

Region <u>WCK</u>	County <u>St LOUIS</u>	Report Date <u>8/1994</u>	Classification <u>LAL</u>
Water Body: <u>Wilson Creek</u>			
Discharger: <u>Wilson WWTP</u>			

If stream is classified as Limited Forage Fish (LFF) or Limited Aquatic Life (LAL), check any of the following Use Attainability Analysis factors that are identified in the classification report:

- Naturally occurring pollutant concentrations prevent the attainment of use
- Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met
- Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place
- Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or operate such modification in a way that would result in the attainment of the use
- Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses
- Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact

Supporting Evidence in the report (include comments on how complete/thorough data is)

- Biological Data (fish/invert)
- Chemical Data (temp, D.O., etc.)
- Physical Data (flow, depth, etc.)
- Habitat Description
- Site Description/Map
- Other: photos

Historical Reports in file:

- 8/21/96 - Paul Laliberte
- 4/16/90 - Paul Laliberte
- 7/9/86 - Paul Laliberte
- 3/28/78 -

Additional Comments/How to improve report:

- should this classification be LFF rather than LAL?
- confirm class'n w/ region
- any more data available?

what is "limiting" stream?
 C:\Data\BUD\UAA resources\Site UAA checklst.doc

Handwritten notes:
 How is direct hydrologic connection

WATER QUALITY STANDARDS REVIEW FOR
THE HEADWATERS OF WILSON CREEK NEAR WILSON, WI

PAUL LA LIBERTE
August 21, 1996

The Wilson WWTP discharges seasonally at a low rate to a dry run tributary to Wilson Creek. This is done with the intent to have the effluent seep to groundwater prior to reaching the continuously flowing headwater of this trout stream. The last water quality standards review of the stream reach between the outfall and the trout stream was April 1990. The only evaluation of the stream since that time was a macroinvertebrate sample collected near HWY 12 on 5-16-95. This site is in the continuously flowing headwater of the stream. The results of this sample was compared with previous samples from the same stream reach in 1979 (Figure 1).

MACROINVERTEBRATE METHODS

Macroinvertebrate samples were collected and processed utilizing the procedures for sampling and sorting formally adopted by the Department in 1983, which included sorting in the lab. The biometrics applied were the HBI (1) and the MMM (2,3). Table 1 lists Hilsenhoff's Biotic Index classification categories.

TABLE 1. HILSENHOFF WATER QUALITY CATEGORIES

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	SIGNIFICANT ORGANIC POLLUTION
7.51-8.50	POOR	VERY SIGNIFICANT ORGANIC POLLUTION
8.51-10.00	VERY POOR	SEVERE ORGANIC POLLUTION

The MMM (2,3) is a metric combining six community measures; the Biotic Index (1), Average Tolerance Value (4) Species Diversity (5), Species Richness, Percent Ephemeroptera, Plecoptera and Trichoptera Species and Percent Collector Species. As such, it is a measure sensitive to a variety of environmental perturbations besides organic pollution. The MMM value from an individual sample can be compared to a regional database to characterize its comparative quality. Each metric is expressed as a percent of the best value found in the region. The best is defined as the 95thile in the database. The total range used for percentage calculation was the 5thile value to the 95thile value in the database. The MMM sum for an individual sample therefore receives

a value between -2 to 6, depending on how favorably it compares with the best samples in the database using all six metrics.

A low MMM sum indicates a problem with the macroinvertebrate community, but not the cause. The individual metrics constituting the MMM sum should be examined to see which are contributing the least to the sum. This identifies which metrics are measuring an effect. The sensitivity of individual metrics to specific perturbations are described elsewhere (6,7) and should be consulted to assess the cause of low values of the MMM and it's individual metrics.

MACROINVERTEBRATE RESULTS

The macroinvertebrate results are summarized in Figure 2. The HBI was in the excellent or very good categories in all samples collected from 1979-1995. In 1979, the MMM fluctuated seasonally between the average and high range at sites 1 and 2 and remained high at site 3. The single 1995 sample at site 2 was also in the high MMM range and documents an improved condition versus what was found in May 1979.

RECOMMENDATIONS

The headwaters of Wilson Creek appear to be in good health as measured by the macroinvertebrate community. The existing stream classifications and effluent limitations for Wilson should be retained. Due to the lack of a direct hydrologic connection between the outfall and the continuously flowing stream, the facility is a candidate for an alternative phosphorus limit due to lack of impact.

a:wilson.rpt

REFERENCES

- (1) Hilsenhoff, W. L. 1987. An Improved Biotic Index of Organic Stream Pollution. Great Lakes Entomologist. Vol. 20, #1, page 31.
- (2) La Liberte, P. 1996. Methods for application of MMM to DNR stream Data.
- (3) La Liberte P. 1996. Pilot Study of a Macroinvertebrate Community Biological Standard for Wisconsin. Report to DNR Monitoring Committee and USEPA Environmental Indicators Project.
- (4) Lillie, R. and Schlessler, R. 1994. Extracting Additional Information from Biotic Index Samples. Great Lakes Entomologist. 27(4) p129-136.
- (5) Margelef, D. 1957. Information Theory in Ecology. General Systems 3:36-71.
- (6) Yoder, C. and Rankin, E. 1994. Biological Response Signatures and the Area of Degradation Value: New Tools for Interpreting Multimetric Data. p263-286 in *Biological Assessment and Criteria*, W. Davis & T. Simon eds. Lewis Publishers, Boca Raton FL.

- (7) Plafkin, J. et al 1989. Rapid Bioassessment Protocols for use in Streams and Rivers: Benthic Macroinvertebrates and Fish. USEPA/444/4-89-001, May 1989

Figure 1

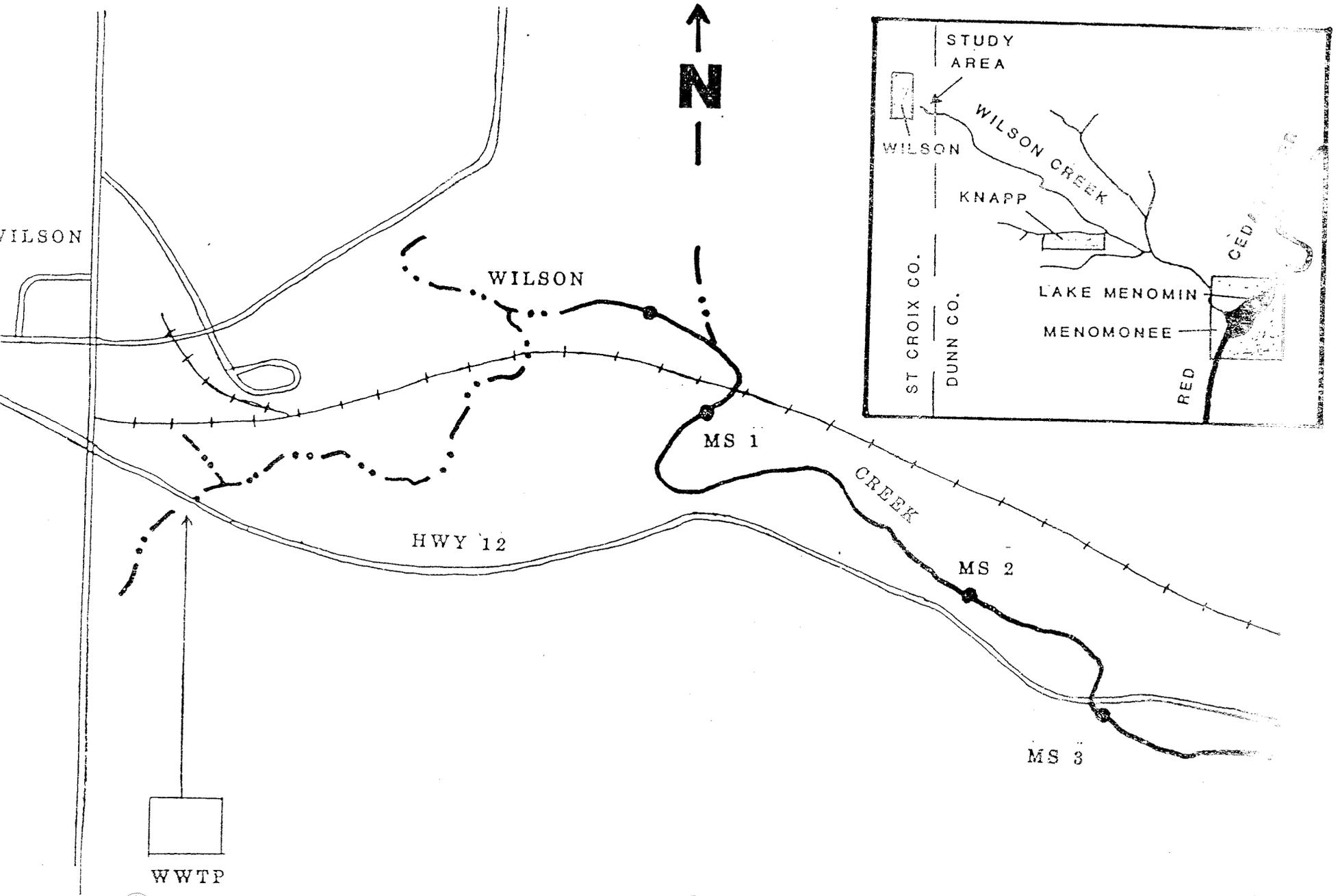
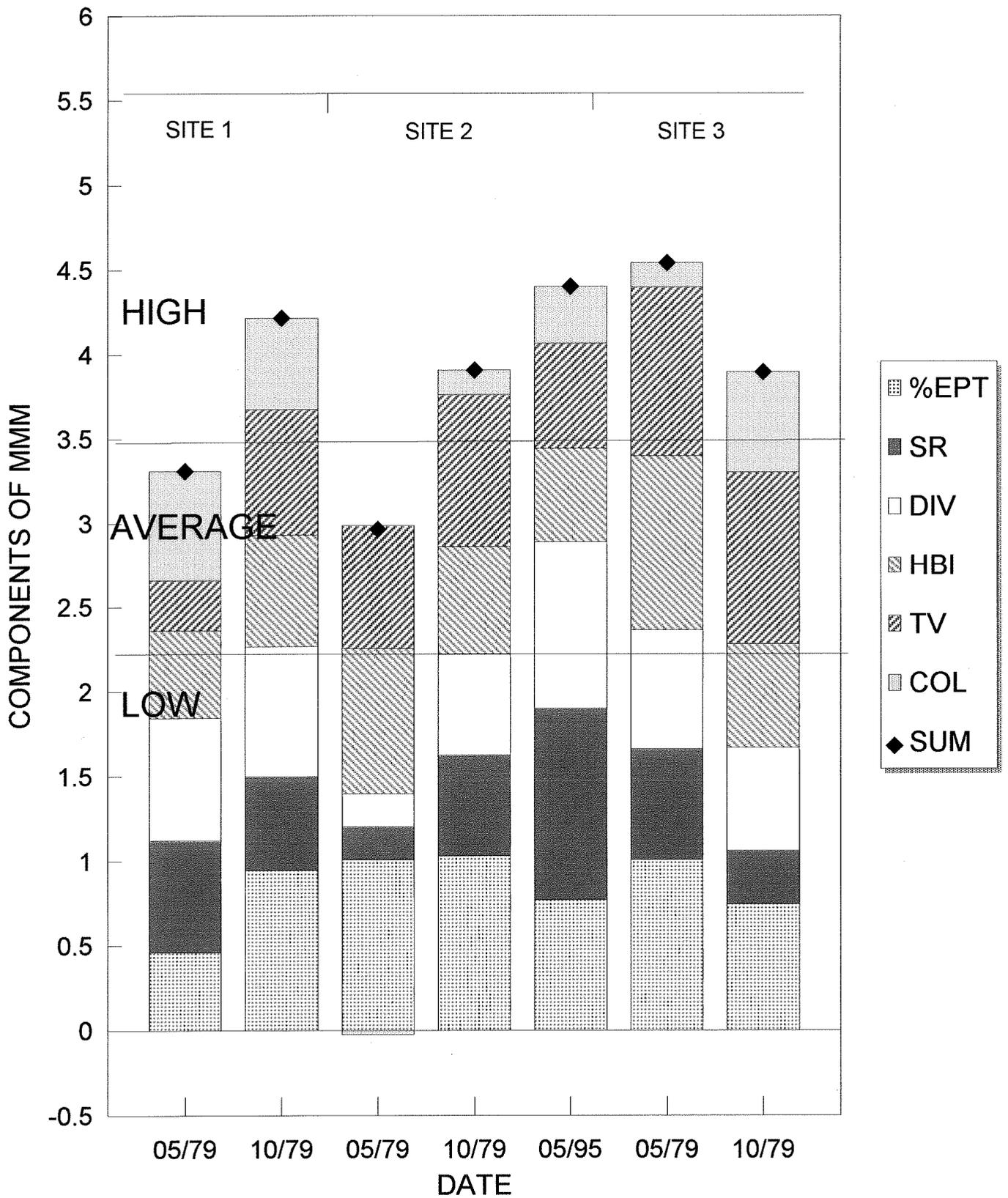


TABLE 2. MACROINVERTEBRATE COMMUNITY OF THE HEADWATERS OF WILSON CREEK

SAMPLENUM	DATE	REP	TOTAL COUNT	HBI	% EPT	SPECIES RICHNESS	MARGELEV DIVERSITY	AVG. TOLERANCE VALUE	TFM COUNT	% COLLECTORS
790515-56-01	05/79	1	120	4.250	13	20	3.144	5.200	117	48
791031-56-10	10/79	1	112	3.705	61	17	3.282	3.636	111	54
790517-56-02	05/79	1	101	3.033	76	11	1.758	3.667	100	98
791031-56-20	10/79	1	111	3.782	81	18	2.775	3.154	107	82
950516-56-01	05/95	1	158	4.124	34	34	4.005	4.033	133	67
790517-56-03	05/79	1	116	2.485	74	19	3.092	2.867	113	82
791031-56-30	10/79	1	107	3.890	33	13	2.815	2.800	106	51

FIGURE 2. MACROINVERTEBRATE COMMUNITY QUALITY COMPARISON OF WILSON CREEK WITH REGIONAL REFERENCES



WEST CENTRAL District Biotic Index Report

HBI-Rep1: 4.124 Rep2: 0.000 Rep3: 0.000 Rep4: Rep5:
 Sample ID # 950516-56-01 Waterbody Name WILSON CREEK
 Water Temp (Celsius) 10.0 Dissolved Oxygen (mg/l) 11.6
 Sample Location: SW SW S36 T29N R15W Master Waterbody # 2066000
 Lat./Long.: N 0deg 0min 0.0sec W 0deg 0min 0.0sec
 Lat./Long. Method
 Project Name WILSON WWTP Storet Station #
 Ave. Stream Width (Ft.) at Site 6.0 Ave. Stream Depth (Ft.) at Site 1.0
 Collector PIPPENGER, J. Field # 01 Rep 1
 Measured Velocity (fps)
 Est. Velocity (fps)
 Sorter ROOST, B. Moderate (0.5-1.5)
 Est % of sample sorted 67 Sampled Habitat
 Taxonomist DIMICK, J.
 Location Description 50 FT FROM STH 12 OFF DEAD END 1. Riffle
 ROAD TO THE RIGHT. SAMPLED IN RIFFLE 1/4
 MILE DOWN DEAD END ROAD.

Est. Time Spent Sampling (Min.) 10

Sampling Device 1. D Frame

Substrate at Site Location (%)

0.0 Bedrock	40.0 Rubble	20.0 Sand	0.0 Clay	0.0 Muck
0.0 Boulders	40.0 Gravel	0.0 Silt	0.0 Detritus	0.0 Debris/Veg

Substrate Sampled (%) (Same as above No)

0.0 Bedrock	30.0 Rubble	40.0 Sand	0.0 Clay	0.0 Muck
0.0 Boulders	30.0 Gravel	0.0 Silt	0.0 Detritus	0.0 Debris/Veg

Aquatic Vegetation 0 % of Total Stream Channel at Sampling Site

Observed Instream Water Quality Indicators (Perceived WQ)

	Not Present	Insig-nificant	Sig-nificant	Comments
Turbidity	1			
Chlorine or Toxic Scour	1			
Macrophytes	1			
Filamentous Algae		2		
Planktonic Algae	1			
Slimes	1			
Iron Bacteria	1			

FACTORS WHICH MAY BE AFFECTING HABITAT QUALITY

Sludge Deposits	1
Silt and Sediment	1
Channel Ditching	1
Down/Up Stream Impoundment	1
Low Flows	2
Wetlands	2

POLLUTANT SOURCES

Livestock Pasturing	1
Barnyard Runoff	1
Cropland Runoff	1
Tile Drains	1
Septic Systems	1
Stream Bank Erosion	2
Urban Runoff	
Construction Runoff	1

Point Source (Specify Type) 1
Other (Specify)

*** WEST CENTRAL DISTRICT BIOTIC INDEX REPORT ***

SAMPLE ID# 950516-56-01

PAGE 2

*** TAXA ***	*** SPECIES ***	TAXONOMIC KEY USED	TOL VAL	ORGANISM ID	ORGANISM COUNT	REP1	REP2	REP3
PLECOPTERA								
NEMOURIDAE								
AMPHINEMURA	DELOSA	*1	3.00	01040101	1	0	0	0
NEMOURA	TRISPINOSA	*1	1.00	01040201	3	0	0	0
PERLODIDAE								
CLIOPERLA	CLIO	*2	1.00	01060501	1	0	0	0
EPHEMEROPTERA								
BAETIDAE								
BAETIS	TRICAUDATUS	*2	2.00	02010116	5	0	0	0
HEPTAGENIIDAE								
STENONEMA	VICARIUM	*2	2.00	02060608	1	0	0	0
TRICHOPTERA								
GLOSSOSOMATIDAE								
PUPAE		*3		04020400	5	0	0	0
HYDROPSYCHIDAE								
CHEUMATOPSYCHE	**UNIDENTIFIED**	*2	5.00	04040100	16	0	0	0
CERATOPSYCHE	SLOSSONAE	*4	4.00	04040706	8	0	0	0
PUPAE		*3		04040900	2	0	0	0
HYDROPTILIDAE								
HYDROPTILA	**UNIDENTIFIED**	*2	6.00	04050200	1	0	0	0
LIMNEPHILIDAE								
HESPEROPHYLAX	DESIGNATUS	*2	3.00	04080401	6	0	0	0
PHILOPOTAMIDAE								
WORMALDIA	MOESTUS	*2	0.00	04110301	2	0	0	0
RHYACOPHILIDAE								
RHYACOPHILA	VIBOX	*1	2.00	04150103	1	0	0	0
UENOIDAE								
NEOPHYLAX	**UNIDENTIFIED**	*2	3.00	04190100	1	0	0	0
LEPIDOPTERA								
NEPTICULIDAE								
		*3		06020000	1	0	0	0
COLEOPTERA								
ELMIDAE								
OPTIOSERVUS	**UNIDENTIFIED**	*5	4.00	07020500	10	0	0	0
	FASTIDITUS	*5	4.00	07020501	8	0	0	0
DIPTERA								
ATHERICIDAE								
ATHERIX	VARIEGATA	*2	2.00	08010101	1	0	0	0
CHIRONOMIDAE								
	PUPAE	*6		08050000	1	0	0	0
				08050002	7	0	0	0
CHAETOCCLADIUS	SP.A	*1	5.00	08050503	1	0	0	0
CRICOTOPUS	**UNIDENTIFIED**	*2	7.00	08051300	4	0	0	0
	SP.A	*1	6.00	08051304	1	0	0	0
DIAMESA	**UNIDENTIFIED**	*2	5.00	08051700	2	0	0	0
ORTHOCLADIUS	SP.A	*1	6.00	08054001	1	0	0	0
	SP.D	*1	5.00	08054004	9	0	0	0
POLYPEDILUM	NR.CONVICTUM	*1	5.00	08055001	1	0	0	0
	NR.ILLINOENSE	*1	6.00	08055004	1	0	0	0
TANYTARSUS	**UNIDENTIFIED**	*2	6.00	08056800	1	0	0	0
CONCHAPELOPIA	**UNIDENTIFIED**	*1	6.00	08058200	1	0	0	0
ORTHOCLADINAE		*2		08059100	1	0	0	0
EMPIDIDAE								
CHELIFERA	**UNIDENTIFIED**	*3	6.00	08070300	7	0	0	0

*** WEST CENTRAL DISTRICT BIOTIC INDEX REPORT ***

SAMPLE ID# 950516-56-01

PAGE 3

***	TAXA	***	TAXONOMIC	TOL	ORGANISM	ORGANISM		
		SPECIES	KEY	VAL	ID	COUNT		
			USED			REP1	REP2	REP3
DIPTERA								
TABANIDAE								
	CHRYSOPTERA	**UNIDENTIFIED**	*2	6.00	08130100	1	0	0
TIPULIDAE								
	ANTOCHA	**UNIDENTIFIED**	*2	3.00	08140100	7	0	0
	LIMNOPHILA	**UNIDENTIFIED**	*2	3.00	08140800	1	0	0
EMAPHIPODA								
GAMMARIDAE								
	GAMMARUS	PSEUDOLIMNAEUS	*7	4.00	09010201	34	0	0
			*6		11000000	1	0	0
			*6		12000000	1	0	0
CARI								
HEMATODA								
ASTROPODA								
	PHYSIDAE							
	PHYSA	**UNIDENTIFIED**	*6		14040200	1	0	0
LIGOCHAETA								
	HAPLOTAXOIDA		*6		16060000	1	0	0
*** TOTALS: ***						158		
							0	
								0
*** BIOTIC INDEX: ***						4.124		

Taxonomic Key Code References

- *1 Hilsenhoff 1981,85
- *2 Hilsenhoff 1981,82
- *3 Merritt, Cummins 84
- *4 Hilsenhoff 1981,86
- *5 Hilsenhoff 1992
- *6 Pennak 1978
- *7 Holsinger 1972

CORRESPONDENCE/MEMORANDUM

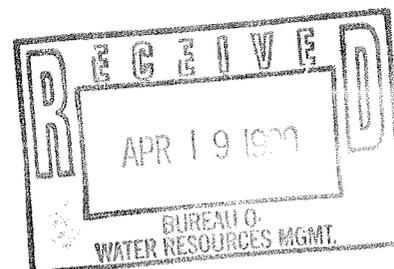
STATE OF WISCONSIN

Date: April 16, 1990 File Ref: 3200
To: Wilson POTW Facility File
From: Paul LaLiberte *Paul*
Subject: Water Quality Standards Review for the Headwaters of Wilson Creek

This facility is in the practice of discharging once per year. Their permit is currently being modified to accommodate the recommendations made in the previous water quality standards review (1986). Since that time, one discharge was observed by Water Resources Management staff (September 1987). The effluent seeped into the ground before reaching the downstream trout stream (Wilson Creek). Apparently healthy trout were observed in Wilson Creek at Highway 12 at that time.

The existing stream classification for the headwaters of Wilson Creek is correct. No changes in water quality standards are indicated.

c: D. Schuettpelz - WR/2 ←
P. Skorseth
WR/PL021.sz



July 9, 1986

File Ref:

3200

To: Duane Schuettpelz - WRM/2
Scott Stewart

Joan Ross

John Paddock

From: Paul LaLiberte

PL

Subject: Effluent Limits for Wilson POTW

mw

Wilson Creek

RECEIVED
MAY 18 1987
DNR-ECA
RECEIVED
JUL 10 1986
DNR-ECA

The current effluent limits (see attachment) for the Wilson POTW are based on fill and draw operation, water quality standards to protect warm water fish and aquatic life, and an available stream flow of 6 cfs. This volume of flow is only present during snowmelt. The duration of flow can be as short as one week, making it very difficult to time a discharge to coincide with maximum stream flow. Also, effluent NH₃-N could be very high at this time of year. The existing permit needs to be changed to insure adequate protection of the eventual receiving stream, a Class II brook trout fishery.

The facility has had two partial discharges since its construction. The purpose of this memo is to use data collected during those discharges, the Preoperative Point Source Impact Study (1982), the stream classification (1978), effluent limits correspondence dated 4/18/78, 9/19/78, 9/15/82, and 9/8/85, and other pertinent information to recommend an appropriate permit modification.

First of all, a qualification should be made concerning the 1978 stream classification based on what is now known about the stream's hydrology. The current classification of intermediate fish and aquatic life is correct when considering a continuous discharge of over 100 gpm. Under these conditions, the effluent would likely create a constantly flowing stream continuous with the downstream natural headwaters of Wilson Creek. Without an effluent, stream flow is absent almost all of the time, channel vegetation is terrestrial in nature and a classification of marginal - no aquatic life (use class E) would be appropriate. For a discharge up to about 100 gpm, flow is created in the stream during dry weather but not sustained beyond one mile below the outfall. A discharge significantly above 100 gpm has potential to create flow which extends 1.5 miles downstream to the portion of the stream classified as Use Class A or Class II trout. Supporting documentation is attached.

The duration of a discharge is also an important factor in determining the stream's potential for supporting aquatic life. At design flow, 12 months of storage for the facility is 8.76 million gallons. Discharged at a rate of about 100 gpm (or 0.15 mgd), 60 days would be needed to empty the pond. Sixty days of flow is probably insufficient to support

a significant aquatic community, especially when the stream is not connected with another water body. It should be noted that the facility is significantly under design hydraulic loading and that both of the two discharges which have occurred in the 5 1/2 year life of the facility have been less than 1/3 of total storage capacity.

I therefore recommend that the Wilson POTW continue to be operated as a fill and draw facility and that a maximum discharge rate of 0.15 mgd be imposed. The discharge should be confined to June 1 - Sept. 30 to prevent the discharge of high ammonia concentrations, maximize the seepage of effluent, and avoid times of trout spawning and egg and fry incubation. By limiting the discharge rate to 0.15 mgd and the season in which discharge can occur, effluent will be prevented from reaching the natural headwaters of Wilson Creek except in dilute form during rain events. The receiving stream classification appropriate for this type of facility operation is marginal (use class E). The effluent limits should be changed to match NR 104.02(3)(b), Wisconsin Administrative Code. The application of marginal effluent limits at 0.15 mgd is consistent with observed stream hydraulics and available aquatic habitat. Operational records suggest that the facility should be able to meet these limits.

Please send me your comments on this suggestion.

PJL:dd
Attach.

PLT257

*talked with Joan in
May 1987. She agreed with
changing permit to include
max discharge rate and time
of year. She did not want
to change eff. limits until
10 yrs are up (6-30-90 issuance).
She will initial modifications.*

PJL 5-26-87

WILSON, ST. CROIX COUNTY
WASTEWATER RECEIVING STREAM CLASSIFICATION

Receiving Stream: Intermittent stream tributary to Wilson Creek,
Q_{7,10} at discharge site is 0.00 cfs.

The effluent from the Wilson WWTP will be discharged to an intermittent stream south of the Village, which is tributary to Wilson Creek. The creek has its headwaters in an 8-square mile area surrounding the Village. Upstream from the second railroad trestle east of Wilson, flow is limited to short periods during spring snowmelt and rainfall events. Below the trestle, the flow is continuous to where it joins the Red Cedar River at Lake Menomin. The first major source of continuously flowing water is a series of springs starting just upstream from the second railroad trestle.

The continuously flowing headwaters of Wilson Creek have a rocky bottom, high water quality, and have been documented as a trout spawning area. The entire creek is classified as a Class I trout stream, with naturally reproducing brook and brown trout.

The intermittent tributary between the discharge site and the second railroad trestle has a predominantly gravel and rock bottom, with well defined streambed and bank. Some areas of grassy streambed are present. The tributary flows through alternating wooded and agricultural settings. Most of the agricultural land is cropland with some pasture.

RECOMMENDATIONS:

Wilson Creek shall be classified as noncontinuous, intermediate aquatic life above the second railroad trestle east of Wilson, up to the Wilson WWTP discharge point (approximately 1 mile). Below the trestle, Wilson Creek is classified as continuous fish and aquatic life (Class I trout stream). The stream use class from the discharge point to the second railroad trestle shall be Class D, capable of supporting tolerant or very tolerant forage or rough fish, or tolerant macroinvertebrates. Below the trestle, the stream is classified as Class A, capable of supporting cold water sport fish.

EVALUATION DATE:

March 28, 1978

PERSONNEL:

Bert Apelgren - Area Fish Manager, Eau Claire
Tom Lou - Review Engineer, Municipal Wastewater
Terry Moe - Water Quality Management Supervisor
Steve Skavronek - Environmental Engineer, Water Quality Evaluation

PL:dd
Attach.

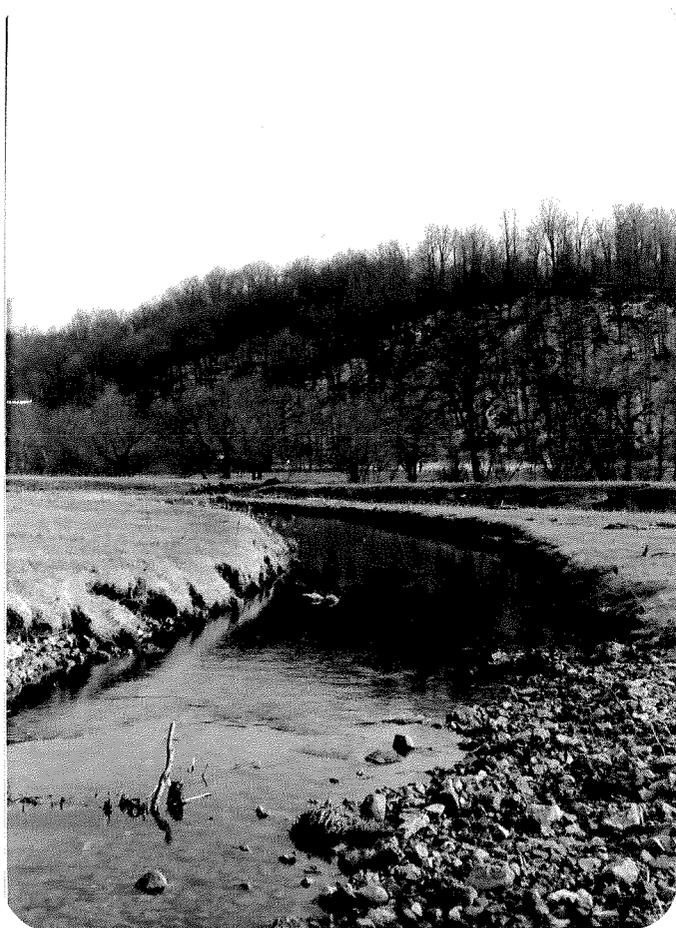
PLT017



Intermediate tributary to Wilson Creek immediately downstream from discharge site.

3-28-78

Negative #16



Continuous reach of Wilson Creek at Hwy 12 bridge east of Wilson, 2 mi. below discharge point.

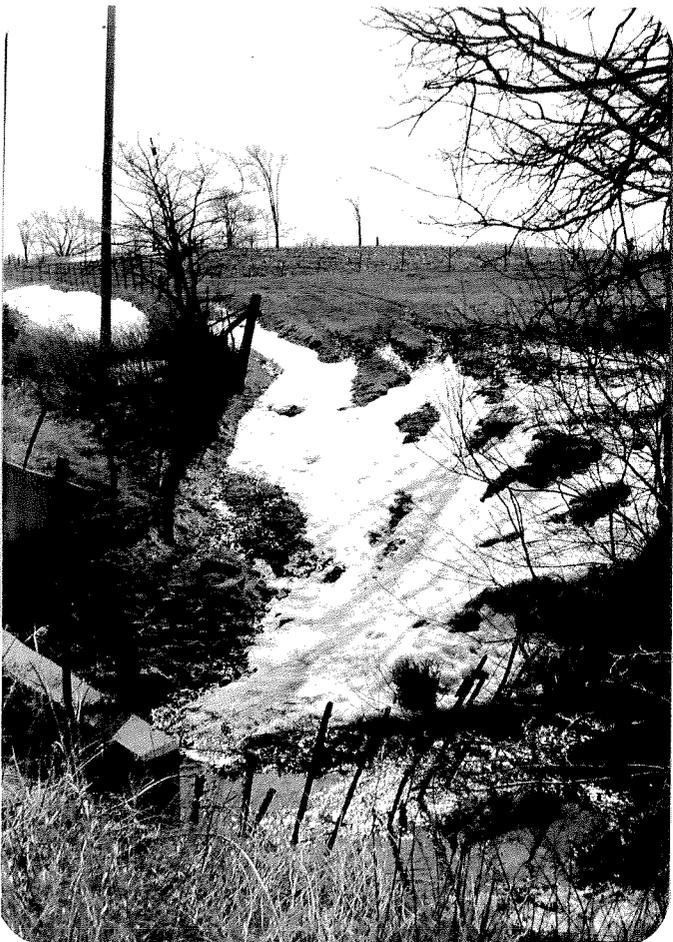
3-30-78



Intermittent tributary to Wilson
Creek at discharge point looking
upstream.

3-28-78

Negative #15



Future site of discharge pipe by
Hwy 12 bridge south of Wilson.

3-28-78