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MICHIGAN DEPARTMENT OF NATURAL RESOURCES
SURFACE WATER QUALITY DIVISION
DECEMBER, 1994

STAFF REPORT

A BIOLOGICAL SURVEY OF THE MUSKEGON AND WEST BRANCH MUSKEGON
RIVERS, CLARE, MISSAUKEE AND ROSCOMMON COUNTIES
AUGUST 31-SEPTEMBER 1, 1993

As part of the nonpoint source surveillance activity, staff of the Great Lakes and Environmental Assessment Section (GLEAS) conducted a biological survey of the West Branch Muskegon River and the portion of the Muskegon River between Reedsburg Dam and Muskegon Road. The biological survey was performed according to GLEAS Procedure #51 (available upon request). Additional observations were made of the Muskegon River by traveling in a canoe from Reedsburg Dam downstream to Cadillac Road.

The objective of the biological survey was to evaluate the current impact of land use practices on the fish and macroinvertebrate community and physical habitat conditions of the Muskegon and West Branch Muskegon Rivers.

SUMMARY

1. The locations of the biological sampling stations are shown in Figure 1.
2. Fish and macroinvertebrate community and physical habitat evaluation data generated at these stations are presented in Tables 1-3, respectively. It should be noted that fish community assessments were not conducted at Stations 2-4 due mainly to the depth of water.
3. The fish community was rated "excellent" (non-impaired) at Station 1. A total of 15 fish taxa, which included 6 game fish taxa, were found at Station 1.
4. The macroinvertebrate community was rated "fair" (moderately impaired) at Stations 1 and 2, and "good" (slightly impaired) at Stations 3 and 4. The score for the macroinvertebrate community rating at Station 1 was reduced by the large gastropod (snail) population found in this wide and open segment of the river. The moderately impaired macroinvertebrate community at Station 2 was related to severely impaired physical habitat conditions.
5. Habitat was rated "good" at Station 1, "fair" at Stations 3 and 4, and "poor" (severely impaired) at Station 2. The moderately to severely impaired habitat ratings in the

Muskegon River reflected the lack of available habitat and excessive embeddedness and bottom deposition due to excessive sedimentation. The primary source of sediment appeared to be the numerous steep banks with large erosional areas which likely are the result of historic logging practices. Other sources of sediment to the river included poorly maintained public access points, Off-the-Road Vehicle (ORV) traffic at the Dolph Road and Wolf Creek Road crossings and the riverside sand beach at Cove's Canoe Livery at Muskegon Road.

The bottom substrate physical character of the Muskegon River changed from clean, rocky substrate to highly vegetated rocky substrate within 150 yards of Reedsburg Dam; to sand bottom with log substrates within one quarter mile; and to unconsolidated shifting sand with log substrates within one half mile. The shifting sand bottom continued to Muskegon Road and limited the productivity of this system.

The moderately impaired physical habitat rating in the West Branch Muskegon River at Station 3 also reflected lack of available habitat and poor bank stability. Causes were not determined.

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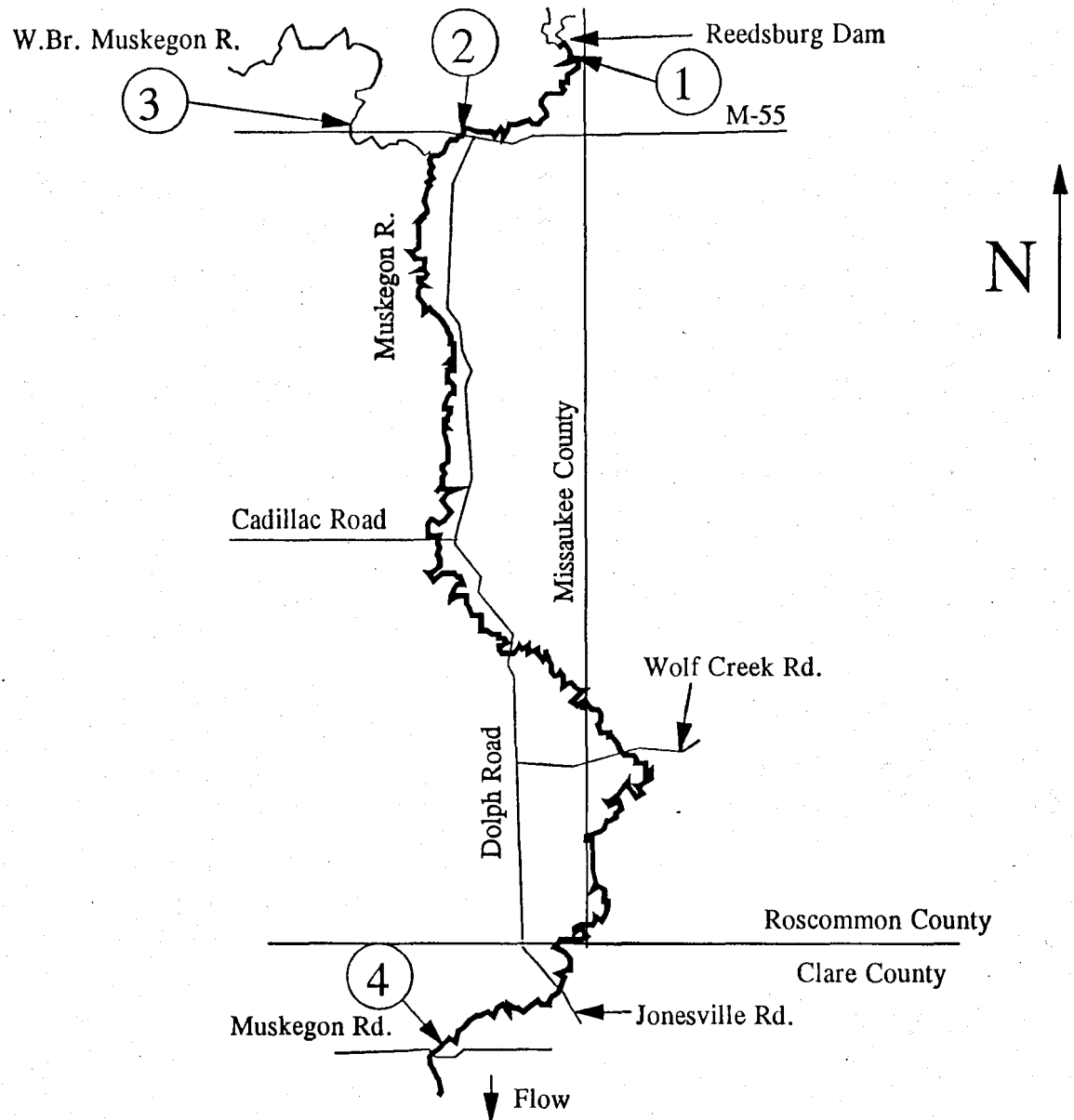


Figure 1. Biological Survey Stations in the Muskegon and W. Br. Muskegon Rivers, August 31-September 1, 1993.

Table 1A. Qualitative fish sampling results for the Muskegon River,
August 31-September 1, 1993.

TAXA	Muskegon R.	
	d/s dam	STATION 1
Petromyzontidae (lampreys)		
Ichthyomyzon fossor (N. brook)	1	
Amiidae (bowfins)		
Amia calva (Bowfin)	4	
Cyprinidae (minnows and carps)		
Nocomis biguttatus (Horneyhead)	5	
Nocomis micropogon (River chub)	1	
Notemigonus crysoleucas (Golden)	7	
Catostomidae (suckers)		
Catostomus commersoni (W. sucker)	5	
Moxostoma macrolepidotum (S.head)	1	
Ictaluridae (Bullhead, Catfish)		
Ictalurus melas (Black bullhead)	1	
Centrarchidae (sunfish)		
Ambloplites rupestris (Rock bass)	14	
Lepomis gibbosus (Pumpkinseed)	12	
Micropterus salmoides (Lm. bass)	3	
Percidae (perch)		
Etheostoma caeruleum (Rainbow d.)	2	
Etheostoma nigrum (Johnny darter)	1	
Percina maculata (Blackside d.)	2	
Perca flavescens (Yellow perch)	4	
TOTAL INDIVIDUALS	63	
NUMBER OF ANOMALIES	0	
SQUARE FOOT SAMPLED	3200	
DENSITY OF INDIVIDUALS (#/SF)	0.020	

Table 1B. Fish metric evaluation of the Muskegon River, September 1, 19

METRIC	STATION 1	
	Value	Score
TOTAL NUMBER OF TAXA	15	5
NUMBER OF DARTER SPECIES	3	5
NUMBER OF SUNFISH SPECIES	2	5
NUMBER OF SUCKER SPECIES	2	5
PERCENT CARP, G.SUNFISH, W.SUCKER	7.9	5
PERCENT OMNIVORES	20.6	3
PERCENT INSECTIVO. CYPRINIDS	9.5	1
PERCENT PISCIVORES	39.7	5
DENSITY OF INDIVIDUALS	0.020	3
PERCENT ANOMALIES	0.0	5
TOTAL SCORE		42
FISH COMMUNITY CATEGORY		EXCELLENT (NON- IMPAIRED)

Table 2A. Qualitative macroinvertebrate sampling results for the Muskegon and W. Br. Muskegon Rivers, August 31-September 1, 1993.

TAXA	Muskegon R. d/s dam STATION 1	Muskegon R. M-55 STATION 2	W.Br.Muskegon R. M-55 STATION 3	Muskegon R. Muskegon Rd. STATION 4
PORIFERA (sponges)	2			1
PLATYHELMINTHES (flatworms)				
Turbellaria	2			
BRYOZOA (moss animals)				2
ANNELIDA (segmented worms)				
Hirudinea (leeches)	1	1		
Oligochaeta (worms)	2	1	1	1
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	20	30	15	6
Decapoda (crayfish)	8	7	6	4
Isopoda (sowbugs)	2	8	2	
Insecta				
Ephemeroptera (mayflies)				
Baetidae	6	10	19	20
Heptageniidae	10	4	10	10
Oligoneuriidae				4
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1	1		
Gomphidae		5		3
Zygoptera (damselflies)				
Calopterygidae	3	2	2	
Coenagrionidae	2	1	1	
Plecoptera (stoneflies)				
Perlidae			1	7
Pteronarcyidae				8
Hemiptera (true bugs)				
Belostomatidae			2	1
Corixidae	2	9	10	30
Gerridae	6	8	3	5
Mesoveliidae	1	1		
Notonectidae		1		1
Pleidae				2
Megaloptera				
Corydalidae (dobson flies)			2	1
Sialidae (alder flies)	1		2	1
Trichoptera (caddisflies)				
Brachycentridae				1
Helicopsychidae	2			
Hydropsychidae	4	8	25	8
Limnephilidae	4	6	2	3
Philopotamidae				2
Phryganeidae		1		
Coleoptera (beetles)				
Gyrinidae (adults)		7		4
Haliplidae (adults)		2		2
Hydrophilidae (total)	2	1		1
Elmidae	1	1	5	2
Gyrinidae (larvae)	4		1	
Diptera (flies)				
Athericidae	1			5
Chironomidae	12	7	5	8
Simuliidae	6	5	8	4
Tabanidae			1	
MOLLUSCA				
Gastropoda (snails)				
Campeloma	20			
Ferrissia (limpet)	2			
Elimia (=Goniobasis)	3			
Helisoma	2		2	
Physa	1	2	2	1
Viviparus	5	10	10	
Stagnicola	4		2	
Pelecypoda (bivalves)				
Unionidae (mussels)				
Mussel 1	1			
Mussel 2	1			
Sphaeriidae (clams)				
Pisidium	2			
Sphaerium	7	4	10	
TOTAL INDIVIDUALS	153	143	149	148

Table 2B. Macroinvertebrate metric evaluation of the Muskegon and W.Br. Muskegon Rivers, August 31-September 1, 1993.

METRIC	Muskegon R. d/s dam STATION 1		Muskegon R. M-55 STATION 2		W.Br.Muskegon R. M-55 STATION 3		Muskegon R. Muskegon Rd. STATION 4	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	36	6	27	6	26	6	30	6
NUMBER OF MAYFLY TAXA	2	4	2	4	2	4	3	6
NUMBER OF CADDISFLY TAXA	3	4	3	4	2	4	4	6
NUMBER OF STONEFLY TAXA	0	0	0	0	1	4	2	6
PERCENT MAYFLY COMP.	10.5	0	9.8	0	19.5	0	23.0	6
PERCENT CADDISFLY COMP.	6.5	0	10.5	0	18.1	6	9.5	0
PERCENT CONTR. DOM. TAXON	13.1	6	21.0	4	16.8	6	20.3	4
PERCENT ISOPOD, SNAIL, LEECH	26.1	0	14.7	0	12.1	0	0.7	6
PERCENT SURFACE AIR BREATHERS	7.2	4	20.3	2	10.1	4	31.1	2
TOTAL SCORE		24		20		34		42
MACROINVERTEBRATE COMMUNITY CATEGORY		FAIR (MODERATELY IMPAIRED)		FAIR (MODERATELY IMPAIRED)		GOOD (SLIGHTLY IMPAIRED)		GOOD (SLIGHTLY IMPAIRED)

Table 3. Habitat evaluation the for the Muskegon and W. Br. Muskegon Rivers,
August 31-September 1, 1993.

HABITAT METRIC	STATION 1 Muskegon R. d/s dam	STATION 2 Muskegon R. M-55	STATION 3 W.Br. Muskegon R. M-55	STATION 4 Muskegon R. Muskegon Rd.
Bottom Substrate Available Cover:	12	4	10	6
Embeddedness:	14	2	11	11
Velocity:Depth:	12	8	12	11
Flow Stability:	10	9	8	7
Bottom Deposition:	9	2	10	2
Pools-Riffles-Runs-Bends:	9	5	9	8
Bank Stability:	6	7	4	7
Bank Vegetative Stability:	8	9	8	7
Streamside Cover:	7	7	7	7
TOTAL SCORE	87	53	79	66
HABITAT CONDITION CATEGORY	GOOD (SLIGHTLY IMPAIRED)	POOR (SEVERELY IMPAIRED)	FAIR (MODERATELY IMPAIRED)	FAIR (MODERATELY IMPAIRED)
Date:	Sept. 1, 1993	August 31, 1993	August 31, 1993	Sept. 1, 1993
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater
Weather:	Sunny	Rainy	Prtly Cldy	Sunny
Stream Order:	fourth	fourth	third	fourth
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP
Air Temperature:	64 Deg. F.	61 Deg. F.	62 Deg. F.	72 Deg. F.
Water Temperature:	72 Deg. F.	72 Deg. F.	66 Deg. F.	67 Deg. F.
Ave. Stream Width:	82 Feet	60 Feet	35 Feet	Feet
Ave. Stream Depth:	2.5 Feet	3.5 Feet	1.5 Feet	Feet
Surface Velocity:	0.5 Ft./Sec.	0.5 Ft./Sec.	0.4 Ft./Sec.	Ft./Sec.
Estimated Flow:	102.5 CFS	105 CFS	21 CFS	CFS
Basin Code:	4060102	4060102	4060102	4060102