

**WATER QUALITY STANDARDS REVIEW  
AND STREAM CLASSIFICATION FOR  
THE NORTH BRANCH OF THE PIKE RIVER,  
PIKE RIVER WATERSHED, KENOSHA COUNTY, WISCONSIN  
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## INTRODUCTION

Stream classifications are being developed for reaches of the Pike River that may be affected by implementation of recommendations set forth in SEWRPC Planning Report No. 35, A Comprehensive Plan for the Pike River Watershed(1983). This appraisal contains survey results, a stream classification and other water quality management recommendations for the North Branch of the Pike River and a related tributary(Bartlett Branch).

## BACKGROUND

The headwaters of the North Branch of the Pike River are located in the Upper Pike River subwatershed near CTH C, Racine County, at T3N, R22E, Sec.11, SW, NW. From there, the river flows southerly to Petrifying Springs County Park in the Town of Somers, Kenosha County, where it is joined by the South Branch of the Pike River(Pike Creek). The North Branch of the Pike River drains an area of approximately 17 square miles and has an observed Q7,2 of 0.01 cfs and a Q7,10 of <0.01cfs, as measured at STH 20, Racine County (Holmstrom, 1982). A small tributary, the Bartlett Branch, has its confluence with the North Branch at T3N, R22E, Sec.11, SW, NW. The North Branch of the Pike River and the Bartlett Branch have been extensively modified in the past, contributing to the degraded state of the system at the present time.

Land use in the Upper Pike River subwatershed is predominantly agricultural, although increasing residential and commercial development may lead to further modification of the stream system. The Hebron-Montgomery-Aztalan is the dominant soil association along the immediate stream corridor. This association is characterized by well-drained to poorly drained soils that have a loam to silty clay subsoil. Erosion is a hazard on the Hebron soils, and improved drainage is needed on the Montgomery and Aztalan soils. The Varna-Elliot-Ashkum is the dominant soil association in the surrounding subwatershed. This association is characterized by well-drained to poorly drained soils that have a silty clay loam to clay subsoil (Link and Demo, 1970). The presence of poorly drained soils in each of these associations has encouraged channelization and the tiling of fields to improve agricultural land drainage.

The North Branch of the Pike River receives several industrial cooling water discharges and has experienced fish kills which generally have been attributed to spills, although exact sources are unknown. The North Branch of the Pike River was most recently classified as a warmwater sport fish community from its confluence with the Lower Pike River upstream to STH 20, Racine County, and as a warmwater forage fish community from STH 20 upstream to the headwaters (Mace, 1992).

## METHODS

The stream classifications for the North Branch of the Pike River and the Bartlett Branch are based on guidelines developed by Ball (1982). Fish community and habitat surveys were conducted at two sites on both the North Branch and the Bartlett Branch during April and May 1993. Habitat surveys were again conducted on the two North Branch sites in July of 1993 in order to check the results of the earlier surveys. The first station on the North Branch, upstream of STH 20, Racine County, to the first culvert(at the Knights Inn Motel) was sampled on April 14, 1993. The second station, upstream of the culvert at Knights Inn to the culvert at Mariner Drive in the Crossroads subdivision, was sampled on May 20, 1993. The first site on the Bartlett Branch, upstream of Stuart Road, Racine County, to the first culvert, was sampled on May 20, 1993. The second Bartlett Branch site, at Old Spring Street in Racine County, was also sampled on May 20,1993. Fish community samples at all sites were collected using a DC backpack electroshocker operating at between 120 and 150 volts and 1.9 to 2.6 amps. Sampling efficiency was not estimated for any of the samples. Earlier fish community samples were reported by Fago (1984).

## RESULTS

### Water Quality

Water temperatures and dissolved oxygen were measured at both Bartlett Branch sites and at the second site on the North Branch during the 1993 stream classification (Appendix 2). All values were within seasonal limits. However, the presence of rather dense filamentous algae and aquatic macrophytes may lead to oxygen deficit during the summer months.

### Habitat

Habitat quality for the North Branch rated poor at the first station(immediately upstream of STH 20) and fair at the second station(between the culvert at Knights Inn and the culvert at Mariner Road in the Crossroads subdivision). Habitat quality rated poor at both the Bartlett Branch sites. Fish and aquatic life cover at the first site on the North Branch is provided by instream vegetation and occasional woody snag. The substrate consists almost entirely of silt and clay or muck. The lack of stable substrate is obvious at this station. Fish and aquatic life cover at the second site on the North Branch is provided by overhanging bank vegetation, instream woody snags, scattered rubble, and an occasional undercut bank.The substrate at this station consists mainly of silt and sand with some gravel and rubble also present. Fish and aquatic life cover at both sites is limited to overhanging bank vegetation and an occasional woody snag. Lack of adequate depth at low flows is also apparent at all sites.

Woody bank vegetation is present and well-established at the second site on the North Branch and consists of both mature trees and low shrubs. The understory vegetation is somewhat sparse, resulting in areas of bare soil along the banks. The bank vegetation at the first site on the North Branch consists mainly of shrubs and primarily immature trees. Bank vegetation on the Bartlett Branch is dominated by grasses at the Stuart Road site and by woody shrubs at the Old Spring Street site. Sparse understory vegetation is contributing to bank erosion at the Old Spring Street site.

Factors and sources responsible for limiting habitat quality include stream channelization, debrising of streambanks, draining of wetlands, sedimentation from agricultural sources of

nonpoint pollution, and increased stormwater drainage due to expanding development within the subwatershed.

### Fish Community

A total of eighteen species and two hybrid crosses have been collected at six different sites on the North Branch of the Pike River and the Bartlett Branch since 1975 (Appendix 2). At the present time the North Branch and the Bartlett Branch support fish communities of primarily tolerant to very tolerant forage fish species. Resident sport fish are currently represented by green sunfish, which were collected at all sites in 1993. Historically, sport fish species have been represented by green sunfish, bluegill, largemouth bass, black bullhead, and a green sunfish and pumpkinseed hybrid cross. The presence of a single brook trout smolt in the North Branch in 1993 can be attributed to the Lake Michigan stocking program administered by the Wisconsin DNR. Intolerant fish species are currently represented by southern redbelly dace and blacknose dace. A calculation of the Index of Biotic Integrity for the reaches sampled on the North Branch yielded ratings of **Poor** for the reach upstream of STH 20 and **Very Poor** for the reach upstream of the culvert at Knights Inn (Lyons, 1992).

Factors responsible for the decline in fish and aquatic life diversity include historical stream channelization, removal of bank vegetation and loss of riparian buffer zones, lack of instream cover and suitable substrate, and increased sedimentation from agricultural sources of nonpoint source pollution.

### Recreational Use

Potential or existing recreational uses for the North Branch and Bartlett Branch and their corridors include wading, fishing, bait fish collection, trapping, hiking, aesthetics, nature study, and others. These uses are or would be limited by the lack of public access along these stream reaches.

### SUMMARY

A Stream Classification was completed for the North Branch of the Pike River and the Bartlett Branch during 1993. In 1992, the North Branch was classified as supporting a warmwater sport fish community from its confluence with the mainstem upstream to STH 20 in Racine County, and as supporting a warmwater forage fish community from STH 20 upstream to the headwaters near the Town of Mt. Pleasant in Racine County (Mace, 1992). The Bartlett Branch was not previously classified.

Habitat quality was rated poor at the first site on the North Branch (upstream of STH 20 to the culvert at Knights Inn) and fair at the second North Branch site (upstream of the culvert at Knights Inn to the culvert at Mariner Drive). Habitat quality was rated poor at both sites on the Bartlett Branch. Factors and sources which limit habitat quality include stream channelization, debrising of streambanks, draining of wetlands, sedimentation from agricultural sources of nonpoint pollution, and increased stormwater drainage due to expanding development within the subwatershed.

The North Branch and the Bartlett Branch support communities composed primarily of forage fish species classified as tolerant to very tolerant of habitat degradation. Resident sport fish are currently represented by green sunfish. The presence of a single brook trout smolt can be attributed to stocking programs administered by the Wisconsin DNR. The diversity of fish and aquatic life communities is limited by historical stream channelization, removal of bank vegetation and loss of riparian buffer zones, lack of instream cover and suitable substrate, and increased sedimentation from agricultural sources of nonpoint source pollution.

## RECOMMENDATIONS

1. The North Branch of the Pike River from its confluence with the mainstem upstream to STH 20 in Racine County shall be classified as a **WARMWATER SPORT FISH COMMUNITY**. This classification remains the same as that which was developed by Mace (1992). The North Branch upstream of STH 20 supports a fish community composed primarily of tolerant to very tolerant forage fish. However, the habitat is adequate to support a more diverse forage and sport fish community, such as that which existed in that reach historically. Also, the presence of a brook trout smolt in the North Branch may indicate that this reach serves as a refuge for stocked salmonids during periods of high flow. Based on these considerations the North Branch of the Pike River upstream of STH 20 shall also be classified as a **WARMWATER SPORT FISH COMMUNITY** according to Stream Classification Guidelines for Wisconsin (Ball, 1982).
2. The Bartlett Branch supports a fish community composed primarily of forage species classified as tolerant to very tolerant of habitat degradation. Habitat quality and water flows are such that the Bartlett Branch can not support a sport fish or a balanced forage fish community. Based on this consideration the Bartlett Branch shall be classified as a **LIMITED FORAGE FISH COMMUNITY** according to Stream Classification Guidelines for Wisconsin (Ball, 1982).
3. The following land and stream management practices should be considered to improve or restore aquatic life and wildlife communities, water quality, and recreational uses:
  - a. Prevent further modification of the stream channel and stream corridor.
  - b. Explore techniques to mitigate the effects of past channel modifications including, but not limited to, alternative channel designs and selected habitat improvement methods.
  - c. Protect and restore riparian habitats. Encourage the growth of woody plants along the stream channel to improve bank stability, provide wildlife habitat, and aid in moderation of water temperatures through shading of the stream channel.
  - d. Implement best management practices to reduce sedimentation from agricultural sources of nonpoint source pollution.
  - e. Limit future development within the floodplain to protect riparian habitats.

## REFERENCES

- Ball, Joseph. 1982. Stream Classification Guidelines for Wisconsin. Technical Bulletin. Wisconsin Department of Natural Resources, Madison, Wisconsin.
- Fago, Donald. 1984. Distribution and Relative Abundance of Fishes in Wisconsin. Number IV. Root, Milwaukee, Des Plaines, and Fox River Basins. Technical Bulletin No. 147. Wisconsin Department of Natural Resources, Madison, Wisconsin.
- Holmstrom, B. K. 1982. Low-Flow Characteristics of Streams in the Lake Michigan Basin, Wisconsin. U. S. Geological Survey, Madison, Wisconsin.
- Link, E. G. and O. R. Demo. 1970. Soil Survey of Racine and Kenosha Counties, Wisconsin. U. S. Department of Agriculture, Soil Conservation Service.
- Lyons, John. 1992. Using the index of biotic integrity (IBI) to measure environmental quality in warmwater streams of Wisconsin. Gen. Tech. Rep. NC-1149. St. Paul, MN: U. S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 51p.
- Mace, Steve. 1992. Stream Classifications for the North Branch, South Branch, and Mainstem Branch of the Pike River. Wisconsin Department of Natural Resources, Southeast District, Milwaukee, Wisconsin.

Appendix 1  
Stream System Habitat Rating Forms

Appendix 2

Fish Distribution, Relative Abundance and  
Tolerance for the North Branch of the Pike River  
and the Bartlett Branch

<u>Date</u>	<u>Location</u>	<u>Common name</u>	<u>Number</u>	<u>Tolerance</u>
7/8/24	T2N R22E S.2 NW SW	Largescale stoneroller	3	Intolerant
		Hornyhead chub	3	Intolerant
		Common shiner	51	Tolerant
		S. redbelly dace	3	Intolerant
		Bluntnose minnow	4	Tolerant
		Blacknose dace	9	Intolerant
		Creek chub	5	Tolerant
		Common shiner x		
		S. redbelly dace	1	-
		White sucker	1	Tolerant
		Least darter	2	Intolerant
		Johnny darter	17	Tolerant
		9/4/75	T3N R22E S.27 SE SE	Golden shiner
S. redbelly dace	4			Intolerant
Fathead minnow	99			Very Tolerant
Creek chub	83			Tolerant
White sucker	10			Tolerant
Black bullhead	11			Sport Fish
Green sunfish	20			Sport Fish
Bluegill	2			Sport Fish
Largemouth bass	1			Sport Fish
Green sunfish x				
Pumpkinseed	1			-
5/9/78	T3N R22E S.14 NE SW	Fathead minnow	16	Very Tolerant
		White sucker	12	Tolerant
		Brook stickleback	7	Tolerant
		Green sunfish	3	Sport Fish
4/14/93	T3N R22E S.14 SE NW	White sucker	6	Tolerant
		Creek chub	15	Tolerant
		Brook stickleback	14	Tolerant
		Green sunfish	1	Sport Fish
		S. redbelly dace	4	Intolerant



Appendix 2, continued

Fish Distribution, Relative Abundance and  
Tolerance for the North Branch of the Pike River  
and the Bartlett Branch

<u>Date</u>	<u>Location</u>	<u>Common name</u>	<u>Number</u>	<u>Tolerance</u>
5/20/93	T3N R22E S.14 SE NW	Creek chub	181	Tolerant
		Green sunfish	5	Sport Fish
		White sucker	63	Tolerant
		Brook stickleback	19	Tolerant
		Blacknose dace	15	Intolerant
		Fathead minnow	8	Very Tolerant
		Golden shiner	1	Tolerant
		S. redbelly dace	1	Intolerant
		Brook trout	1	Sport Fish

water temperature(C) = 8.9 dissolved oxygen = 10.7 mg/l  
% saturation = 92.8

5/20/93	T3N R22E S.10 NW SE	Green sunfish	5	Sport Fish
		Creek chub	8	Tolerant
		Fathead minnow	5	Very Tolerant

water temperature(C) = 8.9  
dissolved oxygen = 10.7 mg/l  
% saturation = 92.8

5/20/93	T3N R22E S.10 SE NW	Green sunfish	1	Sport Fish
		Fathead minnow	9	Very Tolerant
		Creek chub	2	Tolerant

water temperature(C) = 11.6  
dissolved oxygen = 8.2 mg/l  
% saturation = 74

Appendix 3

Index of Biotic Integrity Ratings  
for the North Branch of the Pike River

Stream name: North Branch of the Pike River

Date sampled: April 14, 1993

Reach location: Upstream of STH 20, Racine County

Distance from nearest lake >10 acres (mi): Approximately 10 miles

Distance from nearest stream w/mean Q > 1500 cfs (mi):

Mean stream width (ft): 10.9

INDIVIDUAL SPECIES METRIC		IBI SCORE
Distance sampled (meters):	83.8	
Total fish captured:	40	
Number of species:	5	
Total number of native species:	5	0
Number of darter species:	0	0
Number of sucker species:	1	2
Number of sunfish species:	1	5
Number of intolerant species:	0	0
Total number of tolerant fish:	22	
Total number of intolerant fish:	18	
Total number of omnivores:	6	
Total number of insectivores:	15	
Total number of top carnivores:	0	
Total number simple lithophores:	10	
Total number of DELT:	0	
Percent tolerant species:	55.00	0
Percent omnivores:	15.00	10
Percent insectivores:	37.50	5
Percent top carnivores:	0.00	0
Percent simple lithophilous spawners:	25.00	5
Number of individuals* / 300 m sampled:	64.44	0
Percent DELT:	0.00	
<b>TOTAL IBI SCORE:</b>		<b>27</b>
Biotic Integrity Rating:	Poor	

\*excluding tolerant species

Stream name: North Branch of the Pike River

Date sampled: May 20, 1993

Reach location: Upstream of the culvert at Knights Inn to Mariner Rd., Racine County

Distance from nearest lake >10 acres (mi): Approximately 10 miles

Distance from nearest stream w/mean Q > 1500 cfs (mi):

Mean stream width (ft): 10

INDIVIDUAL SPECIES METRIC		IBI SCORE
Distance sampled (meters):	370	
Total fish captured:	294	
Number of species:	8	
Total number of native species:	8	0
Number of darter species:	0	0
Number of sucker species:	1	2
Number of sunfish species:	1	5
Number of intolerant species:	0	0
Total number of tolerant fish:	273	
Total number of intolerant fish:	20	
Total number of omnivores:	72	
Total number of insectivores:	24	
Total number of top carnivores:	0	
Total number simple lithophores:	79	
Total number of DELT:	0	
Percent tolerant species:	92.86	0
Percent omnivores:	24.49	5
Percent insectivores:	8.16	0
Percent top carnivores:	0.00	0
Percent simple lithophilous spawners:	26.87	5
Number of individuals* / 300 m sampled:	16.22	-10
Percent DELT:	0.00	0
<b>TOTAL IBI SCORE:</b>		<b>7</b>
<b>Biotic Integrity Rating:</b>	<b>Very Poor</b>	

\*excluding tolerant species

Appendix 4

Stream Classifications Prior to 1993



Figure 1. North Branch of the Pike River upstream of STH 20, Racine County. Note the bank vegetation, which is dominated by grasses, shrubs, and immature trees. Also note the presence of aquatic macrophytes in the stream channel.



Figure 2. North Branch of the Pike River, upstream of the culvert at Kings Hill. Note the trees in the background.



Figure 3. North Branch of the Pike River, upstream of the culvert at Knights Inn. Note the overhanging bank vegetation, which is shading the stream channel.



Figure 4. Brook trout captured during fish community survey on the North Branch of the Pike River near Mariner Drive. The North Branch may serve as a refuge for stocked trout and salmon before outmigration to Lake Michigan.