Restored wetland along Olson Road on the Oneida Reservation

Chapter 4
Wetlands, Streams, and Surface Waters

Tsi? kahnekinikʌ.slu

RESOURCE HISTORY

The cultural uses of water on the Oneida Nation Reservation requires a broader perspective which examines the intertwined history, culture, economy, health, and social aspects of the Oneida way of life. Oneida ancestors spoke of the good times in the 1800's when the Oneida Reservation was whole and there was an abundance of fish, game, berries, nuts and medicine for them to use. They understood the interaction and reciprocity of all these things with the main waterway they called Duck Creek. They recalled their interdependence upon the vast forest, which surrounded it and them. They built their houses from the pine and wove baskets from the Black Ash. Their pigs grew fat from the acorns of the Red and White Oak. Huge quantities of maple syrup and sugar were harvested from the various "sugar bushes." Families gathered where everyone there had a certain responsibility. They thanked the Creator everyday for all of these things.

During settlement times, the Duck Creek River was filled with wild rice, which attracted clouds of ducks to the area, thus giving name to this water body. In the Algonquin language the river was called PAW SA CUE (Duck River) and Green Bay into which it flowed was called PAUCHEQUETTE (Salt Bay) (noted in *Early Duck Creek History*, J. & L. Rentmeester, 1989). Over the years, Duck Creek and the other waters of the Oneida Reservation have experienced considerable change. Trapping and the early fur trade impacted many of the furbearer populations during the mid 1700's–1800's. Expansive forests were completely logged for timber production by the twentieth century. Large wetland areas were drained for agricultural purposes. Heavy sediment loads washed away from the landscape during rain events.

During the time period from 1860–1970, significant negative changes occurred, which impacted the natural environment and these changes had a direct impact on the Oneida people. As natural resources dwindled due to logging, dams, and pollution, the Oneida way of life was changed. Subsistence farming, gathering, and fishing from the environment was the natural way of life for Oneida people.

After allotment in 1891 and the subsequent loss of lands, the non-Indians use of chemicals in commercial farming greatly damaged the environment. From approximately 1900–1925 the entire ecosystem of the Oneida Reservation was severely altered from one hundred years previous when the Oneida People first arrived at their new homes along Duck Creek. Fencing soon occurred and every farmer pastured his cattle and horses contingent to Duck Creek or its tributaries. These domestic animals confined to certain areas ate the young wild berry plants, including the red and black raspberry bushes and the blackberry and they roamed the entire territory of their limitations and trampled the young shoots of the blueberry and hazelnut. The underbrush in the pastured areas was lost causing a major shift in the wild animal habitat that had existed there for centuries before. The water table was significantly affected because of the lack of tree roots to retain water. Free flowing springs diminished in flow or ceased to flow altogether. The Black Ash trees growing on the banks of Duck Creek were essential for basket making. With the changes in Duck Creek there was a significant decline in the Black Ash tree, therefore baskets, which had been made and sold as a part of family income, were no longer made. Butternut trees have become virtually nonexistent on the Reservation. Channelization and other modification to surface waters have continued, but agricultural land uses are shifting toward suburban and commercial development across much of the Reservation. Land based sources of aquatic pollutants from these activities can affect the quality, use, and value of waters of the Oneida Reservation significantly.

The Oneida Nation began to conduct environmental studies in 1978. These studies included the 1978–79 Duck Creek Chemical and Benthic Watershed study, repeated in 1980–81 with assistance from the University of Wisconsin. The Oneida Nation conducted the 1982 Duck Creek Hydrological Aspects of Discharge Evaluation of Watershed study.

In 1988, the Oneida Nation established the gathering laws that would allow enrolled members to harvest natural resources. The annual fish harvest data was used as a management tool as the Nation continued to monitor the water resources with gauging tests from 1989 through 1994. As resource gathering continued, so did the monitoring, with the Macroinvertebrate Rapid Bioassessment in 1991. There was also a Phosphorus Concentration study conducted in 1992 and a National Water Quality Assessment in 1993. Routine water quality monitoring and fisheries surveys began in 1997 and routine benthic macroinvertebrate sampling and community analysis began in 1999. Using biological monitoring data to gauge progress in restoration efforts, enhanced stream restoration projects began shortly afterwards. The first stream restoration project was initiated in 2003 on a headwater tributary to Trout Creek. Following documented manure runoff from the former State Farm property, more external partnerships were formed to expand restoration work. A manure containment system installed on a Trout Creek headwater tributary played a large role in the restoration of the system to its current, improved state. Since then, several projects have been successfully implemented in the Trout Creek watershed as well as in the Silver Creek watershed. Currently, there are several, large scale projects in the planning and implementation stages in the South Branch of the Suamico River, Duck Creek, Lancaster Brook and Trout Creek. Two Trout Creek projects will have major impacts on the system as far reestablishing fish passage and improving habitat.

RESOURCE DESCRIPTION

The entire Oneida Reservation, covering approximately 64,430 acres, is drained by four major streams. Duck Creek and its tributaries drain nearly 70%, Dutchman Creek drains 20%, and the headwaters of Ashwaubenon Creek and the South Branch of the Suamico River drain the remaining 10%. Table 4.1 shows a brief resource overview for the Oneida Reservation. At this time, the main sources of impairment are sedimentation (agricultural and residential construction) and nutrients (agriculture, suburban lawns, golf courses). Loss of hydrologic function from tiling and ditching has resulted in reduced flows in Reservation streams. The Oneida Nation adopted Water Quality Standards in 1996.

A priority of the water resources team is to effectively implement Oneida Nation's Water Quality Standards and Water Resource Ordinance, and achieve "fishable and swimmable" waters of the Reservation.

Table 4.1 Atlas of Tribal Waters

Factor/Resource	Value
Total miles of streams (major streams)	76.3
Miles of intermittent streams (all waterways except major streams)	228.5
Number of sampling points on streams	9.0
Acres of lakes/ponds	248.8
Acres of lakes monitored	10.9
Total acres of wetlands	7,015.6

Streams and Surface Waters

Water Quality Monitoring

The Oneida Environmental, Health & Safety Division (EH&SD) have a strong record of gathering environmental information on the water quality of the Reservation. The water quality data collected is used for analysis, research, aiding in habitat improvements, and also to assure compliance with Oneida Water Quality Standards (Resolution #7-17-96B) and the Oneida Water Resource Ordinance (Resolution #5-8-96B). Water quality indicators measured include alkalinity, chloride, ammonia, total nitrogen, total phosphorous, total dissolved solids, total suspended solids, and sulfates. Baseline physical, chemical, and biological information monitoring helps to determine water quality, biological status, and trends in each sub-watershed based on ecological indicators while identifying potential problem areas. When baseline-monitoring data indicate a potential problem within a sub-watershed, targeted site-specific monitoring is conducted.

In addition, targeted site-specific monitoring is conducted for episodic events, such as reported fish kills, as well as monitoring to measure water quality improvements associated with management initiatives. E. Coli is also monitored on selected water bodies where it may be a threat to stream health. Oneida has a Joint Funding Agreement with the USGS (U.S. Geological Survey) to maintain the continuous water gauging station in Duck Creek at Cty. FF, which has been in operation since 1988. This station provides real-time discharge, gauge height, and precipitation information, which are continuously monitored.

Osnúsha? Kanya.talayV in Fall

Biological Monitoring

The surface waters of Oneida are also monitored for biological indicators of stream health. Biological monitoring or "bioassessment" uses the known habitat preferences of aquatic animals to assess the health of aquatic communities. Pollution and other negative factors can eliminate low tolerance organisms from streams. With successful restoration, these species should reappear, which indicates the aquatic community is being restored to health. We use aquatic invertebrates and fish to do this for the most part, but have recently added amphibians such as, salamanders, which are very sensitive to habitat degradation. Since invertebrates are a large and diverse group in streams and wetlands, they make excellent indicators of the health of those stream and wetlands. Quantitative and qualitative invertebrate surveys are conducted annually in May through July in Reservation waters. Fish communities also reflect the quality of aquatic habitats. Fish surveys are conducted annually as well, with the timing of those surveys varying depending upon water levels. Specific wetland and stream restoration projects monitored for success using biological monitoring include a study of the restoration of the Trout Creek tributary between Olson and Cooper Roads and the "Buffalo Overlook" wetland near Cooper Road and Highway 54.

Figure 4.1 The Presence of Specific Invertebrates (often insects) in Oneida's Waters Signals the Aquatic Health of Each Stream

Aquatic Beetle

Mayfly Nymph

Figure 4.2 Examples of Fish Prevalent in Oneida Streams

Brook Trout

Northern Pike

Largemouth Bass

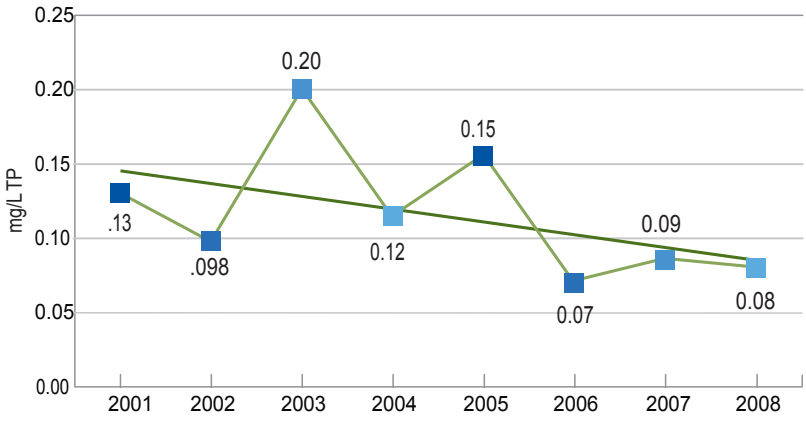
Monitoring Stream Health Summary

Water Quality Monitoring. Monthly monitoring consists of the following field measurements: water temperature, air temperature, pH, specific conductivity, salinity, barometric pressure, total dissolved solids, turbidity, and dissolved oxygen. Grab samples are done quarterly in the months of November, March, June, and September and analyzed by Northern Lights Services.

Annual Benthic Macroinvertebrate Monitoring. Qualitative and quantitative sampling of benthic macroinvertebrate populations at approximately 12 established sites in June and July. Macroinvertebrate samples are picked, sorted, and identified to genus and/or species.

Routine Fishery Surveys. Consists of daytime electrofishing of a stream assessment reach 35 times the mean stream width during baseflow conditions in late spring through early autumn. Young of year Northern Pike monitored using traps.

Figure 4.3 Trout Creek at FF Annual Average Total Phosphorous



Regulatory Components

Point and Non-point Sources

Point sources of pollution are from a distinct pipe or outfall. At this time, there is only one known permitted point source on the Reservation, the Oneida Wastewater Treatment Facility (WWTF). This is permitted through Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES) program.

Most other pollution is from non-point sources, such as storm water runoff from farm fields and construction sites, lawns, parking lots, etc. For approximately 10 years, the Oneida Reservation has required on-site treatment of storm water for all new buildings. This includes a treatment train system at the Health Center, an innovative no discharge swale system at the Elder Complex, as well as wetland treatment designed to recharge the Oneida Creek watershed at the Oneida WWTF, which itself is a state of the art treatment system. Currently, any land disturbing activity of an acre or more on the Oneida Reservation is required to be covered under the EPA issued Construction Site General Permit. Coverage under this permit is to ensure that proper erosion control practices be implemented to prevent sediment and possibly other pollutants from leaving construction sites and negatively impacting surface or groundwater systems. Oneida Reservation staff works with EPA's Region 5 Storm Water Coordinator to ensure compliance and proper use of erosion control Best Management Practices (BMP's) within the Reservation. With regards to industrial storm water, the EPA Multi-Sector General Permit was issued in 2008, but has not been implemented as of yet. However, with this permit, the Oneida Reservation and three other entities covering the same urbanized area are all going to be implementing post-construction maintenance and monitoring of storm water systems.

Oneida also has a strong non-point source program, which works with the Tribal farm and non-tribal farmers and focuses on agricultural BMP's. They have installed hundreds of acres of grassed waterways, buffers, and Water and Sediment Control Basins (WASCOBS) in the last 15 years. All agricultural leases made by the Tribe include mandatory compliance with a nutrient management plan, as well as minimum buffers for any waterways or wetlands. The Tribe also has partnered with other agencies such as Glacierland RC&D, Brown and Outagamie Counties, and WDNR to implement watershed scale non-point source management. Efforts in these areas will continue as partnerships, incentives, and laws continue to evolve.

"Buffalo Overlook" restored wetland on Oneida Reservation.

Overview of Reservation Streams and Lakes

Thornberry Creek and Lancaster Brook are among the highest quality habitats of the streams monitored. These streams can support some cold water fish species and have the highest percentage of forested area of all streams in the Reservation. Thornberry Creek is a Class I stream and has scored in the "Very Good" category based on invertebrate surveys. Lancaster Brook is a Class II Trout Stream possessing relatively good water quality. Due to development and poor agricultural practices, it exhibits degraded instream habitat, high peak flows, and low base flow levels as well a lack of suitable substrate for fish.

Oneida Creek has extremely high quality riparian zones (areas along the bank of the river), but overall this stream is of fair quality. Land use is 84% agriculture. This stream is usually fairly dry in the summer months. Monthly monitoring shows good oxygen levels, but Oneida Creek continues to have high nutrient levels, which lowers the water quality and affects fish and wildlife.

Trout Creek (Tsyotyá·ktu kayhuhatáti) has one of the highest quality habitats of the streams monitored. It can support some cold water fish species and has one of the highest percentage of forested areas of all the streams in the Reservation. Land use in Tsyotyá·ktu kayhuhatáti is 52% agriculture, 28% forest, 10% grass/pasture, 9% residential and only 1 % commercial.

Duck Creek is the major stream on the Reservation. Fish, Oneida, Silver, and Trout creeks flow into Duck Creek within the Oneida Reservation. At Seminary Road, Duck Creek scores only fair water quality based on invertebrate surveys. Due to high loads of nutrients from Oneida Creek and Fish Creek, as well as other point and non-point sources, Duck Creek water quality is impaired.

Silver Creek is a fair-medium quality stream in terms of habitat and water quality. Bank erosion is a problem. Land use is approximately 85% agriculture. Monthly monitoring shows good oxygen levels, but Silver Creek continues to have high nutrient levels, which lowers the water quality and affects fish and wildlife. This cold water stream once supported Brook Trout and likely was home to the Redside Dace, a species of special concern in Wisconsin, and which still occurs in nearby Trout Creek.

Fish Creek (Kvtsi kayhuhatáti) is a fair quality stream. Land use is approximately 80% agriculture, 11% forest, 7% non-forested wetland, and 3% forested wetland. It is dry during most of the summer and frequently into the fall and frozen during the winter, so large numbers of samples/monitoring events are not possible. Our findings of stream health are based on the relatively small number of samples and monitoring events that occur. The greatest impacts to Kvtsi kayhuhatáti are excessive nutrients and sediment runoff due to agricultural and construction practices.

Dutchman Creek is a highly impacted rural stream and is low in terms of water quality and habitat. It is classified as 90% agriculture. Poor land use practices are the main source of impairment to Dutchman Creek. Oxygen levels are low, and nutrient levels are high. Dutchman Creek is highly impaired. Based on data since 2005, 88% of total phosphorous samples from 2005–2008 exceed Oneida Water Quality Standards and 27% of the dissolved oxygen samples also exceed.

Beaver Dam Creek is a first-order stream which flows primarily through an urban setting. It is classified as 52% urban, 40% grassland, and 7% forest. The benthic invertebrate community suggests fair to poor water quality. Storm water runoff is the biggest impact to this stream. It was a former trout creek, however development around the creek has impaired the waters. Storm water runoff prevents the creek from having a stable ecosystem.

Finger Lake (Osnúshaʔ Kanya·talayV) is classified as an artificial lake. The lake is spring fed, but also a storm water pipe that remains a problem for nutrient levels in the lake. It is roughly 5 acres with a maximum depth of 16 feet. A dam and water control structure exist at the outlet where it drains northwest to Duck Creek, located approximately 1200 feet downstream. Osnúshaʔ Kanya·talayV frequently experiences algae blooms in the summer. Suspected nutrients are residential fertilizers, grass clippings, and runoff from nearby streets.

Wetland undergoing restoration near South Branch Suamico River

Quarry Lake (Tyenvyokwáhtha? tsi?tyutate?nikuhlolyá·tha?) was quarried in the 1880's by Oneida men who used the stone for the Episcopal church in central Oneida. Today, it is a popular fishing location. Fish include Walleye, Bluegill, Largemouth Bass, White Cuckers, and Carp. Nutrient levels are not as high as Osnúsha? Kanya·talayV, however total phosphorous levels are not meeting the Oneida Water Quality standards. As a part of the Oneida Lake Project, EH&SD will be using rocky material from Tyenvyokwáhtha? tsi?tyutate?nikuhlolyá·tha? in the creation of the Oneida Lake. In return, EH&SD will modify the former quarry to create a better nursery habitat.

Restoration Project Highlights

Duck Creek—Fish Passage Project

Removal of two dams on Duck Creek and enhancement of the fish passage barrier at a third dam. This project will enhance the ability of lake fish in Green Bay to access approximately 1 mile of spawning habitat.

Lancaster Brook—Stream Habitat Restoration

Strategically placed logs enhance in-stream Brook Trout habitat, provide food for invertebrates as the logs decay, and provide cover for aquatic organisms such as fish, amphibians, turtles, as well as habitat for mammals such as mink. Tree plantings on banks provide the shade which cools temperatures for cold water species.

Dutchman Creek and Oneida Creek—Best Management Practices

Projects such as manure and barnyard runoff control, nutrient and pesticide management, and crop practices such as contour farming; residue management and rotational grazing have been implemented to improve the impaired waters.

Trout Creek—Steps to Support Brook Trout

Over 10 years, a series of planning that included: installation of a manure containment system to prevent manure runoff into creek (2002), enhanced headwater tributary habitat by constructing meanders and installing large woody habitat (2003), habitat enhancement using engineered log jams (2004), and reintroduction of 3,000 Brook Trout (2009).

Fish Creek—Best Management Practices

Initiatives include field diversions, grade stabilization structures, waste storage abandonment, wetland restoration, and agricultural stream crossing projects.

Silver Creek—Channel Restoration Project

Restore natural stream morphology, create buffer, improve hydrology, enhance instream fish habitat, address erosion areas, remove culvert impeding fish passage, grade and plant trees for cover and extension of riparian corridor. Project also improves habitat for waterfowl and other culturally important wildlife, including the Bald Eagle and the Wood Turtle, which is a threatened species.

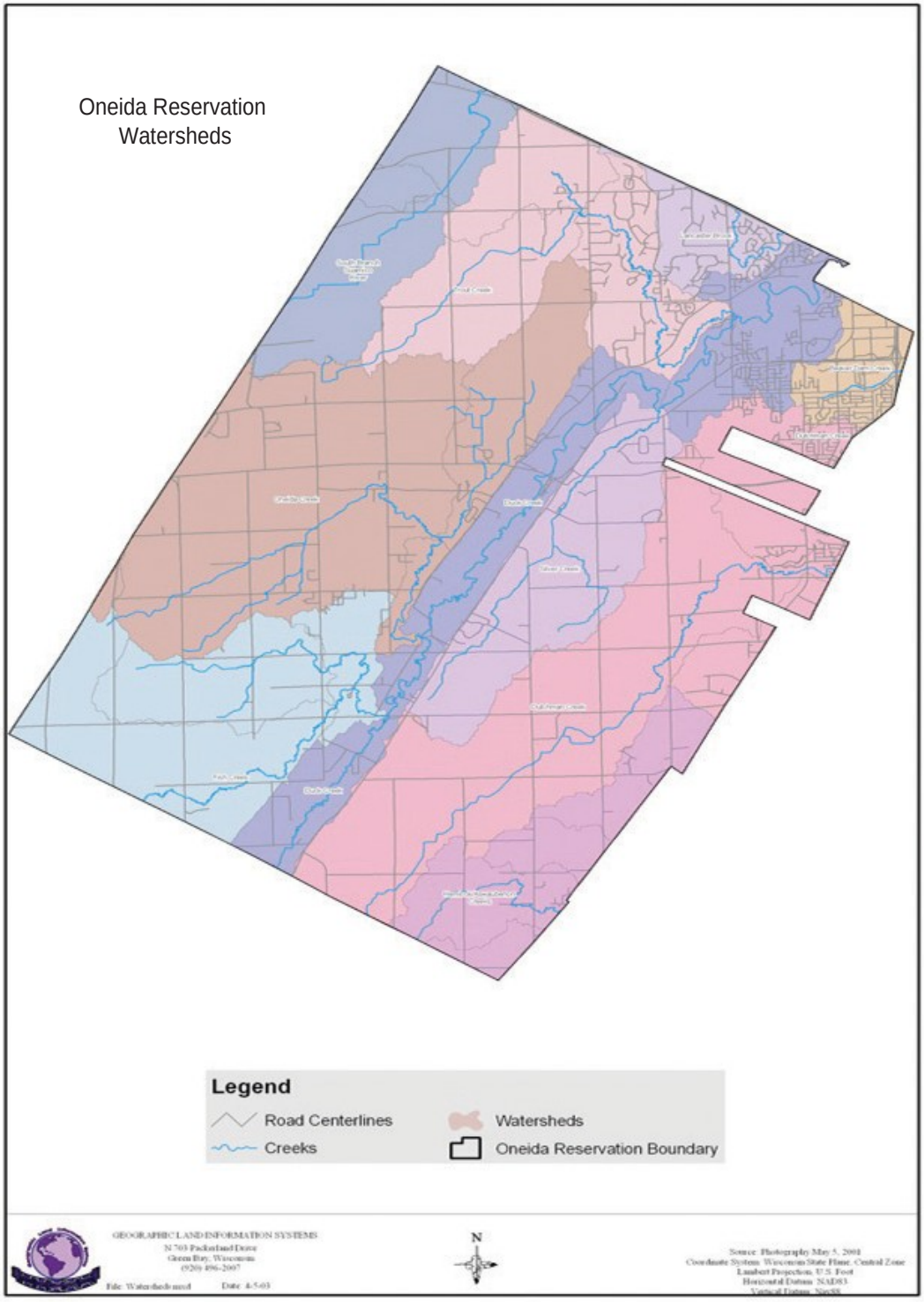
Wetlands

The goal of the wetland program is to protect, restore and preserve the Oneida Nation's wetland resources. This is achieved through a variety of methods. Historically there were approximately 13,000 acres of wetlands within the Reservation boundary. Most of these were located in the northwestern portion, which was known as "the great swamp." Today there are 7,185 acres of mapped wetlands. This is a loss of about 45%.

There have been over 20 wetland restoration projects conducted as of 2010 with approximately 850 acres of wetlands restored, enhanced or created. Typically one project is implemented per year. These have been as small as a 2 acre groundwater discharge spring or as large as a 200 acre wetland complex that has everything from wet prairie to floodplain forest. Most wetland projects also incorporate establishing medicinal and culturally significant plant communities such as wild rice, sweet grass and bergamot.

Partnerships are critical for implementing wetland projects. Typical partners include the U.S. Fish & Wildlife Service (USFWS), NRCS (Natural Resource Conservation Service), BIA (Bureau of Indian Affairs), and the Fox River Natural Resources Damage Assessment (NRDA) Trustee Council. The Federal Clean Water Act (CWA) protects wetlands. The Army Corps of Engineers oversees Section 404 permit for dredging and filling wetlands, and the EPA administers Section 401 for water quality certification.

Figure 4.4 Oneida Watersheds Map



COMMUNITY SUGGESTIONS & FEEDBACK

Results of the Live, Sustain, Grow survey indicate that:

- 73% of the respondents felt that streams and surface waters on the Reservation are an important feature of the landscape.
- 52% felt that wetlands and marshes are an important feature of the Reservation landscape.
- 72% of the respondents felt that it was very important to protect habitat for fish and wildlife, and;
- 85% of the respondents felt it was very important to protect water quality.

With regards to our efforts to restore waterways on the Reservation, 74% of the respondents were somewhat to moderately aware of our restoration activities. When asked what tools should we use to help improve waterways and wetlands on the Reservation the respondents indicated the following should be used:

Table 4.2 Live, Sustain, Grow Survey Results

What tools should we use to help improve waterways and wetlands on the Reservation?	
Land acquisition	42%
Research and monitoring	48%
Wetland and stream restoration projects	57%
Designate lands as wetland reserves	41%
Plant vegetated lands as wetland reserve	39%
Limit runoff from farm fields	57%
Education and outreach	47%
Strengthen laws and policies for protection	48%

Discussions with community members at outreach events indicate that we need to continue the events and school activities in order for the community to be aware of the surface water resources available on the Reservation, as well as to enjoy them.

GOALS AND OBJECTIVES

Streams and Surface Waters

- Continue implementing our water quality monitoring plan on the Reservation streams and lakes.
- A biological monitoring plan is being used to collect baseline information on the biological health of our waterways through benthic invertebrate and fish monitoring. In the near future we will use the collected data to establish numeric standards for total suspended solids and biocriteria in Oneida's Water Quality Standards.
- The Water Quality Standards need to be revised. Identifying sufficient financial resources and staff time to accomplish this is limiting factor.
- Continue to educate citizens and contractors about storm water management.

Wetlands

- The ultimate goal is healthy, aquatic systems on the Reservation. Stream and wetland restoration projects are the route to getting there.
- Provide suitable habitat for the return of aquatic organisms. Wetland restoration projects completed on the Reservation have been proven to be successful in accomplishing this.
- Incorporate areas for community recreation, hiking, and gathering into restoration activities.
- As changes in weather due to climate change add unpredictability, wetland projects are important in reducing peak flows during strong cycles of precipitation.

BENEFITS ASSESSMENT

Streams and Surface Waters

Social

- Going fishing together has been an Oneida family tradition as long as Oneidas have resided in Wisconsin. The success of 12 years of the Oneida Youth & Elder Fishing day reflects the desire of Oneidas to partake in their surface waters.

Cultural

- Oneida traditionally has a strong interaction with the Duck Creek and a dependence on all Reservation waterways as a resource.

Food

- The objective of water quality and biological monitoring in streams is to tell us that our aquatic systems are healthy and safe for the community to harvest fish and other resources.

Wetlands

Environmental

- Wetlands are considered the most biologically diverse of all ecosystems and serve as natural water purification systems.

Social

- Hunting, gathering, and wildlife viewing are social activities that wetlands can directly provide.
- Strategic wetland protection and restoration can help reduce flood peaks and protect human health and safety from floodwaters.

Cultural

- Culturally significant plant species found within or near wetlands include: Black Ash, Sweet Grass, wild rice, bergamot, mint, raspberries, Sweet Flag and Swamp Milkweed.

Food

- Migratory waterfowl, wild rice and most fish species require wetland habitat to carry out their life cycles. Managing Oneida's wetlands for these natural resources provides many opportunities to gather healthy, locally abundant food.

IMPLEMENTATION PLAN

Oneida Environmental Quality works with internal and external partners for grant funding and technical assistance to enhance the integrity of surface waters for fish and wildlife habitat. Collaborative efforts are fruitful in leveraging outside resources and expertise while enhancing the standing and sovereignty of the Oneida Nation. Oneida wetlands, streams and surface waters will continue to be actively managed and improved with focus around the following efforts over the next several years:

- Creation of safe fish passage at the Brown County golf course to improve migration and breeding potential.
- Meandering of upper main branch of Trout Creek for improved Brook Trout habitat and management.
- Improvements to wetlands at the South Branch Suamico River project site.
- Continue successful community education and outreach regarding the benefits realized through restoration projects.
- Continue to work with state and federal partners on coordination of wetland restoration projects for wildlife, recreation areas, and flood control.