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Comparative Analysis

This chapter presents a comparative analysis of the tools and strategies that the 11 Tribes and Native organizations selected for the case studies are using to meet their wetland protection goals. The Tribal wetland programs and projects described in the case studies are categorized by general program components. Where a Tribe or Native organization has developed a unique program to protect its wetlands, such programs are described separately from the general program components. 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. The comparative analysis is summarized in Figure 1.

Often, Tribes develop wetland programs and projects in response to pressing issues that must be addressed immediately. A Tribal wetland program may initially focus on one area and gradually evolve into a more comprehensive program. Instead, a Tribe should begin developing its wetland protection program by reviewing publications and outreach materials (Appendix III) that provide guidance for development of wetland programs and "Draft Core Essential Elements of a State or Tribal Wetlands Program" (Appendix IV). This approach, given sufficient funding and other resources, could result in a more comprehensive and efficient wetland program.

The purpose of this comparative analysis is not to advocate one approach over another. EPA recognizes and respects the diverse situations of Tribes. The purpose is to show what features the programs have in common and where the programs diverge as they seek to meet the unique needs of each Tribe or Native organization. The following general program components used in the case studies are also used in the comparative analysis:

- Wetland and Watershed Planning
- Wetland Inventory, Assessment, Mapping
- Regulation
- Restoration
- Mitigation
- Partnerships and Stakeholder Coordination
- Education and Outreach
- Monitoring

Figure 1. Summary of Comparative Analysis

Tribe or Native Organization	Program Component							
	Wetland and Watershed Planning	Wetland Inventory, Assessment, Mapping	Regulation	Restoration	Mitigation	Partnerships and Stakeholder Coordination	Education and Outreach	Monitoring
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/Nanwalwek Native Villages								
Seminole Tribe of Florida								
Taos Pueblo								
Wampanoag Tribe of Gay Head								
White Mountain Apache Tribe								

The 11 case studies represent diverse situations, but the motivations of Tribes to protect wetland resources provide an appropriate starting point for a comparison of Tribal wetland programs. Similarities are present in both the motivations of Tribes to develop wetland programs and the types of tools and strategies used to protect their wetlands. Considerations such as the amount of wetland acreage, types of wetlands, wetland hydrology, Tribal political framework, human impacts on wetlands—both on and off Tribal lands, the cultural significance of wetlands, and the species that depend on wetland habitat will in part determine the specific types of tools and strategies for program implementation.

Many Tribes have wetlands that have been adversely affected by human activities both on and off Tribal lands. In these cases, Tribal wetland programs often aim to stop degradation, followed by a strategy of restoration and a plan to mitigate potential future impacts. Other Tribes are fortunate to have wetlands that are in a relatively pristine state, and in these instances protection of the resource from potential impacts is the desired strategy. More common are Tribal lands that encompass both pristine and degraded wetlands, requiring an adaptive strategy that includes protection, restoration, and mitigation.

Wetland and Watershed Planning

A number of Tribes and Native organizations discussed in the case studies initiated development of their wetland programs by securing an EPA Wetland Development Grant. Development of a wetland program is one of the primary purposes of this grant program. Historically, awards to Tribes, in comparison to state and local governments, represent a significant portion of overall program funds. Whether or not an EPA Wetland Development Grant or similar planning-oriented funding source is secured, Tribes that engage in a wetland planning process usually develop a road map for future activities. In many cases, a specific issue is examined during the planning process. For instance, the White Mountain Apache Tribe in Arizona is particularly interested in riparian and wetland restoration, and thus their planning efforts focused on that area. The Oneida Nation in Wisconsin is concerned about nonpoint sources of pollution. This interest led to a cooperative effort with neighboring counties to assess the sources of those pollutants and to develop abatement strategies along with education and outreach.

The Nisqually Tribe, because of its proximity to the Fort Lewis Military Reservation in Washington and intensive harvesting of forest products, has found it necessary to participate in basinwide planning efforts. This approach has gained the Tribe the respect of other stakeholders, and has given the Tribe an opportunity to have input into planning efforts that could potentially affect Tribal lands. The Port Graham/Nanwalek Native Villages initiated a wetland-focused watershed planning process to protect the pristine state of the Lower Kenai Peninsula of Alaska. Coordinated by the Port Graham/Nanwalek Watershed Council, this planning effort has emphasized educating Native members about the functions and values of wetlands.

Wetland Inventory, Assessment, Mapping

In many cases, inventory and mapping of Tribal wetlands takes place as part of the planning process. A determination of the location, extent, and condition of a Tribe's wetlands supports the planning process. Compiling this information and subsequently storing it in a relational, geographically referenced database can lay the groundwork for a useful planning tool and monitoring system. The Port

Graham/Nanwalek Native Villages have created an extensive geographic information system (GIS) database that includes information on geology, hydrology, climate, soil, plant communities, water quality, wetlands, land ownership, land uses, and wildlife and fishery resources. The Confederated Salish and Kootenai Tribes of the Flathead Reservation and the Blackfeet Tribe, both in Montana, and the Seminole Tribe of Florida, have carried out inventory and assessment efforts and have developed a GIS that supports their planning processes. The Wampanoag Tribe of Gay Head in Massachusetts delineated and mapped its wetlands, and developed a geographically referenced database that will store data from the Tribe's wetland monitoring program.

Tribes must determine the appropriate level of assessment to be conducted based on their financial and human resources and their goals. There are both low-cost/low-tech and high-cost/high-tech solutions for wetland assessment. A Tribe that cannot afford expensive computer hardware and software and outside consultants should not dismiss the possibility of conducting an assessment of its wetlands. In many cases, Tribes have harnessed technical assistance from federal agencies and universities to help carry out assessment and mapping efforts. Increasingly, volunteers are conducting, assessing, and monitoring wetlands. Volunteer programs promote outreach and education goals while also meeting data needs. Taos Pueblo in New Mexico developed a volunteer monitoring program for its surface water monitoring program and plans to expand it to wetlands monitoring. Reaching out to local experts can be the key to the development and execution of an effective wetland assessment and mapping effort.

The Campo Band of Kumeyaay Indians in Southern California is developing its own definition and classification of wetlands based on climatic fluctuations in addition to those based simply on hydrology, soils, and vegetation. Because of wide variations in rainfall from year to year, the Campo Band is creating a three-tier classification system so that wetlands with dry cycles would still be considered wetlands. In conjunction with development of the classification system based on climatic fluctuations, the Campo Band is drafting a wetland protection plan and ordinance that will provide greater legal protection for "dry cycle" wetlands.

Regulation

Developing and instituting specific wetland regulations is a realm into which many Tribes have not yet ventured. The Oneida Nation developed an Environmental Policy that establishes a framework within which environmental regulations can be developed. The Policy ensures that development activities are compatible with the Tribe's traditional environmental beliefs. However, it does not provide for specific protection of wetland resources.

The Seminole Tribe of Florida is approved by EPA for TAS to manage its Clean Water Act (CWA) Section 303 Water Quality Standards Program, CWA Section 401 Water Quality Certification Program, CWA Section 319 Nonpoint Source Grant Program, and CWA Section 106 Water Quality Management Grants Program. This affords the Tribe a considerable amount of sovereignty in protecting its aquatic resources. Specific criteria and standards for wetlands are being developed in conjunction with the Tribe's extensive monitoring program.

The Confederated Salish and Kootenai Tribes of the Flathead Reservation in Montana are also approved for TAS to manage their CWA Section 303 Water Quality Standards Program, CWA Section 401 Water Quality Certification Pro-

gram, and CWA Section 106 Water Quality Management Grants Program. The Confederated Tribes' water quality standards also apply to wetlands although there are no wetland-specific criteria and standards at this time. The Confederated Tribes' Aquatic Lands Conservation Ordinance is similar to the CWA Section 404 Wetlands Protection Program. It allows for extensive review and consultation with the Confederated Tribes' water quality projects that have potential to impact aquatic resources on the Tribe's lands.

Many of the Tribes and Native organizations included in the case studies have assumed some portion of administration of the CWA. These Tribes and Native organizations recognize the significance of managing these programs in terms of the degree of sovereignty they exert over their lands and the environmental policies that can protect them. Determination of which CWA programs that should be assumed by a Tribe depends on the needs, interests, resources, and capacities of individual Tribes. The CWA Section 106 Water Quality Management Grants Program is most commonly assumed by Tribes because this program allows a Tribe to direct funds to particular projects. It can help develop the foundation for water quality standards as well as other water quality programs. Table 1 indicates programs under the CWA for which these Tribes and Native organizations are granted TAS.

Table 1

Clean Water Act Section 106 Water Quality Management Grants Program	Clean Water Act Section 314 Clean Lakes Grant Program	Clean Water Act Section 319 Nonpoint Source Grant Program	Clean Water Act Section 303/401 Water Quality Standards and Certification Program
Wampanoag Tribe of Gay Head	Menominee Tribe of Wisconsin	Seminole Tribe of Florida	Seminole Tribe of Florida
Seminole Tribe of Florida	Blackfeet Tribe	Wampanoag Tribe of Gay Head — Application Pending	Campo Band of Kumeyaay Indians — Application Pending
Menominee Tribe of Wisconsin		Campo Band of Kumeyaay Indians	Confederated Salish and Kootenai Tribes of the Flathead Reservation
Oneida Tribe of Indians of Wisconsin			White Mountain Apache Tribe
Taos Pueblo			
Blackfeet Tribe			
Confederated Salish and Kootenai Tribes of the Flathead Reservation			
Campo Band of Kumeyaay Indians			
White Mountain Apache Tribe			

Restoration

Loss and degradation of wetlands are two of the primary challenges facing wetland and water quality specialists throughout the country, both on and off Indian lands. Wetland planning and regulation help to reduce losses and identify the types and sources of impacts affecting wetlands. Once the sources have been identified and measures taken to address them, there is a need to regain the functions and values of the healthy wetlands. Ecological restoration, particularly wetland restoration, is being carried out across the country to return degraded wetlands to full integrity. Determining which sites are in need of restoration and prioritizing restoration efforts are key challenges Tribal wetland programs face today. Wetland planning and assessment can help with these decisions, but determination and prioritization of wetland restoration efforts must take place at the local level. Many Tribes have found it useful to determine their wetland restoration priorities in terms of the significance (e.g., cultural, ecological, economic) of specific wetlands, the actual and potential impacts affecting them, and the potential for restoration. With this information as a starting point, many Tribes are developing practical restoration strategies.

The Confederated Salish and Kootenai Tribes of the Flathead Reservation identified wetland restoration as one of the priorities of their Wetlands Conservation Strategy. As part of implementation of the Confederated Tribes' restoration/mitigation project, the Tribes' wetlands coordinator developed clearly stated goals and objectives, performance standards, a detailed monitoring plan (including a monitoring and reporting schedule), and operation and maintenance considerations.

The White Mountain Apache Tribe identified restoration as an integral part of achieving sustainability. The Tribe believes there are four cornerstones to sustainability—people, ecosystems, culture, and sovereignty—which they consider forms of natural and social capital. The Tribe's Wetlands Conservation Plan addresses these cornerstones and discusses the role of each in attaining sustainability. The Tribe has focused on riparian and wetland restoration, with a particular emphasis on shifting dominant vegetation from exotic to native species. The Tribe also developed an evaluation component to measure progress and provide feedback to improve future restoration efforts.

The Oneida Nation, in addition to using restoration as a tool to mitigate development impacts, is engaging in bioengineering to stabilize stream channels. The Tribe decided to use bioengineering methods instead of traditional rip-rap because bioengineering is more effective in the long run, less energy-intensive, and more pleasing aesthetically. The Oneida Nation has also undertaken a comprehensive ecological restoration plan for a 100-acre agricultural field that includes a significant amount of wetland acreage. Part of the restoration effort was a commitment to refrain from the use of chemical pesticides and fertilizers.

The Wampanoag Tribe of Gay Head is focusing its wetland restoration efforts on the Tribe's cranberry bogs. The Tribe cultivates cranberries traditionally and organically, using no mechanization and no synthetic pesticides or fertilizers. Restoration of the bogs involves manually clearing vegetation that competes with the cranberries for light, soil, and nutrients. The Tribe is also considering installation of retention ponds and scrubber systems to minimize petrochemical and heavy metal inflow from roadways. The Campo Band of Kumeyaay Indians is using traditional wetland and stream restoration techniques in its modern restoration program. For centuries, the Kumeyaay people have assembled rock structures in arroyos (intermittent streams) to build up silt carried by floodwaters, thereby developing riparian wetland areas through the accrual of moist

sediments over time. The Campo Band has successfully restored several wetlands in this way.

The mighty salmon is driving the restoration efforts of the Nisqually Tribe. Many of the salt marshes along the Nisqually River were converted to cropland early in this century, and now efforts are under way to turn these areas back into marshes. The Nisqually National Wildlife Refuge provides motivation and support.

Wild rice and sturgeon are both extremely important culturally and nutritionally to the Menominee Tribe of Wisconsin. Efforts are ongoing to reintroduce wild rice in Tribal lakes and restore sturgeon in the Wolf River. Restoration will be most successful and garner the most support from Tribal members when the wetlands in question are significant to the Tribe for cultural, economic, nutritional, or other reasons.

Mitigation

Wetland compensatory mitigation and wetland mitigation banking are integral to wetland regulation. Wetland compensatory mitigation aims to compensate for unavoidable wetland losses due to development authorized under the CWA Section 404 Wetlands Protection Program permitting process. A wetland mitigation bank is a wetland area that is restored, created, enhanced, or (in exceptional circumstances) preserved and then set aside to compensate for future conversions of wetlands for development activities. Although wetland mitigation and mitigation banking remain controversial, many states, Tribes, local governments, private corporations, and nonprofit organizations across the country are conducting mitigation projects and are realizing multiple benefits.

The Oneida Nation is engaged in a mitigation effort that is compensating for wetland loss due to authorized development, while at the same time restoring previously degraded wetlands to full health. In addition, the Oneida Nation is discussing plans with the Wisconsin Department of Transportation to use Tribal lands as a wetland mitigation bank. In such an arrangement, the Tribe would gain wetland acreage while mitigating the impact of highway projects elsewhere in the state. The Confederated Salish and Kootenai Tribes of the Flathead Reservation, in partnership with the Montana Department of Transportation, are implementing a project to mitigate unavoidable impacts on wetlands resulting from highway construction on the reservation. The Montana Department of Transportation is providing funds, and the Confederated Tribes are restoring a site degraded by many years of grazing as well as drainage for crop production.

The Nisqually Tribe carried out a mitigation effort to compensate for wetlands lost as a result of construction of a hatchery along the Nisqually River. The Tribe has avoided nearly all impacts on the river shoreline as this is the only developed site. The remainder of the reservation shoreline and the slope up to the top of the bluff are maintained in mature forest and intact wetlands.

Partnerships and Stakeholder Coordination

An essential component of every wetland program is a mechanism for stakeholder coordination during planning and program implementation. Although the goals of stakeholders may vary, coordination and regular communication allow them to participate in planning and implementing a wetland program and thus help to ensure “buy-in” at key points in the process.

In the case of the Port Graham/Nanwalek Watershed Council, 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 involve not only the Port Graham and Nanwalek Native Villages, but also the Alaska Native Claims Settlement Act (ANCSA) corporations, which are the major landowners in the watershed. Individual Native Allotment owners are also active in the process. The Confederated Salish and Kootenai Tribes of the Flathead Reservation engage in extensive stakeholder communication to ensure the success of their wetland protection efforts. The Confederated Tribes are supported by the numerous federal and state agencies and nongovernmental organizations that have land management responsibilities within the borders of the reservation.

Education and Outreach

Education and outreach for Tribal environmental staff, as well as Tribal members and the community, is critical to the success of any environmental protection effort. Training for Tribal wetland staff is an effective way to build the capacity necessary to manage a comprehensive wetland program. The White Mountain Apache Tribe and Taos Pueblo Environmental Office are both involved in hosting training in which other Tribes have taken part. Such cooperation is an effective way to get the most out of funds available for training. The White Mountain Apache Tribe has apprenticeship and mentor programs that help develop Tribal managers under the supervision and training of experienced managers. In addition, the Tribe has regularly scheduled Natural Resource Workshops that bring leaders and resource managers together to hone their leadership skills in natural resource management. When Tribes boost their capacity to administer wetland and water quality programs, they reduce potential reliance on outside consultants and enhance their ability to maintain sovereignty over their lands and programs.

Many wetland impacts are human-induced. Regulatory and technical tools are important in reducing such impacts on wetlands. These tools, however, cannot be relied on to meet all wetland protection and restoration goals. A large part of the challenge of wetland protection is changing the mind-set of individuals whose combined efforts could help protect the resource over the long term. Tribes are using numerous approaches to educate Tribal members and surrounding communities about wetland-related issues.

Taos Pueblo is developing a curriculum that will teach children about wetlands through field work, lab work, and classroom studies. The curriculum is for grades K through 12 and is tailored to the needs of individual grade levels. The Blackfeet Tribe environmental staff teach a wetland course at the local community college, which promotes interest in wetland issues among young adults seeking a career path, as well as older people who have the ability to influence others because of their stature in the community. The Menominee Tribe established the Menominee Sustainable Development Institute (MSDI) 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 the findings to the larger model of sustainable development—one that can support the economy while balancing the environmental and social requirements of the Tribe.

The White Mountain Apache Tribe asserts that people are the human capital needed to fortify the foundations of sustainability. To this end, the Tribe secured

an EPA Wetland Development Grant to help fund its Ecological Youth Camp for Tribal children. It will raise their awareness of ecology and give them hands-on experience.

The Port Graham/Nanwalek Watershed Council is taking an innovative approach to education and outreach. As part of its planning and assessment process, the Council is conducting a survey to measure the values of wetlands as village residents perceive them. The survey results are expected to bring relevance to the hydrogeomorphic (HGM) wetlands assessment method by linking specific wetland functions to the local wetland values they support. The Council believes that by linking wetland values as perceived by the community to the functional assessment process, the outreach and survey effort will educate people and provide a tool to support long-range planning.

Monitoring

Long-term monitoring of wetland health is an undertaking that involves detailed planning, but the rewards are many. Monitoring may be the single most important tool in measuring the overall success of a wetlands protection program. Monitoring data can provide information to wetland specialists that will guide future planning efforts, identify stressors, help prioritize restoration sites, measure the success of restoration and mitigation projects, and support development of water quality standards for wetlands. A range of wetland features can be monitored, but always in consideration of Tribal needs and resources. Because the objective of the Clean Water Act is to "restore and maintain the physical, chemical, and biological integrity of the Nation's waters," EPA promotes the use of a combination of monitoring methods to ensure the most accurate assessment of wetland integrity. Wetland monitoring can include biological, chemical, and physical parameters.

As noted earlier (see Wetland Inventory, Assessment, Mapping on page 7), monitoring can be costly and it requires a degree of expertise that may take time for a Tribe to acquire. Much technical expertise is available to support the design of monitoring projects as well as ongoing identification and analysis. Partnering with agencies such as EPA, the U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture's Natural Resources Conservation Service, as well as academics and local, regional, and state governments, can help Tribes locate experts in relevant fields. In addition, the use of volunteers in monitoring programs can be effective for collection of data and serves as an important education and outreach function as well.

The Seminole Tribe of Florida, as part of its wetland inventory effort, engaged in two years of characterization of specific reference wetlands in terms of water quality and vegetative/macroinvertebrate community types. Ongoing monitoring includes water quality monitoring (twice monthly), macroinvertebrate collection (quarterly), vegetative transect inventory (quarterly), and panoramic photos (quarterly). The Tribe will use this information in the development of wetland-specific water quality standards. Taos Pueblo has an extensive water quality monitoring program that focuses on surface waters and boasts a successful volunteer monitoring component. The program measures chemical and biological conditions essential to the health of aquatic ecosystems. The Taos Pueblo Environmental Office is educating its staff in preparation for applying to EPA for TAS for the CWA Section 303/401 Water Quality Standards and Certification Program. In addition, the Pueblo would like to incorporate wetlands into its monitoring program and develop wetland-specific water quality standards.

The Wampanoag Tribe of Gay Head delineated all of its wetlands and put all of this information into a geographically referenced database. The Tribe is now implementing a wetland monitoring program. The monitoring data will be stored in the database created as part of delineation and assessment and will be used to track the success of preservation and restoration efforts.

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 with the assistance of the Port Graham/Nanwalek Watershed Council. Macroinvertebrate samples were collected to establish baseline reference conditions of Native Villages' riverine wetlands.

Other Approaches

This comparative analysis focused on tools and strategies that Tribes are using to protect their wetlands. From the discussion, it is obvious that Tribes customize these tools and strategies to meet their needs and resource limitations. In addition, Tribes are creative in the approaches they take in grappling with the larger issues of resource use, sustainability, respect for the natural environment, and the role humans and their societies play in encouraging the wise use and preservation of natural resources.

Some of these unique approaches are discussed earlier in the context of their use as tools in wetland protection. The Port Graham/Nanwalek Watershed Council, for example, is working to link wetland assessment with education and outreach. Other unique approaches are not discussed in this comparative analysis simply because they do not fall within a specific category. For example, the Oneida Nation is working to improve the overall sustainability of its food system by encouraging the use of organic growing methods and developing both on- and off-reservation markets for its sustainable products. The Oneida Nation, like all Tribes, recognizes how natural resource issues are interconnected. This knowledge places Tribes in a unique position to educate their own members and others about how people can reconcile environmental and economic concerns.