MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
SURFACE WATER QUALITY DIVISION
JULY 1998

STAFF REPORT

REPORT ON A SITE VISIT TO THE UNNAMED TRIBUTARY OF SHINGLEBOLT CREEK, MECOSTA COUNTY
MAY 6, 1998

As part of the nonpoint surveillance activity of Surface Water Quality Division, staff of the Great Lakes and Environmental Assessment Section (GLEAS) conducted a site reconnaissance assessment of the unnamed tributary (UT) of Shinglebolt Creek in southwest Mecosta County. The assessment of habitat was conducted according to GLEAS Procedure 51 (available upon request). Water samples were collected, preserved as required, and transported to the Michigan Department of Environmental Quality (MDEQ) Environmental Laboratory for analyses. The main objective of the site visit was to become familiar with the area with respect to the review of a permit application, which proposes to create an impoundment on the UT.

The UT is one of the two main branches of the Shinglebolt Creek system. The UT is on the south side of Shinglebolt Creek and joins Shinglebolt Creek about 1.7 stream miles upstream of its mouth. The UT also has a branch which shall be called the south branch for discussion purposes. The segments of the UT evaluated in this assessment are first and second order streams in the Southern Michigan/Northern Indiana Till Plain ecoregion. Shinglebolt Creek is a designated trout stream and flows into the Little Muskegon River which is also a designated trout stream.

SUMMARY

1. The approximate locations of the five UT habitat assessment stations are shown in Figure 1. Figure 1 does not show the nearby locations where the water samples were collected. These three locations can be easily located on a county map. The fisheries, physical habitat and chemistry data are presented in Tables 1A and 1B, 2, and 3, respectively. Macroinvertebrate sampling was not conducted because of the reconnaissance nature of the site visit. Staff from the Michigan Department of Natural Resources (MDNR) Fisheries Division and the MDEQ Land and Water Management Division sampled the fish community at Stations 1, 2, and 3 during the site visit.

2 The fish community (Tables 1A and 1B) was not rated at Station 1 as the sampling there was more presence/absence in nature. A plunge pool and a short distance downstream were all that was sampled. Not all the fish were captured at Station 1 and the total number shown is an underestimate of the fish present. No trout or other intolerant fish species were captured at Station 1. Station 2 was rated as not meeting the coldwater designation because no trout were captured at that time. Two intolerant fish species were captured at this station. A portion of the Station 2 segment was not sampled rigorously due to some brush cover and the total number shown is an

underestimate of the fish present. Station 3, which is on the south branch UT, met its coldwater designation. Brook trout from 4-7 inches in length were captured and comprised about 10% of the fish present. One other intolerant fish species was captured at Station 3.

3. Habitat quality (Table 2) was rated as fair at Stations 1, 2, and 4 and good at Stations 3 and 5. The fair rating scores were at the upper end of the fair category and the good rating scores were in the middle of the good category. All stations had water temperatures of 59-62.5 degrees Fahrenheit which indicates strong groundwater influences.

Station 1 was below an old trail crossing and was more in the headwater portions of the UT than the other stations. It was the smallest (1' to 2' wide, about 1" to 2" deep with a few 4" to 6" deep undercuts) of the stream sites visited. The small channel was primarily sand with some deposits of small gravel in the center areas and it had silty margins because of the muck soil surroundings. Specked alders were common on the bank and woody debris was also present in the stream. The fair habitat rating is due in part to the absence of deeper water, which is typically lacking in headwater reaches.

Station 2 was downstream of the confluence of the two branches of the UT and was below a two track trail which crossed the stream. The culvert placed at the two track appeared to be either inadequately sized or improperly installed because of the differences between the upstream and downstream stream channel. Downstream of the crossing, the channel averaged around 5' to 5.5' wide and had a predominantly sandy bottom with varying amounts of silts present. Some woody debris was present but the riparian zone here was more grassy and meadow-like than at Station 1. Upstream of the culvert (which was not the focus of this station assessment), the creek channel was narrower and appeared to be completely silted in. At least part of this difference was probably due to the damming effects of the culvert. Water depths up to about one foot were present by bank or log undercuts in some spots downstream of the crossing. No gravel was noted in this reach and the fair habitat rating was primarily due to the sand substrate bottom.

Station 3 is on the lower end of the south branch UT. Habitat at Station 3 was good with cobble, gravel, and woody debris over a sand base. Numerous small undercuts were also present. Large areas of soft bottom or extensive silt deposits were not present in the area viewed although some areas where the water slowed had silt coatings. This general area had more of a lightly forested riparian zone and the channel was very serpentine as it cut through a bottomland area adjacent to a ridge line. Some grasses and alders were also present along the channel. Some bends or undercuts present were 6" to 12" deep. The stream gradient appeared to be higher here than at the previous two stations. The presence of trout and the abundant caddisfly populations observed at this station were probably a reflection of the higher quality habitat present.

Station 4 was located toward the downstream end of an extensive grassy, wet meadow. The riparian zone was primarily grass on thick organic soils with very few shrubs or trees present. The substrate was mainly silt over sand although some areas had an open sand bottom. Silt depths ranged from 3" to 12" along the channel margins and soft sands ranged from about 3" to 12" to a hard sand bottom. Woody debris was present in limited amounts and undercut banks provided some cover. Little cobble was present. Water depths ranged from about 5" to 18" and the channel varied between 4'

to 6' wide. The fair rating was primarily due to the limited amounts of hard substrate and the accumulations of silts and sands.

Station 5 was located well downstream of the wet meadow and was in a forested area. The stream was generally wider, shallower, and more sinuous than at Station 4. Long areas with gravel and some cobble were present. Woody debris was present and undercut banks and bends also provided cover. Silts were less apparent as the gradient here prevented extensive accumulations. Overall, habitat quality appeared to improve with distance downstream from the wet meadow. At the end of the forested reach, the creek flowed into what appeared to be another wet meadow area. This meadow area was not assessed.

4. The chemistry data in Table 3 do not show any metals present at unusual levels at the two locations sampled. At the time of sampling, the total phosphorus levels at all three locations sampled were within typical ranges for coldwater streams. Nitrates/nitrites were the only analyte group with some unusual results in that Sylvester Creek had a very high concentration while Cedar Creek was very low with the overall range being quite large. Chlorides were somewhat higher, relative to Shinglebolt Creek, in the Cedar Creek sample.

5. Overall, it is apparent the unnamed tributary has value as a coldwater resource. The values relate to coldwater supplies, macroinvertebrate production, and spawning, nursery, and general fish habitat. The UT has good groundwater inputs and areas of good quality habitat are present in this tributary of Shinglebolt Creek. Good numbers of brook trout are present in at least the south branch UT. Some lower gradient areas of the UT have lower quality habitat due to accumulations of sand or organic soils that come from the general watershed or the wetlands and bottomland meadow areas which the creek flows through.

REFERENCES

MDNR. 1994. Quality Assurance Manual for Water, Sediment, and Biological Sampling. Surface Water Quality Division. Michigan Department of Natural Resources.

Field Work By: Bruce R. Walker, Aquatic Biologist
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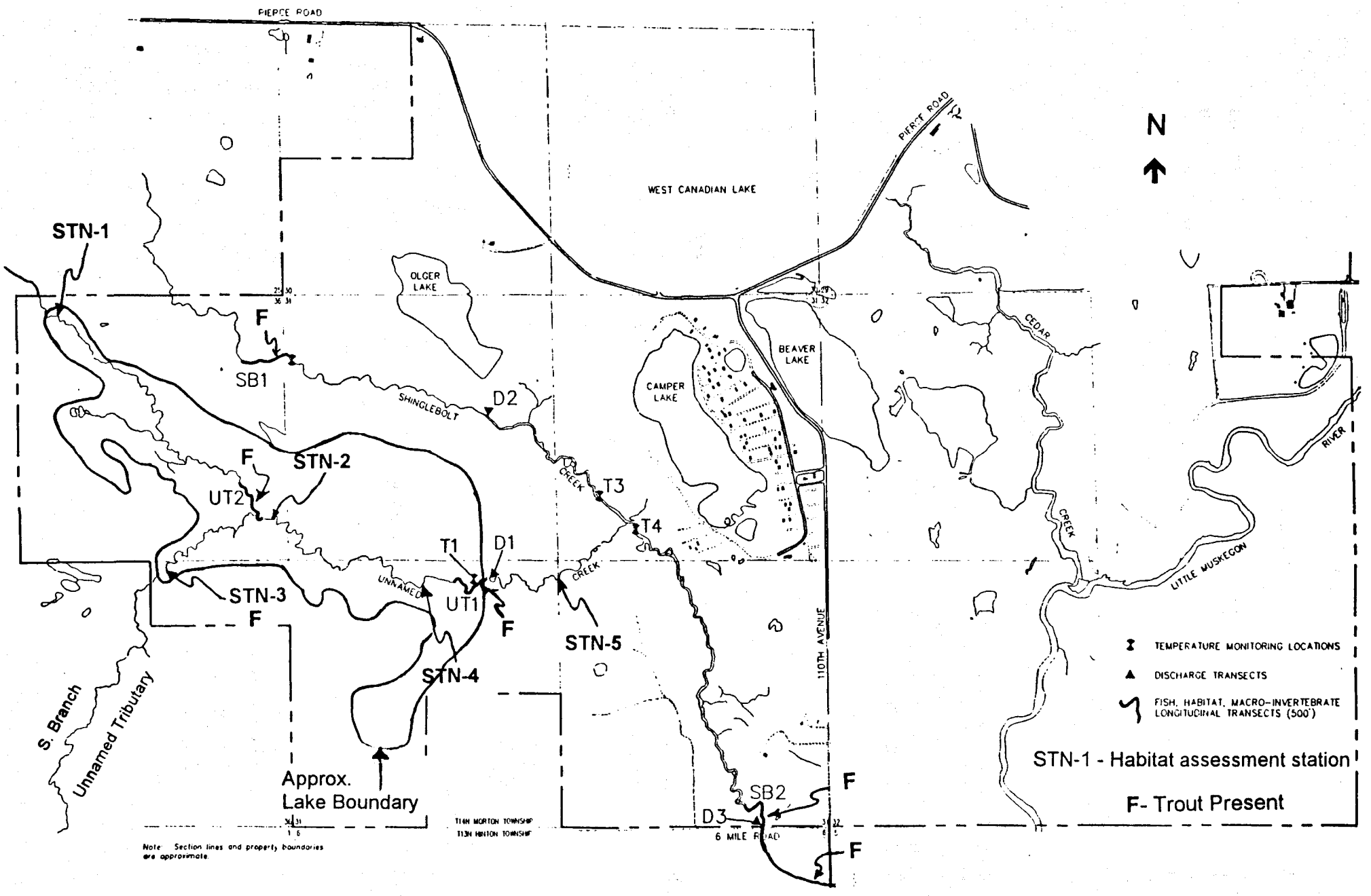

Figure 1. Locations of sites assessed for habitat quality on the unnamed tributary of Shinglebolt Creek, Mecosta County, on May 6, 1998 (map adapted from N.E.S. report).

Table 1A. Qualitative fish sampling results for the unnamed tributary of Shinglebolt Creek, Mecosta County, on May 6, 1998.

TAXA	STATION 1 Crossing #2	STATION 2 Below Forks	STATION 3 Crossing #1
Salmonidae (trouts)			
Salvelinus fontinalis (Brook trout)			9
Umbridae (mudminnows)			
Umbra limi (Central mudminnow)	5	3	4
Cyprinidae (minnows and carps)			
Semotilus atromaculatus (Creek)	5	7	18
Notropis heterolepis (Blacknose sh.)		2	
Pimephales promelas (Fathead m.)	6	1	2
Phoxinus eos (N. redbelly dace)	24	40	38
Rhinichthys atratulus (Blacknose dace)		6	14
Cottidae (sculpins)			
Cottus bairdii (Mottled sculpin)		15	2
TOTAL INDIVIDUALS	40	74	87
Number of anomalies	0	0	0
Percent anomalies	0.000	0.000	0.000
Percent salmonids	0.000	0.000	10.345
Reach sampled (ft)	NA	189	196
Area sampled (sq ft)	pool area #	1,040	882
Density (# fish/sq ft)		0.071 #	0.099
Gear	BPS	BPS	BPS

- Station 1 sampling was presence/absence in nature in area near pool only. Station 2 also had portion of reach sampled less rigorously. Total fish numbers for Stations 1 and 2 are underestimates of community present.

Table 1B. Fish metric evaluation of the unnamed tributary of Shinglebolt Creek, Mecosta County, on May 6, 1998.

METRIC	STATION 1 Value	STATION 2 Value	STATION 3 Value
TOTAL NUMBER OF TAXA	4	7	7
Meets Coldwater Designation:	**not rated**	**No**	**Yes**

Table 2. Habitat evaluation for five locations on the unnamed tributary of Shinglebolt Creek, Mecosta County, on May 6, 1998.

HABITAT METRIC	STATION 1 Crossing #2	STATION 2 Below Forks	STATION 3 Crossing #1	STATION 4 Wet Meadow	STATION 5 Below Dam Site
Bottom Substrate Avail. Cover (20):	8	8	14	7	11
Embeddedness (20):	8	8	12	6	12
Velocity:Depth (20):	7	10	10	9	10
Flow Stability (15):	10	10	10	13	13
Bottom Depos. (15):	6	6	11	5	10
Pools-Riffles-Runs-Bends (15):	7	7	10	7	10
Bank Stability (10):	8	6	7	9	8
Bank Vegetative Stability (10):	9	9	8	10	8
Stream Cover (10):	7	6	7	4	6
TOTAL SCORE (135):	70	70	89	70	88
HABITAT RATING:	FAIR (MODERATELY IMPAIRED)	FAIR (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	FAIR (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)
Date:	5/6/98	5/6/98	5/6/98	5/6/98	5/6/98
Weather:	Ptly. cloudy	Ptly. cloudy	Ptly. cloudy	Ptly. cloudy	Ptly. cloudy
Air Temperature:	Deg. F.	Deg. F.	74 Deg. F.	Deg. F.	Deg. F.
Water Temperature:	59 Deg. F.	59 Deg. F.	62 Deg. F.	62.5 Deg. F.	Deg. F.
Ave. Stream Width:	1.5 Feet	5.5 Feet	4.5 Feet	5.5 Feet	Feet
Ave. Stream Depth:	0.17 Feet	0.42 Feet	0.33 Feet	0.67 Feet	Feet
Surface Velocity:	Ft./Sec.	0.5 Ft./Sec.	0.7 Ft./Sec.	0.6 Ft./Sec.	Ft./Sec.
Estimated Flow:	0.1-0.2 est. CFS	1.1 CFS	1 CFS	2.2 CFS	CFS
Stream Modifications:					
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number: MI/DEQ/SWQ-98/036					
STORET No.:					
Stream Name: Shinglebolt Creek, Unnamed tributary					
Road Crossing/Location: All u/s of 110th					
County Code: 54					
TRS:	T14NR9WS36	T14NR9WS36	T14NR9WS36	T14NR8WS31	T14NR8WS31
Latitude (dd):					
Longitude (dd):					
Ecoregion: SMNITP					
Stream Type:	coldwater	coldwater	coldwater	coldwater	coldwater
USGS Basin Code: 04060102					
COMMENTS:					

Table 3. Water concentrations of selected constituents for Shinglebolt Creek and two nearby streams in Mecosta County on May 6, 1998.							
	Sylvester Cr. at 110th		Shinglebolt Cr. at 110th		Cedar Cr. at 7 Mile		
PARAMETER							
Silver (ug/l)			< 0.5		< 0.5		
Arsenic (ug/l)			1.1		1		
Barium (ug/l)			16		18		
Calcium (mg/l)			39.9		42.9		
Cadmium (ug/l)			< 0.2		< 0.2		
Chloride (mg/l)			6		15		
Chromium (ug/l)			< 1.0		< 1.0		
Copper (ug/l)			< 1.0		< 1.0		
Mercury (ug/l)			< 0.2		< 0.2		
Potassium (mg/l)			0.71		0.76		
Magnesium (mg/l)			13.7		13.7		
Sodium (mg/l)			4.6		8		
N02 + NO3 (mg N/l)	6.5		0.095		0.009		
Ammonia (mg N/l)	0.015		0.02		0.026		
Kjeldahl N (mg N/l)	0.47		0.37		0.33		
Lead (ug/l)			< 1.0		< 1.0		
Tot. Phos. (mg/l)	0.023		0.024		0.019		
Selenium (ug/l)			< 1.0		< 1.0		
Strontium (ug/l)			48		100		
Zinc (ug/l)			< 4.0		< 4.0		