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MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
SURFACE WATER QUALITY DIVISION
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GLEAS Original

STAFF REPORT

A BIOLOGICAL SURVEY OF THE LITTLE MUSKEGON RIVER AND SELECTED TRIBUTARIES, OF MECOSTA AND MONTCALM COUNTIES, MICHIGAN JULY 1-2, 1996

As part of the nonpoint source surveillance activities, staff from the Great Lakes and Environmental Assessment Section (GLEAS) conducted a qualitative biological survey of the Little Muskegon River and four major tributaries. The tributaries included the East Branch of the Little Muskegon, the West Branch of the Little Muskegon, Sylvester Creek, and Handy Creek. The biological survey was conducted according to GLEAS Procedure #51 (available upon request).

The East Branch of Little Muskegon is a second order coldwater stream that originates from Lake 28 in east central Mecosta County and flows northwest to Hughes Swamp (Figure 1). It then turns southwest to join the West Branch of the Little Muskegon, just southwest of Mecosta Township. The West Branch of the Little Muskegon originates from Blue Lake and flows southeast to join the East Branch of Little Muskegon. Sylvester Creek is a second order coldwater stream that originates in southeastern Mecosta County and flows west approximately six miles to its confluence with the Little Muskegon River. Handy Creek is also a second order stream that originates in southwestern Mecosta County (Figure 2). It flows southwest through Montcalm County, to its confluence with the Little Muskegon River just east of the Newaygo County line. The East and West branches converge to form the Little Muskegon, a third order river that flows southwest through Mecosta and Montcalm Counties to Newaygo County. In Newaygo County the Little Muskegon flows northwest to its confluence with the Muskegon River in Croton. Numerous tributaries drain substantial areas of Mecosta and Montcalm counties. The entire Little Muskegon River watershed lies in the Southern Michigan/Northern Indiana Till Plain ecoregion.

The survey was conducted to evaluate the effects of current land use activities within the watershed and determine if they are adversely impacting the biological integrity and physical habitat conditions within the Little Muskegon River and selected tributaries.

SUMMARY

1) Sampling locations are shown in Figures 1 and 2. A summary of overall biological and habitat category ratings is given in Table 1. Fish community ratings, macroinvertebrate ratings and habitat evaluations are given in Tables 2, 3, and 4, respectively. Salmonid species list and size class distribution for stations 1-4 and 6 are also provided (Table 5).

2) The East Branch of the Little Muskegon, West Branch of the Little Muskegon, the Little Muskegon at Station 3, Sylvester Creek, and Handy Creek are all designated coldwater streams. Since the Procedure 51 fish rating system is based on warmwater metrics, the current fish community ratings are not provided for these stations. Fish communities were classified as meeting coldwater designated uses if at least 1% of the fish collection consisted of salmonid species. All coldwater stations except Station 2, the West Branch of the Little Muskegon, were meeting coldwater designated uses (Tables 1B and 5). The lack of salmonids at Station 2 may have been due to elevated stream temperatures compared to the stations that were meeting designated uses for coldwater streams (Table 3). The West Branch of the Little Muskegon is fed from Blue Lake, a warmwater lake. The station, during the survey, had a stream temperature of 78°F, unsuitable for supporting coldwater designated uses. Station 3 was found to be marginally supporting coldwater designated uses, with only 1.3% of the fish community composed of salmonids (Table 5). Temperatures at Station 3 was also elevated (74°F) compared to Stations 1, 4 and 6 (Table 4). Stations 2 and 3 were both exceeding Water Quality Standards for temperature in coldwater streams (68°F). At all four stations meeting coldwater designated uses, at least one legal size trout was collected (Table 5).

Stations 5 and 7 on the Little Muskegon are designated warmwater streams and received "excellent" and "acceptable" fish community category ratings, respectively (Table 2). Station 5 had a diverse taxa list with a large number of intolerant taxa and a low percentage of tolerant and omnivorous taxa. Sampling difficulties, including the inability to sufficiently sample the deep pool habitats, may have contributed to the lower (acceptable) fish community rating for Station 7. Because only riffles and shallow runs were sampled adequately at Station 7, other fish taxa were possibly missed that may have increased the category rating for this station.

3) The macroinvertebrate communities rated "excellent" at all stations except Station 2 (Table 3). These stations had diverse communities with high percentages of mayflies and caddisflies and low percentages isopods, snails, and leeches. Station 2 was rated "acceptable" tending toward excellent. The macroinvertebrate community at Station 2 had a lower percent mayfly composition and a higher percentage of isopods, snails, and leeches compared to the other six stations.

4) Habitat was rated "excellent" at Stations 5 and 7, "good" at Stations 1, 2, 4 and 6 and "fair" at Station 3 (Tables 1 and 4). Stations 5 and 7 had a higher percentage of bottom substrate and available cover and a greater degree of variability of habitats, such as pools, riffles, runs and bends, compared to the other stations. Station 3 showed the lowest total score for habitat among the seven stations. Elevated embeddedness and reduced amounts of bottom substrate and available cover characterized Station 3. The available habitat at Station 3 was mostly along the stream bank and included some shallow pools, undercut banks and over hanging vegetation. The majority of midstream habitat was covered by sand. The possible source of the sediment appeared to be upstream stream road crossings and the road running along the north side of the stream.

Overall current land use activities, including agriculture and urban development have had minimal effect on the Little Muskegon River. Continued stewardship in the development of the Little Muskegon River watershed will be important to future of this river.

Maintenance of vegetative riparian zones and of stable flow regimes throughout the Little Muskegon River watershed are essential to protecting the high quality of its designated uses.

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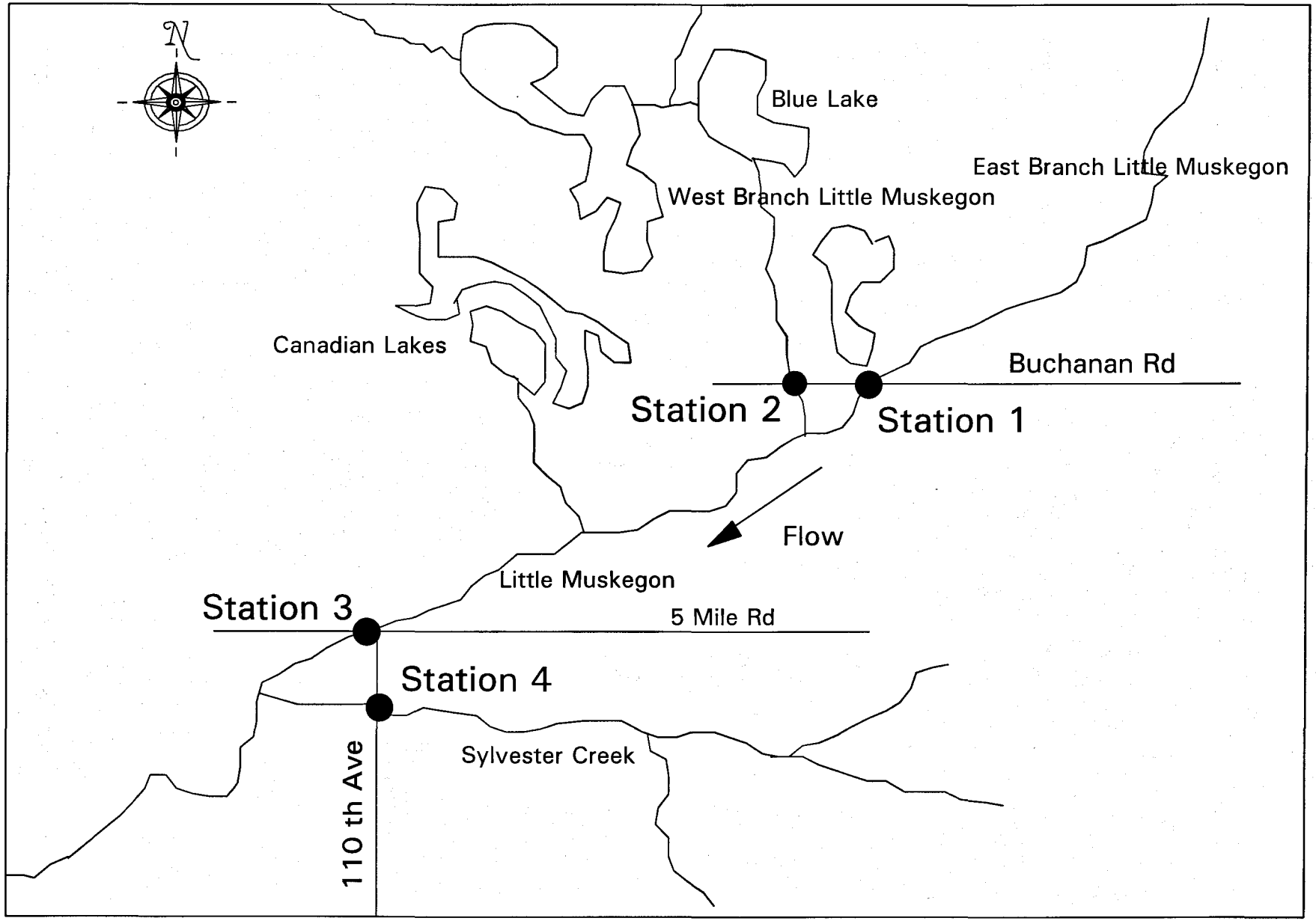

Figure 1. Survey stations 1-4 on the Little Muskegon River and selected tributaries, Mecosta county, Michigan.

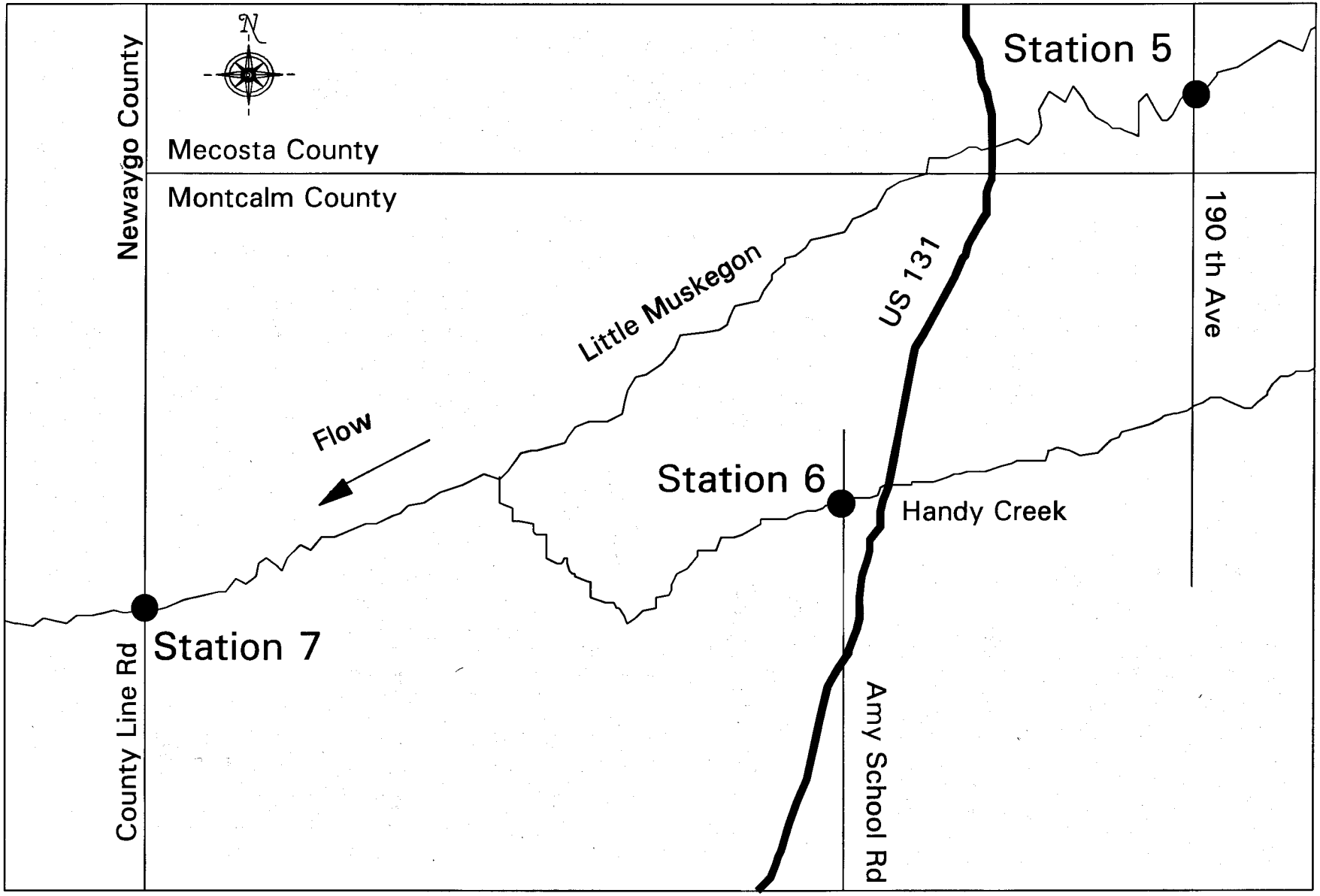

Figure 2. Survey stations 5-7 on the Little Muskegon River and selected tributaries, Mecosta and Montcalm counties, Michigan.

Table 1. Overall biological and habitat category ratings for the Little Muskegon River and selected tributaries, Mecosta and Montcalm counties, Michigan, July 1 and 2, 1996.

Station #	Fish Community Category	Macroinvertebrate Community Category	Overall Biological Category	Habitat Category
1	+	Excellent	Excellent	Good
2	-	Acceptable	Acceptable	Good
3	+	Excellent	Excellent	Fair
4	+	Excellent	Excellent	Good
5	Excellent	Excellent	Excellent	Excellent
6	+	Excellent	Excellent	Good
7	Acceptable	Excellent	Acceptable	Excellent

+ ; meeting coldwater designated uses for fish.

- ; not meeting coldwater designated uses for fish.

Table 2A. Qualitative fish sampling results for the Little Muskegon River and selected tributaries, Mecosta and Montcalm counties, Michigan, July 1-2, 1996.

TAXA	E. Br. Little Muskegon Buchanan Rd STATION 1	W. Br. Little Muskegon Buchanan Rd STATION 2	Little Muskegon Five Mile/110th STATION 3	Sylvester Creek Ave, 110th STATION 4
Petromyzontidae (lampreys)				
Ichthyomyzon castaneus (Chestnut)	6	21	12	3
Salmonidae (trouts)				
Oncorhynchus mykiss (Rainbow tr.)	4		1	15
Salmo trutta (Brown trout)	1		1	
Salvelinus fontinalis (Brook trout)	6			
Umbridae (mudminnows)				
Umbra limi (Central mudminnow)	5	17	8	21
Cyprinidae (minnows and carps)				
Campostoma anomalum (Cent. stone.)		1	8	
Nocomis biguttatus (Horneyhead)	4	39	5	
Semotilus atromaculatus (Creek)	23	16	26	3
Luxilus cornutus (Common shiner)	1	27	16	
Rhinichthys atratulus (Blacknose d.)	21	1	13	
Cottidae (sculpins)				
Cottus bairdii (Mottled sculpin)	26		20	20
Catostomidae (suckers)				
Catostomus commersoni (W. sucker)	4	27	15	2
Hypentelium nigricans (N. hog s.)		2	1	
Gasterosteidae (sticklebacks)				
Culaea inconstans (Brook)			2	
Centrarchidae (sunfish)				
Ambloplites rupestris (Rock bass)	1	3	1	
Lepomis macrochirus (Bluegill)		2	3	
Percidae (perch)				
Etheostoma nigrum (Johnny darter)	1	15	19	4
Perca flavescens (Yellow perch)		4		
TOTAL INDIVIDUALS	103	175	151	68
Number of hybrid sunfish	0	0	0	0
Number of anomalies	0	0	0	0
Percent anomalies	0.000	0.000	0.000	0.000
Percent salmonids	10.680	0.000	1.325	22.059
Reach sampled (ft)	405.000	480.000	645.000	225.000
Area sampled (sq ft)	8100.000	14400.000	29000.000	1800.000
Density (# fish/sq ft)	0.013	0.012	0.005	0.038
Gear	ss	ss	ss	bp

Table 2B. Fish metric evaluation of the Little Muskegon River and selected tributaries, Mecosta and Montcalm counties, Michigan, July 1-2, 1996.

METRIC	STATION 1 Value	Score	STATION 2 Value	Score	STATION 3 Value	Score	STATION 4 Value	Score
TOTAL NUMBER OF TAXA	13		13		16		7	
NO. OF DARTER, SCULPIN, MADTOM TA	2		1		2		2	
NUMBER OF SUNFISH TAXA	1		2		2		0	
NUMBER OF SUCKER TAXA	1		2		2		1	
NUMBER OF INTOLERANT TAXA	6		3		6		3	
PERCENT TOLERANT	52.43		43.43		53.64		44.12	
PERCENT OMNIVOROUS TAXA	51.46		34.86		41.06		38.24	
PERCENT INSECTIVOROUS TAXA	31.07		48.57		43.71		35.29	
PERCENT PISCIVOROUS TAXA	0.97		1.71		0.66		0.00	
% SIMPLE LITHOPHILIC SPAWNER TAXA	25.24		32.57		29.80		2.94	

Table 2A cont. Qualitative fish sampling results for the Little Muskegon River and selected tributaries, Mecosta and Montcalm Counties, Michigan, July 1 -2, 1996.

TAXA	Little Muskegon Ave, 190th STATION 5	Handy Creek Amy School Rd STATION 6	Little Muskegon County Line Rd STATION 7
Petromyzontidae (lampreys)			
Ichthyomyzon castaneus ammocoete (Chestnu	11	3	2
Salmonidae (trouts)			
Oncorhynchus mykiss (Rainbow tr.)		5	
Salvelinus fontinalis (Brook trout)		9	
Cyprinidae (minnows and carps)			
Nocomis biguttatus (Horneyhead)	4		1
Semotilus atromaculatus (Creek)	2	15	10
Notropis atherinoides (Emerald)	5		
Luxilus cornutus (Common shiner)	8		2
Pimephales notatus (Bluntnose m.)	5		1
Phoxinus eos (N. redbelly dace)		1	
Rhinichthys atratulus (Blacknose d.)		17	1
Rhinichthys cataractae (Longnose d.)		4	12
Cottidae (sculpins)			
Cottus bairdii (Mottled sculpin)		1	9
Cottus cognatus (Slimy sculpin)		10	
Catostomidae (suckers)			
Catostomus commersoni (W. sucker)	2	4	
Hypentelium nigricans (N. hog s.)	2		
Moxostoma anisurum (Silver redh.)	1		
Moxostoma macrolepidotum (Shorthead)	5		
Ictaluridae (Bullhead, Catfish)			
Ameiurus melas (Black bullhead)	3	2	
Centrarchidae (sunfish)			
Ambloplites rupestris (Rock bass)	3		
Lepomis macrochirus (Bluegill)	9		1
Micropterus salmoides (Lm. bass)	1		
Micropterus dolomieu (Sm. bass)	6		
Percidae (perch)			
Etheostoma caeruleum (Rainbow d.)	8		15
Etheostoma nigrum (Johnny darter)	4		12
Percina caprodes (Logperch)	1		
Percina maculata (Blackside d.)	8		6
Perca flavescens (Yellow perch)	1		
TOTAL INDIVIDUALS	89	71	72
Number of hybrid sunfish	0	0	0
Number of anomalies	0	0	0
Percent anomalies	0.000	0.000	0.000
Percent salmonids	0.000	19.718	0.000
Reach sampled (ft)	1300.000	230.000	1200.000
Area sampled (sq ft)	6500.000	2760.000	66000.000
Density (# fish/sq ft)	0.014	0.026	0.001
Gear	ss	bp	ss

Table 2B cont. Fish metric evaluation of the Little Muskegon River and selected tributaries, Mecosta and Montcalm Counties, Michigan, July 1 -2, 1996.

METRIC	STATION 5 Value	Score	STATION 6 Value	Score	STATION 7 Value	Score
TOTAL NUMBER OF TAXA	20	1	11		12	0
NO. OF DARTER, SCULPIN, MADTOM TA	4	1	2		4	1
NUMBER OF SUNFISH TAXA	2	0	0		1	-1
NUMBER OF SUCKER TAXA	4	1	1		0	-1
NUMBER OF INTOLERANT TAXA	7	1	6		4	0
PERCENT TOLERANT	14.61	1	50.70		33.33	0
PERCENT OMNIVOROUS TAXA	13.48	1	53.52		16.67	0
PERCENT INSECTIVOROUS TAXA	61.80	0	21.13		80.56	1
PERCENT PISCIVOROUS TAXA	11.24	0	0.00		0.00	-1
% SIMPLE LITHOPHILIC SPAWNER TAXA	39.33	0	35.21		50.00	1
TOTAL SCORE		6				0
FISH COMMUNITY RATING		EXCELLENT				ACCEPT.

Table 3A. Qualitative macroinvertebrate sampling results for the Little Muskegon River and selected tributaries, Mecosta and Montcalm counties, Michigan, July 1-2, 1996.

TAXA	E. Br. Ltl. Muskegon Buchanan STATION 1	W. Br. Ltl. Muskegon Buchanan STATION 2	Little Muskegon Five Mile/110th STATION 3	Sylvester Creek One hundred tenth Ave STATION 4
PORIFERA (sponges)			1	
BRYOZOA (moss animals)			1	1
ANNELIDA (segmented worms)				
Oligochaeta (worms)			5	
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	10	5	15	20
Decapoda (crayfish)	5	20	10	
Isopoda (sowbugs)		5	1	
Insecta				
Ephemeroptera (mayflies)				
Baetidae			3	5
Ephemerellidae		5	5	10
Ephemeridae		10	8	8
Heptageniidae	10		10	10
Tricorythidae	1	1		
Odonata				
Anisoptera (dragonflies)		1		
Macromiidae		1		
Zygoptera (damselflies)				
Calopterygidae				1
Coenagrionidae		5		
Plecoptera (stoneflies)				
Perlidae	8	5		
Perlodidae	1	5	3	2
Pteronarcyidae			1	
Hemiptera (true bugs)				
Belostomatidae			1	
Gerridae	5	5	5	5
Megaloptera				
Corydalidae (dobson flies)	1		1	1
Sialidae (alder flies)				1
Trichoptera (caddisflies)				
Brachycentridae			10	5
Glossosomatidae	1			
Helicopsychidae	1	5	8	1
Hydropsychidae	20	10	10	5
Limnephilidae	15		5	10
Uenoidae	10	10	10	5
Coleoptera (beetles)				
Dytiscidae (total)			1	1
Gyrinidae (adults)			1	
Elmidae	1	5		
Diptera (flies)				
Athericidae				10
Chironomidae	9	15	10	
Simuliidae	5			
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)				
Lymnaeidae	1		1	
Physidae				5
Planorbidae	1	20		
Pelecypoda (bivalves)				
Sphaeriidae (clams)	5	10	5	5
Unionidae (mussels)		2	1	
TOTAL INDIVIDUALS	110	145	132	111

Table 3B. Macroinvertebrate metric evaluation of the Little Muskegon River and selected tributaries, Mecosta and Montcalm counties, Michigan, July 1-2, 1996.

	STATION 1		STATION 2		STATION 3		STATION 4	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	19	0	20	0	26	1	20	0
NUMBER OF MAYFLY TAXA	2	0	3	0	4	1	4	1
NUMBER OF CADDISFLY TAXA	5	1	3	0	5	1	5	1
NUMBER OF STONEFLY TAXA	2	1	2	1	2	1	1	1
PERCENT MAYFLY COMP.	10.00	0	11.03	0	19.70	1	29.73	1
PERCENT CADDISFLY COMP.	42.73	1	17.24	0	32.58	1	23.42	0
PERCENT CONTR. DOM. TAXON	18.18	1	13.79	1	11.36	1	18.02	1
PERCENT ISOPOD, SNAIL, LEECH	1.82	1	17.24	-1	1.52	1	4.50	0
PERCENT SURF. AIR BREATHERS	4.55	1	3.45	1	6.06	1	5.41	1
TOTAL SCORE		6		2		9		6
MACROINV. COMMUNITY CATEGORY		EXCELLENT		ACCEPT.		EXCELLENT		EXCEL.

Table 3A cont. Qualitative macroinvertebrate sampling results for the Little Muskegon River and selected tributaries, Mecosta and Montcalm counties, Michigan, July 1-2, 1996.

TAXA	Little Muskegon Ave, 190th STATION 5	Handy Creek Amy School Rd STATION 6	Little Muskegon County Line Rd STATION 7
PORIFERA (sponges)	1		
ARTHROPODA			
Crustacea			
Amphipoda (scuds)	2	10	10
Decapoda (crayfish)	20	5	15
Isopoda (sowbugs)	1		
Insecta			
Ephemeroptera (mayflies)			
Baetidae	8		5
Ephemerellidae		1	8
Ephemeridae	5		
Heptageniidae	15	10	8
Isonychiidae	8		
Siphlonuridae			8
Odonata			
Anisoptera (dragonflies)			
Libellulidae		5	
Macromiidae		1	
Zygoptera (damselflies)			
Calopterygidae		5	
Plecoptera (stoneflies)			
Perlidae	8	10	
Perlodidae			5
Pteronarcyidae	5		8
Hemiptera (true bugs)			
Corixidae			1
Gerridae	5		5
Megaloptera			
Corydalidae (dobson flies)		1	1
Trichoptera (caddisflies)			
Glossosomatidae		5	5
Helicopsychidae	3		
Hydropsychidae	4	5	8
Hydroptilidae	8		15
Leptoceridae	5		
Limnephilidae		5	5
Polycentropodidae		10	
Psychomyiidae	8		15
Uenoidae	10	10	10
Lepidoptera (moths)			
Pyralidae	5		
Coleoptera (beetles)			
Dytiscidae (total)	1	1	
Psephenidae (adults)	5		5
Elmidae	10	1	
Diptera (flies)			
Chironomidae	15	10	10
Simuliidae		5	
Tipulidae			1
MOLLUSCA			
Gastropoda (snails)			
Ancylidae (limpets)			
Lymnaeidae	8		
Pelecypoda (bivalves)			
Sphaeriidae (clams)	8		5
TOTAL INDIVIDUALS	168	100	153

Table 3B cont. Macroinvertebrate metric evaluation of the Little Muskegon River and selected tributaries, Mecosta and Montcalm counties, Michigan, July 1-2, 1996.

	STATION 5		STATION 6		STATION 7	
METRIC	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	24	0	18	0	21	0
NUMBER OF MAYFLY TAXA	4	1	2	0	4	1
NUMBER OF CADDISFLY TAXA	6	1	5	1	6	1
NUMBER OF STONEFLY TAXA	2	1	1	1	2	1
PERCENT MAYFLY COMP.	21.43	1	11.00	0	18.95	1
PERCENT CADDISFLY COMP.	22.62	0	35.00	1	37.91	1
PERCENT CONTR. DOM. TAXON	11.90	1	10.00	1	9.80	1
PERCENT ISOPOD, SNAIL, LEECH	5.36	0	0.00	1	0.00	1
PERCENT SURF. AIR BREATHERS	6.55	1	1.00	1	7.19	0
TOTAL SCORE		6		6		7
MACROINV. COMMUNITY CATEGORY		EXCELLENT		EXCELLENT		EXCELLENT

Table 4. Habitat evaluation for the Little Muskegon River and selected tributaries, Mecosta and Montcalm counties, Michigan, July 1-2, 1996.

HABITAT METRIC (MAX)	E. Br. Little Muskegon Buchanan STATION 1	W. Br Little Muskegon Buchanan STATION 2	Little Muskegon Five Mile/110th STATION 3	Sylvester Creek Ave, 110th STATION 4
Bottom Substrate Avail. Cover (20):	11	10	6	11
Embeddedness (20):	11	11	3	6
Velocity:Depth (20):	15	10	6	6
Flow Stability (15):	15	15	12	11
Bottom Depos. (15):	7	7	4	3
Pools-Riffles-Runs-Bends (15):	9	7	8	7
Bank Stability (10):	9	10	10	9
Bank Vegetative Stability (10):	10	10	10	9
Stream Cover (10):	9	9	10	10
TOTAL SCORE (135):	96	89	69	72
HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	FAIR (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)
Date:	7/1/96	7/1/96	7/1/96	7/1/96
Weather:	sunny	sunny	sunny	sunny
Air Temperature:	68 Deg. F.	72 Deg. F.	80 Deg. F.	84 Deg. F.
Water Temperature:	64 Deg. F.	78 Deg. F.	74 Deg. F.	64 Deg. F.
Ave. Stream Width:	20 Feet	30 Feet	45 Feet	8 Feet
Ave. Stream Depth:	1.5 Feet	1 Feet	2.5 Feet	1 Feet
Surface Velocity:	0.75 Ft./Sec.	0.75 Ft./Sec.	0.5 Ft./Sec.	0.75 Ft./Sec.
Estimated Flow:	22.5 CFS	22.5 CFS	56.25 CFS	6 CFS
Stream Modifications:				
Nuisance Plants (Y/N):	N	N	N	N
Report Number:				
STORET No.:				
Stream Name:	E.Br. Little Muskegon	W.Br. Little Muskegon	Little Muskegon	Sylvester Creek
Road Crossing/Location:	Buchanan Rd	Buchanan Rd	Five mile/110th	Ave, 110th
County Code:	54	54	54	54
TRS:	T14NR8WS22	T14NR8WS22	T13NR8WS06	T13NR8WS08
Latitude (dd):	43.59	43.59	43.54	43.54
Longitude (dd):	-85.26	-85.28	-85.31	-85.3
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Coldwater	Coldwater	Coldwater
Basin Code:	4060102	4060102	4060102	4060102
COMMENTS:				

Table 4 cont. Habitat evaluation for the Little Muskegon River and selected tributaries, Mecosta and Montcalm countoes, Michigan, July 1-2, 1996.

HABITAT METRIC (MAX)	Little Muskegon Ave, 190th STATION 5	Handy Creek Amy School Rd STATION 6	Little Muskegon County Line Rd STATION 7
Bottom Substrate Avail. Cover (20):	15	10	18
Embeddedness (20):	13	11	15
Velocity:Depth (20):	18	11	18
Flow Stability (15):	15	8	15
Bottom Depos. (15):	7	6	11
Pools-Riffles-Runs-Bends (15):	12	9	14
Bank Stability (10):	10	2	8
Bank Vegetative Stability (10):	10	9	10
Stream Cover (10):	8	9	10
TOTAL SCORE (135):	108	75	119
HABITAT RATING:	EXCELLENT (NON-IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	EXCELLENT (NON-IMPAIRED)
Date:	7/2/96	7/2/96	7/2/96
Weather:	partly cloudy	cloudy	cloudy
Air Temperature:	74 Deg. F.	70 Deg. F.	74 Deg. F.
Water Temperature:	72 Deg. F.	62 Deg. F.	68 Deg. F.
Ave. Stream Width:	50 Feet	12 Feet	55 Feet
Ave. Stream Depth:	2 Feet	1 Feet	1.5 Feet
Surface Velocity:	0.75 Ft./Sec.	0.5 Ft./Sec.	1 Ft./Sec.
Estimated Flow:	75 CFS	6 CFS	82.5 CFS
Stream Modifications:			
Nuisance Plants (Y/N):	N	N	N
Report Number:			
STORET No.:			
Stream Name:	Little Muskegon	Handy Creek	Little Muskegon
Road Crossing/Location:	Ave,190th	Amy School Rd	County Line Rd
County Code:	54	59	59
TRS:	T13NR10WS36	T12NR10WS15	T12NR10WS30
Latitude (dd):	43.48	43.43	43.43
Longitude (dd):	-85.48	-85.5	-85.56
Ecoregion:	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Coldwater	Warmwater
Basin Code:	4060102	4060102	4060102
COMMENTS:			

Table 5. Salmonid species list and size class distribution for stations 1, 2, 3, 4 and 6 from the biological survey of the Little Muskegon River and selceted tributaries.

			Number per Size Classes (inches)										
Station	% Slamonids	Species	1	2	3	4	5	6	7	8	9	10	11
#1	10.7	Rainbow Trout						1			3		
		Brown Trout							1				
		Brook Trout		1			2	2		1			
#2	0.0	-											
#3	1.3	Rainbow Trout							1				
		Brown Trout									1		
#4	22.1	Brook Trout	1	2		2	2	3	2	2			1
#6	19.7	Rainbow Trout				2	1		1	1			
		Brook Trout					3	2	1	1	2		