

MICHIGAN DEPARTMENT OF NATURAL RESOURCES  
SURFACE WATER QUALITY DIVISION  
MARCH, 1990

STAFF REPORT

BIOLOGICAL SURVEY ON THE MUSKEGON  
RIVER IN THE VICINITY OF  
EVART, MICHIGAN  
MAY 16, 1989

A biological survey was conducted on the Muskegon River in the vicinity of Evart, Michigan on May 16, 1989. The objective was to assess the impact the Evart Waste Water Treatment Plant (WWTP) had on the Muskegon River.

SUMMARY

1. The Evart WWTP discharge had an adverse effect on the Muskegon River as indicated by the decline in the macroinvertebrate community and the presence of bacterial slime growth downstream from the WWTP discharge.

METHODS

Two stations were sampled on the Muskegon River. Data were collected on the macroinvertebrate community, and stream characteristics. The sample site locations were as follows: Station 1 was at the Evart campgrounds; Station 2 was approximately 100' downstream from the WWTP effluent pipe (Figure 1).

Macroinvertebrates were collected using a triangular dip net and by hand picking all available substrates. Sampling continued until no new taxa were found. Taxa were identified as collected with unknown taxa preserved and returned to the Water Quality Appraisal Unit (WQAU) laboratory for identification.

Stream observations were recorded on Stream Survey Cards (attached).

RESULTS AND DISCUSSION

The macroinvertebrate habitats at Station 1 and 2 were similar and of high quality with respect to their physical parameters. There was a decrease in macroinvertebrate species diversity and abundance at Station 2 (Table 1). Most notably was the decrease in abundance of stoneflies (Plecoptera), mayflies (Ephemeroptera) and caddisflies (Trichoptera). The decrease in macroinvertebrate abundance and diversity is probably a reflection of the Evart WWTP discharge, and degradation of water quality in this vicinity. Bacterial slime growth was observed from the WWTP discharge pipe to approximately one half mile downstream. The presence of bacterial slimes suggests an increase in nutrients and organic material downstream of the WWTP. This study suggests that the Evart WWTP has an adverse effect on habitat and stream quality which extends approximately one half mile downstream.

GLEAS LIBRARY

DATE  
INITIALS

Survey Conducted by: Scott Cornelius, Aquatic Biologist  
Great Lakes and Environmental  
Assessment Section

Report by: David Huntly, Aquatic Biologist  
Great Lakes and Environmental  
Assessment Section

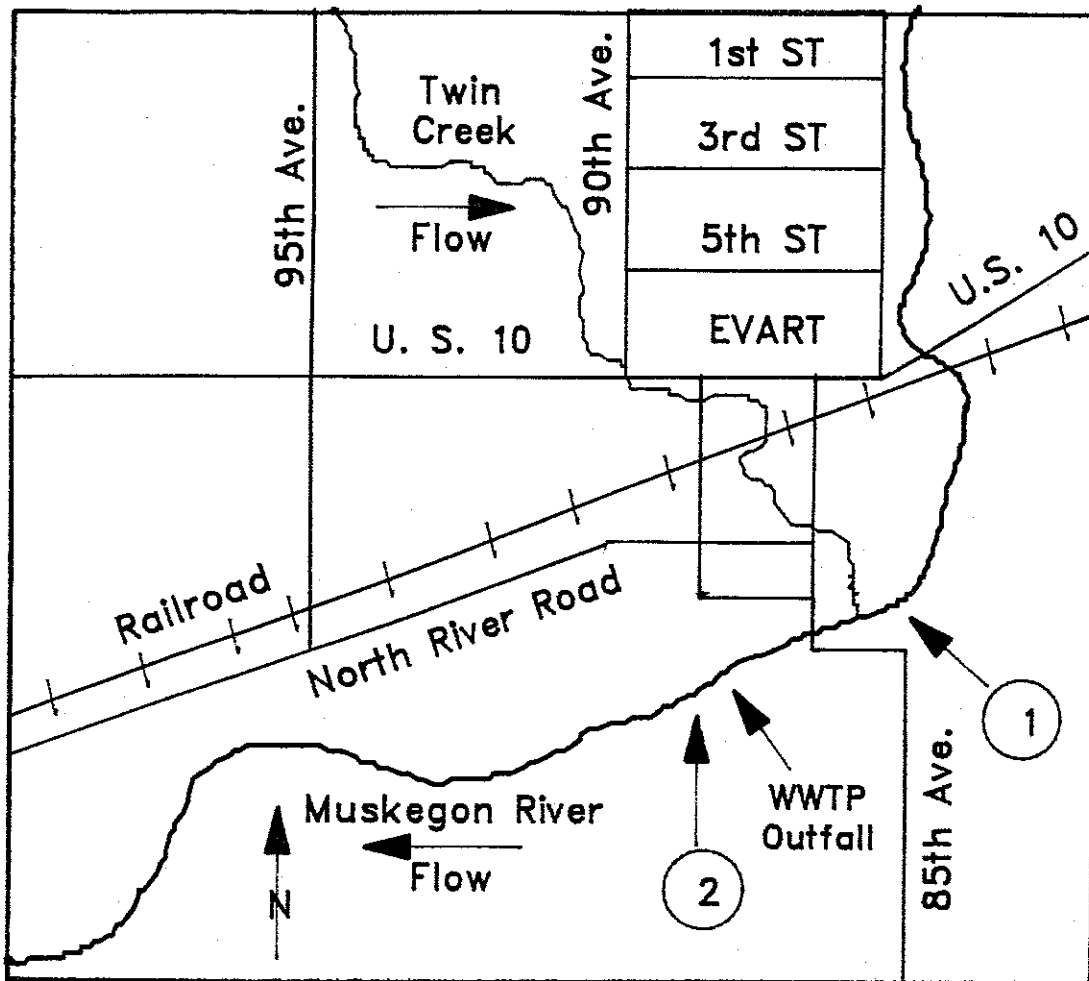


FIGURE 1. Biological Survey Stations on the Muskegon River in the Vicinity of the Evart WWTP, May 16, 1989.

Table 1. Macroinvertebrate sampling results for the Muskegon River in the vicinity of the Evert WWTP, Osceola County, Michigan, May 16, 1989.

Station Location	1 At Evert Campgrounds	2 100' below Evert WWTP
Taxa		
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Planaria (Flatworm)	S	
Hirudinea (Leeches)		S
Pelecypoda (Clams)		
Unionidae	A	A
Isopoda (Sowbugs)	S	
Amphipoda (Scuds)	M	
Decapoda (Crayfish)	P	A
Plecoptera (Stoneflies)		
Perlidae	A	S
Perlodidae	A	
Ephemeroptera (Mayflies)		
Baetidae	A	
Ephemeridae	S	
Heptageniidae	A	S
Siphonuridae	A	
Tricorythidae	A	
Trichoptera (Caddisflies)		
Helicopsychidae	S	
Hydropsychidae	A	S
Hydroptilidae	S	
Coleoptera (Beetles)		
Elmidae	S	S
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Total No. of Taxa	16	7
Overall habitat quality	High	High

S = sparse  
M = moderate  
A = abundant  
P = profuse

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STREAM SURVEY CARD

STORET NO.:

STREAM: Muskegon River INVESTIGATORS: Cornelius/Porter DATE: 5/16/89  
STATION: 1 LOCATION: Evert Campgrounds TIME: 10:30  
STREAM TYPE: Warmwater LAND USE: Suburban REACH LENGTH(FT): 100  
WEATHER: Sunny AIR TEMP(F): 76 WATER TEMP(F): 58  
SHADING(%): 20 DAM U/S: No CHANNELIZED: No  
DISCH. STABILITY: Stable BANK STABILITY: Stable UNDERCUT BANKS: No  
WIDTH(FT): 50 DEPTH(FT): 1.5 VELOCITY(FPS):  
BANKFUL WIDTH(FT): 55 BANKFUL HGT.(FT): 2 EST DISCH(CFS):  
CHANNEL SLOPE(%): BANK SLOPE(%): WATER COLOR: Clear  
CHANNEL SHAPE: Rectanglar TURBIDITY: Slightly Turbid RUBBLE BLACK? No  
WATER OILS: None WATER ODORS: None  
SED OILS: None SED ODORS: None

VEGETATION: GRASSES HERBACEOUS BRUSH DECIDUOUS CONIFER BARREN OTHER  
COVERAGE(%) 90 10  
HEIGHT(FT) 0.3 40

INORGANIC SUBSTRATE FLOW VELOCITY CHARACTERISTICS OR SIZE (INCH) PERCENT IN SAMPLING AREA ORGANIC SUBSTRATE CHARACTERISTICS OR SIZE PERCENT IN SAMPLING AREA

INORGANICS:

BOULDERS\* >3 fps > 10" MUCK-MUD BLK. VERY FINE ORGANIC  
RUBBLE\* 2 fps 2.5 - 10" 10 PULPY-PEAT INDISTINGUISHABLE PLANT PARTS  
GRAVEL 1 fps 0.1 -2.5" 90 FIBROUS PEAT PARTIALLY DECOMPOSED PLANT MATERIAL  
SAND 0.7 fps 0.002 - 0.079" DETRITUS STICK, WOOD, COARSE PLANT MATERIAL  
SILT 0.4 fps LOGS, LIMBS SNAGS, SWEEPS  
CLAY SLICK TEXTURE

\*EMBEDDEDNESS: (1) None (2) 1/3 or less (3) 1/3 to 2/3 (4) 2/3 or more

SITE SUBSTRATE COMPOSITION: % INORGANIC % ORGANIC

MICHIGAN DNR  
SWQD/GLEAS

STREAM SURVEY CARD

STORET NO.:

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STREAM:	Muskegon River	INVESTIGATORS:	Cornelius/Porter	DATE:	5/16/89
STATION:	2	LOCATION:	100ft. Below WWTP	TIME:	
STREAM TYPE:	Warmwater	LAND USE:	Suburban	REACH LENGTH(FT):	50
WEATHER:	Sunny	AIR TEMP(F):	76	WATER TEMP(F):	57
SHADING(%):	20	DAM U/S:	No	CHANNELIZED:	No
DISCH. STABILITY:	Stable	BANK STABILITY:	Stable	UNDERCUT BANKS:	No
WIDTH(FT):	50	DEPTH(FT):	5	VELOCITY(FPS):	
BANKFUL WIDTH(FT):	60	BANKFUL HGT.(FT):	5	EST DISCH(CFS):	
CHANNEL SLOPE(%):		BANK SLOPE(%):		WATER COLOR:	Clear
CHANNEL SHAPE:	U-shaped	TURBIDITY:	Turbid	RUBBLE BLACK?	Yes
WATER OILS:	None	WATER ODORS:	Sewage		
SED OILS:	None	SED ODORS:	Sewage		

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VEGETATION:	GRASSES	HERBACEOUS	BRUSH	DECIDUOUS	CONIFER	BARREN	OTHER
COVERAGE(%)	90		5	5			
HEIGHT(FT)	0.4	0	3	20			

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INORGANIC SUBSTRATE	FLOW VELOCITY	CHARACTERISTICS OR SIZE (INCH)	PERCENT IN SAMPLING AREA	ORGANIC SUBSTRATE	CHARACTERISTICS OR SIZE	PERCENT IN SAMPLING AREA
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INORGANICS:

BOULDERS*	>3 fps	> 10"		MUCK-MUD	BLK. VERY FINE ORGANIC	
RUBBLE*	2 fps	2.5 - 10"	20	PULPY-PEAT	INDISTINGUISHABLE PLANT PARTS	
GRAVEL	1 fps	0.1 -2.5"	80	FIBROUS PEAT	PARTIALLY DECOMPOSED PLANT MATERIAL	
SAND	0.7 fps	0.002 - 0.079"		DETRITUS	STICK, WOOD, COARSE PLANT MATERIAL	
SILT	0.4 fps			LOGS, LIMBS	SNAGS, SWEEPS	100
CLAY		SLICK TEXTURE				

\*EMBEDDEDNESS: (1) None (2) 1/3 or less (3) 1/3 to 2/3 (4) 2/3 or more

SITE SUBSTRATE COMPOSITION: % INORGANIC                      % ORGANIC