Observations on the Hersey River, Reed City, Osceola County, Michigan August 29-30, 1967

George Liddle and Frank Vining of the Cadillac office requested a survey of the Hersey River downstream from Reed City, Michigan. Vining reported prolific fungus growth downstream from the wastewater treatment plant and that the river is becoming filled with weeds and algae growths.

On August 29, 1967 members of the Michigan Department of Conservation Fish Division, accompanied by Vining and me, conducted a fish survey of the Hersey River downstream from Reed City. On August 30, 1967 a biological survey of the macro-invertebrates of this same portion of the Hersey River was conducted. This preliminary report is based upon observations made during these two surveys. A more comprehensive report on the fish, macroinvertebrates, and general biological conditions will follow. A waste survey involving the Reed City wastewater treatment facility is schedule for this fall.

**FISH SURVEY**

The fish survey was made in three zones as indicated in Figure 1.

**Zone I.** Below the dam at Reed City, downstream to the wastewater treatment plant outfall.

Abundant - Brown trout
White sucker
Common shiner

Common - Lamprey
Burbot

Occasional - Northern pike
Smallmouth bass
Miscellaneous darters, dace, minnows

This zone is dominated by trout, suckers, and shiners and can be considered a good to excellent trout stream.

**Zone II.** From the wastewater treatment plant, downstream to the U.S. 10 bridge.

Abundant - White sucker
Common shiner

Occasional - Burbot
Lamprey

Rare - Brown trout
Northern pike

The dominant species of this zone are suckers and shiners. One brown trout and two pike were taken in this zone, all in the upper reaches along the clean water side (before complete lateral mixing of the effluent). Trout stream conditions did not exist in this zone.

**Zone III.** Downstream portion between four and five miles below the wastewater treatment plant outfall.

Abundant - White sucker
Common shiner

Common - Chubs
Lamprey

Occasional - Miscellaneous darters and sunfish
The dominant fish species of this zone were white suckers and common shiners. Trout stream conditions did not exist but there was a general improvement of conditions over Zone II.

A previous survey below the Hersey dam showed moderate numbers of trout. It appears that the Reed City wastewater treatment plant discharge has destroyed seven miles of potential trout stream.

**BIOLOGICAL SURVEY**

Ten stations were selected for the biological investigation (Figure 2). Observations at these locations are outlined below.

**Station 1** - Reed City impoundment. Growths of higher aquatic plants, filamentous algae, or duckweed were not observed. Bottom composition - a clay silt. Dominant animals were midges and snails.

**Station 2** - River below Reed City dam. Water clear, with a bottom of cobble, gravel, and sand. Minimal siltation and periphyton normal. Dominant animals were sponge, caddisfly larvae, and crayfish. Productivity excellent.

**Station 3** - Upstream from wastewater treatment outfall. Water clear, bottom of cobbles, gravel, and sand. Minimal siltation and periphyton normal. Dominant animals were sponge, caddisfly larvae, and crayfish.

**Station 3.5** - Area between outfall and Station 4. Water cloudy with a strong sewage odor. *Sphaerotilus* growths begin immediately below outfall. A short distance downstream it completely covers all the hard substrate. *Sphaerotilus* is constantly breaking off and floating downstream. Bottom cobbles and gravel in main channel are completely covered with slime. No algae were observed. The inside of curves have up to three feet of sludge deposits.

**Station 4** - U.S. 10 bridge (3/4 miles below outfall). Water cloudy. Sediments with a sewage odor. Stream bottom cobbles and gravel covered completely with fungal slime. Considerable amounts of slime washing downstream. Sludge sediments in eddies and quiet pockets containing some oil. No algae growths or higher aquatic plants observed. Dominant animals were tolerant oligochaete worms, red midges, and leeches.

**Station 5** - One and one-fourth miles downstream from outfall. Water slightly cloudy, bottom sediments gravel with some cobble. Dense beds of *Potamogeton pectinatus* cover stream bottom. Considerable *Sphaerotilus* attached to stream substrate and *Potamogeton*. Large quantities of slime floating downstream. Some sludge deposits in eddypockets with sewage odors. Duckweed growths were noticed along the shoreline. Dominant animals were again oligochaete worms, red midges, and leeches.

**Station 6** - Two miles downstream from outfall. Water clear, intermittent slimes floating downstream, but none growing attached at this station. Bottom sand and gravel. Extremely dense *Potamogeton* growths all across river. Filamentous algae matting the shoreline and as stringers attached to the substrate. Siltation noticeable in vegetation beds. Duckweed all along the shoreline. Dominant animals were leeches and red midges.
Station 7 - Four miles downstream from outfall. Water clear, bottom of sand, gravel, and silt. Filamentous algae forming long stringers attached to substrate. Potamogeton in very dense beds all across river, except narrow central channel. Conditions much as with Station 6 except siltation of stream bed is much greater.

Station 8 - Five miles downstream from outfall. Water clear. Bottom a hard clay with cobble, some sand and gravel overlay, very little siltation. Plant growths reduced, but still classed as excessive. Duckweed spotty along margins. Dominant animals were amphipods, crayfish, and snails.

Station 9 - Impoundment at Hersey, about seven miles downstream from outfall. Somewhat less than half of surface covered by duckweed. Elodea mats dense and extensive. Bottom sediments vary from a rich black organic silt to a clay silt. There is considerable organic debris.

Station 10 - River below Hersey dam. Water clear, bottom mostly cobble. Periphyton normal, as in Stations 2 and 3. No silt deposits. Dominant animals were sponge, crayfish, and caddisfly larvae. No higher aquatic plants present on substrate.

The Reed City waste water treatment plant discharge has severely altered the Hersey River. The macroinvertebrate fauna was changed from one of intolerant and facultative organisms such as sponges, caddisfly larvae, and crayfish to one of tolerant organisms such as oligochaete worms, red midges, and leeches. For at least three-quarters of a mile downstream Sphaerostylus covers the entire solid substrate. The increased nutrient load has produced conditions of excessive vegetation and siltation in the river. The impoundment at Hersey is also affected by the nutrients from Reed City. They are most probably a contributing factor to the excessive Elodea growths. Below the Hersey dam conditions are comparable to those above the Reed City outfall seven miles upstream. A more detailed report will follow.

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Michigan Water Resources Commission
September 7, 1967
Figure 2. Sampling stations of a biologic survey of the Hersey River, vicinity of Reed City, Oceola County, Michigan, August 30, 1967.
Figure 1. Study areas of a fish survey of the Hersey River vicinity of Reed City.