fire department support from neighboring jurisdictions, including other Pueblos, and from the Bureau of Indian Affairs, has been called in for safety preparedness on occasion when larger burns are contemplated. Burning is done under the auspices of Ohkay Owingeh tribal burn permits.

Project Outcomes

Eliminate existing threats to the ecosystem: The results of data analysis help determine if changes are needed in restoration methodology. The monitoring protocol has been changed over the years to better meet restoration objectives and changes can be made in the future if necessary. There are at least three examples of adaptive management in Ohkay Owingeh bosque restoration so far: Early in the restoration of the bosque, many cottonwood poles were purchased and planted on the bosque. Soon, it was observed that thousands of cottonwood seedlings would reliably sprout in areas were open, moist ground was created by excavation activities. It has also been observed that New Mexico olive respond well, increasing in density with the removal of the exotics, in the absence of a large scale replanting effort. During the past couple of years, bird monitoring has been added to the regular protocol at several project sites. Many of these birds can be monitored as indicator species for habitat recovery after bosque restoration. Over the years, the addition of certain components to the monitoring of bosque restoration activities at Ohkay Owingeh, give us a richer texture with which to measure restoration success. As restoration activities continue, so do monitoring activities. This allows us to continue to advance in our understanding of bosque ecology as well as to advance in our restoration techniques. Ohkay Owingeh restoration projects have achieved some of the best overall control of Russian olive, elm and salt cedar of any projects on the

Rio Grande. Nevertheless, it remains an ongoing struggle. Even if work during a project is successful in removing Russian olives (and other invasive trees) and the vast majority of seedlings and root sprouts, inevitably a few are missed and seed is washed in by the river or brought in by birds and animals. It may be unrealistic to completely eradicate invasive trees from the bosque, but we have come quite close in many areas and a relatively small - but very important - ongoing effort will keep them from invading all over again. Factors limiting recovery of the ecosystem: Without restoring natural flooding and meandering, to the extent possible, to both the Rio Grande and the Rio Chama, all our bosque work so far will ultimately be in vain. We have gained some time and stopped the accelerating encroachment of Russian olives and other exotic species into the bosque, but we are treating cancer with band-aids unless we can allow the rivers to create the physical conditions in their floodplains that enable bosque plants and animals to survive and reproduce without constant human help. Many small-scale efforts at geomorphological restoration have been completed at Ohkay Owingeh through the (re)creation of wetlands, reconnection of abandoned river channels back to the Rio Grande, and other attempts to add water back to the bosque. However, large scale restoration of river function is necessary to preserve and perpetuate the bosque as we know it. Without real geomorphological restoration, which means room for the river to flood and meander within the floodplain, all our bosque restoration efforts will only put off the final collapse of an endangered system. It will be take collaborative efforts between government agencies such as the Army Corps of Engineers, the Bureau of Indian Affairs, the Bureau of Reclamation, and local and Tribal governments to carry out the large-scale river restoration that is needed. We should continue to be enthusiastic participants, and in fact we should be leaders, in the Corps of Engineers "General Investigation" that is taking place with our neighboring Pueblos to plan river restoration along the Rio Grande. In the interim, the type of bosque restoration that is taking place at Ohkay Owingeh will provide necessary habitat for riparian plant and animal species and will continue to provide the resources needed by the tribe for cultural purposes. So far restoration projects specifically designed to create habitat for southwestern willow flycatchers have been nominally completed on 83 acres, with work in progress on a further 106 acres. These efforts have brought the Pueblo funding of nearly $1 million, and a desire to ensure continued habitat for flycatchers and other birds with similar requirements has been an important factor in getting funding for our other restoration work. The willows and other vegetation planted in restoration sites has not had time to grow in to sufficient maturity to serve as flycatcher habitat, and will probably need anywhere from 4 to 10 more years to do so. However, a flycatcher was observed in existing willows within a restoration site for the first time last year, raising hopes that the additional water and/or vegetation added to the restoration site may produce the desired result of additional viable habitat even before the newly planted willows get big enough. It seems likely that an increasing focus of restoration efforts may center on flycatchers for the next few years, both in creating new habitat for the future and in understanding the ecological succession processes that are needed to ensure continuing habitat over time. Until and unless the Rio Grande (at least) is restored to a reasonable degree of geomorphological activity - flooding - continued flycatcher habitat will depend ultimately on periodic human intervention to create the young, vigorous early-successional willow breaks needed by flycatchers and many other birds and animals. Even if river channel restoration proceeds with all the speed reasonably possible, there will be a continuing need to create additional habitat for the next few years to ensure that there is not a gap in the availability of suitable habitat in the future. Economic vitality and local livelihoods: The project has been fortunate so far in securing grant funding for bosque and wetland restoration, and hopefully will continue to be fortunate into the future. Nevertheless, the Pueblo may well face a need to assume a gradually increasing responsibility for protecting and maintaining the success that has been achieved in the bosque. One of the key ways in which this could be done would be for the Pueblo itself to employ one or two tribal members to patrol the bosque regularly on foot. This kind of ranger or bosque manager would be able to spot outbreaks of Russian olive, other invasive trees, or noxious plants or even animals in the bosque. Such a person could also keep track of problems with acequias, trespassing by people or animals, or other issues in the bosque and on the rivers. Any problems discovered that required more manpower than one or two people could provide (such as eradicating an outbreak of Russian olive or purple loosestrife) could be handled by a summer job program like YCC or the Boys and Girls Club to provide extra hands. A "bosque ranger" or similar person could also perform and/or train summer youth to help with some periodic monitoring of vegetation or bird life in the bosque, which would ensure tribal control over data gathered, give the Pueblo vital information about conditions in the bosque and early warning of potential problems, and be helpful in the ongoing effort to secure funding. Additional duties might include helping to patrol for fires in the springtime, prevent trash or septage dumping in the river or bosque, preventing unauthorized vehicle access, and outreach to neighbors to explain bosque restoration. The salary of even one tribal employee engaged in this kind of work full-time would also help provide cost matching that is increasingly important in competing for outside funds. It could well be that some of the responsibilities described above could be combined with some responsibilities already handled by existing Pueblo programs - such as checking gates, managing acequias, patrolling the Tribal Lakes, or monitoring water quality, for instance. If jobs can be combined in this way, an entire new salary would not be needed to get the work done.

Monitoring and Data Sharing

Does the project have a defined monitoring plan?:

NO

Open Access URL:

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Long Term Management