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Dr. Leonard
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Michigan's Hunt Creek Fisheries Experiment Station [1]

[1] Contribution from the Michigan Institute for Fisheries Research.

A. S. Hazzard and J. W. Leonard

Michigan Department of Conservation

Ann Arbor, Michigan

Since 1935, staff members of Michigan's Institute for Fisheries Research [2]

[2] Technical branch of the Fish Division, Michigan Department of Conservation

had recognized the need for a field experiment station where trout fisheries problems could be investigated continuously and more intensively than was possible by field trips from a central laboratory in the southern part of the state. A major purpose of the establishment of such a station was to provide comfortable living quarters and good facilities for investigations of trout during the winter months which may be the "bottle-neck" in trout production.

In 1938, approval was given, and funds made available, by the Michigan Conservation Commission, for the establishment of a field laboratory and experimental area to be devoted principally to the investigation of trout stream problems. After carefully examining various streams in different parts of the state, Institute staff members agreed on a section of the

headwaters of Hunt Creek, a tributary of the Thunder Bay River, in the northeastern part of Michigan's lower peninsula. With the exception of two small private holdings on minor tributaries, all the stream frontage was already state-owned; the stream system itself seemed fairly typical of the many smaller trout streams of this part of the state; its size was such that it could be worked by a relatively small number of men with ordinary equipment; it was known to be but little affected by ice formation; and the area, while off the main roads, would be accessible the year around.

The experimental area embraces about three miles of Hunt Creek and includes 6 tributaries of varying importance which range in length from about one-sixth of a mile to 2 1/4 miles. There are also 4 small lakes (more properly called ponds), two of which contain brook trout. The water supply of the system is almost wholly of spring origin. The country is hilly with swamps of tag alder, cedar, balsam and tamarack along some portions of the stream system. The uplands formerly supported good stands of red and white pine but are now mainly forested with second growth aspen, white birch, maple and oak. The soil is largely of sand and gravel which absorbs rainfall and minimizes floods.

At the lower end of the experimental area the average flow is about 22 cubic feet per second. The slope of the stream bed is considerable; through most of its course the surface velocity is between 1 and 2.5 feet per second. Through the upper reaches, dense cover is provided by white cedar swamp. Then the course enters a relatively open, marshy area, the scene of former beaver activity, where clumps of alder provide negligible amounts of shade, and cover is largely restricted to the slightly undercut banks. Below the marsh, the stream flows between high banks supporting a mixed growth of aspen, balm-of-Gilead and oak, with occasional clumps of

white cedar, spruce and balsam along the water's edge. After more than half a mile the character of the streamside gradually reverts to swamp conditions, with dense growths of white cedar and tamarack. Here, however, the swamp forest seldom extends to the shoreline, and the stream receives considerable sun. The stream flows through swamp for about 1,800 feet, then enters a broad, open marshy meadow which continues for a little over half a mile to the lower end of the experimental area.

Through the upper marsh area the stream bottom is composed largely of silt, fibrous peat and sand. In the high-bank and cedar-tamarack swamp sections the bottom is predominantly gravel. The lower marshy section is very sandy. Thus, the experimental area provides examples of the major types of bottom material and bank-cover characterizing the streams of much of the state.

Construction of the physical plant began in the late summer of 1939, and has continued to the present time. Present facilities include a frame building housing the office and laboratory, quarters for transient investigators, and an apartment for the resident biologist. The basement provides space for a small workshop, garage, darkroom, tanks and troughs in addition to the heating plant. The building is provided with central heating, running hot and cold water, and "high-line" electricity. A 3-room and a 1-room cabin provide accommodations for permanent and part-time assistants. A series of 3 stream-channel diversions totalling about 600 feet in length has been constructed, where screen-holding bulkheads permit experiments with known fish populations under natural conditions. Counting weirs have been installed on five tributaries entering Hunt Creek in the experimental area. A water-level control dam and two-way fish trap have been built at the outlet of one of the small trout lakes.

At present, the station staff is composed of the resident biologist, in charge; one trained permanent assistant; and 3 temporary assistants employed for the duration of the trout season. Necessary laborers and construction workers are engaged locally, on a temporary basis. Various members of the Ann Arbor staff of the Institute spend considerable time at the station working on special projects.

The broad goal of the station's research program is the development of practical methods for accurately determining the carrying and productive capacities of trout streams and lakes and for increasing these capacities so far as may be economically feasible. Specific investigations now under way include:

1. An intensive creel census, now in its fourth summer, whereby there are obtained complete yield records for the various parts of the experimental area, and incidental information on catch per hour, types of lures used, fluctuations in quality of angling. Scale samples and weight-length data are taken to provide information on age and growth rate. Stomachs are secured at intervals for food analyses.

2. A study of fish movements throughout the experimental area by means of counting weirs installed in each of the major tributaries. It is believed that the results from weir operations will throw light on the much-mooted question of the desirability of closing tributaries as "nursery streams," as well as on brook trout migrations generally.

3. A thorough test of the success of hatchery trout plantings through the medium of marking and releasing equal numbers of wild and hatchery trout, with subsequent intensive recovery by seining and other methods. The creel census referred to above gives the final results of these planting experiments in terms of trout reaching the angler's creel.

4. Observations on the relative success of wild and hatchery-reared trout of various sizes and at various seasons, conducted under natural conditions in the screened stream channel diversions. Comparative data on survival, natural feeding, condition and growth rate are taken.

5. Attempts at adequate correlation of natural food organisms present with feeding habits of trout, stressing such questions as availability of organisms *versus* selectivity by trout, relative nutritive properties of various natural food organisms, and seasonal fluctuations in the natural food supply.

6. Investigations of the life-histories and requirements of aquatic insects, with the aim of learning how to favor forms found to be most desirable.

7. Development of new methods for estimating total fish populations and tests of the reliability of existing methods.

8. Development and testing of new fish-marking techniques.

9. A thoroughgoing test of the management value of stream improvement, based on intensive study of a stream section for which three year's records of yield, total population and food supply prior to improvement are available to serve as a "yardstick" by which to measure the effect of structures installed in 1941.

10. The maintenance of general ecological records on the area to provide a basis for appreciation of gradual changes in the environment. As a foundation for this phase of the program, a detailed map of the stream and its tributaries was prepared on a scale of 1 inch = 20 feet, and fixed stations were established for repeated photography of certain sites at regular intervals.

In addition to the foregoing, numerous experiments of short duration are conducted. These include actual field tests of new designs for experimental apparatus, tests of various chemical agents reputed to control noxious aquatic insects with minimal damage to fish, and similar short-term investigations.

None of the major studies has been completed yet so that only progress reports to the Conservation Department have been made; however, several of the investigations have now progressed to the point where the results seem to be consistent and dependable. Preparation of publications on these results are planned for the next three years.

INSTITUTE FOR FISHERIES RESEARCH

By A. S. Hazzard and J. W. Leonard

Report typed by: R. Bauch

Combination laboratory and residence,
Hunt Creek Experiment Station

Two-way fish weir with self-cleaning rotary screen [1] installed in Fuller Creek, principal tributary of Hunt Creek

[1] We gratefully acknowledge the assistance of Mr. Milo C. Bell, Chief Engineer, Washington State Department of Fisheries, who supplied us with blueprints covering the basic design of this structure.

Seining in connection with trout population study in Section A of the Hunt Creek Experimental Area