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cc: Education-Game  
Inst. for Fish. Res.  
J. W. Leonard  
C. T. Yoder  
J. S. Rogers  
R. J. Ellis

INSTITUTE FOR FISHERIES RESEARCH  
DIVISION OF FISHERIES  
MICHIGAN DEPARTMENT OF CONSERVATION  
COOPERATING WITH THE  
UNIVERSITY OF MICHIGAN

ALBERT S. HAZZARD, PH.D.  
DIRECTOR

April 13, 1954

ADDRESS  
UNIVERSITY MUSEUMS ANNEX  
ANN ARBOR, MICHIGAN

Report No. 1416

A SECOND PROGRESS REPORT ON A STUDY OF THE BOTTOM  
FAUNA OF HOUGHTON CREEK, OGEMAW COUNTY

By

Robert J. Ellis

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Abstract

This report covers the period from January 1952 to January 1954. New methods have been employed since the first report and a description of these methods is included in this report.

Four of the original 24 bottom sampling sites plus two stations added in 1951 have been sampled in December of each year. Two of these sites have been sampled on alternate months throughout the year. All of these samples were taken in gravel riffles until the summer of 1953 when attempts were made to sample silty stream margins, moss covered stones, beds of higher vegetation, and surfaces of submerged logs.

Qualitative collections of both adult and immature stream invertebrates have been made at random since work began on this problem in 1950. During the early spring of 1953 qualitative sampling was intensified and both extensive and intensive collections were made of aquatic and aerial forms.

In 1950 eleven sections of the stream were mapped. In 1952 eight of these were remapped and in 1953 six of the 8 areas mapped in 1952 were remapped and one new area was mapped.

Water samples were collected from a series of seven stations on Houghton Creek to help evaluate the influence of the domestic sewage entering the stream from Rose City. Maximum-minimum temperatures were recorded at one station from April to December 1953.

The rearing of aquatic insects was continued. Each site mapped in 1953 was photographed completely from permanently located sites.

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The first progress report on this project covered the period from September 1950 to January 1952 and is contained in Institute for Fisheries Research report number 1344. This report covers the period from January 1952 to January 1954. The major objective of this study continues to be an evaluation of the influence of watershed improvement upon stream bottom fauna.

New methods have been employed since the first report and a description of these methods is included in this report.

Quantitative sampling

In the fall of 1950, twenty-four bottom sampling sites were established. Four of these sites along with two stations added in 1951 have been sampled in December of each year. At two of these sites bottom samples have been collected on alternate months throughout the year (sites 12 and 14).

During the period from September 1950 to January 1952 the quantitative stream bottom samples were taken with a Surber-type stream-bottom

sampler. Sampling was confined to the gravel riffles after it was determined in 1950 that the bottom fauna production of exposed hardpan and sand was low when compared to that of shallow gravel riffles. Field work during the summer of 1952 and early spring of 1953 indicated that a significant amount of bottom fauna is to be found in silt at the stream margins, on the surfaces of moss-covered stones, in beds of vegetation, in deep gravel areas, and on the surface and the inside of logs and sticks. These observations indicated that it would be desirable to obtain a quantitative estimate of the production of these areas.

Starting in early fall of 1953 attempts were made to sample these additional habitats. Certain difficulties were encountered which made it impractical or impossible to sample these areas quantitatively with the Surber-type sampler. The lack of current at silty stream margins and in beds of Ranunculus sp. and Eloдея sp. made use of this sampler impossible. The depth of water at the deep gravel areas and in many beds of vegetation made its use impractical. Growths of the moss Fontinalis sp. occurring on large stones could not be sampled with the Surber sampler because of the irregular surfaces of the stones. Sampling the surfaces and interstices of logs was complicated by the large number of irregular sizes and shapes encountered.

The silty stream margins and beds of vegetation were sampled with a piece of galvanized stove pipe 7 inches in diameter and 24 inches in length. This pipe was pushed into the bottom soils. Usually it was possible to remove all the water and vegetation as well as 2 to 4 inches of the bottom soil from the stream with this device. Moss on stones was sampled quantitatively by carefully lifting the stones from the water, immediately outlining a 3 inch x 3 inch area by removing the surrounding vegetation with a knife, and then removing all the vegetation and visible

organisms from this area. This sample was then carefully placed in a pail for sorting and measuring. The small size of the area sampled by the above two procedures was a desirable feature because of the high concentration of organisms encountered in these habitats and because of the time required to sort these materials. The areas of deep gravel and the surface of logs and sticks were not successfully sampled.

#### Qualitative sampling

Qualitative collections of both adult and immature stream invertebrates have been made at random since work began on this problem in 1950. During the early spring of 1953 qualitative sampling was intensified and both extensive and intensive collections were made from all discernible habitats in the stream. This work was concentrated in six areas selected to represent the major ecological sections of the stream (designated on the map as sites I-VI).

During 1953, the collection of adult insects was incidental to the habitat collections until the spring emergences began. At this time a regular schedule was established for collecting adults. The collecting of adults was done entirely by hand until the evenings became warm enough to warrant use of electric light traps. Two light traps were operated on a schedule which called for sampling each of six stations twice a week (I to VI). Power was supplied by two portable gasoline-powered A. C. generators. Air net collections were made each day at the site of light trap operations.

#### Mapping

In 1950 eleven sections of the stream were mapped. In 1952 eight of these sections were remapped and in 1953 six of the 8 areas mapped

in 1952 were remapped and one new area was mapped. The mapping procedure was essentially the same as that followed in 1950. These maps are in the author's files.

#### Water analyses

Water samples were collected from a series of stations (A to G) on Houghton Creek to help evaluate the influence of the domestic sewage entering the stream from Rose City. The services of the Michigan Department of Health, Division of Laboratories in Lansing were utilized in analyzing these samples when their work-load permitted. The majority of the water analyses were made in the Institute for Fisheries Research laboratory under Dr. F. F. Hooper's direction.

Water samples were collected on a regular schedule after a preliminary series was analyzed in October 1952. The schedule called for 7 series of samples during a one-year period. Results of these analyses are on file at the Institute for Fisheries Research. These data have not been fully analyzed in detail but in general they indicate that the water of the sewage outfall is exceptionally rich in nitrogen and phosphorus. The increased fertility of the water below the sewer is correlated with an increase in bottom fauna production.

Maximum and minimum air temperatures were recorded at stream sampling site No. 4 from April to December 1953. The maximum water temperature in 1953 was a few degrees lower than that of 1951. The 1951 maximum was 70° F. and occurred during the last week of August. In 1953 the maximum was 66° F. and was also reached during the last week of August. Air temperatures are not immediately available for 1951. The 1953 maximum air temperature was 92° F. and was recorded during the last week of August.

### Miscellaneous activities

The rearing of aquatic insects to facilitate correlation and identification of adult and immature forms was continued. Each site mapped in 1953 was photographed completely from positions that were permanently marked. These positions are indicated on the individual maps of each area by locating them from permanent landmarks.

INSTITUTE FOR FISHERIES RESEARCH

Robert J. Ellis

Approved by: A. S. Hazard

Typed by: P. R. Darling

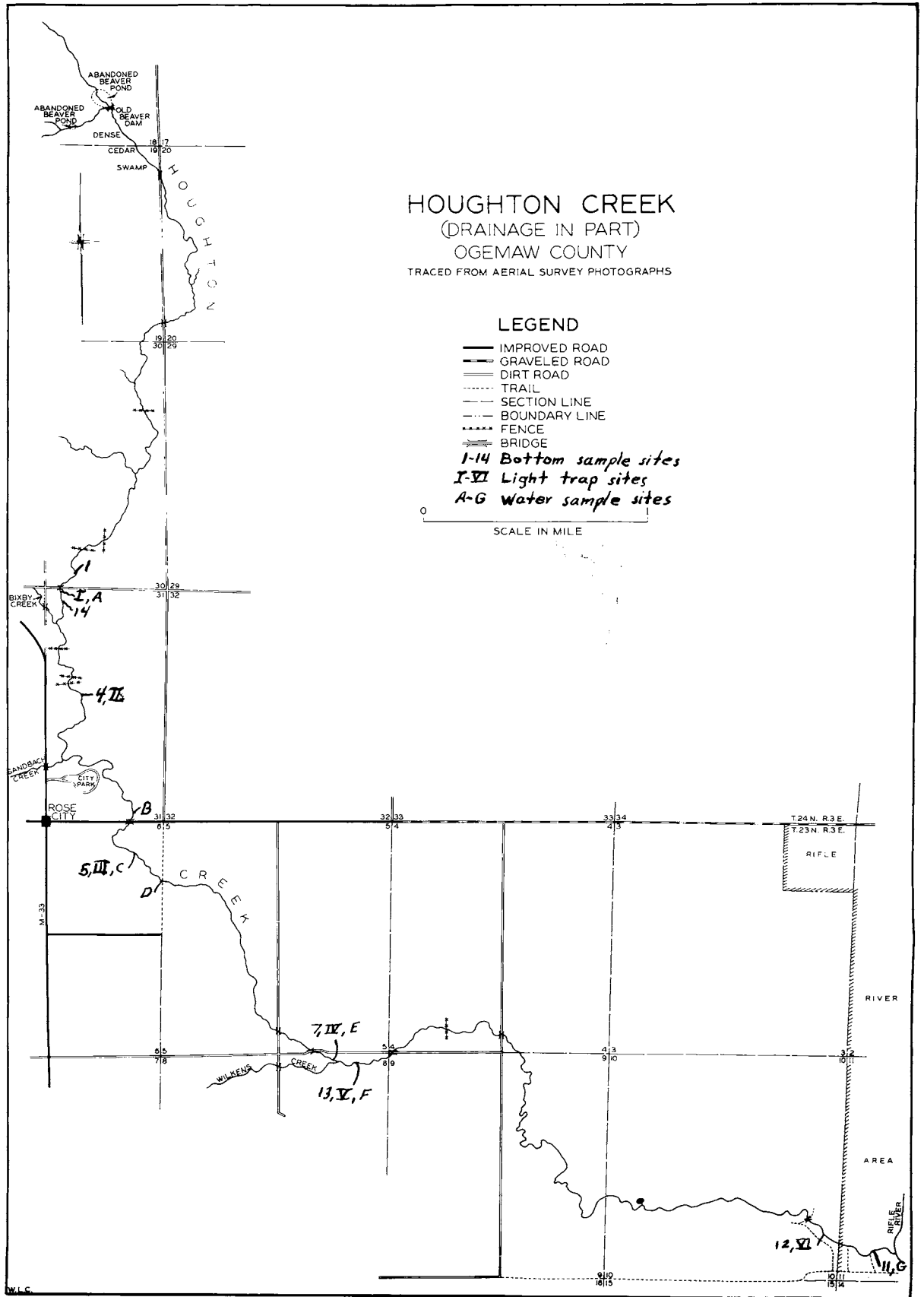


Figure 1. Map of Houghton Creek showing various sampling sites