Nonpoint Source Assessment Report

Stockbridge-Munsee Community

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4 OVERVIEW

Section 319 of the Federal Clean Water Act provides authority and funding to states, territories, and tribes to address problems associated with non-point source (NPS) pollution. The Environmental Protection Agency defines nonpoint source pollution (https://www.epa.gov/polluted-runoff-nonpoint-source-pollution/what-nonpoint-source).

> Nonpoint source pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification. Nonpoint source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters and ground waters.

Section 319 requires the development and approval of an NPS assessment report in coordination with the EPA. The assessment report is a comprehensive technical summary, which identifies the condition of Tribal water resources as well as existing and potential NPS pollution through the use of data collected from Tribal watershed streams, lakes, and groundwater aquifers. The assessment report identifies categories and subcategories of NPS pollution that contribute to watershed water quality degradation. The assessment report determines best management practices (BMP) to improve water quality, prioritizes activities to address NPS pollution, describes processes to develop partnerships and gather public interest and lastly serves as the foundation of the Stockbridge-Munsee Community 319 management plan.

NPS pollution lacks a discrete origin and is the most common source of pollution on the Stockbridge-Munsee Community's (Tribe) reservation. NPS pollution assessment is a complex task for the Tribe since a large proportion of the regional watershed area is outside of the boundaries of Tribal lands. Therefore, NPS mitigation and prevention will materialize only through a broad and inclusive coalition of stakeholders, who are willing to implement best management practices on pollutant source sites throughout the watershed.

The most significant NPS concerns in regional watersheds are agricultural activities and hydrologic modifications. Agricultural activities introduce sediment, nutrients and other pollutants over a large land area, which is often in close proximity to surface and groundwater. Hydrologic modifications are caused by road crossings poorly designed or placed culverts, channelized streams, or poorly constructed forest roads. The modifications alter the stream channel, disrupt natural flow regimes, increase erosion, intensify sedimentation, and alter water temperatures.

The overall goal to protect and restore water quality will be achieved by forming partnerships, focusing attention on the various categories and subcategories water quality impairment at the

watershed scale and to identify management practices to reduce NPS impairments. NPS pollution comes from diffuse sources by the action of rainfall, snowmelt, or irrigation runoff, which moves over land or through the ground, picks up pollutants, and deposits the pollutants into rivers, lakes, or groundwater. The Tribal NPS assessment will outline specific actions to improve the quality of reservation water resources, develop a watershed approach, utilize effective and favorable BMPs, and grow regional partnerships with a myriad of stakeholders.

Specific objectives of the assessment report are to:

- Understand watershed condition through a technical summary
- Categorize NPS pollution affecting Tribal waters
- Describe existing Tribal, State, and Federal programs for controlling NPS
- Involve the public in Best Management Practice selection
- Develop a comprehensive management plan from the assessment report and ID waters that will not meet water quality goals/standards without NPS control
- Identify categories and subcategories of NPS which do not meet water quality standards and will require NPS control

5 INTRODUCTION

The Stockbridge-Munsee Community (Tribe), the "People of the Waters That Are Never Still," originated in New York's Upper Hudson River Valley. European settlers moved the Tribe from native lands to a reservation in Stockbridge, Massachusetts, then to a location on Lake Winnebago in Wisconsin, and finally to two sections of land taken from the Menominee Reservation in Wisconsin. The SMC has been located in the townships of Red Springs and Bartleme in Shawano County, WI since the 1856 land exchange treaty. The tribe currently has some level of jurisdiction over 24,872.717 of land. Of this acreage, 16,993.75 acres are held in held in trust by the Federal Government and it owns 7,878.967 acres of land in fee simple. About 548 of the 1,562 total enrolled tribal members reside on the Tribal lands. The land is governed by the Tribal President, Vice-President, Treasurer, four Council members and a Tribal Court System.

The Tribe's trust land base has a diverse variety of water resources, which include approximately 50 miles of stream, proximity to 8 major lakes, numerous small ponds, over 6,500 acres of wetland, and 36 square miles of unconfined till and bedrock aquifer. These lands and waters are located within the Wolf River watershed. Approximately 80 percent of the Tribal lands are within the Red River watershed with lesser parts within the North Branch of the Embarrass River and the West Branch of the Wolf River watersheds. Tribal land use is dominated by forests with limited agricultural land cover; a reverse of the watershed land cover off of Tribal land.

The Tribe has grown rapidly over the last 20 years. The Tribal gaming facility has been expanded three times and now includes a hotel and guest service space inside a world-class gaming complex. Water and wastewater infrastructure has also increased to serve the Tribe's

gaming facility expansion and four new subdivisions. The new growth provides critical services for the Tribe and the broader regional community. The expansion has placed a significant value on the maintenance of water quality for human consumption and recreation as well as beneficial use for fish and wildlife.

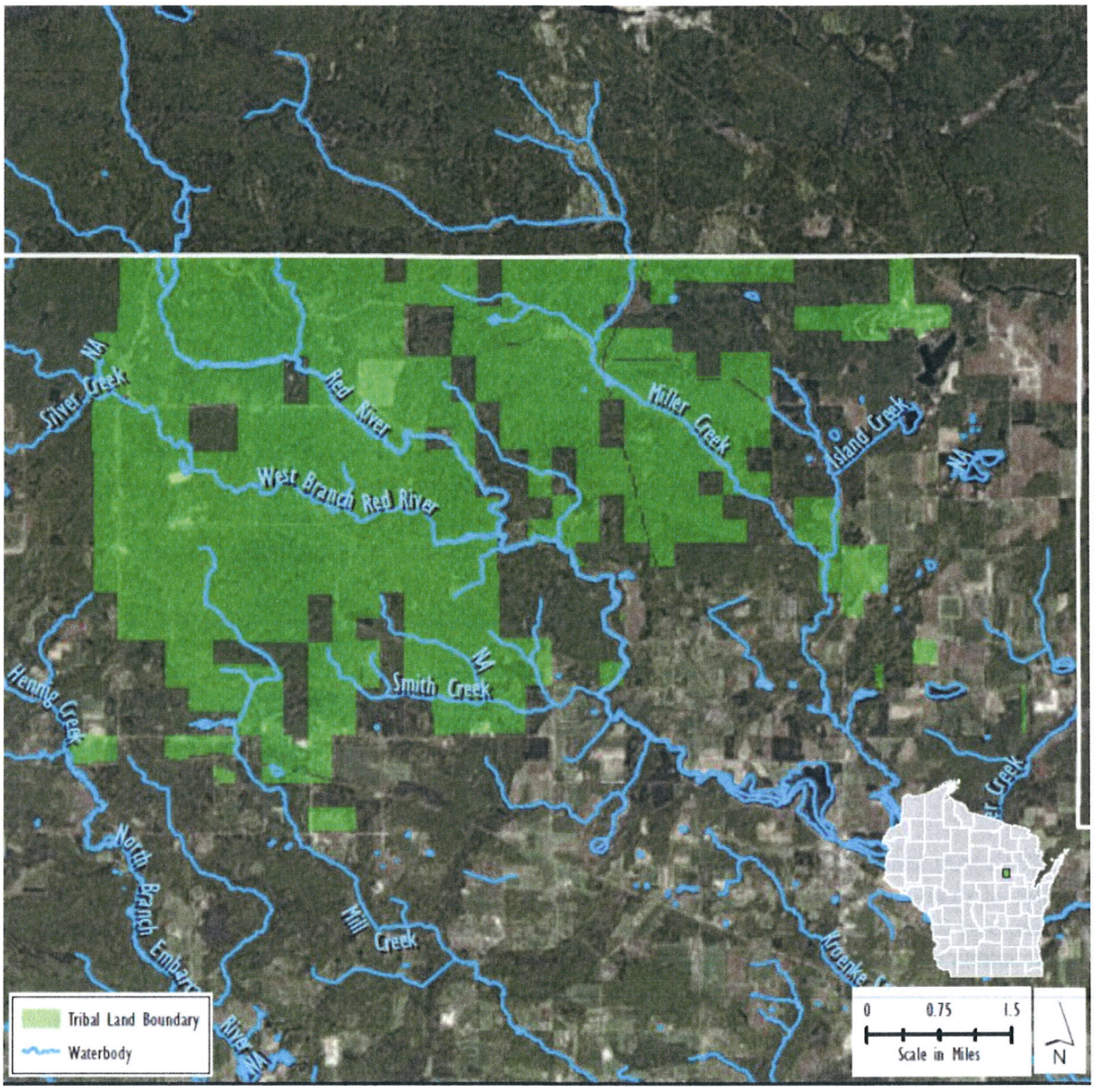
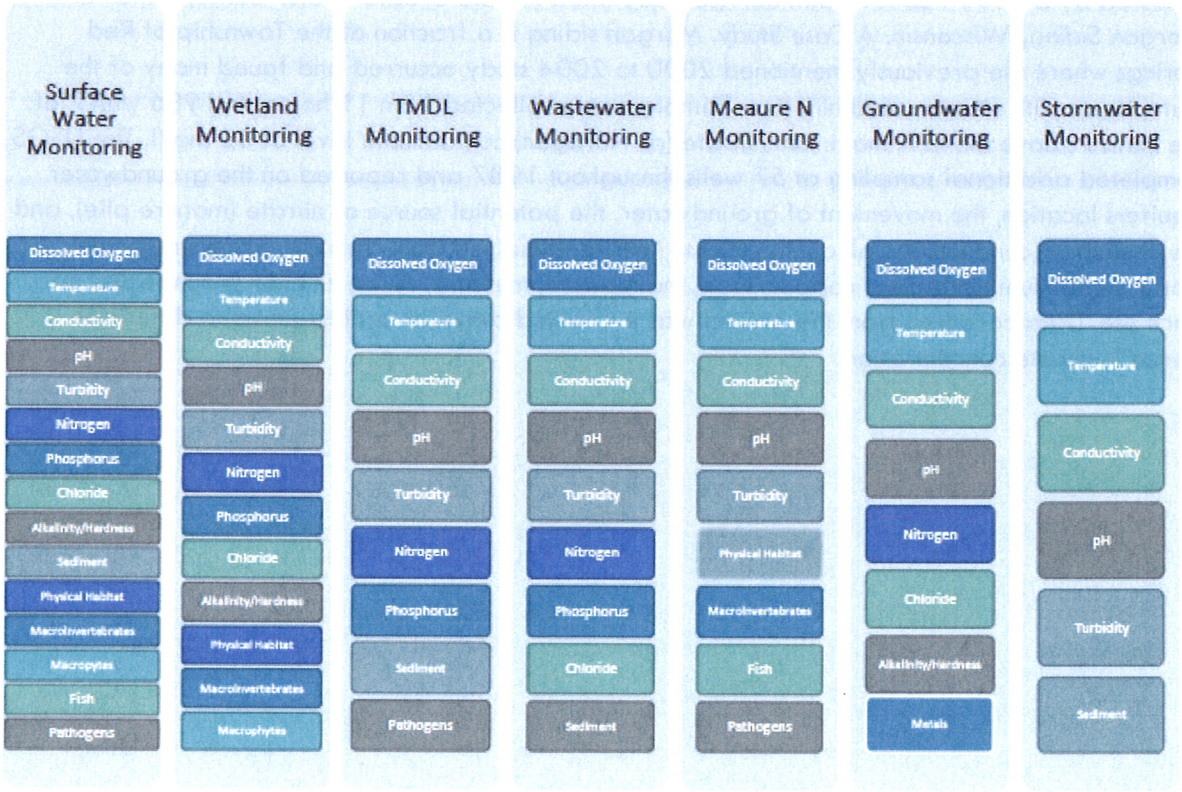


Figure 1: Stockbridge-Munsee Community tribal land holdings (green) and local water resources (blue lines).

6 METHODOLOGY

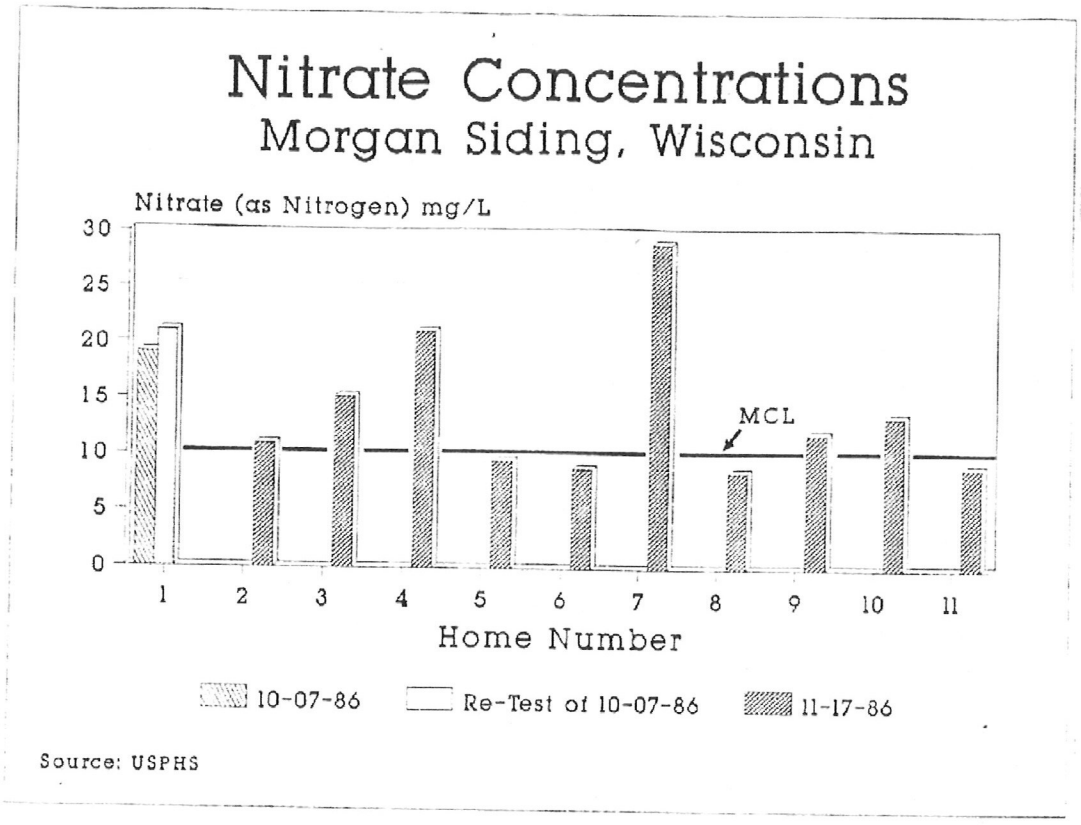
The NPS categorical concerns listed for each water body and aquifer are based on data collected by the Tribal, State, and Federal agencies as well as private contractors. The SMC Environmental Department collects large volumes of data under Section 106 of the Clean Water Act and the BIA Water Resources Program. Data collection is often completed in partnership with Federal and State agencies. Collected data are evaluated with Tribal, International, Federal and State water quality numeric and narrative criteria are based on chemical, physical, and biological attributes within ecoregions, watersheds or specific water bodies. Eco-regional values found at reference sites during the EPA's national wadeable stream, lake, and wetland surveys were used for comparison when water quality criteria were not present. The FY2010 SMC Tribal Water Quality Assessment Report (Appendix 1) details the data collected by the environmental department, which will be presented throughout the NPS assessment. In addition to previously collected data, field observations made in coordination with geographic information and positioning systems helped determine NPS concerns related to forestry, hydromodifications, and agriculture.

Table 1. 2011/12 Tribal monitoring constituents for current water resources program areas



The largest groundwater study conducted on the SMC was the *Simulation of Shallow Ground-Water Flow on the Stockbridge-Munsee Indian Reservation with the Use of an Analytic Element Model*, which analyzed monitoring and homeowner wells throughout the eastern half of the reservation. The data was collected between 2000 and 2004 and assembled in coordination with the University of Wisconsin Stevens Point, Northern Environmental and Tribal environmental staff. The sampling of homeowner and monitoring wells created a universe of wells, which was expanded to thoroughly cover the Red Springs area. Wells were analyzed for nitrate, chloride, metals, chlorofluorocarbons and a number of additional constituents to determine the extent of nitrate contamination, the distribution and movement of groundwater, and the potential for housing throughout the area. Each well in the universe was sampled 1 to 7 times over the four year period, dependent on the type of well, the wells condition throughout the project, and availability of the homeowner. Data from the investigation was also utilized to develop the *Simulation of ground-water flow in the Red Springs area, Stockbridge-Munsee Indian Tribe, Wisconsin* (Dunning, 2003). The simulation created an analytic-element model developed with the GFLOW computer program. The analytic-element model produced estimates for time of travel through till, moraine, and the various components of the local geology.

Another group of studies in the late 1980s and early 1990s were conducted to address nitrate concentrations around Morgan siding. The United States Geologic Survey (USGS) completed the *Final Report On The Source Of Nitrate In Ground-Water At Morgan, Wisconsin,* which was followed by a 1991 Public Health Service study titled *Nitrate Ground Water Concentration at Morgan Siding, Wisconsin: A Case Study*. Morgan siding is a fraction of the Township of Red Springs where the previously mentioned 2000 to 2004 study occurred and found many of the same issues with nitrate contamination. Samples were collected from 11 homes in 1986 with 7 of the homes above the EPA maximum Nitrate (as Nitrogen) contaminant level of 10 mg/l. The USGS completed additional sampling at 57 wells throughout 1987 and reported on the groundwater aquifers location, the movement of groundwater, the potential source of nitrate (manure pile), and the chemistry (conductivity, alkalinity, nitrate+nitrite, dissolved iron, chloride, aluminum, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, silver, zinc) of groundwater at each site. Data collected from the project was evaluated between project years to determine trends in nitrate concentration.



7 Surface Water

Surface water monitoring was completed through the baseline surface water monitoring (BSWM) project from 2004-2010 at twelve stream locations and nine lakes. The sampling design was a fixed site distribution, which allowed for a large number of sites to be monitored, infrequently, to determine the general characteristics of a wide range of Tribal water bodies. Chemical, biological and habitat measurements were made at each site on a quarterly basis for six years. Collected data included water temperature, pH, dissolved oxygen, conductivity, turbidity, stream discharge, alkalinity, chloride, nitrogen as ammonium, total Kjeldahl nitrogen, nitrate+nitrite, total phosphorus, orthophosphate, total suspended solids, in situ metals, chlorophyll *a*, and *E. coli*. Data collected form the sites was evaluated with Federal and State water quality criteria or ecoregional reference site data from EPA national wadeable stream, lake, and wetland assessments. Data was stored in the Water Quality Exchange database (formerly STORET). Site RR3 is the location of the USGS Red River at Morgan gage station. The gage station collects temperature and flow data on fifteen-minute intervals. The site also collects nutrient and sediment data on a program, which can be adjusted based on time or flow parameters.

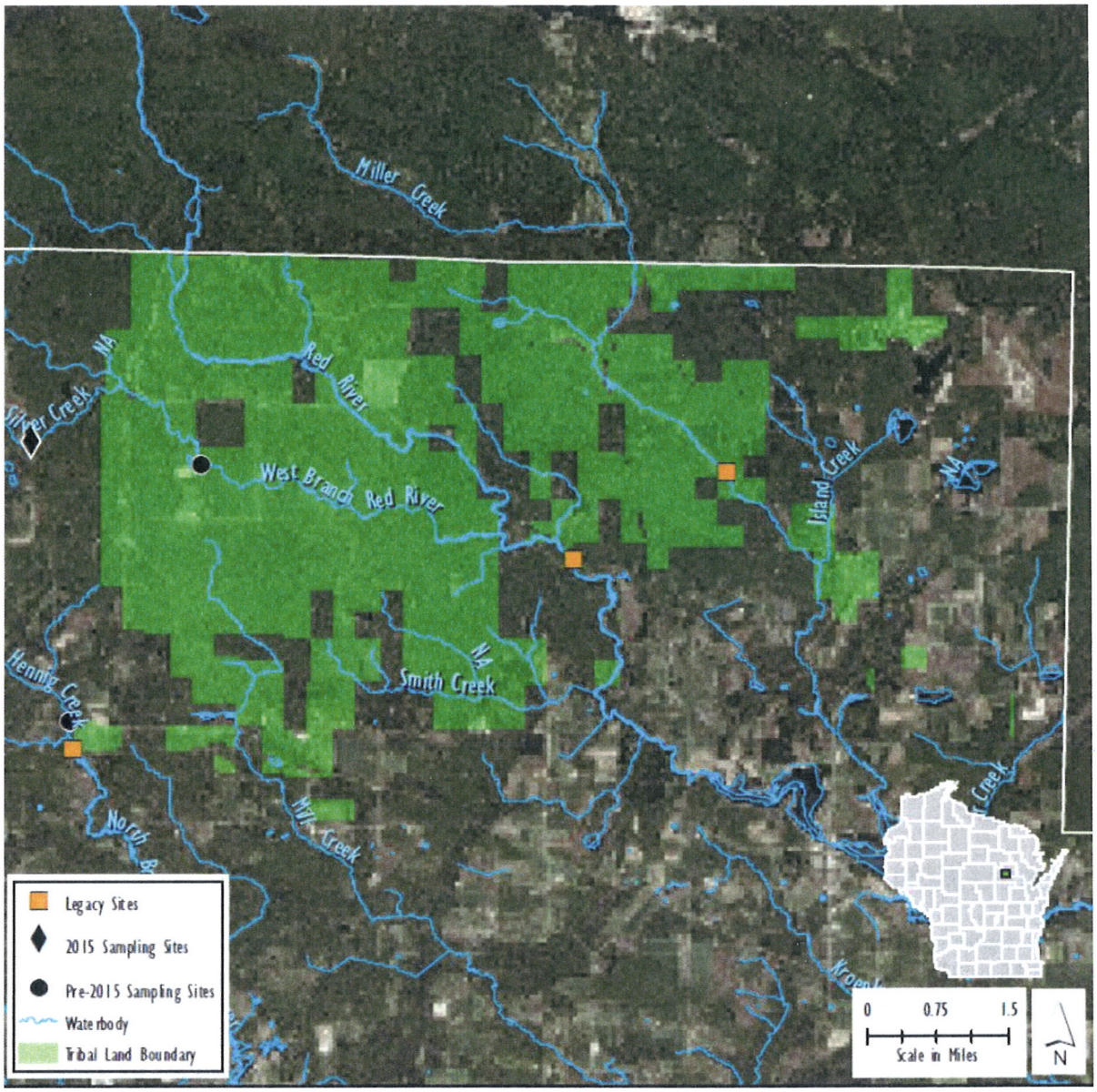


Figure 2: Tribal Land baseline surface water monitoring sites

The USGS stores a number of datasets on the quality and quantity of surface water resources on the SMC. The USGS completed an analysis of water resources in the early 1990s, which was titled *Water resources of the Stockbridge-Munsee Indian Reservation*. From 1992 to 1998, the USGS collected over 250 data points, which analyzed nutrients, sediments, and inorganics from the Red River. The Red River gage station has collected temperature, discharge, and gage height every fifteen minutes since 1992. The data provides a high resolution data set to evaluate trends in the reservations primary watershed. Data collected by the USGS are stored in the National Water Information System.

8 Biological Monitoring

8.1 Aquatic macroinvertebrates

The Tribe collected one aquatic macroinvertebrates sample per year at each BSWM site. Streams macroinvertebrates were collected in the spring of each year with the use of kick and D-nets. Lake macroinvertebrates were collected each fall using a D-net for shallow water samples and an Eckman dredge for deep water samples. Macroinvertebrates were evaluated to family level from 2004 to 2005 and to the lowest possible taxonomic level from 2006 to 2010. Summary statistics were utilized to evaluate the condition of each site (Hilsenhoff biotic index, percent EPT, percent tolerant/intolerant, and percent air breather). Raw species level data were evaluated to determine the presence of rare and endangered insects listed in the National Heritage Inventory or listed under the Wisconsin or Federal Endangered Species Act.

8.2 Fisheries

BSWM collected stream fish assemblages once each summer during base flow conditions from 2007 to 2010 with the use of backpack or barge electrofishing gear. Summary statistics and the coldwater index of biotic integrity were used to interpret data (percent tolerant, percent salmonid, percent stenothermic). The United States Fish and Wildlife Service collected fisheries samples with similar methods in the early 1990s from a number of the same sites as well as different locations.

Lake fish communities were sampled for Viral Hemorrhagic Septicimia (VHS) in 2010. Sixty fish were collected from six sites, which included four lakes (Big, Beauleau, Upper Red, Moon) and two streams (Red River, Embarrass River). The sixty fish were placed into lots by species and sent into a regional testing facility, where internal organs were removed and used to diagnose the presence of VHS.

8.3 Aquatic Vegetation

Aquatic vegetation was surveyed each summer from 2007 to 2010. The Wisconsin Floristic Quality Index was used to assess each lake plant community's health. Species and density data were collected at each point from a gridded plot laid over the lake. Data were stored in WDNR Floristic Quality Assessment files.

8.3.1 Habitat

Qualitative stream habitat assessments were performed annually on BSWM sites. Information collected was used to describe the stream reach's quality of habitat for aquatic organisms. Qualitative estimates of surrounding land use, riparian vegetation, substrate composition, embeddedness, and bank erosion provided insight into the quality of stream habitat. Results were

used to identify impairments and appropriate corrective techniques to enhance stream function and habitat.

8.4 Geographic Information Systems

Geographic Information Systems (GIS) are utilized by the Tribe to delineate and analyze natural and man-made features impact on water resources. The Tribe utilizes *ESRI's ArcGIS* suite of desktop GIS software. One of the primary functions of the software for the Tribe is the ability to catalog forest roads and crossings, which contribute NPS pollutants when culverts are washed out, roads are overrun by stream or wetland flow, or when stormwater carries sediment load to waterbodies. Forest roads and crossings have been cataloged since 2004 and are continually added to the GIS database when identified. The forest roads and culverts are classified by the magnitude of impact structure has on local hydrology (erosion around the stream crossing, barrier to the natural movement of water through a wetland, barrier to fish passage, poorly maintained/plugged/damaged). Data on the location and conditions of impaired sites are provided to forestry staff and roads crews when annual work lists are composed for forest roads and crossings.

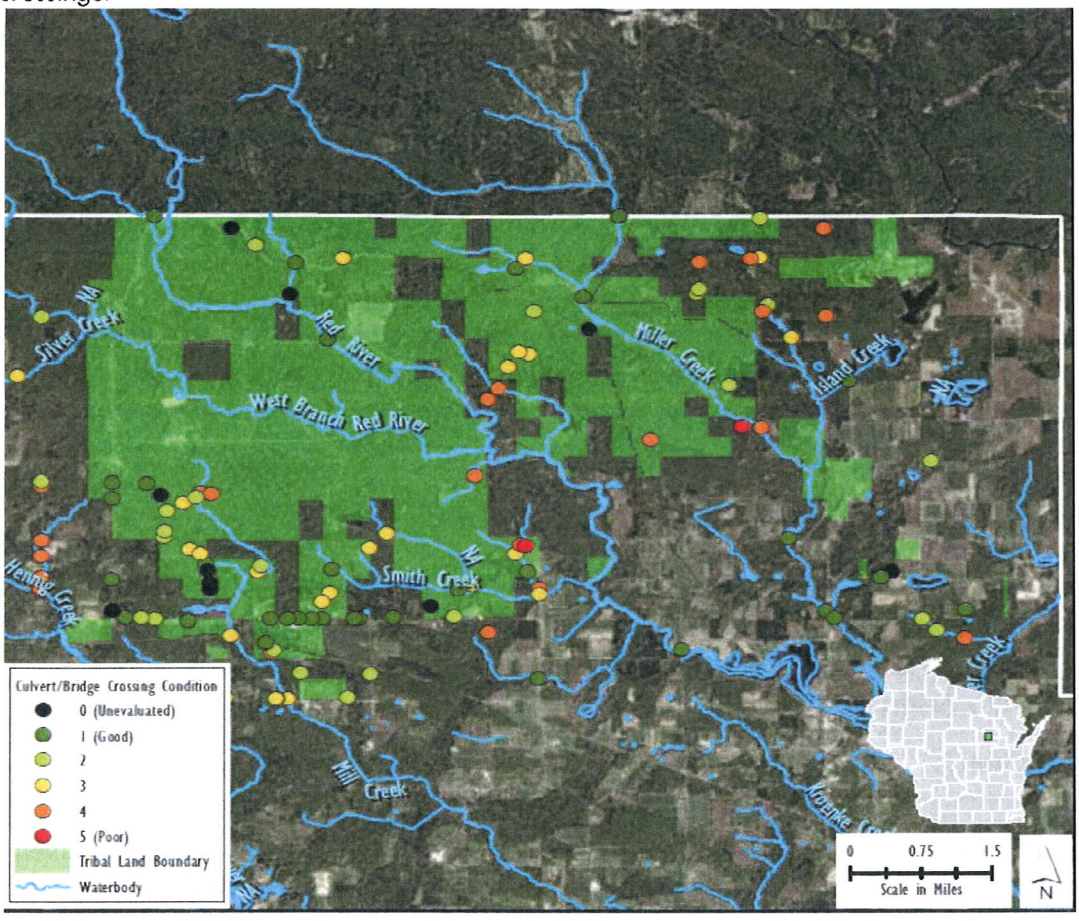


Figure 3: Stockbridge Munsee Community Trust Land, culvert/bridge crossings rated by condition (Black/Unevaluated, Green/Good to Red/Poor).

9 LAND USE SUMMARY

The Tribe has a land base of 24,872.717 acres that is primarily located in the Townships of Bartelme and Red Springs, Shawano County, Wisconsin. The Tribe has 16,993.75 acres that are proclaimed reservation land and/or are held in trust for the Tribe's benefit by the Federal Government. The Tribe also owns 7,878.967 acres as a fee simple landowner. The Tribes base land use and land cover was evaluated with the use of 2006 USGS land cover data, which illustrates both the high quality of trust lands and the NPS challenges the Tribe faces. Nearly 90 percent of the tribal land base is covered in woods or wetland with less than ten percent in agriculture or other types of intensive development. The Tribe has restored upland as well as lowland habitat and institutes best management practices for agricultural development, which decreases the Tribe's NPS contribution to local watersheds. When the current Tribal land base land cover is evaluated alongside the historic tribal land base (the full Townships of Bartleme and Red Springs) land cover, the amount of agriculture increases from 7 percent on tribal lands to 26 percent with tribal and non-tribal lands combined. The dramatic change in percent agriculture demonstrates why agricultural NPS pollution concerns outside of the reservation boundaries, yet still in the watersheds containing Tribal lands, must be addressed to improve water quality within the reservation.

Table 2: Tribal land use summary based on 2006 and 2011 USGS land cover type data with area in acres, percent land cover of current tribal lands, and percent land cover for the historic reservation boundaries.

Land Cover	Area Acres (2006)	Percent Cover 2006	Area Acres (2011)	Percent Cover 2011	Percent Cover 2006 (Historic Reservation)
Open Water	90	0.38	89	0.36	1.07
Developed, Open Space	551	2.32	712	2.91	3.84
Developed, Low Intensity	15	0.06	40	0.16	0.80
Developed, Medium Intensity	2	0.01	14	0.06	0.19
Developed, High Intensity	4	0.02	2	0.01	0.06
Barren Land (Rock/Sand/Clay)	2	0.01	10	0.04	0.01
Deciduous Forest	9897	41.69	10101	41.26	36.77
Evergreen Forest	840	3.54	823	3.36	1.14
Mixed Forest	1004	4.23	974	3.98	2.89
Shrub/Scrub	94	0.4	165	0.67	0.43
Grassland/Herbaceous	29	0.12	101	0.41	0.33
Pasture/Hay	120	0.51	132	0.54	5.63
Cultivated Crops	1533	6.46	1650	6.74	20.49
Woody Wetlands	9422	39.69	9510	38.84	25.91
Emergent Herbaceous Wetlands	138	0.58	162	0.66	0.43
Total Area	**23741**		**24484**		

The land cover data also demonstrates the extent of forest resources, which covers over 40% of the regional landscape. Forest cover is predominately deciduous with smaller components of mixed and evergreen stands. "Sugar bushing" is a tradition and many areas of the forest are used by Tribal members to collect maple syrup and other commodities such as mushrooms, berries, herbs and medicinal plants Rainforest Alliance certified sustainable forestry is practiced in many of the forest stands while other forest stands are protected as "reserve." Reserve areas are maintained as old growth forest, which is only put under management if catastrophic conditions related to invasive species, man-made wildfire, or extreme pest outbreaks occur. Forest resource management and use requires temporary and permanent roads and crossings, which can conflict with NPS management and be a potential source of non-point pollution. Hydrologic modifications and habitat alterations can be caused by forest management practices, which make forestry a primary NPS concern of the Tribe.

Tribal lands contain a tremendous water resource complex composed of lakes, rivers, and wetlands, which cover over 40 percent of the Tribe's current land holdings. The combination of high quality water and forest complexes provides an abundance of habitat for wildlife. Hunting and fishing are major subsistence uses of Tribal water resources. Many activities that may increase the NPS loads degrade the extent and health of Tribal wetlands, which affects the ability of Tribal members to subsist on many fish species.
The Tribe tracks land use according to a number of land use types. Residential land assignments cover approximately 800 acres. 190 acres of land is used for recreational purposes such as

baseball fields, basketball courts, parks and playgrounds. Agricultural operations cover approximately 560 acres of land. Tribal government and commercial operations are on 130 acres of Tribal land, which includes the Tribal Offices, Health and Wellness Center, Library/Museum, Departmental buildings, the Tribe's two wastewater treatment facilities, as well as Mohican North Star Hotel and Casino and the C-Store. The Tribal land base provides for 347 homes, 40 low rent apartments, 12 apartment rentals, and an elderly care facility.

10 Watershed Land Cover

Land cover across the three HUC 10 watersheds, which cover Tribal land, changes from heavily forested in the north to moderately agricultural in the south. Deciduous forest and woody wetlands cover over half of each watershed, which provides excellent habitat for terrestrial and aquatic organisms. Tribal forests and the neighboring Menominee reservation create one of Wisconsin's largest forest stands, while surrounding privately held lands host a larger amount of agricultural land cover. The Embarrass River watershed is the southernmost watershed and has the smallest amount of reservation land within the watershed's boundaries. Consequently, the Embarrass River also has the highest amount of agricultural land cover with 37 percent of the land in cultivated crops or pasture/hay. Opportunities for bacterial, nutrient, and sediment loading increase significantly in the Embarrass watershed due to the shift from native forest to large amounts of agricultural land cover.

Table 3: 2006 USGS watershed land cover types by square mile and percent for the three HUC 10 watersheds occurring on Tribal lands.

Cover Type	Red River	%	West Branch Wolf River	%	North Branch Embarrass River	%
Deciduous Forest	72.98	35.87	68.89	41.92	43.28	24.72
Woody Wetlands	58.60	28.80	60.95	37.09	47.85	27.33
Cultivated Crops	36.73	18.06	11.02	6.71	44.32	25.32
Pasture/Hay	12.53	6.16	3.82	2.32	21.61	12.34
Developed, Open Space	6.72	3.30	5.92	3.60	7.01	4.00
Mixed Forest	5.36	2.63	6.83	4.16	3.81	2.18
Evergreen Forest	4.70	2.31	1.75	1.07	1.35	0.77
Open Water	1.78	0.88	2.21	1.35	1.09	0.62
Shurb/Scrub	1.48	0.73	0.39	0.24	1.05	0.60
Grassland	1.09	0.54	1.51	0.92	1.40	0.80
Emergent Wetlands	0.74	0.36	0.63	0.39	0.92	0.53
Developed, Low Intensity	0.58	0.29	0.32	0.19	0.93	0.53
Developed, Medium Intensity	0.08	0.04	0.03	0.02	0.39	0.22
Barren Land	0.04	0.02		0.00	0.03	0.02
Developed, High Intensity	0.03	0.01	0.06	0.04	0.02	0.01
Total (square miles)	**203.44**		**164.33**		**175.07**	

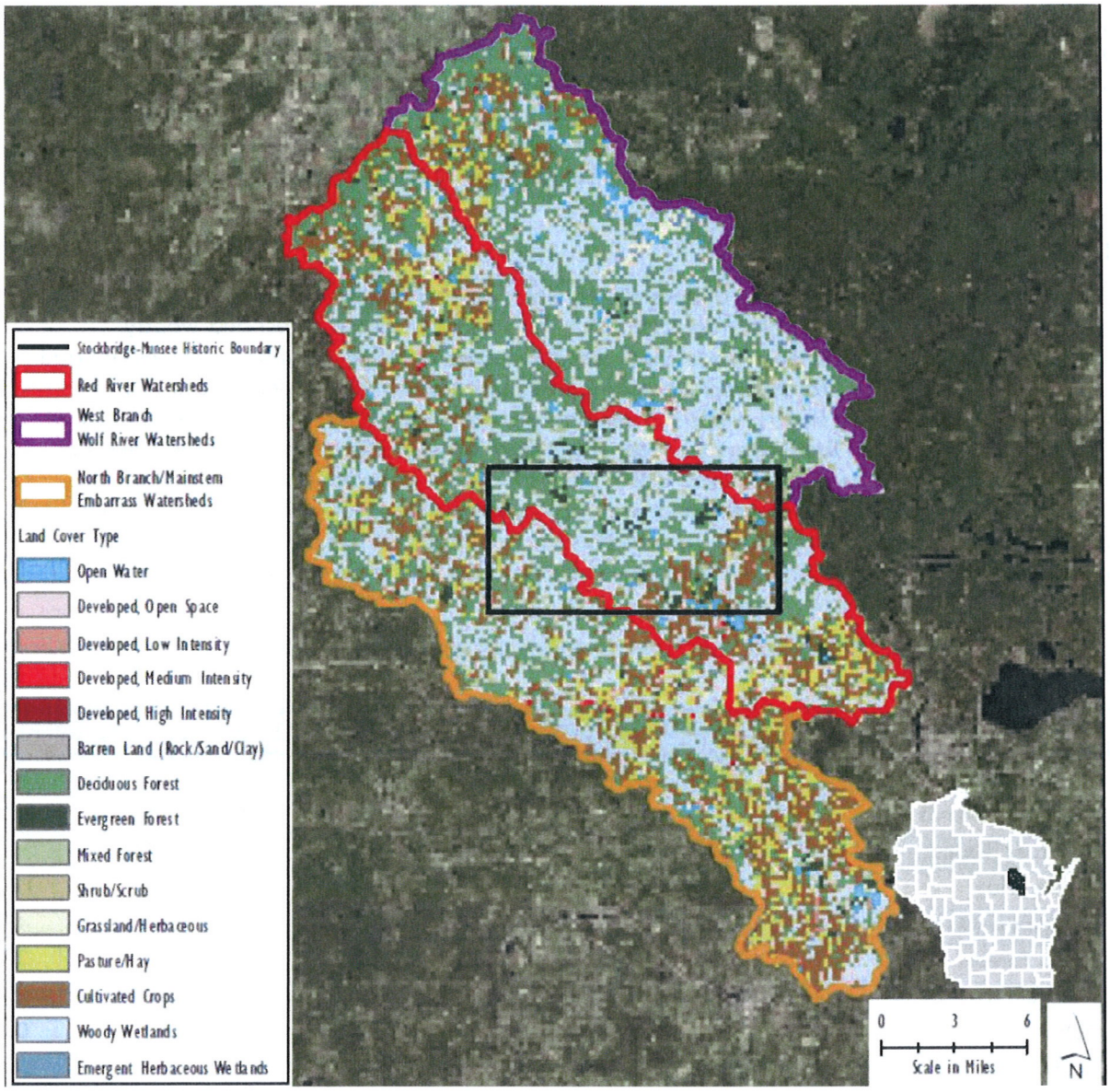


Figure 4: Watershed land cover for the HUC 10 watersheds associated with Stockbridge-Munsee Tribal Land with HUC 12 watersheds outlined.

10.1 ECOREGIONS

Tribal lands are composed of numerous hills, small valleys, streams, lakes and wetlands, which were formed from glacial events 10,000 to 12,000 years ago. According to Omernik's classification of ecoregions, Tribal lands are located within the North Central Hardwood Forests ecoregion 51, which is a region of nutrient poor glacial soils, coniferous and northern hardwood forests, undulating till plains, moraine hills, broad lacustrine basins, and extensive sandy outwash plains. Soils in the ecoregion are thicker than northern Wisconsin soils, but still lack the arability of

southern soils. The numerous lakes that dot the landscape are clearer and less productive than those in ecoregions to the south. Stream density is highly variable, with some areas having limited stream networks while other areas have high densities of perennial systems. The reservation contains two subdivisions of ecoregion 51, which are the Upper Wolf Stagnation Moraine (51e) and the Green Bay Till and Lacustrine Plain (51f). The Upper Wolf Stagnation moraine is characterized by end moraines and pitted outwashes. The region supports stands of hemlock, beech, sugar maple and mixed conifers. Land use is mixed with agriculture and woodland, but large intact stands remain on Tribal lands and within National forest. The Green Bay Till and Lacustrine Plain is a transitional ecoregion characterized by outwash and loamy recessional moraines with areas of outwash plains in the northwest, lake plains and ground moraines in the south, and ground moraines throughout the rest of the region. The native vegetation of the region represents a shift from the predominantly northern hardwoods and conifer swamps along the lake shore to the maple, basswood, oak forests, and oak savanna to the south. The red sandy, loamy soils of the ecoregion are similar to some southern areas. Generally, a milder climate occurs because of proximity to Lake Michigan, which provides a favorable growing season. Therefore, much of the area has been cleared of natural vegetation and replaced by agriculture (Omernick et. al, 2008).

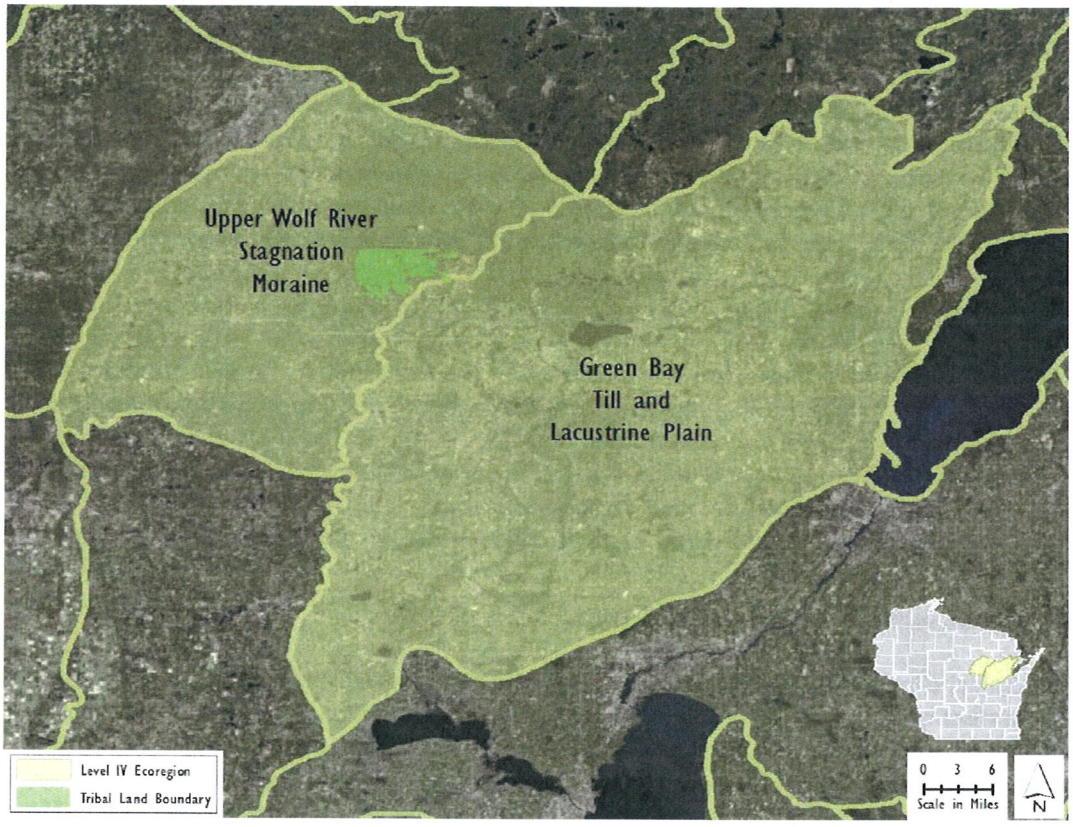


Figure 5: Wisconsin's Level IV ecoregions, highlighted ecoregions containing Tribal lands, and the Tribal land base.

10.2 Fauna

The local landscapes have a diverse assemblage of fauna. The primary bird species include coniferous and mixed forest warblers such as the Tennessee, Golden winged, Blue winged, Nashville, Northern parula, Magnolia, Cape May, Yellow-rumped, Blackburnian, Pine, and Black-throated green warblers. Primary predators include gray wolf, lynx, and fisher. Browsers include white-tailed deer, snowshoe hare, porcupine, and the occasional moose. Other mammals include the artic shrew, least chipmunk, and northern flying squirrel. Typical herps include four toed salamander, fox snack, blandings and wood turtle. Typical fish include brook trout, northern pike, smallmouth bass, white sucker, mottled sculpin, common shiner, and creek chub. Extirpated species, which have been reintroduced, are the marten, fisher, peregrine falcon, moose, and wolf. The wolverine, mountain lion, woodland caribou, and bison remain expatriates.

10.3 Climate

The climate of the region is typically continental with some modification by Lakes Michigan and Superior. About two-thirds of the annual precipitation falls during the growing season. Rainfall is normally adequate for vegetation, although drought is occasionally reported. The regions climate is stimulated by an oftentimes rapid succession of storms, which move predominately from west to east and southwest to northeast. The long-term mean annual precipitation is 32 inches per year. Thunderstorms average about 30 per year and occur mostly in the summer. Occasional hail, wind, and lightning damage are also reported. The average seasonal snowfall is 40 inches. The mean dates of first snowfall of consequence vary from early November to early December. Average annual duration of snow cover is approximately 120 days. Snow cover acts as protective insulation for tree roots, grasses, autumn seeded grains, alfalfa, and other vegetation.
The average monthly temperature varies approximately 45 degrees throughout the year. The highest temperature ever recorded was 114 F and the lowest temperature on record was minus 55 F. During more than one-half of the winters, temperatures fall to minus 40 F or lower and almost every winter temperatures fall to minus 30 or colder. Summer temperatures above 90 F average 7 days per year. Freezing temperatures can occur during marked cool outbreaks in summer months. The freeze-free season ranges around 120 days. The short growing season in the central portion of the State is attributed to a number of factors, which include inward cold air drainage and low heating capacities due to peat and sandy soils. The average date of last spring freeze is typically early May and the first autumn freezes occur in late September.

10.4 Categories and Subcategories of NPS pollution

The geographic, climatic, and geologic makeup of the regional watersheds forms the basis for the types and extent of NPS pollution. The largest NPS impact to regional watersheds is through agricultural operations. The cool springs and falls, moderate summer temperatures, and reliable amounts of precipitation allow for dairy farmers to develop successful operations. However, some farms in the watershed overgraze riparian areas, conduct cultivation practices without buffers around stream banks and shorelines, or apply manure on frozen ground. The activities contribute nutrients, sediment, and bacteria to local aquifers, lakes, and streams. A second suite of NPS concerns arise from hydrologic modifications such as dammed or straightened segments, which were created to accommodate local resource development. Third, forestry operations require forest road construction and harvesting practices, which can affect the movement and composition

of water moving over and under the land. Harvest equipment can rut and disturb soils, forest roads can fill wetlands or contribute sediment, and hydrology can be constricted. Fourth, habitat alterations in wetlands and riparian areas have altered beneficial habitat to suit the development of housing and agriculture. Regional wetlands have been filled to accommodate agricultural activities and housing developments. Fifth, boating activities and boat landing construction practices have created sources of sediment and litter. Finally, many of the local roads, highways, and bridges contribute NPS pollutants through construction and maintenance. The use of salt and sediment to keep roads safe for winter travel places a large amount of NPS pollutants on the landscape.

Table 4: Primary Nonpoint Source Pollution Categories and Subcategories Addressed by the Stockbridge-Munsee Nonpoint Source Pollution Management Program

Level -1-, data confirmed impairment currently exists;
Level -2-, possible impairment not yet confirmed by monitoring data;
Level -3-, NPS pollution without current impairment;
Level -4-, No known NPS pollution occurring or impairment to waterbodies).

Categories	Subcategories	Impairment Level
Resource Extraction	Surficial Mining Runoff	-4-
Agriculture	Animal Feeding Operations	-2-
	Overgrazing	-3-
	Cultivation Practices	-2-
	Fertilizer Application	-1-
	Pesticide Application	-3-
	Irrigation Operations	-4-
Forestry	Road Construction and Use	-3-
	Harvesting Practices	-3-
Hydrologic Modification	Channelization/Channel modification	-2-
	Dams/Culverts	-2-
Habitat Alteration	Streambank/Shoreline Erosion or Hardening	-3-
	Wetland Draining/Filling	-1-
	Riparian Vegetation Removal	-3-
Marinas and Boating	Infrastructure development	-3-
	Waste Storage and Removal	-3-
	Streambank/Shoreline Erosion or Hardening	-3-
Roads, Highways, Bridges	Construction Runoff	-3-
	Maintenance Runoff	-3-
	Right of Way Maintenance	-4-
Development	Stormwater Runoff	-4-
	Failing Septic Systems	-3-
	Illegal Dumping	-3-

11 SURFACE AND GROUNDWATER QUALITY SUMMARY

Surface and groundwater quality has been evaluated under a number of different programs over the last couple of decades. In the 1980s, groundwater was evaluated by the Tribal drinking water program, the USGS and Public Health Service (PHS) when concerns arose about the concentration of nitrate in groundwater. Additional data on the conditions of the eastern groundwater aquifer was collected throughout the 1990s and 2000s. The collected groundwater data included a large suite of parameters ranging from conductivity to nitrate to Chloro Flouro Carbon (CFC) concentrations to determine age and movement of the groundwater. The Tribal streams chemical, physical and biologic condition was evaluated in the early 1990s by the USGS NAQWA, United States Fish and Wildlife Service (USFWS), and the Tribe. The collected data evaluated fisheries, sediment metal, nutrient, dissolved oxygen and other parameters. The WDNR has records on a number of streams throughout the watershed, which contain anywhere between 1 to 20 various sampling visits for a number of different parameters at the sites. The Tribal Clean Water Act Section 106 program began around the same time period. In 2004, the program began collecting quarterly samples from major lakes and streams within the historic boundaries of the reservation, documenting information on aquatic vegetation, invertebrates, fisheries, nutrients, Chlorophyll a, metals, dissolved oxygen and a host of other parameters. Primary findings from the various studies were the presence of nutrient contamination (nitrate) in the eastern groundwater aquifer, bacterial contamination in the Red River watershed, and habitat degradation in the North Branch of the Embarrass River and Red River from 19th and early 20th timber cuts. The most commonly observed NPS categories were the result of past and present agricultural, hydrologic modifications, and forestry and habitat alteration practices.

Table 1: Tribal Lakes, Ponds, and streams (appendix) with respective total lengths and areas within and outside Trust Land Boundaries, as well as the difference between the two

Lake Name	Tribal Acres	Total Acres	Difference
JIM AND JOES	0.96	0.96	0
PINE HILLS POND	2.48	2.48	0
RADOLL POND	3.40	3.40	0
AMOX LAKE	4.36	4.36	0
FOUND LAKE	3.28	3.28	0
HERMAN POND	0.50	0.50	0
POND 7-1	0.40	0.40	0
SPRING POND	0.79	0.79	0
LOST LAKE	4.75	4.75	0
POND 23-4	0.43	0.43	0
MOON LAKE	2.96	6.83	4
BEAULIEU LAKE	1.49	26.79	25
BIG LAKE	0.25	63.05	63
MISSION LAKE	0.25	25.24	25

Tribal lands are located entirely in the Lake Michigan basin's Wolf River watershed (HUC 04030202). Three HUC 10 subwatersheds of the Wolf occur on Tribal lands. The Red River is a 204 square mile watershed (HUC 0403020207), which contains approximately 80 percent of Tribal lands. Lesser parts of the watersheds are held in the 175 square mile North Branch and Mainstem Embarrass River (HUC 0403020213) as well as the 164 square mile West Branch of the Wolf River (0403020204). Tribal lands within the watersheds contain or are connected to 3 lakes, 3 impoundments, and 8 ponds. Tribal lands also contain 37 miles of perennial streams and 12 miles of intermittent stream. The streams and lakes are underlain and fed by an unconsolidated till and bedrock aquifer. Groundwater is the primary source of water to local lake, streams, and wells.

The Red River watershed contains 5 subwatersheds, which all contain portions of Tribal land except for the Mattoon Creek–West Branch of the Red River. In total, the watershed is 130,173 acres and contains approximately 20,700 acres of Tribal land. Nearly all streams in the watershed are state classified as trout waters. However, the water body's in the Mattoon Creek-West Branch of the Red River and the Silver Creek-West Branch of the Red River upper reaches support a number of dairy operations, which increases the amount of nutrient, sediment, and bacteria in the HUC12s waterbodies. The Miller Creek HUC 12 was also developed intensively for agriculture and groundwater aquifers are contaminated with nitrate. The main-stem of the Red River was utilized to float logs in the 19th and 20th century and was heavily impacted by check dams and log jams.

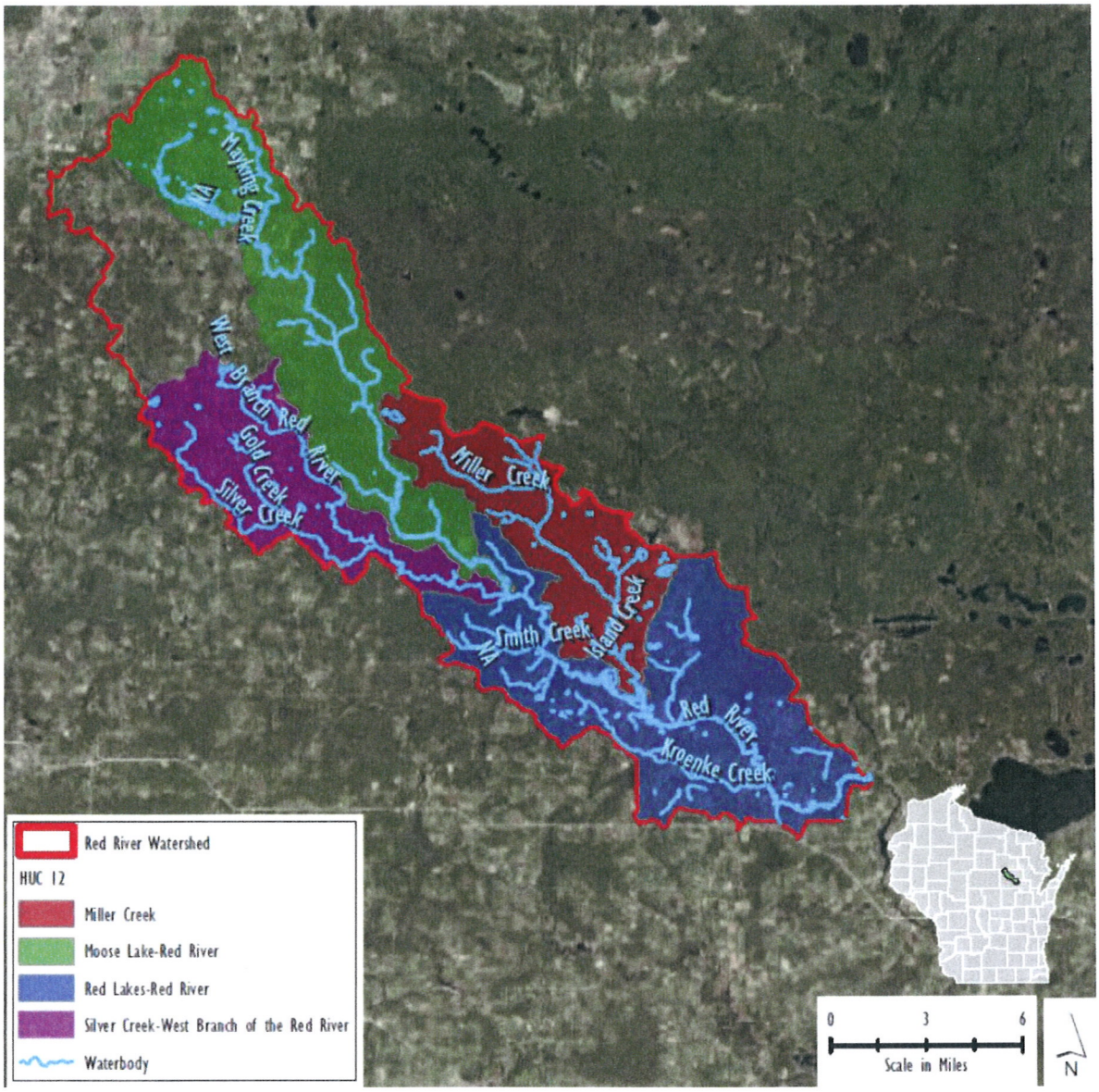


Figure 6: The Red River watershed and associated HUC 12 watersheds.

The North Branch and Mainstem of the Embarrass River watershed contain 8 subwatershed. Strassburg Creek-North Branch of the Embarrass River, Mill Creek and Pony Creek-North Branch of the Embarrass River contain Tribal Land (Figure 9). The watershed is 200,051 acres and contains approximately 4,000 acres of Tribal land. The watershed is impacted by agricultural operations and wastewater discharges, which increase the amount of bacteria, sediment, and nutrients in waterbodies. Attempts to use the Embarrass River as a route for forest products were not successful and prevented extensive damage from the practice. The Mill Creek subwatershed contains Mill Creek, which houses the only documented population of brook lamprey on Tribal lands.

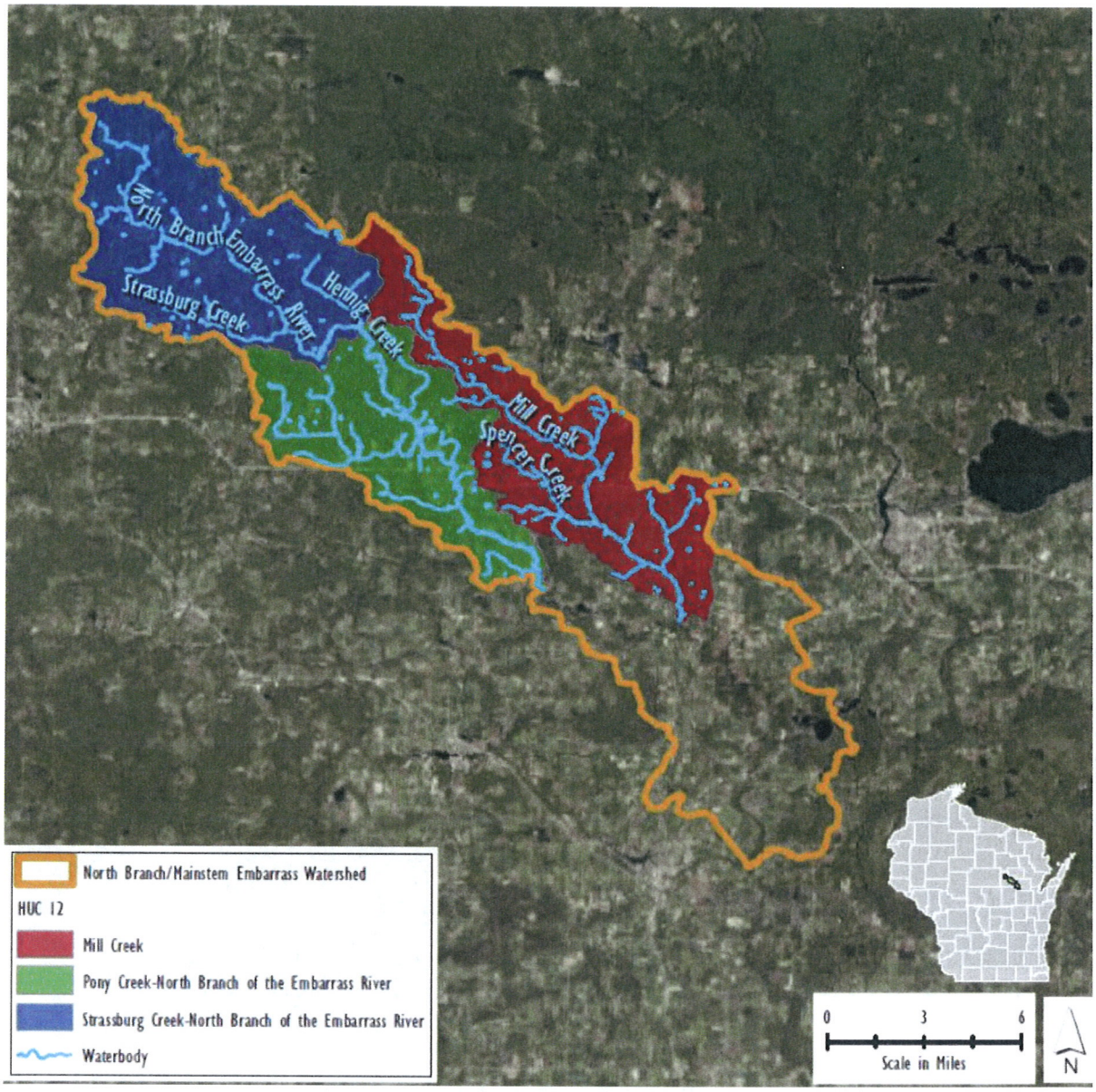


Figure 7: The North and Main-stem Embarrass River watershed and associated HUC 12 watersheds.

The West Branch of the Wolf River contains six subwatersheds of which only one, Neopit Millpond 108-West Branch of the Wolf River, contains Tribal lands. The watershed is 170,355 acres and contains 700 acres of Tribal lands. The large amount of forested land cover protects the quality of waterbodies occurring within the watershed. Most of the watershed is contained in the Menominee Indian Reservation to the north and west of Tribal lands. The watershed contains Big Lake, which, at 60 acres, is the largest lake with Tribal land and access. Big lake has an active volunteer water quality monitoring program, which has collected nutrient and clarity on the lake for a number of years and is still active in conjunction with the Department of Natural Resources.

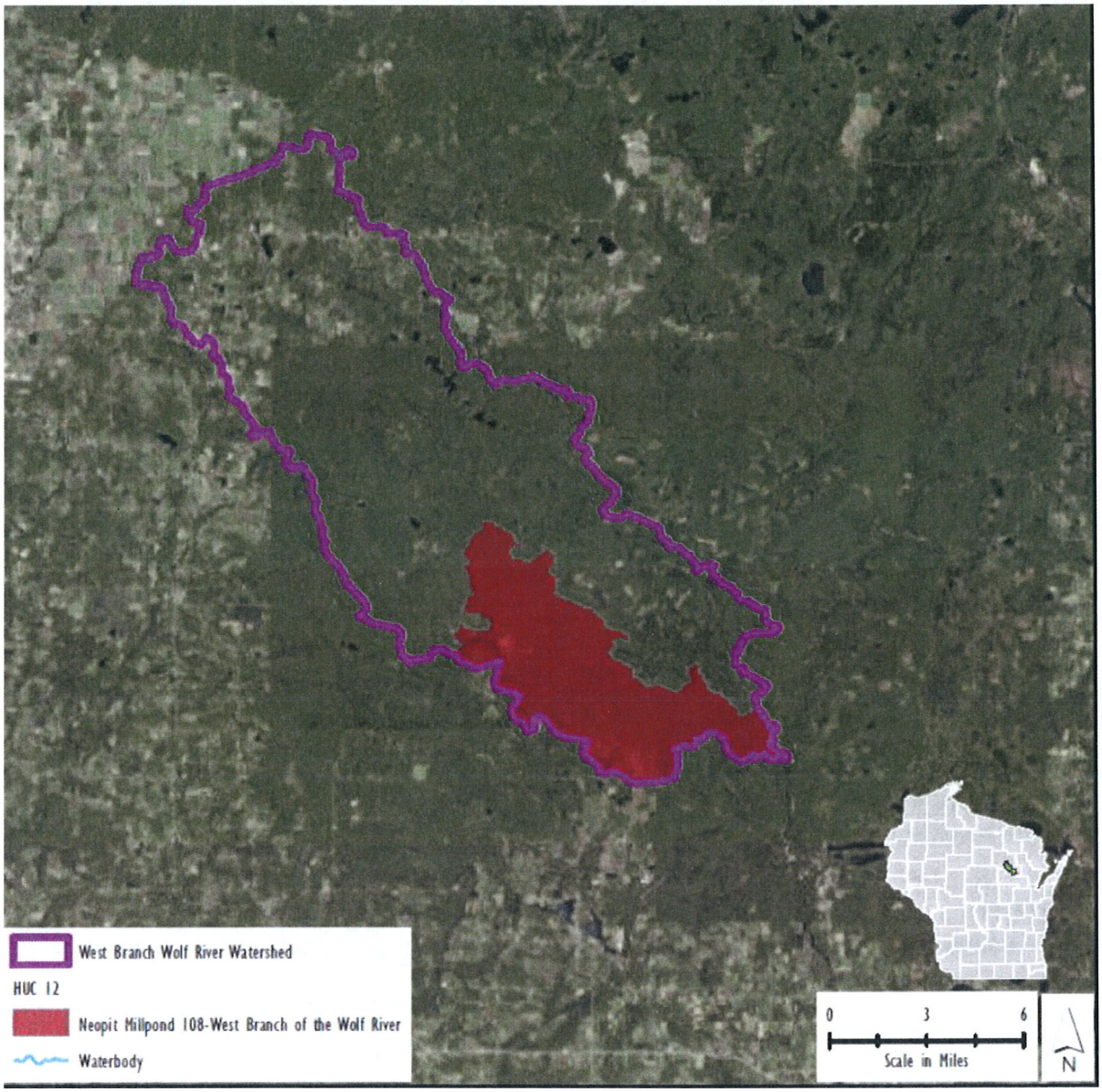


Figure 8: The West Branch of the Wolf River watershed and associated HUC 12 watersheds.

12 RESULTS

The status of known and potential NPS impairments to watersheds and surface water bodies on or adjacent to Tribal lands has been evaluated through water quality sampling and geospatial analysis. The water quality found at some of the sampled wells, streams, and lakes are below criteria set for safe drinking, recreation, and fish and wildlife propagation. The primary NPS

constituents that create impairment at sampled sites are nutrients (phosphorus, nitrogen) bacteria, and sediment. In addition to sampling, geospatial surveys were conducted to identify areas of concern. Geospatial analysis has produced a database of sites, which have or have the potential to serve as a NPS concerns.

Table 2: Lake Name (Streams appendix), monitoring status *(Monitored: continued assessment/Evaluated: one time assessment), NPS category – subcategory, impairment, and severity of impairment (Level 1, data confirmed impairment currently exists; Level 2, possible impairment not yet confirmed by monitoring data; Level 3, NPS pollution without current impairment; 4, No known NPS pollution occurring or impairment to waterbodies).

Lake Name	Monitored/Evaluated*	Category - Subcategory	Impairment	Severity
JIM AND JOES	E			4
PINE HILLS POND	E			4
RADOLL POND	E			4
AMOX LAKE	M	Hydrologic Modification - Dam/Culvert		3
FOUND LAKE	E			4
HERMAN POND	E			4
POND 7-1	E			4
SPRING POND	E			4
LOST LAKE	M			4
POND 23-4	E			4
MOON LAKE	M	Marinas and Boating – Streambank/Shoreline Erosion or Hardening	Sediment	3
BEAULIEU LAKE	M	Habitat Alteration – Riparian Vegetation Removal; Marinas and Boating – Streambank/Shoreline Erosion or Hardening	Sediment, Thermal	3
BIG LAKE	M	Habitat Alteration – Streambank/Shoreline Erosion or Hardening; Habitat Alteration – Riparian Vegetation Removal	Nutrients	2
MISSION LAKE	M	Agriculture - Fertilizer Application; Habitat Alteration – Riparian Vegetation Removal	Nutrients, Clarity	2

Geospatial surveys have documented over 40 stream and road crossings, which are in poor condition. Poor condition documents the potential of crossing failure due to piping along culverts, culvert crushing due to road failure, or bridge collapse. Any type of failure has the potential to transfer tons of sediment into receiving waters, which has happened during large spring runoff events, periods of extensive forest road use, and during torrential summer storms. The effects on the receiving waters are large and immediate. The natural gradient and stream particle size distribution is altered, flow paths are changed, and the natural meander of the streams is disrupted; often times permanently. In addition to failure, the surveys have also documented road crossings that impair the ability of water, fish, and other organisms to move between reaches of the stream. Dams on the Red River and Wolf River inhibit the movement of mussel host fish (Black side darter, Red horse suckers) and limit the biologic diversity of upstream reaches. The loss of sturgeon from the river system may be comparable to the loss of salmon in streams along the west coast of the United States. In addition to crossings, forestry practices require an extensive forest road network, which covers approximately 300 acres of Tribal land. Forest roads inhibit the

movement of water, which often is forced to flow in ditches to narrow constrictions. Constricting flows in wetlands can increase water temperature and has altered wetland hydrology and thereby plant and animal distributions. Forest roads also provide a source of raw sediment that moves off of the roads and into stream networks during periods of heavy use or precipitation.

Agriculture also delivers bacteria, sediment and nutrients to watersheds and waterbodies. The Red River, West Branch of the Red River, Silver Creek and upper tributaries, exceed single sample maximum criteria for E. Coli and Fecal Coliform (235MPN/100ml) during approximately 25 percent of the sampling events. Phosphorus concentrations have spiked above the 0.075 mg/L total phosphorus criteria for Wisconsin streams. Total suspended sediment often has peaked above 20 mg/L of total suspended sediments. Agricultural NPS sources impact large portions of the riverine network and occur on Tribal lands as well as upstream and downstream of the reservation. The link between agriculture can be seen in lower portions of Miller Creek watershed, where agriculture is predominant. Here, significant increases in nitrogen content occur in Miller Creek compared to headwater sections, which lack agricultural development. Groundwater studies in the Miller Creek ground watershed indicated that the age of groundwater traveling to the stream from upland sources has been in the aquifer since the 1970s. A number of lakes have likely been impacted by fertilizer applications from Agricultural operations. Mission and Beaulieu Lake have agricultural land adjacent to the water bodies. Phosphorus and nitrogen concentrations range from slight in Beaulieu to moderate in Mission Lake.

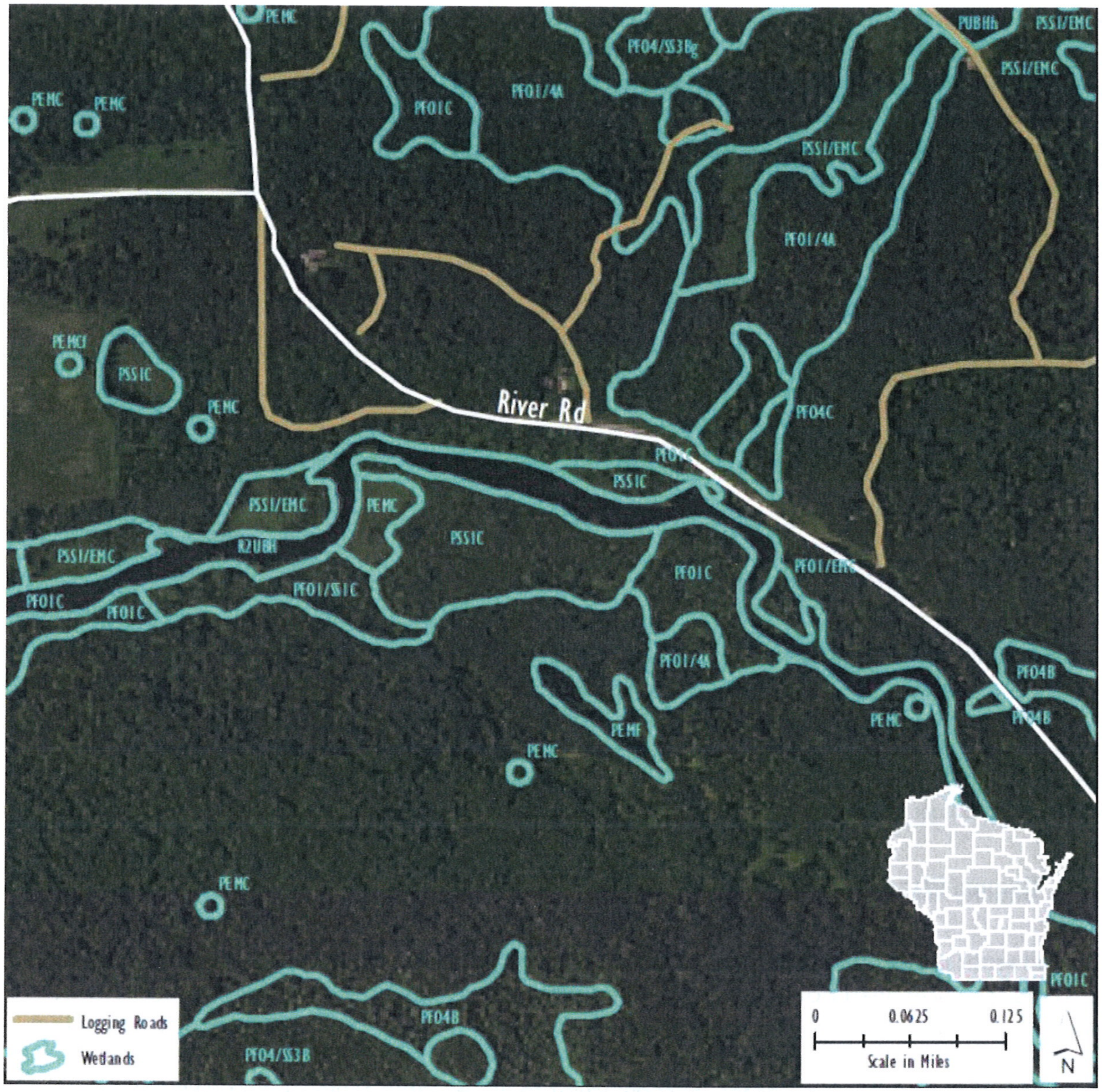


Figure 9: Change in wetland classification from the long term hydrologic modification created by a roadway on Tribal land where the portion (PSS4/1B), north of the roadway is artificially inundated, creating a change in land cover due to natural over land flows being blocked.

Tribal waterbodies were also impacted by historic activities, which still present NPS impacts. The largest NPS effects were caused by channelization hydromodifications on portions of the Red River. Channelization was created for the efficient transport of hard and softwood timber to downstream timber mills in the late 19th and early 20th century. Hydromodifications such as check dams and roadway crossings created large impoundments (Fig. 11), which significantly altered

riparian areas. The effects of the dams, log drives, and haul routes from timber landing sites still degrade sections of the Red River. Degradation increased stream widths, decreased water velocities, and expanded instream vegetative cover as well as sediment deposits; all which capture and transfer heat to the stream. Degraded sections of the river contain few Brook Trout (top predator) that upstream sections contain in abundance. The lack of top predators creates expansive lower trophic levels, which contain large populations of Catostomids and Cyprinids. Some of the degraded sections of the Red River have been restored and resulted in improved fish index of biotic integrity scores (IBI).

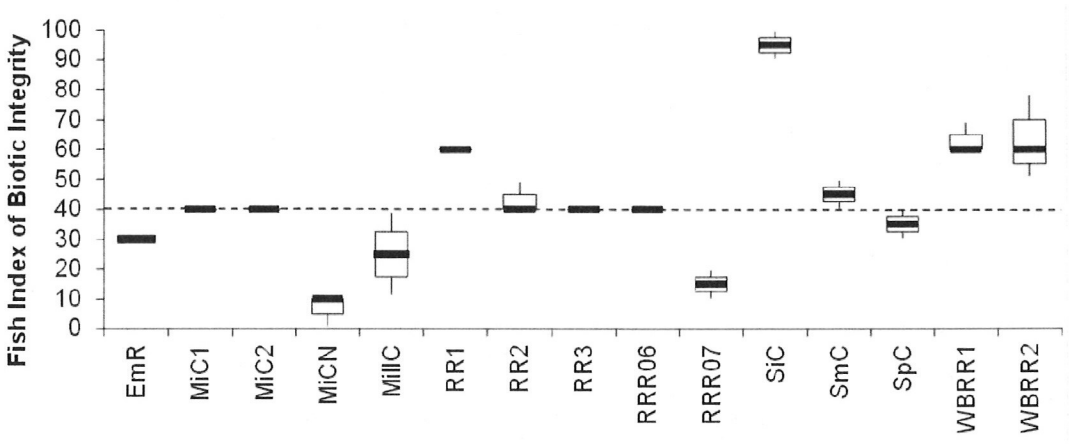


Figure 12: Fish Index of Biologic Integrity for Tribal sites demonstrating degraded conditions at RRR07 and improved conditions at RRR06.

12.1 Ground Water

Groundwater elevations on the reservation range between 900-1120 feet. Glacial deposits that make up the unconfined aquifer are composed primarily of sand and gravel with some cobble, boulder, clay and silt in varying quantities and degrees. Ground water elevations are normally a subdued reflection of surface topography. The direction of ground water flow is from upland area of recharge to lowland areas, perpendicular to water table contours, and ultimately discharging into lakes, streams and wetlands. Groundwater flow systems, especially shallow water systems, can be significantly influenced by season to season differentials in precipitation. Recent drought conditions have resulted in low water levels in Tribal lakes. Beauleau and Mission Lake water levels have been well below normal in recent years. The USGS groundwater monitoring sites on and around the reservation have also reflected the groundwater table fluctuations throughout 2005-2009. However, prolific rain and heavy snow pack throughout much of 2010 and 2011 have made noted increases in the water table.

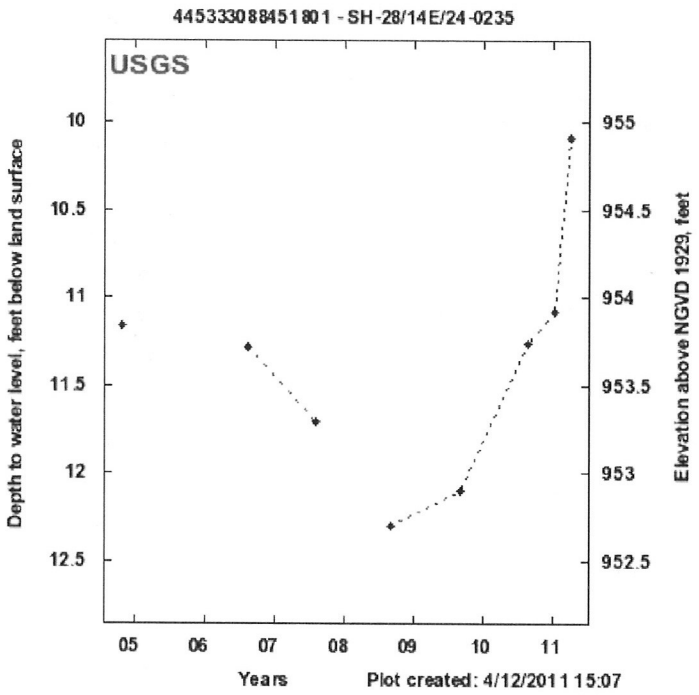


Figure 13: Elevation of Groundwater at the USGS groundwater monitoring site on the Stockbridge-Munsee Community.

Groundwater and drinking water sampling has been completed for a number of years and has demonstrated a significant impact from NPS pollution. The western portion of the Tribe's land was not developed for agriculture while the eastern portion was intensively farmed. Groundwater conditions reflect the disparity in land use. Average nitrate concentrations in the eastern portion of Tribal land over the last ten years have routinely been above nitrate drinking water standards. Eighteen percent of the samples were above the 10 mg/L safe drinking water standard during the last major sampling event.

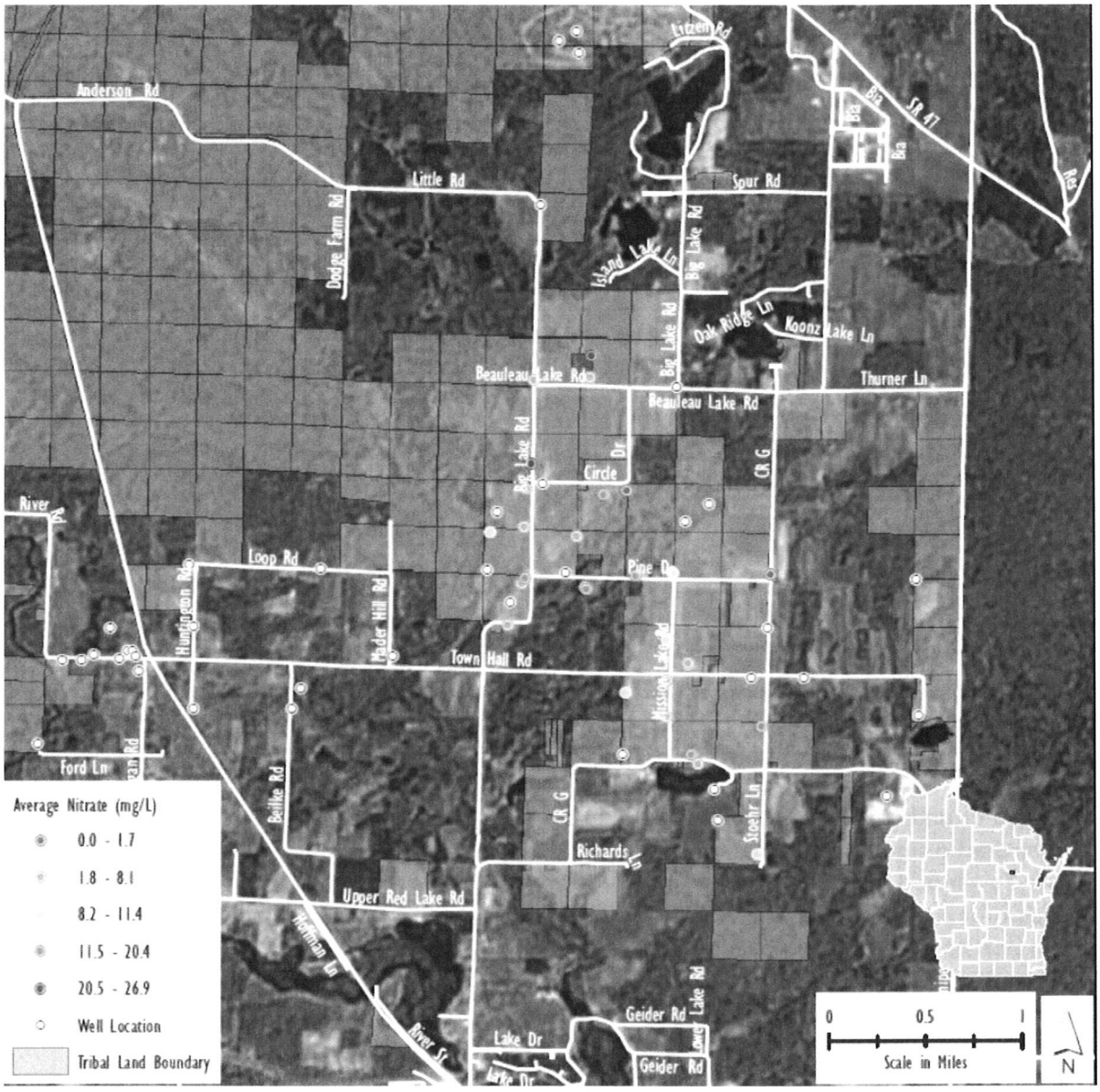


Figure 10. 2005 average groundwater nitrate concentration in mg/L for monitoring wells on the eastern half of Trust Land.

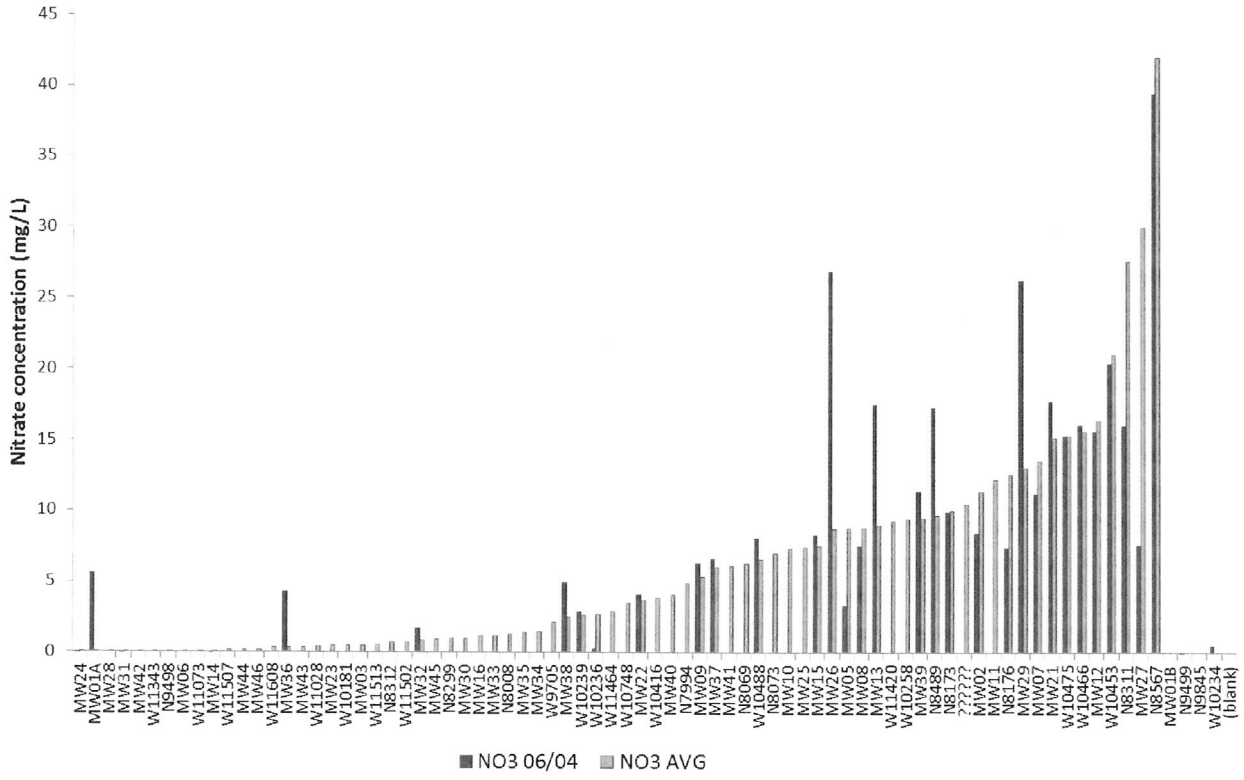


Figure 15: Nitrate concentrations from 2000-2004 and from the last major sampling period in FY2004.

13 DISCUSSION

Water quality on the Stockbridge-Munsee Community is generally very good. The biologic communities of the reservation and the natural, native vegetation of the landscape are intact even though nutrient, sediment and bacterial concentrations can be elevated above thresholds for safe drinking water or recreational use. Habitat conditions provide a substantial boost to populations of aquatic organisms and provide resilience against fluctuating anthropogenic, climatic, and natural conditions. Still, NPS categories impacting reservation waters are degrading the ability of water to provide beneficial uses. Through the use of a NPS pollution program the Tribe expects to improve and maintain water quality within the tribal boundary and surrounding community, although there are no specific goals or standards as of this assessment. The discussion about NPS categories and subcategories, which are impacting sites on the reservation, is based on best professional judgments. The judgments were made based off of monitoring data when available, the common sources of observed pollutants, watershed land use, and observations of individual waterbodies condition. The primary data set for discussion judgments was from Tribal monitoring within Tribal lands. The discussion below is a summary of findings from the Tribal Assessment

Report, which is an attached appendix. The WDNR surface water data viewer was utilized to review data from a number of sites throughout the watershed. The WDNR datasets consisted of small number of data points from a large number of sites, but also contained excellent descriptions of the character of watersheds since staffs were able to observe a large portion of the watershed over their course of service.

13.1 Agriculture

Agricultural impacts are demonstrated in streams, lakes, and aquifers throughout the reservation watersheds. There are four major Concentrated Animal Feeding Operations (CAFOs) and several smaller operations, including crop land that supports the herd(s) that occur throughout the Red River and North Branch of the Embarrass River watershed. The increased size of operations condenses the number of animal units per area unit, increases the amount of fertilizer applied to the regional land area, and often times ends up in runoff. Cultivation next to stream and overgrazing within the riparian area loads sediment and nutrients into streams as soil particles and fecal matter are delivered through overland flow and groundwater discharge. E.Coli data demonstrates the impacts of agriculture on the condition of local streams. All sites which exceed the EPA E.Coli beach standard of 126MPN/100ml are located in either the Silver Creek-West Branch of the Red River or the Strassburg Creek HUC 12 watersheds. Both watersheds are in the closest proximity to registered CAFOs. However, both subwatersheds also contain wastewater treatment plants and additional analysis of the watersheds bacterial concentrations is warranted. Even with the wastewater plants discharge and permits allowing bacteria concentrations with a monthly average of 126#/100ml and a maximum of 235#/100ml, The tribal staff feels strongly that the largest contributor is agricultural operations due to the scale of operations and the location of agricultural lands in watersheds.

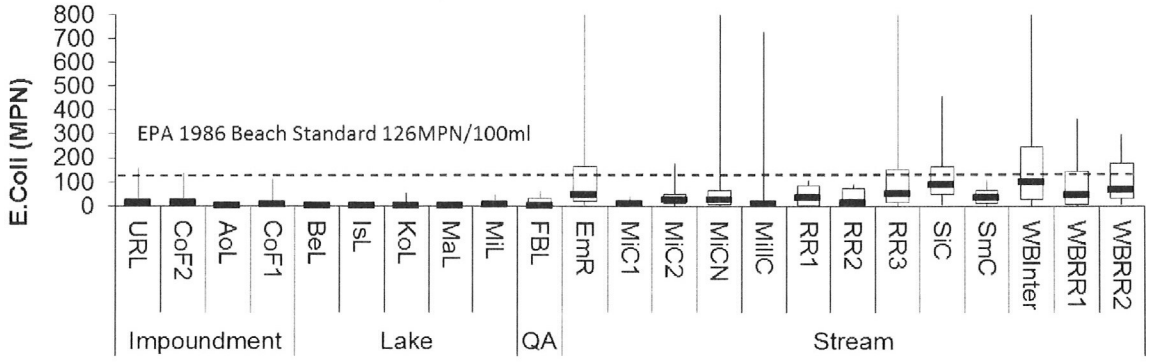


Figure 16: Tribal E.Coli monitoring results from surface water monitoring

The aquifer under eastern trust lands has also been impacted by agriculture. The proximity of high concentrations of nitrate in the groundwater aquifer is demonstrated in Figure 15. Nitrate concentrations were highest at sampling points within a quarter mile of farmsteads. Many of the farmsteads have been purchased by the Tribe and nitrate concentrations limit Tribal development of the area. The Tribe has implemented best management practices to reduce nitrate

concentration, which include conservation tillage, nutrient management plans, and elimination of manure application. Additionally, the tribe has planted nearly one thousand acres of trees and prairies to remove nutrients from deeper sources, purify incoming water sources, and ultimately cleanse the aquifer. Current tracks of land and future purchases of land, which lie over the eastern aquifer will require similar practices to ensure the long term quality of drinking water and groundwater discharge.

The results of nitrate sampling from surface water revealed a similar pattern to E.Coli data and the impacts of discharge from the eastern aquifer. All sites in the Silver Creek-West Branch Red River and the Strassburg Creek HUC 12 watersheds exceed reference nitrate conditions, which is a similar observation to observations generated by E.Coli data. Additionally, the degradation of the southern portion of the Miller Creek HUC 12 by agricultural practices is demonstrated in Figure 15 and Figure 16. MiC1 and MiCN both occur in the northern portion of the Miller Creek HUC 12, which is an isolated portion of the watershed with extremely limited development and nearly 100 percent native land cover. MiC2 is located in the southern portion of the watershed where contaminated groundwater would discharge to Miller Creek. The increase in Nitrate concentrations between MiC1 and MiC2 is substantial and very likely due to the change in land cover and use.

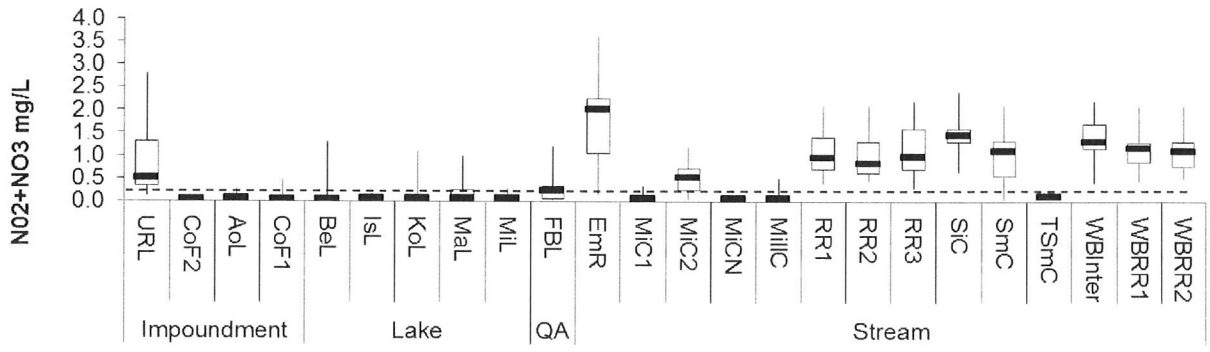


Figure 17: Nitrate Concentration from Tribal sample site with median reference conditions for the ecoregion demarcated with a dashed line.

Agriculture also contributes large amounts of phosphorus. Phosphorus is a problematic pollutant because of the elements longevity in ecosystems. Phosphorus is the limiting nutrient in most of the ecoregions aquatic ecosystems. Therefore, phosphorus is often circulated through the ecosystem many times prior to burial in benthic sediments or export through biological exodus. Sites MaL and MiL are impacted by agricultural discharges. Both lakes have agricultural land with direct conveyance potential to the lakes. MiL agricultural impacts are likely historic, but active farming on the west shore very likely contributes a small load of phosphorus to the seepage lake. MaL receives inflow from Malone Creek, which is a small first order stream with a large amount of agricultural land use in the Creek's watershed. MaL dissolved oxygen concentrations average less than 1.0 mg/L, which is likely a symptom of algal decay and concurrent dissolved oxygen use for decomposition in the winter months. The lakes attachment to an inflow allows fish to avoid winterkill most winters, but regular reports of partial winter fish kills are received.

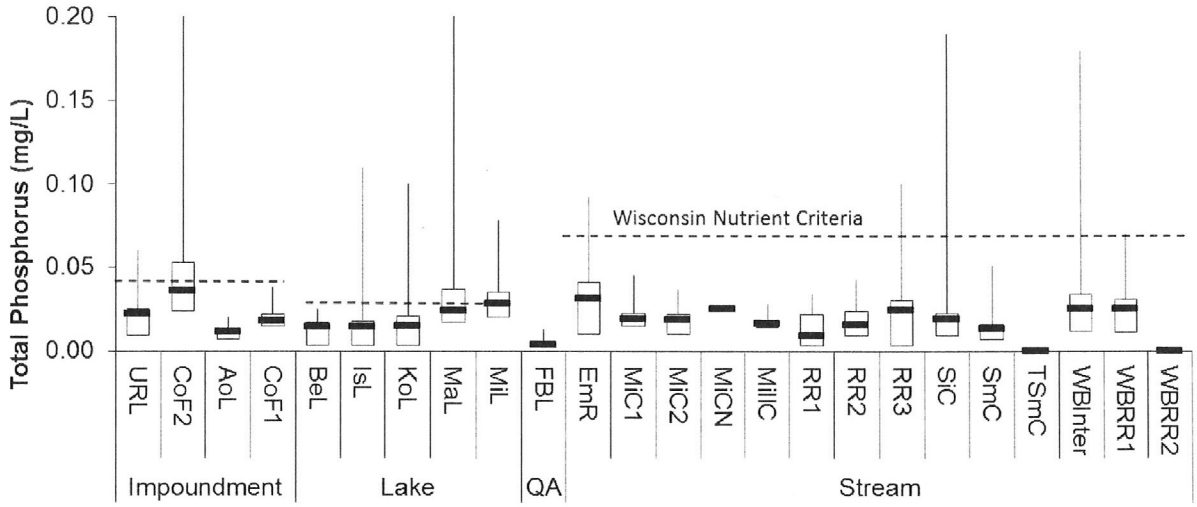


Figure 18: Phosphorus Concentration from Tribal sample site with Wisconsin nutrient criteria demarcated with dashed lines for each waterbody type.

Sediment from agricultural runoff degrades habitat conditions in many streams and lakes. The movement of sediment is a natural function of streams. However, excessive sediment loads creates a myriad of damaging effects in streams. Sediment can smoother habitat when excessive loads delivered to streams during event flows are deposited over habitat when stream flow and energy decrease. Site EmR, MiCN, and SmC received low scores for embeddedness. The scores indicate that gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment. The lack of three dimensional habitat structures limits biological diversity, which often leaves the stream defenseless against the biological remediation of other types of pollutants.

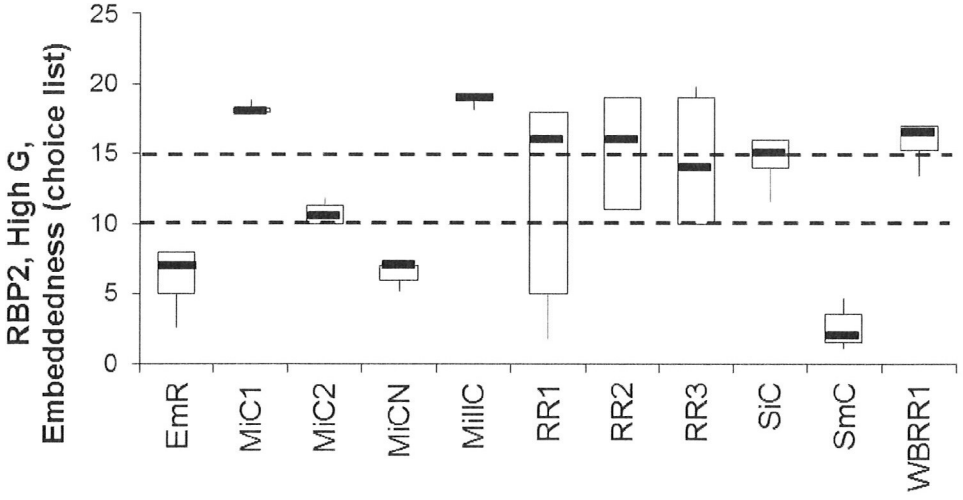


Figure 18: Habitat assessment embeddedness assessments from qualitative habitat surveys conducted by the Tribe.

Other sources of pollutants exist, which can contribute to water quality degradation besides NPS pollution. Wastewater discharge to groundwater occurs upstream of site SmC and likely contributes to elevated nitrate concentrations at the site. TSmC is a tributary of SmC, which has an isolated watershed further to the north of SmC, which does not receive wastewater contaminants with groundwater inflow to the stream. Therefore, TSmC lacks nitrate contamination. The discussion discloses the possibility that other sources of nitrate, phosphorus, and E.Coli impact results. However, the Tribe believes that collected data supports the conclusion that NPS pollution from agriculture is a critical source, not the only source, of contamination. The Tribe believes restoration of reference conditions in many waterbodies throughout regional watersheds will require agricultural NPS pollution elimination.

13.2 Forestry

Forestry operations occur on half of the Tribe's land base and throughout the HUC 10 watersheds, which occur on the reservation. Forest road construction and use as well as harvesting practices can increase sediment and nutrient concentrations in addition to water temperatures. Forest operations also contribute to the extent of hydrologic modifications, which are discussed as another NPS. Forest roads stretch over 177 miles on tribal lands. The use and construction of forest roads buries wetland, delivers sediment to streams, ponds, and lakes, and creates biologic barriers for numerous populations of sensitive species. A recent cut of Pine Plantations left visible signs of erosion leading down to Deer Farm Creek and caused a stream crossing to fail on Simple Creek. Forestry crossing failure and long term delivery from poorly constructed road delivers hundreds to thousands of pounds of sediment to a waterbody in an event that may be as short as one hour or as long as a decade. Unfortunately, long term monitoring has not collected information from the smaller first and second order streams, which have been effected by blowouts and crossing contamination. Thankfully, the revision of the Tribal Forest Management Plan will provide a fresh set of BMP's, which will be utilized during forest cuts. Geospatial analysis of road condition and impacts will be a critical component of future attempts to address whole scale NPS pollution from forestry operations.

13.3 Hydrologic Modification

Hydrologic modifications impact nearly every stream on the reservation. The culverts and bridges or the structures lack of adequate capacity to effectively move water through man-made barriers has a large impact on regional watersheds. Movement of various biological communities is hampered by perched culverts, pinched stream segments with increased velocities, and a lack of contiguous habitat for movement along the shoreline or benthic substrates. Every year, the Tribe generates a new list of hydrologic modifications for replacement or permanent removal. The continuous wear and tear on structures from road traffic, event flows, and natural degradation causes the modifications to plug, fail, or erode.

The overarching impact of modifications across entire watersheds and catchments has already been studied. Physical separations caused by hydrologic modification lead to a number of impairments for the

propagation and survival of fish and shellfish. Impassable barriers can decrease the richness and abundance of fish populations by more than 50 percent (Nislow et. al.; 2011). Hydrologic modification also disconnects population genetics, decrease the size of sport fish, decrease spawning opportunities, and decrease access to habitat for stages of fish and shellfishes lifecycle. Culverts and bridges in poor condition impact 26 of the Tribe's 39 miles or approximately 66.6 percent of the stream network.

Hydrologic modifications also create channelization and channel modification. Miller Creek and the Red River have sections where the natural stream channel has been channelized or modified. The Red Rivers channel was channelized and modified with bolder removal for historic log drives. Most of the damage has been repaired by an ambitious stream restoration approach, which has improved sinuosity, the composition of the biologic community, and the diversity of instream structure. However, two sections of the Red River, the National Guard Road and the Big Dam sections, are still in need of restoration. Channel modification at Miller Creek was created as an artifact of hydrologic modification from the placement of a section of road, a culvert, and a bridge over a short segment of stream. The modifications result in a decrease in the segments ability to provide stable habitat for the dispersal of fish and shellfish.

13.4 Habitat Alteration

Habitat Alterations are most often associated with the development of aquatic habitats for human habitation or use as an agricultural resource. Stream bank/Shoreline Erosion or Hardening has been shown to impact populations of aquatic vegetation, which in turn reduce available habitat. Big, Beaulieu, and Mission Lake have a number of developments where shoreline hardening or riparian vegetation removal has taken place to develop beaches or eliminate shoreline erosion; shoreline erosion is a symptom of riparian vegetation removal. Riparian vegetation removal can result in a varying amount of sediment loading to impacted water bodies depending on the surrounding topography and the location of the beach in relation to prevailing wind and wave action. Finally, wetland draining/filling has very likely helped contribute to the loss of denitrification capacity in the southern portion the Miller Creek HUC 12 and the concurrent contamination of the groundwater aquifer. The Tribe believes that similar losses in wetland capacity in the Stassburg Creek HUC 12 are increasing nitrate concentration in the North Branch of the Embarrass River. Current efforts with the development of a wetland protection plan will identify wetland loss throughout HUC 12 watersheds, which overlie Tribal lands. The resulting watershed scale dataset will prove useful for the identification and remediation of NPS sites.

13.5 Marinas and Boating

Marinas and Boating can contribute a number of NPS pollutants. For example, infrastructure development at boat landings on Moon and Beaulieu Lake has created stream bank/shoreline erosion or hardening. The development of boating capacity also provides a source for petro chemical and litter pollutants, neither of which has caused a tremendous Tribal NPS pollutant problems. However, with already four utilized boat landings on lakes with tribal access and increasing access points do to land purchase(s) may show affects in the future.

13.6 Roads, Highways, Bridges

The road network on the reservation alone covers over 127 miles of the reservation. The volume of salt and sand needed to maintain the road during winter months is a tremendous potential source of NPS. Fortunately, chloride, sediment, and turbidity concentrations at sampled sites do not appear elevated compared to criteria developed by other states and Tribes (No more than +10-20 NTU for streams with median turbidity around 50 NTU; 30 mg/L TSS for Coldwater streams). Still, road construction has been an area the Environmental Department continues to monitor very closely. The development of a timeline of potential projects with our Roads and Forestry Departments is a critical task, which will help Tribal staff monitor the impact of roadways on the watersheds more consistently.

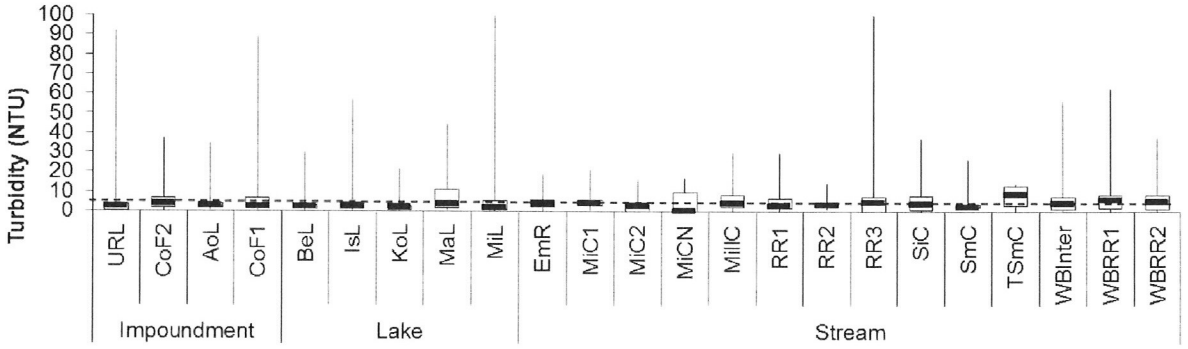


Figure 19: Turbidity concentrations for Tribal sampling sites based on water body type.

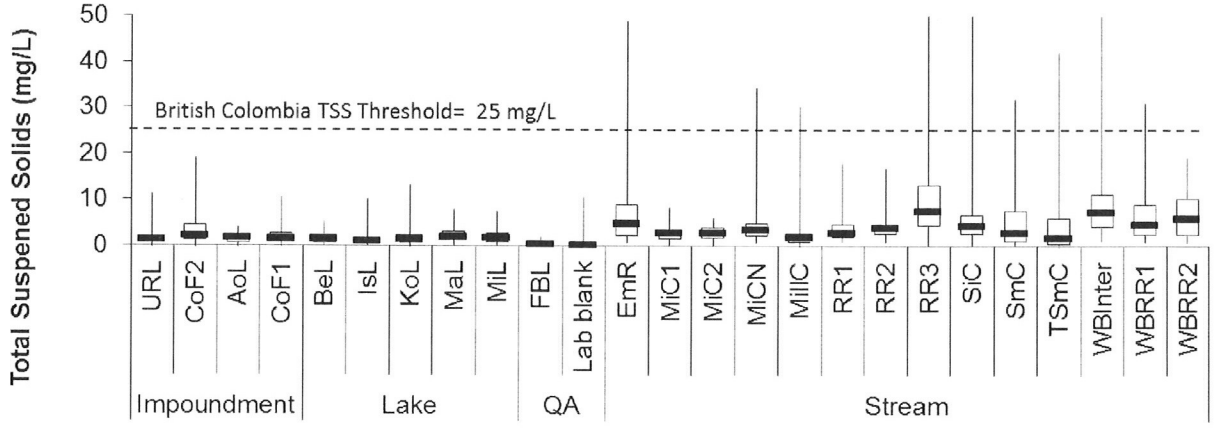


Figure 20: Total Suspended Sediment concentrations for Tribal sampling sites based on water body type.

13.7 Development

Development areas can provide a significant source of pollutants. Many impacts are regulated under regulations outside of an NPS program. Municipal Separate Stormwater Sewer Systems (MS4), National Pollution Discharge Elimination Systems (NPDES), and the management plans the permits require can create a complex system of pollution control and elimination. Tribal development has similar permits for wastewater treatment systems and constructions sites, but Tribal developments are low density, were built before new stormwater regulations were enacted, and do not capture stormwater for treatment. Additionally, many homes throughout Tribal lands are hooked to septic systems instead of waste treatment plants.

NPS pollution from stormwater discharge from housing area's and illegal dumping has not been a significant source of pollution. Conversely, septic systems are a large concern. Septic systems are defined sources of pollution, but the discharge from the system is not quantified or regulated. The pollution source is a discrete source, but the pollution created by septics is transmitted diffusely through the groundwater aquifer. Unfortunately, septics have a high capacity for damage on the Tribal land base. The porous, shallow soil and high bedrock in regional geology create conditions, which can quickly contaminate streams, lakes, and aquifers with nutrients, bacteria, and other pollutants discharged from households. The development of a program to assess and remediate septic systems will be a large and important task for the Tribe, which Section 319 may be able to help create.

13.8 NPS and Point Source Pollution

Obviously, other sources of pollutants exist, which can contribute to water quality degradation besides NPS pollution. Wastewater discharge to groundwater occurs upstream of surface water sampling site SmC and likely contributes to elevated nitrate concentrations at the site (Figure 16). Further evidence for the conclusion is supported by sampling site TSmC, which is a tributary of SmC. TSmC, has an isolated watershed further to the north of SmC, which does not receive wastewater contaminants with groundwater inflow to the stream. Therefore, TSmC lacks nitrate contamination. The discussion discloses the possibility that other sources of nitrate, phosphorus, and E.Coli impact results from surface water sampling. However, the Tribe believes that collected data supports the conclusion that NPS pollution from agriculture and hydromodifications is a critical source, not the only source, of contamination. The Tribe believes restoration of reference conditions in many waterbodies throughout regional watersheds will require NPS pollution elimination.

14 Selection of Best Management Practices

Best management practices (BMP) are techniques that prevent or reduce water pollution from nonpoint sources by using the most effective and practical means of achieving water quality goals. BMPs include official controls, structural and nonstructural controls, as well as operation and maintenance procedures. The process of identifying, selecting, and implementing BMPs is

completed by: integrating public comment and participation; coordinating with existing programs and agencies, who offer technical and financial assistance for BMP implementation; and use of existing BMPs used within watersheds. BMP is described with uses and a description of anticipated pollution reductions from implementation.

14.1 Core Participants

The SMC Environmental, Conservation and Forestry Department's staff will be responsible for the selection and implementation of BMPs. SMC water office staff are committed to the improvement and protection of Tribal streams, lakes, and groundwater aquifers as well as the life and habitats the Tribal land supports. The Hydrologist, Angela Waupochick, will serve as the Nonpoint Source Program Coordinator. The Tribal Council will be informed of all activities and will provide approve BMP implementation if needed. Tribal departments and committees such as the Conservation department, Forestry department, Road department, Property and Equipment department, Land Use department, Land Use committee, Forestry committee, Fish and Wildlife committee will be coordinated with to complete the day-to-day activities of the Tribe's NPS program. Many of the department and committees will be affected, involved, and coordinated with throughout the process.

14.2 Public Participation and Governmental Coordination

Effective implementation of BMPs across the watershed will require the Tribe to coordinate with the Local, County, State, and Federal agencies as well as non-profits and other stakeholder groups. Together, the groups can share and select BMP from published guidelines with consultation with agency experts, who are well practiced in the implementation of BMP. Technical guidance manuals kept by the NRCS will be utilized (http://www.nrcs.usda.gov/technical/efotg/). Local government programs, where NPS projects will occur or that participate in NPS control will be notified. Local governments include the Menominee Indian Tribe, Shawano County, Bartleme Township and Red Springs Township.

The model for the tribal decision making process regarding selection of BMPs most suitable to address each identified category and subcategory of nonpoint source pollution is:

1. Identify all BMPs that are appropriate to each type of NPS pollution through research and consultation.
2. Determine BMPs suitable for the Tribe in terms of scale, environment, and existing infrastructure.
3. Determine likely effectiveness of locally appropriate BMPs in reducing NPS loading through research, modeling, and consultation. Rank BMPs based upon likely performance.
4. Consult with other relevant agencies and jurisdictions to determine which of the BMPs may best be used in coordination with their efforts. Develop formal cooperative agreement(s) when necessary. Identify multiple funding options where possible.
5. Determine which BMPs will have the most favorable results per unit cost.

6. Present options at public meetings to allow tribal leadership, tribal members and nontribal public an opportunity to shape the implementation of the proposal.
7. Implement BMP with adequate resources to perform necessary maintenance and monitor performance.
8. Provide regular updates on BMP status and effectiveness for the Tribe and relevant agencies.

14.3 Existing BMP and Assistance

Implementation of BMP will be accomplished through a number of nonpoint source pollution reduction oriented programs, funding mechanisms, and educational programs conducted by the Tribe in conjunction with federal and state agencies. Some of the federal and state agencies that can contribute to a nonpoint source pollution control program include technical and financial assistance from the EPA, NRCS, BIA, WDNR, and FWS. Other State, Federal, and local organizations participating in nonpoint pollution control include: Wisconsin Department of Transportation, Wisconsin Department of Trade and Consumer Protection, Army Corps of Engineers, Shawano County Land Conservation Department, University of Wisconsin Extension, and the Fox Wolf Watershed Alliance.

14.4 Pollution Reduction

The Tribal assessment has identified the major impairments, which degrade the quality of watersheds. NPS prevention, control, and remediation are essential. Input from Tribal Departments, regional WDNR contacts, and the EPA will enhance pollution reduction. Effective monitoring plans across jurisdictions will measure the success of the NPS pollution reduction. The WDNR have coordinated on projects in the past and will enhance efforts in the future. Short-term goals include the location of bacterial inputs in regional watersheds.

Table 8: NPS category, impairments, BMP to treat impairment, participants, and funding source.

NPS Category	NPS Impairments	NRCS BMP/Other BMP	Participant(s)	Funding Source(s)
Resource Extraction	Sediment/Nutrients	327 Conservation Cover	Tribe (LM), NRCS, WDNR	CWA 319; NRCS EQUIP
Agriculture	Sediment	528 Prescribed Grazing	Tribe, NRCS	NRCS EQUIP
	Bacteria	528 Prescribed Grazing; 382 Fence; 634 Manure Transfer; 393 Filter Strip; 412 Grassed Waterway	Tribe, NRCS, LO	CWA 319; NRCS EQUIP
	Nutrients/Clarity/ Dissolved Oxygen	590 Nutrient Management; 412 Grassed Waterway; 393 Filter Strip	Tribe, NRCS, LO	CWA 319; NRCS EQUIP
Forestry	Sediment/Nutrients	560 Access Road; 666 Forest Stand Improvement	Tribe, NRCS, LO, WDNR	CWA 319; NRCS EQUIP
Hydrologic Modification	Sediment/Nutrients	322 Channel Vegetation; 395 Stream Habitat Improvement and Management; 584 Stream Channel Stabilization; 500 Obstruction Removal; 578 Stream Crossing; 396 Aquatic Organism Passage	Tribe, NRCS, LO, Local, ACE, EPA	CWA 319; NRCS EQUIP; ACE; FWS; WDNR
	Thermal	390 Riparian Herbaceous Cover	Tribe, NRCS, LO, Local, ACE, EPA	CWA 319; NRCS EQUIP; ACE; FWS; WDNR
Habitat Alteration	Sediment	580 Streambank and Shoreline Protection	Tribe, NRCS, LO	CWA 319; NRCS EQUIP; FWS TWIG
	Nutrients	658 Wetland Creation; 657 Wetland Restoration	Tribe, NRCS, LO	CWA 319; NRCS EQUIP; FWS TWIG
Marinas and Boating	Sediment	560 Access Road	Tribe, NRCS, LO	CWA 319; NRCS EQUIP
	Bacteria	635 Vegetated Treatment Area	Tribe, NRCS, LO	CWA 319
	Nutrients	580 Streambank and Shoreline Protection	Tribe, NRCS, LO	CWA 319; NRCS EQUIP; FWS TWIG
Roads	Sediment/Nutrients	570 Runoff Management	Tribe, LO, Local, WDNR, EPA	CWA 319
Development	Thermal	570 Runoff Management	Tribe, LO, Local, WDNR, EPA	CWA 319
	Nutrients	606 Subsurface Drain; 600 Terrace	Tribe, LO, Local, WDNR	CWA 319; BIA Water
	Bacteria	635 Vegetated Treatment Area	Tribe, LO, Local	CWA 319

14.5 Existing Nonpoint Source Control Programs

The Environmental, Conservation, and Forestry department have addressed NPS under a number of Federal and Tribal funding sources. The projects have replaced culverts, rebuilt wetlands, and closed forest roads to eliminate NPS concerns. Currently, several programs and projects are being undertaken to address NPS impacts:

The Tribe and the Bureau of Indian Affairs are revising the Forestry Management Plan (FMP), which is currently being drafted by Forestry and revised by Conservation as well as Environmental departments. The revised FMP will include BMPs to enhance forest operations and reduce associated NPS pollutants. The FMP BMPs have been incorporated into Table 8.

The Environmental department is accepting proposals to draft plans for a subdivision, which will include a pollutant prevention and reduction BMP section for home construction, pre and post construction stormwater, and homeowner applied herbicides, fertilizers and other potential pollutants (petrochemicals). The Tribal Environmental department and the Wisconsin Community Action Program Association developed a Source Water Assessment and Protection Plan, which emphasized BMPs to reduce impacts from Development

The Environmental and Conservation department recently completed the restoration of 15 acres of wetland and 25 acres of upland to help reduce nitrates in the eastern portion of Tribal lands. The project was coordinated with the NRCS and the Shawano County Roads department. The site will hold spring snowmelt and runoff, treat pollutants, and discharge a significant volume of water to groundwater. Large portions of the site contain large sand lenses adjacent to thick layer of clay and water residing on top of or flowing over the sand lenses is easily absorbed.

The Environmental, Roads, and Forestry department recently removed an obstruction from a small stream and closed the unused and poorly maintained forest road. The project will protect young of the year trout, who use the site during extended periods of high flow. The project also reconnected upstream and downstream floodplains and segments of streams, which were disconnected by the perched culvert and uplifted road.

The above projects have been funded by:

- USDA NRCS Environmental Quality Incentive Program
- USDA NRCS Wildlife Habitat Improvement Program
- USFWS Partners for Fish and Wildlife, Tribal Wildlife Incentive Grant
- BIA Circle of Flight Program
- BIA Water Resources on Indian Lands Program
- Clean Water Act Section 106 Program
- Indian Environmental General Assistance Program (GAP)

15 CONCLUSION

The NPS assessment report identified categories and subcategories of NPS concerns as well as the impairments, which were created. The cumulative severity of impacts of NPS to HUC 12 watersheds, which overlay Tribal lands ranged from moderate to negligible impacts. The limited severity of NPS on portions of the watershed is undoubtedly attributed to the expansive BMP program the Tribe has already initialized in coordination with the NRCS, the FWS and other agencies and stakeholders.

Table 9: HUC 12 watersheds evaluated with the Tribal NPS and severity of watershed impact.

HUC 12 Watersheds	Severity	Rating
Strassburg Creek-North Branch of the Embarrass River	2.5	Impacted
Moose Lake-Red River	3.0	Moderately Impacted
Red Lakes-Red River	3.0	Moderately Impacted
Silver Creek-West Branch of the Red River	3.2	Moderately Impacted
Neopit Millpond-West Branch of the Wolf River	3.5	Slightly Impacted
Miller Creek	3.5	Slightly Impacted
Mill Creek	3.7	Slightly Impacted
Pony Creek-North Branch of the Embarrass River	4.0	No Impact

The most frequent NPS concern was hydrologic modifications, which are widely distributed and easily damaged or improperly installed. The wide use and distribution of modifications can change sediment loads, thermal conditions, and ecosystem diversity. Agriculture was the category that created the most damaging NPS impacts. The use of fertilizer, manure, and pesticides over large land areas and within close proximity to surface and groundwater creates numerous opportunities for bacterial, nutrient, and sediment pollution.

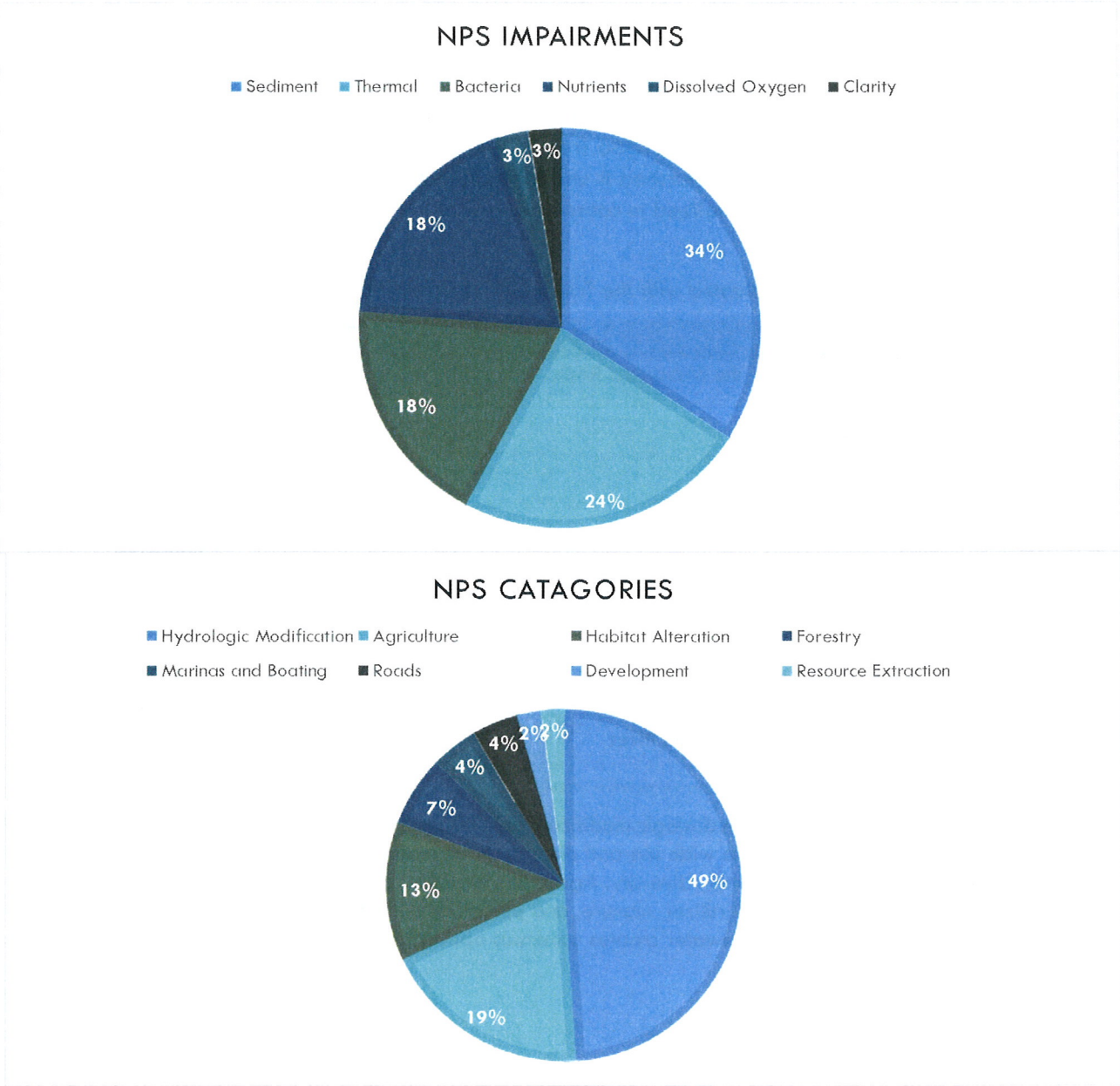


Figure 22 & 23: Type and number of NPS categories (above) and impairments (bottom) occurring in waterbodies surveyed for the Tribal NPS assessment.

The establishment of an organized and equipped Tribal CWA Section 319 NPS program will further the protection and enhancement of Tribal waters. Additionally, the institution of watershed based monitoring with CWA 106 funds will expand the universe of surface water sites in regional HUC 12 watersheds and improve future assessments of watershed condition. Finally, the

partnerships the NPS assessment created and outlined will improve the management, remediation, and funding of NPS sites. The assessment report provided a framework for prioritization of categorical and watershed based activities listed in table 10. The severity is categorized on a scale from 1-5 with 1 being the most severely impacted and 5 not being impacted.

Table 10: HUC 12 watersheds, waterbody name, NPS category and subcategory, impairment from NPS concerns, severity of impairment, and a description of the impairment.

HUC 12 Watershed	Name	Category - Subcategory	Impairment	Severity	Descriptions
Strassburg Creek-North Branch of the Embarrass River	North Branch Embarrass River	Agriculture -Animal Grazing, Fertilizer Application; Habitat Alteration – Wetland Draining/Filling	Bacteria, Sediment, Nutrients-Nitrogen	1	River that flows into and quickly out of the south end of the reservation, which is impacted by agricultural operations further to the west
Moose Lake-Red River	Red River	Agriculture - Animal Grazing, Fertilizer Application; Hydrologic Modification – Dam/Culvert; Habitat Alteration - Channelization/Channel Modification; Roads – Right of Way Maintenance	Bacteria, Thermal, Sediment	1	Impacted by high concentrations of bacteria below confluence with West Branch of the Red River. Two dams impound the river in the town of Gresham. River road follows Red through Tribal lands
Silver Creek-West Branch of the Red River	Silver Creek	Agriculture – Fertilizer Applications; Hydrologic Modification – Dam/Culvert	Bacteria	1	Impacted by elevated bacterial concentrations.
Silver Creek-West Branch of the Red River	West Branch of Red River	Agriculture - Fertilizer Application	Bacteria	1	Receives high concentrations of bacteria from Gold and Silver Creek.
Miller Creek	Miller Creek	Agriculture - Fertilizer Application; Hydrologic Modification – Dam/Culvert; Habitat Alteration – Wetland Draining/Filling	Nutrients, Thermal	2	Miller Creek south of Anderson Road impacted by groundwater with increased concentrations of nitrate.
Red Lakes-Red River	MISSION LAKE	Agriculture - Fertilizer Application	Nutrients, Clarity	2	Small seepage lake impacted by agriculture with large spring and fall green algae blooms because of phosphorus concentrations.
Red Lakes-Red River	Feast Creek	Hydrologic Modification - Dam/Culvert; Forestry - Road Construction and Use	Sediment	2	Three stream crossings; eastern crossing severely degraded.
Strassburg Creek-North Branch of the Embarrass River	Henning Creek	Agriculture - Animal Grazing; Hydrologic Modification - Dam Culvert; Habitat Alteration – Riparian Vegetation Removal	Sediment, Nutrients, Bacteria	2	Flows through agricultural area west of Tribal lands. Culverts on creek severely perched.
Red Lakes-Red River	Malone Creek	Agriculture - Cultivation, Fertilizer Practices; Hydrologic Modification - Dam/Culvert	Bacteria, Nutrients, Sediment	2	Surrounded by active farm fields. Delivers elevated nutrient concentrations to Malone Lake, which decreases lake's dissolved oxygen.
Red Lakes-Red River	Smith Creek	Agriculture - Overgrazing , Hydrologic Modification - Dam/Culvert	Bacteria, Nutrients	2	Perched culverts impacted by culverts at road crossings and livestock paddocks.

15.1 PUBLIC NOTICE AND COMMENT

NOTICE

The Stockbridge-Munsee Community Environmental Department is requesting public comments on a proposed Nonpoint Source Assessment Report and Nonpoint Source Management Plan.

The Nonpoint Source Assessment Report seeks to assess the extent or threat of nonpoint source pollution and outline measures to alleviate significant impacts to the Stockbridge-Munsee Community's lands and waters. The Nonpoint Management Plan identifies actions, such as best management practices and community education activities, which will occur to protect the quality of the Tribe's watershed.

A copy of the draft Nonpoint Source Assessment Report and the Nonpoint Source Management plan is available on the Stockbridge-Munsee Community website, http://www.mohican-nsn.gov/, or at the Stockbridge-Munsee Tribal Office located at N8476 Moh He Con Nuck Road, Bowler, WI 54416

Comments on the proposed Management Plan can be submitted by fax, email or mail, to the Stockbridge-Munsee Tribal Secretary at N8476 Moh He Con Nuck Road, P.O. Box 70, Bowler, WI 54416 (fax: 715-793-4887) (email: jerilyn.johnson@mohican-nsn.gov) on or before August 29, 2016.

Your comments are appreciated. We welcome the opportunity to discuss ways to improve our surface and groundwater quality.

Angela Waupochick, Hydrologist
Stockbridge-Munsee Community Environmental Department
N7689 Koan Tuk Dr Bowler, WI 54416
(715) 793-4818

Stockbridge-Munsee Community Nonpoint Source Pollution Assessment Report Draft

Appendix

Figure 1: Tribal Lakes, Ponds, and streams (appendix) with respective total lengths and areas within and outside Trust Land Boundaries, as well as the difference between the two

Table 1: Waterbody name, monitoring status *(Monitored: continued assessment/Evaluated: onetime assessment), NPS category – subcategory, impairment, and severity of impairment (Level 1, data confirmed impairment currently exists; Level 2, possible impairment not yet confirmed by monitoring data; Level 3, NPS pollution without current impairment; 4, No known NPS pollution occurring or impairment to waterbodies).

Stream Name	Tribal Miles	Total Miles	Difference
Amox Creek	0.7	0.7	0.0
Breakline Creek	0.3	0.3	0.0
Cedar Creek	0.1	0.1	0.0
Coyhis Creek	0.3	0.6	0.3
Cut Back Creek	0.1	2.9	2.8
Deer Farm Creek	0.5	1.3	0.8
Ditch Creek	0.2	0.2	0.0
Dodge Farm Creek	0.1	1.6	1.5
Dog Face Creek	0.7	0.7	0.0
Feast Creek	0.7	1.2	0.5
Fell Tree Creek	1.5	1.5	0.0
Flight Creek	1.5	1.5	0.0
Green Heron Creek	0.2	0.2	0.0
Hennig Creek	0.6	3.7	3.1
Ice Hauler Creek	0.9	0.9	0.0
Island Creek	1.0	1.9	0.9
Jackpot Creek	0.0	2.9	2.9
Little Farm Creek	0.1	0.8	0.8
Little Heron	1.8	1.8	0.0
Lost Lake Creek	1.2	1.2	0.0
Malone Creek	0.2	1.7	1.5
Mill Creek	4.4	11.7	7.3
Miller Creek	6.1	15.5	9.4
Missing Creek	1.0	1.2	0.1
Moon Creek	0.4	0.6	0.2
Newborn Creek	0.0	1.0	1.0
North Branch Embarrass River	0.5	9.8	9.3
Otter Creek	1.5	1.5	0.0
Red River	6.0	42.5	36.5
Silver Creek	5.0	12.4	7.4
Simple Creek	0.6	0.6	0.0
Slicky Creek	2.0	2.9	0.9
Smith Creek	1.9	3.7	1.8
Spring Pond Creek	0.1	0.1	0.0
Spruce Creek	1.3	1.3	0.0
Third Tier Creek	0.3	0.8	0.5
Tousey Creek	0.3	3.1	2.8
U Turn Creek	0.0	1.8	1.8
Wave Creek	0.3	4.2	3.9
West Branch of Red River	7.5	29.6	22.1
Wilderness Creek	0.2	0.2	0.0
Wolf Paw Creek	0.3	0.4	0.1

Figure 1: Tribal Lakes, Ponds, and streams (appendix) with respective total lengths and areas within and outside Trust Land Boundaries, as well as the difference between the two

Stream Name	Monitored/Evaluated	Category - Subcategory	Impairment	Severity
Amox Creek	E	Hydrologic Modification - Dam/Culvert	Thermal	3
Cut Back Creek	E	Hydrologic Modification - Dam/Culvert		4
Deer Farm Creek	E	Hydrologic Modification - Dam/Culvert; Forestry – Road Construction and Use	Sediment	3
Dodge Farm Creek	E	Hydrologic Modification - Dam/Culvert	Thermal, Sediment	3
Found Creek	M	Hydrologic Modification - Dam/Culvert	Thermal	3
Feast Creek	E	Hydrologic Modification - Dam/Culvert; Forestry – Road Construction and Use	Sediment	2
Fell Tree Creek	E	Hydrologic Modification - Dam/Culvert	Sediment	3
Flight Creek	E	Hydrologic Modification - Dam/Culvert	Thermal, Dissolved Oxygen	3
Henning Creek	M	Agriculture - Animal Grazing; Hydrologic Modification - Dam Culvert; Habitat Alteration – Riparian Vegetation Removal	Sediment, Nutrients, Bacteria	2
Island Creek	E	Hydrologic Modification - Dam/Culvert		4
Little Farm Creek	E	Hydrologic Modification - Dam/Culvert	Sediment	3
Little Heron	M	Hydrologic Modification - Dam/Culvert		4
Lost Lake Creek	E	Hydrologic Modification - Dam/Culvert		4
Malone Creek	E	Agriculture - Cultivation, Fertilizer Practices; Hydrologic Modification - Dam/Culvert	Bacteria, Nutrients, Sediment	2
Mill Creek	M	Hydrologic Modification - Dam/Culvert; Roads – Maintenance Runoff	Thermal, Sediment	3
Miller Creek	M	Agriculture - Fertilizer Application; Hydrologic Modification – Dam/Culvert; Habitat Alteration – Wetland Draining/Filling	Nutrients – Nitrate, Thermal	2
Moon Creek	E	Hydrologic Modification - Dam/Culvert - Channelization/Channel Modification		3
North Branch Embarrass River	M	Agriculture -Animal Grazing, Fertilizer Application; Habitat Alteration – Wetland Draining/Filling	Bacteria, Sediment, Nutrients-Nitrogen	1
Otter Creek	E	Hydrologic Modification - Dam/Culvert	Thermal	3
Red River	M	Agriculture - Animal Grazing, Fertilizer Application; Hydrologic Modification – Dam/Culvert; Habitat Alteration - Channelization/Channel Modification; Roads – Right of Way Maintenance	Bacteria, Thermal, Sediment	1
Silver Creek	M	Agriculture – Fertilizer Applications; Hydrologic Modification – Dam/Culvert	Bacteria	1
Simple Creek	E	Forestry - Road Construction and Use	Sediment	3
Slicky Creek	M	Hydrologic Modification - Dam/Culvert		4
Smith Creek	M	Agriculture, Hydrologic Modification – Dam/Culvert	Bacteria, Nutrients	2
Spring Pond Creek	M			4
Spruce Creek	E			4
Tousey Creek	E	Hydrologic Modification - Dam/Culvert		4
U Turn Creek	E			4
Wave Creek	E			4
West Branch of Red River	M	Agriculture	Bacteria	1
Wilderness Creek	E			4

*Table 1: Waterbody name, monitoring status *(Monitored: continued assessment/Evaluated: onetime assessment), NPS category – subcategory, impairment, and severity of impairment (Level 1, data confirmed impairment currently exists; Level 2, possible impairment not yet confirmed by monitoring data; Level 3, NPS pollution without current impairment; 4, No known NPS pollution occurring or impairment to waterbodies).*