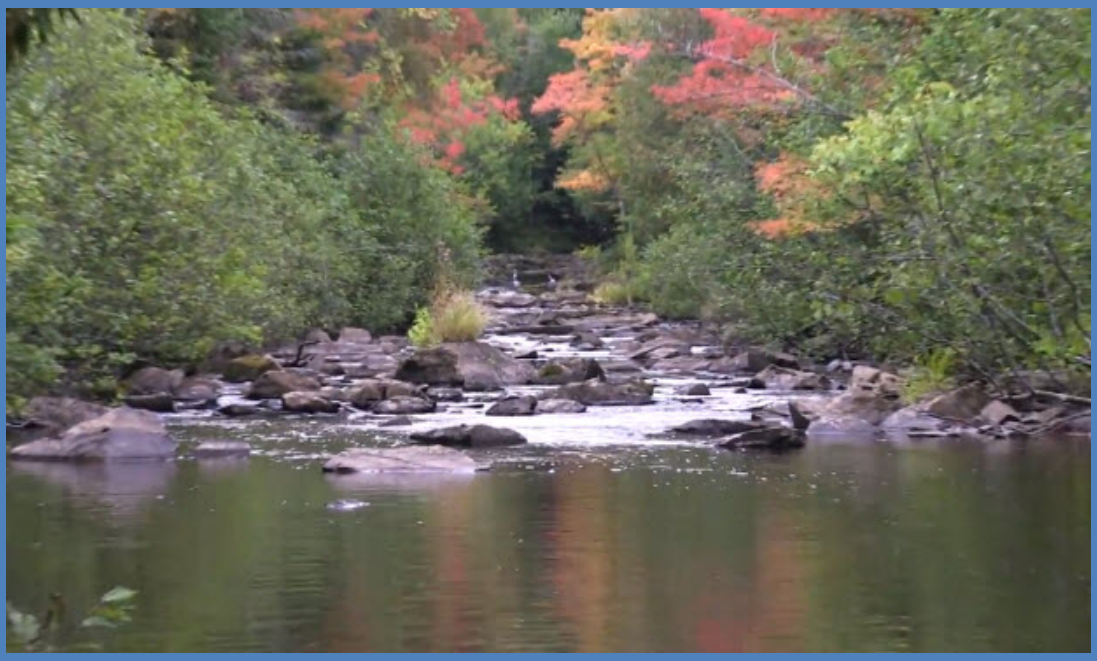


Tyler Forks, Wisconsin – Photo by Coppersmith Studios

TYLER FORKS WATERSHED – LS13

A Watershed Report created by the Bureau of Water Quality in support of the Clean Water Act.

Contents

Watershed Details

About the Watershed

Tyler Forks Watershed is a sub watershed within the Bad River Watershed. The watershed drains 78 square miles of land originating at Shine Lake in the Township of Knight, south of Upson, Wisconsin. Shine Creek is joined by the outflow of O'Brien Lake and becomes Tyler Forks. As the low volume river flows north, west, and then southwest toward Mellen it receives the waters of tributary creeks such as Mead, Erickson, Rouse, Dunn and Javorsky. Finally, Tyler joins the Bad River within Copper Falls State Park. The Bad ultimately flows to Lake Superior through the Bad River Indian Reservation and Odanah, Wisconsin.

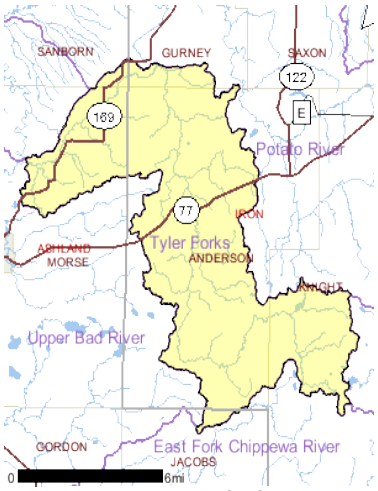


Figure 1 Watershed Location

Population and Land Use

Almost three-quarters of the land cover in the Tyler Forks Watershed is Forest (76.71%). There is only one other sizeable land use within the watershed, and that is Wetland, which constitutes approximately 19% of the watershed; together, Forest and Wetland make-up over 95% of the entire watershed. The rest of Tyler Forks Watershed is comprised of Open Land and Water (2.51%), Agriculture (1.79%), Grassland (0.22%) and Suburban (.05%). According to the National Land Cover Data from 2001, Urban and Barren land make-up zero percent of the watershed.

Table 1: Tyler Forks Watershed Land Use

Land Use	% of Area
Agriculture (%)	1.79
Urban (%)	0
Sub Urban (%)	0.05
Wetland (%)	18.71
Barren (%)	0
Grass Land (%)	0.22
Forest (%)	76.71
Open Land and Water (%)	2.51
Total Acres in Watershed (2006)	50,409.37

Land Use in the Tyler Forks Watershed

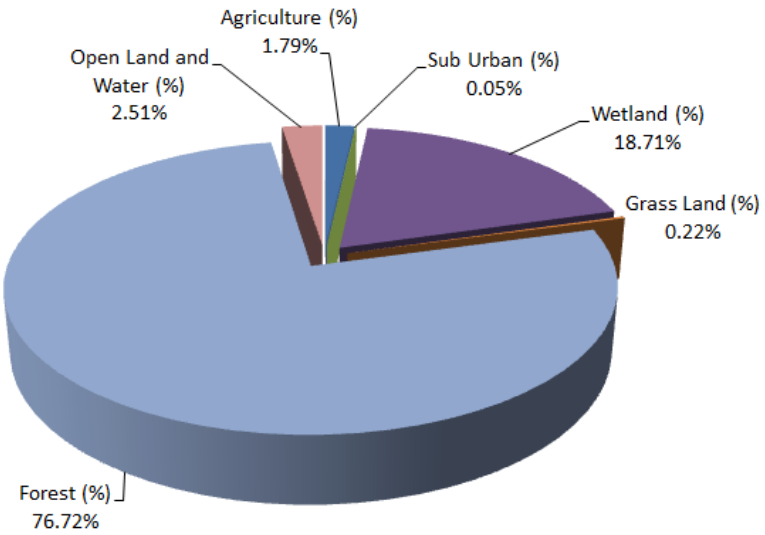
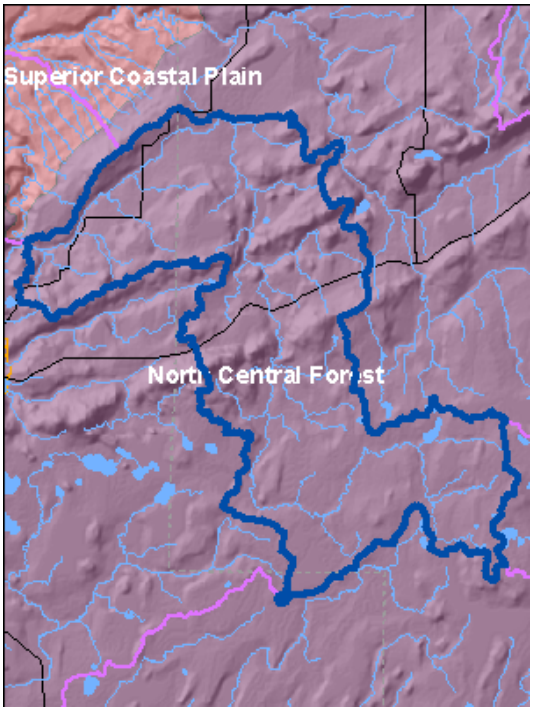


Figure 2 Land Use Break Down

Hydrology

The land use in this watershed is largely comprised of forest and wetland, so the hydrology is fairly natural with little human-induced overland flow that would be found in urbanizing landscapes. However, heavy forest harvesting like had a large an impact on local hydrological functions.

Ecological Landscapes



The North Central Forest Ecological Landscape occupies much of the northern third of Wisconsin. Its landforms are characterized by end and ground moraines with some pitted outwash and bedrock controlled areas. Kettle depressions and steep ridges are found in the northern portion. Two prominent areas in this Ecological Landscape are the Penokee-Gogebic Iron Range in the north extending into Michigan, and Timm's Hill, the highest point in Wisconsin (1,951 feet) in the south. Soils consist of sandy loam, sand, and silts. The vegetation is mainly forest, with many wetlands and some agriculture, though the growing season is not as favorable as it is in southern Wisconsin. Lake Superior greatly influences the northern portion of the Ecological Landscape especially during the winter season, producing greater snowfall than in most areas in Wisconsin. The historic vegetation was primarily hemlock-hardwood forest dominated by hemlock, sugar maple, and yellow birch. There were some smaller areas of white and red pine forest scattered throughout the Ecological Landscape, and individual white pines trees were a component of the hemlock-hardwood forest. Harvesting hemlock to support the tanneries was common at the turn of the century, and the species soon became a minor component of forests due to over-harvesting and lack of regeneration. Currently, forests cover approximately 80% of this Ecological Landscape. The northern hardwood forest is dominant, made up of sugar maple, basswood, and red maple, and also including some scattered hemlock and white pine pockets within stands. The aspen-birch forest type group is also relatively abundant, followed by spruce-fir. A variety of wetland community types also are present, both forested and non-forested.

Historical Note

Tyler Forks River is named for John Tyler, a Great Lakes ship captain and surveyor for the Indian Agency at Ashland, Wisconsin. In the early 1860s and before, exploratory mining for copper ore occurred in the canyon of the Bad River between Copper Falls and Brownstone Falls. Not much is known of this activity other than the shafts shown on early maps, but it is assumed that this search for copper was due to the North's armament needs during the Civil War. [History of Copper Falls]

Edward Dolan of Mellen, Wisconsin, was son of Mrs. Ellen Bacon Dolan, cook for the Ruggles mining crew. On January 16, 1975, at age 76, he gave the following information to Park Manager Kent Goeckermann:

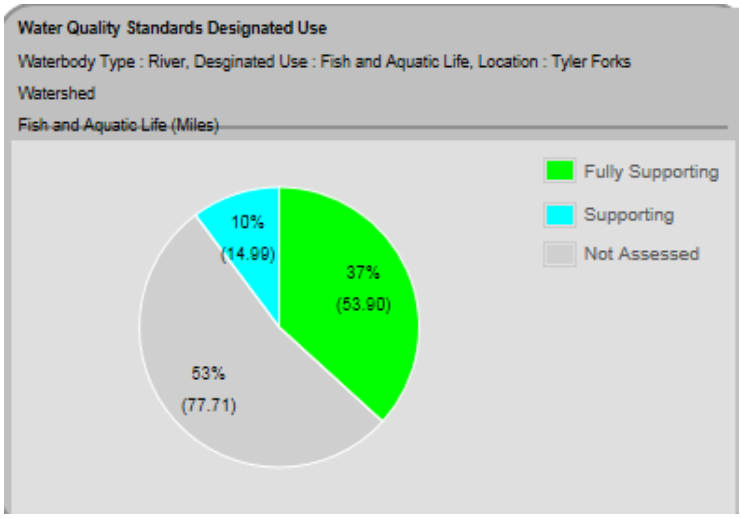
> "In the late 1800s and early 1900s, Wells M. Ruggles ran a four- or five- man mining crew in what is now Copper Falls State Park. The camp consisted of several houses and farm buildings on *the Bad River just southwest of the present picnic grounds. John Blix was mine captain and crew boss of the Ruggles men in their search for copper ore. The Ruggles crew sank a vertical shaft at the site of the present footbridge across the Bad River. They also dug a nearly horizontal shaft into the hillside at the southeast corner of the present picnic grounds. This shaft was known as "the cave." While working on this shaft, the mining crew became irritated at the rises of the*

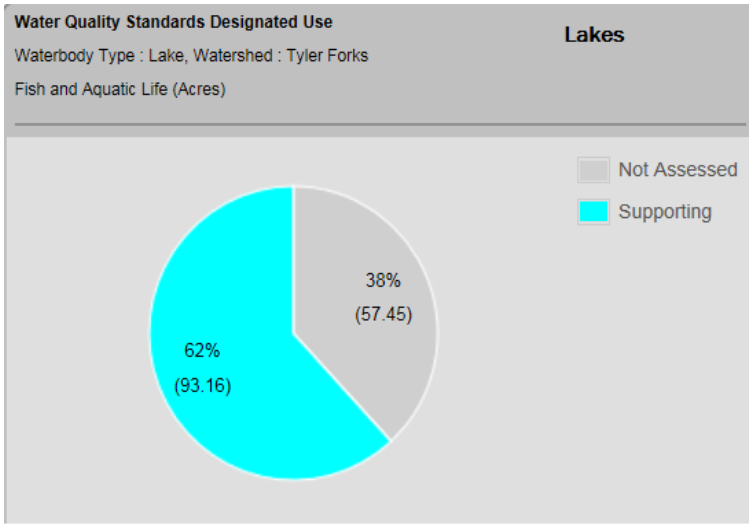
Bad River causing flooding in their diggings. To solve this problem, the Ruggles crew proceeded to divert the Bad River to the north of the hill that you can see at the east end of the present picnic ground. The river formerly curved to the south in the area of the present concession footbridge, then swept east, and then north in a quarter-mile loop back to Copper Falls. The Ruggles mining venture found little copper, and investors were disappointed."

Watershed Condition

Overall Condition

All the named streams in this watershed support trout populations, primarily brook trout. Most are small and flashy, subject to siltation and beaver activity. This watershed's management boundaries only include Tyler Forks and its tributaries. Much of the land is in county ownership and there are no WPDES-permitted discharges in the watershed.





River and Stream Condition

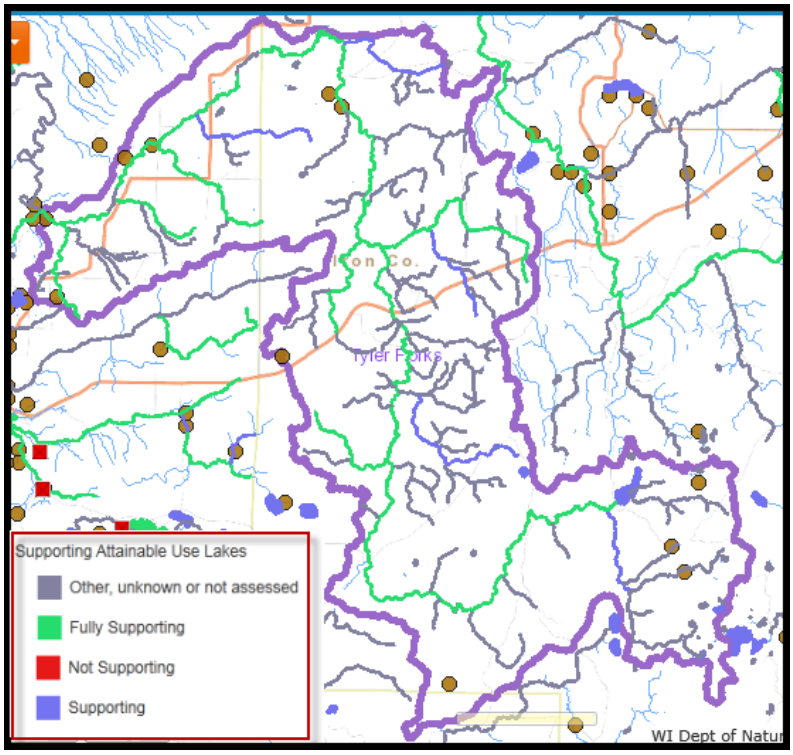
The chart below indicates that of rivers assessed, 47% are supporting attainable uses, while the remainder of waters are unassessed, fully supporting or not assessed. The waters in this area are very high quality.

Lake Health

Over 140 lake acres are documented in the Watershed; of these lakes 62 percent are supporting and 38% are not yet assessed. However, many of these lakes are considered oligotrophic or mesotrophic, with good water clarity and few sources of runoff or pollutants. These waters do not count the bays, harbors or impoundments.

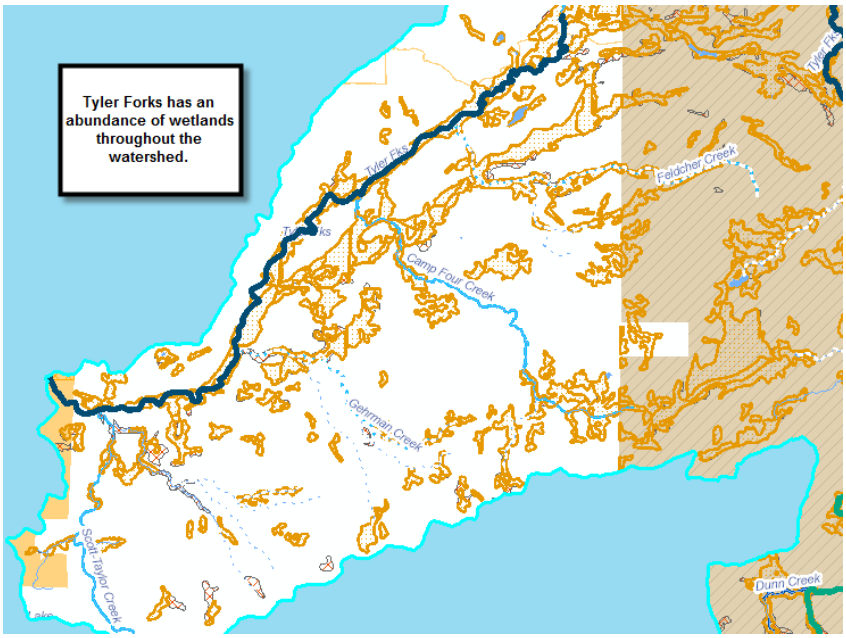
Tyler Forks Watershed – LS13

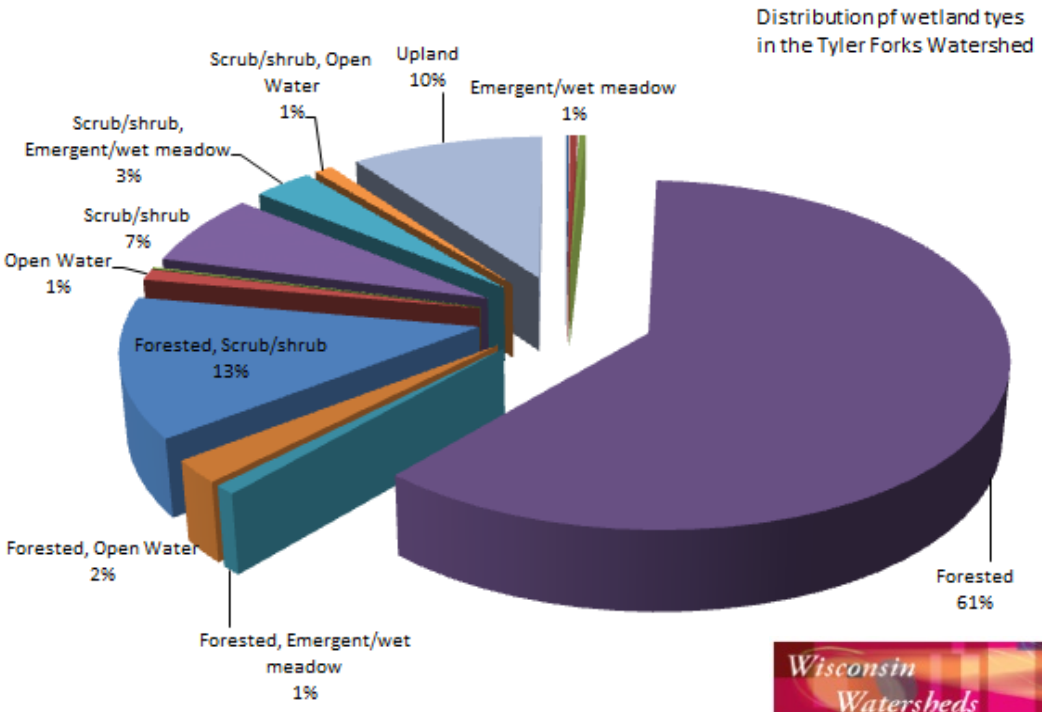
This map shows the attainable use support for rivers and streams in the watershed. All waters in the watershed are either fully supporting, supporting or not assessed (none are considered impaired) for fish and aquatic life.



Wetland Health

Wetland Type	Acres
Deep water lake	13
Emergent/wet meadow	41
Emergent/wet meadow, Open Water	37
Forested	6315
Forested, Emergent/wet meadow	92
Forested, Open Water	228
Forested, Scrub/shrub	1374
Open Water	108
Road	13
Scrub/shrub	715
Scrub/shrub, Emergent/wet meadow	324
Scrub/shrub, Open Water	99
Upland	1050
Grand Total	**10,406.99**





Wetland Status

This watershed covers 78 square miles and has over 10,406.99 acres of wetlands. Wetland types include forested wetlands (61%) , scrub/shrub and upland wetlands.

Groundwater

This glaciated, water rich landscape underlain by ancient bedrock supports diverse and exceptional wetlands, springs and groundwater supply. This area does not have any high capacity wells located in the watershed.

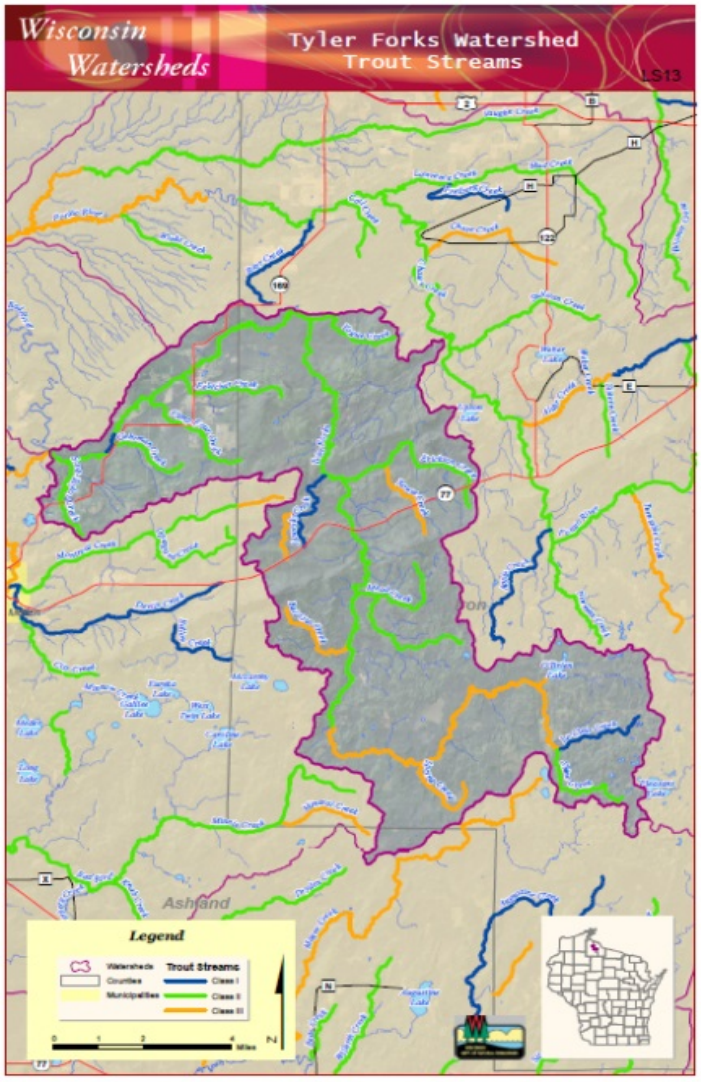
Point and Nonpoint Pollution

No point sources discharges are located in this watershed. Nonpoint source, or diffuse pollution, is limited in the watershed due to the predominance of forests and wetlands. However, land use in these areas may result in erosion.

Waters of Note

Trout Waters

Class I trout streams are high quality trout waters that have sufficient natural reproduction to sustain populations of wild trout, at or near carry capacity. Consequently, streams in this category require no stocking of hatchery trout. These streams or stream sections are often small and may contain small or slow-growing trout, especially in the headwaters. Class II trout streams may have some natural



reproduction, but not enough to utilize available food and space. Therefore, stocking is required to maintain a desirable sport fishery. These streams have good survival and carryover of adult trout, often producing some fish larger than average size. Class III trout streams are marginal trout habitat with no natural reproduction occurring. They require annual stocking of trout to provide trout fishing. Generally, there is no carryover of trout from one year to the next.
(http://dnr.wi.gov/fish/species/trout/streamclassification.html).

The Tyler Forks Watershed contains 6.53 miles of Class I trout streams, 56.65 miles of Class II trout streams and 22.36 miles of Class III trout streams. The table below indicates where these trout waters are located along the streams, starting from the mouth at mile zero.

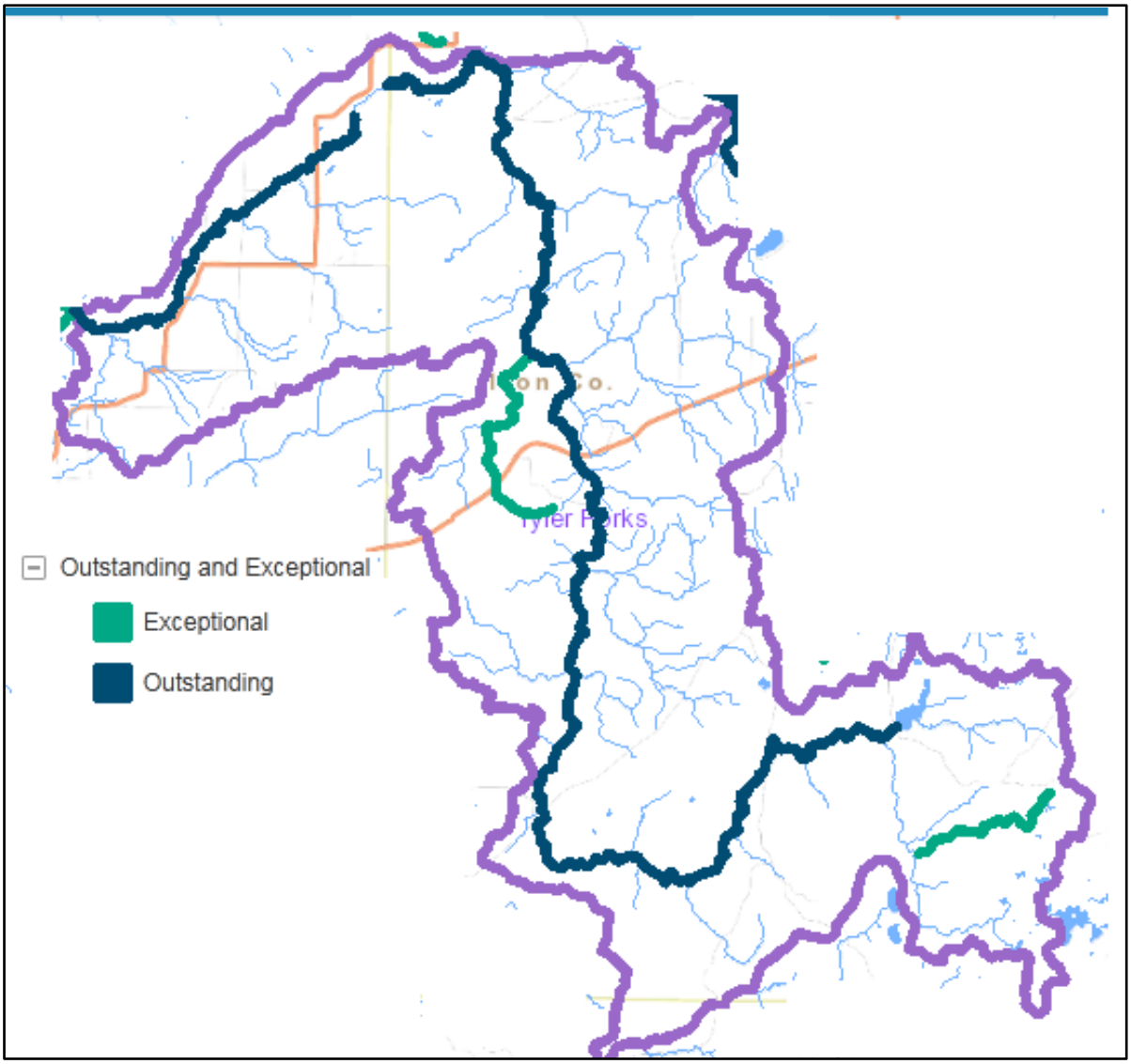
Trout Waters Report: Watershed: Tyler Forks

WADRS ID	Official Waterbody Name	WBIC	Start Mile	End Mile	Trout Class	Trout ID	Counties
17747	Scott-Taylor Creek	2923300	0	3	CLASS II	2790	Ashland
17749	Camp Four Creek	2923600	0	4	CLASS II	2792	Ashland,Iron
17753	Dunn Creek	2924700	0	2	CLASS III	3295	Iron
17757	Mud Creek	2926000	0	3.7	CLASS II	2797	Iron
17758	Bull Gus Creek	2926700	0	3	CLASS III	3297	Iron
17748	Gehrman Creek	2923500	0	2.25	CLASS II	2791	Ashland
17761	Leclair Creek	2927800	0	3	CLASS I	1483	Iron
17755	Rouse Creek	2925000	0	3	CLASS III	3296	Iron
17760	Shine Creek	2927600	0	2.18	CLASS III	3299	Iron
17746	Tyler Fks	2923100	0	1.72	CLASS II	2788	Ashland
305486	Shine Creek	2927600	2.18	5.53	CLASS II	2798	Iron
17754	Erickson Creek	2924800	0	5.11	CLASS II	2795	Iron
17756	Mead Creek	2925900	0	4	CLASS II	2796	Iron
1439062	Tyler Fks	2923100	1.72	2.25	CLASS I	1481	Ashland
1439873	Tyler Fks	2923100	25.65	34.83	CLASS III	3294	Iron
1514571	Tyler Fks	2923100	6.57	7.34	CLASS II	2789	Ashland
17751	Vogue Creek	2924100	0	3	CLASS II	2794	Iron
17752	Javorsky Creek	2924600	0	3	CLASS I	1482	Iron
1439073	Tyler Fks	2923100	2.24	6.57	CLASS II	2789	Ashland
1514542	Tyler Fks	2923100	7.34	25.65	CLASS II	2789	Iron
17750	Feldcher Creek	2923800	0	3.11	CLASS II	2793	Ashland,Iron
17759	Spring Creek	2927300	0	3	CLASS III	3298	Iron
4000512	Unnamed	5002602	0	.65	CLASS I	null	Iron
4000518	Unnamed	5002602	null	null	CLASS I	null	Iron

Outstanding and Exceptional Resource Waters

Outstanding Exceptional Waters Report: Watershed: Tyler Forks

Local Waterbody Name	WBIC	ORW/ERW	Start Mile	End Mile	Code Reference	Counties
Javorsky Creek	2924600	/ERW	0	3	102.11(1)(a)	Iron
Le Clair Creek	2927800	/ERW	0	3	102.11(1)(a)	Iron
Tyler Forks	2923100	ORW/	0	1.72	102.10(1)(f)7m	Ashland
Tyler Forks	2923100	ORW/	1.72	2.25	102.10(1)(f)7m	Ashland
Tyler Forks	2923100	ORW/	25.65	34.83	102.10(1)(f)7m	Iron
Tyler Forks	2923100	ORW/	2.24	6.57	102.10(1)(f)7m	Ashland
Tyler Forks	2923100	ORW/	7.34	25.65	102.10(1)(f)7m	Iron
Javorsky Creek	5002602	/ERW	null	null	null	Iron
Javorsky Creek	5002602	/ERW	0	.65	null	Iron



Impaired Waters

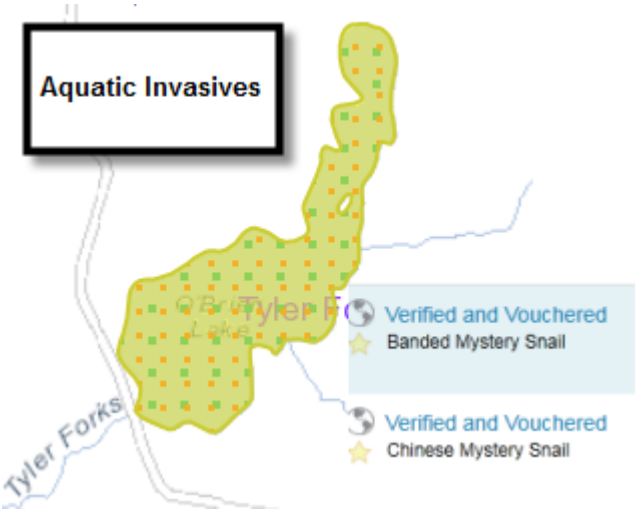
Currently there are no waters identified as impaired in this watershed. However, Rouse Creek This water is recommended for listing in the 2016 303(d) listing cycle based on three Poor fIBI results from 2006 to 2008.

Fish Consumption

Wisconsin's fish consumption advisory is based on the work of public health, water quality, and fisheries experts from eight Great Lakes states. Based on the best available scientific evidence, these scientists determined how much fish is safe to eat over a lifetime based on the amount of contaminants found in the fish and how those contaminants affect human health. Advisories are based on concentrations of contaminants along with angler habits, fishing regulations, and other factors. No specific advisories are in place in this watershed, only a general statewide advisory for mercury.

Aquatic Invasive Species

Waters where the Banded Mystery Snail is confirmed include Lake O'Brien, Tyler Forks and an unnamed stream (2010), while Lake O'Brien has also been confirmed (2007) as having the Chinese Mystery Snail. For more information, see



Species of Special Concern

WDNR's Natural Heritage Inventory Database indicates that the following water-dependent endangered, threatened or special concern species and/or communities have been sighted in this watershed within the last 20 years. In addition, an evaluation of coastal wetlands in 1996 identified species and habitats that are described in *Wisconsin's Lake Superior Coastal Wetlands Evaluation / Including Other Selected Natural Features of the Lake Superior Basin (Epstein 1997).* Note: The lack of rare elements listed here does not signify a lack of rare elements in the watershed. They have merely gone unreported in the Natural Heritage Inventory Database.

BIRDS

- Golden-Winged Warbler - Vermivora chrysoptera, Vogues Road Swamp
- Nashville Warbler - Vermivora ruficapilla, Vogues Road Swamp
- Veery - Catharus fuscescens, Vogues Road Swamp
- Yellow-Bellied Flycatcher - Empidonax flaviventris, Vogues Road Swamp

RARE MACROINVERTEBRATES

- Ephemeroptera; Family Ephemerellida - Drunella cornutella, Feldcher Creek
- Ephemeroptera; Family Heptageniida - Epeorus vitreus, Tyler Forks (Ashland County)
- Odonata; Family Gomphidae - Ophiogomphus carolus, Tyler Forks (Ashland, Iron Counties)
- Odonata; Family Cordulegastridae - Cordulegaster oblique, Scott-Taylor Creek
- Trichoptera; Family Philopotamidae - Dolophides distinctus, Gehrman Creek

State Natural and Wildlife Areas

Copper Falls State Park and Iron County Forest are two major natural areas near and partially within the watershed.

Watershed Actions

Grants and Projects

The projects listed below are the latest information on grants and projects in this area.

Project Name (Click for Details)	Year Awarded
Aquatic Invasives County Coordinator - Ashland County	2011
IRON COUNTY: Iron County Shoreland Protection Project	2011
IRON COUNTY: Turtle-Flambeau Flowage AIS Project	2011
IRON COUNTY: Iron County Shoreland Zoning Ordinance Revision Project	2010
IRON COUNTY: Amendment of Iron County Zoning Ordinance	2009
IRON COUNTY: D.O. Meter Purchase	2009
Aquatic Invasives County Coordinator - Iron County	2008
IRON COUNTY: Aquatic Invasive Species Education, Prevention & Outreach	2008
ASHLAND COUNTY: Lakes Classification & Protection Guide Booklet	2002
Fish Propagation Actions	2001
ASHLAND COUNTY: Ashland Co Lake Class, Environmental Prot., & Ordinance Dev	1999
IRON COUNTY: Iron County Lakes Classification & Management Planning Model	1996

Monitoring

BRWA Penokee Study **6/1/2011**

Bad River Watershed Association staff will be collecting macroinvertebrate samples and submitting to UW-Superior and installing temperature loggers to complete a watershed assessment.

- BRWA 2011 Quality Control Report, BRWA 2012 Quality Control Report, BRWA 2013 Quality Control Report Bad River Watershed Association Quality Assurance Reports
- BRWA Penokee Study Macroinvertebrate Dataset
  File with fieldwork event numbers assigned for macroinvertebrate sampling by the Bad River Watershed Association.
- Staff Water Quality Monitoring: Continuous Temperature, Macroinvertebrate, Conductivity
  Approved QAPP for Monitoring beginning in 2012
- Addendum to QAPP for 2012 Season: Adjusted sample locations and QA criteria

Best Management Practices Evaluation **7/1/2006**

Nonpoint source pollution from logging practices has long been a concern of water quality managers and forestry officials alike. The three parameters generally associated with impacts from logging practices are changes in flow regime, temperature and turbidity (total suspended solids). Perhaps the

most widely accepted best management practice (BMP) used to curb degradation is to leave an undisturbed vegetative buffer strip immediately adjacent to the stream. This riparian buffer can decrease sheet flow runoff and thereby reducing sedimentation. Wisconsin Office of Forestry currently has guidelines for riparian buffers along streams in timber harvest areas. These guidelines were largely based upon good science from other states, but as a follow up they should be empirically tested to determine if they provide adequate protection of stream resources unique to Wisconsin.

This project evaluated the changes in the three previously noted parameters generally associated with impacts from logging practices. Accurate measurement and estimation of water quality changes is dependent on the timing and frequency of data collection. This is particularly true for parameters such as suspended solids. For example, it is common in streams and rivers for most of the annual suspended sediment to be transported during a few, large runoff events. Automated data collection is essential to effectively capture such events. Although it is possible to rely solely on manual measurements, important flows are infrequent, unpredictable, and when they do occur, trained personnel may not be available to collect the required information.

There is currently no practical method to directly measure the full range (submicron to 2 mm) of suspended sediment concentration (SSC) in the field. Pumped or manual samples must be transported to a laboratory for analysis. However, like the new generation of pressure transducers, a number of companies now offer turbidity sensors that can be deployed on a continuous basis in streams. These sensors use near-infrared light source to accurately measure the stream water's light scattering ability and are designed with a automated small wiper/cleaning device to keep the sensor surface clean from debris and biofouling. These sensors generally possess highly accurate dynamic range (0-1500 NTUs). While turbidity cannot replace SSC, it can be of great benefit as an auxiliary measurement. The continuous turbidity record can reveal sediment pulses unrelated to flow, providing information about the timing and magnitude of sediment inputs.

The most rigorous evaluation of riparian buffers in timber harvest areas would be on landscapes with steep slopes and erodible soils. We expect that if the buffers perform adequately in sensitive landscapes then they should be adequate for other landscape types as well. We propose to test buffer effectiveness in the Lake Superior clays region with the soils dominated by calcareous red clays and where topographic relief can frequently be 90 - 100 m/km. The Lake Superior clays region was identified from the USGS Quaternary Surficial Geology map. This region corresponds closely with Omernick et al. (2000) Level IV ecoregion Lake Superior Clay Plain. The effective study area shrinks considerably once focusing upon the forested land cover within the region. Ultimately the intend to sample streams in timber harvest areas using riparian buffer BMPs prescribed by Office of Forestry in the region.

- SPECIAL PROJECTS 2007 - BMP EVALUATION, BMP PROJECT PARAMETER LIST

NOR - Natural Community Stream Reference Sites 2008

This study involves reference site selection and monitoring using the 2008 Streams Natural Communities dataset, which was based on stream flow and temperature modeled by WDNR Integrated Science Services and USGS Region V States. This study evaluates highest quality streams representative of each of the eleven proposed natural communities. The purpose of the study is to provide the range of biological and ecological conditions for specific communities through determining the "potential biological use" of each and to gather information that will provide insight into the value of the 11 distinct natural communities for state assessment and water quality standards work.

EPA National Lakes Survey 2012 2012

During the summer of 2012, the U.S. Environmental Protection Agency (EPA), states, tribes and other partners will conduct the second nationwide survey of the condition of the nation's lakes. The National Lakes Assessment (NLA) will help citizens and governments measure the health of our waters, take actions to prevent pollution, and evaluate the effectiveness of protection and restoration efforts. The NLA 2012 is one in a series of national surveys of the condition of the nation's waters (see www.epa.gov/aquaticsurveys). Designed to estimate the percentage of lakes that are in good, fair, or poor condition, the survey will serve as a scientific report card on America's lakes. It will examine ecological, water quality, and recreational indicators, and assess how widespread key stressors (such as nitrogen, phosphorus, and acidification) are across the country. The survey is an effort that involves dozens of environmental and natural resource agencies, federal agencies, universities and others.

- National Lakes Survey Fact Sheet
- Sample Sites for National Lakes Survey
- USEPA National Lake Survey Website
- National Lakes Assessment Report
- National Lakes Assessment Survey 2012 (2nd Survey)

NOR Watershed Rotation Sites (Non LTT) Ongoing

Stream water quality monitoring covering primarily biological, chemical, and habitat related monitoring to determine ambient conditions at "pour point" locations for each of state's 330 watersheds.

Volunteer Monitoring

There are no citizen monitors in the Tyler Creeks Watershed. For information on how to become a Water Action Volunteer Stream Monitor, visit- http://watermonitoring.uwex.edu/index.html.

Priority Issues

- Potential runoff / erosion from land management activities.
- Protection of high quality resources in the watershed.

Recommendations

- Restore Wetlands to prevent altered food webs, a loss of biodiversity, and a poorly functioning ecosystem.
- Study the effectiveness of best management practices in forestry areas with steep slopes as per the BMP management study described above.
- Write up and incorporate results of the macroinvertebrate study into the WATERS data system.
- Follow up monitoring should be conducted for the following waters:

WBIC	STATION	WATERBODY	MEAN	MEDIAN	RESULT_CNT	RELATION_TO_STANDARD	MIN_DATA_REQ_FLAG
2923100	10012906	Tyler Fks	27.5	26.55	6	Clearly Meets	Y
2926000	10029359	Mud Creek	25	25	1	Insuf Data: Only 1 value/Std Dev = 0; cannot run stats	N
2923100	10030684	Tyler Fks	33.5	29.5	6	Clearly Meets*	Y
2923100	10034350	Tyler Fks	23.03333	22.65	6	Insuf Data: Prelim Result-Clearly Meets	N
2924600	10034371	Javorsky Creek	26.25	21.65	6	Insuf Data: Prelim Result-Clearly Meets	N
2926700	10037096	Bull Gus Creek	31.46667	28.75	6	Insuf Data: Prelim Result-Clearly Meets	N
2926200	10039970	Unnamed	25.375	24.5	4	Insuf Data: Prelim Result-Clearly Meets	N

Contributors

WDNR Water Quality Program Staff (Lisa Helmuth) and Jon Kleist, Water Quality Biologist Northern District.

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