

ALASKA

FEDERAL AID IN FISH RESTORATION
STUDY G-1

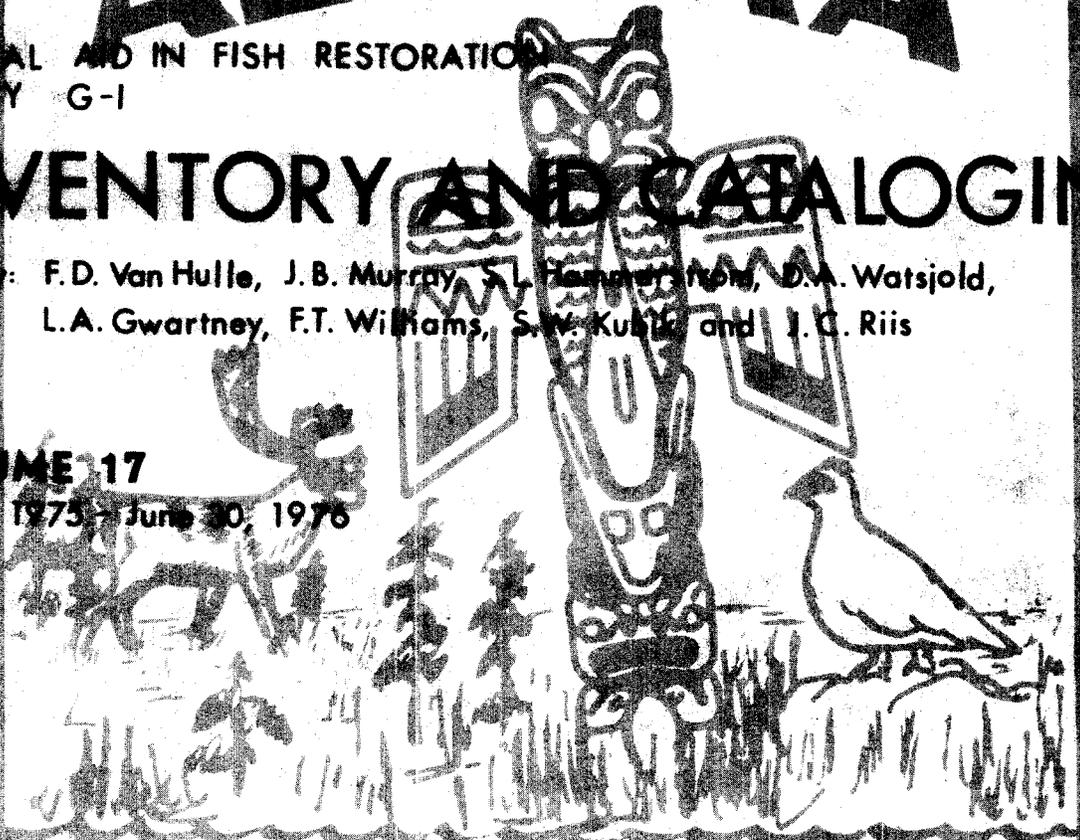
INVENTORY AND CATALOGING

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James W. Brooks, Commissioner

Sport Fish Division

Support Building
JUNEAU, ALASKA

STATE OF ALASKA

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Annual Performance Report for

INVENTORY AND CATALOGING

by

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RESEARCH PROJECT SEGMENT

State: Alaska Name: Sport Fish Investigations
of Alaska.

Project No.: F-9-8

Study No.: G-I Study Title: INVENTORY AND CATALOGING

Job No.: G-I-H Job Title: Inventory and Cataloging
of Sport Fish and Sport
Fish Waters of the Lower
Susitna River and Central
Cook Inlet Drainages.

Period Covered: July 1, 1975 to June 30, 1976.

ABSTRACT

Fifteen lakes in the Anchorage vicinity and five lakes in the western Susitna area were test netted for fish population data. General characteristics of water chemistry in the management area are reported.

Rainbow trout, Salmo gairdneri Richardson, were experimentally stocked in 15 Anchorage area lakes, and Arctic grayling, Thymallus arcticus (Pallas), were planted in one lake.

The 1975 escapement of chinook salmon, Oncorhynchus tshawytscha (Walbaum) into west side Susitna streams was studied. Escapement appeared to be lower than 1974 levels.

Creel census data were collected from 479 anglers fishing the Talachulitna River to provide effort and harvest information and growth and age data of rainbow trout and Arctic grayling.

Creel census activities conducted at Eshamy Creek in Prince William Sound revealed a total recreational harvest of 53 sockeye salmon, O. nerka (Walbaum), in 302 man-days of fishing effort.

BACKGROUND

Enumeration of salmon in the Susitna River drainage is confined to the clear water tributaries. The magnitude of the chinook salmon run into upper Cook Inlet cannot be evaluated because of the many turbid, glacial streams in which the salmon cannot be detected visually. Since 1964, chinook salmon escapement surveys have been made annually on selected streams in the Susitna basin.

Concern over increased angling pressure on the Talachulitna River, long noted for its quality Arctic grayling and rainbow trout fishing, necessitated a study in 1974 to provide fish population estimation, age, and growth data. A similar creel census program was continued in 1975 to obtain angling effort and harvest data for a second year. A general description of the area investigated in 1974 and information collected on this project is presented by Chlupach, (1974).

During 1975 a creel census program was initiated at Eshamy Creek in western Prince William Sound to establish sport fish effort and harvest levels. Recreational access to Eshamy is primarily by small boat craft originating from Whittier and float planes for access to both Eshamy Lake and Lagoon. Present recreational use is light but is expected to increase significantly as facilities at Whittier and Valdez develop.

As in previous years, the program for restocking Anchorage area lakes was continued in 1975. Test netting to determine population trends within managed lakes and water chemistry surveys to record the chemical conditions influencing survival and growth of game fish in landlocked lakes was also conducted.

RECOMMENDATIONS

1. Investigation of spawning runs of eulachon, their biological characteristics and the sport fishery in the Turnagain Arm area be continued.
2. Creel census in the western Prince William Sound area be conducted in conjunction with other activities. Angler interviews be specifically conducted on Coghill, Eshamy and Shrode creeks for catch information to establish sport fish effort and harvest levels.
3. Investigation of waters between the Chakachatna River on Cook Inlet and the headwaters of the Talachulitna River be conducted on a continuing basis due to anticipated effects of proposed coal and gas field development in the area.
4. Continuation of chinook salmon escapement counts.
5. Experimental stocking evaluations on area lakes to be continued.

OBJECTIVES

1. To determine the environmental characteristics of the existing and potential recreational fishing waters of the job area, and where practical, obtain estimates of the sport fish harvest and angler participation rates.
2. To evaluate the impact of water use and urban development projects on fisheries, aquatic life, and water quality of lakes and streams in the area.
3. To determine stocking measures, formulate management practices, and direct the course of future studies on area waters.
4. To investigate, evaluate and develop plans for the enhancement of king salmon stocks.

TECHNIQUES USED

Fish population sampling throughout the Anchorage-western Susitna River area was accomplished with 125-foot variable mesh gill nets, a Smith-Root Type V backpack electrofishing unit, hook and line, and dip nets. Measurements on fish collected included total lengths to the nearest millimeter (mm), and weight to the nearest gram (g). Scale samples from fish were pressed on cellulose acetate sheets and projected on the screen of a Micro-Design C.O.M. 200 scale reader to determine ages.

Water samples collected from lakes in the area with a Kemmerer water sampler were analyzed for dissolved oxygen, pH, total alkalinity, total hardness and conductivity with a portable Hach chemical kit.

Shorelines of lakes for construction of morphometric maps were established by plane table and alidade surveys. Depths plotted on morphometric maps were obtained from a boat with a Lowrance LFD-300 fathometer along transects of the lake surface.

Aerial and ground surveys were utilized to observe distribution numbers and time of arrival of adult chinook salmon in upper Cook Inlet streams.

A creel census was conducted on the Talachulitna River. Length measurements and scale samples were collected from Arctic grayling and rainbow trout. An attempt was made to interview all fishermen to determine number of hours spent fishing, total catch, and catch by species.

A creel census designed to contact 100% of the anglers was conducted at Eshamy Creek to determine angler effort and harvest data.

FINDINGS

Results

Survey of Fish Populations of Area Lakes - Test Netting:

The 15 lakes in the Anchorage area test netted in 1975 are shown in Table 1 with fish species present and total length. All of the lakes shown except Chenie Pond and the "C" Street Gravel Pit are part of the Sport Fish Division experimental stocking program. Six-Mile and Otter Lakes were rehabilitated in October, 1973, with rotenone at the rate of 1.25 ppm to eliminate threespine stickleback, Gasterosteus aculeatus (Linnaeus). These rehabilitation efforts were unsuccessful as evidenced by the continued presence of stickleback (observed visually) and other species which were not stocked in either lake.

Approximately 50 adult sockeye salmon, Oncorhynchus nerka (Walbaum), were observed for the first time in Six-Mile Creek on August 18, 1975.

The presence of Dolly Varden, Salvelinus malma (Walbaum), coho, O. kisutch (Walbaum), pink, O. gorbuscha (Walbaum), and chinook salmon, O. tshawytscha (Walbaum), in the "C" Street Gravel Pit is the result of natural introduction from Campbell Creek during high water periods.

Lake surveys and test netting for fish species occurrence and composition was conducted on Felt, Bishop, Viapan, Unnamed #6271 and Unnamed #6532 lakes in the western Susitna area. As shown in Table 2, Bishop Lake contained the most diverse fish population of the surveyed lakes. Felt Lake was the only lake in which no threespine stickleback were found and was judged as an excellent sport fishery for the angler. Viapan Lake was devoid of all fish species except threespine stickleback which were captured in minnow traps.

Water Chemistry Surveys:

Data on water quality parameters of dissolved oxygen, pH, total alkalinity, total hardness and conductivity are shown in Table 3 for Anchorage area lakes and Table 4 presents dissolved oxygen, pH, total alkalinity, hardness, temperature and secchi depth for western Susitna River lakes.

The lakes examined for water quality demonstrated no unusual departures from the water quality characteristics common to lakes of the region. On the basis of total alkalinity and hardness measurements, all the lakes can be characterized as being of low to moderate biological productivity.

Morphometric Surveys:

Morphometric surveys were made on all five western Susitna lakes shown in Table 4 and detailed maps constructed are on file in the Anchorage area office.

Table 1. Test Netting Results, Anchorage Area Lakes, 1975.

Lake	Date	Species*	Number of Fish	Length (mm) Range	Mean
Beach	10/16	RT	24	300-350	320
"C" Street Gravel Pit	10/09	KS	3	410-439	422
		SS	10	167-405	316
		PS	1	339	339
		DV	1	333	333
Campbell Point	05/22	RT	3	368-416	388
Chenie Pond	10/09	0	0		
Clunie	05/15	RT	16	318-479	379
	10/16	RT	17	250-530	316
DeLong	05/17	RT	5	365-476	414
Fish	10/24	RT	2	280-300	290
Gwen	10/17	RT	17	360-410	386
Hercules	10/21	RT	4	300-430	395
		SS	2	270-310	290
Hillberg	10/23	RT	3	275-315	290
Mirror	05/15	GR	150	142-169	152
Otter	10/17	RT	15	190-540	387
		SS	13	140-300	200
		DV	11	120-220	180
Six-Mile	05/15	SS	6	162-217	189
	10/23	SS	6	185-320	250
		DV	1	260	260
Thompson	10/21	RT	13	290-450	314
Triangle	05/16	RT	2	324-327	325
	10/24	RT	1	210	210

* RT - Rainbow trout
 KS - Chinook salmon
 SS - Coho salmon
 PS - Pink salmon
 DV - Dolly Varden
 GR - Grayling

Table 2. Test Netting Results, Western Susitna Area, 1975.

Lake and Location	Date	Species*	Number Of Fish	Length Range	(mm) Mean
Felt T14N,R11W,S32	7/23/75	RT	36	225-287	256
Unnamed #6211 T11N,R12W,S3&10	8/04/75	RT	14	215-355	274
Unnamed #6532 T15N,R11W,S35	7/01/75	RT	4	289-338	317
Bishop T14N,R12W,S9	6/11/75	RT DV	3 1	134-475 182	278 182
Viapan T12N,R10W,S18	6/18/75	0	0		

* RT - Rainbow trout
DV - Dolly Varden

Table 3. Water Chemistry of Anchorage Area Lakes, 1975.

Lake Name	Date	D.O. ppm	pH	Total Alkalinity (mg/l CaCO ₃)	Total Hardness (mg/l)	Conductivity (micromhos/cm)
Campbell Point	5/22/75	14	6.5	17.1	17.1	38
Clunie	2/16/75	2	7.5	34.2	34.2	40
	6/24/75	11	7.7	34.2	34.2	
DeLong	6/27/75	12	7.0	17.1	17.1	38
Fish	2/17/75	10	7.0	17.1	17.1	62
	6/25/75	12	6.5	17.1	17.1	
Green	6/27/75	12	7.8	68.4	85.5	103
Gwen	8/15/75	14	9.0	68.4	102.6	160
Hillberg	6/25/75	12	7.0	51.3	68.4	82
Jewell	8/12/75	12	7.4	34.2	51.3	66
Mirror	8/14/75	13	9.0	85.5	102.6	190
Otter	8/18/75	13	8.7	119.7	136.8	220
Sand	8/12/75	12	7.2	34.2	34.2	46
Six-Mile	8/13/75	12	9.1	68.4	85.5	135
Thompson	8/14/75	11	7.3	34.2	34.2	40
Triangle	6/25/75	9	6.8	17.1	34.2	19

Table 4. Chemical and Physical Characteristics of Surface Waters in Western Susitna Lakes Surveyed, 1975.

Lake and Location	Date	Temperature (C)	pH	Dissolved Oxygen (mg/l)	Total Alkalinity (mg/l as CaCO ₃)	Total Hardness (mg/l)	Secchi Depth (feet)
Bishop S9, T14N, R12W	6/12/75	11	6.7	17	17.1	17.1	12.5
Felt S32, T14N, R11W	7/24/75	17	7.0	12	17.1	17.1	
Unnamed #6532 S35, T15N, R11W	7/01/75	17	7.5	12	17.1	17.1	16.5
Unnamed #6211 S3&10, T11N, R12W	8/05/75	19	7.3	12	34.2	34.2	7.0
Viapan S18, T12N, R10W	6/19/75	16	7.1	11	17.1	17.1	8.5

Sport Fish Stocking:

Sixteen lakes in the area incorporating metropolitan Anchorage, Elmendorf Air Force Base, and the U. S. Army Reservation at Ft. Richardson, were experimentally stocked with game fish in 1975. The location of each lake, date stocked, species, size and number of fish released are shown in Table 5.

Since 1968 the Department of Fish and Game has had a cooperative agreement with Elmendorf and Ft. Richardson whereby the State of Alaska on an annual basis provides fish for restocking purposes. During 1975 military reservation lakes received 44,300 or 57% of the total catchable size rainbow trout planted. The general public is granted access to all fishing areas on the military installations; however, the majority of participants are military personnel and dependents.

Information on the sport fishery characteristics and success of the stocking program on military lakes has never been collected although most of these lakes have been stocked with game fish for many years. On lakes which are artificially stocked with rainbow trout and Arctic grayling, data on survival, age and growth of fish, and angler use will be reviewed and assessed to aid in determining appropriate stocking levels. A creel census program utilizing military wildlife personnel to evaluate current fishing pressure levels and harvest on nine lakes will be initiated in 1976.

Eulachon Investigations:

Investigation of the Twenty-Mile River eulachon, Thaleichthys pacificus (Richardson), continued for the fourth consecutive year. However, a creel census was not conducted in 1975 due to a general paucity of both eulachon and fishermen.

The majority of eulachon spawn at three years of age which may explain the reason for the poor run of 1975. In 1972, recreational fishermen dip-netted an estimated 1,259 man-hours to harvest 15,870 fish. The dip net fishery for eulachon during 1972 could only be categorized as poor, (Trent, 1973). The stronger and more extended run of smelt in 1973 resulted in an estimated harvest of 72,950 fish in 3,514 angler-hours of effort. It is anticipated the 1976 run will increase due to the stronger 1973 parent run.

Multiple Water-Use and Urban Development Projects:

During the past year, no major water-use projects affecting fish or fisheries habitat within this area developed.

Upper Cook Inlet-West Side Susitna River Chinook Salmon Escapement:

Enumeration of salmon in the Susitna River drainage is confined to the clearwater tributaries. The magnitude of the chinook salmon run into upper Cook Inlet cannot be evaluated because the salmon cannot be detected visually in the many turbid, glacial streams. Total escapement counts are not practical on these large streams so on some streams standard index areas are counted each year. This type of count, covering a fraction of the spawning

Table 5. Experimental Fish Stocking in Anchorage Area Lakes, 1975.

Lake	Location	Date	Species* Stocked	Number Stocked	Size (Fish/Lb.)
Beach	Anchorage	5/23	RT	4,000	5.3
Campbell Point	Anchorage	5/23	RT	5,000	5.2
DeLong	Anchorage	5/20	RT	5,100	5.3
Jewell	Anchorage	1/27	RT	256	2.5
		1/27	RT	344	2.8
		5/20	RT	6,900	4.9
		5/27	RT	1,600	4.5
		6/04	RT	400	1.2
Lower Fire	Anchorage	2/05	RT	200	2.3
		5/21	RT	4,000	5.1
		5/27	RT	1,000	4.5
		6/04	RT	700	3.7
		6/04	RT	400	1.3
Mirror	Anchorage	6/22	GR	20,000	Fry
Sand	Anchorage	5/22	RT	5,300	5.5
Fish	Elmendorf AFB	5/21	RT	1,700	5.2
		5/27	RT	300	4.5
		8/21	RT	300	3.0
Hillberg	Elmendorf AFB	5/21	RT	4,300	5.2
		5/27	RT	700	4.6
		6/03	RT	400	1.4
		8/20	RT	2,500	3.2
		8/21	RT	200	1.1
Old Cooling Pond	Elmendorf AFB	1/20	RT	300	2.4
Triangle	Elmendorf AFB	5/22	RT	2,000	5.3
		8/20	RT	1,300	3.2
		8/21	RT	200	1.1
Clunie	Ft. Richardson	5/21	RT	7,500	5.1
		5/27	RT	2,500	4.5
Derby Pond	Ft. Richardson	6/05	RT	100	1.3
		6/05	RT	500	4.5

Table 5. (Cont). Experimental Fish Stocking in Anchorage Area Lakes, 1975.

Lake	Location	Date	Species* Stocked	Number Stocked	Size (Fish/Lb.)
Gwen	Ft. Richardson	5/20	RT	3,200	5.0
		5/27	RT	800	4.6
Otter	Ft. Richardson	1/27	RT	300	3.0
		5/20	RT	7,500	5.0
		7/02	RT	2,000	4.0
		7/02	RT	700	1.0
Thompson	Ft. Richardson	5/20	RT	4,100	5.0
		5/27	RT	900	4.6

* RT - Rainbow trout
GR - Grayling

area of a stream, provides only relative escapement values for a comparison from one year to another.

The 1975 escapement of chinook salmon into west side Susitna streams appeared to be lower than 1974 levels. A total of 7,842 chinook salmon were observed in 12 west side Susitna streams during 1975; in the streams where comparisons can be drawn between 1974 and 1975 (Table 6) there were 7,831 salmon counted in 1975 as compared to 8,978 in 1974.

Escapement surveys were conducted from July 11 through August 15 while streams were low and clear, thus affording excellent visibility conditions. All surveys were conducted by helicopter.

A sample of 338 chinook salmon carcasses from the Deshka River were examined for sex and size composition. The salmon ranged in length from 305-1,232 mm with a mean of 762 mm. Males and females averaged 709 and 870 mm, respectively. The sex ratio of males to females was 2:1.

In addition to the west side Susitna streams, Ship Creek in the Anchorage area was surveyed for spawning populations of chinook salmon. Enumeration through the Chugach Dam fish ladder facility showed 120 adult chinook counted in 1975 as compared to 146 salmon in 1974.

Talachulitna River Investigation:

Talachulitna River creel census activities were conducted from June 11 through August 14, 1975. A total of 479 anglers fished 1,474 hours for 549 grayling and 183 rainbow trout.

Table 6. Chinook Salmon Survey Counts - West Side Susitna River, 1974-1975.

Stream	1974	Type Survey	1975	Type Survey
Deshka River System	5,279	Aerial	4,737	Aerial
Alexander Creek System	2,193	"	1,878	"
Lake Creek System	535	"	281	"
Chuit River	171	"	629	"
Theodore River	205	"	95	"
Lewis River	135	"	75	"
Talachulitna River	303	"	120	"
Peters Creek	124	"	8	"
Canyon Creek	10	"	2	"
Martin Creek	23	"	6	"
Straight Creek			9	"
Nikolai Creek			2	"
Nakochna Creek	<u>2</u>	"	<u> </u>	
Total	8,980		7,842	

A total of 549 grayling were caught and 219 retained for a retain/release ratio of 1:1.5. Grayling catch per hour for the creel census period was 0.37. Angler retained grayling ranged from 248-419 mm with mean length of 327 mm. Age analysis from a sample of 74 grayling indicated a predominant age class of III (Figure 1). Range in length per age group is shown in Figure 2.

Seventy-nine of the total 183 creel census rainbow trout were retained for a retain/release ratio of 1:1.3. Catch per angler hour was 0.12. Angler retained fish ranged from 200-457 mm with a mean length of 330 mm. Age determination and range in length per age group of 32 rainbow trout sampled are presented in Figures 3 and 4, respectively.

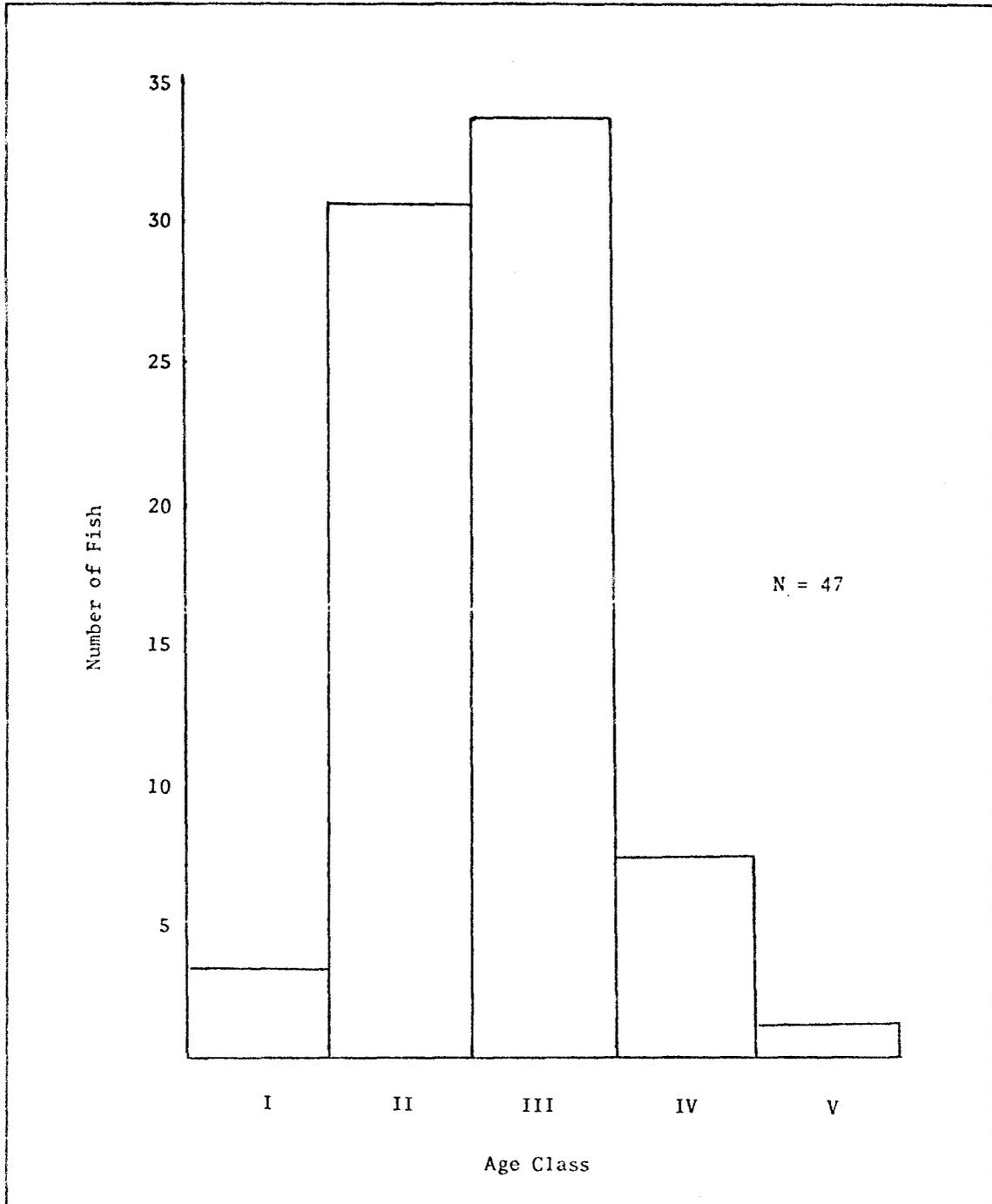


Figure 1. Number of Arctic Grayling in Each Age Class Sampled, Talachulitna River, 1975.

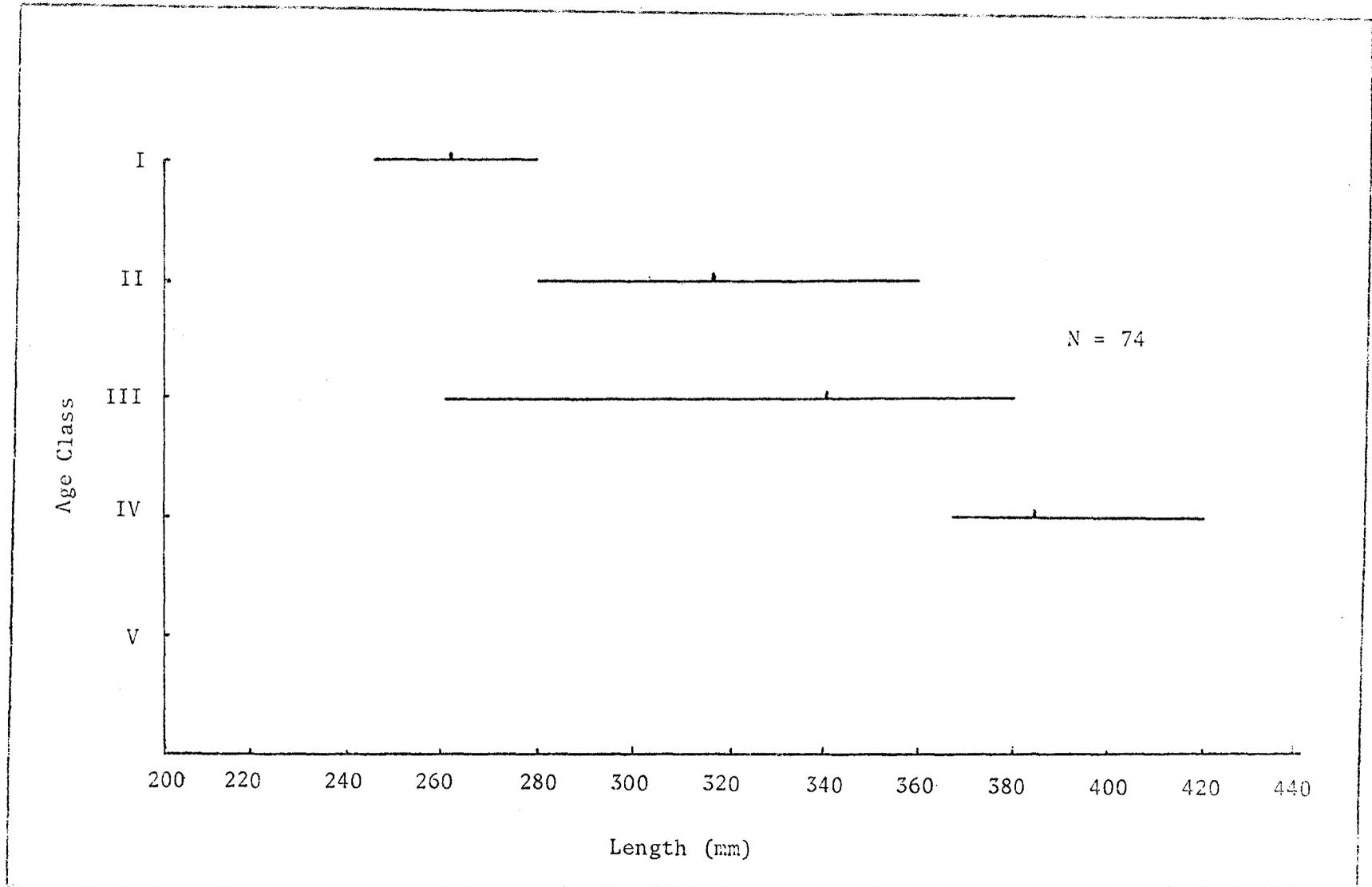


Figure 2. Mean and Range of Length Per Age Group for Arctic Grayling Sampled, Talachulitna River, 1975.

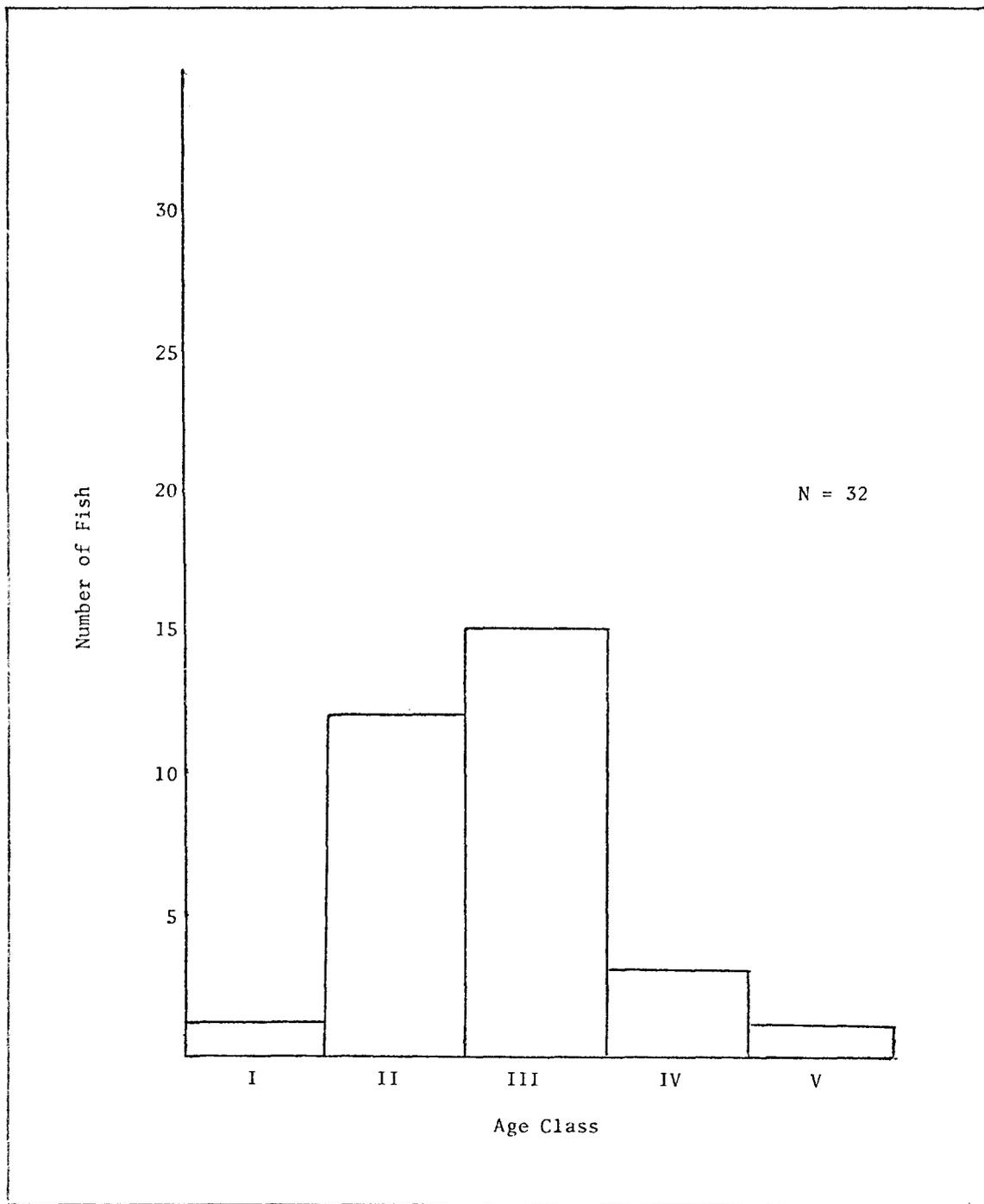


Figure 3. Number of Rainbow Trout in Each Age Class Sampled, Talachulitna River, 1975.

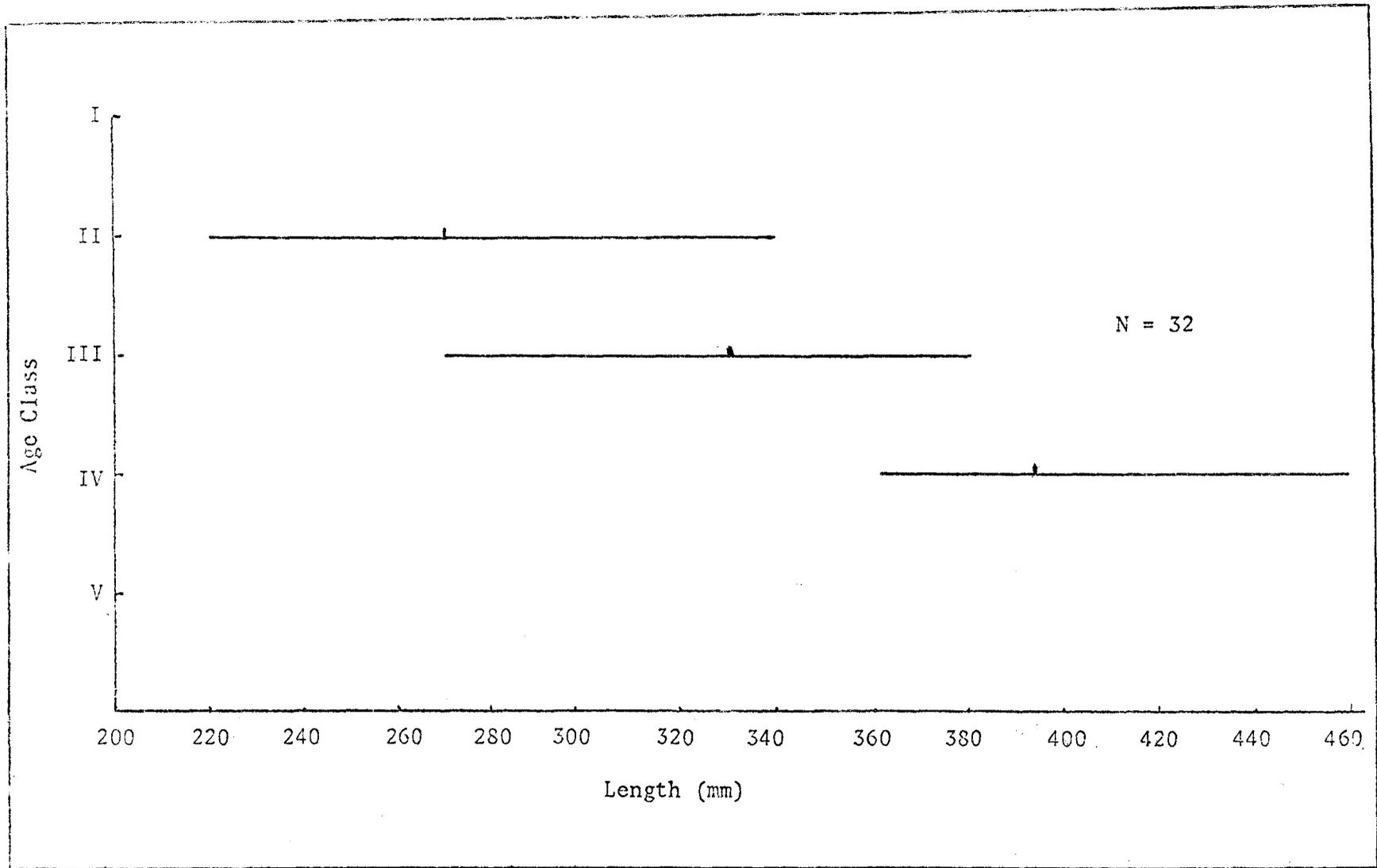


Figure 4. Mean and Range of Length Per Age Group for Rainbow Trout Sampled, Talachulitna River, 1975.

Eshamy - Western Prince William Sound:

Eshamy Lake outlet, where it enters salt water has been the site of a small but growing sport fishery. Salmon fishing is the most popular fishing activity with sockeye being the primary species caught. Prior to 1975 fishing was concentrated at the creek mouth (intertidal area) where the fish schooled prior to entering the creek, and was basically a snag fishery.

Until 1974 the sport fish catch was considered to have been insignificant when compared to escapement and commercial harvest figures (Table 7). Sockeye catches by sport anglers ranged from 151 fish in 1966 to 2,689 in 1973. In 1974 however, escapement (Table 7) dropped to a record low, and sport fishermen took twice the number of sockeye that passed through the Eshamy fish weir to spawn upstream in Eshamy Lake.

During 1975, stricter sport fishing regulations were instituted, which prohibited snagging in fresh water and in a 100-yard area of the intertidal zone where the salmon were vulnerable to snagging. During the 1975 season, 53 sockeye were harvested by sport fishermen. Table 8 presents catch and effort information from 1972 through 1975.

The 1975 decrease in effort and harvest on sockeye salmon over the previous three-year levels can be attributed to stricter regulations, improved enforcement, and a poor run.

Discussion

Surveys conducted on lakes in the western Susitna River area and water analysis of Anchorage area lakes show biological productivity as being low to moderate based on total alkalinity, hardness and conductivity measurements. These findings could be valuable in determining future stocking densities and in formulating management plans. Fifteen lakes in the Anchorage area were stocked with 79,500 rainbow trout and one lake received 20,000 grayling in 1975.

The 1975 eulachon run in Twenty-Mile River was not strong. There was very little effort from recreational fishermen. It is anticipated the 1976 run will be stronger. This study should be continued so escapement trends can be documented.

The 1975 escapement of chinook salmon into west side Susitna streams appeared to be lower than 1974 levels. A total of 7,842 chinook salmon were observed in 12 west side Susitna streams during 1975.

Increased fishing effort and harvest is anticipated on the Talachulitna River due to the construction of new lodges in the area.

Whittier is rapidly developing into a popular tourist center on western Prince William Sound. Some of the largest salmon producing systems in the Sound, such as Eshamy Creek, are located within easy boating or flying distance of Whittier and have become very popular in recent years with Anchorage area residents and other visitors. The present recreational use has been defined as light but is expected to increase significantly as facilities at Whittier and Valdez develop.

Table 7. Eshamy Lagoon Sport Salmon Catch, 1966-1975.

Year	Census Period	Sockeye	Pink	Coho	Chum	Total Salmon	Sockeye Escapement	Sockeye Commercial Catch
1966	7/01-9/05	151	42	6		199	26,593	20,876
1968	6/30-8/27	316	5	8		329	68,048	closed
1969	6/26-9/11	452	40	9	1	502	61,196	61,728
1970	6/25-9/01	448	40	1		489	11,460	17,292
1971	7/12-9/05	297	29	23		349	3,000	closed
1972	7/01-9/10	1,413	141	60		1,614	28,750	52,888
1973	6/29-9/10	2,698	182	0		2,880	10,202	16,439
1974	6/23-8/27	1,472	364	0		1,836	637*	19,037
1975	6/21-9/19	53	139	14		206	1,754	closed

* Escapement count incomplete, weir panels pulled early.

Table 8. Eshamy Lagoon Sport Effort (Angler-Days) and Catch/Angler, 1972-1975.

Year	Angler Days	Catch/Angler-Day			
		Sockeye	Pink	Coho	All Salmon
1972	380	3.71	0.37	0.16	4.24
1973	949	2.84	0.19		3.03
1974	771	1.91	0.47		2.38
1975	302	0.17	0.46	0.05	0.68

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