

U. S. DEPARTMENT OF THE INTERIOR
FISH & WILDLIFE SERVICE
DIVISION OF ECOLOGICAL SERVICES
Juneau, Alaska

Snettisham Project Follow-up

INTRODUCTION

Previous Fish and Wildlife Service reports to the Bureau of Reclamation (now Alaska Power Administration in Alaska), have recommended "that additional detailed studies of fish and wildlife resources affected by the project be conducted as necessary after the project is authorized. . ." In addition to previous surveys conducted in 1957, 1958, 1959 and 1974, a survey was conducted in August 1978. This survey was conducted utilizing basic parameters that were first initiated by Berg in 1974 (A Study of Fishery Resources in Indian Lake).

Indian Lake, a cold, turbid lake, rests between steep hillsides. The mountain slopes rise to over 2,000 feet on both sides. Indian Lake is 2.5 miles long and nearly 200 feet in depth and has a surface area of 520 acres. Indian Lake has a surface elevation of 177 feet.

OBJECTIVES

Additional information on fish and wildlife of Indian Lake was collected to:

1. Support and add to previously collected data.
2. Sample resident fish populations in Indian Lake.
3. Measure chemical and physical characteristics of Indian Lake; these parameters included turbidity, dissolved oxygen, and temperatures.

4. Attempt to determine project-caused changes in fish and wildlife habitat and populations.
5. Attempt to assess inter and subtidal productivity near the outfall.
6. Make recommendations designed to improve present or future projects or mitigate fish and wildlife impacts.

MATERIALS AND METHODS

The survey was conducted August 1-3, 1978, by U. S. Fish and Wildlife Service biologists. The 65-foot Service vessel M/V CURLEW was tied to the Snettisham dock and used as a base of operations. The CURLEW also served another function on this trip--it transported materials for the Alaska Power Administration that were too large for air carriers. Transportation to Indian Lake was provided by FWS amphibious Beaver N728 which also flew a 12-foot inflatable boat and 6 HP motor to the lake. The inflatable boat was used for conducting surveys. Fish sampling was conducted ^{using} utilizing two 100-foot gillnets, one vertical and one horizontal. Each net was made up of four 25-foot panels of mesh size 1/2", 3/4", 1" and 2", respectively.

Water samples were collected at two sample sites utilizing a Van Dorn bottle. The Winkler method was used to determine dissolved oxygen. Temperatures were recorded to a depth of 30 meters ^{using} utilizing a YSI Model 33 SCT meter. Light penetration was measured using a Secchi disc, with distances being measured using a meter wheel to improve accuracy.

RESULTS

Weather during the trip was exceptional--clear, sunny skies with temperatures in the 70's. Two monofilament gillnets were set at

different locations in Indian Lake (see Figure 1). A 100-foot vertical net was set in the east end (Site 2) of the lake and fished a period of 24 hours 57 minutes. Its yield was only one Dolly Varden (Salvelinus malma), a 457 gram gravid female, with a forklength of 42.3 centimeters. The second net (Site 1) was set horizontally near the inlet of Long River. This net fished a total of 22 hours 20 minutes and was much more successful yielding a total of 14 Dolly Varden; see Table 1 below for sex, length and weight.

Table 1. Dolly Varden

Sex	Forklength (cm)	Weight (grams)
Female	44.2	685.7
Male	29.5	223.9
Male	26.9	182.4
Female	23.7	107.8
Female	23.3	106.7
Male	20.5	91.2
Male	20.5	77.1
Male	19.8	78.4
Male	19.2	71.7
Female	19.2	70.9
Male	18.5	71.9
Female	18.5	71.9
Female	17.9	63.3
Male	16.6 $\bar{x} = 22.5$	53.2 $\bar{x} = 139.7$

Note: All females were gravid.

Test fishing this season failed to turn up any evidence of either kokanee (Oncorhynchus nerka kennerly) or threespine stickleback (Gasterosteus aculeatus), which were both observed during the 1974 survey. There is no reason to believe that these species are absent, only that they were not detected during this survey. From the standpoint of fish productivity, at least for Dolly Varden, Indian Lake does not appear to have gone through significant adverse change. All fish that were captured seemed in good shape with good color and significant amounts of body fat. Stomach samples were not analyzed.

Temperatures, dissolved oxygen and Secchi disc readings for Indian Lake are given below in Table II.

Table II.

Station 1 ^{Duilet}					Station 2 ^{Inlet}				
Secchi Disc	Depth (meters)	Temp. ° C.	DO (ppm)	pH	Secchi Disc	Depth (meters)	Temp. ° C.	DO (ppm)	pH
3.9 m	2	12.1	11.5	6.95	5.2m	2	12.0	11.6	6.85
	5	11.1				5	10		
	10	8.1				10	7.6		
	15	7.0	11.9			15	6.5	12.5	
	20	6.0				20	5.5		
	25	5.8	6.9			25	5		
	30	5.2				30	4.7	12.7	

DISCUSSION AND RECOMMENDATIONS

This study was conducted to add to already existing data and to make recommendations for this project or other projects that may be similar.

*Test water be 1 bar for long
Marshes 6/7 228*

In comparing previous data with that collected this trip, Indian Lake has not changed appreciably. Temperatures and dissolved oxygen levels are similar to those gathered by Berg in 1974. The only significant change occurs in light penetration at the east end of the lake.

Secchi readings exhibited a 1.5 meter increase in light penetration over pre-project readings that were taken in 1974. This is undoubtedly due to a lessening of the flow from Long Lake into Indian Lake. Secchi readings in the west end of the lake, however, showed a decrease in light penetration of .2 meters. The Long River enters Indian Lake at this end of the lake, and is probably responsible for higher turbidity levels. These higher turbidity levels do not appear to be detrimental to fish populations, as all but one of the fish captured during this survey were taken at the west end of the lake.

A shoreline survey was conducted along both ends of the lake. Tracks of river otter and black bear were readily discernible. Service biologists confirmed the presence of black bear in the area when on the second day of the study the inflatable boat that had been left in the lake overnight was partially destroyed by an inquisitive bear.

Some subtidal work in Port Snettisham was scheduled in the operation plan; however, this was scratched due to limitations in funding. A low tide foot survey was conducted on August 2, 1978, along the flats in front of the powerhouse. The entire area adjacent to the Snettisham project exhibits low productivity, at least from a marine organism standpoint. The pilings that were placed for the dock do not show any colonization by either barnacles or mussels, the usual piling growth.