Volume 23 Project AFS 41-10

STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

A STUDY OF CHINOOK SALMON IN SOUTHEAST ALASKA

by

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ALASKA DEPARTMENT OF FISH AND GAME

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Volume 23 Project No. AFS-41

COMPLETION REPORT

State: ALASKA Name: Sport Fish Investigations of Alaska

Project No.: AFS-41 Project Title: A STUDY OF CHINOOK SALMON IN SOUTHEASTERN ALASKA

Segment No.: AFS-41-10 Segment Title: Status of Important Native Chinook Salmon Stocks in Southeastern Alaska

Cooperator: Paul D. Kissner

Period Covered: July 1, 1981 to June 30, 1982

ABSTRACT

The chinook salmon, Oncorhynchus tshawytscha (Walbaum), research project was initiated in 1971 to determine the status of important chinook salmon stocks in southeastern Alaska. Major emphasis has been placed on monitoring catches in terminal fisheries and spawning population levels in the major and medium-producing systems. In addition, during the last 5 years, 205,795 wild juvenile chinook have been coded wire tagged on the Taku River and 106,963 on the Stikine River to determine migration patterns, areas and timing of harvest, and exploitation rates.

By the mid 1970's, it was apparent that chinook salmon populations were generally depressed throughout southeastern Alaska and, during subsequent years, terminal gill net fisheries were either severely restricted or eliminated on the Taku, Stikine, and Alsek Rivers. Additional sport and commercial trolling restrictions have been made to protect maturing chinook during their spring spawning migration.

These restrictive regulations have aided the rebuilding process in central and northern southeastern Alaska. The nearly 10,000 chinook observed in various tributaries of the Taku River during 1981 was the largest recorded escapement since the 1950's. A record 5,744 chinook were observed in the Tahltan drainage of the Stikine River. Escapements were also good in the Chilkat River System and many smaller producers. Systems in the Behm Canal area have not responded as well, quite possibly because of the later entry timing of spawners.

Based on age class data collected at the Nakina carcass weir, returns to the Taku River will be low during the next several years. This is at least partially the result of a major landslide on the Inklin River and several large forest fires in the drainage during 1978. Reduced returns are also expected to the Stikine River during 1982, as the escapement from the major brood year contributing to the return (1976) was weak.

Recoveries from the first group of smolts tagged on the Taku River during the spring of 1977 (1975 brood) are complete through their 4-ocean return. It appears that Taku chinook leave southeastern Alaska, rear beyond the present limits of the troll fishery, and migrate back through the waters of southeastern Alaska only at maturity.

Recoveries from coded wire tagging of Taku and Stikine River chinook will continue through 1986.

KEY WORDS

Chinook, escapement, gill net catches, juveniles, migration, status, Taku, Stikine, Alsek, southeastern Alaska.

RECOMMENDATIONS

Management

1. The restrictive troll and gill net regulations designed to protect maturing southeastern Alaska chinook salmon returning to their rivers of origin should be continued. Southeast Alaska chinook salmon stocks are in the process of rebuilding but continued restrictions will be necessary for at least several more years.

2. Drift gill net fisheries throughout Southeastern should be monitored to determine the harvest of immature chinook taken incidentally to the target species. Night closures should be made in areas where high incidental catches of immature chinook occur.

Research

1. Sampling of the sport and commercial harvest of chinook to recover coded wire tags should continue. Recovery of tagged chinook from the Taku and Stikine Rivers will permit determination of marine migration patterns, areas and timing of harvest at various life history stages, and rates of harvest.

2. Length frequency and scale sampling of spawning chinook in the major and medium producing rivers should be conducted to determine the quality of the various escapements and to forecast future returns.

3. Continue to determine the current status of major and medium chinook salmon systems in Southeast through monitoring of escapements by aerial, ground, and/or weir enumeration. This is necessary to determine if the various closures designed to aid depressed southeastern chinook are effective.

4. Sport caught chinook salmon less than 711 mm total length should be sampled from May 1 through June 14 throughout Southeast to determine maturity composition. This would permit determination of the percentage of precocious males harvested by area.

OBJECTIVES

1. Determine the catch and escapement of Taku River chinook salmon.

2. Determine the catch and escapement of Stikine River chinook salmon.

3. Determine the escapement of chinook salmon in other important spawning rivers of southeast Alaska.

TECHNIQUES USED

Commercial chinook salmon harvest data were taken from statistical runs which were compiled by the Division of Commercial Fisheries from individual fish tickets.

Mid-eye to fork of tail measurements were taken from chinook salmon sampled on the spawning grounds.

Scales were collected to determine the age of chinook salmon harvested in various sport and commercial fisheries in Southeast, as well as on the spawning grounds. Scales were taken from the preferred area at the posterior edge of the dorsal fin, two rows above the lateral line. Because of the high occurrence of regeneration in chinook salmon scales, several additional scales were taken from each side of each fish and placed in a numbered coin envelope.

During August, a tripod weir was operated on the Nakina River, approximately 137 m above its junction with the Silver Salmon River. Chinook spawning above the weir were enumerated after they could no longer maintain station in the river and floated against the weir face. The structure was cleaned of carcasses at 10 a.m. and 7 p.m. daily. All species were enumerated and length data, scale samples, and sex determinations were collected from the chinook salmon. Upriver surveys of both banks of the river were conducted every day to enumerate and sample spawned-out chinook salmon which had not floated downriver to the weir. The survey area extended approximately 2.4 km above the weir.

All escapement surveys were conducted on foot or by "Alouette II", "Hughes 500", or "Hiller 12E" helicopters. Only 3- and 4-ocean chinook salmon ($\geq$ 660 mm in total length) were enumerated during aerial and foot surveys.

Gee minnow traps, baited with clusters of salmon roe, were used to capture juvenile salmonids in the rivers. From 50-300 traps were checked and the juveniles removed. The traps were rebaited and reset on a daily basis. Salmon roe was disinfected prior to use by immersion in dilute betadyne, at a ratio of 1:90 (1 part betadyne per 90 parts water) for 15 minutes.

A beach seine 72 m long by 3.6 m deep and constructed of three panels of web was used to capture smolts in Taku Inlet. The two end panels were each 29.97 m long, of 13 mm square mesh, and the center panel was 14.99 m long, of 6 mm square mesh. In setting this seine, two people held one end on

shore while the remainder of the net was set from a 7.2 m inboard jet powered aluminum boat. Four people were required to purse the net onto the beach, hold it open, and remove the catch.

Juvenile salmon captured by beach seine in Taku Inlet ware transported in circulating live tanks to Juneau for tagging. Tagged smolts were held overnight, transported to an area about 3 kilometers from the capture site, and released.

Juvenile chinook tagged in the rivers were transported from various capture sites to the tagging locations in live-boxes and, after tagging, were released approximately 1 kilometer below the trapping areas to reduce the number of recaptures.

Chinook salmon smolts and rearing juveniles were anesthetized with Tricaine Methanesulfonate (MS-222), marked by removal of the adipose fin, and micro-wire tagged with a Northwest Marine Technology, Inc. (NMT) tag injector. The tagging unit was modified to function under remote conditions by conversion to a 24-volt battery system (Koerner 1977).

The micro-wire tags were made of type 302 stainless steel wire and were 0.25 mm in diameter and 1.0 mm in length. A code, based on the binary system, was etched into the surface of each wire to identify the agency tagging and the specific treatment of the individual.

The micro-wire tags must be implanted in the cartilaginous wedge of the fish's snout in order to obtain maximum retention. Thus, several fish were sampled daily to insure proper tag placement. The fish's skull was bisected by a vertical incision through the dorsal median plane to the oral cavity. The tag was then readily observed in the snout. If the tag was improperly placed, adjustments in the depth of the head mold were made and several more fish were checked to insure proper placement of the tag.

The micro-wire tags were magnetized by dropping the tagged fish head-first through a ring magnet into a bucket of water. The fish were then passed through a NMT field sampling detector to check for the presence of a magnetized tag.

Samples of chinook salmon smolts and rearing juveniles were collected for age and growth determinations. Fish were measured from the tip of the snout to the fork of the tail to the nearest millimeter and several scales were taken from the preferred area.

Scales were examined under a binocular microscope and the first complete scale was cleansed in detergent and mounted on a numbered gum card. The scales were pressed in cellulose 'acetate and analyzed on a 3-M Consultant 114 microfiche reader.

FINDINGS

Taku River Studies

Introduction:

The Taku River, which discharges its flow into the Pacific Ocean approximately 48 kilometers east of Juneau, Alaska, originates in the high plateau country of northwestern British Columbia and drains an area of approximately 16,576 square kilometers. The drainage above the abandoned community of Tulsequah, British Columbia, remains in a pristine state as mining, logging, or other land use activities have never been permitted. The area is among the most remote in British Columbia, with no highway access and no year-around residents.

The two major clearwater tributaries, the Nakina and Nahlin Rivers, contribute less than 25% of the total discharge, with most of the remainder originating from ice fields on the eastern slope of the Coast Range.

Drift Gill Net Fishery:

A commercial fishery for chinook has operated in Taku Inlet since the late 1800's. Moser (1898) states that "as soon as the ice breaks up in the river the fishery for king salmon commences, and all that are packed at Pyramid Harbor are taken in the Taku, except for a few stragglers that appear around the Chilkat very early in the season. . . These fish are all taken with drifting gill nets by white fishing crews[1]".

The chinook catch in the Taku Inlet drift gill net fishery has varied greatly throughout the years (Table 1), partially as the result of regulatory changes (Kissner 1977). A complete closure of the early season, large mesh gill net fishery was initiated in 1976, as it was evident that the stock was at a low level (Table 2). As with the Stikine River terminal gill net fishery, the best annual comparable catch statistics are from the early season, large mesh gill net fishery that occurred from late April or early May through mid-June (Table 3). Catches of chinook during this time period are over 95% maturing chinook bound for the Taku River, while catches after mid-June are from smaller mesh sockeye gear and the incidental 'catch of immature and mature jack chinook increases greatly.

Concern for the large incidental harvest of immature chinook during the 1973 sockeye salmon, Oncorhynchus nerka (Walbaum), fishery led to the annual monitoring of the Taku drift gill net fishery (Kissner 1973-1980). Fishermen indicated that the largest catches of immature chinook occurred at night. During 1978, an opportunity to test the effect of daylight only gill net openings occurred in District 106, and the harvest of immature chinook was dramatically reduced (Kissner 1979). It is recommended that if similar problems occur in other gill net fisheries, only daylight openings should be permitted.

There was much concern over the possibility of overharvesting the late returning segment of the chinook spawning run incidental to the sockeye harvest during the first gill net opening in 1981. It was felt that many additional chinook would be in the area as the result of the April 15-May

Table 1. Total annual commercial gill net catch* of chinook salmon (mature and immature) in Taku Inlet, Area 111-32, southeastern Alaska, 1904-1980.

Year	Chinook	Year	Chinook	Year	Chinook
1904	29,214	1928-	No Data	1960	8,763
1905	22,362	1939-	No Data	1961	7,269
1907	10,701	1940	<1,000	1962	5,719
1908	10,757	1941	<1,000	1963	2,650
1909	7,384	1942	<1,000	1964	2,482
1912	8,088	1943	<1,000	1965	4,170
1913	9,985	1944	3,610	1966	4,817
1914	16,996	1945	4,263	1967	5,351
1915	12,099	1946	6,935	1968	4,862
1916	13,048	1947	3,932	1969	6,869
1917	8,239	1948	6,035	1970	3,073
1918	7,781	1949	6,473	1971	6,753
1919	9,713	1950	8,443	1972	9,634
1920	21,977	1951	13,635	1973	9,525
1921	10,049	1952	14,125	1974	2,283
1922	6,474	1953	13,754	1975	1,999
1923	12,900	1954	20,667	1976	1,693
1924	17,088	1955	14,408	1977	754
1925	16,232	1956	13,382	1978	1,642
1926	7,801	1957	8,482	1979	3,017
1927	8,177	1958	15,343	1980	2,157
		1959	18,512		

*Statistics for the years 1904-1927 may include a portion of fish taken by other forms of gear.

Sources: 1904-1927 Rich and Ball, 1933
1940-1950 Alaska Fishery & Fur Seal Industries
1951-1959 Simpson, 1960
1960-1980 Commercial Fish statistical tuns.

Table 2. Minimum total run of chinook salmon in the Taku River, 1944–1981.

Year	Harvest Method		Canadian	River Escapement		Minimum
	Through Mid-June					Total Run
	U.S. Gillnet	Troll	Gillnet	Inklin	Nakina	
1944	3,610	...	...	...	...	3,610
1945	4,109	...	...	...	...	4,109
1946	6,704	...	...	...	...	6,704
1947	3,572	...	...	...	...	3,572
1948	5,320	...	...	...	...	5,320
1949	5,801	...	...	...	...	5,801
1950	7,342	...	...	...	...	7,342
1951	9,059	5,750*	...	1,500	5,000	21,309
1952	10,119	No Fishery	...	...	9,000	19,119
1953	15,207	9,020*	...	...	7,500	31,727
1954	13,668	7,502*	...	...	6,000	27,170
1955	9,753	3,250*	...	...	3,000	16,003
1956	9,963	...	...	...	1,380	11,343
1957	7,637	...	...	...	1,500	9,137
1958	12,847	...	...	7,000	2,500	22,347
1959	15,312	...	...	...	4,000	19,312
1960	7,756	...	...	...	Poor	7,756
1961	6,480	...	...	...	Poor	6,480
1962	3,488	...	...	322	...	3,810
1963	796	...	...	...	...	796
1964	1,217	...	...	...	...	1,217
1965	2,378	...	...	405	3,050	5,833
1966	1,394	...	...	881	...	2,275
1967	3,471	...	...	1,500	...	4,971
1968	3,242	...	...	3,220	...	6,462
1969	2,363	...	...	4,100	...	6,463
1970	804	...	...	1,791	...	2,595
1971	2,328	...	...	2,358	...	4,686
1972	2,500	...	...	763	1,000	4,263
1973	3,073	...	...	800	2,000	5,873
1974	343	...	...	1,279	1,800	3,422
1975	423	...	...	274	1,800	2,497
1976	0	...	...	1,726	3,000	4,726
1977	0	...	...	1,821	3,850	5,671
1978	0	...	...	1,685	1,620	3,305
1979	0	...	97	2,046	2,110	4,253
1980	0	...	225	3,044	4,500	7,769
1981	0	...	153	4,676	5,110	9,939

* mature Taku River chinook salmon

Table 3. Taku River drift gill net catch of chinook salmon per boat per day through mid-June, 1945-1975.

Year	Days Fished	Weighted Average # Boats	Maximum # Boats	Chinook Catch	Average Catch Per Boat Per Day
1945	17.0	18.6	24	4,109	13.0
1946	20.5	29.9	41	6,704	10.9
1947	24.5	23.3	33	3,572	6.3
1948	22.0	25.2	38	5,320	9.6
1949	23.5	23.1	33	5,801	10.7
1950	24.5	21.8	29	7,342	13.7
1951	20.0	34.1	43	9,059	13.3
1952	20.5	39.9	69	10,119	12.4
1953	23.5	37.5	63	15,207	17.3
1954	19.0	47.4	67	13,668	15.2
1955	17.0	53.9	74	9,753	10.6
1956	17.0	53.7	65	9,963	10.9
1957	19.0	31.9	53	7,637	12.6
1958	18.0	54.7	72	12,847	13.0
1959	18.0	59.2	65	15,312	14.4
1960	15.0	86.8	94	7,756	6.0
1961	16.0	65.1	72	6,480	6.2
1962	7.0	30.3	40	3,488	16.4
1963	4.0	35.3	44	796	5.6
1964	7.0	17.6	24	1,217	9.9
1965	8.0	16.0	32	2,378	18.6
1966	7.0	15.0	21	1,394	13.3
1967	7.0	24.9	33	3,471	19.9
1968	7.0	33.1	40	3,242	14.0
1969	5.5	26.9	31	2,363	16.0
1970	4.0	27.5	36	804	7.3
1971	6.0	29.8	33	2,328	13.0
1972	6.0	29.2	34	2,500	14.3
1973	7.0	35.9	43	3,073	12.2
1974	2.0	30.5	32	343	5.6
1975	3.0	20.7	23	423	6.8

14 region-wide commercial troll closure and the gill net fishery opened on the earliest possible date of week 25. The actual catch was much less than expected, with only 365 3- and 4-ocean spawners, 115 jacks, and 1,209 immature chinook reported for the season. Some chinook were not landed because of the possibility of restrictions if the catch was too large, but it is felt that this was not a major problem.

Managers should take the variation in opening dates in statistical week 25 into consideration when planning their strategies for the first sockeye opening. Additional protection could be given to the chinook by moving the upper fishing boundary further from the mouth of the river to protect late returning spawners.

Escapement:

The Nakina River, which is the major clearwater chinook salmon spawning tributary of the Taku River, originates in interior northwestern British Columbia (lat. 59° 15'N., long. 132° 30'W.) approximately 64.3 kilometers southeast of Atlin, British Columbia. The 96.5 kilometer river flows north from Nakina Lake and joins the glacial Sloko River at Canoe Landing, British Columbia. Historically, this area has been the hunting and fishing territory of Athabascan and Tlingit speaking groups. "Tahltan and Tlingit informants tell stories of many bitter wars fought over the right to control this region, important as a trade route to the coast and interior, and rich in fishing resources" (French 1974).

Access to the region above Canoe Landing is by helicopter or foot, The river has not been altered from its natural condition by any land use practices, although human activity in the form of hunting and fishing camps has resulted in increased utilization of the available resources.

Only the lower 35.4 kilometers of the river are accessible to anadromous salmonids. A 152 meter increase in elevation in 402 meters of river blocks further migration at a point 4.8 kilometers below the old Nakina Telegraph Station.

Foot and/or helicopter escapement surveys of the total Nakina River were conducted during early August from 1951 to 1956, in 1965, and from 1972 to 1981. A carcass collecting weir was operated on the Nakina River above the junction of the Silver Salmon River during 1956 to 1959 and from 1973 to 1981. The weir data has been utilized as an index of escapement and an aid in prediction of future returns. Intermittent aerial surveys were made by Super Cub or Cessna 180 from 1960 to 1971. These fixed wing aerial estimates were of little value as annual counts cannot be compared. Factors affecting the reliability of these aerial surveys include turbulent flying conditions, high murky water, missing the peak of spawning and questionable species composition. The fixed wing aerial estimates are not presented or used in the data analysis for these reasons.

The survey area in the Nakina River extends from Grizzly Bar (a prominent gravel bar 8 km below the Silver Salmon River confluence) to a narrow canyon 3.2 km above the Silver Salmon River.

Spawning distribution information on chinook salmon in the Nakina River was determined only in 1952, 1953, and 1972 through 1981. Several hundred chinook can be observed in years of' good escapements between the junction of the Sloko and Nakina Rivers upstream to Grizzly Bar, a distance of about 14 km. Most chinook will be observed in the lower 1 km above the junction of the Sloko River. This area is not intensively surveyed because of the few fish present.

Survey Area I — Grizzly Bar to the heavy rapids and small gorge 2.4 kilometers upstream.

The area from Grizzly Bar upstream for about 550 meters is always well seeded, while the area above, to the small gorge, is only well utilized during years of good escapement. About 55% of the Nakina chinook escapement spawns in this area.

Survey Area II — From the heavy rapids and small gorge upriver to the Silver Salmon River.

This area has never been well utilized, however, increasing use has been evident in years of good escapements. Less than 5% of the Nakina escapement spawns in this area.

Survey Area III — Silver Salmon River confluence upriver to the major gorge, 3.2 km upstream.

This is an excellent spawning area with the largest spawning concentration just below the gorge. On an average year about 30% of the chinook escapement is enumerated in this area.

In years of high water during late July and early August, over 500 chinook can be observed spawning between the major gorge, 3.2 km upstream from the confluence of the Silver Salmon River, and the total barrier, 4.8 km below the old Telegraph Trail crossing. In an average or low water year, less than 200 chinook use this area. This is a difficult area to survey because of shadows, rotor clearance, and wind.

Peak aerial surveys are conducted during the period August 1 to August 7, usually near the 4th of August. If surveys are conducted after August 14th, over half of the spawning population will have died. Caution must be exercised in enumerating only chinook salmon during escapement surveys as large numbers of pink salmon, Oncorhynchus gorbuscha (Walbaum), and some sockeye salmon are also present. For this reason, only chinook over 660 mm (3– and 4–ocean) are enumerated.

The chinook salmon escapement into the Nakina river has three major components; 3–, 4–, and 5–ocean age females, 3–, 4–, and 5–ocean age males, and 1– and 2–ocean males (jacks). The 3–, 4–, and 5–ocean male and female chinook are enumerated during surveys. Jacks are only counted at the

carcass weir, as they are difficult to observe during aerial or ground counts.

There are always more males in the escapement than females (combining jacks and 3-, 4-, and 5-ocean males). Thus, the critical component of the escapement is the number of females. Consequently, discussions on chinook escapements into the Nakina will deal mostly with females.

During the period 1951 through 1954, with large terminal gill net harvests averaging 12,000 chinook, Nakina escapements varied between 2,300 and 3,500 females. Returns from this level of escapement were adequate to permit gill net harvests averaging 11,000 chinook from 1955-1958, but escapements were reduced to an average annual female escapement of only 1,310 chinook. These declining escapements led to poor returns and reductions in gill-netting in 1962 to only 1 day per week. Continued poor escapements from 1972 through 1975 (average less than 1,000 females per year) indicated that the run was not rebuilding and the early season terminal gill net fishery on chinook was closed beginning in 1976 (Table 4). Since the gill net closure, the female component of the Nakina escapement has varied between 810 and 3,107 and has averaged 1,888. The 1981 escapement of 3,107 female chinook was the largest recorded escapement since 1954 and was at least partially the result of the April 15 through May 14 commercial trolling closure throughout southeastern Alaska. Past studies have indicated that the Nakina River can support at least 3,500 female chinook (Kissner 1975).

The Nakina Carcass Weir, located approximately 137 meters upriver from the junction of the Silver Salmon and Nakina Rivers, has been operated from 1956 through 1959 and from 1973 through 1981. The major functions of the carcass weir are to collect; 1) unbiased age frequency data which is useful in making projections of future returns, 2) sex ratio data to determine the quality of the escapement, and 3) coded wire tags.

Projection of future returns have been made annually since 1974 (Kissner 1975-1980) and (Kissner and Bethers 1981). Since the percentage of a brood that is harvested in various sport and commercial fisheries must have a large annual variation, and we do not have techniques for stock separation of chinook in mixed stock fisheries, it would be difficult to make a numerical forecast. However, it is very obvious from the data collected at the weir that once a brood year returns strongly after the first and second ocean years it will return strongly in succeeding years at 3- and 4-ocean years of age. Conversely, if a brood has a weak escapement to the spawning ground after the first and second ocean returns, subsequent year's returns at 3- and 4-ocean years will also be weak.

Several qualifications occur in the data, as a partial barrier to migration occurred at Village Falls in both 1975 and 1976. During 1975, only 215 3- and 4-ocean chinook spawned above the weir and in 1976 the weir was moved downriver about 8 km to the riffle below Grizzly Bar, as only 20 chinook were able to negotiate the partial barrier. The data collected during these 2 years is of limited value, however, age frequency trends in the jack component were evident. In 1975, the 2-ocean return was very strong and in 1976 the 1-ocean return was extremely weak. This permits us to follow additional brood years through their cycle of spawning ground returns (Table 5).

Table 4. The number of age five through seven year old male and female chinook and three and four year old jacks enumerated at the Nakina Carcass weir and expansions of sex ratio data on large chinook only, for the total Nakina River, by year.

Year	Enumerated at Carcass Weir			Expansion for total Nakina River		Total
	Female	Hale	Jacks	Female	Male	
1951	...	...	...	...	...	5,000
1952	...	...	...	2,322	6,678	9,000
1953	...	...	...	3,488	3,512	7,000
1954	...	...	...	3,384	2,616	6,000
1955	...	...	...	1,533	1,467	3,000
1956	424	277	2,076	835	545	1,380
1957	403	309	2,034	849	651	1,500*
1958	644	601	3,822	1,293	1,207	2,500*
1959	1,191	839	2,040	2,347	1,653	4,000*
1960	...	...	...	...	...	Poor
1965	...	...	...	...	...	3,050
1972	...	...	...	...	...	1,000
1973	614	493	1,218	1,110	890	2,000
1974	420	362	1,481	967	833	1,800
1975	69	145	742**	580	1,220	1,800
1976	385	307	504***	1,669	1,331	3,000
1977	1,143	664	1,575	2,435	1,415	3,850

Table 4. The number of age five through seven year old male and female chinook and three and four year old jacks enumerated at the Nakina Carcass weir and expansions of sex ratio data on large chinook only, for the total Nakina River, by year.

Year	Enumerated at Carcass Weir			Expansion for total Nakina River		Total
	Female	Male	Jacks	Female	Male	
1978	207	222	3,122	782	838	1,620
1979	271	436	2,027	809	1,301	2,110
1980	654	560	1,028	2,424	2,076	4,500
1981	1,066	687	579	3,107	2,003	5,110

* Counts of total river not conducted, estimates based on carcass weir data
** Partial barrier to migration at Village Falls
*** Partial weir at Grizzly Bar

Table 5. Number and age of male and female chinook salmon enumerated at the Nakina carcass weir, by year.

	YEAR												
	1956	1957	1958	1959	1973	1974	1975*	1976**	1977	1978	1979	1980	1981
MALE													
Age 1.1	958	789	1,716	950	446	845	297	85	1,269	2,192	675	486	178
1.2	1,118	1,245	2,106	1,090	772	636	445	419	306	930	1,352	542	401
1.3	242	270	513	615	283	260	94	226	327	140	375	388	365
1.4	35	39	88	224	203	99	50	77	330	74	59	172	322
1.5	0	0	0	0	7	3	1	4	7	8	2	0	0
TOTAL	2,353	2,343	4,423	2,879	1,711	1,843	887	811	2,239	3,344	2,463	1,588	1,266
FEMALE													
Age 1.3	270	244	413	665	167	163	14	151	182	41	185	258	198
1.4	154	159	231	526	447	257	55	234	950	159	82	396	862
1.5	0	0	0	0	0	0	0	0	11	7	4	0	6
TOTAL	424	403	644	1,191	614	420	69	385	1,143	207	271	654	1,066

* Partial barrier to migration at Village Falls
** Partial weir at Grizzly Bar.

The predicted very strong escapement of 6-year-old chinook to the Nakina River in 1981 returned as forecasted, but the 5-year old segment was stronger than projected (Kissner and Bethers 1980). This was probably the result of the April 15-May 14 commercial trolling closure throughout southeastern Alaska, as three chinook, disc tagged on vessels chartered to fish during the closure, were recovered in the Nakina River.

Recent escapement trends have indicated that the runs were in the process of rebuilding (Table 6), but several large forest fires and a major landslide, all of which occurred in 1978, appeared to have severely effected the survival of the 1977 and 1978 broods. The two major fires burned throughout the summer, denuding large areas along the Inklin and Sloko Rivers and a large landslide on the Inklin River, several miles upstream from Yeth Creek, dammed the Inklin River. The mainstem Taku, which usually clears in the winter, remained very muddy during the winter of 1978-1979 as the Inklin River eroded through the barrier. Indications of the affect of the siltation on overwintering juveniles from the 1977 brood was evident as growth was reduced about 50% in comparison to the 3 preceding brood years (Kissner 1980).

Projections of age class return in 1982 are difficult because of the unknown effect of the 1 month commercial trolling closure. However, it appears that the 6-year-old return should be average, the 5-year-old return below average, and the 4-year-olds should be extremely weak.

Comparison of the total chinook enumerated at the weir and total estimated escapement for the Nakina River indicates that 11.8% to 55.4% of the Nakina chinook escapement spawns in the area above the weir. Since removal of the partial barrier at Village Falls, the percentage of chinook spawning above the weir has varied between 26.5% and 46.9%. Because of the annual variation in the percentage of chinook that spawn in this area, which may be related to such factors as water level and spawning density in the lower river, the carcass weir count gives only a very general index of abundance. Therefore, its major value is the collection of biological information, including age, sex ratio, and coded wire tag data.

Male chinook salmon return to spawn at ages 3 through 7 and females return at ages 5 through 7. Adult males from a given brood always return stronger at age 5 than at age 6 and female spawners almost always return stronger at age 6 (Table 5). Several exceptions in the mid-1950's were probably caused by gill net selectivity (Kissner 1976).

Based on the 1953, 1974, and 1975 brood years, where complete return information is available, the jack (1- and 2-ocean) component from individual broods varied from 56.8% to 66% of the total return; 3-ocean, 12% to 23.9%; and 4-ocean from 17.2% to 22.0%.

Sampling of the carcasses at and above the Nakina carcass weir has shown a variation in the timing of the die-off of male and female chinook after spawning. Therefore, any sampling of carcasses over only a short time period would give a distorted sex ratio.

At maturity, a variation in flesh and egg color occurs between red- and white-fleshed chinook salmon. Spawning red-fleshed chinook have a dark

Table 6. Peak escapement counts of chinook salmon in the Taku River tributaries, 1951-1981.

Year	Nakina	Kowatua	Tatsamenie	Dudidontu	Tseta	Nahlin	Total
1951	5,000	...	...	400	100	1,000	6,500
1952	9,000	...	...	...	...	...	9,000
1953	7,500	...	...	...	...	...	7,500
1954	6,000	...	...	...	...	...	6,000
1955	3,000	...	...	...	...	...	3,000
1956	1,380	...	...	...	...	...	1,380
1957	1,500*	...	...	...	...	...	1,500
1958	2,500*	...	...	4,500	...	2,500	9,500
1959	4,000*	...	...	...	...	...	4,000
1960	Poor	...	...	...	...	...	Poor
1961	Poor	...	...	...	...	...	Poor
1962	...	...	...	25	81	216	322
1963	...	...	...	...	...	...	...
1964	...	...	...	...	...	...	...
1965	3,050	200 G	50 G	100	18	37	3,455
1966	...	14 G	150 G	267	150	300	881
1967	...	250 G	...	600	350	300	1,500
1968	...	1,100 E	800 E	640	230	450	3,220
1969	...	3,300 E	800 E	...	...	...	4,100
1970	...	1,200 E	530 E	10	25	26	1,791
1971	...	1,400 E	320 E	165	...	473	2,358
1972	1,000	130 G	170 G	103	80	280	1,763
1973	2,000	100 G	200 G	200	...	300	2,800
1974	1,800	235 G	120 G	20	4	900	3,079
1975	1,800	...	...	15	...	274	2,089
1976	3,000	341 G	620 E	40	...	725	4,726
1977	3,850	580 G	573 E	18	...	650	5,671
1978	1,620	490 G	550 E	...	21	624	3,305
1979	2,110	430 G	750 E	9	...	857	4,156
1980	4,500	450 G	905 E	158	...	1,531	7,544
1981	5,110	560 G	839 E	74	258	2,945	9,786

G = water glacial
E = water clear
* = Counts of total river not conducted - comparison made from carcass weir enumeration

purple/red color and spawning white-fleshed chinook have a greenish to gray color. The eggs of red-fleshed chinook have the typically orange coloration, while eggs from white-fleshed chinook are very pale, having little or no color.

Observations on the spawning grounds indicate that both red- and white-fleshed chinook of either sex have no preference as to the flesh color of their mate.

The Nahlin River, which is the second major clearwater chinook salmon spawning tributary in the Taku River drainage, originates in the arid interior of northwestern British Columbia (lat. 58° 45' N., long. 131° 45' W). The main river is approximately 97 kilometers long and has two major chinook spawning tributaries, the Dudidontu River and Tseta Creek. The river is uninhabited and has not been altered from its natural condition. The drainage is bisected by the historical Telegraph Trail, used as a route to the Klondike and Atlin gold fields in the late 1890's.

Enumeration of the chinook salmon escapement in the Nahlin River has been conducted intermittently since 1951. During most years, the fixed wing aerial surveys were made after the peak of spawning and the species composition was questionable. Therefore, the counts are of little value. Since 1974, the counts have been conducted by helicopter during the peak of spawning.

Annual chinook salmon escapements have improved during the last 3 years. The 1981 escapement of 2,945 3- and 4-ocean chinook is the largest escapement on record (Table 6).

The river should be surveyed by helicopter between July 22 and 28. Spawning distribution is as follows:

Survey Area I — Nahlin Crossing (outlet of Tedideech Creek) upriver to the Beaver Dam Valley (start of slow moving water, large rock in River).

From Nahlin Crossing to the junction of Kawdy Creek, the chinook spawning is sparse, usually less than several hundred. From the junction of Kawdy Creek upriver to the slow moving water and large rock in the river, dense spawning occurs.

Survey Area II — Large rock in river at beginning of slow moving water (Beaver Dam Valley) upriver about 13 kilometers to faster moving water.

This area is very difficult to survey, except on bright sunny days, because of deep, acid colored waters and many meanders. In 1981, 20.4% of the Nahlin escapement spawned in this area.

Survey Area III — Beginning of faster moving and shallower water upriver for about 8 kilometers to the area where the river forks, then up each fork for one mile.

This is the most concentrated chinook spawning area in the Nahlin River. In 1981, about 40% of the escapement spawned in this area.

Caution should be exercised in determining species composition; in some years as many sockeye are as present as chinook.

Two large mudslides, similar to the Inklin and Tahltan slides, have been observed on the Nahlin River during the past 8 years. Although neither slide caused a barrier to migration, as water cut rapidly through both slides, the area appears to be very unstable and a large mud and boulder slide could hinder migration at any time.

The Kowatua River, the third most important chinook spawning tributary to the Taku, is a glacial stream that flows from the outlet of Little Trapper Lake into the Inklin River. The river carries a heavy silt load until glaciers in the headwaters of the drainage stop melting, usually in mid to late August.

Large numbers of spawning chinook were first observed in 1968 as the water had cleared prior to the fixed-wing aerial survey. During the following 8 years, when the water was clear, over 1,000 chinook could be enumerated and when visibility was poor, only several hundred chinook would be visible on the shallow riffles (Table 6).

The river should be surveyed by helicopter from about August 12 through 17 from the outlet of Little Trapper Lake downstream for about 8 kilometers, to the junction of a small glacial stream that flows into the Kowatua from the south. The stream should be surveyed early in the morning before glacial melt commences for the day. Large numbers of sockeye salmon spawn at the same time in the same area as the chinook.

The Tatsamenie River, the fourth most important chinook spawning tributary, is a slightly glacial river that flows from the Tatsamenie Lakes system into Tatsatua Creek.

Surveys should be conducted by helicopter about August 15–20 from the outlet of Big Tatsamenie Lake downriver through Little Tatsemenie Lake to the junction of the very glacial waters of Tatsatua Creek. In the river, between Big and Little Tatsamenie Lakes, only the upper 1 kilometer and lower 1.5 kilometers need to be surveyed, as the flow through the rest of the river is too fast for spawning chinook. The major chinook spawning concentration occurs below Little Tatsamenie Lake, with the largest number occurring about 0.4 kilometers above the junction of Tatsamenie River and Tatsatua Creek, adjacent to an open meadow. Sockeye salmon spawn at the same time as the chinook, but large numbers of sockeye have not been observed.

The chinook that utilize this system have the latest entry and spawning timing of any tributary observed on the Taku River. Thus, this system is

probably most affected by the present gill net fishery and contributes heavily to the catch of mature chinook during the first several gill net openings.

The Hacket River is a small glacial tributary of the Sheslay River. Good numbers of chinook have been reported by trappers in the area, but only small numbers have been observed during enumeration by helicopter, due to the very glacial water and tall trees along the banks. Sockeye salmon are also present in good numbers in the fall, as are coho. It is recommended that this area not be surveyed because of the large annual variations in the percentage of chinook observed.

Tseta Creek is a clearwater tributary of the Nahlin River. The system is difficult to survey because of almost continuous meanders and deep, dark water. It was carefully surveyed in 1981 to determine if any tagged chinook from the early season test troll fishery were present and 258 chinook were enumerated.

It is recommended that this area not be surveyed as large annual variations in the percentage of chinook observed will occur because of variations in visibility. If surveys are conducted, they should be made from July 25 through August 1 by helicopter.

The Dudidontu River, the other major clearwater chinook spawning tributary of the Nahlin, has much spawning and rearing potential but partial barriers to migration have permitted limited access into the drainage. The upper 32 kilometers of the system, from Camp Island Lake to 6.4 kilometers below Matsatu Creek, contain excellent chinook spawning and rearing habitat. Below this area is a 19 kilometer long canyon which is characterized by steep mud, boulder, and shale slopes with no vegetation. The river through this area is almost continuous heavy rapids.

During low level helicopter flights through the canyon, conducted from 1974–1976, no obvious barriers were detected although several old landslides were noted. During August of 1979, a new slide was noted which impounded a lake about 0.5 kilometers long. Only nine chinook were observed in the vicinity of the slide. Additional slides are possible at any time in this highly unstable canyon.

It is evident that the Dudidontu River has much potential for chinook production; in 1958, a total of 4,500 spawning chinook were observed. Because of the large amount of prime rearing habitat, this system should not be overlooked for enhancement potential, such as planting chinook fry.

Juvenile Chinook Studies:

From 1972 through 1981, a total of 37,693 minnow trap sets have been made in various tributaries of the Taku River (Table 7) to determine habitat preferences, areas of concentrations of juvenile chinook and to capture chinook for coded wire tagging (Kissner 1976–1980, Kissner and Bethers 1981). Over 210,000 juvenile chinook have been captured and 7,748 samples have been taken for age and growth determination (less than 200 actually retained). In addition, attempts were made to capture chinook by beach seine in the Taku River in 1979 (Kissner 1980) and beach seining was

Table 7. Summary of minnow traps set, catch per trap, sample size, and mean fork length of juvenile chinook captured in various areas of the Taku River Drainage, 1972 - 1981.

River	Date	Number of Traps	Catch Per Trap	Sample Size	Mean Fork Length, mm
Nakina	8/08/72	3	65.0	46	56.2
Nakina	8/09/74	14	6.1	...	...
Nakina	9/16/75	42	5.4	...	...
Nakina	10/05/75	17	2.9	19	66.5
Glacial Nakina	9/16/75	10	7.4	...	...
Glacial Nakina	10/15/75	5	15.6	6	63.8
Glacial Nakina	10/15/76	4	42.5	...	...
Glacial-Nakina	10/06-10/23/79	1,425	8.2	397	68.1
Glacial Nakina	9/04-11/02/80	2,634	12.4	1,201	68.7
Glacial Nakina	9/04- 9/26/81	465	34.0	340	63.2
Mainstem Taku	9/16/75	19	6.2	...	...
Mainstem Taku	10/15/75	15	14.6	13	61.4
Mainstem Taku	5/17/76	25	7.0	24	72.2
Mainstem Taku	5/24/76	40	6.9	21	72.1
Mainstem Taku	9/21/76	45	3.7	53	63.3
Mainstem Taku	10/15/76	25	32.8	19	64.2
Mainstem Taku	4/18- 6/10/77	7,548	1.3	401	79.7
Mainstem Taku	10/11-10/29/77	860	25.4	629	62.9
Mainstem Taku	4/12- 5/15/78	5,834	1.6	921	70.3
Mainstem Taku	9/20-11/03/78	3,851	10.2	966	63.9
Mainstem Taku	4/04- 4/11/79	525	5.1	227	66.2
Mainstem Taku	9/18-10/29/79	1,383	6.3	412	64.8
Mainstem Taku	10/01-11/12/80	648	11.8	200	68.4
Mainstem Taku	3/18- 5/13/81	4,269	1.4	973	69.6
Mainstem Taku	9/28-11/02/81	1,038	25.8	400	59.8
Nahlin	7/18- 7/25/75	509	8.0	20	49.6
Nahlin	7/29- 8/04/75	325	5.9	...	...
Nahlin	8/05- 8/11/75	325	6.7	20	60.4
Nahlin	8/18- 8/22/75	250	4.5	28	65.7
Nahlin	9/16/75	30	7.4	...	...
Nahlin	10/15/75	15	7.5	10	68.8
Nahlin	7/26/76	11	17.0	...	...
Nahlin	9/07- 9/30/77	5,484	1.5	402	68.5

conducted in Taku Inlet during 1979 (Kissner 1980), 1980 (Kissner and Bethers 1981), and 1981 to capture smolts for coded wire tagging.

During the first week of beach seining in Taku Inlet in May 1981, a total of 47 adipose clipped and coded wire tagged smolts, which had been tagged inriver, were observed while capturing 1,840 chinook smolts. If a 50% survival is assumed of the young-of-the-year chinook tagged during September and October of 1980 and the 5,800 smolts tagged inriver during the spring are added, it appears that about 25,000 tagged smolts from the 1979 brood migrated into Taku Inlet during the spring of 1981.

Since the basic assumptions associated with making population estimates appear to have been met, it is estimated that about 961,000 smolts migrated into the estuary in 1981.

The potential egg deposition from the 1979 escapement of 3,000 females, with an average fecundity of 6,000 eggs, was approximately 18 million. Thus, the survival from egg to outmigrant would have been about 5.3%.

During operations specifically designed for the capture of chinook for coded wire tagging, an average of 1.53 chinook smolts per minnow trap per 24-hour set were captured during spring programs and 9.72 young-of-the-year per trap during fall operations (Table 8). A total of 205,795 chinook from the 1975-1980 brood years were coded wire tagged and released (Table 9). In both the spring and fall, water levels were much more important than juvenile chinook densities in determining catch per trap. Large differences in chinook densities were apparent during fall tagging operations of the 1976, 1978, and 1980 broods. The 1976 and 1980 broods had good densities and the 1978 brood had poor densities. The apparent high densities of juveniles encountered during spring tagging of the 1977 brood probably occurred because of extremely low water in the mainstem Taku caused by impounding of flow by the Inklin land slide.

Length frequency information collected during coded wire tagging operations on young-of-the-year and smolts in various tributaries of the Taku River is presented in Table 10. Young-of-the-year chinook reach a tagable size (50 mm FL) by about August 1 in most tributaries of the Taku River, but fall tagging usually begins in early September, when the average size was slightly over 60 mm F.L. The smolts average nearly 70 mm F.L. by the following spring. The one major exception was the 1975 brood smolts captured during outmigration in April-June 1977. These smolts were almost 10 mm larger than average. This was probably the result of the extremely mild winter of 1976-1977. Smolts sampled in Taku Inlet average about 84 mm F.L. by June.

Growth of young-of-the-year chinook salmon is greatest in the clearwater Nakina and Nahlin Rivers. However, these systems do not support the densities of rearing juveniles that occur in the Glacial Nakina and mainstem Taku Rivers. Comparison of growth rates by brood year indicates that the Glacial Nakina River is more productive than the mainstem Taku River.

Table 8. Summary of minnow traps checked, chinook smolts tagged and mean catch per trap, by brood year during spring and fall coded wire tagging projects on the Taku River.

SPRING					FALL				
Brood Year	Area	Minnow Traps Set	Chinook Smolts Tagged	Mean Catch Per Trap	Brood Year	Area	Minnow Traps Set	Chinook Juveniles Tagged	Wean Catch Per Trap
1975	Taku Lodge	7,548	9,902	1.31	1975	...	...	...	...
1976	Tulsequah	5,834	9,550	1.64	1976	Tulsequah	860	21,879	25.44
						Nahlin	5,484	8,494	1.55
1977	Tulsequah	525	2,549	4.86	1977	Tulsequah	3,851	39,116	10.16
1978	...	...	...	...	1978	Tulsequah	1,383	10,415	7.53
						Glacial Nakina	1,425	9,947	6.98
1979	Tulsequah	4,269	5,851	1.37	1979	Tulsequah	648	7,618	11.76
						Glacial Nakina	2,634	32,758	12.44
1980	...	...	...	...	1980	Tulsequah	1,038	26,821	25.84
						Glacial Nakina	465	15,791	33.96
TOTALS		18,176	27,852	1.53			17,788	172,839	9.72

Table 9. Juvenile chinook salmon coded wire tagged in various tributaries of Taku River by code, brood year and fork length, 1977 - 1981.

Code	Chinook Tagged	Brood Year	Dates Tagged	Mean Fork Length mm	River(s)
4- 5- 8	5,294	1975	4/20- 5/11/77	79.7	Taku
4- 5- 9	4,555	1975	5/12- 5/29/77	79.7	Taku
4- 5-10	53	1975	5/31/77	79.7	Taku
4-16-55	10,687	1979	9/27-10/31/80	68.7	Glacial Nakina
4-16-56	4,101	1979	10/01-11/08/80	68.4	Taku
4-16-57	1,498	1979	10/31-11/02/80	68.7	Glacial Nakina
4-16-58	5,594	1978	9/21-10/01/79	64.8	Taku
4-16-59	1,066	1978	10/06-10/07/79	68.2	Taku-Glacial Nakina
4-16-60	4,821	1978	10/23-10/30/79	64.8	Taku
4-16-61	1,573	1978	5/27- 6/12/80	84.3	Taku Inlet
4-16-62	2,549	1977	4/04- 4/11/79	66.2	Taku
4-16-63	3,517	1979	11/09-11/12/80	68.4	Taku
4-17- 8	5,092	1976	9/11- 9/18/77	68.5	Nahlin
4-17- 9	3,402	1976	9/20- 9/29/77	68.5	Nahlin
4-17-10	4,358	1976	10/12-10/14/77	62.8	Taku
4-17-11	4,468	1976	10/15-10/18/77	62.8	Taku
4-17-12	4,796	1976	10/19-10/27/77	62.8	Taku
4-17-13	6,134	1976	10/28-10/29/77	62.8	Taku
4-17-14	2,123	1976	10/30/77	62.8	Taku
4-17-21	4,778	1976	4/13- 4/21/78	70.3	Taku
4-17-22	3,717	1976	4/23- 5/07/78	70.3	Taku
4-17-23	666	1976	5/09- 5/11/78	70.3	Taku
4-17-24	389	1976	5/12- 5/16/78	70.3	Taku
4-17-28	31,376	1977	9/23-11/03/78	63.9	Taku
4-17-30	7,740	1977	9/23-11/03/78	63.9	Taku
4-19-20	3,531	1979	5/28- 6/11/81	83.8	Taku Inlet
4-19-59	8,881	1978	10/10-10/23/79	68.2	Taku-Glacial Nakina
4-19-60	10,590	1979	9/06- 9/13/80	68.7	Glacial Nakina
4-19-61	9,983	1979	9/14- 9/26/80	68.7	Glacial Nakina
4-20- 1	1,633	1979	5/04- 5/14/81	73.5	Taku
4-20- 3	4,218	1979	3/22- 5/04/81	67.7	Taku
4-21-15	5,252	1980	9/23- 9/26/81	63.2	Glacial Nakina
4-21-16	9,995	1980	9/28-10/07/81	59.9	Taku
4-21-17	10,566	1980	10/07-10/23/81	59.9	Taku
4-21-18	6,260	1980	10/24-11/02/81	59.9	Taku
4-21-20	10,539	1980	9/04- 9/23/81	63.2	Glacial Nakina

Table 10. Sample size/mean fork length in millimeters by brood year and month of chinook juveniles sampled on the Taku River, 1975 - 1981.

Brood Year	Area	Young - of - the - Year					Smolts			
		July	Aug.	Sept.	Oct.	Nov.	March	April	May	June
1974	Mainstem	...	...	...	13/61.4	...	...	...	45/72.2	...
1975	Mainstem	...	...	53/63.3	19/64.2	35/64.6	...	100/78.8	200/78.6	101/83.2
1976	Mainstem	...	...	...	629/62.9	...	...	521/68.8	400/70.8	...
1977	Mainstem	...	...	...	373/63.7	593/ .2	...	227/66.[illegible]	204/69.5	...
1978	Mainstem	...	...	211/63.4	201/66.3	...	...	...	...	67/84.3*
1979	Mainstem	...	...	...	...	200/6[illegible].4	208/66.4	448/68.[illegible]	317/73.5	123/83.8*
1980	Mainstem	...	...	100/56.6	300/60.9	...	...	...	...	...
1974	Glacial Nakina	...	...	...	6/63.8	...	...	...	...	...
1978	Glacial Nakina	...	...	...	397/68.1	...	...	...	...	...
1979	Glacial Nakina	...	...	600/66.2	402/70.5	200/[illegible].6	...	...	...	...
1980	Glacial Nakina	...	...	340/63.2	...	...	...	...	...	...
1974	Nahlin River	20/49.6	48/63.5	...	10/6[illegible].8	...	...	...	...	...
1976	Nahlin River	...	...	402/67.2	...	...	...	...	...	...
1971	Nakina River	...	46/56.2	...	...	...	...	...	...	...
1974	Nakina River	...	...	...	19/66.5	...	...	...	...	...

* Taku Inlet

Tag Recovery

Recovery of coded wire tags from 9,902 smolts tagged during April and May, 1977 (1975 brood), near the mouth of the Taku River are complete through their 4-ocean return. Twenty two recoveries were made in ocean commercial and sport fisheries and 43 recoveries were made on the spawning grounds. All of the ocean recoveries were made either in terminal net fisheries or before late June in the various troll fisheries, which indicates that the fish are migrating through southeastern Alaska only at maturity.

Using the ratio of tag recoveries from the 1975 brood to the total sample size and expanding the information based on helicopter enumeration of the total Nakina and Nahlin Rivers (the only two systems where sampling was conducted) indicates that 29 tagged chinook from the 1975 brood spawned in the Nakina and about 30 in the Nahlin during 1981. Expanding the 1980 tag recoveries (when sampling was only conducted in the Nakina River) indicates that about 14 tagged chinook were present, Spawning ground expansions of the 1975 brood during their 1- and 2-ocean returns are not possible because they are difficult to observe during aerial or ground enumeration of the total river.

The 22 ocean recoveries were not expandable as many of them were recovered early in the year and held at the cold storages until Department sampling began.

To date, an additional 11 ocean and 21 spawning ground recoveries have been made from 1976-1978 brood Taku chinook. All but one of the recoveries show a similar pattern to the 1975 brood. The exception was the recovery of a chinook tagged in the Nahlin River in 1977 which was landed in Sitka on September 4, 1980.

Recoveries will continue through 1986, as 195,000 potential tags (1976-1980 broods) remain at sea (Table 11).

Tag Retension - 1975 Brood

Complete recovery information is available for the 1975 brood chinook smolts which were coded wire tagged during the spring of 1977. A total of 39 chinook heads were sampled on the spawning grounds and 34 contained tags, an 87.2% tag retension rate. An additional four fish were recovered with an adipose clip but with no head or a missing snout. Bears that are well fed often eat only one bite from a chinook salmon and that bite usually includes the cartilaginous snout, where the tag has been implanted.

At the present time, with the small size of the juvenile chinook that we coded wire tag (55-75mm), we consider a 90-95% tag retention (based on recaptures of tagged fish over a 60 day period) to be good. Thus, the 87.2% retention of adult chinook on the spawning grounds from our first year of tagging, when we were developing techniques, is acceptable.

Table 11. A summary of coded wire tagging and recovery of Taku River chinook salmon tagged by the Chinook Salmon Project, 1977 to date.

DATA						RECOVERY			
Number	Young-of-the-Year	Smolt	Brood	[illegible]	Tagging Information	Date	Age	Head Length (-) Pork Length (FL) Hideye-Fork (MF)	Recovery Type and Area
4-5-8		5,294	1975	79.7	Mainstem Taku, Tagged April-May, 1977 at Taku Lodge	08/10/78	1.1	360 mm (MF)	Weir, Nakina
						08/13/78	1.1	330 mm (MF)	Weir, Nakine
						08/15/78	1.1	410 mm (MF)	Weir, Nakina
						08/18/78	1.1	295 mm (MF)	Weir, Nakina
						08/23/78	1.1	355 mm (MF)	Weir, Nakina
						05/17/79	1.2	683 mm (FL)	Comm. Diet. Troll, 113
						07/12/79	1.2	659 mm (FL)	Comm. Diet. Gillnet, 111
						08/13/79	1.2	575 mm (MF)	Weir, Nakina
						08/16/79	1.2	480 mm (MF)	Weir, Nakina
						08/18/79	1.2	545 mm (MF)	Weir, Nakine
						08/18/79	1.2	420 mm (MF)	Weir, Nakina
						05/20/80	1.3	175 mm (-)	Car. Troll, 113, 114, 116
						05/21/80	1.3	175 mm (-)	Comm. Troll, 113, 114, 116
						05/30/80	1.3	855 mm (FL)	Car. Dist. Troll, 113
						06/10/80	1.3	780 mm (FL)	Comm. Troll, 113,114,116
						06/18/80	1.3	170 mm (-)	Comm. Troll 113,114,116
						06/20/80	1.3	850 mm (FL)	Comm. Dist. Gillnet, 111
						06/26/80	1.3	853 mm (FL)	Comm. Dist. Gillnet, 111
						08/15/80	1.3	755 mm (MF)	Weir, Nakina
						08/14/80	1.3	760 mm (MF)	Weir, Nakina
						08/15/80	1.3	735 mm (MF)	Weir, Nakina
						08/16/80	1.3	660 mm (MF)	Weir, Nakina

Table 11. (Cont'd.) A summary of coded wire tagging and recovery of Taku River chinook salmon tagged by the Chinook Salmon Project, 1977 to date.

DATA						RECOVERY			
Number	Young-of-the-Year	Smolt	Brood	mm	Tagging Information	Date	Age	Head Length (-) Fork Length (FL) Mideye-Fork (MF)	Recovery Type and Area
						06/13/81	1.4	996 mm (FL)	Comm. Troll, 109-50
						05/20/81	1.4	900 mm (FL)	113-Deer Harbor
						05/10/81	1.4	997 mm (FL)	Breadline-Sport
						08/03/81	1.4	...	Nahlfn-escapement
						08/18/81	1.4	790 mm (MF)	Nakina-escapement
						08/14/81	1.4	865 mm (MF)	Nakina-escapement
						08/19/81	1.4	855 mm (MF)	Nakina-escapement
4-5-9		4,555	1975	79.7	Mainstem Taku, Tagged May, 1977 at Taku Lodge	07/27/78	1.1	330 mm (MF)	Weir, Nakina
						08/04/78	1.1	310 mm (MF)	Weir, Nakina
						08/15/78	1.1	335 mm (MF)	Weir, Nakina
						08/16/78	1.1	310 mm (MF)	Weir, Nakina
						08/20/78	1.1	330 mm (MF)	Weir, Nakina
						07/05/79	1.2	595 mm (FL)	Comm. Dist. Gillnet, 111
						07/05/79	1.2	579 mm (FL)	Comm. Dist. Gillnet, 111
						07/12/79	1.2	650 mm (FL)	Comm. Dist. Gillnet, 111
						08/12/79	1.2	535 mm (MF)	Weir, Nakina
						08/15/79	1.2	515 mm (MF)	Weir, Nakina
						08/16/79	1.2	570 mm (MF)	Weir, Nakina
						08/18/79	1.2	420 mm (MF)	Weir, Nakina
						05/20/80	1.3	853 mm (FL)	Comm. Troll, 113,114,116
						05/20/80	1.3	765 mm (FL)	Comm. Dist. Troll, 114
						05/21/80	1.3	175 mm (-)	Comm. Troll, 113,114,116
						06/18/80	1.3	790 mm (FL)	Comm. dist. Gillnet, 111

Table 11. (Cont'd.) A summary of coded wire tagging and recovery of Taku River chinook salmon tagged by the Chinook Salmon Project, 1977 to date.

DATA						RECOVERY			
Number	Young-of-the-Year	Smolt	Brood	mm	Tagging Information	Date	Age	Head Length (-) Fork Length (FL) Hideye-Pork (MF)	Recovery Type and Area
						06/19/80	1.3	730 mm (FL)	Comm. Dist. Gillnet, 111
						05/10/81	1.4	914 mm (FL)	Pt. Stepheno-Sport
						05/20/81	1.4	915 mm (FL)	Comm. Troll, Deer Harbor Scow
						08/03/81	1.4	...	Nahlin-escapement
						08/13/81	1.4	780 mm (MF)	Nakina-escapement
						08/07/81	1.4	890 mm (MF)	Nakina-escapement
						08/08/81	1.4	860 mm (MF)	Nakina-escapement
						08/12/81	1.4	780 mm (MF)	Nakina-escapement
						08/11/81	1.4	815 mm (MF)	Nakina-escapement
						08/11/81	1.4	895 mm (MF)	Nakina-escapement
						08/05/81	1.4	850 mm (MF)	Nakina-escapement
4-5-10		53	1975	79.7	Mainstem Taku, Tagged Hay, 1977 at Taku Lodge				
4-16-55	10,687		1979	68.7	Glacial Nakina River, Tagged at Inklin Jct., Oct. 1980				
4-16-56	4,101		1979	68.4	Taku River, Tagged at Inklin Jct., Oct. 1980				
4-16-57	1,498		1979	68.7	Glacial Nakina River, Tagged at Inklin Jct., Nov. 1980				
4-16-58	5,594		1978	64.8	Mainstem Taku, Tagged at Tulsequah, Sept. 1979				
4-16-59	1,066		1978	68.2	Glacial Nakina River, Tagged at Inklin Jct., Oct. 1979				

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Table 11. (Cont'd.) A summary of coded wire tagging and recovery of Taku River chinook salmon tagged by the Chinook Salmon Project, 1977 to date.

DATA						RECOVERY			
Number	Young-of-the-Year	Smolt	Brood	mm	Tagging Information	Date	Age	Head Length (-) Fork Length (FL) Mideye-Fork (MF)	Recovery Type and Area
4-16-60	4,821		1978	64.8	Mainstem Taku & Nakina Tagged at Inklin Jct. & Tulsequah, Oct. 1979				
4-16-61		1,573	1978	84.3	Taku Inlet, Tagged at Juneau, May 1980				
4-16-62		2,549	1977	66.2	Mainstem Taku, Tagged at Tulsequah, May 1979	08/12/80	1.1	345 mm (MF)	Weir, Nakina
						08/12/80	1.1	350 mm (MF)	Weir, Nakina
						08/15/81	1.2	520 mm (MF)	Weir, Nakina
						08/16/81	1.2	485 mm (MF)	Weir, Nakina
4-16-63	3,517		1979	68.4	Glacial Nakina River, Tagged at Inklin Jct., Sept. 1980				
4-17-8	5,092		1976	68.5	Nahlin River, Tagged Sept. 1977				
4-17-9	3,402		1976	68.5	Nahlin River, Tagged Sept. 1977	09/04/80	1.2	156 mm (-)	Landed, Sitka
						08/03/81	1.3	...	Nahlin-escapement
4-17-10	4,358		1976	62.9	Mainstem Taku, Tagged at Tulsequah, Oct. 1977	05/16/80	1.2	610 (TL)	Breadline-sport
4-20-[illegible]17-11	4,468		1976	62.9	Mainstem Taku, Tagged at Tulsequah, Oct. 1977	05/28/81	1.3	996 mm (FL)	Comm. Elfin Cove Scow
						08/08/81	1.3	700 mm (MF)	Nakina-escapement
4-21-15 12	4,796		1976	62.9	Mainstem Taku, Tagged at Tulsequah, Oct. 1977				
4-21-16									
4-21-1[illegible] 13	6,134		1976	62.9	Mainstem Taku, Tagged at Tulsequah, Oct. 1977	06/05/81	1.3	875 mm (FL)	Comm. Elfin Cove Scow
4-17-14	2,123		1976	...	Mainstem Taku, Tagged at Tulsequah, Oct. 1977				

(Cont'd.) A summary of coded wire tagging and recovery of Taku River chinook salmon tagged by the Chinook Salmon Project, 1977 to date.

DATA						RECOVERY			
N ıber	Young-of-the-Year	Smolt	Brood	mm	Tagging Information	Date	Age	Head Length (-) Fork Length (FL) Mideye-Fork (MF)	Recovery Type and Area
4-17-21		4,788	1976	70.3	Mainstem Taku, Tagged at Tulsequah, April 1978	08/11/79	1.1	310 mm (MF)	Weir, Nakina
						08/13/79	1.1	310 mm (MF)	Weir, Nakina
						08/20/79	1.1	310 mm (MF)	Weir, Nakina
						08/15/80	1.2	520 mm (MF)	Weir, Nakina
						05/21/81	1.3	880 mm (FL)	Comm. Deer Harbor Scow
						05/27/81	1.3	835 mm (FL)	Comm. 113 Lisianski to Surge
						06/03/81	1.3	860 mm (FL)	Comm. 116 Icy Point
						07/29/81	1.3	760 mm (MF)	Weir, Nakina
4-17-22		3,717	1976	70.3	Mainstem Taku, Tagged at Tulsequah, May 1978	08/12/80	1.2	565 mm (MF)	Weir, Nakina
						04/14/81	1.3	864 mm (TL*)	Comm. 114 Homeshore
						06/04/81	1.3	748 mm (FL)	Comm. 113 Deer Harbor Scow
						05/02/81	1.3	813 mm (FL)	Breadline-Sport
4-17-23		666	1976	70.3	Mainstem Taku, Tagged at Tulsequah, May 1978				
4-17-24		389	1976	70.3	Mainstem Taku, Tagged at Canyon Island May 1978				
4-17-28	31,376		1977	63.9	Mainstem Taku, Tagged at Tulsequah, Oct. 1978	∞/1℠/80	1.1	360 mm (MF)	Weir, Nakina
						∞/1∃/∞	1.1	350 mm (MF)	Weir, Nakina
						∞/1ˈ/81	1.2	590 mm (MF)	Weir, Nakina

* (TL) = Total Length

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Table 11. (Cont'd.) A summary of coded wire tagging and recovery of Taku River chinook salmon tagged by the Chinook Salmon Project, 1977 to date.

DATA						RECOVERY			
Number	Young-of-the-Year	Smolt	Brood	mm	Tagging Information	Date	Age	Head Length (-) Fork Length (FL) Mideye-Fork (MF)	Recovery Type and Area
						07/17/81	1.2	550 mm (MF)	Weir, Nakina
						08/17/81	1.2	440 mm (MF)	Weir, Nakina
						08/18/81	1.2	605 mm (MF)	Weir, Nakina
4-17-30	7,740		1977	63.9	Mainstem Taku, Tagged at Tulsequah, Oct. 1978	08/10/80	1.1	355 mm (MF)	Weir, Nakina
						06/27/81	1.2	...	Landed Sitka
4-19-20		3,531	1979	83.8	Taku Inlet Seining May & June 1981				
4-19-59	8,881		1978	68.2	Nakina River, Tagged at Inklin Jct., Oct. 1979	08/11/81	1.1	300 mm ...	Weir, Nakina
						08/16/81	1.1	310 mm ...	Weir, Nakina
4-19-60	10,590		1979	68.7	Glacial Nakina River, Tagged at Inklin Jct., Sept. 1980				
4-19-61	9,983		1979	68.7	Glacial Nakina River, Tagged at Inklin Jct., Sept. 1980				
4-20-1		1,663	1979	73.5	Tulsequah, May 1981				
4-20-3		4,218	1979	67.7	Tulsequah, March through May 1981				
4-21-15	5,252		1980	63.2	Glacial Nakina River Sept. 1981				
4-21-16	9,995		1980	59.8	Mainstem Taku, Sept. & Oct. 1981				
4-21-17	10,566		1980	59.8	Mainstem Taku, Oct. 1981				
4-21-18	6,260		1980	59.8	Mainstem Taku, Oct. & Nov. 1981				
4-21-20	10,539		1980	63.2	Glacial Nakina River, Sept. 1981				

Table 11. **(Cont'd.)** A summary of coded wire tagging and recovery of Taku River chinook **salmon tagged** by **the Chinook Salmon Project, 1977 to** date.

DATA						RECOVERY			
Number	Young-of-the-Year	**Smolt**	**Brood**	[illegible]	Tagging **Information**	Date	Age	Head **Length (-)** Fork Length (FL) Mideye-Fork **(MF)**	Recovery Type and Area
						ADIPOSE CLIP PLUS NO CODED **WIRE TAG** **RECOVERIES** FROM **TAKU** RIVER DRAINAGE ONLY			
						08/06/78	**1.1**	**335 mm (MF)**	**4-5-8** or **4-5-9** **weir, Nakina**
						08/10/78	**1.1**	**355 mm (MF)**	**4-5-8** or 4-5-9 **weir,** Nakina
						08/10/78	**1.1**	...	Head **missing,** **4-5-8** or **4-5-9** **weir, Nakina**
						08/12/78	**1.1**	...	Head **missing,** **4-5-8** or 4-5-9 **weir, Nakina**
						08/24/78	**1.1**	380 a **(MF)** Tag **lost**	**4-5-8** or 4-5-9 **weir, Nakina**
						08/06/79	**1.2**	...	Head **missing,** **4-5-8** or **4-5-9** weir, **Nakina**
						08/18/79	**1.2**	**545 mm (MF)**	4-5-8 or 4-5-9 weir, Nakina
						08/20/79	**1.2**	**470 mm (MF)**	**4-5-8** or **4-5-9** weir, Nakina
						08/24/79	**1.2**	470 [illegible] (MF) Tag lost	**Weir,** Nakina
						08/14/80	**1.1**	325 [illegible] (MF)	Weir, Nakina
						08/12/80	...	560 **mm (MF)**	Weir, Nakina
						08/14/80	...	600 **mm (MF)**	**Weir,** Nakina
						08/19/81	...	760 [illegible] **(MF)**	Weir, Nakina
						08/07/81	...	740 [illegible] **(MF)**	Weir, Nakina
						08/15/81	...	740 [illegible] (MF)	Weir, Nakina
						08/11/81	...	520 [illegible] **(MF)**	Weir, Nakina
						08/11/81	...	680 **mm (MF)**	Weir, Nakina
						08/07/81	**1.4**	900 **mm (MF)**	Head **missing,** Grizzly Bar, **Nakina-Data** Code **4-5-8** *or* **4-5-9**

Stikine River Studies

Introduction:

The Stikine River, which is approximately 643 kilometers long and drains an area of about 50,246 square kilometers, discharges its flow into the Pacific Ocean 20 kilometers northeast of Wrangell, Alaska. This large transboundary river, with only the lower 64 kilometers in Alaska, has waterfalls, rock slides, and velocity blocks that prevent anadromous migration into well over 50% of the watershed.

The fourth salmon cannery in southeastern Alaska was constructed 13 kilometers above the mouth of the Stikine River in 1887, but it soon became evident that this large glacial system did not support sizable runs of salmon. Thus, the cannery was moved to Wrangell Island in 1889.

Drift Gill Net Fishery:

A terminal gill net fishery has operated on the Stikine River since the late 1800's. According to Rich and Ball (1933), chinook were the most important species fished. Available commercial catch statistics for the chinook fishery are presented in Table 12. Recorded catches from 1895-1927 were by all gear types; thus, it is not possible to allocate the catch of mature Stikine River chinook.

Gill net catches of chinook in the Stikine River fishery have been recorded since 1942. Large annual variations occur in the number of immature chinook harvested after mid-June. Thus, the best catch statistics of maturing Stikine River chinook are from the late April or early May opening date through mid-June, i.e., until the gill net mesh size is reduced from 8"-9" to 5"-5½" mesh. Reduced harvests of mature chinook during the April-mid June indicated that the Stikine chinook population was depressed and a complete terminal area closure was initiated in 1978 to rebuild the run.

Escapement:

In past interviews, Tahltan informants from Telegraph Creek, British Columbia, have indicated that the Tahltan Drainage was the major chinook salmon spawning tributary of the Stikine River. Foot surveys of the Little Tahltan River, the major clearwater chinook spawning tributary of the Stikine, were conducted annually from 1956 through 1960. Aerial estimates, utilizing low flying helicopters, have been made from 1975 to the present (Table 13).

The importance of the glacial mainstem Tahltan was confirmed on August 13, 1975, when the mainstem cleared and a helicopter survey revealed 2,908 large chinook spawning between the junction with the Stikine River and the outlet stream from Tahltan Lake (Kissner 1977). Annual enumeration of spawners in the mainstem have been conducted since that time with variable results, partially associated with its glacial characteristics.

During 1981, a record 3,334 chinook salmon were observed spawning in the Little Tahltan River. An additional 1,852 were observed in the mainstem

Table 12. Commercial gill pet catch* of chinook salmon in the Stikine River district, Area 108, 1895–1980.

Year	Chinook	Year	Chinook	Year	Chinook
1895	(3,294)	1921	(1,274)	1956	9,591/7,224
1896	(3,958)	1922	(13,308)	1957	8,409/5,703
1897	(4,680)	1923	(66,853)	1958	10,901/7,215
1898	(8,565)	1924	(16,583)	1959	12,599/8,410
1899	(12,215)	1925	(4,518)	1960	7,824/4,673
1900	No Data	1926	(2,242)	1961	7,243/5,222
1901	(3,269)	1927	(1,379)	1962	7,491/4,173
1902	(3,793)	1928–1937	No Data	1963	2,107/203
1903	(181)			1964	2,911/947
1904	(3,905)	1938	(30,062)	1965	3,106/1,683
1905	(9,270)	1939–1941	No Data	1966	4,516/1,058
1906	(2,663)			1967	6,361/3,466
1907	(14,871)	1942	5,077	1968	4,604/2,570
1908	(17,572)	1943	2,994	1969	5,015/1,965
1909	(22,782)	1944	3,553	1970	2,034/224
1910	(23,113)	1945	4,795	1971	3,288/2,078
1911	(34,430)	1946	7,890	1972	7,341/4,799
1912	(25,155)	1947	5,559	1973	9,253/5,649
1913	(30,586)	1948	3,653	1974	8,197/7,006
1914	(11,247)	1949	4,822	1975	1,534/1,534
1915	(6,237)	1950	4,716	1976	1,123/1,101
1916	(4,853)	1951	5,162	1977	1,443/274
1917	(5,414)	1952	11,419	1978	513
1918	(7,367)	1953	11,331	1979	91
1919	(12,939)	1954	17,323/8,758	1980	631
1920	(25,216)	1955	12,518/8,858		

* Statistics for the years 1895–1927 may include a portion of fish taken by other forms of year.

1954–1977 - Total seasonal catch/catch through mid–June.

Sources: 1985–1927 Rich and Ball, 1933
1942–1950 USFWS Memo
1951–1959 Simpson, 1960
1960–1980 Commercial Fish statistical runs

Table 13. Peak escapement counts of chinook salmon in the Tahltan and Little Tahltan Rivers.

Year	Date	Chinook	Remarks
		LITTLE TAHLTAN RIVER	
1956	August 11	334 jacks 493 adults	Hyland Ranch to Tahltan River
1957	July 21	199	Too early - fish schooled
1958	August 06	790	3/4 mi below Hyland to 1 1/2 mi below Saloon
1959	August 07	198	Fish in poor condition - survey too late
1960	August 05	346	1/4 mi below Hyland Ranch to a mile or two below saloon
1967	...	800	Canadian survey
1975	August 13	700	Many spawned-out
1976	August 07	400	Conditions fair
1977	July 30	800	Peak spawning
1978	July 26	632	Mostly schooled
1979	July 28-Aug. 01	1,166	Peak spawning
1980	July 29	2,137	Peak spawning
1981	July 28	3,334	Peak spawning

Table 13. Peak escapement counts of chinook salmon in the Tahltan and Little Tahltan Rivers (Cont'd).

Year	Date	Chinook	Remarks
		MAINSTEM TAHLTAN RIVER	
1965	...	85	Air lifted over slide
1966	...	318	Air lifted over slide
1975	August 13	2,908	Clear
1976	August 20	120	Late
1977	July 30 & Aug. 18	0	Glacial
1978	August 08	756	Glacial
1979	August 10	2,118	Partly glacial
1980	July 29	960	Very glacial
1981	August 04	1,852	Partly glacial

Tahltan River. It is felt that many more were present but that they were unobservable in the glacial water. Approximately 550 chinook were enumerated in Beatty Creek.

Escapements into the Tahltan system have responded well since the terminal gill net closure, beginning in 1978. However, it appears that the 1982 escapement will be lower than those observed during the last 3 years, as the 1976 escapement, which should be the dominant brood in the return, was very weak.

Several other broods should remain weak, associated with the mud slide and resulting barrier to migration on the mainstem Tahltan River in 1965 and 1966. Only 85 chinook were air lifted over the barrier in 1965 and 318 in 1966. The river had cut through the barrier sufficiently to allow passage by the summer of 1967.

The mainstem, Tahltan River should be surveyed from its junction with the Stikine River upstream to the canyon about 1.6 kilometers upstream from the junction of the Little Tahltan River on about August 4th. Chinook spawning is fairly uniform throughout the survey area. The densest spawning observed occurs just upstream from the junction with Beatty Creek and just downstream from the junction with the Little Tahltan River. Chinook salmon spawning has been observed upstream from the survey area, but only in very low densities.

The Little Tahltan River should be surveyed on or about July 28. The survey should include that portion of the river from its junction with the mainstem Tahltan to a point about 16 kilometers upstream where the 762-meter contour crosses the riverbed. In years with escapements of less than 800 chinook, most of the spawning has occurred between the Saloon Lake outlet and the junction with the mainstem Tahltan. In years with large escapements, such as in 1980 and 1981, spawning was excellent throughout the survey area, with the densest spawning occurring in the Saloon area.

Beatty Creek should be surveyed on or about August 4 from its junction with the mainstem Tahltan upriver for about 8 kilometers. The spawning density is greatest near its mouth, decreasing rapidly upstream. This stream has been surveyed for about 24 kilometers above the survey area and few chinook have been observed although no barriers to migration are present.

Juvenile Chinook Studies:

During the last 5 years, 12,772 minnow trap sets have been made in various areas of the Stikine River (Table 14) to determine habitat preferences, areas of concentrations of juvenile chinook, and to capture smolts and young-of-the-year for coded wire tagging (Kissner 1978-1980, Kissner and Bethers 1981). A total of 106,830 juveniles, representing the 1976-1980 brood years, have been coded wire tagged (Table 15) and 4,604 have been sampled for age and growth studies (less than 100 actually retained).

During the spring, the Stikine River is a difficult system to capture smolts in because of its large drainage area. Water levels are constantly changing, with fluctuations of 1 foot per day being common. Limited

Table 14. Summary of minnow traps set, catch per trap, sample size and mean fork length of juvenile chinook salmon captured in various areas of the Stikine River, 1978 - 1981.

River	Date	Number of Traps	Catch Per Trap	Sample Size	Mean Fork Length mm
Stikine Mainstem	5/05/77	40	.2	...	...
Stikine Mainstem	5/25/77	40	.8	...	
Stikine Mainstem	4/19- 5/18/78	2,100	.4	750	73.9
Stikine Mainstem	9/21-11/03/79	3,039	8.0	1,468	64.4
Stikine Mainstem	9/19-11/08/80	3,120	9.7	615	63.1
Stikine Mainstem	9/18-11/01/81	3,318	13.0	1,110	57.8
Little Tahltan	7/25/78	8	59.0	48	55.9
Little Tahltan	9/06- 9/14/78	967	7.1	476	62.4
Little Tahltan	7/27- 8/02/79	120	2.1	137	57.2
Chutine	7/26/78	12	1.9	...	...
Mainstem Tahltan	7/26/78	8	3.3	...	...

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Table 15. Juvenile chinook salmon coded wire tagged in various tributaries of the Stikine River by code, brood year, and mean fork length, 1978 - 1981.

Code	Chinook Tagged	Brood Year	Dates Tagged	Mean Fork Length mm	River
4–16–33	507	1976	4/24- 5/18/78	73.9	Stikine
4–16–54	6,677	1978	10/29-11/03/79	64.4	Stikine
4–17–16	357	1976	4/24- 5/18/78	73.9	Stikine
4–17–17	420	1976	4/24- 5/18/78	73.9	Stikine
4–17–20	5,223	1977	9106- 9/10/78	63.6	Little Tahltan
4–17–25	2,819	1977	9/11- 9/14/78	63.6	Little Tahltan
4–17–26	4,420	1979	9/27- 9/30/80	63.1	Stikine
4–17–27	4,536	1979	9/30-10/18/80	63.1	Stikine
4–19–62	5,001	1979	9119- 9/26/80	63.1	Stikine
4–19–63	8,865	1979	10/18-10/29/80	63.1	Stikine
4–20– 2	7,430	1979	11/01-11/08/80	63.1	Stikine
4–20– 4	9,910	1978	9/21-10/04/79	64.4	Stikine
4–20– 5	7,577	1978	10/09-10/29/79	64.4	Stikine
4–21–11	8,643	1980	9/18- 9/27/81	57.8	Stikine
4–21–12	10,083	1980	9/27-10/01/81	57.8	Stikine
4–21–13	10,736	1980	10/01-10/09/81	57.8	Stikine
4–21–14	10,175	1980	10/09-10/27/81	57.8	Stikine
4–21–46	3,451	1980	10/27-11/01/81	57.8	Stikine

seining conducted during the 'spring of 1978 was not effective in capturing good numbers of smolts.

Fall operations are much more efficient, averaging 10 young-of-the-year per trap (Table 16). As on the Taku River, catches are best as the water drops and clears. One or 2 weeks of minnow trapping are lost each fall due to floods.

It appears that there is a general downstream movement of young-of-the-year chinook in the mainstem Stikine during the fall, similar to that observed in the Little Tahltan River (Kissner 1979). The movement is probably most affected by changes in water level. Falling water levels reduce the amount of habitat available, thus forcing fish to move downstream to seek new rearing areas. This was especially apparent during 1981 after a period of low water in late September and early October.

The Stikine River's chinook are similar in size to chinook in the Taku River during all stages of their freshwater life history (Table 17). The exception was the detection of larger young-of-the-year, averaging 71.5mm F.L., moving downstream in the Little Tahltan River during September 1978. A portion of these juveniles were quite silvery and it might be argued that these were smolts migrating to the estuary in the fall. If this is the case, very few must survive, as the adult scales do not indicate outmigration at age zero.

The mean size of juveniles from the 1980 brood captured and coded wire tagged on the mainstem Stikine during 1981 was about 6 mm smaller than those observed during 4 other brood years. Because the density of juveniles was also the highest observed, the smaller size may be a function of increased juvenile competition for food and space,

To date, only one coded wire tagged chinook from .wild stock tagging conducted during the spring of 1978 has been recovered. This was from a group of only 1,284 smolts tagged (Table 18). Good numbers of recoveries are not expected until 1983.

Alsek River Studies

Introduction:

The Alsek is a large glacial river system with headwaters in the Yukon Territory. It flows south through British Columbia before flowing into the Gulf of Alaska, about 96 kilometers southeast of Yakutat. Only the lower 32 kilometers are located in Alaska.

Drift Gill Net Fishery:

A commercial gill net fishery for chinook began about 1901 (Moser 1902) and catch records are available from 1908 to the present (Table 19). Unlike the terminal chinook fisheries which operated on the Taku and Stikine Rivers, the Alsek fishery is conducted almost entirely inriver. Thus, most all of the chinook caught are maturing Alsek fish.

Table 16. Summary of minnow traps checked, chinook smolts tagged, and mean catch per trap, by brood year during spring and fall coded wire tagging projects on the Stikine River.

SPRING					FALL				
Brood Year	Area	Minnow Traps Set	Chinook Smolts Tagged	Mean Catch Per Trap	Brood Year	Area	Minnow Traps Set	Chinook Juveniles Tagged	Mean Catch Per Trap
1976	U.S. Border	2,110	777	.37	1976	...	...	...	...
	Mouth	?	507	?					
1977	...	...	...	...	1977	Little Tahltan	967	6,896	7.13
						*Little Tahltan	*	1,146	*
1978	...	...	...	...	1978	Anuk	3,039	24,164	7.95
1979	...	...	...	...	1979	Anuk	3,120	30,252	9.70
1980	...	...	...	...	1980	Anuk	3,318	43,088	12.99
TOTALS		2,110	1,284	.37			10,444	105,546	10.00

* Weir

Table 17. Sample size/mean fork length in mm by time period of chinook juveniles sampled on the Stikine River, 1978 - 1981.

Brood Year	Area	Young - of - the - Year					Smolts			
		July	Aug.	Sept.	Oct.	Nov.	March	April	May	June
1976	U.S.-Canadian Border	...	...	...	...	...	...	151/73.0	599/74.2	
1977	Little Tahltan Minnow Trap	48155.9	...	476162.4	...	...	...	...	...	...
1977	Little Tahltan Weir	...	...	181/71.5	...	...	...	...	...	...
1978	Little Tahltan	137157.2	...	...	...	...	...	...	...	...
1978	Anuk-Mainstem	...	...	400/63.8	1068164.6	...	...	...	...	...
1979	Anuk-Mainstem	...	...	109/62.2	300/63.2	200/63.4	...	...	...	...
1980	Anuk-Mainstem	...	...	452156.3	658158.9	...	...	...	...	...

Table 18. A summary of coded wire tagging and recovery of Stikine River chinook salmon tagged by the Chinook Salmon Project, 1978 to date.

	DATA					RECOVERY			
Number	Young-of-the-Year	Smolt	Brood	mm	Tagging Information	Date	Age	Head Length (-) Fork Length (FL) Mideye-Fork (MF)	Recovery Type and Area
4-16-33		507	1976	73.9	Mainstem Stikine, Tagged at River mouth by Coho Research, May 1978				
4-16-54	6,677		1978	64.4	Mainstem Stikine, Tagged near Porcupine River mouth, Oct. 1979				
4-17-16		357	1976	73.9	Mainstem Stikine, Tagged near Iskut River mouth May 1978	09/16/80	1.2	170 mm (-)	Comm. Dist., Troll landed Sitka
4-17-17		420	1976	73.9	Mainstem Stikine, Tagged near Iskut River mouth				
4-17-20	5,223		1977	63.6	Little Tahltan, Tagged Sept. 1978				
4-17-25	2,819		1977	63.6	Little Tahltan, Tagged Sept. 1978				
4-17-26	4,420		1979	63.1	Stikine River, Tagged near Porcupine river, Sept. 1980				
4-17-27	4,536		1979	63.1	Stikine River, Tagged near Porcupine River, Oct. 1980				
4-19-62	5,001		1979	63.1	Stikine River, Tagged near Porcupine River, Sept. 1980				
4-19-63	8,865		1979	63.1	Stikine River, Tagged near Porcupine River, Sept. 1980				

Table 18. (Cont'd.) A summary of coded wire tagging and recovery of Stikine River chinook salmon tagged by the Chinook Salmon Project, 1978 to date.

	DATA					RECOVERY			
Number	Young-of-the-Year	Smolt	Brood	mm	Tagging Information	Date	Age	Head Length (-) Pork Length (FL) Hideye-Fork (MF)	Recovery Type and Area
4-20-2	7,430		1979	63.1	Stikine River, Tagged near Porcupine River, Nov. 1980				
4-20-4	9,910		1978	64.4	Mainstem Stikine, Tagged near Porcupine River mouth, Sept. 1979				
4-20-5	7,577		1978	64.4	Mainstem Stikine, Tagged near Porcupine River mouth, Oct. 1979				
4-21-11	8,643		1980	57.8	Mainstem Stikine, Tagged near Porcupine River, Sept. 1981				
4-21-12	10,083		1980	57.8	Mainstem Stikine, Tagged near Porcupine River, Sept. & Oct. 1981				
4-21-13	10,736		1980	57.8	Mainstem Stikine, Tagged near Porcupine River, Oct. 1981				
4-21-14	10,175		1980	57.8	Mainstem Stikine, Tagged near Porcupine River, Oct. 1981				
4-21-46	3,451		1980	57.8	Mainstem Stikine Tagged near Porcupine River, Oct. & Nov. 1981				

Table 19. Set net catch of chinook salmon in the Alsek River, 1908-1981.

Year	Chinook	Year	Chinook	Year	Chinook
1908	6,769	1933	12,427	1957	1,800
1909	...	1934	16,893	1958	896
1910	2,340	1935	6,869	1959	967
1911	316	1936	Poor catch	1960	525
1912	2,098	1937	Light catch-	1961	2,120
1913	4,066		good escapement	1962	2,278
1914	11,500	1938	5,863	1963	125
1915	8,340	1939	6,318	1964	591
1916	386	1940	1,775	1965	719
1917	14,372	1941	3,858	1966	934
1918	11,708	1942	No fishing	1967	225
1919	13,031	1943	No fishing	1968	215
1920	22,882	1944	2,173	1969	685
1921	10,683	1945	10,662	1970	1,128
1922	7,257	1946	8,579	1971	1,222
1923	14,228	1947	6,391	1972	1,827
1924	19,055	1948	8,363	1973	1,754
1925	19,130	1949	No cannery	1974	1,162
1926	16,824	1950	No cannery	1975	1,379
1927	8,153	1951	184	1976	512
1928	...	1952	2,165	1977	1,402
1929	...	1953	1,534	1978	2,441
1930	10,305	1954	1,833	1979	2,525
1931	...	1955	2,881	1980	1,382
1932	...	1956	4,382	1981	761

Sources: 1908-1927 Rich and Ball, 1933
1930-1950 Alaska Fish and Fur Seal Industries
1951-1959 Simpson, 1960
1960-1981 Commercial Fish statistical runs.

The chinook catch has been extremely variable in the last 73 years, ranging from 22,882 to 125 fish. Patt of the variability was caused by the lack of or difficulty in transportation of fish to the market and partly by regulation changes, mostly affecting the opening date.

To determine if the chinook stock had been rebuilt, experimental early openings (May 15) were conducted during 1961 and 1962. The catches during these 2 years were still low and it was concluded that the Alsek chinook stock was at a low level of abundance.

A terminal gill net fishery for chinook still operates on the Alsek River. Large mesh gear is permitted and the fishery opens on the first Monday in June.

Escapement:

Limited escapement data has been collected on various tributaries of the Alsek River since 1962 (Table 20). Before 1976, escapement estimates were usually made utilizing fixed wing aircraft. Since that time, the Canadian Department of Fisheries and Oceans has operated a weir at the junction of the Kluckshu and Tatshenshini Rivets to enumerate chinook and sockeye into the Kluckshu drainage.

The Alaska Department of Fish and Game began enumerating chinook utilizing low flying helicopters during 1981. The survey was conducted on August 10th, about 10 days past the peak of spawning. It is recommended that Mile 112 Creek and the Kluckshu, Blanchard, and Takhanne Rivers be surveyed on about August 1 by helicopter.

Summary of Escapements in Other Areas of Southeastern Alaska

A summary of chinook salmon systems monitored annually is presented in Table 21.

Additional helicopter surveys of the North Bradfield and Harding Rivers and Grant Creek were made in 1981 to determine if these systems were suitable for annual escapement surveys. Because of the small numbers of chinook observed in these systems, and because glacial silt limits visibility, annual enumeration should not be conducted in these three systems.

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Table 20. Peak escapement counts of chinook salmon in the Alsek River 1962-1981.

Year	Village System	Mile 112 Creek	Kluckshu System	Blanchard System	Takhanne River
1962	...	...	86	...	...
1963	...	...	...	...	...
1964	...	...	20	1	
1965	...	...	100	100	250
1966	...	...	1,000	100	200
1967	...	...	1,500	200	275
1968	...	...	1,700	425	225
1969	...	72	700	250	250
1970	100	...	500	100	100
1971	50	60	300	...	...
1972	...	32	1,100	...	250
1973	...	...	...	...	49
1974	14	183	62	52	132
1975	17	...	58	81	177
1976	...	...	1,278 weir	...	...
1977	...	...	3,144 weir	...	...
1978	...	...	2,976 weir	...	...
1979	...	...	4,404 weir	...	...
1980	...	...	2,637 weir	...	...
1981	0	...	2,113 weir	35	11

Table 21. Peak escapement counts of chinook salmon in southeast Alaska rivers.

Year	Chinook	Method
	Unuk River	
1961	673	Foot
1962	331	Air
1963	1,070	Air
1968	650	Air
1969	475	Air
1972	885	Air
1973	182	Air
1975	55	Helicopter
1976	198	Helicopter
1977	1,166	Helicopter, weir-foot
1978	1,765	Helicopter, weir-foot
1979	576	Helicopter, weir-foot
1980	1,052	Helicopter, weir-foot
1981	731	Helicopter, weir-foot
	Chickamin River	
1961	336	Ground
1962	775	Air
1963	450	Air
1969	345	Air
1972	860	Air
1973	229	Helicopter
1974	176	Helicopter
1975	351	Helicopter
1976	122	Helicopter
1977	235	Helicopter
1978	181	Helicopter
1979	140	Helicopter
1980	261	Helicopter
1981	275	Helicopter

Table 21. **(Cont'd.)** Peak escapement counts of chinook salmon in southeast **Alaska** rivers.

Year	Chinook	Method
	King Salmon River (Admiralty Island)	
1957	200	Foot
1961	117	Foot
1971	94	Foot
1972	90	Foot
1973	211	Foot
1974	104	Foot
1975	42	Foot
1976	65	Foot, Helicopter
1977	134	Foot, Helicopter
1978	57	Foot, Helicopter
1979	88	Foot, Helicopter
1980	70	Foot, Helicopter
1981	101	Foot, Helicopter
	Blossom River	
1961	68	Ground
1963	825	Air
1972	700	Air
1974	166	Helicopter
1975	153	Helicopter
1976	68	Helicopter
1977	112	Helicopter
1978	143	Helicopter
1979	54	Helicopter
1980	89	Helicopter
1981	159	Helicopter
	Keta River	
1948	500	Foot
1950	210	Foot
1951	120	Foot
1952	462	Foot
1953	156	Foot
1954	300	Air
1955	1,000*	Air
1956	1,500*	Air
1957	500*	Air
1961	44	Ground
1975	203	Helicopter
1976	84	Helicopter
1977	230	Helicopter
1978	392	Helicopter
1979	426	Helicopter
1980	192	Helicopter
1981	329	Helicopter

Table 21. (Cont'd.) Peak escapement counts of chinook salmon in southeast Alaska rivers.

Year	Chinook	Method
	Chilkat River (Big Boulder Creek)	
1960	316	Foot
1966	330	Foot
1967	150	Foot
1968	259	Foot
1970	176	Foot
1974	0	Foot
1975	21	Foot
1976	25	Foot, Helicopter
1977	25	Foot, Helicopter
1981	187	Foot, Helicopter
	Situk River	
1928	1,224	Weir
1929	3,559	Weir
1930	1,455	Weir
1931	2,967	Weir
1932	1,978	Weir
1933	...	...
1934	1,486	Weir
1935	638**	Weir
1936	816	Weir
1937	1,290**	Weir
1938	2,668**	Weir
1939	2,117	Weir
1940	903	Weir
1941	2,594	Weir
1942	2,543	Weir
1943	3,546**	Weir
1944	2,906	Weir
1945	1,458	Weir
1946	4,284	Weir
1947	5,077	Weir
1948	3,744	Weir
1949	1,978	Weir
1950	2,011	Weir
1951	2,780	Weir
1952	1,459	Weir
1953	1,040	Weir
1954	2,101	Weir
1955	1,571	Weir
1971	964	Weir
1972	400	Float

Table 21. (Cont'd.) Peak escapement counts of chinook salmon in southeast Alaska rivers.

Year	Chinook	Method
	Situk River (Cont'd)	
1973	510	Float
1974	702	Float
1975	1,180	Float
1976	1,933	Weir
1977	1,872	Weir
1978	1,103	Weir
1979	1,754	Weir
1980	1,125**	Weir
1981	807**	Weir

* Probably some chum salmon.
** Weir out part of the time.

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ACKNOWLEDGEMENTS

The author would like to acknowledge the following individuals for assistance in field activities conducted from 1972 through 1981.

Mark Anderson
Diane Bartlett
Mike **Bethers**
Albert Bixby
Robert Bosworth
Jan Conitz
Scott Dale
Alan Davis
Larry Derby
Heather Derby
Joseph **Donohue**
Steven Elliott
Kirk Fink
David Fiorito
Steven Ford
Janet Hall
Robin **Herdman**
Kim Hodgson
Jeff Jeffers
Ed Jones
John Longworth
Brian Lynch
David **Magnus**
Robert Miller
Lee **Neimark**
Stephen Nelson
Ellen Norton
Kristine Norosz
Paul **O'Brien**
Jeff Orth
Lenard Parisien
Meta Parker
Charles Peters
Rose Piper
Rick Reed
Marty Remund
Bev Richardson
Ted Schad
Andrew Smoker
Barbara Staake
John **Stotka**
Peter Sullivan
John Svenson
Reed Thacker
Jim Thompson
Phil Timpany
Gary Timothy
Joan Todd
Joseph Urbani
Ken Wiley
Jill Wiley
Barry **Wiseman**
Shirley **Wiseman**
Gordy Woods

Special acknowledgement and thanks go to Robert H. Armstrong for his support and the many stimulating discussions that aided in formation of this project's direction. The author is also indebted to Rupert Andrews, Louis Bandirola, Don Stewart, and Roger **Wadman** for their support, encouragement, advice, and assistance.

APPENDIX

Appendix I. Timing of die-off of female chinook salmon at the Nakina carcass weir 1973-1981.

DATE	1973	1974	1975	1976	1977	1978	1979	1980	1981
July 27	...	...	...	...	...	2	...	...	...
28	...	...	...	...	3	1	...	...	...
29	...	...	...	...	4	0	...	...	1
30	...	...	...	...	3	2	2	1	1
31	...	...	...	...	2	1	2	3	9
Aug. 1	...	...	...	...	8	1	0	1	5
2	...	...	...	...	12	5	0	1	2
3	5	...	...	...	13	7	0	4	16
4	5	...	...	...	35	9	5	8	18
5	3	...	...	...	40	11	4	8	25
6	5	1	...	...	53	11	2	14	34
7	10	2	1	...	69	12	6	27	43
8	17	8	1	28	141	16	3	30	78
9	17	8	1	29	113	17	10	40	63
10	37	6	1	41	126	26	10	30	80
11	37	13	3	46	135	17	9	63	104
12	36	16	8	43	57	27	18	64	91
13	42	26	2	36	89	17	20	63	114
14	44	21	5	14	53	5	26	68	99
15	54	52	1	39	70	6	15	63	90
16	30	38	7	29	39	4	22	34	74
17	49	70	8	23	35	3	25	56	35
18	31	33	5	20	18	3	25	21	29
19	57	64	5	14	12	2	10	36	17
20	33	28	8	19	2	0	19	12	20
21	54	20	3	5	9	1	13	3	13
22	36	14	3	15	2	0	14	4	5
23	15	...	3	2	1	1	12	0	...
24	...	...	4	...	...	0	2	...	...
TOTAL	617	420	69	403	1,144	207	274	654	1,066

Appendix II. Timing of die-off of male chinook salmon at the Nakina weir 1973-1981.

DATE	1973	1974	1975	1976	1977	1978	1979	1980	1981
July 27	...	...	...	...	...	7	...	...	...
28	...	...	...	...	4	2	...	3	...
29	...	...	...	...	7	5	...	0	4
30	...	...	...	...	8	7	1	1	5
31	...	...	...	...	17	3	6	3	6
Aug. 1	...	...	...	...	14	15	9	4	4
2	...	...	...	...	28	20	3	7	11
3	4	...	1	...	38	32	9	7	11
4	8	...	1	...	56	59	9	11	18
5	15	...	1	...	94	54	14	23	43
6	41	27	2	...	134	85	17	35	61
7	55	18	8	...	155	100	33	59	80
8	86	28	6	63	213	152	46	69	85
9	95	29	13	78	147	142	55	90	93
10	116	66	16	146	194	243	74	119	98
11	94	101	20	114	204	208	109	139	121
12	133	89	35	152	187	274	109	145	91
13	141	159	27	84	188	233	130	139	104
14	133	177	64	27	116	227	212	106	82
15	138	183	63	34	126	246	195	123	71
16	92	206	60	46	89	222	212	89	64
17	116	202	87	36	78	212	197	125	64
18	83	168	81	24	38	214	207	75	49
19	123	147	73	29	44	138	219	87	45
20	72	123	69	19	24	108	186	51	21
21	100	65	62	10	20	94	146	43	24
22	46	54	60	19	8	84	131	26	10
23	22	...	57	4	9	107	109	9	...
24	...	...	58	...	...	51	28	...	...
TOTAL	1,713	1,842	864	885	2,240	3,344	2,466	1,588	1,265

Appendix III. Length frequency of male chinook sampled at the Nakina carcass weir.

Mid-Eye to Fork (mm)	1956	1957	1958	1959	1973	1974	1975	1976	1977	1978	1979	1980	1981
200	1	0	0	0	0	0	0	0	0	0	0	0	0
225	3	1	3	3	1	0	1	0	0	0	0	0	0
250	34	26	46	20	7	10	1	3	2	1	1	6	1
275	141	96	162	132	24	100	31	7	54	36	24	35	14
300	235	168	289	328	114	274	73	27	290	462	134	102	52
325	362	305	301	275	108	254	80	16	432	853	267	175	51
350	82	66	262	120	97	143	52	10	343	616	180	107	42
375	57	64	192	41	68	41	32	12	142	239	65	39	32
400	83	144	202	61	71	56	63	15	46	86	48	18	23
425	129	131	215	98	99	68	81	28	44	36	94	25	35
450	330	365	207	111	120	110	76	32	50	63	188	47	39
475	146	141	271	132	94	107	72	57	35	100	204	64	45
500	140	165	262	170	100	94	57	57	41	150	288	99	62
525	103	113	202	148	91	68	46	71	32	162	208	88	40
550	138	136	145	182	93	55	28	69	28	147	168	86	42
575	46	60	86	99	78	44	31	52	21	97	97	80	54
600	36	30	70	100	49	49	18	39	15	102	81	60	41
625	56	77	68	71	38	31	14	35	24	33	34	52	38
650	22	30	89	90	39	36	14	34	22	18	36	59	44
675	17	26	69	86	27	25	9	28	33	14	36	49	40
700	44	43	67	87	35	42	9	34	48	8	40	48	55
725	21	16	35	68	34	37	10	32	52	9	58	48	57
750	24	18	29	66	37	45	9	22	67	10	53	49	59
775	46	56	29	62	28	21	12	26	62	4	37	30	39
800	19	27	27	58	27	23	12	16	50	5	34	43	46
825	19	24	22	81	28	21	8	21	26	10	22	20	29
850	11	8	29	66	35	16	13	13	48	13	22	27	39
875	7	7	12	68	39	21	5	14	42	10	8	25	47
900	1	0	9	37	49	17	13	11	57	11	7	27	57
925	0	0	3	14	35	16	7	12	46	20	14	25	49
950	0	0	2	4	24	8	7	11	46	9	7	28	49
975	0	0	0	1	22	11	3	6	41	20	8	27	45
TOTAL	2,353	2,343	3,405	2,879	1,711	1,843	887	810	2,239	3,344	2,463	1,588	1,266

Appendix IV. Length frequency of female chinook sampled at the Nakina carcass weir.

Mid-Eye to Fork (mm)	1956	1957	1958	1959	1973	1974	1975	1976	1977	1978	1979	1980	1981
575	7	3	0	3	0	0	0	1	0	0	0	0	0
600	3	5	2	6	0	0	0	2	0	0	0	0	0
625	6	3	9	10	0	2	0	2	0	0	0	1	0
650	16	20	13	17	2	2	0	4	2	0	2	1	3
675	29	17	38	42	3	1	3	9	4	1	5	14	6
700	44	28	66	93	10	22	8	21	13	6	12	27	27
725	46	49	55	142	17	21	3	25	38	1	34	47	33
750	69	56	76	192	43	53	12	60	66	8	39	69	69
775	66	52	67	197	59	52	4	51	112	13	44	82	86
800	87	125	87	238	112	90	16	71	175	28	51	99	153
825	28	29	36	156	108	64	11	56	203	26	34	77	186
850	15	13	21	71	150	70	7	51	219	36	19	98	201
875	4	2	5	18	77	28	4	22	171	41	17	75	150
900	3	1	2	5	22	11	0	6	96	33	8	49	109
925	0	0	0	1	6	4	1	3	34	11	5	9	28
950	1	0	1	0	3	0	0	0	8	2	1	6	12
975	0	0	0	0	2	0	0	1	2	1	0	0	3
TOTAL	424	403	*478*	1,191	614	420	69	385	1,143	207	271	654	1,066

Appendix V. Minnow traps checked, chinook smolts tagged, recaptures and tag retention by date on the Taku River, 1981.

Date	Minnow Traps Checked	Number Tagged	Recaptures		Cumulative Tagged Fish Released to Date	CWT Code
			Total	No. Tags Retained		
3/18	34	...	...	...	...	...
3/19	91	...	...	...	...	...
3/20	88	...	...	...	...	...
3/21	81	...	...	...	...	...
3/22	93	540	15	15	540	4-20-3
3/23	55	...	...	...	...	...
3/24	62	...	...	...	...	...
3/25	71	...	...	...	...	...
3/26	54	...	...	...	...	...
3/27	38	456	6	5	996	4-20-3
3/28	24	...	...	...	...	...
3/29	38	...	...	...	...	...
3/30	55	...	...	...	...	...
3/31	62	...	...	...	...	...
4/01	63	...	...	...	...	...
4/02	65	...	...	...	...	...
4/03	65	453	6	6	1,449	4-20-3
4/04	65	...	...	...	...	
4/05	76	...	...	...	...	
4/06	78	...	...	...	...	
4/07	81	...	...	...	...	
4/08	110	...	...	...	...	...
4/09	86	668	4	4	2,117	4-20-3
4/13	85	...	...	...	...	
4/14	96	...	...	...	...	...
4/16	113	579	11	10	2,696	4-20-3
4/17	107	...	...	...	...	
4/18	119	...	...	...	...	...
4/19	136	...	...	...	...	...
4/20	112	...	...	...	...	...
4/21	23	...	...	...	...	...
4/22	17	767	17	16	3,463	4-20-3
4/23	67	326	6	6	3,789	4-20-3
4/24	57	...	...	...	...	...
4/25	26	...	...	...	...	...
4/26	72	...	...	...	...	...
4/27	55	...	...	...	...	...
4/28	65	...	...	...	...	...
4/29	94	314	10	9	4,103	4-20-3
4/30	92	...	...	...	...	...
5/01	126	...	...	...	...	...
5/02	115	...	...	...	...	...
5/03	146	...	...	...	...	...
5/04	137	115	12	12	4,218	4-20-3
5/04	...	348	...	...	4,566	4-20-1

Appendix V. (Cont'd.) Minnow traps checked, chinook smolts tagged, recaptures and tag retention by date on the Taku River, 1981.

Date	Minnow Traps Checked	Number Tagged	Recaptures		Cumulative Tagged Fish Released to Date	CWT Code
			Total	No. Tags Retained		
5/05	123	...	...	...	...	...
5/06	149	...	...	...	...	...
5/07	133	587	13	13	5,153	4-20-1
5/08	49	...	...	...	...	...
5/09	91	...	...	...	...	...
5/10	64	...	...	...	...	...
5/11	72	418	16	15	5,571	4-20-1
5/12	102	...	...	...	...	...
5/13	91	280	9	8	5,851	4-20-1

Appendix VI. Minnow traps checked, young-of-the-year chinook tagged recaptures and tag retention by date on the Glacial Nakina and Mainstem Taku River, 1981.

Date	Minnow Traps Checked	Number Tagged	Recaptures		Cumulative Tagged Fish Released to Date	CWT Code
			Total	No. Tags Retained		
9/04	32	1,170	...	...	1,170	4-21-20
9/05	31	1,031	...	...	2,201	4-21-20
9/06	49	2,197	...	...	4,398	4-21-20
9/18	29	562	...	...	4,960	4-21-20
9/19	20	736	...	...	5,696	4-21-20
9/20	31	829	...	...	6,525	4-21-20
9/21	31	978	...	...	7,503	4-21-20
9/22	43	1,258	...	...	8,761	4-21-20
9/23	55	1,778	...	...	10,539	4-21-20
9/23	...	573	...	...	11,112	4-21-15
9/24	51	1,734	...	...	12,846	4-21-15
9/25	49	1,599	...	...	14,445	4-21-15
9/26	44	1,346	...	...	15,791	4-21-15
9/28	35	900	4	4	16,691	4-21-16
9/29	40	1,207	4	3	17,898	4-21-16
9/30	38	1,177	3	3	19,075	4-21-16
10/01	38	670	2	2	19,745	4-21-16
10/02	38	1,017	6	6	20,762	4-21-16
10/03	38	959	4	4	21,721	4-21-16
10/04	45	1,035	5	5	22,756	4-21-16
10/05	41	891	2	2	23,647	4-21-16
10/06	42	1,269	10	10	24,916	4-21-16
10/07	47	870	6	5	25,786	4-21-16
10/07	...	692	...	...	26,478	4-21-17
10/08	47	1,549	2	2	28,027	4-21-17
10/09	47	1,393	4	4	29,420	4-21-17
10/10	50	1,250	4	4	30,670	4-21-17
10/11	48	1,149	6	6	31,819	4-21-17
10/12	48	1,070	12	11	32,889	4-21-17
10/13	48	1,579	14	13	34,468	4-21-17
10/14	38	567	8	7	35,035	4-21-17
10/22	30	589	6	6	35,624	4-21-17
10/23	30	728	15	15	36,352	4-21-17
10/24	30	1,142	9	8	37,494	4-21-18
10/25	30	412	2	2	37,906	4-21-18
10/29	34	1,754	30	28	39,660	4-21-18
10/30	34	764	13	13	40,424	4-21-18
10/31	34	759	10	9	41,183	4-21-18
11/01	44	788	13	13	41,971	4-21-18
11/02	44	641	8	8	42,612	4-21-18
TOTALS	1,503	42,612	202	193		

95.5% Tag Retention

Appendix VII. Minnow traps checked, young-of-the-year chinook tagged, recaptures and tag retention by date on the Stikine River, 1981.

Date	Minnow Traps Checked	Number Tagged	Recaptures		Cumulitive Tagged Fish Released to Date	CWT Code
			Total	No. Tags Retained		
9/18	29	203	0	0	203	4-21-11
9/20	160	392	0	0	595	4-21-11
9/21	106	1,107	0	0	1,702	4-21-11
9/22	135	1,200	1	0	2,902	4-21-11
9/23	123	1,317	1	1	4,219	4-21-11
9/24	110	1,246	3	3	5,465	4-21-11
9/25	37	523	0	0	5,988	4-21-11
9/26	100	1,028	2	2	7,016	4-21-11
9/27	109	1,627	1	1	8,643	4-21-11
9/27	...	263	...	...	8.906	4-21-12
9/28	112	2,832	11	10	11,738	4-21-12
9/29	140	2,491	8	6	14,229	4-21-12
9/30	135	2,581	12	12	16,810	4-21-12
10/01	37	1,916	19	17	18,726	4-21-12
10/01	...	75	...	...	18,801	4-21-13
10/03	146	1,364	8	8	20,165	4-21-13
10/04	119	2,426	8	8	22,591	4-21-13
10/05	113	1,716	3	3	24,307	4-21-13
10/06	91	1,461	3	3	25,768	4-21-13
10/07	101	1,612	0	0	27,380	4-21-13
10/08	95	2,048	12	10	29,428	4-21-13
10/09	126	34	6	6	29,462	4-21-13
10/09	...	2,105	...	...	31,567	4-21-14
10/10	119	2,837	205	192	34,404	4-21-14
10/11	80	1,826	144	135	36,230	4-21-14
10/13	98	1,526	82	79	37,756	4-21-14
10/14	95	1,144	1	1	38,900	4-21-14
10/24	275	577	10	10	39,477	4-21-14
10/27	178	160	35	30	39,637	4-21-14
10/27	...	298	...	...	39,935	4-21-46
10/30	253	1,368	26	22	41,303	4-21-46
10/31	78	924	21	19	42,227	4-21-46
11/01	18	861	18	17	43,088	4-21-46
TOTALS	3,318		640	595		

93.02 Tag Retention

Appendix VIII. Situk River catch, escapement and minimum total run, 1915-1981.

Year	Catch	Weir Escapement	Total Minimum Run
1915	836	...	...
1916	931	...	...
1917	2,499	...	...
1918	1,036	...	...
1919	316	...	...
1920	782	...	...
1921	1,952	...	...
1922	2,118	...	...
1923	1,761	...	...
1924	1,351	...	...
1925	1,087	...	...
1926	1,851	...	...
1927	1,687	...	...
1928	...	1,224	...
1929	...	3,559	...
1930	...	1,455	...
1931	...	2,967	...
1932	...	1,978	...
1933	267	No Weir	...
1934	450	1,486	1,936
1935	558	638**	1,196
1936	...	816	...
1937	...	1,290**	...
1938	1,220	2,668**	3,888
1939	495	2,117	2,612
1940	164	903	1,067
1941	390	2,594	2,984
1942	430	2,543	2,973
1943	947	3,546**	4,493
1944	844	2,906	3,750
1945	692	1,458	2,150
1946	1,468	4,284	5,752
1947	885	5,077	5,962
1948	694	3,744	4,438
1949	410	1,978	2,388
1950	378	2,011	2,389
1951	948	2,780	3,728
1952	225	1,459	1,684
1953	378	1,040	1,418
1954	314	2,101	2,415
1955	740	1,571	2,311
1956	1,867	...	...
1957	1,796	1,500*	...
1958	187	300*	...
1959	426	...	

Appendix VIII. (Cont'd.) Situk River catch, escapement and minimum total run, 1915-1981.

Year	Catch	Weir Escapement	Total Minimum Run
1960	312	500*	...
1961	368	400*	...
1962	337	1,000*	...
1963	459	...	...
1964	706	725*	...
1965	442	1,500*	...
1966	410	800*	...
1967	203	200*	...
1968	312	700*	...
1969	1,020	2,500*	...
1970	927	1,100*	...
1971	473	964	1,437
1972	303	400F	703
1973	752	510F	1,262
1974	791	702F	1,493
1975	562	1,180F	1,742
1976	1,002	1,933	2,935
1977	833	1,872	2,705
1978	382	1,103	1,485
1979	1,028	1,754	2,782
1980	971	1,125**	2,096
1981	859	807**	1,666

* Peak aerial survey
** Weir out part of the time
F Float Survey