Informational Leaflet 17

A PRELIMINARY STUDY OF THE MIGRATION AND GROWTH OF THE DOLLY VARDEN CHAR IN KITOI BAY, ALASKA

By:

Leonard Revet
Division of Biological Research
Kodiak, Alaska

August 23, 1962

STATE OF ALASKA
WILLIAM A. EGAN - GOVERNOR

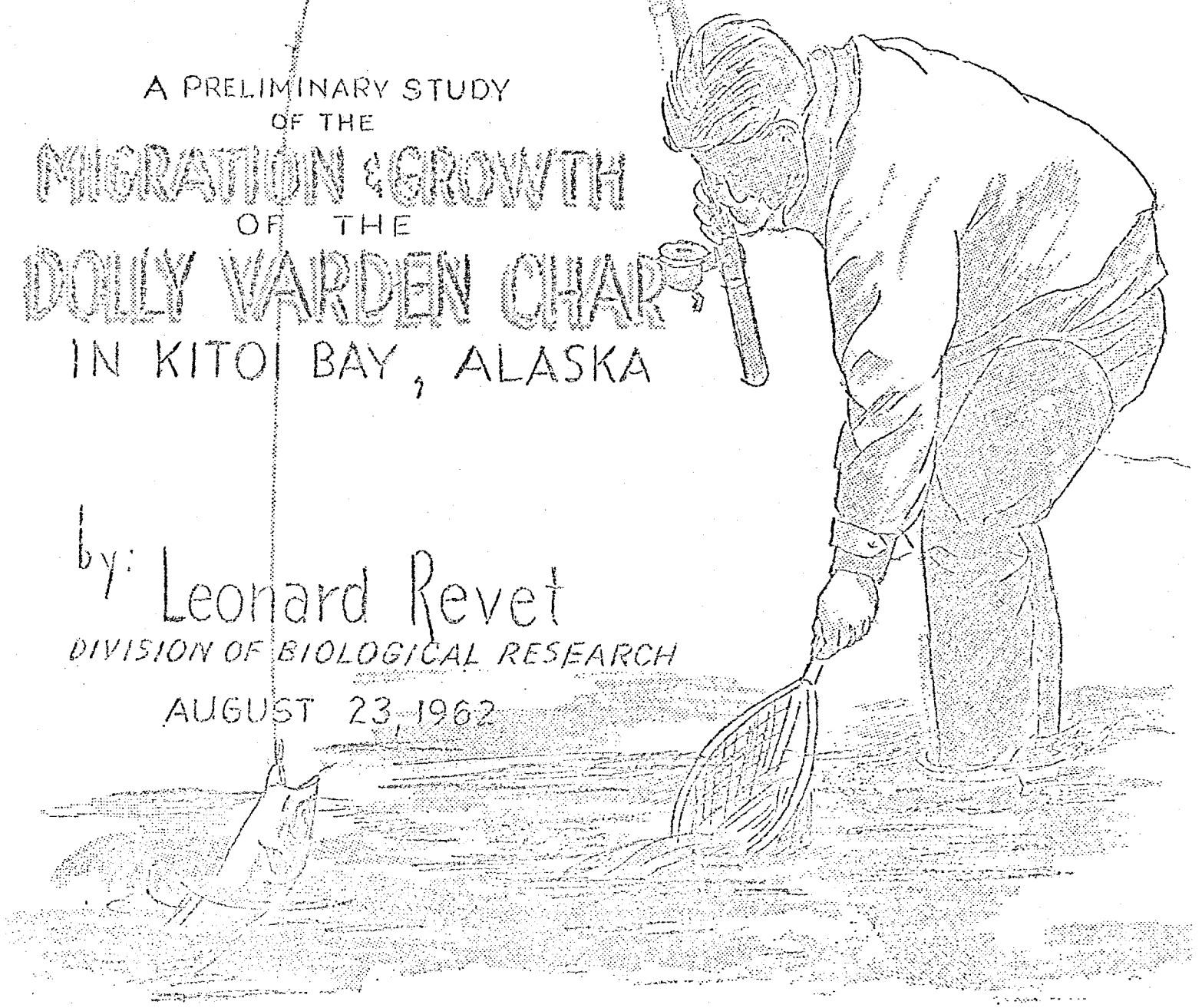
DEPARTMENT OF
FISH AND GAME
WALTER KIRKNESS - COMMISSIONER
SUBPORT BUILDING, JUNEAU

ALASKA DEPARTMENT OF FISH AND GAME

Informational Leaflet 17

A PRELIMINARY STUDY OF THE

MIGRATION & GROWTH OF THE DOLLY VARDEN CHAR IN KITOI BAY, ALASKA



by: Leonard Revet
DIVISION OF BIOLOGICAL RESEARCH

AUGUST 23, 1962

WILLIAM A. EGAN, GOVERNOR – WALTER KIRKNESS, COMMISSIONER
JUNEAU, ALASKA

A PRELIMINARY STUDY OF THE MIGRATION AND GROWTH OF THE DOLLY VARDEN CHAR IN KITOI BAY, ALASKA

INTRODUCTION

The Dolly Varden char, *Salvelinus malma* (Walbaum), is an important predator and competitor of young salmon[1]. In some areas, it is also an important sport and food fish. For these reasons and because attempts are now being made to utilize the dolly commercially in Alaska, a life history study was started at the Kitoi Bay Research Station on Afogank Island in 1961.

OBJECTIVES

During the first two years of the study, the objectives were (1) to define the migratory pattern of the Dolly Varden, and (2) to study the ocean growth of this fish.

Although this life history study is still in progress, some segments of the research warrant reporting at this time.

DESCRIPTION OF THE STUDY AREA

The Kitoi Bay Research Station is located on Afognak Island, latitude 152° 12' W longitude 58° 12' N (Figure 1). The immediate area contains a large number of lake systems suitable to salmonids. One of these lake systems, Little Kitoi, was chosen for this study because of its accessbility and weir facilities for capturing migrating fish. This system also contains a large number of Dolly Vardens and has considerable spawning area suitable for dollies. There is no sport fishing in the area except that of research station personnel and this fishing can be surveyed.

METHODS

To study migratory patterns, all of the Dolly Vardens migrating seaward from Little Kitoi Lake in the spring of 1961 were fin-clipped (adipose and left pelvic fins), with the exception of 191 which were tagged as well as fin-clipped. All of the Dolly Vardens entering the lake that were not fin-clipped on the previous outmigration were clipped (adipose and right pelvic fins) and 16 were tagged (Table 1). A "spaghett" type loop tag was used. The tag was

---

[1] Ricker, W.E. 1941. The consumption of young sockeye salmon by predaceous fish. Fish. Res. Bd. Canada, 5(3):293-313.

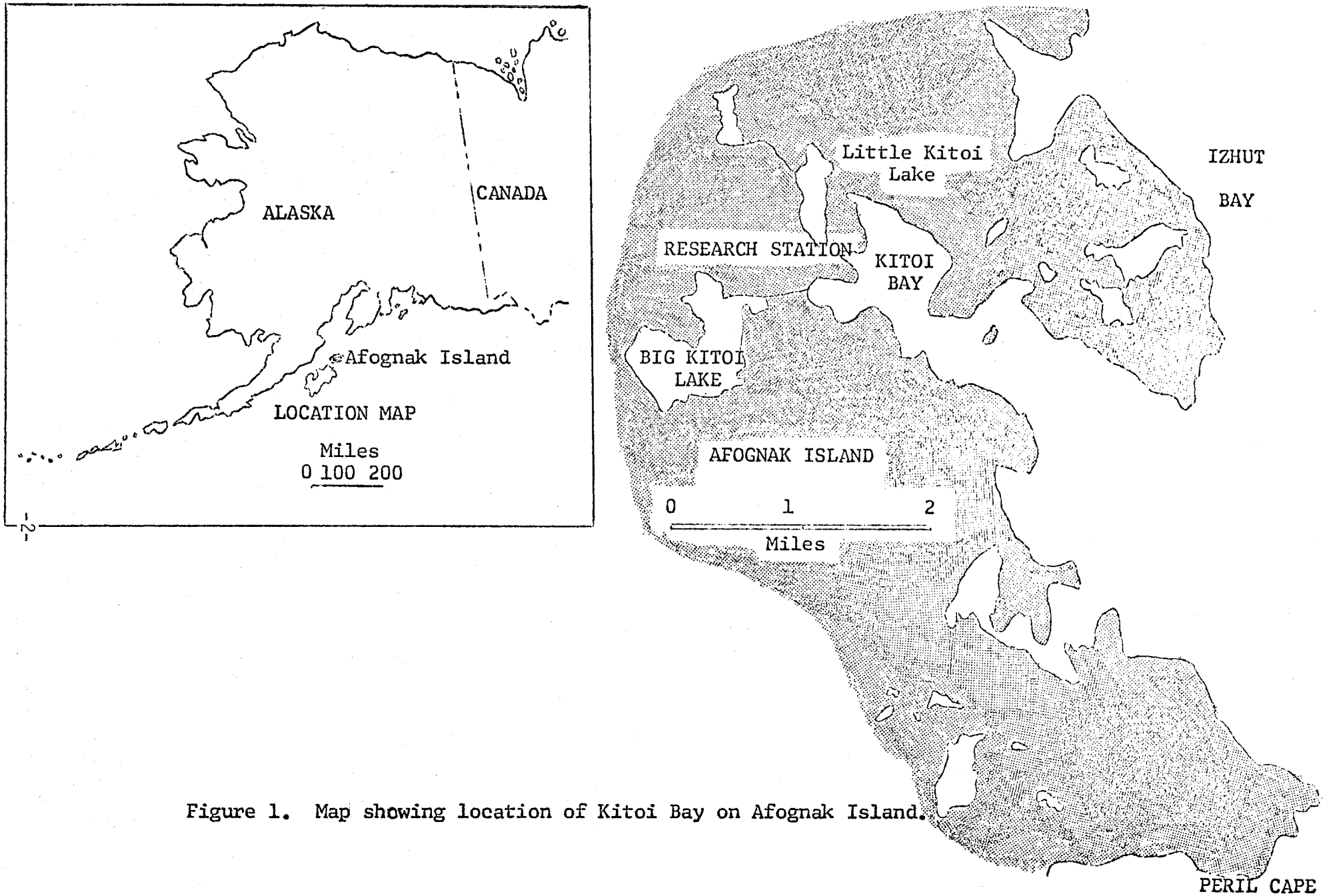


Figure 1. Map showing location of Kitoi Bay on Afognak Island.

Table 1. Comparison of the out and in migrations of the Little Kitoi Dolly Vardens, 1961-62.

		Outmigrants	In-migrants
Tagged and Clipped	1961	191	39
	1962	407	168
Clipped	1961	357	76
	1962	112	55
Unclipped	1961	0	162
	1962	0	336
Total	1961	548	277
	1962	519	559

used. The tag was made from a 10-inch length of polyvinylchloride plastic tubing onto which was attached an oval plastic disc. The tubing was threaded just beneath the dorsal fin with a curved stainless needle. The plastic disc bearing identification and a serial number was then attached to the plastic tubing which in turn was tied in an overhand knot. The trailing ends of the "spaghetti" provided conspicuous identification of the tagged dollies. In 1962, 297 dollies were tagged with plastic dart tags, 108 were tagged with "spaghetti" and oval discs, and 112 were clipped (left pelvic fin). All in-migrants that had not been previously clipped or tagged were clipped (right pelvic fin - see Table 1). The dart tag used was a 2-inch piece of polyvinylchloride tubing attached to a nylon dart. The dart had one barb approximately 3/16 inch long. To insert the dart an incision was first made with a sharp needle and the dart tag was driven into the fish just below the dorsal fin. The barb should be placed to catch on the internal rays of the dorsal fin if the tag should start to pull out.

To define growth at sea, length and weight measurements were made on all out and in-migrants. In 1961, fork length was measured in millimeters, weights were taken in ounces and converted to grams. In 1962 the same procedure was followed except weights were taken in grams.

RESULTS

In the spring of 1961, 548 Dolly Vardens left the lake and 277 returned in the fall. Of the 277 immigrants returning to Little Kitoi Lake, only 115 had migrated out in the spring. In 1962, 519 Dolly Vardens left Little Kitoi Lake in the spring and 559[2] returned in the fall. Of the 559 immigrants returning to Little Kitoi Lake, 223 had migrated out in the spring. A comparison of lengths and weights of the returning tagged out-migrants showed that these fish which had been at sea less than two months had doubled their weight (Table 2).

Sightings of tagged Dolly Vardens were made as far as 2 miles from Little Kitoi Lake. Also rod and reel sampling showed that clipped and unclipped dollies intermingled at sea, however, lack of time and equipment prevented more adequate sampling to determine the extent of mixing of the populations.

DISCUSSION

Two important items were discovered during the Kitoi study: (1) the tremendous growth of the dolly, and (2) the seemingly poor homing tendency of this species. The dollies in relatively poor condition that left their winter lake environment in the spring, return as firm, well-conditioned fish in the fall. A com-

---

[2] At the time of writing, there were still a few dollies coming in.

Table 2. Comparison of average increase in length, weight, condition factor, and time at sea of tagged in and out Dolly Varden migrants at Little Kitoi Lake, 1961-62.

Year	Type of Tag	Number of Tagged Returnees	Average Fork Length in mm	Average Weight in grams	Average Increase in Fork Length	Average Increase in Weight	Average Increase in K*	Average Time at Sea-Days
1961	"spaghetti"	39	278	186	43	174	0.258	52
1962	"	18	190	52	11	18	0.076	37
1962	dart	105	212	88	17	147	0.243	54

* K value is standard condition factor $K = \frac{W \times 10^6}{L^3}$

mercial dolly fishery would therefore have a much better and more readily marketable fish if the fall upstream migrations were utilized in contrast to the spring out-migrations.

Some explanations for the small number of returnees may be (1) wandering to other systems, (2) remaining at sea two or more seasons, (3) predation or natural mortality. Most likely the poor number of returnees is due to a combination of the above factors and not to any one single factor. Since less than one-half of the fall in-migrants were marked (Table 1), the rest of the in-migrating fish had to come from other sources. Any attempt to control an anadromous dolly population must be made with this migratory pattern in mind. Preliminary results from a study at Lake Eva in Southeastern Alaska have also determined considerable wandering in the populations of dollies inhabiting that area.

The Alaska Department of Fish and Game administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; U.S. Fish and Wildlife Service, 4040 N. Fairfax Drive, Suite 300 Webb, Arlington, VA 22203 or O.E.O., U.S. Department of the Interior, Washington DC 20240.

For information on alternative formats for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-6077, (TDD) 907-465-3646, or (FAX) 907-465-6078.