

CORRESPONDENCE/MEMORANDUM _____ State of Wisconsin

August 2, 1991

File Ref: 3200

TO: Duane Schuettpelz WR/2

FROM: Will Wawrzyn WR/SEH

SUBJECT: Stream Classification and Water Quality Standards
Review for an Unnamed Tributary to Lake Michigan,
Sheboygan County

The attached stream classification and WQSR was completed for an Unnamed Tributary to Lake Michigan, Sheboygan County. The recommended stream classification is consistent with the proposed effluent limits for the Kohler Company-Generator facility (WI-0000795). If you have any comments or questions, please call me at (414) 263-8699.

cc: Sharon Gayan WR/SEH
Sheboygan R. Basin file WR/SEH
Joe Ball WR/2 (2 copies)

**STANDARDS REVIEW and STREAM CLASSIFICATION
FOR AN UNNAMED TRIBUTARY TO LAKE MICHIGAN
SHEBOYGAN COUNTY, WISCONSIN**

JUNE 12, 1991

by Will Wawrzyn

Water Resource Management, Southeast District

OBJECTIVE

The objective of this stream classification and water quality standards review is to determine the appropriate biological and recreational use designations, and supporting water quality standards for an unnamed tributary to Lake Michigan in Sheboygan County, Wisconsin. The final designated biological and recreational uses, and supporting water quality standards are based on the Stream Classification Guidelines for Wisconsin, Ball, 1982 and Water Quality Standards for Wisconsin Waters per Chapter NR 102.

DESCRIPTION OF THE WATER RESOURCE

The unnamed tributary to Lake Michigan discharges to Lake Michigan at T16N, R23E, S.34, NE1/4 of the NE1/4. It is approximately two miles long and has a stream gradient of 12 ft/mi. The watershed and stream corridor is dominated by row crops along the upper 2/3, woodlands along the lower 1/3, and lesser amounts of wetlands and industrial/commercial land uses.

The Kohler Company-Generator Division (WI-0000795) is the only point source which discharges to the stream. Outfall 003 discharges to the stream approximately one mile upstream of the stream confluence with Lake Michigan at T16N, R23E, S.28, SE1/4 of the SE1/4. The treatment system has a design discharge of 53,000 gpd. The streams estimated Q7,2 and Q7,10 upstream of the Kohler Company discharge is <0.1 cfs.

The stream was previously classified as a non-continuous, marginal fish and aquatic life stream (Kurz, 1979). The original classification was not based on the most recent formalized stream classification guidelines for Wisconsin streams (Ball, 1982).

WATER RESOURCE EVALUATION

Water Quality

No chemical and/or physical water quality information is available for this stream with the exception of instantaneous dissolved oxygen and temperature measurements obtained during the April 23, 1991 fish collection and habitat survey. Dissolved oxygen levels met warm water forage fish community standards. Results are as follows;

Location	Time	Diss. O2 mg/l	Temp. C	Diss. O2 sat.
Upstream of Kohler outfall 003 (R.M. = 1.0-)	1415	14.5	11.4	139%
Kohler outfall 003 (R.M. = 1.0)	1416	4.2	14.0	43%
Stream/Kohler effluent mix (R.M. = 1.0+)	1417	13.8	11.8	133%
Garton Rd. (R.M. = 0.3)	1300	14.0	11.3	132%

Super-saturated dissolved oxygen levels are likely a result of instream primary production. Filamentous algae covers up to 50% of the stream substrate. Widely fluctuating diurnal dissolved oxygen concentrations may occur as a result of plant respiration.

A wastewater effluent sample was collected from the Kohler outfall 003 on April 23, 1991. The results are presented in Appendix 1. The results indicate that chromium, nickel, zinc and total phosphorus concentrations may have exceeded the proposed weekly mean effluent limits.

Parameter	Outfall 003	Proposed Weekly Mean Effluent Limits
Chromium	58.0 ug/l	2.0 ug/l
Nickel	140.0 ug/l	86.0 ug/l
Zinc	88.0 ug/l	40.0 ug/l
Total Phosphorus	3.96 mg/l	1.0 mg/l

Fish

A fish collection survey on May 9, 1980 failed to capture any fish. A survey completed on April 23, 1991 at Garton Rd. (R.M. 0.2) resulted in the following fish species being collected (Appendix 2);

<u>Species</u>	<u>Common Name</u>	<u>Number</u>
<u>Salvelinus fontinalis</u>	Brook trout	7
<u>Oncorhynchus mykiss</u>	Rainbow trout	1
<u>Nocomis biguttatus</u>	Horneyhead chub	3
<u>Culaea inconstans</u>	Brook stickleback	11
<u>Pimephales promelas</u>	Fathead minnow	3
<u>Catostomus commersini</u>	White sucker	10
<u>Cyprinus carpio</u>	Common carp	3
<u>Rhinichthys cataractae</u>	Longnose dace	1

The stream contains a moderately diverse but relatively low abundance of fish species, including cold and warm water species. Eight species of fish were collected from an 800 ft. reach. Brook and rainbow trout can be assumed to be anadromous and of recent Lake Michigan stocking at Pigeon River (Coshun, 1991). It is doubtful that self sustaining populations of trout can exist in the stream due to natural and/or other uncontrollable factors, such as low flow. The stream mouth has been observed on more than one occasion to be sealed by a sand and gravel bar formed by wave action, only to be reopened by a high, seasonal discharges.

Large (18-20 inch) male white suckers were observed in a post-spawned condition as evidenced by lesions and breeding tubercles on the head, anal and caudal fins. At least three year classes of white sucker were collected (Becker, 1983). The presence of post-spawned white sucker may suggest that this species uses the stream for spawning and nursery habitat.

One male longnose dace in pre-spawn condition was also collected.

Macroinvertebrates

An in-field assessment of the macroinvertebrate community revealed Asellus sp. (abundant), Chironomidae (common), Gastropoda (common), Hydropsychidae (common), and Baetidae (present). These taxa are considered "tolerant" to "very tolerant" of degraded environmental quality.

Physical Habitat

Stream and riparian habitat assessments were completed for three stream reaches according to Ball (1982) (Appendix 3).

Headwaters to Kohler Co. outfall (R.M. 1.5 to 1.0)

Fish and aquatic life instream and riparian habitat along this stream reach is considered moderately "poor".

Banks erosion is infrequent and vegetative bank cover and density is 70-90%. Row cropping is often present up to the stream bank. This practice results in direct runoff reaching the stream. Parent bottom substrate is dominated by fine silt and clay, with coarse material comprising 5-30% of the bottom. Bottom deposition by fine textured sediment occurs in pools and runs. Average water depths during low flow conditions range from 0.1 to 0.5 ft. with a maximum water depth of 1.0 ft. The entire reach has been channelized. Instream and bank vegetation and depth provide important cover for fish and aquatic life.

Factors responsible for limiting habitat in this reach of stream include channelization, sedimentation from agricultural runoff, modification and destruction of wetlands habitats, and low flow.

Kohler outfall to Garton Rd. (R.M. 1.0 to 0.3)

Fish and aquatic life instream and riparian habitat along this stream reach is considered "fair".

Banks erosion is moderate with bank cover and density ranging from 70-90%. Attempts by riparians to control bank erosion through the random dumping of concrete along the bank may exacerbate bank erosion along the opposite bank and downstream. Bottom deposition by fine textured sediment occurs in pools and runs. Parent bottom substrate is dominated by clay, gravel and cobble. Coarse material is present along 30-50% of the stream bottom. Average water depths during low flow conditions range from 0.1 to 1.5 ft. Channelization is predominate along the upper half of this reach. Bank vegetation, snags, rubble, and depth provide important cover for fish and aquatic life.

Factors responsible for limiting habitat in this reach of stream include channelization, sedimentation from agricultural runoff, and bank erosion, scour from excessive runoff, modification and destruction of wetlands habitats, and low flow. A failing residential septic system appears to be discharging to the stream.

Garton Rd. to Lake Michigan (R.M. 0.3 to 0.0)

Fish and aquatic life instream and riparian habitat along this stream reach is considered moderately "poor".

Banks erosion is frequent and massive. Bank cover and density is <50%. Parent bottom substrate is dominated by clay pan, gravel and cobble. Bottom deposition by fine textured sediment is extensive and deep in pools, riffle and runs. Average water depths during low flow conditions range from 0.1 to 2.0 ft.

Snags, rubble, and depth provide important cover for fish and aquatic life.

Factors responsible for limiting habitat in this reach of stream include channelization, sedimentation from agricultural runoff, and bank erosion, scour from excessive runoff, modification and destruction of wetlands habitats, and low flow. A failing residential septic system appears to be discharging to the stream approximately 200 ft. upstream of Garton Rd.

Although habitat is considered degraded, it is sufficient to support a warm water fish and aquatic life community. Factors which have been observed to limit habitat are completely or partially manageable. Abatement of these factors and sources would result in an improvement in stream habitat, biological, and recreational uses.

SUMMARY AND RECOMMENDATIONS

A stream classification and water quality standards review has been completed for an unnamed tributary to Lake Michigan in Sheboygan County. The stream has previously been classified as a non-continuous, marginal fish and aquatic life stream.

Limited water quality information suggests that the stream meets State water quality standards for dissolved oxygen and temperature. Abundant filamentous algae growth and super saturated daylight dissolved oxygen concentrations suggests that the stream may exhibit wide diurnal dissolved oxygen concentrations.

The stream contains a moderately diverse and relatively low abundance of fish species. A total of eight species of fish have been collected, including anadromous rainbow and brook trout via Lake Michigan. Natural or uncontrollable habitat conditions may preclude the stream from maintaining a self sustaining population of salmonids. Existing habitat is conducive to the maintenance of a self-sustaining population of warm water forage fish species. The presence of post-spawned white suckers and multiple year classes suggests that stocks from Lake Michigan may use the stream for spawning and nursery purposes.

Macroinvertebrate samples indicate taxa considered "tolerant" to "very tolerant" of environmental degradation.

Habitat is considered "fair" to "poor" and suitable for the maintenance of a warm water fish and aquatic life community. Manageable factors responsible for degraded habitat include channelization, sedimentation from agricultural runoff and bank erosion, scour from excessive runoff, modification and destruction of historical wetland communities. Abatement of these problems and sources would result in improved water quality, habitat, and biological diversity. These limiting

factors and their sources are completely or partially controllable through existing regulatory or voluntary programs. This investigation did not include an assessment of the impacts or benefits of the Kohler Generator Company facility on the receiving stream.

It is recommended that this stream be reclassified from non-continuous, marginal fish and aquatic life to a Warm Water Forage Fish Community per NR 102. Existing biological communities, habitat conditions, and the controllability of existing limiting factors support this conclusion.

REFERENCES

- Ball, Joseph. 1982. Stream Classification Guidelines for Wisconsin. Technical Bulletin. Water Resource Management, Madison, Wisconsin.
- Becker, George. 1983. Fishes of Wisconsin. University of Wisconsin Press.
- Coshun, Michael. 1991. Personnel Communication. Fish Management, Milwaukee, Wisconsin.
- Fago, Donald. 1984. Distribution and Relative Abundance of Fishes in Wisconsin. Bureau of Research, Madison, Wisconsin.
- Kurz, Joseph. 1979. Stream Classification for an Unnamed Tributary to Lake Michigan-Kohler Generator Company, Sheboygan County. Water Resource Management, Milwaukee, Wisconsin.

attachments

- Appendix 1 SLOH Effluent Sample Results-Kohler Generator
(WI-0000795)
- Appendix 2 Fish Collection Results
- Appendix 3 Habitat Assessment Results

APPENDIX 2

State Laboratory of Hygiene
University of Wisconsin Center for Health Sciences
465 Henry Mall, Madison, WI 53706

R.H. Laessig, Ph.D., Director S.L. Inhorn, M.D., Medical Director

Environmental Science Section (608) 262-3458 DNR LAB ID 113133790
Inorganic chemistry (#34 of 36 on 07/08/91, unseen)

Id: 603102 Point/Well/...: 003 Field #: Route: WR21
Collection Date: 04/23/91 Time: 14:15 County: 60 (Sheboygan)
From: KOHLER GENERATOR CO. OUTFALL 003 ADJACENT TO GARTON RD
To: WAWRZYN
DNR Source: Effluent
MILWAUKEE

Account number: WR045 Collected by: WAWRZYN
Date Received: 04/24/91 Labslip #: IB083694 Reported: 07/02/91

BOD 5 DAY	* >19	MG/L #1
analysis rejected		
CADMIUM, AA FURNACE	<0.2	UG/L
CALCIUM, ICP	66.	MG/L
CHROMIUM, AA FURNACE	58.	UG/L
COD LOW LEVEL, COLORIMETRIC	120.	MG/L
CONDUCTIVITY (AT 25 DEG C)	987.	UMHOS/CM
COPPER, AA FURNACE	4.	UG/L
DIGEST 730.1, LIQUIDS, EPTOX, ICP EXCEPT AS,AG,SE	DIG MET	
DIGESTION 740.1, LIQUIDS, FOR FURNACE AND AG ICP	DIG MET	
DIGESTION 760.1, ALL LIQUIDS & EPTOX FOR AS AND SE	DIG MET	
DIRTINESS, CALCULATION METHOD	320.	MG/L
MAGNESIUM, ICP	36.	MG/L
AMMONIA-N	0.015	MG/L
detected between 0.005 (LOD) and 0.019 (LOQ)	MG/L	
NICKEL, ICP	140.	UG/L
TOTAL PHOSPHORUS	3.96	MG/L
SELENIUM, AA FURNACE	<5	UG/L
SUSPENDED SOLIDS	4.	MG/L
STANDARD ADDITION, AAS	SA CU	
STANDARD ADDITION, AAS	SA CR	
ZINC, ICP	88.	UG/L
TEMPERATURE FIELD	14.0	C
DISSOLVED OXYGEN FIELD	4.2	MG/L

--- Footnotes ---
Remark #1: Q.C. RESULTS APPROXIMATE

APPENDIX 2

STREAM AND SITE BACKGROUND

PERSONNEL: WAWRZYN DATE: 04/23/91 TIME: 13:00
BARICA

STREAM INFORMATION

STREAM NAME: UNNAMED WBIC: N/A STREAM LENGTH (mi.): 2.0
MAJOR BASIN CODE: 2 MINOR BASIN CODE: 30
TOWNSHIP: T 16 N RANGE: R 23 E SEC: 34 1/16: NE 1/4: NE STREAM ORDER: 1
(at confluence) (at confluence)

SITE INFORMATION

COUNTY CODE: 60 WATERSHED CODE: 5H SUBWATERSHED CODE: UN SEGMENT NO.: 001
SITE NO.: 001
TOWNSHIP: T 16 N RANGE: R 23 E SEC: 34 1/16: NE 1/4: NE STREAM ORDER: 1
(at site) (at site)

LOCATION DESCRIPTION: UPSTREAM AND DOWNSTREAM OF GARTON ROAD
TR 16 TO L. MICHIGAN

SITE WATER QUALITY INFORMATION

TEMP. (C): 11.3 DISS. O2 (mg/l): 14.0 DISS. O2 (% sat): 132
TEMP. (htu): .. pH (su): .. COND. (umhos/cm): ..
OTHER: ..

LIST HISTORICAL WATER RESOURCE REFERENCES:

NONE - WQ
FALL 1980 - FISH NONE COLLECTED AT GARTON RD.

(eg. previous basin plans, SEWRPC/DNR phys./chem. WQ data, HBI's, fisheries, stream classifications, water quality, Surface Water Resource publ. etc. incl. date of publ.)

- | | | | |
|---------------|--------------------|---------------|--------------------|
| Major basins: | Minor basins: | County codes: | Watershed Codes: |
| L. Michigan 2 | Milwaukee R. 20 | Kenosha 30 | Upper Fox UF |
| Mississippi 3 | Fox R. 210 | Milwaukee 41 | Milwaukee South SO |
| | Rock R. 221 | Ozaukee 46 | Milwaukee E/W EW |
| | Root/Pike R. 10 | Racine 52 | Milwaukee North NO |
| | Des Plaines R. 200 | Sheboygan 60 | Menomonee ME |
| | Sheboygan R. 30 | Walworth 65 | Cedar Cr. CE |
| | | Washington 67 | Sheboygan SH |
| | | Waukesha 68 | |

FISH ASSEMBLAGE (Lyons)

ORDER MILEAGE CODING: 2.2

STATION MILEAGE: 0.3 JAR(S) IDENTIFICATION:
 (use subwatershed/segment/site codes)

DISTANCE FROM NEAREST LAKE >10AC (mi): ~800 DISTANCE SAMPLED (ft.): ~800

DISTANCE FROM NEAREST STREAM WITH MEAN Q >1500 cfs (mi): N/A

MEAN CHANNEL WIDTH (ft.): 7.6 n=10: 14 16 8 3 4 3 3 10 8 7

GEAR: BACKPACK ELECTROSHOCKER VOLTS: 11-12 ELECTROSHOCKER AMPS: 2

MACROINVERTEBRATE COMMUNITY OBSERVATIONS (inc. relative abundance):

Aesellus Hydropsyche Psephenus Gerris
 (A) (B) (C)

Common Name	Spec Code	Number	Taxa	Tol Val	Feed Gr	Spawn	DELT
BROOK TROUT		1111 1 (7)			P	L	-
RAINBOW TROUT		1 (1)			P	L	-
HONEYHEAD CHUB		111 (3)					-
BROOKS STEELHEAD		1111 111 (11)					-
FATHEAD MINNOW		111 (3)					-
WHITE SUCKER		111 111 (10)					Post SPAWN TUBES C, A, HEAD.
COMMON CUPP		111 (3)					-
LONGNOSE WEEV		1 (1)					PRE-SPAWN ♂

WHITE SUCKER LENGTHS (IN) TOTAL TL 18, 20, 6, 13, 11, 4

APPENDIX 3

STREAM AND SITE BACKGROUND

PERSONNEL: WATSON
ANDERSON

DATE: 4/23/91 TIME: 13:00

STREAM INFORMATION

STREAM NAME: UNNAMED WBIC: N/A STREAM LENGTH (mi.): 2.0
MAJOR BASIN CODE: 2 MINOR BASIN CODE: 30
TOWNSHIP: T 16 N RANGE: R 23 E SEC: 34 1/16: NE 1/4: NE STREAM ORDER: 1
(at confluence) (at confluence)

SITE INFORMATION

COUNTY CODE: 60 WATERSHED CODE: SH SUBWATERSHED CODE: UN SEGMENT NO.: 001
SITE NO.: 001
TOWNSHIP: T 16 N RANGE: R 23 E SEC: 34 1/16: NE 1/4: NE STREAM ORDER: 1
(at site) (at site)

LOCATION DESCRIPTION: GACTON RD DOWNSTREAM

SITE WATER QUALITY INFORMATION

TEMP. (C): 11.3 DISS. O2 (mg/l): 14.2 DISS. O2 (% sat): 132
TURB. (htu): — pH (su): — COND. (umhos/cm): —
OTHER: —

LIST HISTORICAL WATER RESOURCE REFERENCES:

NONE

(eg. previous basin plans, SEWRPC/DNR phys./chem. WQ data, HBI's, fisheries, stream classifications, water quality, Surface Water Resource publ. etc. incl. date of publ.)

- | | | | |
|---------------|--------------------|---------------|--------------------|
| Major basins: | Minor basins: | County codes: | Watershed Codes: |
| L. Michigan 2 | Milwaukee R. 20 | Kenosha 30 | Upper Fox UF |
| Mississippi 3 | Fox R. 210 | Milwaukee 41 | Milwaukee South SO |
| | Rock R. 221 | Ozaukee 46 | Milwaukee E/W EW |
| | Root/Pike R. 10 | Racine 52 | Milwaukee North NO |
| | Des Plaines R. 200 | Sheboygan 60 | Menomonee ME |
| | Sheboygan R. 30 | Walworth 65 | Cedar Cr. CE |
| | | Washington 67 | Sheboygan SH |
| | | Waukesha 68 | |

STREAM HABITAT EVALUATION SUMMARY

STREAM WATER SUPPLY (Bozek)

Intermittent: INT Perennial: PER Intermittent w/ standing water: INW

STREAM CHANNELIZED (Estimated Percent of Total):

STREAM Q7,10 (cfs): Q7,2 (cfs): MEAN ANNUAL Q (cfs): N/A

SITE HABITAT EVALUATION SUMMARY

ARE THE UNDERSIDE OF STONES WHICH ARE NOT DEEPLY EMBEDDED BLACK? (Plafkin)

Yes: Y No: N

SUBSTRATE ODOR (Plafkin)

Normal: N Sewage: S Petroleum: P Chemical: C Anaerobic: A

Other: specify in comments

SUBSTRATE OIL RESIDUES (Plafkin)

Absent: A Flecks: F Sheen: S Slick: L Globules: G

Other: specify in comments

SITE CROSS SECTION (Bozek, Platts)

Flat: F Trapezoidal: T Rectangular: R Elliptical: E

SITE SINUOSITY RATIO (Bozek, Platts)

1.00: 1 1.00-1.08: 2 1.08-1.44: 3 1.44-2.81: 4

DISTANCE BETWEEN BENDS (ft) (Lyons):

SITE WATER LEVEL (Bozek, Lyons)

Drought: D Low: L Moderate: M High: H

PURPLE LOOSESTRIFE DISTRIBUTION (Bozek)

Not present: N Present: P Common: C Abundant: A

(sparse)

(not dominant)

(dominant)

PRESENT AT CTH 45

PHOTOGRAPH(S) DESCRIPTION

(Include roll/frame no. and description)

Blank lines for photograph description.

COMMENTS: UPPER 1/2 OF STREAM OLD CHANNELIZATION - IN AB.

Blank lines for comments.

STREAM AND SITE LIMITING FACTORS AND SOURCES (Meyer)

Problems Threats	Source	Impacts		Upstream	Impacts		
		Observed	Potential		Local	Downstream	
A1 HABP	A1 HMCA	✓	/	✓	/	/	/
A2 HABW	A2 HMOR	✓	/	✓	/	✓	/
A3 MIG	A3 HMPI	✓	/	✓	/	✓	✓
A4 FLOW	A4 HMCU	✓	/	✓	/	✓	✓
B1 SEP	B1 SE	✓	/	✓	/	✓	/
B2	B2		/		/		/
B3	B3		/		/		/
B4	B4		/		/		/
C1 HABP	C1 CL	✓	/	✓	/	✓	✓
C2 TRO	C2 JB	✓	/	✓	/	✓	✓
C3 SED	C3 HMCF	✓	/	✓	/	✓	✓
C4 SCR	C4	✓	/	✓	/	✓	✓
D1 NV	D1 CL		/	✓	/	✓	✓
D2	D2 RST		/		/		/
D3	D3		/		/		/
D4	D4		/		/		/
E1	E1		/		/		/
E2	E2		/		/		/
E3	E3		/		/		/
E4	E4		/		/		/
F1	F1		/		/		/
F2	F2		/		/		/
F3	F3		/		/		/
F4	F4		/		/		/
G1	G1		/		/		/
G2	G2		/		/		/
G3	G3		/		/		/
G4	G4		/		/		/
H1	H1		/		/		/
H2	H2		/		/		/
H3	H3		/		/		/
H4	H4		/		/		/

Comments and References (inc. location of site specific sources)

SEPTIC TILE UPSTREAM OF GARDEN RD IN SUBDIVISION
 UNPERMITTED RIP RAP (CONCRETE) UPSTREAM OF GARDEN RD. CAUSING
 BANK EROSION OFFSHORE BANK
 EXTENSIVE FILL ALONG CRIPPER & DOWNSTREAM AT PLOT 503.

STREAM AND SITE PROBLEMS AND SOURCES (Meyer, Bozek)

Problems or threats

Bacteria (BAC)

Loss of fish, invert habitat (HABF)
Loss of wildlife habitat (HABW)
Fish migration interference (MIG)
Stream flow fluctuation or low flow (FLOW)
Trophic/community imbalance (TRO)
Low dissolved oxygen (DO)
pH fluctuations (PH)
Septage seeps/tile (SEP)
Sludge deposits (SOD)

Temperature extremes (TEMP)
Sedimentation or Embeddedness (SED)
Hydraulic scour (SCR)
Streambank erosion or scour (SB)
Turbidity (TURB)
Nuisance vegetation (NV)
Ponding (PON)

Chlorine toxicity (CL)
Metals (MET)
Ammonia toxicity (NH3)
Organic toxicity or bioaccumulation (ORG)
PCB bioaccumulation (PCB)
Pesticide or herbicides (PST)
Toxicity, unspecified (TOX)

Other (specifiy in comments)

Sources

Beaver dam (BDAM)

Hydrological modifications
Dam (HMDA)
Channelization/snagging (HMCH)
Bank Debrushing (HMDE)
Drainage of wetland (HMDR)
Filling of wetland (HMFI)
Culvert, sill, conduit (HMCU)

Nonpoint sources

Unspecified (NPS)
Cropland runoff (CL)
Streambank erosion (SB)
Streambank pasturing (PSB)
Floodplain pasturing (PFP)
Woodland pasturing (PWL)
Barnyard runoff (BY)
Roadside ditch erosion (RS)
Construction site runoff (CE)
Urban runoff (URB)
Drain tile (DT)
Failed septic systems (SE)

Point Sources

Municipal (PSM)
Industrial (PSI)

Natural

Wetland drainage (WD)
Spring (SP)
Excessive canopy (EC)
Parent soils (PS)
Low flow (NFLO)
Natural, unspec. (NAT)
Bioturbation (BIO)

In-Place pollutants (INSED)
Excessive Vegetation (EV)

Other (specifiy in comments)

STREAM BIOLOGICAL USE CLASSIFICATION (Meyer)

Stream Length (miles)	Current Use (miles)	Potential Use (miles)
2.0 (P.R.)	FALT(A) _____	FALT(A) _____
_____	FAL(B) _____	FAL(B) _____
_____	FAL(C) _____	FAL(C) <u>2.0</u>
_____	INT(D) _____	INT(D) _____
_____	MAR(E) <u>2.0</u>	MAR(E) _____

Supporting Potential Use(s)

Fully (miles)	Partial (miles)	Not (miles)
FALT(A) _____	FALT(A) _____	FALT(A) _____
FAL(B) _____	FAL(B) _____	FAL(B) _____
FAL(C) _____	FAL(C) _____	FAL(C) <u>2.0</u>
INT(D) _____	INT(D) _____	INT(D) _____
MAR(E) _____	MAR(E) _____	MAR(E) _____

Stream Assessed (miles)	Stream Monitored (miles)	Stream Improved (miles)	Stream Degraded (miles)
FALT(A) _____	FALT(A) _____	FALT(A) _____	FALT(A) _____
FAL(B) _____	FAL(B) _____	FAL(B) _____	FAL(B) _____
FAL(C) <u>2.0</u>	FAL(C) <u>2.0</u>	FAL(C) <u>0</u>	FAL(C) <u>2.0</u>
INT(D) _____	INT(D) _____	INT(D) _____	INT(D) _____
MAR(E) _____	MAR(E) _____	MAR(E) _____	MAR(E) _____

STREAM RECREATIONAL AND RELATED BIOLOGICAL USES (existing or potential)

Sport fishing: **SF** Wading: **WA** Wildlife: **WI**
 Bait fishing: **BF** Swimming: **SW** Spawning: **SP**
 Trapping: **TR** Boating: **BO** Nature Study: **NS**
 Hunting: **HU** Canoeing: **CA** Other (specify): SEASONAL FISH & Sockeye

STREAM RECOMMENDED RECREATIONAL USE CLASSIFICATION

Full: **F** Partial: **P** None: **N**

Factors which limit the next highest recreational use classification from being attained?

Insufficient depth: **ID** Industrial use conflicts: **IU**
 Insufficient width: **IW** Navigational use conflicts: **NU**
 Insufficient water volume: **IV** Effluent channel: **EC**
 Substrate texture: **ST** Safety: **SA**
 In-place pollutants: **IP** Limited or no access: **LA**
 Aesthetics: **AE** Other: _____

COMMENTS: _____

REFERENCES

- Ball, J. 1982. Stream Classification Guidelines for Wisconsin. Wisconsin Department of Natural Resources. Madison, Wisconsin.
- Bozek, M. 1986. A Method for Inventorying Physical Habitat in Wisconsin Streams. Wisconsin Department of Natural Resources. Water Resource Management, Southeast District. Milwaukee, Wisconsin. Draft.
- Lyons, J. 1990. Development of Standardized Procedures for Sampling and Assessing Fish and Fish Habitat in Streams during Nonpoint Source Pollution Priority Watershed Projects. Wisconsin Department of Natural Resources, Bureau of Research-Fish Management. Fitchburg, WI. Draft.
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- Pajak, P. 1987. Stream Habitat Surveys-Milwaukee River Basin. Wisconsin Department of Natural Resources. Fish Management, Southeast District. Milwaukee, Wisconsin.
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Stream UNNAMED Reach Location LEWIS ROAD Reach Score/Rating _____

County WISCONSIN Date 4-23-71 Evaluator WALKER Classification _____

Rating Item	Category			
	Excellent	Good	Fair	Poor
14 Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
14 Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). 14	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
8 Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. 4	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
12 Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 6	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 9	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
14 Lower Bank Channel Capacity	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio <7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 14	Inadequate, overbank flow common. W/D ratio >25. 16
15 Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. 15	Heavy deposits of fine material, increased bar development. 18
12 Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 20
17 Bottom Substrate/Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble gravel or other stable habitat. Lack of habitat is obvious. 22
24 Avg. Depth Riffles and Runs	Cold >1' 0 Warm >1.5' 0	6" to 1' 0 10" to 1.5' 0	6 3" to 6" 18 6 6" to 10" 18	18 <3" 24 18 <6" 24
24 Avg. Depth of Pools	Cold >4' 0 Warm >5' 0	6 3' to 4' 0 6 4' to 5' 0	6 2' to 3' 18 6 3' to 4' 18	18 <2' 24 18 <3' 24
24 Flow, at Rep. Low Flow	Cold >2 cfs 0 Warm >5 cfs 0	6 1-2 cfs 6 6 2-5 cfs 6	6 .5-1 cfs 18 6 1-2 cfs 18	18 <.5 cfs 24 18 <1 cfs 24
12 Pool/Riffle, Run/Bend Ratio (distance between riffles + stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
14 Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16

Column Totals: _____

Column Scores E _____ + G _____ + F _____ + P _____ = 204 = Score

<70 = Excellent, 71-129 = Good, 130-200 = Fair, >200 = Poor

See reverse side for additional habitat features, water quality impacts, and comments.

TRIBUTARY TO LAKE MICHIGAN
Kilke Cr. - BARRISON

Department of Natural Resources

STREAM SYSTEM HABITAT RATING FORM
Form 3200-68 1-85

Stream UNNAMED Reach Location BARRISON'S GARDEN RD Reach Score/Rating _____
County Delaware Date 4-22-91 Evaluator WAWRZYD Classification _____

14
14
16
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10
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24
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Rating Item	Category			
	Excellent	Good	Fair	Poor
Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). 14	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. 4	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 6	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 9	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
Lower Bank Channel Capacity	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio < 7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 14	Inadequate, overbank flow common. W/D ratio > 25. 16
Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. 15	Heavy deposits of fine material, increased bar development. 18
Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 20
Bottom Substrate/ Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble gravel or other stable habitat. Lack of habitat is obvious. 22
Avg. Depth Riffles and Runs	Cold >1' 0 Warm >1.5' 0	6" to 1' 0 10" to 1.5' 0	6 3' to 6" 18 6 6" to 10" 18	<3" 24 <6" 24
Avg. Depth of Pools	Cold >4' 0 Warm >5' 0	3' to 4' 0 4' to 5' 0	6 2' to 3' 18 6 3' to 4' 18	<2' 24 <3' 24
Flow, at Rep. Low Flow	Cold >2 cfs 0 Warm >5 cfs 0	1-2 cfs 6 2-5 cfs 6	6 .5-1 cfs 18 6 1-2 cfs 18	<.5 cfs 24 <1 cfs 24
Pool/Riffle, Run/Bend Ratio (distance between riffles + stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16

Column Totals: _____

Column Scores E _____ + G _____ + F _____ + P _____ = 183 = Score

<70 = Excellent, 71-129 = Good, 130-200 = Fair, >200 = Poor

See reverse side for additional habitat features, water quality impacts, and comments.

TRIBUTARY P LAKE MICHIGAN
Koshkonong Co Wisconsin

Department of Natural Resources

STREAM SYSTEM HABITAT RATING FORM
Form 3200-68 1-85

Stream UNNAMED Reach Location CARTON Rd to LAKE Reach Score/Rating _____
County SHEBOYGAN Date 4-23-90 Evaluator WANNZYN Classification _____

17
20
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Rating Item	Category			
	Excellent	Good	Fair	Poor
Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. (14)	Heavy erosion evident. Probable erosion from any run off. 16
Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). (4)	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
Bank Erosion, Failure	No evidence of significant erosion or bank failures. Little potential for future problem. 4	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. (20)
Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 8	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 9	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. (18)
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Avg. Depth Riffles and Runs	Cold >1' 0 Warm >1.5' 0	6" to 1' 0 10" to 1.5' 0	6 3" to 6" 6 6" to 10"	18 <3" 18 <6"
Avg. Depth of Pools	Cold >4' 0 Warm >5' 0	3' to 4' 0 4' to 5' 0	6 2' to 3' 6 3' to 4'	18 <2' 18 <3'
Flow, at Rep. Low Flow	Cold >2 cfs 0 Warm >5 cfs 0	1-2 cfs 0 2-5 cfs 0	6 5-1 cfs 6 1-2 cfs	18 <.5 cfs 18 <1 cfs
Pool/Riffle, Run/Bend Ratio (distance between riffles + stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. (8)	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. (10)	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16

Column Totals: _____

Column Scores E _____ + G _____ + F _____ + P _____ = 208 = Score

<70 = Excellent, 71-129 = Good, 130-200 = Fair, >200 = Poor

See reverse side for additional habitat features, water quality impacts, and comments.

STREAM: Tributary to Lake Michigan

DISCHARGER: Kohler Generator Co.

COUNTY Sheboygan

CLASSIFICATION RECOMMENDATION

It is the recommendation of this department to classify the stream as non-continuous, marginal fish and aquatic life.

ADDITIONAL COMMENTS

Road(#). Oil boom along bank at plant location. Oil evident in substrate at Garden

ATTACHMENTS

USGS map

REFERENCES USED

low flow characteristics of Wisconsin streams at sewage treatment plants and industrial plants. USGS Water Res. Invest. 79-31

CC:

Mark Tusler (central office)

Frank Schultz (SED wastewater section)

STREAM CLASS REACHES

PHYSICAL FEATURE		STREAM CLASS REACHES				
		1	2	3	4	5
Watershed Character (maps or observations)	Size (sqmi)					
	Vegetation Type					
	Predominant Land Use	Industrial	Wooded			
	Wetland Type	N/A	N/A			
Hydrologic Features (indicate if estimated or actual measurements)	Width (ave)	~ 1'	3'-4'			
	Depth (ave/max)	\bar{x} ~ 3"	Ave 6"			
	Velocity (est)(fps)	~ 1.5 fps	0.5 fps			
	Flow (cfs)	~ 0.3 cfs	~ 0.9 cfs			
	Pools or Refuges for Fish No. observed, depth					
% Bottom Type	Silt					
	Sand Gravel	50% sand 50% gravel	30% sand			
	Rubble		70% rubble			
	Other					
Control Structures or Obstructions	None	slight blockage at bridge				
Irretriev. Channel Alterations	None	None				
Discharge	Q ₇₁₀ - 0 Q ₇ - 0	Not Known				

BIOLOGICAL CHARACTERISTICS

STATIONS ON RECEIVING WATER

		1	2	3	4	5
Bank Vegetation		grasses	trees			
Aquatic Macrophytes		None	None			
Invertebrates		None observed	Aseelus dominant			
Phytoplankton (algae)		Heavy phytoplankton growth, some filamentous algae	Heavy filamentous algae			
Fish Observed		None	None			
Fishery Classification		Has little fishery value. May be used by Lake Michigan migrants during certain times of the year.				

CHICAGO

21

22

4854

50'

4853

28

27

4852

33

34

34.71 IV SE
(HOWARDS GROVE)

Kohler
Generator Co...

T. 16 N.

T. 15 N.

4850

4

3

4849

47'30"

660 000
FEET

S H E B O Y G A N

River

