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THE HUNT CREEK FISHERIES EXPERIMENT STATION

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The primary purpose of the Hunt Creek Fisheries Experiment Station is to make possible intensive studies of trout management problems such as the value of tributary streams, determination of the productive and carrying capacities of different types of trout waters, results from plantings, effect of refuges, etc. A secondary but equally important purpose is the study of the limnology of trout waters, especially streams, and the life history and ecology of the brook trout (Salvelinus fontinalis). Detailed investigations throughout the year have generally been hampered or prevented by the distance of travel to trout country, difficulty of access in winter, and the lack of comfortable living and working quarters on the ground.

Selection of the Hunt Creek area was made approximately two years after the project was authorized by the Conservation Commission (July 7, 1937) and only after careful examination of all state-owned trout waters and a number of private holdings. It is believed that this area is quite representative of headwater conditions in a Michigan brook trout stream so that results from experiments here may be applied to like waters in the state. The Hunt Creek Laboratory is also within an hour's drive of

the various branches and main streams of the Au Sable, Pigeon and Sturgeon rivers, as well as numerous smaller trout streams and many lakes.

The Hunt Creek Laboratory, which is just being completed, is located in the northeast part of Michigan's Lower Peninsula, about 10 miles south of Atlanta. Hunt Creek, on whose headwaters the project is located, is a tributary of the Thunder Bay River, which enters the west side of Lake Huron. Nearly all of the waters in this part of the drainage (involving an area of about 5 square miles) are state-owned and lie within the ^{Lundeen} (Lundeen) State Game Area. Approximately two miles of Hunt Creek proper, having an average width of 17.9 feet and a total area of 4.33 acres, are under observation. Seven tributary streams varying in average width from 3 feet to 8 feet and in length from 1/4 to 1 1/2 miles (total approximately 5 miles) are mainly in state ownership. Hunt Creek and tributaries vary in character from open meadow, sand or muck bottomed/^{sluggish} streams running through ~~the~~ spruce and cedar swamp to fast, gravel and rubble bottomed upland types. Beaver ponds of varying age and size are found on 4 tributaries and on the upper end of Hunt Creek.

Four natural lakes or ponds, ranging in size from 1.8 to 24.6 acres and in maximum depth from 6 to 42 feet, offer opportunities for limnological and fish management studies. The larger, deeper lake and the smallest pond contain brook trout. The other two lakes occupy basins which are partially filled, and it is suspected that at least one of these is now to senescent to support fish life. Michigan has many lakes of this type and many others which are aging rapidly. Experiments in retarding this progression may be possible here.

A combination residence and laboratory, in the final stage of construction, is located about in the center of the experimental area. The building is of frame construction and consists of a living room, kitchen, bath, two bedrooms, a dormitory and a laboratory on the main floor. Ample

storage space is provided in the attic, which is reached by a disappearing staircase in the laboratory. The full basement contains garage space for three cars, a furnace room, an aquarium room and a dark room. Ample water for all purposes is brought into the building by gravity from an excellent spring which flows about 175 gallons per minute. Electricity and telephone have been installed.

The laboratory is well lighted from the east and north. It consists of a single rectangular room 28 1/2 by 11 feet, with a laboratory table along the entire front, divided by two sinks, making desk space for four men. A separate desk faces a window on the north. Shelves and cupboards for books, specimens and equipment are built in along the walls.

Program During 1939 and Plans for Future Experiments

The Hunt Creek system was cruised first during the fall of 1938 and again during the coldest period of the following winter (January) to determine the amount of anchor and shelf ice forming in the stream and tributaries. The area was visited again in March and at that time the stream was divided into four sections by types of water and so that each section contained at least one tributary stream and presumably some spawning grounds for trout. Subsequent observations this fall have shown this presumption to have been correct.

A large scale map (20 feet to the inch) of the entire stream headwaters included in the project is being prepared by a plane table traverse. Bottom types, depths, bank cover, and all fish shelters present are shown. Routine inventories of the lakes and ponds were made during August and will be repeated at intervals in winter during successive seasons. Aerial photographs of the region are available and will be enlarged sufficiently to show details of cover type.

Three creel census stations were selected in advance of the 1939 trout season so that men assigned to these posts could secure catch records by sections of all fishing in the upper two miles of Hunt Creek. Signs were placed at the section boundaries requesting cooperation of anglers in reporting catches and in not cleaning fish until after being checked by census clerks. Trained employees patrolled these sections and as far as could be determined, only two fishermen were missed. Individual lengths and weights of fish were secured. Stomachs and scale samples for growth determination were taken from most of the trout. Collection of water snakes were made by the staff at various times during the season. Creel census was in charge of Dr. David S. Shetter and the results are to be reported by him later.

Dr. J. W. Leonard of the regular staff has been appointed resident biologist. It is expected that various Institute employees will occupy the laboratory as may be necessary and that in the near future several assistants will be assigned to individual problems, making use of the facilities as may be required. An opportunity will also be afforded graduate students who may be working on fisheries problems in the area to utilize the station.

An assessment is being made by Dr. Leonard of all potential fish food organisms inhabiting the streams with particular attention to their ecological and seasonal occurrences and distribution. Systematic examination of the stomachs of trout of various sizes from various habitats at intervals are being undertaken to determine food preferences and availability. Laboratory experiments are planned to test the nutritive value and palatability of the dominant organisms.

It is planned to subdivide one of the sections and to stock these areas with varying numbers of trout to attempt to determine the carrying capacity of a known food supply. Thorough sampling of the food and the

fish throughout the experiments will be a part of the program. It is considered possible that some "indicator species" may become dominant under conditions of overabundance of trout and that if this proves to be true, a valuable "measuring stick" will be available for determining the need for stocking in public waters planted by the various hatcheries.

Experimentation was begun early last summer to determine the most efficient type of fish traps for use in checking movements of fish to and from tributary streams. A modification of the type originally described by Shetter (1938) has been installed in three tributaries and have taken fish successfully. It is planned to install similar fish weirs between each section of stream under intensive study to determine the movements of fish in Hunt Creek proper.

A start has been made this season in determining the yield of certain sections of Hunt Creek as described under the creel census. This census will be continued in the future. All trout planted in the Hunt Creek system (35,000 fingerlings) were marked by the removal of the dorsal fins except for 1,000 from which the ~~left pelvic~~^{right pectoral} was clipped. This thousand fingerlings, from two to three inches in length, were planted in Section C. At the same time an equal number of wild fingerlings of the same size range were seined from Section C, marked by removing the ~~right pelvic~~^{left pectoral} fin and returned to this section. Seining is being carried out in all sections at intervals throughout the year to follow the fate of the wild and hatchery fish. It is expected that these fish will come into the catch in 1941 and thereafter. The creel census will demonstrate the relative survival rates of planted and wild fish.

After about three years of census, one section of the stream will be improved to the limit. Census in succeeding years should demonstrate the effect upon the yield of this environmental improvement. Inventories of the food supply will be made before and after improvement to aid in the

interpretation of population counts and any changes which may occur in fish yield. During these experiments the trout planting program will not be altered.

One of the first problems to be attacked by the station will be the development of a more satisfactory method for determining stream fish populations. Seining blocked sections, use of electricity and of stupefying drugs and other means will be thoroughly tested.

Further investigation of beaver-trout relationships will also be possible in the Hunt Creek area as a number of dams of known age are present on several tributary streams. This problem was studied by Salyer (1934) but only a preliminary report with little substantiating data has been published.

The late Professor George C. Embury of Cornell University as early as 1926 frequently discussed with his students the need for experimental trout streams where problems of trout life history and trout fisheries management could be carefully investigated. Since that time a number of workers--White (1930), Surber (1933 and 1937), Lord (1935 and 1936), Hazzard and Shetter (1938), and Needham and Rayner (1939)--have reported on experiments involving survival of planted trout, seasonal production of stream bottom organisms and (or) of yields of trout using the "test stream" method. Early studies involved only short sections of small streams variously screened to control predators and the movements of fish or censused to determine yields.

In the development on Convict Creek, California, described by Needham and Raynor (loc. cit.) the experimental stream idea has been most fully expressed. However, the authors state that "winter conditions on Convict Creek permit only seasonal operation of the project," which is unfortunate as recent studies have shown that winter is probably a very critical period for trout. The Hunt Creek project will avoid this difficulty as a resident biologist will be there throughout the year, the principal road around

the project will be kept plowed in winter and although snow is commonly several feet on the level and sub-zero temperatures are usual, the stream system is readily accessible and remains free of ice.

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