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MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
SURFACE WATER QUALITY DIVISION
JULY 1998

STAFF REPORT

A BIOLOGICAL SURVEY OF SAND CREEK, NEWAYGO COUNTY
AUGUST 1996

Staff of the Great Lakes and Environmental Assessment Section (GLEAS) conducted a qualitative biological assessment survey of Sand Creek, a coldwater tributary to the Muskegon River. The survey was performed in accordance with GLEAS Procedure #51 (MDEQ, 1997). Sand Creek originates in Section 23, Ashland Township, Newaygo County, approximately 1.0 mile west of Grant, Michigan, and terminates at its confluence with the Muskegon River at 112th Ave. in Bridgeton, Michigan. The main stream channel is approximately 6.2 miles long and has two significant tributaries. Land use in the headwater area is mainly agricultural while the lower half of the watershed is more forested. Local topography is characterized as moderately rolling and dominated by sandy soil types (USDA, 1995).

Two sites on Sand Creek were evaluated for macroinvertebrate community structure and stream/riparian habitat. Both sites were within the lower 1.2 mile reach of the stream where the channel gradient is approximately 20 feet/mile. Sand Creek has been recognized as a trout stream in the past and is believed to be a spawning stream for anadromous fishes (Pecor, 1974); however, the fish community was not evaluated during this survey.

SUMMARY

1. Sampling locations are displayed in Figure 1. Macroinvertebrate ratings and habitat evaluations are provided in Tables 1a, 1b, and 2, respectively.

2. The macroinvertebrate community at Station 1 was rated as "acceptable" with a tendency towards "excellent" based upon above average to average metric scores. Chironomid taxa were collected with the highest frequency, however, they constituted only 15% of the macroinvertebrate catch. This indicates excellent community balance but only average community diversity as only 14 taxa were collected at Station 1. Caddisflies, an indicator of excellent water quality, exhibited excellent diversity and density with five families of Trichoptera contributing to 45% of the macroinvertebrate catch. The limited Ephemoptera diversity and the absence of Plecopteran taxa at Station 1 may be related to their respective life histories given the August sampling date.

   Habitat was evaluated as "fair" (moderately impaired) at Station 1. Riparian vegetation was in the form of larger trees with a near absence of understory vegetation. Substrate and channel morphology metrics tended to be reduced to a "poor" rating due to a sand dominated stream channel which limits macroinvertebrate diversity and density. Available macroinvertebrate and fish habitat consisted of small patches of gravel substrate and woody debris jams.

3. The macroinvertebrate community at Station 2 was characterized as "acceptable." Chironomids and Amphipods dominated the catch; however, each taxa represented only 18% of the total catch indicating excellent community balance. As in the previous station, only 14 taxa were observed at Station 2 with slightly fewer high water quality types of organisms. The proportion of both mayfly and caddisfly taxa was less than would be expected in non-impacted lotic waters. At least a portion of this paucity may be indicative of the temporal life history characteristics for each of these groups.

   The habitat at Station 2 was rated "fair" (moderately impaired) due to the lack of stable hard substrates and an apparent high degree of embeddedness in this sand dominated stream. The presence of pollution intolerant macroinvertebrates (i.e., caddisflies and mayflies) suggest good water quality in Sand Creek; however, the lack of macroinvertebrate density indicates poor available habitat due to the sand bed load.

   Station 2 is located at a point of the stream's continuum where the average channel slope is greatly reduced as the stream enters the Muskegon River. As a result, sediments from upstream portions of the watershed are deposited is this area as relief and, therefore, competent velocity (Allan, 1995) is lost. In addition, the overall portion of the lower stream channel is bordered by high, steep banks with minimal or no storm water retention. The position and density of woody debris jams and the presence of somewhat stable gullies, adjacent to the channel suggest seasonal high water events, possibly resulting from snowmelt, may be extreme.

LITERATURE CITED

Allan, J.D. 1995. Stream Ecology: Structure and Function of Running Waters. Chapman and Hall, London. 388 pp.

MDEQ. 1997. GLEAS Procedure #51: Qualitative Biological and Habitat Survey Protocols for Wadable Streams and Rivers.

Pecor, C. 1974. Limnological Survey of Sand Lake and Sand Creek, Newaygo County, Michigan, July 17, 1974. Michigan Department of Natural Resources - Bureau of Water Management, Water Quality Appraisal Section, Inland Lakes Management Group, #84530.

USDA. 1995. Soil Survey of Newaygo County. United States Department of Agriculture, Soil Conservation Service. U.S. Government Printing Office, 1994. 387-974/00525/SCS.

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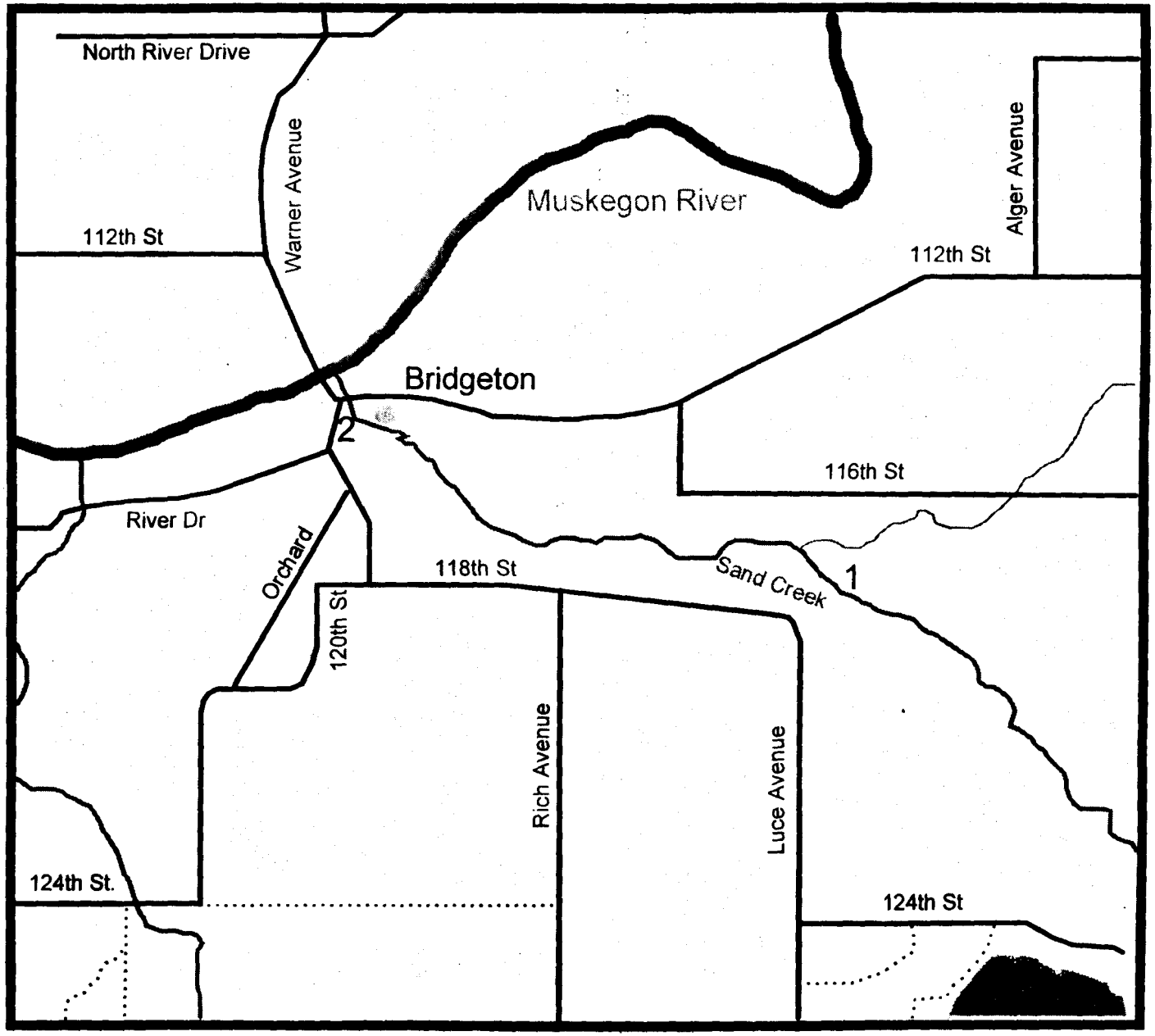

Figure 1. Sampling stations on Sand Creek, Newago County, 15 August, 1996.

Table 1A. Qualitative macroinvertebrate sampling results for Sand Creek, Newaygo County, August 15, 1996.

TAXA	STATION 1 Luce Rd.	STATION 2 u/s 112 St.
ARTHROPODA		
Crustacea		
Amphipoda (scuds)	8	15
Insecta		
Ephemeroptera (mayflies)		
Baetidae	8	8
Heptageniidae	8	5
Odonata		
Anisoptera (dragonflies)		
Aeshnidae	2	1
Zygoptera (damselflies)		
Calopterygidae	5	5
Hemiptera (true bugs)		
Gerridae	2	5
Trichoptera (caddisflies)		
Brachycentridae	10	5
Glossosomatidae	10	
Hydropsychidae	8	5
Lepidostomatidae		1
Limnephilidae	8	
Uenoidae	10	5
Coleoptera (beetles)		
Hydrophilidae (total)	1	
Diptera (flies)		
Chironomidae	15	15
Simuliidae	8	8
Tabanidae		1
MOLLUSCA		
Gastropoda (snails)		
Ancylidae (limpets)		
Physidae		5
TOTAL INDIVIDUALS	103	84

Table 1B. Macroinvertebrate metric evaluation of Sand Creek, Newaygo County, August 15, 1996.

METRIC	STATION 1 Luce Rd. Value	Score	STATION 2 u/s 112 St. Value	Score
TOTAL NUMBER OF TAXA	14	0	14	0
NUMBER OF MAYFLY TAXA	2	0	2	0
NUMBER OF CADDISFLY TAXA	5	1	4	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1
PERCENT MAYFLY COMP.	15.53	0	15.48	0
PERCENT CADDISFLY COMP.	44.66	1	19.05	0
PERCENT CONTR. DOM. TAXON	14.56	1	17.86	1
PERCENT ISOPOD, SNAIL, LEECH	0.00	1	5.95	0
PERCENT SURF. AIR BREATHERS	2.91	1	5.95	1
TOTAL SCORE		4		1
MACROINV. COMMUNITY RATING		ACCEPT.		ACCEPT.

Table 2. Habitat evaluation for Sand Creek, Newaygo County, August 15, 1996.

HABITAT METRIC	STATION 1 Luce Rd.	STATION 2 u/s 112 St.
Bottom Substrate Avail. Cover (20):	5	1
Embeddedness (20):	5	0
Velocity:Depth (20):	2	0
Flow Stability (15):	11	11
Bottom Depos. (15):	2	1
Pools-Riffles-Runs-Bends (15):	2	2
Bank Stability (10):	6	5
Bank Vegetative Stability (10):	9	8
Stream Cover (10):	6	9
TOTAL SCORE (135):	48	37
HABITAT RATING:	FAIR (MODERATELY IMPAIRED)	FAIR (MODERATELY IMPAIRED)
Date:	8/15/96	8/15/96
Weather:		Cloudy
Air Temperature:	69 Deg. F.	69 Deg. F.
Water Temperature:	62 Deg. F.	62 Deg. F.
Ave. Stream Width:	12 Feet	12 Feet
Ave. Stream Depth:	0.3 Feet	0.3 Feet
Surface Velocity:	1 Ft./Sec.	1 Ft./Sec.
Estimated Flow:	3.6 CFS	3.6 CFS
Stream Modifications:		
Nuisance Plants (Y/N):	N	N
Report Number:		
STORET No.:		
Stream Name:	Sand Creek	Sand Creek
Road Crossing/Location:	Luce Road	u/s 112 St.
County Code:	62	62
TRS:	T11NR13WS18	T11NR14WS13
Latitude (dd):	43.3397	43.3464
Longitude (dd):	85.9167	85.9386
Ecoregion:	SMNITP	SMNITP
Stream Type:	Coldwater	Coldwater
USGS Basin Code:	04060102	04060102
COMMENTS:		