

SUGAR RIVER
CLASSIFICATION SURVEY

Dane County, Wisconsin

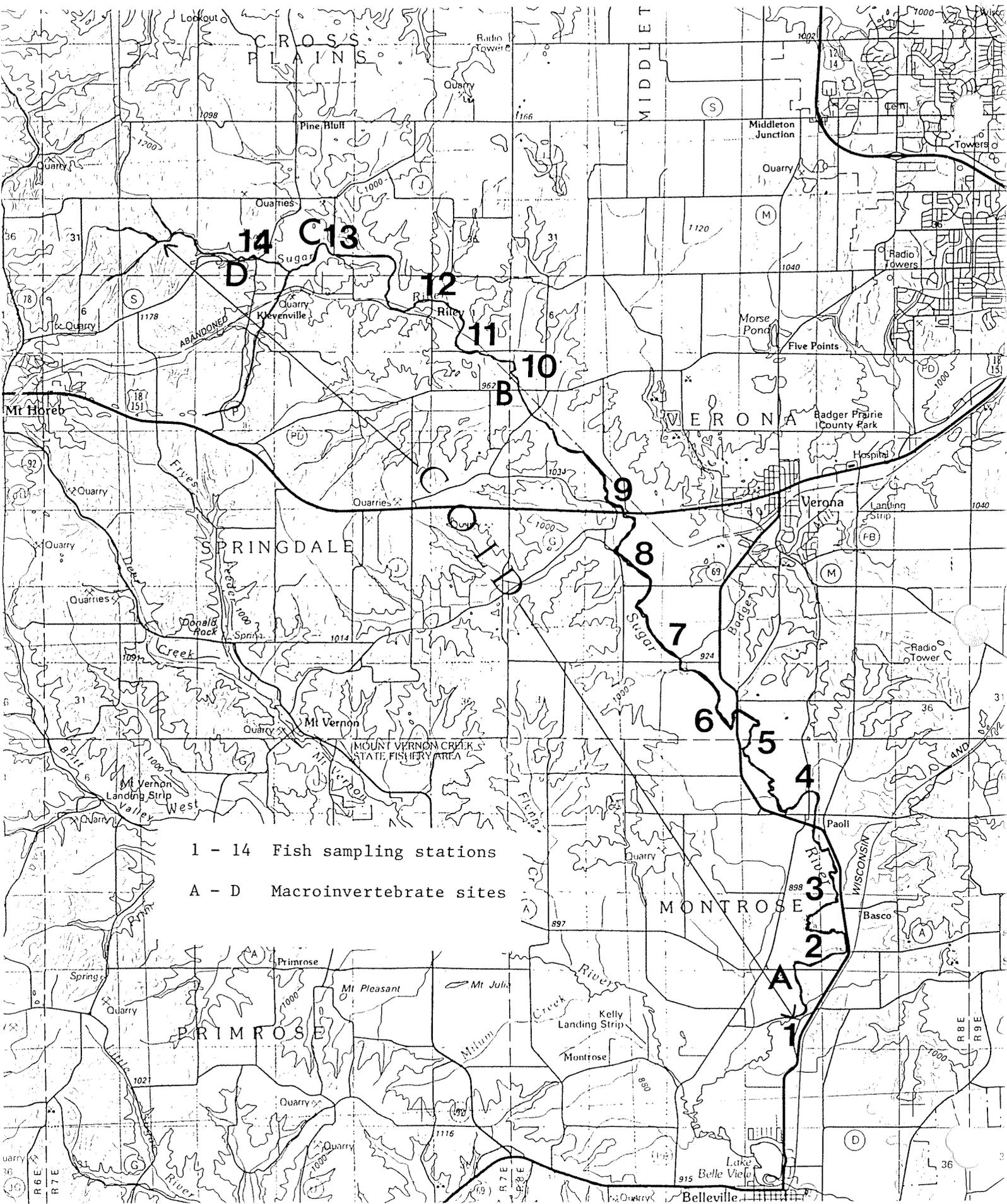
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by

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Wisconsin Department of Natural Resources

Southern District



1 - 14 Fish sampling stations
 A - D Macroinvertebrate sites

SURVEY OBJECTIVE

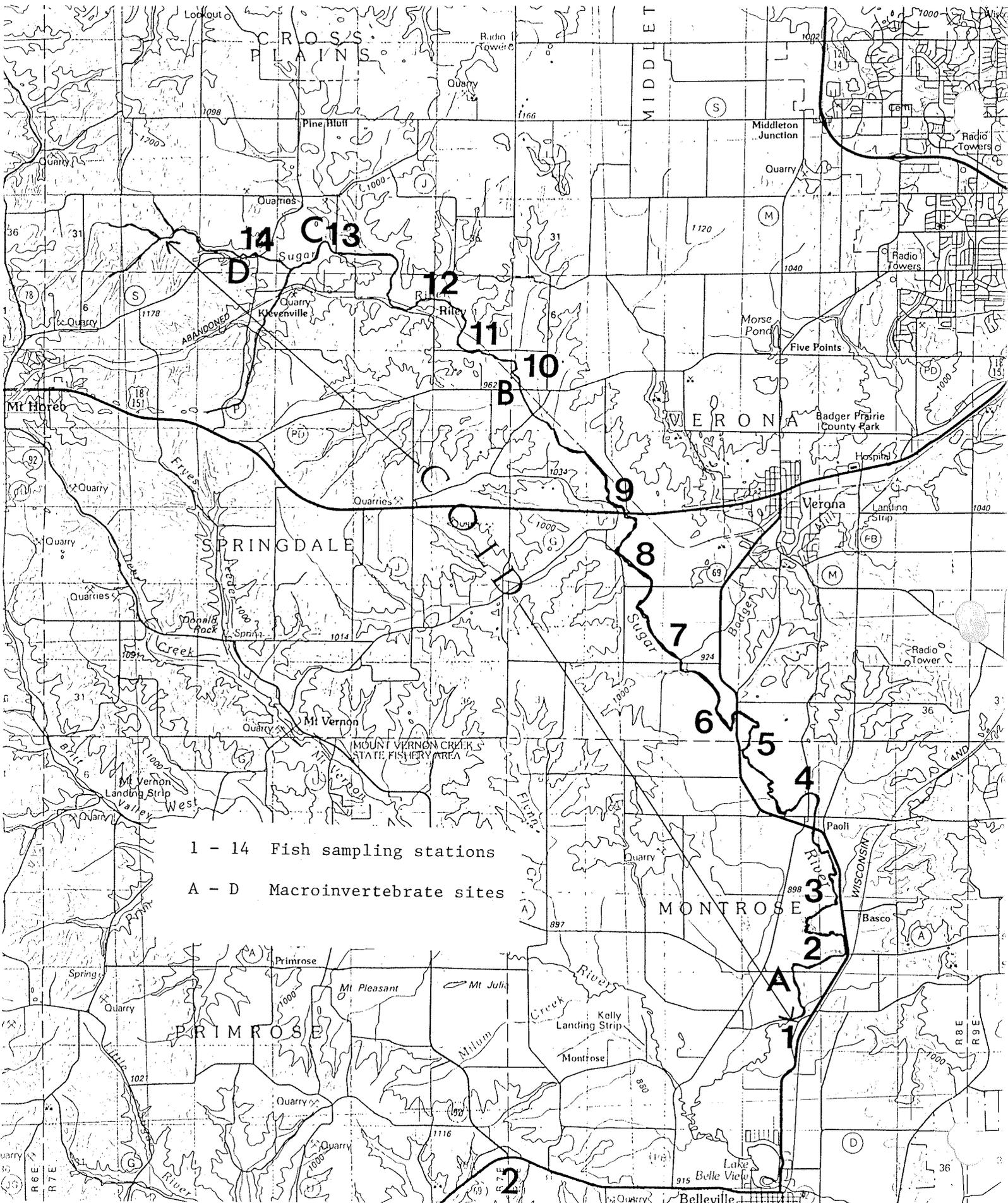
The purpose of the classification survey was to identify appropriate uses for the Sugar River above the Belleville Millpond. The original Sugar River classification was **Warm Water Sport Fisheries**, but in recent years, improvements in land use management and wastewater treatment have improved the potential for supporting cold water communities in the river. The classification survey consisted of a major stream shocking survey and review of file reports including a PL-566 watershed evaluation, Dane County Water Quality Plan, Surface Water Resources of Dane County and Wisconsin Fish Distribution Survey.

WATER RESOURCES DESCRIPTION

The Sugar River is a low gradient stream (4.1 ft./mi.) originating in Section 31, T7N-R7E and flows southeast approximately 24 miles to the Village of Belleville. In Belleville, the stream is impounded by a low head dam to form a small millpond. The Sugar River drains approximately 2,000 acres of wetlands, including a sedge meadow-low prairie-fen complex, supporting rare plant species. The USGS estimated Q7,10 is 8.8 cubic feet/second 0.3 mi. north of Paoli.

Even though the stream is surrounded by numerous wetlands, the water quality has been degraded by agricultural land use management and nonpoint source pollution. Most of the headwater tributaries have been ditched and straightened for wetlands drainage and cropland management. Manure and sediment runoff have degraded streams throughout the watershed. For several years, sedimentation has minimized the recreational potential and storage capacity of the Belleville millpond.

The Sugar River has not been intensively monitored and we do not have enough information to accurately represent long-term water quality trends. However, we have reason to believe the water quality is improving due to a combination of factors. Within the last ten years, landuse management practices in the watershed have improved thanks to a PL-566 watershed project, the Conservation Reserve Program, and stream bank improvement projects sponsored by the Department of Natural Resources, Dane County Land Conservation Department, Trout Unlimited and Dane County Conservation League. Wastewater treatment facilities have improved within the City of Verona, the only community that discharges to the river upstream of Belleville. Several small industrial discharges no longer discharge directly to the river.



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The Sugar River drains several small cold water streams and supports a diverse fisheries community of warm, cool and cold water species. Thirty-one species were identified during the fish distribution study in 1974 and 1979. One hundred eighty-nine cold water mottled sculpin were collected.

In January, 1993, the Natural Resources Board approved the "Exceptional Surface Waters" designation for entire Sugar River reach in Dane and Green Counties under Wisconsin's Antidegradation Policy.

CLASSIFICATION

From the headwaters in T7N-R7E downstream to Frenchtown Road, Section 22, T5N-R8E, the stream classification is cold water fish and aquatic life communities (COLD). Below Frenchtown Road and for the remainder of the Sugar River, the classification is warm water sport fish (WWSF). The Antidegradation Policy of "Exceptional Resource Waters" apply to the entire river.

SURVEY METHODS

Fish: 14 stations were sampled on October 5-8, 1992, with a D.C. electrofishing boat. Station lengths ranged from 1000-1760'. A D.C. electrofishing boat was also used to sample eight sites during the fish distribution survey in 1974 and 1979.

Macroinvertebrates: Benthic arthropods were sampled with a D-frame net as part of the PL-566 watershed evaluation in 1982-83 and 1992, and basin assessment in 1979. The Hilsenhoff Biotic Index (HBI) was calculated from five sampling sites.

Dissolved oxygen/temperature: During 1992, measurements were taken monthly at CTH A bridge, with a YSI Model 57 meter.

SURVEY RESULTS

Forty-three brown trout with lengths ranging from 3.5-23.9" were captured from Frenchtown Road to approximately one mile below Riley in 1992 compared to no trout in 1974 or 1979. Seven trout were judged to originate from hatcheries while the other 36 were wild. The seven hatchery fish migrated from the cold water tributaries. In addition to brown trout, 27 other species were collected including central mudminnow, carp, creek chub, horneyhead chub, brassy minnow, bluntnose minnow, fathead minnow, central stoneroller, common shiner, spotfin shiner, white sucker, northern hog sucker, shorthead redhorse, golden redhorse, silver redhorse, mottled sculpin, black bullhead, yellow bullhead, stonecat, green sunfish, bluegill, black crappie, smallmouth bass, johnny darter, fantail darter, blackside darter, and brook stickleback. White suckers, creek chubs, common shiners and bluntnose minnows were abundant at most stations. Cold water mottled sculpin were found in 11 of 13 sampling stations within the COLD classification zone. Only one sampling station was located below Frenchtown Road and cold water management zone.

Macroinvertebrates collected during the basin survey in 1979 indicated "excellent to fair" water quality with HBI values ranging from 3.28 to 6.38. Macroinvertebrates sampled as part of the PL-566 evaluation indicated "very good to good" water quality with HBI values ranging from 4.01 to 4.76. Most of the samples were collected in the river headwaters except for sites A and B which were sampled in 1979. HBI values at Station A indicated "good" water quality (5.05) in Spring, 1979 and "excellent" water quality (3.28) in Fall, 1979. At Station B, HBI values indicated "fair" water quality (6.39, 6.30) during Spring and Fall sampling.

In 1992, a monthly monitoring station was established at Station A. Except for high levels of fecal coliform/strep bacteria, no water quality standards violations were detected in 1992 and the maximum water temperature was 70.8 degrees F (21.6 degrees C). The highest temperature recorded from the stream was 77 degrees F (25 degrees C) which was measured in July, 1963 approximately 2 miles above Station A.

In general, biological communities reflect fair to good water quality in the stream and capacity for supporting cold water communities. Even though land use practices have improved somewhat in recent years, substantial land use management improvements are still needed. Considering the low gradient nature of the stream, heavy sediment deposits will persist for several years even if all of the land use practices meet conservation standards.

The Belleville millpond limits the potential to extend the COLD management zone further downstream by raising water temperatures and reducing suitable habitat for cold and cool water species. Significant sediment deposits in the tributaries, hillsides, and valley bottoms will contribute sediment to the millpond for years to come and severely limit recreational potential within the millpond.

REFERENCES

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Hilsenhoff, William L. 1987. An Improve Biotic Index of Organic Stream Pollution. The Great Lakes Entomologist.

Holmstrom, BK. 1979. Low-Flow Characteristics of Wisconsin Streams at Sewage Treatment Plants and Industrial Plants. USGS.

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WDNR. 1985. Surface Water Resources of Dane County. Lake and Stream Classification Report.

Appendix 1: Sugar River Fish Distribution Study
 T5N, R8E, T6N, R7E
 May and July, 1974 and July 1975

central mudminnow	Umbru limi	7
Stoneroller	Campostoma	>470
Central Stoneroller	C. anomalum	24
Common carp	Cyprinus Carpio	27
Brassy minnow	Hybognathus hankinsoni	7
Hornyhead chub	Nocomis biguttatus	59
Common shiner	Notropus cornutus	>185
Spotfin shiner	N spilopterus	12
Sand shiner	N stramineus	86
Suckermouth minnow	Phenacobius mirabilis	8
Bluntnose minnow	Pimephales notatus	>392
Fathead minnow	P promelas	88
Creek chub	Semotilus atromaculatus	118
Quillback	Capriodes cyprinus	12
White sucker	Catostomus commersoni	>555
Northern hog sucker	Hypentelium nigricans	107
Silver redhorse	Moxostoma anisurum	1
Golden redhorse	M. Crythrurum	20
Shorthead redhorse	M macrolepidotum	5
Yellow bullhead	Ictalurus natalis	1
Stonecat	Noturus flavus	2
Brook stickleback	Culaea inconstans	35
Green sunfish	Lepomis cyanellus	4
Smallmouth bass	Micropterus dolomieu	44
Largemouth bass	M. salmoides	4
Black crappie	Pomoxis nigromaculatus	1
Rainbow darter	Etheostoma caeruleum	65
Fantail darter	E. flabellare	61
Johnny darter	E. nigrum	98
Blackside darter	Percina maculata	3
Walleye	Stizostedion vitreum	1
Mottled sculpin	Cottus bairdi	189

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Appendix 2: Summary of 1992 Fish Shocking Survey
of the Sugar River

<u>Site</u>	<u>Distance (ft.)</u>	<u>Species</u>	<u>Number or Relative Abundance</u>
1	1000'	Brown trout	2
		White sucker	abundant
		Bluntnose minnow	abundant
		Shorthead redhorse	abundant
		Northern hogsucker	common
		Carp	common
		Bluegill	present
		Johny darter	present
		Hornyhead chub	present
		Common shiner	abundant
		Spotfin shiner	common
		Central stoneroller	present
		Black crappie	present
		Blackside darter	present
		Smallmouth bass	1
		Black bullhead	1
2	1000'	Brown trout	9 (7 hatchery origin)
		Smallmouth bass	2
		White sucker	abundant
		Shorthead redhorse	common
		Bluntnose minnow	abundant
		Creek chub	present
		Silver redhorse	common
		Spotfin shiner	present
		Common shiner	common
		Northern hogsucker	common
		Carp	common
		Golden redhorse	present
3	1000'	Brown trout	4
		Yellow bullhead	1
		White sucker	abundant
		Northern hogsucker	common
		Carp	present
		Spotfin shiner	present
		Bluntnose minnow	abundant
		Shorthead redhorse	common
		Creek chub	common
		Johny darter	present
		Mottled sculpin	present
		Common shiner	common

<u>Site</u>	<u>Distance (ft.)</u>	<u>Species</u>	<u>Number or Relative Abundance</u>
4	1700'	Brown trout	7
		Smallmouth bass	2
		White sucker	abundant
		Bluntnose minnow	abundant
		Northern hogsucker	common
		Creek chub	common
		Central stoneroller	present
		Spotfin shiner	present
		Johny darter	present
		Shorthead redhorse	common
		Carp	common
		Mottled sculpin	present
		Blackside darter	present
		Fantail darter	present
Hornyhead chub	common		
5	1000'	Brown trout	3
		Creek chub	abundant
		Common shiner	abundant
		Bluntnose minnow	abundant
		White sucker	common
		Central stoneroller	common
		Northern hogsucker	common
		Johny darter	common
		Carp	common
		Spotfin shiner	present
		Hornyhead chub	present
6	1000'	Brown trout	2
		White sucker	abundant
		Carp	common
		Creek chub	common
		Johny darter	common
		Bluntnose minnow	common
		Mottled sculpin	present
		Hornyhead chub	present
		7	1000'
Creek chub	common		
Common shiner	common		
White sucker	common		
Bluntnose minnow	abundant		
Mottled sculpin	common		
Johny darter	present		
Spotfin shiner	present		
Carp	present		

<u>Site</u>	<u>Distance (ft.)</u>	<u>Species</u>	<u>Number or Relative Abundance</u>
8	1000'	Brown trout	3
		White sucker	abundant
		Northern hogsucker	common
		Creek chub	common
		Mottled sculpin	common
		Spotfin shiner	present
		Shorthead redhorse	common
		Bluntnose minnow	common
Johny darter	present		
9	1000'	Brown trout	6
		White sucker	abundant
		Creek chub	common
		Mottled sculpin	present
		Fantail darter	present
		Bluntnose minnow	common
		Brassy minnow	present
		Common shiner	present
		Carp	present
10	1000'	Brown trout	4
		Smallmouth bass	1
		Green sunfish	1
		White sucker	common
		Creek chub	common
		Bluegill	present
		Johny darter	present
		Fantail darter	present
		Bluntnose minnow	common
		Mottled sculpin	present
		11	1000'
White sucker	abundant		
Creek chub	common		
Spotfin shiner	present		
Bluegill	present		
Central mudminnow	present		
Brook stickleback	common		
Johny darter	common		
Mottled sculpin	common		
Bluntnose minnow	common		
Green sunfish	present		
Central stoneroller	present		

<u>Site</u>	<u>Distance (ft.)</u>	<u>Species</u>	<u>Number or Relative Abundance</u>
12	1000'	Black bullhead	13
		Creek chub	common
		Stonecat	present
		Carp	common
		Green sunfish	common
		Bluntnose minnow	common
		White sucker	abundant
		Central mudminnow	present
		Mottled sculpin	present
13	1000'	Creek chub	abundant
		White sucker	common
		Mottled sculpin	present
		Bluntnose minnow	present
		Brook stickleback	present
14	1000'	Creek chub	abundant
		Mottled sculpin	common
		White sucker	present
		Fathead minnow	present
		Brook stickleback	present
		Johny darter	present

Appendix 3: Sugar River HBI Data

<u>Site</u>	<u>Date</u>	<u>HBI</u>
A	May, 1979	5.05
	October, 1979	3.28
B	May, 1979	6.39
	October, 1979	6.30
C	November, 1982	4.56
	June, 1983	4.18
	May, 1990	4.76
D	May, 1979	4.36
	October, 1979	4.27
	November, 1982	4.01
	June, 1983	4.48
	May, 1990	4.45

Evaluation of Water Quality Using HBI Values

Biotic Index	Water Quality	Degree of Organic Pollution
0.00 - 3.50	Excellent	No apparent organic pollution
3.51 - 4.50	Very Good	Possible slight organic pollution
4.51 - 5.50	Good	Some organic pollution
5.51 - 6.50	Fair	Fairly significant organic pollution
6.51 - 7.50	Fairly Poor	Signifant organic pollution
7.51 - 8.50	Poor	Very significant organic pollution
8.51 - 10.00	Very Poor	Severe organic pollution

Appendix 4: Sugar River Water Quality Data at Station A (CTH A)

Date	Time	Temp (°C)	D.O. (mg/l)	Sus. Solids (mg/l)	TKN (mg/l)	NH ₃ (mg/l)	NO ₂ & NO ₃ (mg/l)	COD (mg/l)	Tot-P (mg/l)	Cond. (UMHOS/CM)	Hardness (mg/l)	pH (SU)	MFCC	F. Strep
2-24-92	10:40	1.5	11.6	114	3.3	1.08	1.61	63	.79	263	110	7.6	2500	13000
3-24-92	10:15	5.3	14.4	7	0.5	.16	5.20	9	.10	650	330	8.4	1400	260
4-29-92	10:15	11.0	13.4	21	0.5	.09	4.71	< 5	.11	625	330	8.24		
5-19-92	13:40	19.0	13.2	20	0.6	.034	4.87	< 5	.16	634	340	8.43	230	20
6-29-92	14:00	21.6	9.5	34	0.6	.075	4.37	6	.19	663	330	8.28	900	370
8-03-92	09:00	16.9	8.0	29	0.7	.018	4.93	7	.19	656	350	8.28	900	100
8-31-92	09:20	14.1	9.1	32	1.0	.086	3.58	17	.22	559	270	8.15	2700	2200
9-23-92	14:15	16.6	10.3	40	0.7	.051	4.10	14	.20	586	300	8.38	620	310

Belleville Sewage Treatment Plant
Dane County

January 6, 1977

Sugar River - Surface Acres = 65.3 Miles, Miles = 24.5, Gradient = 7.8 feet per mile.

The major stream draining southwest Dane County. Managed for forage fishes, though headwaters support brown trout and downstream waters have fair pan-fish populations. Several milk processing plants and numerous small villages discharge waste products to the stream and its tributaries. The stream is impounded at Belleville to form the Belleville Millpond (11-foot head). Rough fish are abundant in the entire stream. A city park at Belleville provides access for boats and over 25 roads provide bridge access for anglers. Muskrats are abundant and beaver are found on the more remote sections of the river. Fair numbers of waterfowl use the river and its adjoining 2,100 acres of wetland levels are high. Additional recreational opportunities exist in several miles of stream just above the Belleville Millpond where it is navigable for canoes and small boats.

Recommendations

From the Belleville Sewage Treatment Plant outfall and for the remainder of the Sugar River the classification should be continuous fish and aquatic life.

The above recommendations represent a concurrence of opinion of the stream classification team who are as follows:

Jerry Friederichs - District Engineer
Cliff Brynildson - Area Fish Manager
Tom Bainbridge - District Biologist
Roger Schlessler - Natural Resources Technician

Respectfully submitted,


Thomas Bainbridge
Stream Classification Coordinator

RS:js

