

US EPA ARCHIVE DOCUMENT

Case Studies of Tribal Wetland Programs

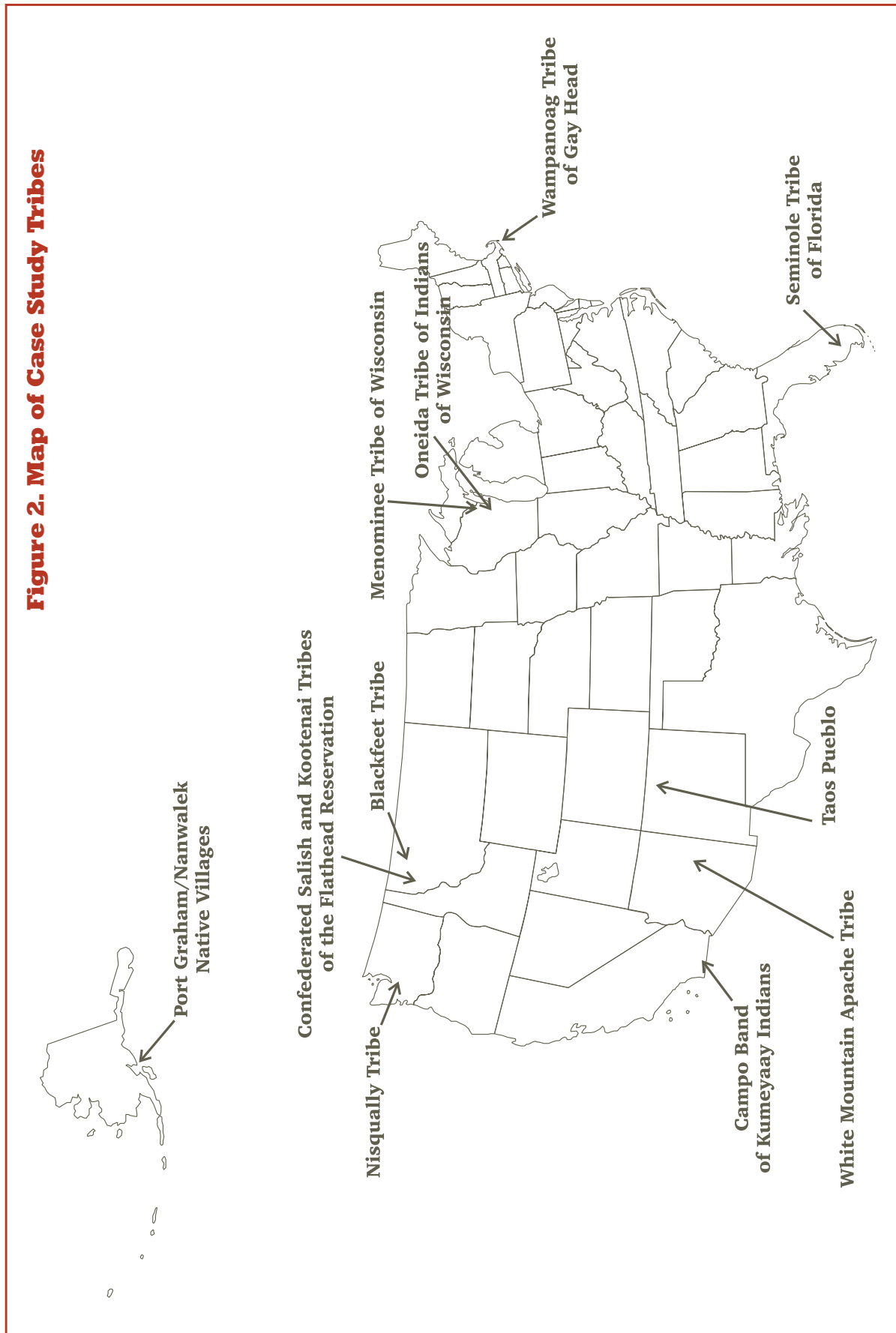
This chapter presents the case studies of selected wetland programs of Tribes and Native organizations. The case studies provide information about the tools and strategies that 11 federally recognized Tribes and Native organizations from around the country (Figure 2) are using to address wetland protection issues. To the extent possible, these wetland programs were selected to represent a range of wetland protection issues and approaches and to demonstrate the geographic diversity among Tribal wetland programs. The following 11 Tribes and Native organizations were selected for comparison:

- Blackfeet Tribe
- Campo Band of Kumeyaay Indians
- Confederated Salish and Kootenai Tribes of the Flathead Reservation
- Menominee Tribe of Wisconsin
- Nisqually Tribe
- Oneida Tribe of Indians of Wisconsin
- Port Graham/Nanwalek Native Villages
- Seminole Tribe of Florida
- Taos Pueblo
- Wampanoag Tribe of Gay Head
- White Mountain Apache Tribe

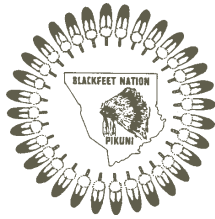
The wetland programs and projects described in these case studies are categorized by general program components summarized in Chapter 2. Where Tribes and Native organizations have developed unique programs to protect their wetlands, such programs are described separately. Additionally, some of the case studies discuss program components that have a beneficial impact on wetland resources even though they do not have a direct wetland focus.



Figure 2. Map of Case Study Tribes



Blackfeet Tribe



Program Components:

Wetland and Watershed Planning • Wetland Inventory, Assessment, Mapping • Regulation • Restoration • Mitigation • Education and Outreach

Background

The Blackfeet Reservation encompasses more than 518 miles of streams that are part of the Missouri River and Saskatchewan River systems. The reservation covers four watersheds and occupies a unique location on the North American continent as some of its watersheds drain to the Gulf of Mexico and one drains into Hudson Bay. Reservation lands are comprised of Rocky Mountain peaks with elevations ranging from 3,400 to 9,000 feet and foothills and plains east of the Continental Divide. The Blackfeet Reservation is bordered to the north by the Canadian Province of Alberta and to the west by Glacier National Park.

Of the Tribe's total reservation lands of 1,525,712 acres, an estimated 5-10 percent are wetlands. The Blackfeet Environmental Office is concerned with mitigating historic wetland loss and protecting wetland aquatic species at risk. The estimated 8,500 Blackfeet living on Tribal lands put a high cultural value on their wetlands. Several plant species are used for medicinal, ceremonial, and practical purposes. For instance, the willows found in wetlands on the Blackfeet Reservation are used to make back rests as well as sweat lodges. Several animals important to the Tribe use wetlands as habitat, such as the beaver.



Wetland and Watershed Planning

The Tribe prepared a draft Blackfeet Wetlands Conservation Plan, which will be distributed for public comment during 2000. The draft plan was developed by the Blackfeet Environmental Office through a collaborative process that allowed for input from the Blackfeet Natural Resources staff.



Wetland Inventory, Assessment, Mapping

In 1994, wetland assessment field work began in the Two Medicine Watershed, followed by the Cut Bank Watershed in 1995 and the Milk River Watershed in 1996. The St. Mary's Watershed was the fourth and last to be sampled. Each watershed is comprised of 15 to 20 USGS topographic quadrangles and there are more than 100 wetlands in each watershed. Field workers usually sampled for wetland assessments at eight sites per USGS quadrangle and classified the wetlands during the field visits. Environmental Office staff sampled physical water parameters and screened rather than exhaustively surveying wildlife. As of May 1998, the wetland inventory and assessment was complete and the data compiled. The Blackfeet Environmental Office expects to begin analyzing the data in 2000.

All wetlands that were sampled were labeled on USGS topographic quadrangles for future reference. A complete set of quadrangles sampled is on file at the Blackfeet Environmental Office.



Regulation

Tribal Ordinance 90 is the Aquatic Lands Protection Law, which protects wetlands within the Blackfeet Reservation. Tribal Ordinance 90 provides for

enforcement by fine. In November 1995, Blackfeet Community College was fined for filling a wetland. Some non-Tribal members have also been fined for violations of this ordinance.



Restoration

To support the restoration, enhancement, and construction of wetlands on Tribal lands, the Blackfeet Environmental Office, in cooperation with Blackfeet Community College, Browning Public Schools, Glacier National Park, the Bureau of Reclamation, and Montana State University, is building a greenhouse to grow native plants for revegetation. Wetland and non-wetland native plants will be grown in the greenhouse.



Mitigation

Currently, the Blackfeet Environmental Office is working with the Montana Department of Transportation and the Tribal Roads Department to develop a wetland mitigation policy. In addition, a constructed wetland on the Perry Ranch site is being designed by the Montana Department of Transportation as a mitigation site.



Education and Outreach

The Tribe implemented several programs to educate Tribal members about wetlands protection and management. The Environmental Office teaches an environmental studies course at the Tribal community college that focuses on the natural resources of the reservation environment. Included in this course is a segment on the Tribe's wetlands. Currently under development is an "outdoor classroom" that will be used to educate young Tribal members about wetlands, while also implementing a wetland enhancement project. The Tribe's Wetlands Program Manager makes presentations to Tribal schools on wetlands protection and water quality.

The Blackfeet Environmental Office held a series of public meetings in which the wetlands management program was presented to Tribal members. There was media coverage of the public meetings. The Tribe's draft wetlands conservation plan will be presented to the public for comment before being finalized.

An important component of the Blackfeet wetlands program is continuing education for staff. Training for staff is provided in numerous areas, including wetland delineation, herbology of native people, building partnerships for watershed protection, Tribal stewardship of environmental resources, wetlands biocriteria, water quality monitoring, bird identification, and use of global positioning systems (GPS) and GIS software.

Sources of Support

The Tribe received funding for wetlands assessment work beginning in 1993 through an EPA Wetland Development Grant. The Tribe was able to continue developing its comprehensive wetlands program through additional funding by EPA's Wetland Development Grant Program for 1996 and 1997. The Tribe was again awarded an EPA Wetland Development Grant in 1998, specifically for developing a wetland mitigation strategy for all highway construction projects to ensure that wetlands protection goals are met. Work on the wetland mitigation strategy will be done in cooperation with Tribal natural resource programs, the U.S. Bureau of Indian Affairs, and the Montana Department of Transportation.

Contact

Mary Clare Weatherwax, Manager, Wetlands Program, or

Gerald Wagner, Director, Blackfeet Environmental Office

P.O. Box 2029

Browning, MT 59417

Phone: (406) 338-7421/7422

Fax: (406) 338-7451

Campo Band of Kumeyaay Indians



Program Components:

Specialized Wetland Classification System • Wetland and Watershed Planning • Regulation • Restoration

Background

The Campo Indian Reservation, located in southwestern California, lies 45 miles east of the Pacific Ocean and one-half mile north of the United States border with Mexico. The reservation is on a high desert plateau with oak woodlands and chamise and redshank chaparral grasslands. Waters of the reservation include the Campo and Diabold Creeks and Springs, and riparian and spring-fed isolated wetlands south of the Laguna Mountains. The reservation consists of two separate areas: Old Campo, which has 710 acres, and the New Reservation, which has 15,802 acres. All reservation land is Tribally owned. All land use decisions, including where to locate even a single home, are made by the General Council for the benefit of the Tribe as a whole.

Growth in industrial and residential development, both on and off the reservation, has made environmental planning a priority for the Campo Band. Agricultural activities, septic systems, underground storage tanks, industrial activities, and residential development pose threats to the integrity of the surface and ground waters of the reservation. Currently, the Campo Band has a water pollution control program that includes an Existing Water Resource Information Inventory, weather monitoring, inventory and monitoring of groundwater and streams, and identification and delineation of wetlands.

Specialized Wetland Classification System

The Campo Band is developing its own definition and classification of wetlands based on climatic fluctuations in addition to soils, hydrology, and vegetation. The region experiences wide variations in rainfall from year to year. Dry cycles occur with several years of desert-type rainfall with less than 10 inches of precipitation annually. Wet cycles also occur with several years of up to 30 inches of annual precipitation. On the average, the region receives from 16 to 20 inches of annual precipitation. There are areas on the Campo Reservation where in wet cycle years, a wetland (standing water and wetland vegetation) is present, but few indicators of wetlands are present in dry cycle years. The Campo Band is creating a specialized 3-tier wetland classification system, under which wetlands that may not be considered wetlands according to U.S. Army Corps of Engineers delineation criteria during dry cycles would be considered wetlands. The classification system will be used to help prioritize which wetlands require the most protection.

The Campo Band is also integrating the specialized wetland classification system into a modeling effort to determine the storage capabilities of aquifers. Rates of replenishment and depletion of aquifers vary depending on rainfall, the type of geology overlying the aquifer, and the type of wetland. Through this effort, the Campo Band is integrating its wetland program with other parts of its water program to achieve multiple goals.



Wetland and Watershed Planning

The Tribe prepared a draft wetlands protection plan. The draft plan includes efforts to increase protection of those wetlands that would be identified as dry cycle wetlands under the Tribe's specialized wetland classification system.



Regulation

A draft wetlands ordinance was prepared along with the draft wetlands protection plan. The draft ordinance would provide greater legal protection for wetlands that would be identified as dry cycle wetlands under the Tribe's specialized wetland classification system. The Tribe is also in the process of developing water quality standards.



Restoration

From evidence of historic wetland and stream restoration activities throughout the original Kumeyaay territory, including the reservations of the Kumeyaay in what is today Mexico, the Campo Environmental Protection Agency developed a modern restoration program. For centuries, the Kumeyaay people have assembled rock structures (formerly by hand) in arroyos (intermittent streams) to build up silt carried by floodwaters, thereby developing riparian wetland areas through the accrual of moist sediments over time. Using modern methods, the Campo Band has restored wetlands in riparian areas. In 1993, the Campo Band completed a project that successfully restored an intermittent stream to a perennial stream.

In 1995, the Campo Band discontinued leases with cattle ranchers who used to graze cattle on Tribal lands. Cattle grazing caused adverse impacts on wetlands in riparian areas. This restriction on grazing has allowed planted willow trees to thrive and native grasses to compete with European grasses.

Sources of Support

Since their long-term assessment strategy attempts to consider the impacts of multi-year meteorological and hydrological cycles, and does not offer rapid results, the Campo Band has had difficulty obtaining funding to support efforts in this area. In the past, the Campo Band received funding under EPA's Wetland Development Grant Program and Nonpoint Source Grant Program.

Contact

Mike Connolly
Water Pollution Control Program
Campo Environmental Protection Agency
36190 Church Road, Suite 4
Campo, CA 91906
Phone: (619) 478-9369 or 478-2177
Fax: (619) 478-2758 or 478-2367

Confederated Salish and Kootenai Tribes of the Flathead Reservation



Program Components:

Wetland and Watershed Planning • Wetland Inventory, Assessment, Mapping • Regulation • Restoration • Mitigation • Partnerships and Stakeholder Coordination



Background

The Flathead Reservation in west-central Montana has a population of about 20,000 and covers more than 1.2 million acres. Although much of the reservation is rural and agricultural, development pressures from highway construction and suburban sprawl from nearby cities are a constant threat. Farming and ranching also have impacts on the reservation's natural resources. Historically, grazing and wetland drainage for agriculture have posed some of the most significant impacts on the reservation's wetland resources. The reservation is the home to five other threatened or endangered species, specifically, the trumpeter swan, grizzly bear, bald eagle, peregrine falcon, and northern grey wolf. These and many other fish and wildlife species found on the reservation are at least in part dependent on wetland ecosystems for food, water, and habitat.

Aquatic resources on the Flathead Reservation are extensive and diverse. Lacustrine wetlands (associated with lakes and reservoirs) occur adjacent to Flathead Lake, the largest natural freshwater lake in the western United States, and around numerous large irrigation reservoirs. Riverine wetlands (associated with larger rivers and streams) occur along the Flathead, Jocko, and Little Bitterroot Rivers. Palustrine wetlands (associated with ponds, small streams, seeps, springs, and wet meadows) occur throughout the reservation, including areas of extremely high densities of pothole wetlands in the Mission Valley.



Wetland and Watershed Planning

In December 1994, the Confederated Tribes completed The Flathead Reservation Wetlands Conservation Strategy. This strategy was intended to provide baseline information and an initial framework to help private, state, federal, and Tribal entities involved in wetland management on the reservation work in a more coordinated and efficient manner. Comprehensive in nature, the strategy includes:

- The Confederated Tribes' wetlands conservation goals and objectives
- Assessment of wetland resources on the reservation
- A wetland inventory quality assurance project plan
- Evaluation of existing Tribal mechanisms for wetlands protection and restoration
- Strategies for improving the protection, restoration, and development of wetlands

- Recommended procedures for documenting progress
- Recommendations for implementing the *Wetlands Conservation Strategy*

Currently, the Wetlands Coordinator is developing the Confederated Tribes' Wetlands Conservation Plan. When complete, the plan will be a detailed road map of how to implement the Wetlands Conservation Strategy.



Wetland Inventory, Assessment, Mapping

As part of developing the Wetlands Conservation Strategy, the Confederated Tribes completed an extensive assessment of the wetland resources on the reservation. Specific tasks completed by the Confederated Tribes as part of this process included:

- Production of National Wetland Inventory (NWI) maps, in cooperation with the U.S. Fish and Wildlife Service (reservation lands are the only place in Montana with NWI maps)
- Digitization of NWI maps for use in the Confederated Tribes' geographic information system (GIS)
- Acquisition and classification of high-resolution multi-spectral digital imagery, ADAR (Airborne Data Acquisition and Registration), to identify wetlands missed by the NWI and to identify wetland changes in the pothole wetland areas of the Mission Valley
- Use of Arc/Info and GRID software to analyze the GIS data from the NWI maps and classified remote imagery
- Completion of vegetation and water quality inventories of selected wetlands

The last task involved field inventories of wetland plant communities and riparian areas. The field inventories also collected information on wetland water quality (chemical and physical) features.



Regulation

The Confederated Tribes have two programs that serve to legally protect wetland resources on the reservation. The two programs and their legal mechanisms are discussed below.

The Shoreline Protection Program is responsible for administering the Shoreline Protection Ordinance 64A (revised) and the Aquatic Lands Conservation Ordinance 87A. The purpose of the Shoreline Protection Ordinance is to “conserve and protect Flathead Lake and all navigable waters within the Flathead Reservation.” The purpose of the Aquatic Lands Conservation Ordinance is to “prevent the degradation of Reservation waters and aquatic lands by regulating construction or installation of projects upon aquatic lands whenever such projects may cause erosion, sedimentation, or other disturbances adversely affecting the quality of Reservation waters and aquatic lands.”

The Confederated Tribes are approved for TAS to manage their CWA Section 303 Water Quality Standards Program and CWA Section 401 Water Quality Certification Program. Water quality criteria, designated uses, and an antidegradation policy are all included in the Confederated Tribes' water quality standards. The Confederated Tribe's water quality standards were recently challenged by the State of Montana. The Supreme Court ruled in favor of the Confederated Tribes and EPA, holding that the Confederated Tribe's TAS was appropriately determined.

In addition to developing and administering the Water Quality Standards Program and the Water Quality Certification Program, the Water Quality Program administers the Water Quality Management Ordinance 89B. The purpose of this ordinance is to “restore, and maintain the chemical, physical, and biological integrity of Reservation waters.” The ordinance specifies programmatic items such as reporting requirements and enforcement mechanisms.

The Water Quality Program is also developing a nonpoint source management plan detailing the implementation of best management practices at the watershed level. This plan will evaluate the contribution of nonpoint sources of pollution to surface waters. Tribal water quality staff have assisted with development of a nutrient loading study for Flathead Lake conducted by the Flathead Basin Commission.



Restoration

In partnership with the Montana Department of Transportation, which is providing funding, the Confederated Tribes are implementing the first wetland ecosystem restoration project on the reservation. Before restoration began, the site was impacted by extensive grazing along with drainage of wetlands to allow for crop production. In addition, the dominant vegetation at the site had shifted from native to introduced species. A key goal of the project is to return as much vegetation as possible to native species.

Essential to the long-term success of the wetland restoration project are clearly stated goals and objectives, performance standards, a detailed monitoring plan (including a monitoring and reporting schedule), and operation and maintenance considerations. The monitoring plan will be implemented beginning in 1999, when the restoration work is complete. The Confederated Tribes will monitor selected parameters to determine achievement of performance standards. The selected parameters are wetland mapping; functional assessment, before and after restoration; annual photographic records; water level; vegetation; aquatic invertebrates; wildlife populations; and amphibians. The breadth and depth of the monitoring plan demonstrates the complexity of this restoration project. The Confederated Tribes are eager to see the results of their hard work and planning on this project, so they will be better equipped to plan for the next restoration opportunity on the reservation.



Mitigation

One of the priorities of the Wetland Protection Office, as outlined in the Wetlands Conservation Strategy, is the mitigation of impacts from highway construction. The Confederated Tribes are implementing a wetland ecosystem restoration project to mitigate for unavoidable impacts to wetlands resulting from highway construction on the reservation. This restoration project and its associated monitoring plan were described earlier.



Partnerships and Stakeholder Coordination

Not unlike many other reservations throughout the country, a significant portion of Flathead Reservation lands are held by non-Indian interests. This makes management of natural resources difficult to coordinate because of the large number of private landowners that are stakeholders. Compounding this problem are the myriad governmental agencies and conservation organizations that have land holdings or land management responsibilities on the reservation. These agencies and organizations include the Bureau of Indian Affairs; U.S. Fish and Wildlife Service; Bureau of Reclamation; Natural Resources Conservation Service; Montana Department of Fish, Wildlife, and Parks; Montana Department of State Lands; The Nature Conservancy; Montana Land Alliance; and Lake,

Sanders, Missoula, and Flathead Counties. The Wetlands Coordinator and Water Quality Program staff coordinate extensively with stakeholders, including government agencies, private landowners, nongovernmental organizations, and others, to promote effective protection and wise use of the Tribe's aquatic resources.

Sources of Support

EPA awarded the Confederated Salish and Kootenai Tribes funding under the Clean Water Act Section 104(b)(3) Wetlands Protection Program for 1992-1994, which enabled the Confederated Tribes to develop the *Wetlands Conservation Strategy*. Clean Water Act Section 104(b)(3) Wetlands Protection Program funding was also awarded in 1995 and 1996, which was used to develop the *Wetlands Conservation Plan*, in addition to producing a refined assessment of wetland resources, the development of specific public outreach and education objectives and projects, and evaluation criteria for development of watershed-based wetlands protection projects. In 1998, Clean Water Act Section 104(b)(3) Wetlands Protection Program funding was also awarded, to develop and provide wetlands training to the Shoreline Protection Board and Shoreline Protection Office in six training modules, classroom presentations, and field trips to project sites carried out under the Tribal Aquatic Lands Ordinance.

Contact

Mary Price, Wetlands Coordinator

Natural Resources Department

P.O. Box 278

Pablo, MT 59855

Phone: (406) 675-2700

Fax: (406) 675-2806

Menominee Tribe of Wisconsin



Program Components:

Forest-Based Sustainable Development • Restoration • Education and Outreach

Background

The Menominee Indian Reservation is located in northeastern Wisconsin, near the city of Green Bay. Of the 235,000 acres of Tribal land, 220,000 acres are forested and 24,000 acres are wetlands, including peat swamps and wild rice fields. The word “Menominee” means “people of the wild rice” in the Algonquin dialect that the Menominee People speak. There are more than 440 miles of rivers and streams, and 123 lakes covering 4,000 acres, throughout the reservation. The Wolf River and its South Branch drain most of the Menominee lands.

The water resources found on the reservation are important to the Menominee People and the natural environment. A diverse population of wildlife and flora depend on the forested and riverine environments. In turn, those species represent essential cultural, spiritual, and nutritional resources upon which the Menominee People depend. These resources include wild rice, trout, sturgeon, bald eagles, osprey, a variety of duck species, swans, geese, heron, cranes, otters, beaver, crows, ravens, thrushes, chickadees, black bear, and deer.

The Menominee are very proud of the Tribe’s efforts to maintain their magnificent forest, which sits in sharp contrast to neighboring deforested areas. The Menominee believe they continue to enjoy a healthy forest as a result of the interplay of several factors over the past 200 years. History, culture, politics, litigation and court decisions, legislation, economics, spiritual and ethical values, and applied forestry, ecology, and technology, have combined to enable the Menominee to avoid the “tragedy of the commons” so often cited as the cause of much environmental degradation. In doing so, they have succeeded in maintaining the quality of their wetland and water resources.

Forest-Based Sustainable Development

The Menominee Tribal government has collaborated with the business arm of the Tribe, Menominee Tribal Enterprises, along with many other partners, to institutionalize forestry best management practices, creating a renowned forest-based sustainable economy that protects the rivers, streams, lakes, and wetlands on the reservation. Although the Tribe’s forest-based sustainable development program is not a wetlands protection program, the protection of wetlands afforded by forestry best management practices is substantial. Sustained yield, continuous forest inventory, and harvesting methods such as selection cutting, shelterwood, and clear-cutting, are used to maximize the profitability and sustainability of the enterprise. The forestry practices that the Tribe has long maintained are designed to protect the waters of the Tribe as well as the soil and air.

Menominee Tribal Enterprises produces forest products that are certified to be harvested sustainably and ensure long-term stewardship of forest resources. Their products are certified by two independent certification agencies—Scientific

Certification Systems (The Forest Conservation Program) and the Rainforest Alliance (Smart Wood). The Forest Stewardship Council (FSC) is an international body that has developed principles and criteria for forest stewardship worldwide. FSC in turn accredits certification agencies to certify sustainable forestry operations. A 1997 booklet on the Menominee forest-based sustainable development tradition tells visitors to the Menominee reservation:

Because of the wisdom and commitment our ancestors used in the practices and principles of sustainable development, while on the Reservation you will be able to travel through a forest where you will find: towering white pines, some of which are more than 200 years old . . . thriving species used as indicators for ecosystem health such as the Eastern Hemlock and Canadian Yew; eagles soaring over treetops, and cormorants feeding their young in the old mill pond; and bobcat, bear, and a host of other wildlife species . . .

At the foundation of the management principles and practices of Menominee Tribal Enterprises is recognition of a need for a balance between the environment, the community, and the economy. The Menominee philosophy is based on traditional beliefs and is further supported by the modern notion of “Sustainable Development.” An excerpt from the Menominee Tribal Enterprises web site explains:

Menominee Tribal Enterprises has been built upon the understanding of the need to integrate advanced science, technology, and business practices, within a cultural context, to remain competitive and profitable for current as well as future generations of Menominee People. The commitment to intergenerational equity is a key determinate of the decision-making and management of MTE, in that immediate gain is deferred to a long term (150 year) and sustainable planning horizon.



Restoration

Historically, wild rice and sturgeon are two of the most important cultural and nutritional resources for the Menominee Tribe. These two native species depend on wetlands habitat for survival. The Tribe is working to enhance the biological integrity of its wetlands through wild rice reintroduction in Tribal lakes and restoration of sturgeon in the Wolf River. These ongoing restoration efforts are being monitored and will be evaluated to determine their success.



Education and Outreach

In 1993, the Menominee Sustainable Development Institute (MSDI) was established under the umbrella of the College of the Menominee Nation. The focus of MSDI is to analyze the achievements of the Menominee in sustainable forestry and apply this to the larger model of sustainable development—one that can support the economy while balancing the environmental and social requirements of the Tribe. The MSDI and the college are working at all grade levels to increase the number of Tribal members who pursue advanced degrees in natural resources and business management. For example, MSDI is developing activities for students in grades K-12 that will emphasize the Menominee as both a traditional people with strong cultural ties to the forest and a people that make visionary decisions regarding resource management.

As part of a project funded by EPA's Great Lakes National Program Office, the Menominee produced several outreach products that promote their sustainable forestry practices. The Tribe produced a technical manual describing the

Menominee forestry practices and the Menominee Tribal Enterprises Forest Management Plan. The technical manual describes some of the Tribe's forestry practices. A more general "layman" brochure was produced to raise awareness in the community and across the state about the positive effects of the program. In addition, the Tribe produced and distributed a sustained yield forestry management video, conducted tours, and organized a seminar promoting the Menominee silviculture model. The Menominee recognize outreach and education as important components of their program and choose various media to reach diverse audiences. The Tribe's outreach efforts can help others in the Wolf River basin implement sustainable forestry practices, thereby increasing opportunities for sustainable development.

Sources of Support

The Menominee Tribe has received funding from numerous sources, including the U.S. Bureau of Indian Affairs, Wisconsin Department of Natural Resources, University of Wisconsin (along with assistance from professors, researchers, and students), U.S. Forest Service, EPA, The Ford Foundation, and First Nations Development Institute Eagle Staff Fund.

Contact

Douglas Cox
Environmental Services Department
P.O. Box 910
Keshena, WI 54135-0910
Phone: (715) 799-4937
Fax: (715) 799-4323

Nisqually Tribe



Program Components:

Wetland and Watershed Planning • Wetland Inventory, Assessment, Mapping • Restoration • Partnerships and Shareholder Coordination

Background

The Nisqually River arises from a glacier on Mount Rainier and flows 78 miles in a northwesterly direction to enter the southern end of Puget Sound. Historically, the Nisqually People lived throughout the Nisqually River basin and in nearby areas of southern Puget Sound. Today, the Nisqually Indian Reservation, approximately 1,500 acres, is located along 6 miles of the western shore of the Nisqually River, beginning 5 miles upstream from the river's delta. The reservation lies mostly on a high gravelly plateau above the river. All wetlands within the reservation are located in the floodplain of the river at the foot of a high bluff. These wetlands were created either out of seeps from the steep valley wall or from meandering and flooding of the river itself. The entire reservation shoreline and the slope up to the top of the bluff are maintained in mature forest and intact wetlands. The only developed area along the shore is the site of the Kalama Fish Hatchery, one of two fish-rearing facilities managed by the Tribe. The Clear Creek Hatchery, a larger facility constructed by the Tribe, sits within the reservation boundaries on lands occupied by the Fort Lewis Military Reservation on the eastern side of the river. Mitigation required for site development has resulted in the creation of 5 acres of wetlands near the hatchery plus 8 acres of tidal wetlands.

The Nisqually River enjoys better protection along its entire length than many of the other rivers in Washington State. Its headwaters and the uppermost 13 river miles reside within Mount Rainier National Park and a good portion of its delta lies in the Nisqually National Wildlife Refuge. No major industrial or population centers are located in the basin. However, two hydroelectric dams approximately 40 miles upstream from the refuge block the upstream migration of anadromous salmonids. (Historically, a natural waterfall in this location similarly blocked upstream fish movement.) Much of the remaining shoreline is in a natural state due to efforts by several entities such as the Fort Lewis Military Reservation, the City of Tacoma (as partial mitigation for its two dams), the Nisqually River Basin Land Trust, and the Nisqually Indian Tribe.



Wetland and Watershed Planning

The Nisqually Tribe acts to protect wetlands in the basin beyond reservation boundaries in a number of ways. It participates in the Timber, Fish and Wildlife Agreement, a 10-year-old cooperative process for regulating forest practices in Washington State. This agreement allows for Tribal recommendations and technical input regarding logging activities near streams and wetlands. The Tribe's Natural Resources Department employs staff knowledgeable about wetlands to review applications, make recommendations, and render technical assistance to landowners and state agency personnel.

Only recently were wetlands considered for additional protection under the state's watershed analysis process. The Nisqually Tribe, along with other treaty

Tribes, are very active in this process. Covered by the Washington State Forest Practices Regulations, this process calls for the analysis of whole sub-basins to determine the best ways to prevent damage to streams, fish, and more recently, wetlands. The Nisqually Tribe initiated the two most recent watershed analyses in the Nisqually River basin. The Tribe is making efforts, under new grant funding, to develop a comprehensive watershed plan, including identifying key wetlands for protection and restoration.

The Nisqually Tribe sits on the Nisqually River Council, an interagency body committed to the protection and enhancement of the Nisqually River basin through education, advocacy, and coordination. Created in 1987, the Council also includes state and federal resource agencies, local governments, and Fort Lewis.



Wetland Inventory, Assessment, Mapping

Most of the middle Nisqually River basin and nearly all of its major tributary, the Mashel River, lie within the commercial forest lands of four major timber interests. These timber interests, along with the Nisqually Tribe, the Nisqually River Council, and others have formed a Natural Resource Management Plan for cooperative protection of the waters of the basin. One of the results of this effort, funded by both the Washington Department of Ecology's Centennial Clean Water Fund and the Nisqually Tribe, is a complete inventory of the wetlands in the plan area. The final document not only contains comprehensive maps and ratings of each wetland, but also makes recommendations for restoration activities specific for each wetland. The next phase of this effort involves the identification and prioritization of wetlands most in need of restoration along with evaluation of the most cost-effective methods of restoring those wetlands.



Restoration

The Nisqually Tribe began a long-sought-after wetland restoration effort in 1998. Historically, the Nisqually River delta occupied hundreds of acres on the edge of Puget Sound, home to myriad creatures, including salmon resting and feeding before their seaward migration. At the turn of the century, farmers diked most of this salt marsh, converting these biologically productive areas into pasture and cropland. The Nisqually National Wildlife Refuge currently occupies the western half of the former marsh. The refuge is developing plans to breach the dike in several spots to allow the waters of Puget Sound to enter and regain some of the tidelands. Across the river, the eastern portion is still occupied by a 400-acre active farming operation. After years of negotiation, the Nisqually Tribe recently purchased this farm with the intention of gradually bringing back the salt marsh. The process of restoration has already begun through the creation of an opening in a dike to allow tidal water to enter 8 acres of pasture. Eventually, most of the Nisqually River delta will once more be home to a thriving community of tideland creatures including, of course, the young salmonids.



Partnerships and Stakeholder Coordination

Extensive cooperation between the U.S. Army at Fort Lewis Military Reservation and the Nisqually Tribe has occurred over the past several years. Under a Department of Defense grant, both in-stream work and riparian restoration were accomplished along Muck Creek, a major salmon stream passing through Fort Lewis. Plantings around a large headwater spring/wetland were included in the project. At the Tribe's urging, Fort Lewis has protected several headwater wetlands on its lands.

Just as in other areas, wetland loss due to agricultural development has occurred in the Nisqually River basin. The Nisqually Tribe has worked with a

large dairy farm adjacent to the river to reduce pollutants entering the river and associated wetlands. However, there are numerous small “hobby” farms dotting the landscape whose cumulative impacts on wetlands are substantial. Wetland impacts from these small farms are the next logical issue to address in terms of wetlands protection. This process demands a gradual building of communication and rapport with local rural citizens groups and conservation districts. The Nisqually Tribe has begun to build those bridges.

The Tribe’s staff work very closely with the Nisqually River Basin Land Trust, a nonprofit corporation whose primary objective is to keep the entire shoreline of the river in its natural state flowing through mature forests and productive wetlands. The land trust holds title to 215 acres, including several riparian wetlands in the river corridor. Tribal fishers have donated and prepared delicious baked salmon for land trust functions and Tribal artisans have donated traditional art objects for the land trust’s annual fund-raising auction.

In summary, the Nisqually Tribe actively participates with many different groups—governmental, community, environmental, and civic—with the goal of protecting or restoring the rivers, streams, and wetlands in the Nisqually River basin. They do this by serving on committees, acquiring funding for practical projects, supporting wetland assessment and planning efforts, and staffing positions to offer regulatory and technical assistance. In general, the Tribe gets involved whenever the opportunity arises to influence the future of the aquatic resources in the basin.

Sources of Support

Washington State Department of Ecology’s Centennial Clean Water Fund and the U.S. Fish and Wildlife Service have funded nearly all the projects described in the case study. However, the Bureau of Indian Affairs supports the Timber, Fish, and Wildlife technical staff position and has provided funding for the two Tribe-initiated watershed analyses. The Department of Defense has funded work for the protection of Muck Creek since it involves mostly Fort Lewis lands.

Contact

Janet Strong
Natural Resources Division
12501 Yelm Highway, SE
Olympia, WA 98513
Phone: (360) 438-8687
Fax: (360) 438-8742

Oneida Tribe of Indians of Wisconsin



Program Components:

Wetland and Watershed Planning • Restoration • Mitigation •
Partnerships and Stakeholder Coordination • Monitoring

Background

The Oneida Nation Reservation is located on the metropolitan fringe of the city of Green Bay in northeastern Wisconsin. The reservation boundaries encompass some 65,400 acres, of which 11,500 acres are owned by the Tribe or Tribal members. The reservation is home to nearly 4,000 of the 12,000 Tribal members who comprise the Oneida Tribe of Indians of Wisconsin. Duck Creek, a major tributary of Green Bay, divides the reservation in half. Burma Swamp, the headwaters of Duck Creek, lies outside reservation lands, and is heavily affected agricultural runoff. Due to the checkerboard nature of the reservation, the Tribe's environmental resources are affected not only by its own activities, but also by those of its neighbors. Indeed, 90 percent of the original wetlands within the boundary of Tribal lands were destroyed through ditching and conversion to cropland. The Tribe determined through aerial photographs that approximately 1,454 acres of the 65,400 acres that comprise the reservation are wetlands. The cumulative impacts of wetlands losses and ongoing nonpoint source pollution has led to degraded water quality and unstable stream flows on the reservation.

Through its various environmental programs and policies, the Oneida Nation attempts to balance the economic needs of the Tribe with environmental protection. This is reflected in their Environmental Policy, as well as in the Tribal governmental structure that makes decisions affecting economic development, planning, and environmental protection. The Oneida Nation developed an Environmental Policy that serves as a guide for all Tribal development activities. The goal of the Tribe's Environmental Policy is twofold. It serves as the framework for the development of environmental codes, and it ensures that development activities are compatible with the Tribe's traditional environmental beliefs. The Policy describes the Oneida Environmental Philosophy, distinguishing between historical and contemporary perspectives. The historical perspective explains that environmental respect and protection are part of the Oneida collective heritage, upon which its existence is based. The contemporary perspective acknowledges the modern challenges to this heritage and states that this policy will have the force of law in 1) working toward the goal of nondegradation of the environment, 2) maintaining a level of zero discharge of toxic and hazardous chemicals to the environment, and 3) recognizing the use of best available technologies for environmental restoration activities and disposal of hazardous materials. In addition, the Environmental, Health and Safety Department requires National Environmental Policy Act (NEPA) review on all Tribal projects. This ensures that environmental assessments are conducted on all proposed projects and that alternatives are considered before impacts take place.

To promote economic development while protecting natural resources, the Oneida have established cooperative links between their Environmental Resources Board and their Economic Development Division. For example, in 1993

the Economic Development Division proposed to build a business park and expand a gaming facility. The Environmental Resources Board worked with the Economic Development Division to mitigate the impact.

Recognizing the linkages between their local food system and their natural resources, the Oneida are also concerned with reducing the environmental impacts of their agricultural practices. The Oneida Community Integrated Food System is committed to “environmentally sensitive and responsible agricultural development” and “organic and healthy food production and processing,” while feeding the Tribe’s people and building external markets for their products. This effort further demonstrates that economic development and environmental protection are not mutually exclusive.

Like many Tribes in the United States, the Oneida Tribe has struggled to maintain both the quantity and quality of its lands. Beyond the ecological functions provided by wetlands to humans, the Oneida culture places high value on the wildlife that depend on wetlands as habitat. In addition to improving environmental conditions that impact human health and well-being, the Oneida Nation is concerned with protecting and restoring wildlife habitat.



Wetland and Watershed Planning

The Oneida National Water Quality Standards (WQS) include provisions that serve to protect, preserve, restore, and enhance water quality and the quantity necessary to maintain healthy aquatic habitats within the Waters of the reservation. It is a goal to maintain populations of wetland plant and wildlife by protecting food supplies, reproductive and nursery areas, and preventing the establishment of nuisance species.

The Oneida are involved in cooperative policy making and planning beyond reservation borders. Under the provisions of the Wisconsin Nonpoint Source Pollution Abatement Program, the Oneida Nation, in partnership with the Wisconsin Department of Natural Resources, the Wisconsin Department of Agriculture, Trade and Consumer Protection, the Brown County Land Conservation Department, and the Outagamie Land Conservation Department, developed the Nonpoint Source Control Plan for the Duck, Apple, and Ashwaubenon Creeks Priority Watershed Project. Approximately 95 percent of the Oneida Nation Reservation lies within those watershed boundaries. Development of the plan was a collaborative effort, aimed at assessing nonpoint sources of pollutants in the watershed and developing abatement and education strategies. The importance of wetlands and stream corridors is highlighted in the plan as integral to improving water quality. In addition, restoration of wetlands and riparian areas is a recommended strategy for improving the water quality of this watershed.



Restoration

As a demonstration project for the Nonpoint Source Control Plan for the Duck, Apple, and Ashwaubenon Creeks Priority Watershed Project, the Oneida Environmental, Health and Safety Department is using bioengineering techniques for stream stabilization in Duck Creek. Bioengineering uses vegetation as an alternative to rip-rap. The project experienced some difficulties in establishing vegetation, but this was expected. The Environmental, Health and Safety Department chose bioengineering over traditional rip-rap because the stabilization is more effective once vegetation is established, it is more aesthetically pleasing, it impacts the environment less, and the work is less energy-intensive. These advantages compensate for the fact that revegetation will take longer than installing rip-rap.

In 1994, the Dexter Road Project was initiated as a comprehensive ecological restoration plan for a 100-acre agricultural field that was historically planted in crops. This restoration effort involved a comprehensive plan for woodland, wetland, and grassland restoration, with a commitment to refrain from using chemical pesticides or fertilizers during the restoration. The project involved reintroducing more than 100 native species of forbs and grasses on 37 acres. During the spring of 1996, 36,000 conifer and hardwood seedlings were planted as part of this project. The small natural wetland was allowed to restore itself naturally.



Mitigation

The Tribe requires wetland mitigation, using an unofficial but working policy of a 2:1 replacement ratio (i.e., two wetland acres are restored for each wetland acre impacted) in current and future projects. Similarly, there are mitigation requirements for trees removed, at a 2:1 ratio. In 1993, the Environmental Resources Board and the Economic Development Division agreed to set aside 270 acres surrounding the Oneida Nation Light Business Park for wildlife habitat restoration. A comprehensive restoration plan was developed and work began in 1994. The plan included reforestation, grassland habitat, food plots for wildlife, wetlands, and brooding ponds. The Tribe reports that planted vegetation has become established and many mammals and birds (including nine species of ducks) have returned to the restoration area. Currently, the Tribe is developing a maintenance and management plan for the site, to ensure its ecological success. Additionally, the Tribe is designing and installing signs to educate the public about this restored wildlife habitat.

The Tribe is discussing plans with the Wisconsin Department of Transportation to use Tribal lands as a wetland mitigation bank. Under such an arrangement, the Tribe would gain wetland acreage while mitigating the impact of highway projects in other parts of the state.



Partnerships and Stakeholder Coordination

The Oneida Nation has participated in many U.S. Department of Agriculture programs intended to restore and protect the natural environment of the reservation. In 1997, the Tribe received a \$677,312 grant under the Environmental Quality Incentives Program to provide cost-share funding to landowners who install best management practices to reduce nonpoint source pollution. In addition, the Oneida Nation Farm has placed more than 1,500 acres of sensitive land into the Conservation and Wetland Reserve Programs.

The Oneida are a partner in the U.S. Department of the Interior, Bureau of Indian Affairs, Circle of Flight program, which focuses on enhancing waterfowl habitat. Since 1991, the Circle of Flight program has distributed \$3.7 million to 24 reservations and 3 inter-Tribal organizations for waterfowl and wetland enhancement projects.



Monitoring

The tributaries within the Oneida Reservation are affected by nonpoint source pollution, as well as pollution coming directing from the Fox River. This has resulted in fish consumption advisories, degraded water quality, and decreased recreational and cultural uses. The objective of monitoring is to gather environmental information on the water quality of the Reservation. This information will be used for analysis and research, and compliance with Oneida Water Quality Standards and the Oneida Water Resource Ordinance.

Although many investigations have been undertaken, comprehensive water quality monitoring is only beginning on waters of the Reservation. The Oneida Water Resources Team works cooperatively with USGS in establishing fixed sites for the collection of water quality data and hydrologic data. The goals of monitoring are to 1) determine the basic water quality in Reservation lakes and streams and 2) determine the successes or failures of best management practices by tracking water quality over time.

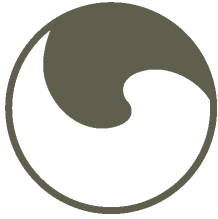
Sources of Support

The Oneida have received funding from numerous sources, including the Oneida Nation Environmental Resources Board, Circle of Flight, the Wisconsin Department of Natural Resources Nonpoint Source Pollution Abatement Program, the U.S. Department of Agriculture's Environmental Quality Incentives Program, and EPA's Coastal Environmental Management and Great Lakes Programs.

Contact

Steve Linskens or Jeff Sanders, Environmental Planners
Environmental, Health and Safety Department
P.O. Box 365
Oneida, WI 54155
Phone: (920) 497-5812
Fax: (920) 496-7883

Port Graham/ Nanwalek Native Villages



Program Components:

Wetland and Watershed Planning • Wetland Inventory, Assessment, Mapping • Partnerships and Stakeholder Coordination • Education and Outreach • Monitoring

Background

Port Graham and Nanwalek are two Aleutian villages located on the Lower Kenai Peninsula of Alaska. The Port Graham/Nanwalek Watershed Council was formed to protect and preserve an area that includes two adjacent watersheds: English Bay River and Port Graham River and their tributaries. The two watersheds consist of approximately 100,000 acres of steep mountainous terrain and glacially developed river valleys with elevations ranging from 3,000 feet to sea level. The valley bottoms and lower slopes are covered with Sitka spruce old growth forests; alpine tundra meadows occur in the higher elevations.

Marine, estuarine, riverine, palustrine, and lacustrine type wetlands are represented in the two watersheds. A large number of these wetlands provide high-quality spawning and rearing habitat for resident and anadromous fish, including five species of salmon, halibut, cod, and trout. The Nanwalek Salmon Enhancement Project has resulted in restoring yearly returns of approximately 40,000 adult sockeye salmon in the English Bay Lakes.

Other wildlife represented include numerous types of shellfish, waterfowl and marine birds, eel, harbor seals, moose, black bear, mountain goat, porcupine, and otter. Plant communities include Sitka spruce forest, tall alder shrub, halophytic grass wet meadows, halophytic sedge wet meadows, sedge moss bog meadows, alpine scrub, bluejoint reedgrass-forb meadows, pondlily, eelgrass, and marine algae. Each one of these plants and animals constitutes an integral part of the two villages' subsistence-based economies. Medicinal plants and berries found in the watersheds are important culturally and in providing medicine for village members. Some medicinal plants and berries found in the two watersheds are yarrow, Bethlehem star, devil's club bark and root, licorice fern, mountain ash, rose petals and hips, cranberry, salmonberry, blueberry, mossberry, trailing raspberry, nagoonberry, watermelon berry, fiddleheads, wild celery, goose tongues, and wild onions.



Wetland and Watershed Planning

The Port Graham/Nanwalek Watershed Council was formed as a result of meetings convened by the Chugachmiut Environmental Health Program to conduct a region-wide survey on where funding for a wetlands protection plan was most needed. The Chugach Regional Resources Commission, the U.S. Department of Agriculture Natural Resources Conservation Service, and the Tribal councils and Alaska Native Claims Settlement Act (ANCSA) corporations attended the meetings. Discussion at these meetings revealed that, in spite of the pristine nature of the area's wetlands and other resources, proposed logging and other commercial activities threatened the status quo, and that the watersheds of the

Port Graham and Nanwalek Villages stood in greatest need of a wetlands plan. Once funding was secured, the Council was charged with developing a Wetlands Conservation Plan encompassing the 100,000-acre planning area comprising the two watersheds. The Port Graham/Nanwalek Watershed Council, which is composed of people from various organizations within the two villages, meets every two months for discussions and workshops.

Because the ecosystems are largely healthy, the management approach of the Watershed Council is to prevent degradation as both communities experience growth in transportation systems, housing, and commercial resource harvests of timber and fish. The Port Graham and Nanwalek Wetlands Conservation Plan is turning out to be a watershed management plan with a wetland emphasis because all of the resources are so closely linked. The Plan uses the Natural Resources Conservation Service's planning process as a model and represents a broad base of sponsors and stakeholders with mutual interests in the watersheds and wetlands of the area, including Tribal councils, regional and village Native corporations, and special interest groups. The plan is not intended to create or expand wetland regulation, but rather to help landowners, local residents, and land managers make wise land and resource management decisions that are compatible with existing laws and regulations. To that end, the plan will recommend how federal, state, and borough regulations should be implemented within the two watersheds. The plan will also be used to leverage assistance or funding from other projects, both regional and federal.

The Port Graham and Nanwalek Wetlands Conservation Plan is comprehensive in scope, and includes:

- A detailed description of the planning area, including geology, hydrology, climate, soils, plant communities (with names of species listed in Aleutian and Latin), water quality, wetlands, land ownership, land uses, and wildlife and fishery resources
- A section on plant and animal species used for subsistence
- Village histories
- An overview of relevant laws and regulations
- Stakeholder scoping issues, including:
 - Natural resource and other development activities
 - Environmental impacts that have been identified
 - The relationship between regulation and property rights
 - The role of education in watershed and wetland management and protection
 - Specific management issues that need to be addressed by the Council
- Guidance in formulating alternatives to plan recommendations
- Plan implementation, providing annual work plans



Wetland Inventory, Assessment, Mapping

As a result of efforts of the Council, stakeholders in the two watersheds have gained a greater appreciation for the interconnectedness of the region's wetlands and the other natural resources that support humans, animal, and plant life. A focus of the Council is to develop resource management planning tools that help people understand why wetlands are important. For management and assessment purposes, they have developed a matrix that identifies local society

values of wetland dependent natural resources. These values are stated in terms of subsistence, cultural, and spiritual importance to the communities. Additional columns will then be added to the matrix that identify the wetland functions that support each expressed value, as well as the HGM (the hydrogeomorphic method of assessing wetland functions) subclass and model. The Council also recognizes the importance of linking HGM with measures of biological integrity “because people can relate to critters and are interested in protecting them.” The Council benefits from the work of a geographic information system contractor, who was hired to help organize information about the villages’ resources. An example of the matrix is presented below:

Wetland Resources	Subsistence value	Cultural value	Spiritual value	How used (when, where, why)	HGM subclass & model	Supporting function
Plants						
Herbs						
Shrubs/Trees						
Berries						
Large Animals						
Moose						
Bear						
Goat						
Small Animals						
Porcupine						
Rabbit						
Grouse						
Fish						
Dollies						
Trout						
Salmon						



Partnerships and Stakeholder Coordination

The Council itself is providing the forum for stakeholder coordination. These efforts are supported by technical assistance from the Natural Resources Conservation Service of the U.S. Department of Agriculture and consist of not only the Port Graham and Nanwalek Native Villages, but also the Alaska Native Claims Settlement Act (ANCSA) corporations, which are the major landowners within the watershed. Individual Native Allotment owners are also active participants in the process.



Education and Outreach

For education and outreach purposes (including educating the Council itself), the Council developed a fact sheet that discusses 1) how a wetland assessment tool is needed to make management decisions about wetlands; 2) that the important things about wetlands are called wetland values, which include such things as the plant and animal life that they support and the flood protection and groundwater replenishment they provide; 3) that wetlands have value because of where they are (location) and what they do (function); and 4) that determining their location and function is essential in the assessment, planning, and management of wetlands. The fact sheet discusses the role of HGM and how the Council is applying it by focusing on those wetland functions that support

local wetland values. Finally, it explains that mapping wetlands is an important component of the assessment process.

The Council also developed education and outreach tools to help village members better understand the functions and values of wetlands, what is being done to protect them, and what they can do to help. These tools include a colorful and informative brochure that is simple and easy to read, but provides a level of detail allowing those with more in-depth or technical interests to be engaged, and an 11-minute video that displays local wetland types and associated natural resources and including sound bites from several Council members describing the importance of wetlands and watershed planning. The video and brochure, which were distributed to every household in the two villages, invite all members to join in the planning process.



Monitoring

The Port Graham/Nanwalek Native Villages have developed bioassessment protocols in cooperation with the University of Alaska-Anchorage campus. During the summer of 1998, at least six sample stations were established within the project area, with the assistance of the Port Graham/Nanwalek Watershed Council. Macroinvertebrate samples were collected to establish the baseline reference conditions of the Native Villages' riverine wetlands.

Sources of Support

The Port Graham and Nanwalek Native Villages have received funding from numerous sources, including the Chugachmiut Environmental Health/Protection Program, Chugachmiut Forestry/Lands Program, an EPA Wetland Development Grant, and the Natural Resources Conservation Service.

Contacts

Christine Celentano
Chugachmiut
4201 Tudor Centre Drive, Suite 210
Anchorage, AK 99508
Phone: (907) 562-4155
Fax: (907) 563-2891

Dan LaPlant
USDA Natural Resources Conservation Service
949 East 36th Avenue, Suite 400
Anchorage, AK 99508
Phone: (907) 271-2424
Fax: (907) 271-3951

Seminole Tribe of Florida



Program Components:

Wetland Inventory, Assessment, Mapping • Regulation • Monitoring • Wetland Research

Background

The sovereign lands of the Seminole Tribe of Florida are spread out among five reservations, known as the Hollywood, Big Cypress, Brighton, Tampa, and Immokalee Seminole Indian Reservations. In addition to these reservations, the Seminole Tribe has reserved Tribal fishing and hunting rights on lands adjacent to the eastern boundary of the Big Cypress Reservation that were granted to the Seminole Tribe by the State of Florida.

In spite of modernization of many aspects of Seminole life, Tribal members still maintain strong ties with their land and natural resources. For instance, cypress trees and sabal palms are harvested to construct chickee huts, once the only form of shelter, now used for ceremonial and recreational purposes. Many Tribal members are avid hunters who enjoy the availability of wild hogs and deer within the swamps, marshes, and hammocks of the rural reservations. The Seminoles place a high value on arable soils, surface and ground water, swamps, marshes, rangeland, timber, medicinal plants, and wildlife. In one way or another, these natural resources are either directly dependent on wetlands, or the manner in which they are managed can impact the health of wetlands. Thus, wetland conservation is a top priority for the Seminole Tribe.

Like many contemporary Tribal members throughout the United States today, Seminoles range from traditionalists who see themselves as one with nature and are ever protective of it to more progressive members who have taken the opportunity to capitalize on their available resources to obtain economic self-sufficiency and advancement for the Seminole Tribe as a whole. The Tribal government is faced with reconciling these often competing interests and encouraging growth and development that need to be sustained to provide future generations of Seminoles with opportunities.

Big Cypress Reservation

The Big Cypress Reservation is the largest of the Seminole reservations, located in the southeastern corner of Hendry County and the northwestern corner of Broward County, encompassing approximately 81.5 square miles or 52,160 acres. This reservation is an integral part of the regional water management system, as a pathway for water flow into the adjacent Big Cypress National Preserve, and ultimately into Everglades National Park. In addition, the Tribe depends on surface and groundwater resources located on Big Cypress for potable uses as well as agricultural production. Due to the ecological, cultural, and socioeconomic importance of the Big Cypress Reservation, it is the focus of much of the Tribe's efforts in defining and solving natural resource problems overall.

The Big Cypress Reservation lies at a junction of soil and vegetation types. To the east lie the classic sawgrass everglades (extensive prairies with occasional

tree islands), underlain by highly organic muck soils. Muck soils indicate that, at least in the past, high soil moisture inhibited degradation of plant remains and peat formed. To the west, there is primarily a more sand or rocky soil base and, in general, a forested terrain with occasional wet prairies interspersed. Cypress heads/strands are frequent and higher sites consist of pine flatwoods maintained by a schedule of burning. The winter dry season is followed by a summer wet season, leading to wide fluctuations in water levels across the reservation. Most wetlands dry out completely when rains slacken. This may have been different in the past before extensive regional hydrologic modifications (described later) were made. For example, in one old-growth cypress head in the southern “Native Area” there are very tall cypress knees, up to 5.5 feet tall. This indicates that the maximum water level at this site used to be in the 5-foot range, yet the present-day maximum seems to be less than 2 feet based on the height of the lichen/moss line on the knees. The knees of these extremely old cypress trees remain as bioindicators of hydrology prior to drainage.

Development of water resources and urbanization both on and off Tribal lands has led to considerable impacts on the quantity and quality of water, as well as wetland and wildlife resources on the reservation. Upstream agriculture has increased phosphorus loadings, leading to an imbalance in the composition and distribution of flora within the larger Everglades ecosystem. Regional hydrologic modifications (in the form of the Central and Southern Florida Flood Control Project built during the canal building era of the 1960s) have greatly reduced the regional supply of water, virtually stopping all water flow into the reservation from the north except for that which enters through the North and West Feeder Canals. Local hydrologic changes (in the form of construction of wetland rim ditches and berms, and field and collection ditches in the pastures and agricultural fields) affect the distribution of water that is still available, and thus represent significant impacts on wetland integrity as well.



Wetland Inventory, Assessment, Mapping

In 1992, with funding from an EPA Wetland Development Grant, the Tribe undertook a comprehensive program for locating, delineating, and mapping wetland resources on all its reservations, including the Big Cypress Reservation. A wetland database was developed, including 1) wetland boundaries digitized from 1" = 400' scale aerial photographs and field truthed for verification, 2) a two-tiered classification system distinguishing between swamps and marshes and distinctive types of each, 3) a classification modifier that identified types of evident impacts, and 4) the acreage of each wetland mapped.

The primary objective of the mapping and inventory project was to identify the limits of wetlands, as defined under prevailing federal guidelines (1987 Corps of Engineers methodology), for use as a planning tool in the design and regulation of future projects on the reservation. This mapping project produced a planning tool that is now used to assess the wetland impacts from proposed uses of Tribal lands.



Regulation

In 1987, as part of a settlement agreement resulting from a water rights dispute, the Seminole Tribe, the State of Florida, and the South Florida Water Management District entered into a Water Rights Compact. The Compact set ground rules by which the parties to the Compact had to abide in relation to water rights, outlined how future disputes would be resolved, and allowed for essential protection of wetlands within reservation boundaries. The signing of the Compact led the Tribal Council of the Seminole Tribe of Florida to create the Water Resource Management Department (WRMD). WRMD, overseen by the

Seminole Water Commission (SWC), is charged with protecting and evaluating the Tribe's land and water resources and facilitating wise use and conservation of these resources by other departments and individuals doing business on Tribal lands.

SWC and WRMD developed the Tribal Water Code to establish a legal framework for protecting and restoring the waters of the Tribe's reservations. The Seminole Tribe was granted TAS status by EPA to implement the Clean Water Act, including setting water quality standards for Tribal lands. In early 1998, SWC approved Final Rules for Water Quality Protection and Restoration: Rules to Carry Out the Federal Clean Water Act and the Tribal Water Code. The Final Rules include water quality standards for the Brighton and Big Cypress Reservations, and provisions for the beneficial use and conservation of water resources. These standards and provisions cover wetlands as well as surface waters. WRMD is working to improve the existing water quality standards to place more emphasis on wetlands. These efforts are described below.

The overall goal of the Big Cypress Water Conservation Plan, of which the Tribe's wetlands program is an integral part, is to join all of the reservation's water and land resources in a single, controllable system to better serve both human and environmental needs. This integrated concept of reconnecting wetland resources with the associated upland areas will be assessed as a possible guide for other landowners in the Everglades watersheds and other American Indian reservations with wetland resources.



Monitoring

Part of the inventory effort described earlier included two years of characterization of specific reference wetlands, in terms of water quality and vegetative and macroinvertebrate community types. This effort was continued into an ongoing monitoring program. The current monitoring program includes water quality monitoring (twice monthly), macroinvertebrate collection (quarterly), vegetative transect inventory (quarterly), and panoramic photos (quarterly). In addition, each of the monitoring sites has a water level recorder for groundwater elevation monitoring.

The Tribe is developing wetland biocriteria to assist in the early detection of impairment to water quality resulting from land use upstream of reservation wetlands. The Tribe would like to incorporate biological criteria for wetlands into the Tribal Water Code Water Quality Standards. Ultimately, thresholds will be found where wetland functions can be maintained while serving the many water resource needs of the reservation, such as water storage, flood control, water quality enhancement, and water table/aquifer replenishment, thereby improving the Tribe's ability to protect and enhance its wetland resources while at the same time maintaining or enhancing species diversity through the establishment of specific biological criteria. The current monitoring program provides a strong foundation upon which to build a biocriteria development program.

In addition to augmenting the wetlands data they collect, in terms of types of information and number of sites monitored, it is a top priority of WRMD to improve the quality of the data collected. Random lab testing is done on a constant basis, and the quality assurance plan for data collection is currently being revised and updated.

Wetland Research

WRMD is constantly reassessing and fine tuning its research questions to ensure that the Tribe's efforts are directing scarce resources to the most pertinent issues. Nutrient loading and the effects of previous hydrologic modification pose specific challenges to the Tribe, and part of their research is aimed at developing

best management practices that can reduce the impacts of these factors on wetland water quality and habitat integrity. An emerging area of research interest for the Tribe is forested wetland systems (especially bald and pond cypress), which form a large part of the western Everglades. These systems are understudied and ill-defined. The Tribe believes that research into the functioning of these systems will help increase the overall understanding of the Everglades as an ecological system.

Sources of Support

The Seminole Tribe received an EPA Wetland Development Grant that supported the Tribe's wetland mapping and inventory project on the Big Cypress Reservation. Ongoing monitoring and research efforts are supported through a collaboration of Tribal, BIA, EPA, and NPS funding sources.

Contact

Craig Tepper, Director
Water Resource Management Department
6300 Stirling Road
Hollywood, FL 33024
Phone: (954) 967-3402
Fax: (954) 967-3489
e-mail: water@gate.net

Taos Pueblo



Program Components:
Education and Outreach • Monitoring

Background

Taos Pueblo, sitting at an elevation of 7,600 feet, is the northernmost of the 19 Pueblos of New Mexico, located in north-central New Mexico. Tribal lands consist of approximately 98,000 acres, encompassing three distinct biozones—alpine tundra and lakes, mixed conifer and aspen forests, and high desert pinon and juniper forests.

The Rio Pueblo and the Rio Lucero, along with their associated watersheds, compose the two major drainage basins on Taos Pueblo lands. Both rivers have their headwaters—Blue Lake and Bear Lake, respectively—in the northern montane region of the reservation known as the Blue Lake Wilderness Area. Both rivers flow from an elevation of approximately 12,000 feet at their headwaters to 5,200 feet at their floodplains, where they meet the Rio Grande. These two lakes are designated as “outstanding Tribal resource waters” and are provided special protection under the Tribe’s proposed water quality standards. The Rio Pueblo flows directly through the historic village, supplying water for ceremonial and domestic purposes. The Rio Lucero is primarily used for irrigation and grazing. Taos Pueblo members are extremely proud of their traditional culturally oriented lifestyle, as evidenced by the following statement on their web site: “We pride our lifestyle with nature as the true source of our existence.”

Taos Pueblo has approximately 800 acres of freshwater wetlands on Tribal lands. These wetlands are an ancient glacial bed, and snowmelt from higher elevations recharges them. According to the Taos Pueblo Environmental Office, there used to be 1,000 acres of wetlands in this area. The loss of wetlands is attributed to development and an increased demand for water beyond Pueblo borders, resulting in over-pumping of groundwater. Loss of natural springs near these wetlands is also attributed to groundwater pumping. Annual spring runoff has not been sufficient to compensate for the increased demand for water.

The remaining wetlands on Taos Tribal lands are in relatively pristine condition. To protect them, the Pueblo employs the traditional tools of rotation and exclusion of livestock, including cattle, horses, bison, and buffalo, to avoid the impacts of overgrazing on water quality. Additionally, all crops grown upstream from the wetlands are grown “organically,” without the use pesticides, fertilizers, and other chemicals that could impact the integrity of Tribal waters. Other sustainable agriculture techniques, such as the use of cover crops, buffer strips, and composting, are used to promote healthy soil and reduce erosion.



Education and Outreach

Education and training of Environmental Office staff and Tribal members is a top priority for Taos Pueblo’s environmental program. Pueblo members are very traditional in their view of the environment—they want very much to protect it, but are apprehensive about using modern, technological approaches to protection. One of the main objectives of the Environmental Office’s education and

outreach effort is to help Pueblo members overcome this apprehension, which will ultimately help the Pueblo develop effective environmental protection programs.

Capacity building of staff is furthered by embracing a partnership approach to education and training. Taos Pueblo is fortunate to receive expert technical assistance from Dr. Gerald Jacobi of New Mexico Highlands University in the area of benthic macroinvertebrate identification. The River Watch Network, a nongovernmental organization, has been extremely valuable in training staff on monitoring techniques. Continuing education is an integral component of the environmental program at Taos Pueblo. In fact, other Tribes and pueblos in the region have benefitted from the knowledge of the Taos Pueblo Environmental Office. Environmental Office staff have conducted several training sessions in water quality monitoring for other Tribes and pueblos, which are now developing and implementing their own monitoring programs.

In addition to the monitoring program, the Environmental Office is engaged in other education and outreach activities. The Environmental Office produced several brochures that describe their programs, and specifically, the biological monitoring program. Currently under development are separate curricula designed for four different age groups: K-3, 4-6, 7-9, and 10-12. Three different curricula are being developed for each group, covering 1) benthic macroinvertebrates and their relationship to water quality and monitoring; 2) wetlands ecology and conservation, and their relationship to the larger watershed ecosystem; and 3) solid waste issues. The three major components of the curricula are class work, lab work, and field experience. The Environmental Office is receiving support on this project from EPA Region 6, and there is much interest from other schools, pueblos, and Tribes. The Environmental Office believes that education and outreach are two of their most important tasks in furthering environmental protection on and off the Pueblo.

The Pueblo has not yet adopted its own water quality standards. The Environmental Office is focusing on educating and building the capacity of its staff. In this way, once standards are adopted, the staff will be positioned with the appropriate knowledge to implement the program. According to an Environmental Office brochure: "Taos Pueblo's goal of the environmental program is to become self sufficient and train Tribal members to understand and implement protection and preservation of our environment." The Tribe prides itself on the fact that environmental staff is made up solely of Pueblo members, furthering a sense of ownership of Tribal resources. The Environmental Office also collaborates extensively with other Tribes and organizations that have similar interests. Taos Pueblo has a volunteer monitoring program that supports the specific goals of the water quality monitoring program, while also furthering the outreach efforts of the Environmental Office by educating interested Pueblo members about water quality and the impacts humans have on environmental quality.



Monitoring

Taos Pueblo has an extensive water quality monitoring program that focuses on surface waters. They are already in the process of developing a monitoring program specifically for wetlands, based on the foundation and success of the surface water monitoring program. The Environmental Office believes that it is important to monitor the health of wetlands, just as it is for surface waters, to have a baseline of integrity to use as a reference point in making management decisions and evaluating impacts to the resources. The surface water quality monitoring program considers chemical and biological conditions to measure the health of the ecosystem and determine the type and

source of stressors impacting the waterbodies. Chemical monitoring includes pH, conductivity, dissolved oxygen, temperature, total alkalinity, phosphorus, and nitrates. Biological monitoring focuses on the collection and identification of benthic macroinvertebrates. The Benthic Macroinvertebrate Identification Project began in the spring of 1996. The biological monitoring program is based on reference site criteria, with a pristine site, an impacted site, and a recovered site. The program uses protocols based on the EPA Rapid Bioassessment Protocol.

Sources of Support

The Taos Pueblo has received funding or technical assistance and support from EPA Region 6, EPA's American Indian Environmental Office, Bureau of Reclamation, Bureau of Indian Affairs, River Watch Network, Rio Grande Restoration, and the HACH Technical Training Center. Several technical experts also provide support to the Pueblo, including Kenneth King, Licensed Geologist; Dr. Gerald Jacobi, New Mexico Highlands University; and Jeff Toomey, Northern New Mexico Community College.

Contact

Luis Zamora, Director
Environmental Office
P.O. Box 1864
Taos, NM 87871
Phone: (505) 751-4601
Fax: (505) 751-3905
e-mail: tpeo@laplaza.org
Internet home page: www.laplaza.org/tpeo

Wampanoag Tribe of Gay Head



Program Components:

Wetland and Watershed Planning • Wetland Inventory, Assessment, Mapping • Restoration • Monitoring

Background

The Wampanoag Tribe of Gay Head (Aquinnah) is located on the westernmost point of Martha's Vineyard, off the coast of southern Massachusetts. Tribal lands span 530 acres, of which 35 percent are wetlands. While all of the wetlands are culturally important to the Tribe, cranberry bogs are especially significant for the Wampanoag. Wampanoag means "colors by the sea" in the Aquinnah Wampanoag language, and this name is exemplified by the ripening cranberries during harvest season. Cranberry bogs are naturally occurring on Tribal lands and were created by receding glaciers (i.e., glacial waters filling depressions scoured by the glacier movements). In previous centuries, the Tribe harvested what the bogs produced naturally. Cranberries are now cultivated by the Tribe, using traditional methods that preserve the cranberry plant's habitat. Cranberry bogs make up 15 to 20 acres of the Tribe's total acreage and produce a bounty of cranberries every year. This harvest is celebrated on Cranberry Day, the Wampanoag traditional holiday, held on the second Tuesday of October every year.

Aquinnah is practically an island unto itself, with the Coastal Great Ponds, Menemsha and Squinocket, separating it from the rest of Martha's Vineyard. The two ponds are each 600 acres, one being salt water and the other brackish. The ponds are very important to the local economy as a tourist attraction as well as for commercial and recreational fishing. The ponds are shared between the Tribe and the towns of Aquinnah and Chilmark. This joint use has encouraged the three entities to collaborate on a comprehensive watershed plan discussed below. Other wetlands in the area are important habitat for fish, shellfish, and waterfowl (including Canada geese, teal, mallard, and black ducks), all of which are harvested for subsistence by Tribal members. Bay scallops, quahogs, soft shell clams, oysters, other shellfish, and lobster are also found in these areas and are very important to the local Tribal economy. Tribal lands lie above Martha's Vineyard's sole source aquifer. Most of the island depends on well water for its drinking water supply, making wetland protection even more important.

Other significant species relying on the habitats in and around the bogs include several species of orchids and Nantucket shadbush, which is listed as threatened by the state. This habitat is also essential nesting and foraging habitat for the Northern harrier hawk.



Wetland and Watershed Planning

To ensure that shared resources in the watershed are protected, the Tribe engaged in a watershed planning process with the towns of Aquinnah and Chilmark in 1996. The three jurisdictions share the Coastal Great Ponds, and all have an impact on the water resources upon which residents of the two towns and Tribal members depend. The trio convened a scoping session with stakeholders from the towns and the Tribe, which resulted in a prioritization of assessment

activities. Through this prioritization effort, the towns and the Tribe identified policies that should be enacted to protect their shared water resources.



Wetland Inventory, Assessment, Mapping

The Tribe delineated all of its wetlands and stored the data in ArcView, a geographic information system (GIS). The Tribe also conducted a nonpoint source assessment for their portion of the watershed and cultural use studies of their wetland resources.



Restoration

Although cranberry cultivation in Massachusetts is a big business, the Wampanoag cultivation of cranberries is strictly a cultural, as opposed to commercial, activity. In other words, all of the cranberries harvested are reserved for Tribal consumption. The Tribe cultivates cranberries traditionally and organically, using no mechanization and no synthetic pesticides or fertilizers. All work associated with growing the cranberries is done by hand, an important tradition in the Wampanoag culture. The Tribe views cranberry cultivation as integral to their Tribal heritage and current well-being, and thus believes that by avoiding the use of machines and chemicals, they are preserving the cranberry habitat so that it can continue to produce cranberries for current and future generations. The Tribe's goal is to preserve the bogs as they are naturally occurring.

The Wampanoag Natural Resources Department is engaged in a variety of activities to preserve and restore the cranberry bogs. Restoration of the bogs involves manually clearing vegetation that competes with the cranberry plants, blocking light and using soil and nutrients that the cranberry plants need. Preservation efforts are concerned with mitigating the impacts of nonpoint source pollution flowing into the bogs. A highway goes right through the bogs and has thus disturbed the natural drainage that existed before the road was built. The Tribe is concerned about the potential impacts of runoff of petrochemicals and heavy metals from the highway as well as storm water runoff. Currently, the Tribe is looking into building retention ponds and installing petroleum scrubbing catch basins along the flow of storm water to remove the petrochemicals and heavy metals.



Monitoring

Through funding from EPA and technical assistance from the Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture, the Tribe is in the process of implementing a wetlands monitoring program. The Tribe periodically inventories biological diversity, including species diversity, within the bogs. This monitoring data will be stored in the Tribe's GIS database. It will be used to track the success of their wetland preservation and restoration efforts.

Sources of Support

The Tribe has received Clean Water Act Section 104(b)(3) Wetlands Protection Program funding as well as Section 106 funding. The NRCS provides funding for a part-time Tribal-NRCS staff position. The Tribe continues to receive funding from the U.S. Bureau of Indian Affairs' Section 638 Tribal Program for water resources, fish and wildlife, and natural resources.

Contact

Matthew Vanderhoop, Director

Natural Resources Department

20 Black Brook Road

Gay Head, MA 02535

Phone: (508) 645-9265

Fax: (508) 645-3790

White Mountain Apache Tribe



Program Components:

Wetland and Watershed Planning • Restoration • Education and Outreach

Background

The Fort Apache Indian Reservation, home to the White Mountain Apache Tribe, is located in east-central Arizona. Tribal lands encompass more than 1.6 million acres ranging in elevation from 2,700 to 11,400 feet. Thousands of miles of streams flow through the reservation, including more than 600 miles of fish-bearing streams. In recognition of the ecological and cultural significance of these waters, the Tribe designated all riparian zones as sensitive areas to be restored to full health. The Tribe adopted a Wetlands Conservation Plan to guide the restoration and other wetlands that are degraded.

Tribal wetlands provide habitat at various life stages for many species of plants and animals that are economically and culturally important to the White Mountain Apache Tribe. Trophy elk, ponderosa pine, native trout, the Arizona willow, and other native wetland plant species are among the biota that depend on healthy wetland habitat. The White Mountain Apache's diverse environmental management programs work together to protect these and other resources that Tribal members depend on for subsistence, cultural, and economic reasons.

Overgrazing by domestic, feral, and wild ungulates is a major source of riparian degradation, leading to soil compaction, bank erosion, and shifts in vegetation composition to non-native species. Livestock overgrazing dates back to the early part of this century when non-Indian grazing permits were first issued by the federal government. Subsequently, intensive road and railroad construction, vegetation eradication, reseeding with exotic species, channel manipulations, and other federal land management efforts contributed to a legacy of riparian degradation.

The protection of the Tribe's water resources is an integral part of its multipronged effort to achieve sustainable development. The White Mountain Apache acknowledge four cornerstones to sustainability, which are interdependent and mutually reinforcing. The Tribe recognizes these cornerstones as forms of social and natural capital essential to its existence. The four cornerstones are:

- *People*, with knowledge, awareness, faith, and energy to promote sound resource management
- *Ecosystems*, that are currently in, or can be restored to, healthy and productive conditions
- *Culture*, instilling strong values that bind communities, that facilitate long-range planning based on traditional knowledge and experience, and that encourage promotion of healthy ecosystems
- *Sovereignty*, including the power to make unfettered decisions about Tribal resources

At the heart of the Tribe's sustainable development program is the strategy of restoration of all four cornerstones. The Tribe's wetlands protection efforts

address three of the cornerstones directly and are discussed in this case study. The fourth area, sovereignty, is all-encompassing and is addressed by virtue of the Tribe's proactive approach to natural resource management.



Wetland and Watershed Planning

In 1995, the Tribe was awarded an EPA Wetland Development Grant to begin development of a wetlands conservation plan. The Tribal Wetlands Conservation Plan (Council Resolution 12-97-367) was adopted in December 1997. It serves as a guide for the riparian and wetland restoration efforts currently under way.

The Wetlands Conservation Plan focuses on protecting, maintaining, and restoring the Tribe's wetlands. Protection guidelines currently under development will address the needs of different wetland types (meadows, marshes, and lakes), to protect them from the primary sources of impacts to wetlands (cattle overgrazing, feral horses, elk, and roads). The implementation plan proposes demonstration projects for the ID Restoration Area and North Fork Watershed. The plan also includes a monitoring and evaluation program that will allow for measuring progress as well as providing feedback to the implementation process.



Restoration

In 1995, the White Mountain Apache Tribe initiated a riparian-wetland assessment and restoration program on the reservation. The program initially focused on passive restoration at 13 sites by excluding livestock from riparian areas with fencing. The primary objective of the riparian restoration program was to encourage the recovery of degraded sites by allowing vegetation to grow. By emphasizing relatively low-cost passive restoration, the program sought to generate a broad base of information on the recovery potential of degraded areas and guide more intensive restoration efforts. Sites were selected across the reservation at various ecological zones ranging in elevation from 5,000 to nearly 9,000 feet. Sites were chosen based on preliminary identification of problem areas and/or suggestions by Tribal members familiar with the history of degradation and recovery potential of the sites.

In addition to livestock exclusion, the White Mountain Apache Wetlands Program works to reduce feral horse and elk populations in sensitive areas to encourage recovery of wetland plants. In addition, the Tribe seeds and transports native species in sensitive areas.

In 1997, the Tribe conducted an evaluation of seven restoration sites to gauge the effectiveness of the initial restoration strategy. The sites included Horseshoe Cienega and Pacheta Cienega, both of which are meadows that sit at high elevations. Kentucky bluegrass and Rocky Mountain iris had displaced the native sedges at Horseshoe Cienega as a result of a lowering of the water table. Exclusion, sedge seeding, and transplanting, and other measures, helped to re-establish the native wetland plants.

Many lessons were learned from the initial restoration efforts that have helped shape future activities. For instance, passive restoration was successful at sites that had native wetland plants, but not in sufficient concentrations due to heavy animal impacts. These sites tended to be more functional than some of the other sites. In these cases, fencing was the most appropriate tool. At other sites, however, the channels were hampered by severe physical dysfunctions that needed to be addressed before passive restoration could yield much improvement.

Knowledge gained from these lessons sparked the development of a decision-making process to support planning for future restoration projects. The decision-making process is focused on site-level planning to address those factors that most

limit riparian recovery. The Tribe notes that while making such evaluations, it is critical to keep in mind how the controlling forces of geomorphology, plants, and animals are intertwined. The early phase of the process should assess the extent to which channel hydrology and geomorphology are limited by off-site conditions.

One of the most important lessons that the White Mountain Apache learned from their restoration efforts is that non-woody wetland vegetation, such as sedges, rushes, reeds, and bulrushes, play a critical role in maintaining stream structure and function. This lesson is now being applied to the more arid lands at lower elevations of the reservation.



Education and Outreach

People are the human capital needed to fortify the foundations of sustainability. Education and outreach for staff and Tribal members are integral components of the White Mountain Apache's restoration strategy. Regularly scheduled Natural Resource Workshops bring together leaders and resource managers to hone leadership skills in natural resource management. Apprenticeship and mentor programs help develop Tribal managers under the supervision and training of experienced managers. The Tribe holds field workshops that attract Tribal members from all over the West. The most recent workshop, which focused on riparian management, was held in cooperation with the InterTribal Timber Council.

A permanent fund was established by the Tribal Council to assist students of natural resource management. An EPA Wetland Development Grant helped fund an Ecological Youth Camp for young Tribal members to raise their awareness of ecology and to get hands-on experience in the field.

The cultural dimension of restoration is addressed through various efforts to enlist elders and other Tribal members to apply traditional knowledge of place, plants, and animals. This information guides resource management and education programs. The Tribe is working to encourage eco-tourism ventures by Tribal members, while instituting plans to ensure that such development is compatible with cultural and environmental concerns. In 1999 the Tribe's Land Restoration Fund, matched by outside funds, began to provide a permanent source of funding to sustain these evolving initiatives.

Sources of Support

The White Mountain Apache Tribe received an EPA Wetland Development Grant under Clean Water Act Section 104(b)(3), and an EPA Water Pollution Control Grant under Clean Water Act Section 106. The Tribe also received a U.S. Fish and Wildlife Service Challenge Cost Share Award. Other funding and support were obtained from the Arizona Water Protection Fund, the U.S. Forest Service Rocky Mountain Station in Flagstaff, Arizona, and through the Job Training Partnership Act.

Contact

Candy Lupe, Manager
 Watershed Program, Wetlands Project
 P.O. Box 700
 Whiteriver, AZ 85941
 Tel: (520) 338-4346 x 284
 Fax: (520) 338-5195

