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STATE OF ALASKA

William A. Egan, Governor



ANNUAL REPORT OF PROGRESS, 1962 - 1963

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-4

SPORT FISH INVESTIGATIONS OF ALASKA

Alaska Department of Fish and Game

Walter Kirkness, Commissioner

E. S. Marvich, Deputy Commissioner

Alex H. McRea, Director

Sport Fish Division

Richard Haley, Coordinator

INTRODUCTION

This report of progress consists of Job Segment Reports from the State of Alaska Federal Aid in Fish Restoration Project F-5-R-4, "Sport Fish Investigations of Alaska".

The project is composed of 25 separate studies designed to evaluate the various aspects of the State's recreational fishery resources. While some studies are of a more general nature and deal with gross investigational projects, others have been developed to evaluate specific problem areas. These include studies of king salmon, silver salmon, grayling and State Access requirements. The information gathered will provide the necessary background data for a better understanding of local management problems and development of future investigational studies.

The assembled progress reports may be considered fragmentary in many respects due to the continuing nature of the respective studies. The interpretations contained therein, therefore, are subject to re-evaluation as work progresses and additional information is acquired.

JOB COMPLETION REPORT

RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations
of Alaska.

Project No: F-5-R-4 Title: Salmonoid Rearing and
Migration Study:
Fire Lake System.

Job No: 8-C-1

Period Covered: April 1, 1962 to April 1, 1963.

Abstract:

Two upstream-downstream fish migration control structures were installed in Fire Creek during the summer of 1962. A total of 55 adult silver salmon were observed in the lower portion of the stream. A beaver dam four feet high located just above the railroad crossing was found to stop the upstream movement of salmon. Four thousand and ten marked silver salmon were released in Fire Creek below the hatchery. The mortality and growth of silver salmon and rainbow trout fry and fingerlings in the hatchery are discussed. Data on the incubation and hatching of silver salmon eggs during the winter months are presented.

Recommendations:

The beaver dam immediately above the Alaska Railroad should be removed prior to salmon migration.

The outlet of the Fire Lake Hatchery road culvert should be remedied to ease the passage of fish.

Objectives:

To evaluate the lake rearing and migratory characteristics of various salmonoid stocks. To determine the suitability of these stocks for use in the various aspects of the sport fish management program. To provide recommendations for management use and to direct the course of future studies.

Techniques Used:

The Department Engineer designed the upstream-downstream structures. The installation in the creek by the hatchery was built by Department personnel. The fishway at the outlet of Lower Fire Lake was let on bid and built by a contractor.

Data collected by foot surveys included number of spawning salmon, natural or artificial barriers, road access or other physical characteristics of the creek.

Minor improvements were made to the downstream end of the 36 inch hatchery road culvert to facilitate passage of migrating fish.

Plants of fin clipped silver salmon were made in Fire Creek during the summer. Records were kept of mortality during incubation, hatching and rearing in the hatchery.

Findings:

On April 23, work was started on the installation of the upstream-downstream control structure at the hatchery (Figure 1). Heavy fall rains halted construction in the fall of 1961. The facility was completed on May 16, 1962 (Figure 2). The area was cleared of debris, then backfilled and riprapped to prevent soil erosion.

The contract for construction of the upstream-downstream control structure at Lower Fire Lake was let in early July. This facility was completed in September, 1962 (Figure 3).

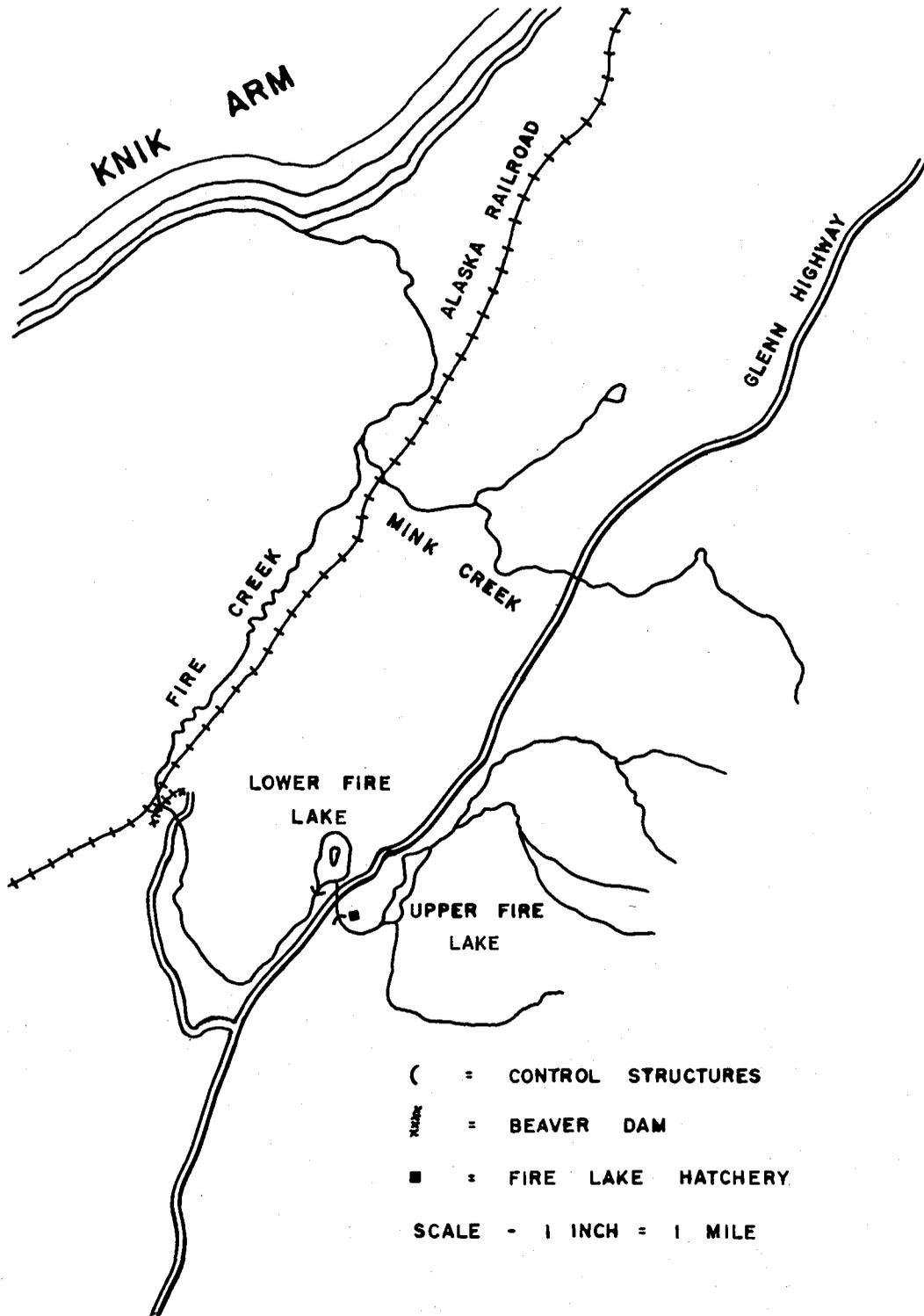


FIGURE 1. FIRE CREEK AND LAKES SHOWING LOCATION OF CONTROL STRUCTURES, IMPASSABLE BEAVER DAM, AND ROAD ACCESS.



Figure 2. View of the fish trapping facility in Fire Creek next to the Fire Lake Hatchery.

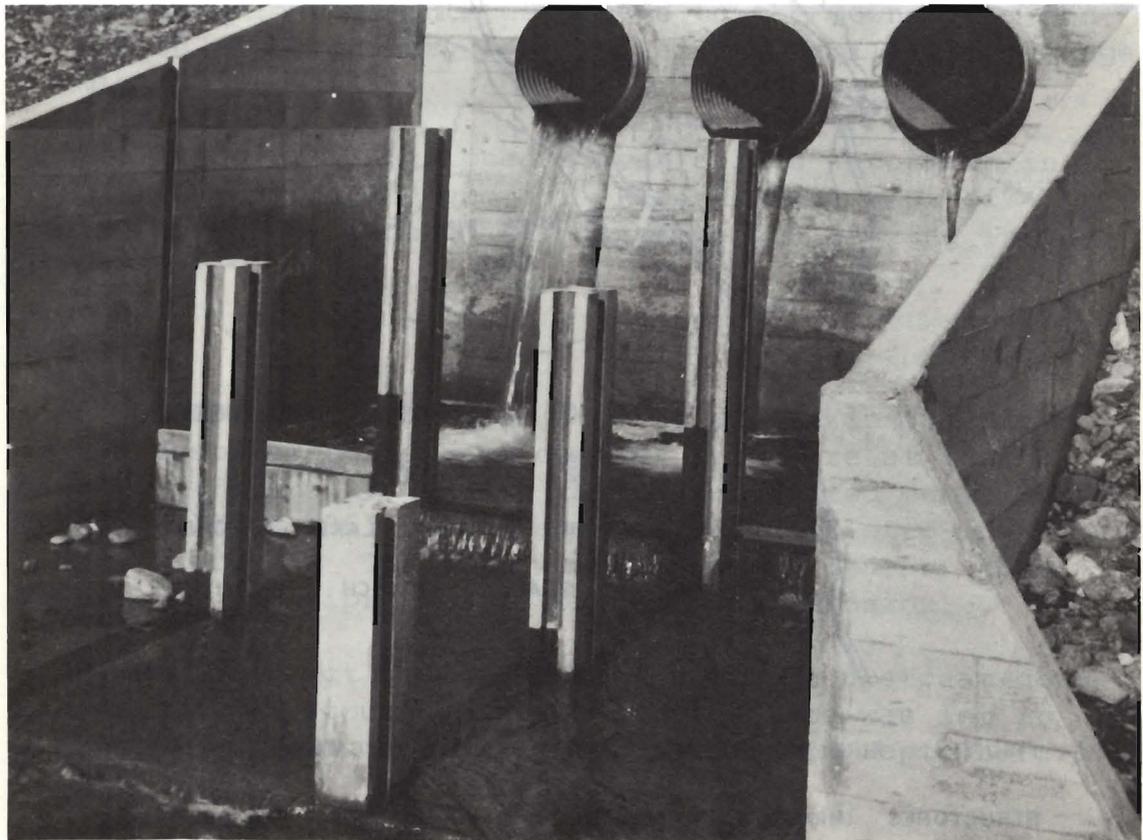


Figure 3. View of the combination fish ladder and trapping facility at outlet of Lower Fire Lake.

No attempts were made to capture any fish during the summer in either trapping facility due to the lack of smolt traps.

On August 3, a survey was conducted of Fire Creek below Lower Fire Lake. A road crossed Fire Creek just above the Alaska Railroad approximately four miles above the mouth. One beaver dam immediately above the railroad culvert forms a barrier to upstream migrant fish. This dam is about four feet high, 100 feet long and backs up approximately 1.5 acres of water. A foot survey was conducted on August 28 in a one-half mile stretch of stream starting approximately two miles above the mouth of Fire Creek. Twenty-five silver salmon were counted in this area with 17 congregated in a pool at the confluence of Mink Creek and Fire Creek. No salmon redds were observed. Lack of man power and time prevented a complete survey.

On September 5, 1962, 4,010 silver salmon were marked by removing the left pelvic fin. Tricaine Methanesulfonate (MS-222-Sand oz) was used to anesthetize the fish. On September 7, the marked silver salmon were released in Fire Creek at the hatchery. A mortality of 15 fish occurred through handling. Within five days, most of the fin clipped fish had moved downstream into Lower Fire Lake.

The Fire Lake hatchery road culvert is a partial barrier to upstream migrant fish (Figure 4). The culvert outlet is about two feet above the stream bed, and the creek water cascades down over large rocks making upstream passage difficult. Additional rocks were placed below the culvert to form pools.

Silver salmon eggs totaling 345,900 were obtained from Fish Creek in the Palmer area. During the spring of 1962, 1,202,600 rainbow trout eggs were received from McLeary's Trout Lodge Springs in Washington and 118,000 from Fall River Hatchery in Oregon.



Figure 4. View of Fire Lake Hatchery road culvert.

In the early stages of development, the egg mortality of the silver salmon was 131,000 or 35 per cent. The fry and fingerling mortality was 62,000 or 26 per cent. The mortality of the fry was greatest when they started to feed. Growth records of the rainbow trout show a definite increase in size and weight corresponding with the increase of water temperature after the fry started feeding (Figure 5). After the fry started feeding, they were transferred from the indoor troughs to outdoor tanks (Figure 6). Four large wooden tanks were constructed near the hatchery warehouse in August and will replace the plastic tanks in 1963 (Figure 7). The wooden tanks are 25 feet in diameter and 3.5 feet in depth, with a capacity of 12,852 gallons of water.

The 1962 fish stocking program was completely fulfilled. A total of 86,200 silver salmon and 682,000 rainbow trout were stocked in 48 lakes and rivers during the summer. Most of the lakes planted are located in the Matanuska Valley. An additional 10,000 silver salmon and 165,400 rainbow trout were transferred to other hatcheries.

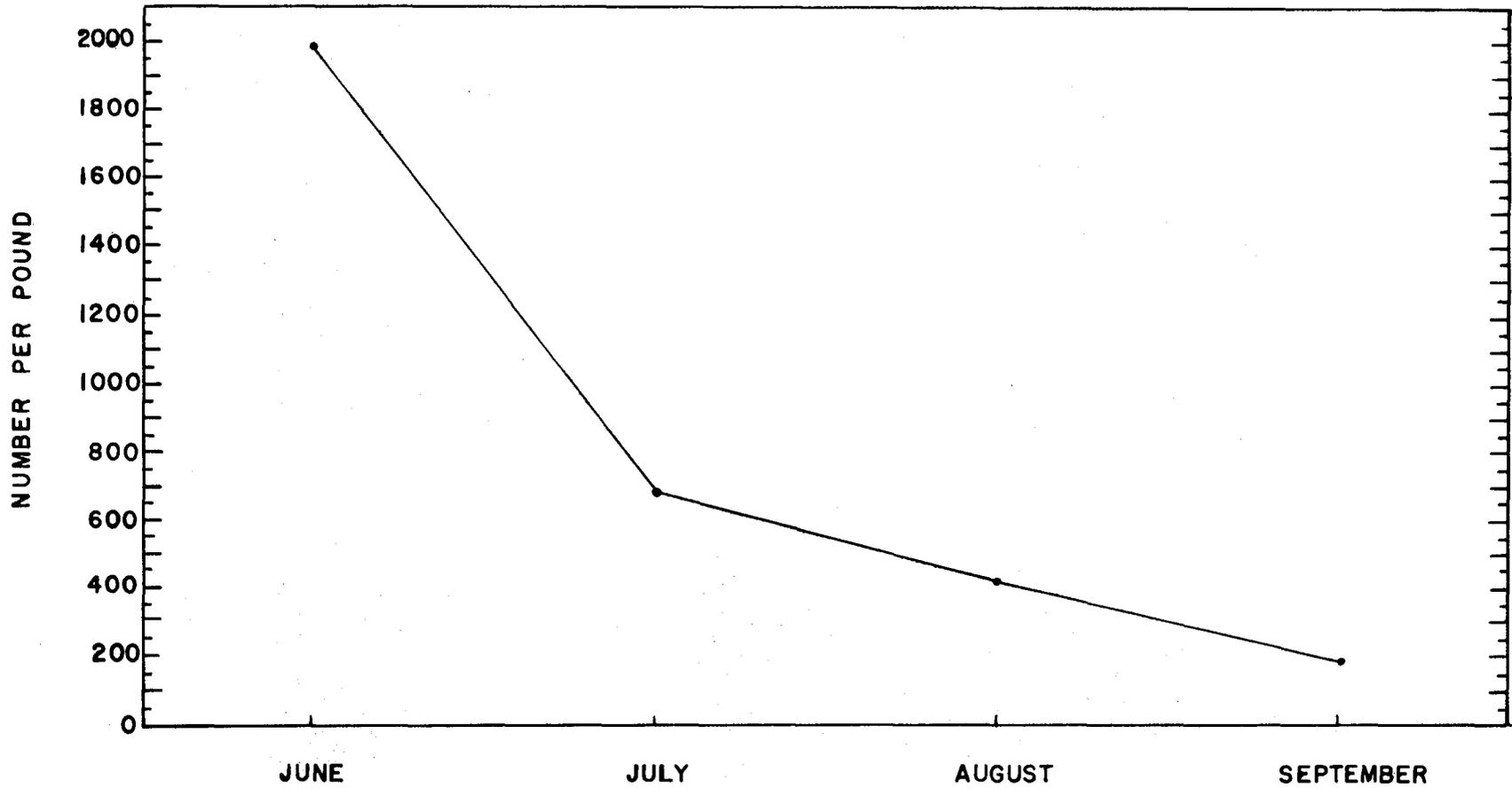


Figure 5. Growth rate of rainbow trout in numbers per pound at Fire Lake Hatchery on the 18th of each month from June through September, 1962.



Figure 6. Temporary plastic rearing tanks at the Fire Lake Hatchery



Figure 7. Four 25 foot diameter wooden tanks at Fire Lake Hatchery.

Silver salmon eggs taken at the egg take sites located at Swanson River near Sterling and from Bear and Dairy Creeks near Seward, during October and November totaled 1,464,000 eggs. The eggs were brought to the "eyed" stage without difficulty. Treatments with malachite green prevented the formation of fungus. Initial mortality due to handling and non-fertilized eggs was 19 per cent. The silver salmon eggs received on October 5, 1962, began hatching on January 23, 1963, giving a total of 111 days at an average water temperature of 38.6° F. After the initial handling mortality, egg and fry mortalities tapered off to less than one per cent per month.

Prepared by:

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Approved by:

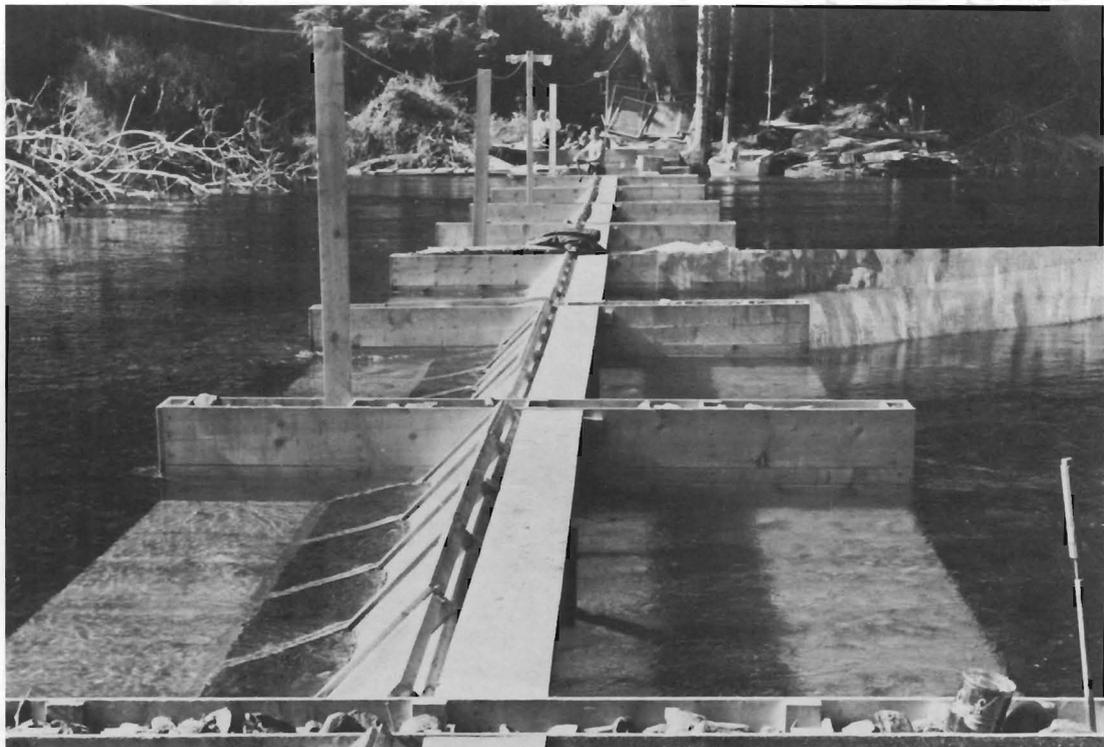
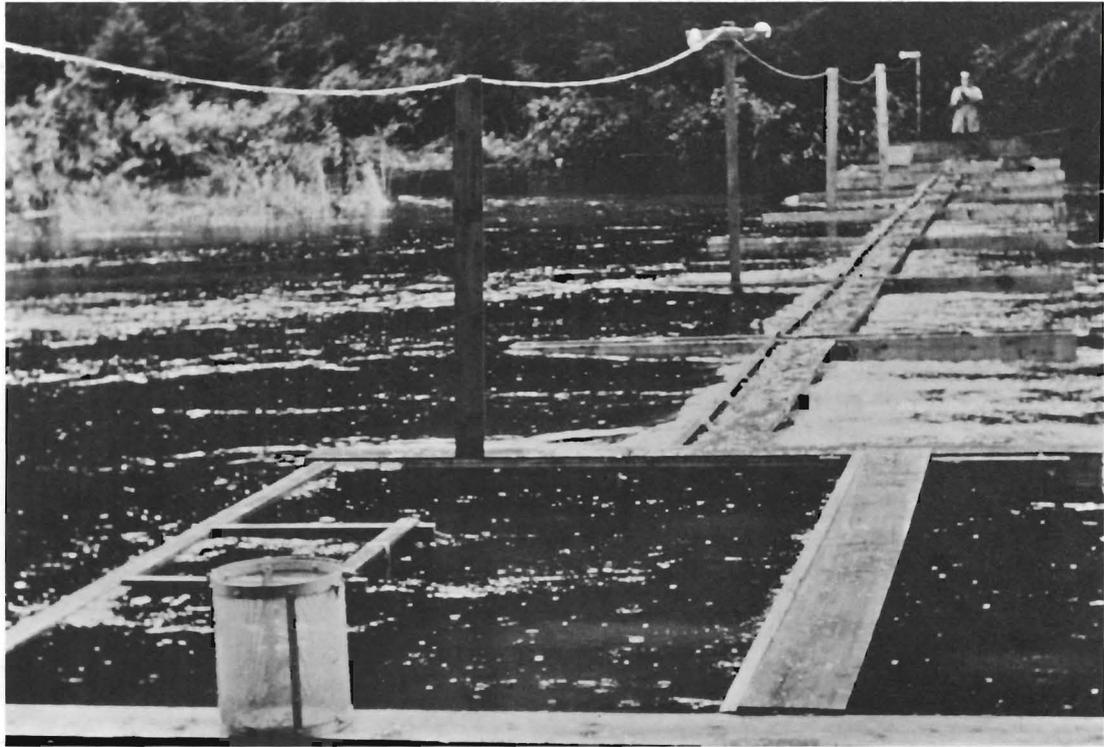
Richard Haley
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Date: May 13, 1963

Alex H. McRea, Director
Sport Fish Division



Research weirs are constructed to meet varying demands of water conditions as well as providing adequate facilities.