

South Fish Creek Targeted Watershed Assessment: A Water Quality Report to Restore Wisconsin Watersheds 2020

*HUC12: 040103011104
Located in the Fish Creek Watershed
(LS08)*

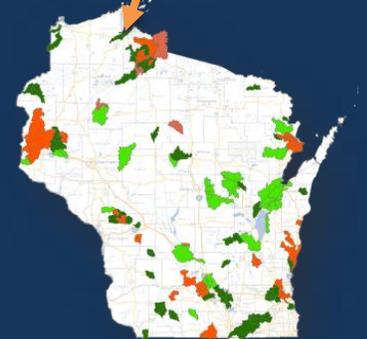
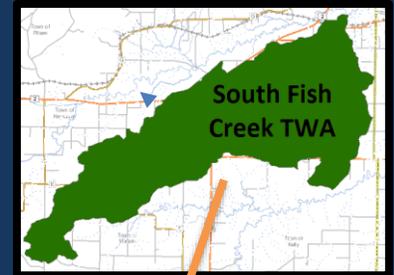


South Fish Creek upstream of STH 63.

Photo taken October 2018. A major flood event in June 2018 scoured and reshaped the channel and left sand deposits on inside bends.

To learn more about this area, see [this Wisconsin TWA Project Online!](#)

Or, search Fish Creek at [Explore Wisconsin's Waters Online](#) for more detail.



EGAD # 3200-2019-09
Water Quality Bureau
Wisconsin DNR

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Targeted Watershed Assessment Study Summary

The South Fish Creek Watershed is a subwatershed of the Fish Creek Watershed and is located in east central Bayfield County Wisconsin (Figure 1). This watershed was monitored in 2015 – 2016 through a Targeted Watershed Assessment (TWA) project to analyze current conditions and to create management goals, objectives, and recommendations. The study involved gathering fish, habitat, macroinvertebrate, and chemistry water quality data. Monitoring for in-stream total phosphorus concentrations was also conducted by Northland College during 2015.

About the Watershed

Slightly more than half (58.7%) of the South Fish Creek Watershed is considered “undeveloped,” with forest, wetland, and grassland/herbaceous land cover. Pasture/hay is the largest developed land use (33.8%) in the watershed; only 2.9% of the project area is cultivated cropland. The entire watershed is located in the Lake Superior Clay Plain (a.k.a. *Superior Coastal Plain*) (Figure 5). Due to the shallow subsurface clay layers, South Fish Creek flows are dominated by surface runoff. Groundwater discharge represents a relatively small contribution to streamflow in South Fish Creek. Surface runoff dominance produces flashy streams with very high flows following runoff events and very low base flows.

Biological Communities and Water Quality

Fish populations at all sites sampled are considered warm transition (cool water) natural communities. Six of the sites are headwater communities, while the most downstream site (South Fish Creek at STH 137) is a mainstem community. Fish index of biotic integrity ratings ranged from fair to excellent (1-fair, 4-good, 2-excellent). Fish communities at all sites were dominated by forage fish species, with some game fish and panfish present at the most downstream site. The majority of fish captured at all sites (56% to 93%) are considered to be “tolerant” to environmental degradation, which is common for Clay Plain streams due to the flashy (surface-water dominated) flows, periods of no flow or very low flow, and chronic turbidity.

The six headwater sites had good qualitative fish habitat ratings, while the mainstem site at STH 137 had a fair rating. The extensive presence of fine sediment and bank erosion at the mainstem site reduces the stream’s condition relative to upstream waters. Macroinvertebrate samples had index of biotic integrity (mIBI) ratings ranging from “fair” to “excellent”. Five of the seven sites had “good” ratings. These ratings are fairly typical for Clay Plain streams, where macroinvertebrates are well adapted to the flashy flows and chronic turbidity.

South Fish Creek is considered impaired due to total phosphorus concentrations exceeding the in-stream water quality standard of 75 ug/l. During fish surveys three sites that had no flow occurring and only standing pools of water had dissolved oxygen concentrations below the 5 mg/l standard for warm transition (cool water) streams. However, fish communities at these sites had fisheries biotic index ratings of good or excellent, so the low dissolved oxygen concentrations were not having a large impact on fish. Total suspended solids concentrations were moderate to high, and transparency was low to moderate, both due largely to the presence of suspended clay.

Recommendations

- Since South Fish Creek is impaired due to high phosphorus concentrations, efforts should be made to reduce sources of phosphorus. The DNR should work with the Bayfield County Land and Water Conservation Dept. to identify options for reducing phosphorus inputs to the creek. Potential application of best management practices for barnyard runoff control and development of farm nutrient management plans should be explored.
- The DNR should also work with the Bayfield County Land and Water Conservation Dept. to identify potential options for reducing peak flows in the watershed (“Slow the Flow” efforts). Streambank erosion is typically the largest source of suspended sediment and turbidity in Clay Plain streams. Reducing peak flows can reduce streambank erosion. This could reduce suspended sediment and turbidity in South Fish Creek and Chequamegon Bay.

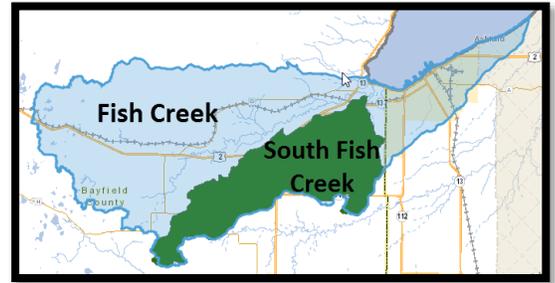


Figure 1: South Fish Creek Watershed Location

Wisconsin Water Quality Monitoring and Planning

This Water Quality Management Plan was created under the state's Water Resources Planning and Monitoring Programs. The plan reflects water quality program priorities and Water Resources Monitoring Strategy 2015-2020 and fulfills Wisconsin's Areawide Water Quality Management Plan requirements under Section 208 of the Clean Water Act. Condition information and resource management recommendations support and guide program priorities for the planning area.

This WQM Plan is approved by the Wisconsin DNR and is a formal update to Lake Superior Basin Areawide Water Quality Management Plan and Wisconsin's statewide Areawide Water Quality Management Plan (AWQM Plan). This plan will be forwarded to USEPA for certification as a formal update to Wisconsin's AWQM Plan.

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Bayfield County Land and Water Conservation Department

Report Acknowledgements

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EGAD #3200-2019-09

Wisconsin Department of Natural Resources

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Abbreviations

AEL: Aquatic Entomology Laboratory at UW – Stevens Point: the primary laboratory for analysis of macroinvertebrate taxonomy in the State of Wisconsin.

BMP: Best Management Practice. A land management practice used to prevent or reduce nonpoint source pollution such as runoff, total suspended solids, or excess nutrients.

DATCP: Wisconsin Department of Agriculture, Trade and Consumer Protection – the state agency in partnership with DNR responsible for a variety of land and water related programs.

DNR: Department of Natural Resources. Wisconsin Department of Natural Resources is an agency of the State of Wisconsin created to preserve, protect, manage, and support natural resources.

END: Endangered Species - Wisconsin species designated as rare or unique due to proximity to the farthest extent of their natural range or due to anthropogenic deleterious impacts on the landscape or both.

ERW: Exceptional Resource Water- Wisconsin's designation under state water quality standards to waters with exceptional quality and which may be provided a higher level of protection through various programs and processes.

FHDB Fishs and Habitat Database – or Fish Database – the state's repository for fish taxonomy and auto-calculated metrics involving fish assemblage condition and related.

FIBI: Fish Index of biological integrity (Fish IBI). An Index of Biological Integrity (IBI) is a scientific tool used to gauge water condition based on biological data. Results indicate condition and provide insight into potential degradation sources. In Wisconsin, specific fish IBI tools are developed for specific natural communities. Biologists review and confirm the natural community to use the correct fish IBI tool.

HUC: Hydrologic Unit Code. A HUC is a code that represents nested hydrologic watersheds delineated by a multiple agencies at the federal and state level including USGS, USFS, and Wisconsin DNR.

MDM: Maximum Daily Averages – maximum daily average is a calculated metric that may be used for temperature, dissolved oxygen and related chemistry parameters to characterize water condition.

mg/L: milligrams per liter - a volumetric measure typically used in chemistry analysis characterizations.

MIBI: Macroinvertebrate Index of biological integrity. In Wisconsin, the MIBI, or macroinvertebrate Index of biological integrity, was developed to assess macroinvertebrate community condition.

Monitoring Seq. No. Monitoring Sequence Number refers to a unique identification code generated by the Surface Water Integrated Monitoring System (SWIMS), which holds much of the state's water quality monitoring data.

NC: Natural Community. A system of categorizing water based on inherent physical, hydrologic, and biological components. Streams and Lakes have uniquely derived systems that result in specific natural community designations for each lake and river segment in the state. These designations dictate the appropriate assessment tools which improves the condition result, reflecting detailed nuances reflecting the modeling and analysis work foundational to the assessment systems.

ND: No detection – a term used typically in analytical settings to identify when a parameter or chemical constituent was not present at levels higher than the limit of detection.

NRCS: USDA Natural Resources Conservation Service - the federal agency providing local support and land management outreach work with landowners and partners such as state agencies.

ORW: Outstanding Resource Water- Wisconsin's designation under state water quality standards to waters with outstanding quality and which may be provided a higher level of protection through various programs and processes.

SC: Species of Special Concern- species designated as special concern due to proximity to the farthest extent of their natural range or due to anthropogenic deleterious impacts on the landscape, or both.

SWIMS ID. Surface Water Integrated Monitoring System (SWIMS) identification number is the unique monitoring station identification number for the location of monitoring data.

TDP: Total Dissolved Phosphorus – an analyzed chemistry parameter collected in aquatic systems positively correlated with excess productivity and eutrophication in Wisconsin waters.

TMDL: Total Maximum Daily Load – a technical report required for impaired waters Clean Water Act. TMDLs identify sources, sinks and impairments associated with the pollutant causing documented impairments.

TP: Total Phosphorus - an analyzed chemical parameter collected in aquatic systems frequently positively correlated with excess productivity and eutrophication in many of Wisconsin's waters.

THR: Threatened Species - Wisconsin species designated as threatened due to proximity to the farthest extent of their natural range or due to anthropogenic deleterious impacts on the landscape, or both.

TWA: Targeted Watershed Assessment. A study design centered on watersheds that uses a blend of geometric design and targeted site selection to gather baseline data and additional collections for unique, site-specific to answer environmental questions including effectiveness monitoring of management actions, evaluation surveys for site specific criteria or permits, protection projects, and generalized watershed planning studies.

TSS: Total suspended solids – an analyzed physical parameter collected in aquatic systems that is frequently positively correlated with excess productivity, reduced water clarity, reduced dissolved oxygen and degraded biological communities.

WATERS ID. The Waterbody Assessment, Tracking, and Electronic Reporting System Identification Code. The WATERS ID is a unique numerical sequence number assigned by the WATERS system, also known as "Assessment Unit ID code." This code is used to identify unique stream segments or lakes assessed and stored in the WATERS system.

WBIC: Water Body Identification Code. WDNR's unique identification codes assigned to water features in the state. The lines and information allow the user to execute spatial and tabular queries about the data, make maps, and perform flow analysis and network traces.

WSLH: Wisconsin State Laboratory of Hygiene– the state's certified laboratory that provides a wide range of analytical services including toxicology, chemistry, and data sharing.



South Fish Creek at CTH E (Map Site No. 1) October 31, 2018. Photo by Craig Roesler.

WQM Plan Goals

The overall goal of this plan is to identify water quality conditions and work toward improving and protecting water quality in the South Fish Creek Watershed of the Lake Superior Basin. This Targeted Watershed Assessment project funded the collection of data to monitor chemistry, biological and habitat data for analyzing current conditions and to make recommendations for future management actions in the area. This plan is designed to present monitoring study results, identify issues or concerns in the area found during the project and to make recommendations to improve or protect water quality consistent with Clean Water Act guidelines and state water quality standards.

Resources Overview

Location and Size

The South Fish Creek Watershed has an area of 110 km² (42.4 mi²) (27,120 acres) and is in Bayfield County, Wisconsin (Figure 2). South Fish Creek merges with North Fish Creek to form Fish Creek, which flows for 1.3 miles before flowing into Chequamegon Bay, Lake Superior.

Land Use, Population

South Fish Creek Watershed land use is shown in Figures 3 and 4.

- Slightly more than half (58.7%) of the watershed has undeveloped land uses (forest, wetland, grassland/ herbaceous).
- Pasture/hay is the largest developed land use (33.8%).
- Only 2.9% of the watershed is cultivated cropland.

The South Fish Creek Watershed includes the Towns of Eileen, Keystone, and Mason (Combined 2016 Population: 1,385). Assuming an even distribution of population in these towns suggests the South Fish Creek Watershed has a population of about 545 persons. The City of Ashland (2016 population: 7957) is located a few miles to the northeast of the South Fish Creek Watershed (Figure 2).

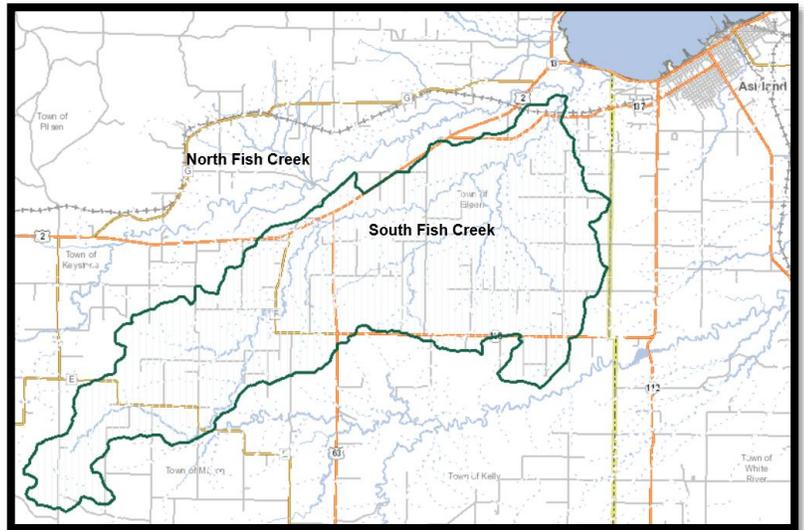


Figure 2. South Fish Creek Watershed Boundary.

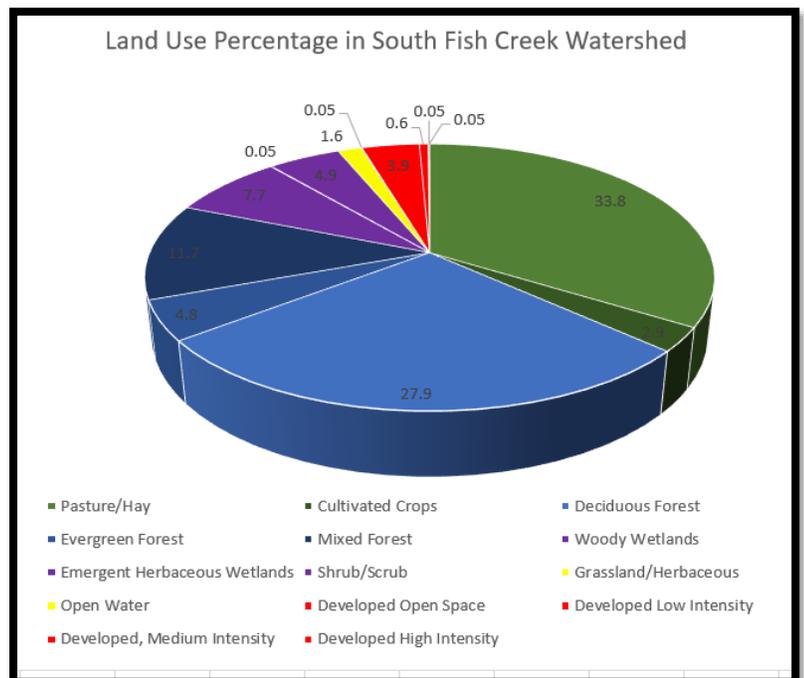
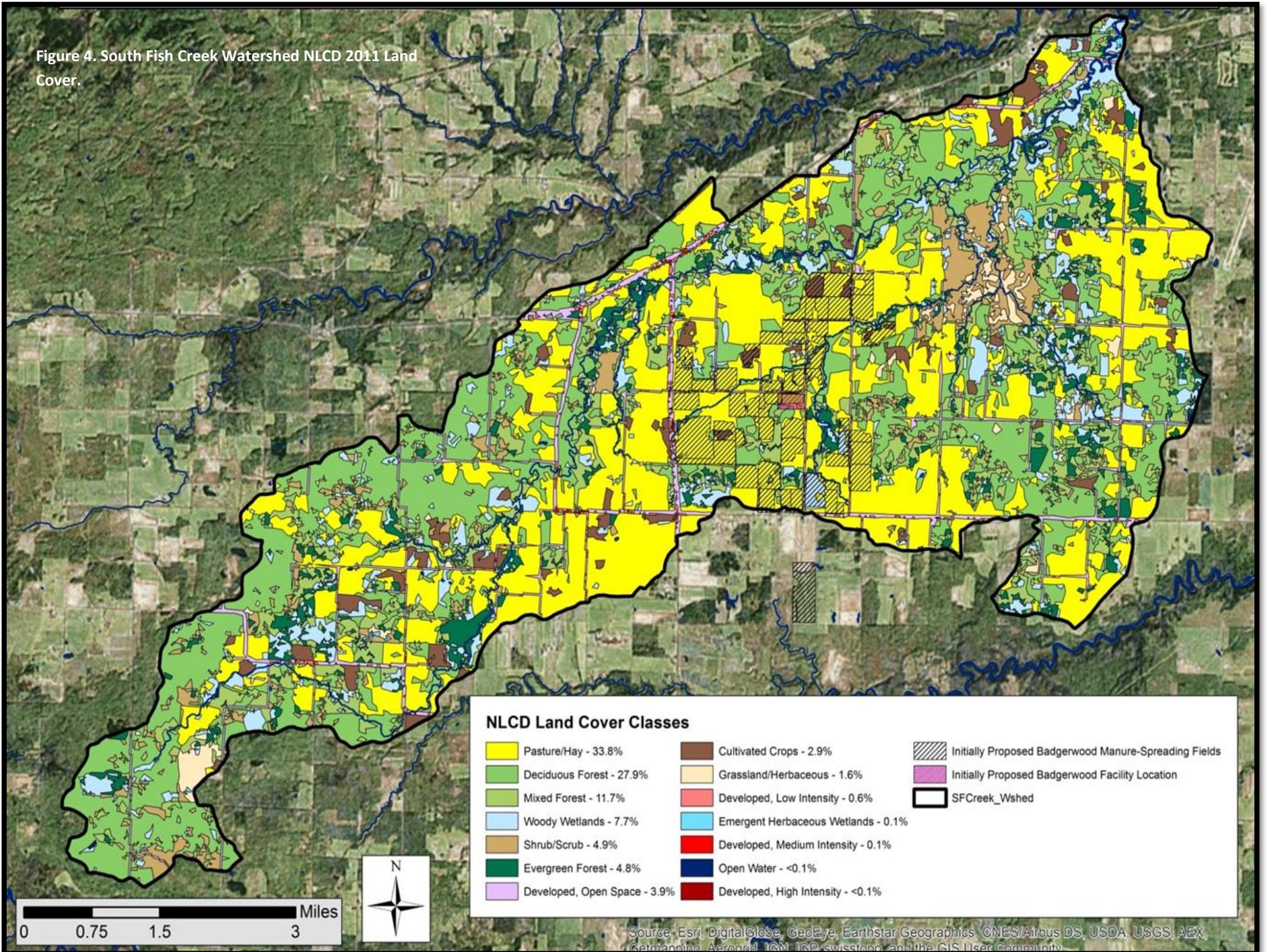


Figure 3. South Fish Creek Watershed NLCD Land Cover Percentages (grouped by land cover type) in 2017.

Figure 4. South Fish Creek Watershed NLCD 2011 Land Cover.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

Ecological Landscapes

The South Fish Creek Watershed is located within the *Superior Coastal Plain* (Figure 5). The Superior Coastal Plain (aka Lake Superior Clay Plain) is Wisconsin's northernmost Ecological Landscape, bordered on the north by southwestern Lake Superior and on the south by the Northwest Sands, the Northwest Lowlands, and the North Central Forest. The climate is strongly influenced by Lake Superior, resulting in cooler summers, warmer winters, and greater precipitation compared to more inland locations. The watershed soils in this area heavily influence water color, streambank stability, and water clarity.

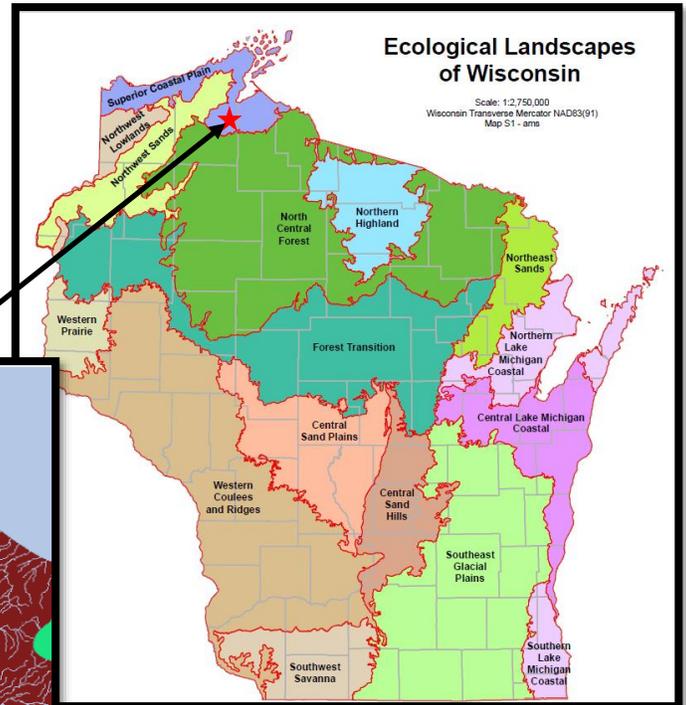
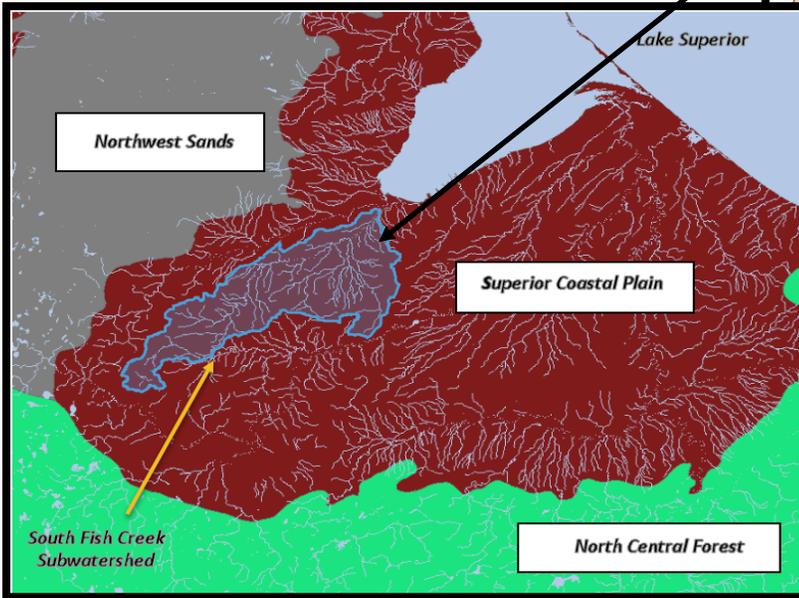


Figure 5. South Fish Creek Watershed and Wisconsin's Ecological Landscapes
[Read more at Wisconsin DNR](#)

Soils

The watershed is in the Lake Superior Clay Plain and most soils have high clay content. The four most common soil mapping units are (Figure 6):

- 480B (34.5%) Portwing-Herbster complex
- 580B (20.6%) Sanborg-Badriver complex
- 756B (8.2%) Superior-Sedgwick complex
- 713B (8.2%) Kellogg-Allendale-Ashwabay complex

The two most common units (480B and 580B; 55% of watershed) have surficial soil textures of silt loam or clay loam. An underlying clay layer begins 9-to-17 inches below the soil surface. Depth to water table ranges from 0 to 12 inches below the surface. The runoff class is high.

The third and fourth most common units (756B and 713B; 16% of watershed) have coarser surficial textures ranging from fine sandy loam to loamy sand. For the Superior-Sedgwick complex (756B) - an underlying clay layer begins at 14 to 16 inches below the surface; depth to water table is 6 inches below the surface; runoff class is very high. For the Kellogg-Allendale-Ashwabay complex (713B) - an underlying clay or silty clay layer begins at 26 to 45 inches below the surface; depth to water table is 6 to 30 inches below the surface; runoff class is very low. Hydrologic soil groups are shown in Figure 7. The majority of soils are included in hydrologic soil group D. These are soils having a very slow infiltration rate and a high runoff potential when thoroughly wetted. The widespread presence of shallow subsurface clay layers in the watershed is the primary cause of this condition.



South Fish Creek at HWY 63, 2018
 (Map Site No. 3). Photo by Craig Roesler.

Hydrology

Due to the shallow subsurface clay layers, South Fish Creek flows are dominated by surface runoff. Most soils are somewhat poorly drained. Relatively small contributions to streamflow are from groundwater discharge. This produces a flashy stream with very high flows following runoff events and very low base flows.

During 2015 South Fish Creek was observed to have no surface flow above County Highway F during most of the summer and early fall. Only standing pools of water were present. Base flow near the Creek mouth was only 1.5 cfs on August 8th, 2015.

Trout Waters

DNR classifies trout streams as either Class I, II or III. Class I are naturally reproducing populations; class II are supplemented by stocking, and class III are wholly supported by stocking. There are no trout waters in the South Fish Creek watershed. See Appendix C (Table 13) and Appendix D (Table 14) for a list of trout waters in the larger Fish Creek Watershed.

Outstanding, Exceptional Resource Waters

Wisconsin designates the highest quality waters as Outstanding Resource Waters (ORWs) or Exceptional Resource Waters (ERWs), these are surface waters that provide outstanding recreational opportunities, support valuable fisheries and wildlife habitat, have good water quality, and are not significantly impacted by human activities. ORW and ERW status identifies waters that the State of Wisconsin has determined warrant additional protection from the effects of pollution. There are no ORW or ERW waters in the South Fish Creek watershed. See Appendix C (Table 13) and Appendix D (Table 13 and Figure 14) which show ORW/ERW waters in the larger Fish Creek Watershed.



South Fish Creek at Colby Road (Map Site No. 2), 10/2018. Photo by Craig Roesler.

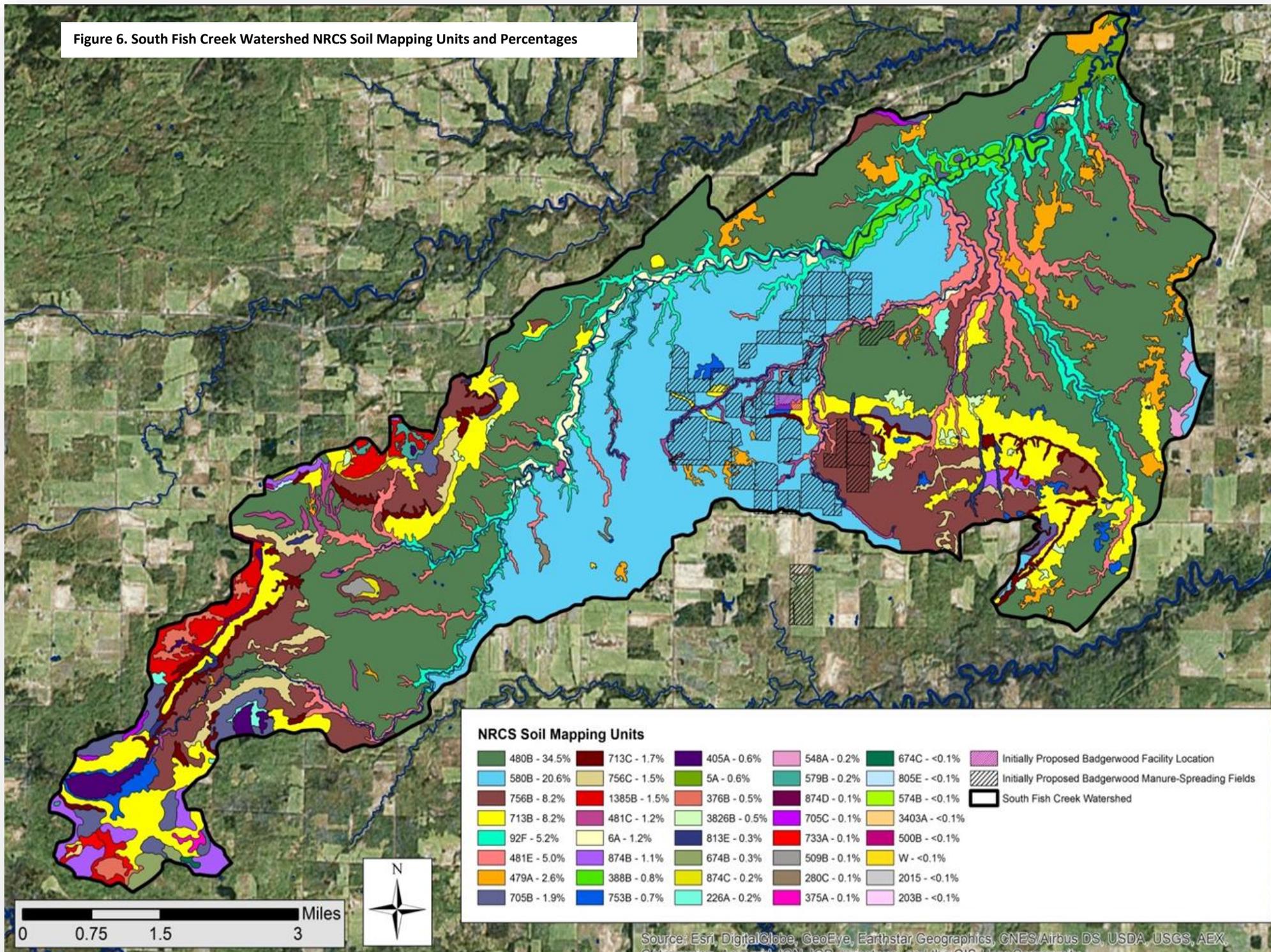
Impaired Waters

Section 303(d) of the Clean Water Act requires states to publish a list of waters that do not meet water quality standards. South Fish Creek and an unnamed tributary to South Fish Creek are impaired waters due to total phosphorus concentrations exceeding the state stream standard of 75 ug/l (Table 1). Impaired waters in the larger Fish Creek Watershed are listed in Appendix D (Table 15).

Table 1. List of impaired waters in the South Fish Creek Watershed

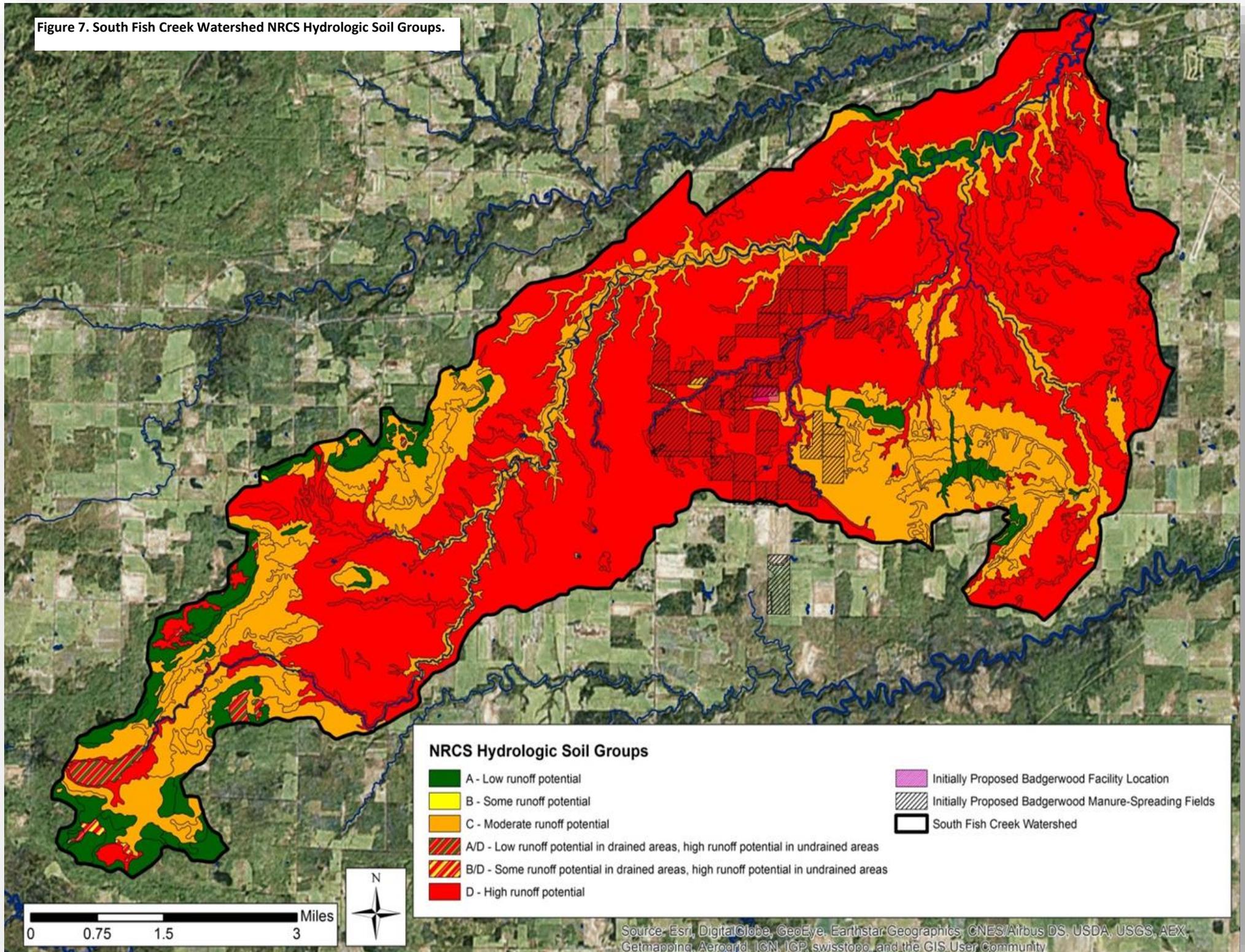
Waterbody Name	WBIC	Start	End	Pollutant	Impairment
South Fish Creek	2889900	0 mi	22.5 mi	Total Phosphorus	Impairment Unknown
Unnamed Trib. to South Fish Creek	2890200	0 mi	6.7 mi	Total Phosphorus	Impairment Unknown

Figure 6. South Fish Creek Watershed NRCS Soil Mapping Units and Percentages



Source: Esri DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 7. South Fish Creek Watershed NRCS Hydrologic Soil Groups.



Monitoring Project Discussion

Study Summary

The South Fish Creek Targeted Watershed Assessment was designed to assess the overall chemical, physical and biological condition of South Fish Creek and its tributaries. There was a preliminary proposal to site a hog CAFO in the watershed at the time that the monitoring was conducted, so the assessment was also useful for evaluating potential impacts of such an operation on water quality. A completed CAFO proposal was never submitted to the DNR.

Site Selection and Study Design

This study involved collection of fish community, macroinvertebrate, qualitative habitat, and water chemistry data at seven sites in the South Fish Creek watershed. Monitoring stations from 2015 and 2012 are listed in Table 2 and displayed in Figure 8. Monitoring during 2012 and 2015 included:

- Fish community surveys at seven sites.
- Water chemistry samples and a flow measurement were made at the time of each fish survey. Parameters measured were total phosphorus, total nitrogen, total suspended solids, dissolved oxygen, pH, temperature, conductivity, and transparency.
- Qualitative habitat assessments at seven sites.
- Macroinvertebrate samples at seven sites.
- Also during 2015 extensive monitoring for total phosphorus at three stream sites was conducted by Northland College.

Table 2. South Fish Creek Watershed Monitoring Sites and Data Collected

Map Site No.	WBIC	Station	Water	Location	Lat	Long	Fish	Invertebrate	Qualitative Habitat
1	2889900	043095	South Fish Cr.	50 m US STH 137	46.57	-90.95	2015	2015	2015
2	2889900	043056	South Fish Cr.	30 m US Colby Road	46.54	-91.01	2015	2015	2015
3	2889900	10044095	South Fish Cr.	80 m US STH 63	46.54	-91.05	2015	2015	2015
4	2889900	10043950	South Fish Cr.	60 m US CTH F	46.51	-91.08	2015	2015	2015
5	2889900	10038083	South Fish Cr.	130 m DS Benoit Rd	46.48	-91.09	2012	2012	2012
6	2889900	10043949	South Fish Cr.	60 m US CTH E	46.47	-91.11	2015	2015	2015
7	2890200	10043551	Un. Tributary	at Colby Road	46.53	-91.01	2015	2015	2015

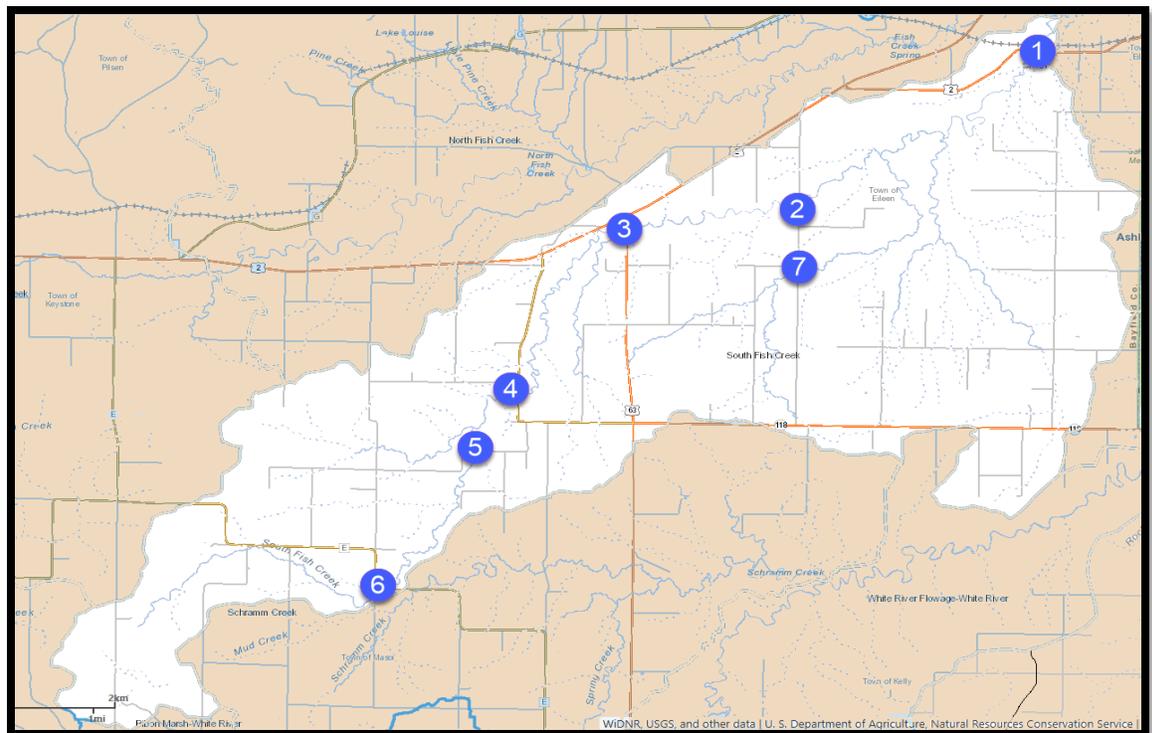


Figure 8. South Fish Creek Watershed Monitoring Sites.

Methods, Equipment, and Quality Assurance

Fish Assemblage and Natural Community

Fish surveys at seven sites were conducted by electroshocking a section of stream with a station length of 35 times the mean stream width (100 m minimum and 400 m maximum station length) (Lyons, 1992). One backpack shocker was used at sites with mean stream widths less than 3 meters and two backpack shockers were used at sites with mean stream widths greater than 3 meters. All fish were collected, identified, and counted. Surveys were conducted using the following methods:

- [Wadeable Stream Fish Community Evaluation Form 3600-230 \(R 7/00\)](#)
- [Guidelines for Assessing Fish Communities of Wadeable Streams in Wisconsin](#)

Fish Habitat Evaluation

At each site, qualitative fish habitat ratings were determined using the following methods:

- [Qualitative Habitat Rating less than 10m Form \(3600-532A\) \(R 6/07\)](#)
- [Guidelines for Qualitative Physical Habitat Evaluation of Wadeable Streams \(2007\)](#)

Macroinvertebrate Evaluation

Macroinvertebrate samples were obtained at seven sites by kick sampling gravel or cobble riffle substrate using a D-frame net. Samples were preserved and sent to the University of Wisconsin-Stevens Point for analyses. Standard metrics were calculated for the macroinvertebrate communities found. Methods used were:

- [Guidelines for Collecting Macroinvertebrate Samples in Wadeable Streams](#)
- [Wadeable Macroinvertebrate Field Data Report Form 3200-081 \(R 08/14\)](#)

Water Sampling

Water samples were collected at seven sites at the time the fish surveys were conducted. Samples were shipped on ice to the State Laboratory of Hygiene where they were analyzed for total phosphorus, total nitrogen, and total suspended solids. Field parameters measured were flow, dissolved oxygen, pH, temperature, conductivity, and transparency. Methods used were:

- [Guidelines and Procedures for Surface Water Grab Sampling \(Dec. 2005 Version 3\)](#)
- [Guidance for Flow Monitoring Wadeable Streams \(v1.0\) 2016](#)
- [Guidance for Dissolved Oxygen Meter Sampling](#)

During 2015, extensive monitoring for total phosphorus at three stream sites was also conducted by Northland College.



South Fish Creek at Colby Rd (Map Site No. 2), 10/2018. Photo by Craig Roesler.

Project Results and Discussion

Fish Communities

A summary of fish survey data is shown in Table 3 and Table 5. Four of the seven sites had intermittent flow, and no surface flow was occurring at three sites at the time of the surveys. Fish were restricted to standing pools of water. Some limited sub-surface flow between pools was probably seeping through stream channel bed materials (hyporheic flow).

The number of fish species found per site ranged from 6 to 19. The two sites with the least species (6 and 8) are intermittent flow sites. The site with the most species (South Fish Creek at STH 137; 19 species) is the most downstream site. It has the most flow and is closest to downstream water bodies such as Fish Creek and Chequamegon Bay.

Fish communities at all sites were dominated by forage fish species. The majority of forage fish were cool water (thermally transitional) species. Game fish or panfish were uncommon at headwater sites, with only one brown trout found at Colby Road and one pumpkinseed found at Benoit Road. Game fish or panfish were more common at the mainstem site at South Fish Creek at STH 137 where one brown trout, one walleye, six yellow perch, and eight rock bass were found.

The majority of fish captured at all sites (56 - 93%) are considered to be “tolerant” to environmental degradation. The four sites with intermittent flows have the highest percentages of tolerant fish (84 - 93%). The most downstream site (South Fish Creek at STH 137) with the most flow has the lowest percentage of tolerant fish (56.5%). A high percentage of tolerant fish is a common feature of many small Lake Superior tributary streams with watersheds strongly influenced by clayey soils. These streams have very low base flows or are intermittent, and have chronic turbidity from suspended clay. These conditions, which are to some extent naturally occurring, are probably a primary reason for the high percentages of tolerant fish. Young of year forage fish were observed at all sites including standing pools in intermittent segments.

This indicates that even intermittent stream segments serve as nursery areas for these species.

Fish populations at all sites indicated warm transition (cool water) natural communities are present. Six of the sites are headwater communities, while the most downstream site (South Fish Creek at STH 137) is a mainstem community. The previously estimated modeled natural communities were all colder than the field-verified natural communities (Table 3). The model probably overestimates groundwater inflow in this area.

Fish Condition

Fish index of biotic integrity (IBI) scores ranged from 60 to 100, with ratings of “fair” to “excellent” (Table 3, Figure 9). Only one site (South Fish Creek downstream of Benoit Rd) had a “fair” rating, while the other six sites were “good” or “excellent”.

The “small stream” IBI (Lyons 2006) was applied to the six headwater sites. The cool-warm IBI (Lyons 2012) was applied to the mainstem site (South Fish Creek at STH 137). The IBI is an index that compares the existing structure, composition, and functional organization of the fish community with regional and habitat-specific expectations derived from comparable high-quality ecosystems (Lyons, et al. 1996). IBI ratings of “fair”, “good”, or “excellent” indicate moderate to low levels of impairment to fish communities are currently resulting from human disturbances.

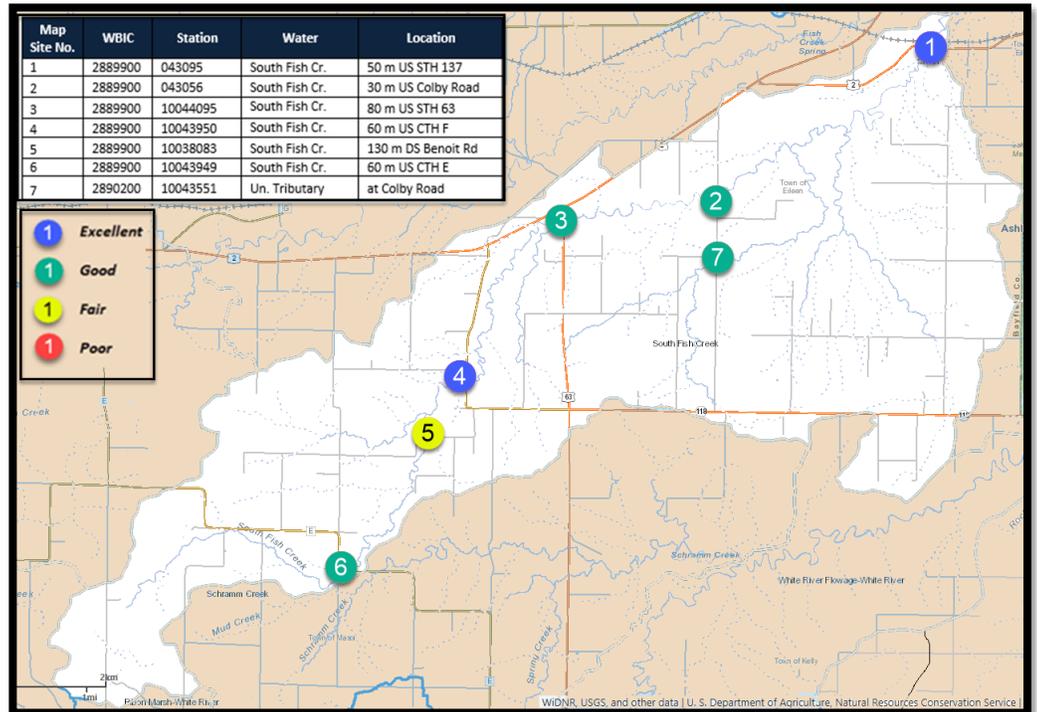
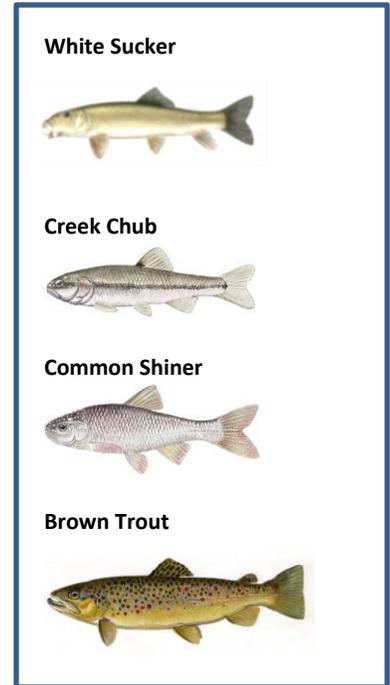


Figure 9. South Fish Creek Fish IBI Ratings

Table 3. South Fish Creek Watershed Fish Survey Taxa Count and Fish Community Data (2012-2015)

Map Site No:	1	2	3	4	5	6	7	
Water	South Fish Creek					Tributary		
Station ID	043095	043056	10044095	10043950	10038083	10043949	10043551	Fish Tolerance Rating
Description	STH 137	Colby Rd	Hwy 63	CTH F	Benoit Rd	CTH E	Colby Rd	
Survey Date	8/13/2015	8/13/2015	8/28/2015	8/12/2015	8/8/2012	8/12/2015	7/23/2015	
Black Bullhead						1		Tolerant
Blacknose Shiner	10							Intolerant
Bluntnose minnow	31		7					Tolerant
Brassy Minnow	1							Intermediate
Brook Stickleback	1			16	10	35	35	Tolerant
Brown Trout	1	1						Intermediate
Central Mudminnow	6		6	11	82	304		Tolerant
Common Shiner	86	117	67	30	26	24	16	Intermediate
Creek Chub	105	164	116	237	89	42	39	Tolerant
Fathead minnow	1	2	9		11	22	5	Tolerant
Finescale Dace						3		Intermediate
Golden Shiner					1	1		Tolerant
Hornyhead Chub	45	15	2					Intermediate
Iowa Darter								Intolerant
Johnny Darter	45	18	17	39	1	2		Intermediate
Logperch	3							Intermediate
Longnose Dace	1	19	10					Intermediate
Mottled Sculpin		10	3	6				Intolerant
Pearl Dace						1		Intermediate
Pumpkin seed					1			Intermediate
Rock Bass	8							Intolerant
Trout Perch	11							Intermediate
Walleye	1							Intermediate
Western Blacknose Dace	12	103	34	83			2	Tolerant
White Sucker	127	23	49	34	13	17	43	Tolerant
Yellow Perch	6							Intermediate
Verified Natural Community	Warm transition mainstem	Warm transition headwater						
Modeled Natural Community	Cold transition mainstem	Coldwater	Coldwater	Cold transition headwater	Coldwater	Coldwater	Coldwater	
Small Stream IBI		80	80	100	60	90	70	
Warm Transition IBI	90							
IBI Rating	Excellent	Good	Good	Excellent	Fair	Good	Good	
% Tolerant Individuals	56	78	69	84	88	93	89	
Total Species	19	10	11	8	9	11	6	
Total Fish	501	472	320	456	234	452	140	

Table 4. Fish Index of biological integrity Condition Categories

Condition (Rating) Categories for Cool-Warm Mainstem		Condition (Rating) Categories for Small Stream	
Fish Index of Biotic Integrity (fIBI)		Fish Index of Biotic Integrity (fIBI)	
fIBI	Condition	fIBI	Condition
61-100	excellent	91-100	excellent
41-60	good	61-90	good
21-40	fair	31-60	fair
0-20	poor	0-30	poor

Table 5. South Fish Creek Watershed Fish Survey Data (2012-2015)

Map Site No.	Site	SWIMS Station#	Flow Status	Survey Date	No. of Species	Best-fitting Natural Community	Fish IBI Applied	IBI Score	IBI Rating	% Tol. (1)
1	South Fish Ck. @ STH 137	043095	perennial	08/13/2015	19	warm transition mainstem	Warm Transition	90	Excellent	56.5
2	South Fish Ck. @ Colby Rd	043056	perennial	08/13/2015	10	warm transition headwater	Small Stream	80	Good	78.5
3	South Fish Ck. @ STH 63	10044095	perennial	08/28/2015	11	warm transition headwater	Small Stream	80	Good	69.1
4	South Fish Ck. @ CTH F	10043950	intermittent	08/12/2015	8	warm transition headwater	Small Stream	100	Excellent	83.6
5	South Fish Ck. @ Benoit Rd	10038083	intermittent	08/06/2012	9	warm transition headwater	Small Stream	60	Fair	88.2
6	South Fish Ck. @ CTH E	10043949	intermittent	08/12/2015	11	warm transition headwater	Small Stream	90	Good	93.4
7	Un Trib. to S Fish Ck. @ Colby Rd.	10043551	intermittent	07/23/2015	6	warm transition headwater	Small Stream	70	Good	88.6

(1) Percent Tolerant Species

Habitat Quality

Condition Values

Qualitative fish habitat ratings for the seven South Fish Creek watershed sites are shown in Table 6 and Figure 10. The six headwater sites had “good” ratings, while the mainstem site at STH 137 had a “fair” rating. The mainstem site lost rating points mostly due to the extensive presence of fine sediment and extensive bank erosion. Moderate to extensive presence of fine sediment also resulted in lost rating points for most headwater sites.

Table 6. South Fish Creek Watershed Qualitative Habitat Survey Results

Map Site No.	1	2	3	4	5	6	7
SWIMS Station ID	043095	043056	10044095	10043949	10038083	10043950	10043551
Description	STH 137	Colby Rd	Hwy 63	CTH E	Benoit Rd	CTH F	Colby Rd
	So. Fish Cr.	So. Fish Cr	So. Fish Cr.	So. Fish Cr.	So. Fish Cr.	So. Fish Cr.	Tributary
Habitat Metric (Score)	8/13/2015	8/13/2015	8/28/2015	8/12/2015	8/8/2012	8/12/2015	7/23/2015
Riparian Buffer Width (15)	15	15	15	10	15	15	15
Bank Erosion (15)	0	10	10	10	10	5	10
Pool Area (10)	3	10	7	7	7	10	10
Width/Depth Ratio (15)	5	10	10	10	10	10	10
Riffle: Riffle or Bend: Bend Ratio (15)	5	10	10	10	10	10	10
Fine Sediments (15)	0	10	5	5	5	5	0
Cover for Fish (15)	10	15	10	10	10	10	10
Total Score	38	80	67	62	67	65	65
Rating	Fair	Good	Good	Good	Good	Good	Good

Table 7. South Fish Creek Watershed Qualitative Habitat Values

Map Site #	Site Description	Station ID	Qualitative Habitat Score	Qualitative Habitat Rating
1	South Fish Creek @ STH 137	043095	38	Fair
2	South Fish Creek @ Colby Rd	043056	80	Good
3	South Fish Creek @ Hwy 63	10044095	67	Good
4	South Fish Creek @ CTH F	10043950	65	Good
5	South Fish Creek @ Benoit Rd	10038083	67	Good
6	South Fish Creek @ CTH E	10043949	62	Good
7	South Fish Creek tributary @ Colby Rd	10043551	65	Good

Table 8. Qualitative Habitat Condition Categories

Condition (Rating) Categories for Qualitative Habitat (Stream Width < 10 m)

Score	Condition
>75	excellent
50-75	good
25-49	fair
< 25	poor

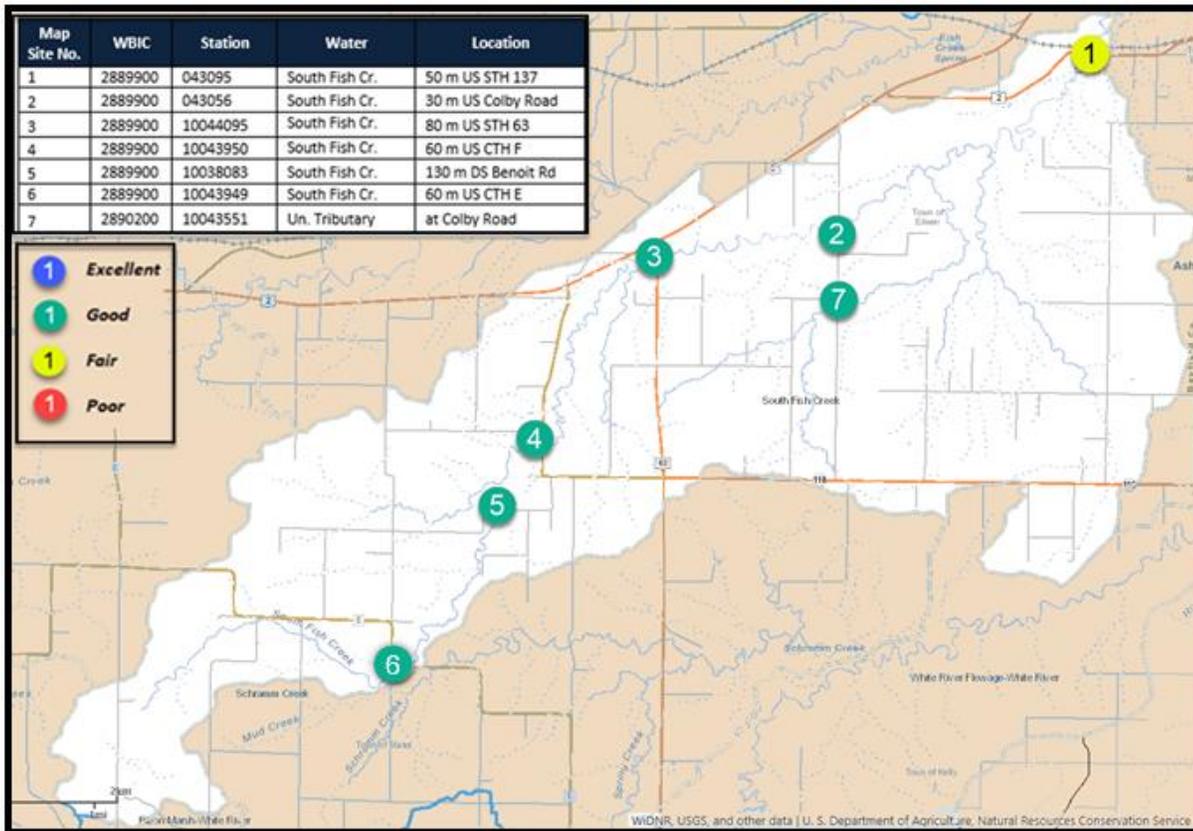


Figure 10. South Fish Creek Fish Qualitative Habitat Ratings

Macroinvertebrate Data

Macroinvertebrate sample results are summarized in Table 9 and Figure 11. Macroinvertebrate index of biotic integrity (MIBI) values ranged from 4.48 to 7.88, with condition categories ranging from fair to excellent. The two most downstream sites (South Fish Creek at STH 137, and South Fish Creek at Colby Road) had the highest MIBI's.

Hilsenhoff biotic index (HBI) values ranged from 3.02 to 7.01, with condition categories ranging from excellent to fairly poor. HBIs reflect the amount of organic loading and the resultant availability of oxygen at a site. *The site with the poorest HBI (South Fish Creek at CTH E) had no flow for several weeks in late summer and early fall.* It also has a narrow channel with an abundance of reed canary grass overhanging channel edges. These factors contributed to the relatively poor HBI value.

Table 9. South Fish Creek Watershed Macroinvertebrate Survey Data (2012-2015)

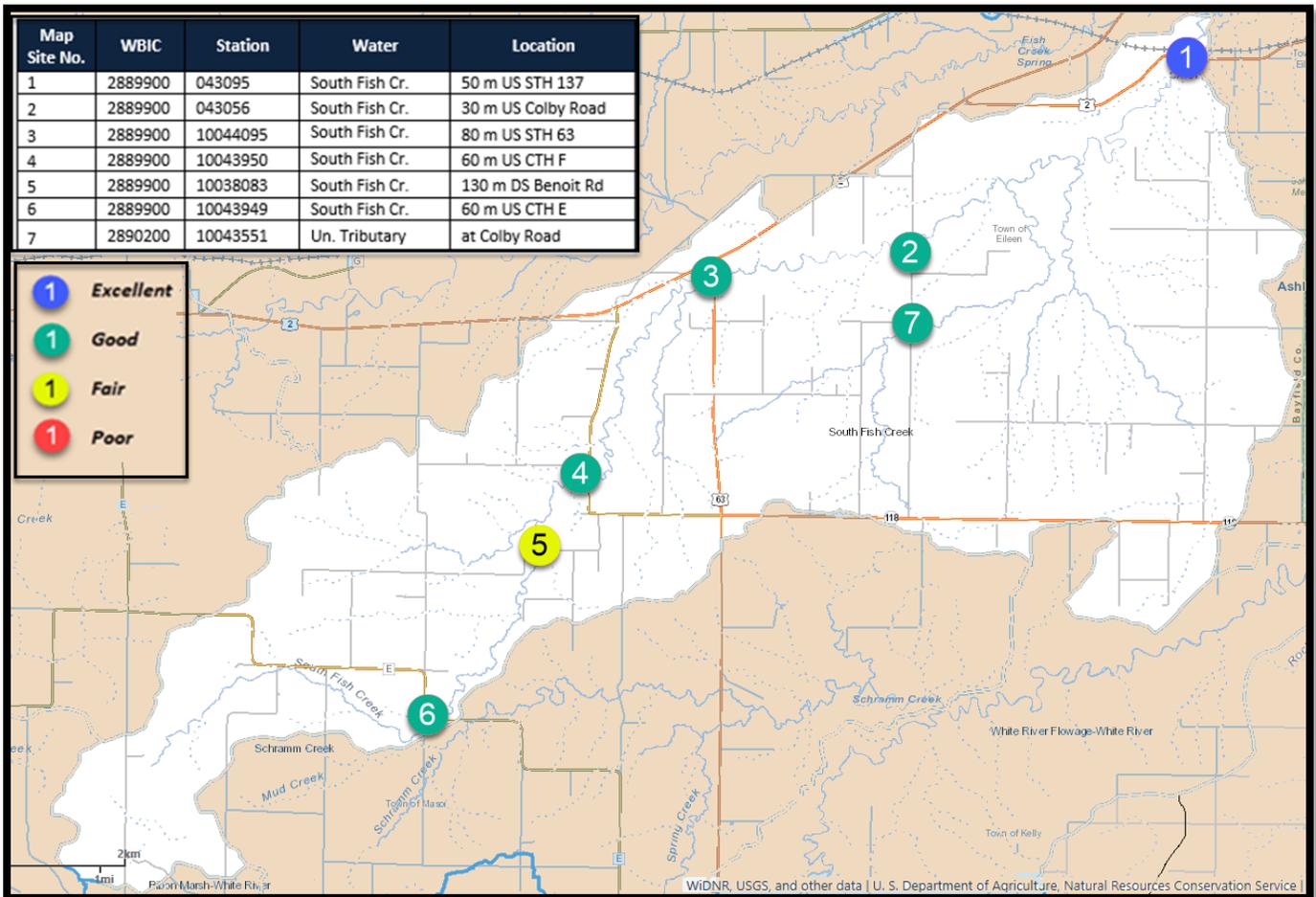
Map Site No.	Site	SWIMS Station	Sampling Date	MIBI	MIBI Condition Category	Hilsenhoff Biotic Index (HBI)	HBI Condition Category	Species Richness	% EPT* Individuals	% EPT* Genera	% Chironomidae Individuals
1	South Fish Ck.@ STH 137	043095	09/10/2015	7.88	Excellent	5.6	Fair	28	25	19	67
2	South Fish Ck.@ Colby Rd	043056	09/10/2015	7.2	Good	3.27	Excellent	35	66	41	9
3	South Fish Ck.@ STH 63	10044095	09/10/2015	5.59	Good	3.02	Excellent	28	55	33	17
4	South Fish Ck.@ CTH F	10043950	10/30/2015	5.38	Good	5.58	Fair	31	66	17	16
5	South Fish Ck.@ Benoit Rd	10038083	10/26/2012	4.48	Fair	5.81	Fair	24	7	13	28
6	South Fish Ck.@ CTH E	10043949	10/30/2015	6.86	Good	7.01	Fairly Poor	36	8	14	36
7	Un Trib. to S Fish Ck @ Colby Rd.	10043551	10/30/2015	6.03	Good	4.66	Good	22	50	18	23

* EPT = ephemeroptera (mayflies), plecoptera (stoneflies), trichoptera (caddisflies)
Complete sample result information is available on DNR's SWIMS data base.

Table 10. Indices of Biological Integrity Condition Categories (Macroinvertebrate IBI and Hilsenhoff IBI)

Condition (Rating) Categories for Macroinvertebrate Index of Biotic Integrity (MIBI)		Condition (Rating) Categories for HBI's	
Score	Condition	HBI	Condition
>75	excellent	0.00-3.50	excellent
50-75	good	3.51-4.50	very good
25-49	fair	4.51-5.50	good
< 25	poor	5.51-6.50	fair
		6.51-7.50	fairly poor
		7.51-8.50	poor
		8.51-10.00	very poor

Figure 11. South Fish Creek Macroinvertebrate IBI Ratings



Water Quality

Water quality data collected during fish surveys and macroinvertebrate sampling is shown in Table 11.

Total phosphorus (TP) concentrations ranged from 110 – 262 ug/l. **All samples exceed Wisconsin’s stream standard for TP concentration of 75 ug/l.** Intermittent stream sites with standing pools of water had higher TP concentrations than the perennial stream sites with flowing water. Sample collection dates vary, which limits comparisons. However, this does indicate that TP is not settling out in standing pools. TP may be largely attached to suspended clay particles which have extremely long settling times. Biological activity by fish and wildlife might also contribute to sediment resuspension in pools.

Total nitrogen (TN) concentrations were moderate and ranged from 0.5 to 1.5 mg/l. Intermittent stream sites with standing pools of water also had higher TN concentrations than the perennial stream sites with flowing water.

Total suspended solids (TSS) concentrations were moderate to high ranging from 5.6 – 29.3 mg/l and are probably largely due to suspended clay. Transparency measurements were low to moderate ranging from 18 to 89 cm and are again largely influenced by suspended clay.

Summer dissolved oxygen concentrations ranged from 1.6 to 10.3 mg/l. The intermittent stream sites with standing pools of water had dissolved oxygen concentrations less than 5 mg/l (1.6 - 4.3mg/l), the water quality standard. Low dissolved oxygen concentrations are probably not chronic.

The site with the lowest dissolved oxygen concentration (Unnamed tributary to South Fish Creek at Colby Rd.; 1.6 mg/l) had a good fish population present, including numerous young of year fish.

Conductivities were variable, ranging from 108 to 364 umhos/cm. Some of the variability is due to relative water contributions from surface runoff and groundwater. Runoff typically has much lower conductivities than groundwater. The pH values ranged from 6.5 to 8.2.

More extensive total phosphorus (TP) testing was conducted by Northland College during 2014. The three sites monitored are South Fish Creek at STH 137, South Fish Creek at Colby Road, and at the Unnamed tributary to South Fish Creek at Colby Road. Monthly TP sample results are displayed in Table 12. Eighty-nine percent (89%) of those samples exceed 75 ug/l.

Table 11. South Fish Creek Water Quality Survey Data (2015)

Map Site No.	Site	Date	SWIMS Station #	Flow (cfs)	TP (ug/l)	TN (mg/l)	TSS (mg/l)	Cond. (umhos/cm)	D.O. (mg/l)	Transparency (cm)	pH (s.u.)	Temp. (C)
Values collected during fish survey sampling												
1	STH 137	08/13/2015	043095	1.5	142	0.544	8	317	10.3	59	8.2	22.3
2	Colby Rd	08/13/2015	043056	0.4	110	0.502	5.6	269	7.9	81	7.8	22.1
3	STH 63	08/28/2015	10044095	0.8	136	0.903	15	238	8.6	41	7.5	16.1
6	CTH F	08/12/2015	10043950	0	262	1.2	29.3	236	4.3	18	7.3	17.8
5	Benoit Road											
4	CTH E	08/12/2015	10043949	0	165	1.52	13.3	326	4.3	35	7.3	20.9
7	Trib @ Colby Rd	07/23/2015	10043551	0	219	1.11	5.6	364	1.6	77	7	18.2
Values collected during macroinvertebrate sampling												
1	STH 137	09/10/2015	043095					254	8.6	60		16.3
2	Colby Rd	09/10/2015	043056					203	9.6	89		17.1
3	STH 63	09/10/2015	10044095					204	9.1	75		16.4
4	CTH F	10/30/2015	10043950					206	9	33	7.3	6.4
5	Benoit Road											
6	CTH E	10/30/2015	10043949					108	9.5	29	6.5	6.5
7	Trib @ Colby Rd	10/30/2015	10043551					319	7.5	78	7.4	6.7

¹ All total phosphorus samples exceed Wisconsin's stream standard for TP concentration of 75 ug/l.

Table 12. Monthly Total Phosphorus Concentrations^(*)

Site Name/Description	Sample Date	Total Phosphorus (ug/l)
South Fish Creek at Hwy 137	07/15/2014	128
	08/12/2014	178
	09/02/2014	353
	5/12/2015	203
	6/16/2015	110
	07/15/2015	275
	08/18/2015	122
	09/22/2015	124
	10/20/2015	69
	2015 median =	123
	2014/15 mean =	174
South Fish Creek at Colby Rd	05/09/2014	721
	06/16/2014	302
	07/15/2014	119
	08/12/2014	72
	09/10/2014	859
	10/14/2014	109
	05/12/2015	140

	06/16/2015	111
	07/15/2015	229
	08/18/2015	110
	09/22/2015	102
	10/20/2015	55
	2015 median =	110.5
	2014/15 mean	244
Unnamed tributary to South Fish Creek at Colby Rd	05/11/2015	173
	06/16/2015	160
	07/15/2015	311
	08/18/2015	267
	09/22/2015	116
	10/20/2015	92
	2015 median =	166
	2015 mean =	186

(* Data Collected by Northland College (2014-2015))



South Fish Creek at CTH F (Map Site No. 6) 2018. Photo by Craig Roesler.

Management Recommendations

Management Options

- Since South Fish Creek is impaired due to high phosphorus concentrations, efforts should be made to reduce sources of phosphorus.
- Suspended sediment concentrations and turbidity are also high in South Fish Creek watershed streams. Streambank erosion is typically the largest source of suspended sediment and turbidity in Clay Plain streams. Reducing peak flows can reduce streambank erosion which could contribute to reduced suspended sediment and turbidity in South Fish Creek and Chequamegon Bay.

Management Recommendations for DNR

- The DNR should work with the Bayfield County Land and Water Conservation Department to identify options for reducing phosphorus input to watershed streams, such as barnyard runoff control and development of farm nutrient management plans.
- The DNR should work with the Bayfield County Land and Water Conservation Department to identify options for reducing peak flows in the watershed ("Slow the Flow" efforts).

Management Recommendations of External Partners

- Bayfield County should continue to apply for grants to fund best management practices with landowners to implement practices and continue ongoing work with specific farmers for reduction of manure and nutrient runoff.
- Local communities should apply for grants to continue best management practices designed to reduce runoff of total phosphorus and sediment.

Monitoring and Assessment Recommendations

- After land management practices and restoration work are conducted, DNR should monitor and assess watershed streams to determine if conditions are improving.
- After land management practices and restoration work are conducted, engage water quality monitoring volunteers to support monitoring watershed streams.

Appendix A: References

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Appendix B: South Fish Watershed Narratives

South Fish Creek (WBIC 2889900)

South Fish Creek flows through a severely eroded channel and experiences large floods that destroy bank cover. The watershed is located in the Lake Superior Clay Plain and has clay-rich soils. Streamflow is provided mostly by surface runoff, with very limited groundwater inflow. This results in “flashy” hydrology, with very high flows occurring during runoff events, and very low base flows. The upstream half of the creek is intermittent with no flow at times.

Fish populations found at six sites monitored during 2012-2015 indicated warm transition (coolwater) natural fish communities. Five of the six sites were headwater communities, while the most downstream site (STH 137) was a mainstem community. The fish Index of Biotic Integrity (IBI) was fair at one site and good to excellent at the other five sites. Fish communities at all sites were dominated by forage fish, with some gamefish and panfish present at the most downstream site. The majority of fish at all sites are considered “tolerant” to environmental degradation. This is probably due to the unstable habitat resulting from the flashy hydrology and the chronic turbidity from suspended clay. The macroinvertebrate Index of Biotic Integrity (MIBI) was fair at one site and good to excellent at the other five sites. The number of macroinvertebrate species present in samples was moderate to high at the six sites, ranging from 24 to 36.

South Fish Creek is identified as impaired due to total phosphorus concentrations (>75 ug/l). However, the available biological data does not indicate impairment (i.e. no macroinvertebrate or fish Index of Biotic Integrity (IBI) scored in the “poor” condition category). Sampling in the past identified fecal coliform bacteria exceedences. This is probably common for Clay Plain streams due to high rates of surface runoff and little infiltration. Total suspended solids concentrations were moderate to high, and transparencies were low to moderate due to the influence of suspended clay.

Streambank erosion is typically the largest source of total suspended sediment and reduced transparency in Clay Plain streams. Runoff from barnyards and other livestock areas is probably a substantial phosphorus source in the South Fish Creek watershed. Cropland runoff is another phosphorus source, although only 2.9% of the watershed is cropland. Streambank erosion also delivers phosphorus to the stream, although this is typically a minor phosphorus source in Clay Plain streams.

Unnamed Tributary to South Fish Creek (WBIC 2890200)

The 6.73-mile clay-dominated intermittent unnamed tributary to South Fish Creek is a warm transition headwater and is considered impaired, or not meeting water quality standards. This stream was monitored at Colby Road (map site 7). The results indicate total phosphorus exceeds water quality standards. Biological impairments, however, were not present at the time of monitoring. Biological data gathered for this study showed a “good” condition based on fish index of biological integrity (F-IBI) and “good” condition for both the Hilsenhoff Index of Biological Integrity (HIBI) and the Wisconsin Macroinvertebrate Index of Biological Integrity (mIBI).

This water was assessed during the 2016 listing cycle; total phosphorus sample data exceeded 2016 WisCALM listing criteria for the Fish and Aquatic Life use. The stream was placed on the impaired waters list (category 5P). However, available data did not indicate biological impairment (i.e. no macroinvertebrate or fish Index of Biotic Integrity (IBI) scored in the “poor” condition category). This water was again assessed during the 2018 listing cycle; new total phosphorus sample data exceeded 2018 WisCALM listing criteria for the Fish and Aquatic Life use. However, available data once again did not indicate biological impairment. Chloride data was also assessed and did not exceed 2018 WisCALM listing criteria for Fish and Aquatic Life use.



South Fish Creek at CTH F (Map Site No. 6) 10-31-18, Photo by Craig Roesler.



South Fish Creek Unnamed Tributary at Colby Road (Map Site No. 7) 10-31-18, Photo by Craig Roesler.

Appendix C: Fish Creek Watershed: Fish and Aquatic Life Use Attainment

Table 13. Fish Creek Watershed Fish and Aquatic Life Designated Use Attainment Table

WBIC	Waterbody Name	Start Mi	End Mi/ Lake ac	Current Use	Attainable Use	Supporting Attainable Use	Designated Use	Assessment	ORW/E RW	DNR Category
2891100	Bay City Creek	0	7.77	FAL	WWFF	Not Supporting	Default FAL	Monitored	None	Category 5A
2756600	Boris Lake	0	2.58	Small	FAL	Not Assessed	Default FAL	No Assessment	None	Category 3
2756900	Buck Lake	0	6.24	Small	FAL	Supporting	Default FAL	Not Assessed	None	Category 3
2965600	Camp One Creek	0	1.67	FAL	FAL	Not Assessed	Default FAL	Not Assessed	None	Category 3
2965700	Camp One Lake	0	32.61	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2757600	Camp Two Lake	0	3.41	Small	FAL	Not Assessed	Default FAL	No Assessment	None	Category 3
2753770	Chequamegon Bay (Ashland Coal Tar Site)	0	16.62	FAL	FAL	Not Supporting	Default FAL	Monitored	None	Category 5A
2760000	Deep Lake	0	10.3	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2887700	Eileen Creek	0	1.3	Cold (Class II Trout)	Cold (Class II)	Not Assessed	Cold	Evaluated: Older Data	ORW	Category 3
2965500	Finger Lake	0	46.14	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2887800	Fish Creek	0	4.55	Shallow Lowland	Cold (Class II)	Not Assessed	Cold	Evaluated	None	Category 3
2888200	Fish Creek Spring	0	0.74	Small	FAL	Not Assessed	Default FAL	No Assessment	None	Category 3
2763800	Honey Lake	0	10.12	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2764600	Island Lake	0	32.61	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2765500	Lake Nokomis	0	8.58	Small	FAL	Supporting	Default FAL	Monitored	None	Category 2
2765700	Lake River	0	13.98	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2751220	Lake Superior	0	156.01	Cold	Cold	Not Assessed	Default FAL	Monitored	None	Category 5A
2751220	Lake Superior (mouth Fish Creek)	0	36.04	FAL	FAL	Not Assessed	Default FAL	Not Assessed	ORW	Category 3
2751220	Lake Superior (mouth Whittlesey Creek)	0	63.47	FAL	FAL	Not Assessed	Default FAL	Not Assessed	ORW	Category 3
2889000	Little Pine Creek	0	1.59	Cold (Class I Trout)	Cold (Class I)	Fully Supporting	Cold	Monitored	ORW	Category 2
2767400	Loon Lake	0	37.29	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2769900	NE Twin Lake	0	10.15	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2888000	North Fish Creek	0	7.45	Cold (Class II Trout)	Cold (Class II)	Not Assessed	Cold	Evaluated: Older Data	ORW	Category 3

March 23, 2020

**SOUTH FISH CREEK TARGETED WATERSHED ASSESSMENT: A WATER QUALITY REPORT
TO RESTORE WISCONSIN WATERSHEDS 2020**

WBIC	Waterbody Name	Start Mi	End Mi/ Lake ac	Current Use	Attainable Use	Supporting Attainable Use	Designated Use	Assessment	ORW/E RW	DNR Category
2888000	North Fish Creek	7.46	17.07	Cold (Class I Trout)	Cold (Class I)	Fully Supporting	Cold	Monitored	ORW	Category 2
2888000	North Fish Creek	17.05	17.47	FAL	FAL	Fully Supporting	Default FAL	Monitored	None	Category 2
2888000	North Fish Creek	17.47	25.37	FAL	FAL	Not Assessed	Default FAL	No Assessment	None	Category 3
2889600	North Fish Creek Trib (S13, T47N R6W)	0	3.27	Cold (Class I Trout)	Cold (Class I)	Not Assessed	Cold	Evaluated	ORW	Category 3
2770200	NW Twin Lake	0	8.44	Small	FAL	Supporting	Default FAL	Monitored	None	Category 2
2770600	Patsy Lake	0	4.65	Small	FAL	Not Assessed	Default FAL	No Assessment	None	Category 3
2888600	Pine Creek	0	5.64	Cold (Class I Trout)	Cold (Class I)	Fully Supporting	Cold	Monitored	ORW	Category 2
2773200	Sawdust Lake	0	18.87	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2773400	SE Twin Lake	0	17.34	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
5001388	Slaughter House Creek	0	1.69	Class I Trout	Class I	Not Assessed	Default FAL	No Assessment	ERW	Category 3
2890700	Slaughterhouse Creek (T47N R5W S01 NESE)	0	1	Cold (Class I Trout)	Cold (Class I Trout)	Not Assessed	Cold	No Assessment	None	Category 3
2890700	Slaughterhouse Creek (T47N R5W S01 NESE)	1	3	FAL	FAL	Not Assessed	Default FAL	No Assessment	None	Category 3
2889900	South Fish Creek	0	22.51	FAL	FAL	Not Supporting	Default FAL	Monitored	None	Category 5P
2774200	Spider Lake	0	65.76	Shallow Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2775700	Topside Lake	0	66.02	Shallow Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2776000	Tub Lake	0	9.94	Small	FAL	Supporting	Default FAL	Monitored	None	Category 2
76 lakes	Unnamed Lakes	0	108.71	Small	FAL	Not Assessed	Default FAL	No Assessment	None	Category 3
2890600	Unnamed Bay	0	12.42	FAL	FAL	Not Assessed	Default FAL	Evaluated	None	Category 3
50 waters	Unnamed Streams	0	97.74	FAL	FAL	Not Assessed	Default FAL	No Assessment	None	Category 3
5001665	Unnamed Trib to N Fish Creek	0	2.18	FAL	FAL	Fully Supporting	Default FAL	Monitored	None	Category 2
2890200	Unnamed Trib to S Fish Creek	0	6.73	FAL	FAL	Not Supporting	Default FAL	Monitored	None	Category 5P
2889100	Unnamed Trib. To Little Pine Creek (T47N R6W S10 NENE)	0	1	Cold (Class II Trout)	Cold (Class I)	Not Assessed	Default FAL	No Assessment	None	Category 3
2889700	Unnamed Trib. To N. Fish Creek(T47N R6W S29)	0	4.11	Cold (Class II Trout)	Cold (Class I)	Supporting	Default FAL	Monitored	None	Category 2

WBIC	Waterbody Name	Start Mi	End Mi/ Lake ac	Current Use	Attainable Use	Supporting Attainable Use	Designated Use	Assessment	ORW/E RW	DNR Category
5001445	Unnamed trib. to North Fish Creek (T47-R6W-S22-5c)	0	0.27	FAL	FAL	Not Assessed	Default FAL	No Assessment	None	Category 3
2888900	Unnamed Trib. To Pine Creek (T47n R6W S11 SWSE)	0	2	FAL	FAL	Not Assessed	Default FAL	Evaluated: Watershed Tables	None	Category 3
2889400	Unnamed Trib. To Pine Creek (T47N R6W S11 SWSW)	0	0.62	Cold (Class I Trout)	Cold (Class I)	Fully Supporting	Cold	Monitored	ORW	Category 2
2889500	Unnamed Trib. To Pine Creek (T47N R6W S11 SWSW)	0	0.87	Cold (Class I Trout)	Cold (Class I)	Not Assessed	Cold	Evaluated: Watershed Tables	ORW	Category 3
4000035	Unnamed (T47-R6W-S10-4b)	0	0.12	FAL	FAL	Not Assessed	Default FAL	Not Assessed	None	Category 3
5001450	Unnamed(T47-R6W-S22-6a)	0	0.38	FAL	FAL	Not Assessed	Default FAL	No Assessment	None	Category 3
2890200	Unnamed tributary to South Fish Creek	0	6.73	FAL	FAL	Not Supporting	Default FAL	Monitored Impaired	None	Category 5a
2832400	Wanoka Lake	0	15.2	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2832500	Wentzel Lake	0	21.35	Deep Seepage	FAL	Supporting	Default FAL	Monitored	None	Category 2
2833000	Wolf Lake	0	9.12	Small	FAL	Supporting	Default FAL	Monitored	None	Category 2

The table reflects the condition of waters in the study area watershed. This table data is stored in the Water Assessment Tracking and Electronic Reporting System (WATERS) and is updated on an ongoing basis via monitoring data and assessment calculations. The following definitions apply:

- Current Use – current condition of water based on monitoring data.
- Attainable Use – “ecological potential” of water based on water type, natural community, lack of human-induced disturbances.
- Supporting Use – decision on whether the water’s current condition is supporting its designated use under “water quality standards”.
- Designated Use – the water’s classified use under NR102, Wisconsin Water Quality Standards, for Fish and Aquatic Life.
- Assessment – field indicates what type of data or information supports the decisions in the table (current, attainable, and supporting attainable).
- Data – Specific data areas used for the decision (see below)
- DNR Category -- Is water meeting or not meeting standards

Category 2: Water has been assessed and meetings at least standards for the assessed designated use.

Category 3: Insufficient data exists to determine if water quality standards are met.

Category 4A: Water is impaired and a TMDL or other restoration plan is in process.

Category 5A: Waters is impaired and a TMDL or other process is required.

Category 5P: Waters that have total phosphorus levels that exceed the State water quality standard, but which currently do not exhibit biological impairment.

Appendix D: Fish Creek Watershed Water Quality Designations & Listings

Table 14. Trout Classifications and O/ERW waters in the Fish Creek Watershed (LS08).

Waterbody Name	WBIC	Start Mile	End Mile	Trout Class	ORW/ERW
Fish Creek	2887700	0	1.29	CLASS II	
Little Pine Creek	2889000	0	1.59	CLASS I	ORW
North Fish Creek	2888000	0	17.05	CLASS II	ORW
North Fish Creek	2888000	17.05	17.47	CLASS I	
Pine Creek	2888600	0	5.64	CLASS I	ORW
Unnamed	2889400	0	0.62	CLASS I	ORW
Unnamed	2889500	0	0.87	CLASS I	ORW
Unnamed	2889600	0	3.27	CLASS I	ORW
Unnamed	4000035	0	0.12	CLASS I	
Unnamed	5001388	0	1.69	CLASS I	ERW
Unnamed	5001445	0	0.27	CLASS I	
Unnamed	5001450	0	0.38	CLASS I	

Table 15. Impaired Water Listings in the Fish Creek Watershed (LS08).

Waterbody Name	WBIC	Start Mile	End Mile	Pollutant	Impairment
Bay City Creek	2891100	0	7.77	Total Phosphorus	Degraded Biology
South Fish Creek	2889900	0	22.51		Impairment Unknown
Unnamed	2890200	0	6.73	E. coli	Recreational Restrictions - Pathogens
Maslowski Beach	2751220			Mercury, PCBs	Contaminated Fish Tissue
Lake Superior	2751220			PAHs	Aquatic Toxicity, Contaminated Sediment
Chequamegon Bay, Ashland Coal Tar Site	2753770				

Figure 12. Fish Creek Watershed Outstanding & Exceptional Resource Waters and Impaired Waters

