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REPORT OF THE JOINT COHO TECHNICAL COMMITTEE TO THE PACIFIC SALMON COMMISSION

TECHNICAL COMMITTEE ON COHO

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June 20, 1986

EXECUTIVE SUMMARY
Joint Coho Technical Committee Report

This report was prepared by the Joint Coho Technical Committee to encapsulate results of 1985 fisheries harvesting coho stocks north of Cape Falcon, Oregon. Available information on catch levels for ocean and inside fisheries and escapements are presented.

Coastwide coho catches are summarized in Table 1. Data are not available to determine stock–specific impacts of mixed–stock fisheries.

Detailed information on the conduct of Southeast Alaskan, British Columbia and Washington/Oregon coho fisheries and stock assessments are contained in reports attached to this executive summary.

FISHERIES SPECIFICALLY REFERENCED IN THE COHO ANNEX

WEST COAST VANCOUVER ISLAND TROLL

A total of 1.404 million coho were caught in this fishery which was under a catch ceiling of 1.75 million. This compares with the 1980–84 average catch of 1.844 million coho. In addition this fishery caught 2.5 million pinks, 1.1 million sockeye, 358,000 chinook and 275,000 chum salmon.

CANADIAN JUAN DE FUCA NET FISHERY (Area 20)

The coho catch in the Juan de Fuca net fishery was 232,000 which was well above the 1980–84 average of 109,000. The catch occurred incidentally in IPSFC fisheries on sockeye and pink. Peak catches were in the first opening in July.

U.S. NET FISHERIES IN AREAS 7, 7A and the STRAIT OF JUAN DE FUCA

As required by section 3 of the Coho Annex, no net fisheries directed at coho salmon occurred in Areas 7 and 7A. A total of 116,400 coho were harvested in northern Puget Sound (Areas 6, 7 and 7A) during fisheries directed at Fraser River sockeye and pink salmon, compared to a 1980–84 average of 76,000. An additional catch of 25,500 coho was taken in Areas 7 and 7A during a fishery directed at chum salmon during late October.

Coho catches by nontreaty and treaty Indian net fisheries in the Strait of Juan de Fuca (Areas 4B, 5 and 6C) occurred during fisheries directed at Fraser River sockeye and pink salmon. As in the years prior to enactment of the Pacific Salmon Treaty, treaty Indian net fisheries directed at coho and chum were conducted by the Makah and Klallam Tribes in the Strait of Juan de Fuca. The U.S. coho catch in the Strait of Juan de Fuca during IPSFC controlled fisheries was 59,200 fish, compared to a 1980–84 average of 25,600 fish. A total of 25,000 coho were harvested during Strait of Juan de Fuca treaty Indian net fisheries directed at coho and chum salmon, 25% below the 1980–84 average.

COHO HARVESTS BY OTHER FISHERIES

SOUTHEAST ALASKA

Troll – Due to chinook management considerations, the troll coho season was delayed until July 1 from the normal June 15th opening. The total catch of 1,588,700 coho was 40% larger than the 1984 harvest and 50% above the 1980–84 average.

Net – Coho are harvested by gillnets in Southeast Alaska during directed coho fisheries and fisheries targeting on other species. The 1985 gillnet (setnets and driftnets combined) coho catch was 508,900 fish. Coho are taken incidentally in purse seine fisheries directed at sockeye, pink and chum. Seine fisheries harvested 386,500 coho in 1985. The total southeast Alaska net catch was 16% higher than 1984 and 21% above the 1980– 84 average.

Sport – Final sport catches of coho for 1985 are not available at this time. The catch of coho is estimated to be similar to the 1982–84 average of 56,000 fish.

BRITISH COLUMBIA

North Coast Net Fisheries – There were no directed net fisheries for coho in the north coast in 1985. A total of 261,000 coho were caught incidentally in fisheries targeting on sockeye, pink and chum. This compares with the 1980–1984 average of 272,000 coho and the 1970–79 average of 381,000 coho. Directed coho net fisheries have been almost entirely curtailed since the late 1970's.

Johnstone Strait Net Fishery – The 1985 coho catch by this fishery was 148,000 fish. This was slightly less than the 1980– 84 average of 184,000 coho. This catch was taken incidentally during fisheries directed at Fraser River sockeye and pink and Big Qualicum chum.

Georgia Strait Net Fishery – The 1985 coho catch in the Georgia Strait net fishery was 32,000 fish. This was above the 1980–84 average catch of 12,000 coho. Most of this catch came during terminal fisheries on Big Qualicum hatchery chum and coho.

West Coast Vancouver Island Net Fishery – The coho catch in this fishery was 23,000 fish. This was above the 1980–84 average catch of 11,000. Most of this catch was taken during fall fisheries directed at various local chum stocks.

Fraser River Gillnet Fishery – The Fraser River gillnet fishery harvested 17,000 coho in directed sockeye and pink fisheries during 1985. This was about equal to the 1980–84 average catch of 16,000 coho.

Indian Food Fishery – The aggregate 1985 catch of coho in the coast–wide Indian food fishery is currently unavailable. However, the coho catch in the Fraser River Indian food fishery, the largest on the coast, was 18,000 fish. This compares with the 1980–84 average coho catch of 43,000 fish.

Georgia Strait Sport Fishery – Coho catch in the Georgia Strait sport fishery totaled 732,000 fish. This compares with the 1980–84 average catch of 470,000 fish. Chinook management actions in the form of reduced bag limits and spot closures may have diverted effort onto coho.

Georgia Strait Troll Fishery – Coho catch in the Georgia Strait troll fishery totaled 199,000 fish which was above the 1980–84 average catch of 132,000. Chinook closures in Georgia Strait redirected effort onto coho during July, August and September.

North Coast Troll Fishery – Coho catch in the north coast troll fishery totaled 627,000 fish. This compares with the 1980–84 average catch of 808,000 coho. Targeting on pink and chinook stocks in July may have diverted effort away from coho.

U.S. OCEAN FISHERIES NORTH OF CAPE FALCON TO THE WASHINGTON–CANADIAN BORDER

U.S. ocean coho fisheries between Cape Falcon, Oregon and the Washington–Canadian border were regulated under quotas in response to management concerns for Skagit River coho. Other stocks identified as being of particular management concern were Oregon coastal natural and Columbia River late coho. Regulations adopted by the Pacific Fishery Management Council (PFMC) were generally designed to minimize impacts on critical stocks while providing harvest opportunity on other stocks.

Non–treaty Troll – Non–treaty troll opportunity for coho harvest occurred in two separate, quota–constrained, all–species fisheries. A July 15–18 all–species fishery in the area between Cape Alava and Leadbetter Point was constrained by a harvest quota of 78,500 coho. The total coho catch in this fishery was 136,300 fish. To compensate for exceeding the quota, the PFMC adjusted regulations for the pink directed fishery north of Carroll Island and the all–species fishery in the Columbia River catch area. For the pink fishery, the originally adopted harvest quota of 31,200 coho was eliminated and coho landings were not allowed. Hooking and release mortality during the pink fishery was estimated at 3,500 coho.

The quota for the all–species troll fishery scheduled to begin on August 21 in the Columbia River management area was reduced from 32,000 coho to a one day fishery with a quota of 10,000 coho. The actual coho catch by this fishery was 32,500 fish.

The total nontreaty troll coho catch in the area north of Cape Falcon to the Washington–Canadian border was 168,800 fish, 26% below the 1980–84 average.

Treaty Troll – The treaty Indian ocean troll fishery was constrained by a 75,000 coho quota for May through September. The catch for this period was 87,200 coho, 64% above the 1980–84 average.

Recreational – The recreational fishery north of Cape Falcon was managed on the basis of three subarea quotas. As planned preseason, inseason management actions were primarily directed at controlling the rate of chinook harvest because a normal fishery would have resulted in the chinook quota (established for the fishery in response to concerns for Spring Creek hatchery tule stock) being reached with a significant portion of the coho quota left uncaught.

The recreational fishery within the Neah Bay–La Push area harvested a total of 25,400 coho (within 100 fish of the quota) and was closed on September 2. The Westport area recreational fishery harvested a total of 73,600 coho, about 400 fish less than the quota established for this subarea. The Columbia River area recreational fishery, including Buoy 10 catches during August 18–22, harvested 110,800 coho, compared to a quota of 99,000 coho.

INSIDE FISHERIES FOR THE COLUMBIA RIVER, WASHINGTON COAST AND PUGET SOUND

Columbia River – The Columbia River gillnet fishery harvested 193,200 coho, nearly all hatchery stocks. A recreational fishery in the Buoy 10 area near the mouth of the Columbia River harvested 25,400 coho. Approximately 600 coho were harvested by mainstem recreational fisheries above the Megler–Astoria Bridge.

Washington Coast – Terminal area commercial coho catches were generally well below preseason expectations for Willapa Bay, Grays Harbor, Quinault, and Quillayute summer stocks. Fisheries on the Queets, Hoh and Quillayute fall stocks were conducted in accordance with management plan agreements reached between the Washington Department of Fisheries and relevant treaty Indian tribes as part of the process employed for developing regulations for ocean fisheries. Generally these plans established fishing schedules with contingencies based upon inseason run size estimation by terminal area fisheries. The commercial terminal net harvests of Queets, Hoh and Quillayute fall coho stocks were above 1980–84 averages and river sport catches were comparable to recent year levels of a few hundred fish.

Puget Sound – The total Puget Sound commercial coho catch was 1.15 million fish, 48% greater than the 1984 catch and 26% above the 1980–84 average. The Puget Sound coho catch, excluding the northern Puget Sound and Strait of Juan de Fuca harvests discussed above, was 922,000, 26% above 1984 and 20% above the 1980–84 average. While catches were relatively high in several areas (e.g. South Sound, Port Gardner Bay, and Bellingham Bay), directed coho fisheries in some other areas, including Skagit River and Bay, Stillaguamish River, and Strait of Juan de Fuca tributaries, were either severely curtailed or completely closed due to coho conservation concerns. Coho harvests in these areas were primarily taken during fisheries directed at other species. Recreational fishery harvest estimates for Puget Sound coho are not available at this time.

SPAWNING ESCAPEMENTS

SOUTHEAST ALASKA

Information is not available on which to directly estimate escapements for Southeast Alaskan coho stocks. Stock status is based upon comparisons of historical and current harvest patterns, harvest rates for selected stocks, and index escapements to a limited number of indicator systems. Available information suggests that, overall, Southeast Alaskan coho stocks are reasonably healthy.

BRITISH COLUMBIA

Despite highly variable ocean survival rates all British Columbia hatcheries met their brood stock targets. Escapement estimates for wild coho stocks are currently unavailable. The Fraser River test fishery suggests a slight increase in Fraser River escapement over the brood year.

PUGET SOUND

Escapement goals for hatchery facilities were generally met. Escapement goals for natural stocks were not achieved for the Skagit River, Stillaguamish River, Hood Canal and tributaries to the Strait of Juan de Fuca.

WASHINGTON COAST

Hatchery escapement goals were met for Willapa Bay, but were not achieved for Grays Harbor. Data for escapements to other hatchery facilities are not available at this time. The escapement of Grays Harbor natural coho was well below its goal. With the exception of the Queets run, escapements of other north coastal natural stocks appear to be above the low end of the range established for management.

COLUMBIA RIVER

The coho escapement to lower Columbia River hatcheries was 93,900 adults, slightly below the 1980–84 average. Escapements to upper river (above Bonneville Dam) hatcheries was 11,600 adult coho, above the 1980–84 average.

Table 1. Preliminary 1985 coho salmon catches compared with 1984 and 1983 (1000 fish)

	Troll			Net			Sport			Total 3/		
Fishery	1985	1984	1983	1985	1984	1983	1985	1984	1983	1985	1984	1983
S.E. Alaska 1/	1,589	1,133	1,280	899	769	699	56	60	55	2,544	1,962	2,034
British Columbia 2a/												
North Coast	507	531	733	164	163	217	-	-	-	671	694	950
Central	128	328	433	97	60	153	-	-	-	225	388	586
West Coast Van. Is.	1,404	2,172	2,169	23	11	9	-	-	-	1,427	2,183	2,178
Georgia St. 2/b,c,d	199	117	121	32	14	16	732	443	404	963	574	541
Johnstone Strait	-	-	-	148	119	243	-	-	-	148	119	243
Juan de Fuca Strait	-	-	-	232	75	17	-	-	-	232	75	17
Fraser River	-	-	-	17	9	11	-	-	-	17	9	11
Sub-totals 3/	2,238	3,148	3,456	713	451	666	732	443	404	3,603	4,042	4,526
WA/OR Ocean												
Wa. Non-treaty	129	23	24	-	-	-	179	40	209	308	63	233
Wa. Treaty	87	43	38	-	-	-	-	-	-	87	43	38
Oregon	84	14	320	-	-	-	182	123	147	266	137	467
California	11	43	57	-	-	-	15	19	27	26	62	84
Sub-totals 3/	311	123	439	-	-	-	376	182	383	687	305	822
Puget Sound	-	-	-	1,155	804	921	-	141	274	1,155	945	1,195
WA Coastal Terminal	-	-	-	71	91	29	-	17	4	71	108	33
Columbia River	-	-	-	193	191	7	1	1	0	194	192	7
Grand Totals 3/	4,138	4,404	5,175	2,960	2,215	2,293	1,165	827	1,116	8,263	7,446	8,584

1/Southeast Alaska troll coho catches shown for calendar year.
1982-84 average used for preliminary estimate of 1985 sport catch.
2a/British Columbia net catches include only fish over 5 lbs. round weight.
b/Sport catches are for tidal waters only,catch updates will be provided by Feb. 1986 for 1983 and 1984.
c/Georgia Strait sport catch is the only data currently compiled for B.C. sport fisheries.
d/Johnstone St., Juan de Fuca St. and Fraser River troll catch included in Georgia St.
3/All totals may include rounding errors.

Joint Coho Technical Committee
Responses to Coho Questions
Posed By the Southern Panel
March 2, 1986

EXECUTIVE SUMMARY

1. Reasons for Increased Georgia Strait Catch in 1985

- Higher than normal proportion of Georgia Strait and Puget Sound hatchery (and possibly wild) stocks remained inside
- Effort shifts resulting from chinook management measures were a minor influence.

2. Effects of Increased Georgia Strait catch

- Overall exploitation rates of Georgia Strait hatchery stocks somewhat lower than recent year levels indicating that reduced availability of inside stocks off the West Coast of Vancouver Island was balanced by increased availability in Georgia Strait
- If Georgia Strait catches had been lower, more fish would have been available to contribute to other fisheries and escapements, primarily in Georgia Strait and Puget Sound.

3. Reasons for WCVI troll catch shortfall

- Catch level of WCVI troll coho fishery below 1.75 million pieces not unusual. The 1978–82 average was 1.63 million pieces.
- Chinook Conservation Measures: Total impact minor – estimated season catch reduction ranges from 30,000 to 50,000 coho
- Redirection of Effort onto Sockeye and Pink: Minor impact. Shortfall occurred at the start of season, during first three weeks in July when sockeye abundance was low.
- Weather conditions: Not possible to quantify, but impact likely to be minor. Exploitation rate of WCVI troll fishery similar to previous years.
- Reduced availability of coho: Major factor

4. WCVI troll regime designed to take 1.75 million coho

- Yes.

5. Inseason management actions possible to increase opportunity to catch coho?

- No practical or desirable actions could have been taken in–season.

6. What fisheries benefited from WCVI shortfall?

- Georgia Strait and Puget Sound fisheries and stocks primary beneficiaries. Smaller benefits also accrued to other fisheries and spawning escapements.

7. Alternative fishery regimes

- Given July 1–September 30 season, average distribution patterns, and 1986 preseason forecasts, catch ceilings of 1.75 million coho or above not expected to be limiting. Higher ocean migration or substantially larger abundance off the WCVI would cause ceilings to become operable.

- "What if" scenarios to examine implications of forcing WCVI troll catches to reach specified ceiling levels:

  a) 1.75 million pieces: Some Washington coastal natural stocks expected to return to rivers below low end of established spawning escapement ranges (Quillayute fall 5%, Queets 14%). Additional stock impacts would be anticipated from terminal fisheries.

  b) 2.074 million pieces: A 17% increase in exploitation rate by the WCVI troll fishery would be required to harvest a ceiling of this magnitude, given average ocean distribution patterns and forecast abundance. Such an exploitation rate by this fishery would result in total harvest rates (all fisheries combined) on several natural stocks above levels believed to be sustainable. Washington coastal stocks expected to return at or substantially below low end of established spawning escapement ranges (e.g. Quillayute fall 17%, Queets 22%).

  c) 1.912 million pieces: An 11% increase in exploitation rate by the WCVI troll fishery would be required to harvest a ceiling of this magnitude under the same conditions as described for scenario (b). Results midway between results of 1.75 million and 2,974 million pieces.

  d) above WCVI regimes plus coho directed fisheries in Juan de Fuca Strait, Canadian Area 20 and Area 7/7A: Compared to their corresponding regimes, reinstitution of directed coho fisheries in these areas would be expected to reduce terminal run sizes of Fraser and most Puget sound stocks by 20%–25%. Strait of Juan de Fuca and Washington coastal terminal run sizes would be expected to be reduced by approximately 15% and 1%, respectively,

  e) Defer any adjustment until 1987: This question cannot be fully answered until 1987 abundnace forecasts become available. Early indications are that Puget Sound natural production will be negatively influenced by extreme low summer stream flows. Based on trends in brood cycle escapements, Fraser natural stocks would be expected to be improved over 1986.

8. Expo Coho

- The Georgia Strait component of the catch would increase, however, increases over 1985 total catch levels cannot be forecast at this time. Increased Georgia Strait hatchery production would decrease exploitation rates of stocks contributing to WCVI troll fisheries, assuming that the ceiling established for this fishery would be reached.

9. 1986 Forecasts of Stocks of Concern

- o Fraser Stocks – concern for declining trend in 1986 brood cycle.

- o Forecasts for Washington stocks are presented in Table 4. Total Puget Sound production is anticipated to be 15% lower compared to 1985 forecasts. Expectations for Washington coastal natural stocks are substantially below (23%–62%) 1985 expectations.

10. Stocks harvested by WCVI troll fishery

- o See Table 5 for a list of stocks and typical exploitation rate patterns by WCVI and Georgia Strait fisheries.

INFORMATION REQUEST ON STOCK COMPOSITION

Stock composition varies substantially from year to year. Quantitative estimates are not available at this time. A list of stocks contributing to these fisheries is presented in Table 5.

HISTORIC WCVI TROLL CATCHES

1970–1985 troll catches for NWVI and SWVI troll fisheries are summarized in Tables 6 and 7, respectively.

JOINT TECHNICAL COMMITTEE RESPONSES TO QUESTIONS POSED BY THE SOUTHERN PANEL

March 2, 1986

1. What was the reason(s) for the increased coho catch in the Strait of Georgia in 1985? Commercial and Recreational.

Response: The coho catch in the Georgia Strait sport fishery totaled 728,000 compared with the previous 5 year average of 470,000. The troll fishery in Georgia Strait caught 199,000 coho compared with an average of 132,000 for the previous 5 years. These increases could be explained either by increased targeting on coho, increased abundance, or low outmigration.

For the sport fishery the total effort was actually slightly below 1985 levels. Redirection of this effort from chinook to coho may have occurred in response to chinook restrictions or the abundance of coho. Creel survey questionaire data will provide evidence on the extent of this redirection. In the troll fishery the chinook non-retention fishery in July and ribbon boundaries (50 fathom line) which forced trollers to fish off-shore undoubtedly caused some redirection or at least a concentration of effort onto coho. Sockeye, pink and chinook availability from late July onwards probably returned targeting on coho to normal.

Coho catch per unit effort in the sport fishery was 1.16 in 1985 compared to 0.68 in 1984. The distribution of Georgia Strait hatchery stocks in 1985 (Table 1 and Figure 1) and higher overall survival rates for Georgia Strait hatchery production provide possible explanations for this apparent abundance. The proportion of these stocks caught by the Georgia Strait troll and sport fisheries was very high in 1985 compared with past years. Conversely, the proportion caught in the WCVI troll fishery was very low. This might indicate a higher availability of Georgia Strait stocks to inside fisheries than in past years. There is some indication that northern Puget Sound (Nooksack-Samish) hatchery stocks behave in a similar manner.

2. What affect (sic) did this increased catch have on Canadian & U.S. coho stocks?

Response: Pre-terminal exploitation rates on two Georgia Strait hatchery stocks (Big Qualicum and Capilano) were lower than recent year levels indicating that the net impact of all fisheries on these stocks was not excessive. The higher catches in Georgia Strait, therefore, appeared to be due to high abundance which was probably caused by a combination of a higher residency in Georgia Strait and higher abundance of at least the hatchery component of the catch.

Impacts on stocks cannot be assessed in isolation; harvest impacts of Georgia Strait should be evaluated in conjunction with those of WCVI fisheries. Overall exploitation rates of Georgia Strait hatchery stocks were not appreciably different than prior years, indicating that decreased abundance of these stocks to WCVI fisheries was counterbalanced by an increase in the catch of these stocks in Georgia Strait fisheries.

If catch levels of Georgia Strait fisheries had been similar to recent year averages, more fish would have been available to contribute to other fisheries and to spawning escapements of Southern Canadian and Puget Sound stocks. Impacts on particular stocks cannot be quantitatively estimated due to the absence of data on spawning escapements and terminal run sizes for Canadian and Puget Sound stocks. Puget Sound stocks in general, and northern Puget Sound stocks in particular, are the U.S. stocks most likely to have been significantly affected.

3. What was the reason for the shortfall in the coho catch in the West Coast Vancouver Island troll fishery in 1985?

Response: The Technical Committee examined the following possible explanations for the shortfall in the 1985 WCVI coho catch:

a) Chinook Conservation Measures.

b) Redirection of effort onto sockeye and pink.

c) Weather conditions which reduced the effectiveness of the troll fleet.

d) Abundance of coho off the west coast of Vancouver Island.

Detailed discussions follow but the general opinion of the Committee is that low abundance of coho in the WCVI troll fishing area was probably the major reason for the shortfall from the ceiling. This was due to an abnormally low presence of Georgia Strait and Puget Sound stocks, which normally contribute to this fishery at higher rates.

a) Chinook conservation measures.

In 1985, two areas, Swiftsure Bank and Big Bank, were closed for part of the troll season. Swiftsure was closed for the first two weeks of July and the last week of September; Big Bank was closed for one week at the end of July and early August. The estimated coho catch foregone during these closures ranges between 60,000 and 100,000 pieces based on: (1) recent average catch for 1980–84 for area 21; and (2) current available data on effort and catch per boat for the Big Bank area. It is estimated that the foregone coho catch would be subjected to a subsequent harvest by fisheries off the West Coast of Vancouver Island. Additionally, the vessels which would have fished these areas if they had been opened undoubtedly caught coho in other areas. The net impact of the closures was an estimated catch reduction of 30,000 to 50,000 pieces.

It should also be noted that the closure of the fishery in June reduced coho shaker losses and thus increased the number of fish available at the start of the season in July.

b) Redirection of effort onto sockeye and pink.

The entire shortfall of 326,000 coho from the Pacific Salmon Treaty mandated 1.75 million catch ceiling in this fishery was accounted for in the first three weeks of the fishery beginning in July, (Table 1 and Figure 2). In past years during this time period almost one half of the seasonal catch was taken. The sockeye catch was relatively low during this three week period and increased quickly in the last two weeks of July.

The exploitation rate on Robertson Creek coho which are caught almost exclusively in the WCVI troll fishery was down from 1984 but about equal to previous years. This suggests that the fishery had an average impact on the available stocks and was not significantly affected by effort redirection.

c) Weather conditions which reduced the effectiveness of the troll fleet.

This factor is impossible to quantify but information from trollers suggests that entrenched

westerly winds might have reduced effort on coho. The exploitation rate on Robertson Creek coho, however, suggests that the impact of the fishery was about average.

d) Abundance of coho off the west coast of Vancouver Island.

Abundance was apparently lower than previous years as indicated by: (a) Coho catch per hour of fishing measured in the Westcoast troll logbook program for the month of July were 38 to 69 percent of 1984 levels for all Statistical Areas; and (b) a significant contribution to the westcoast of Vancouver Island troll fishery for coho is made by Canadian stocks originating in Georgia Strait and Johnstone Strait and by U.S. stocks originating in Puget Sound and Washington coastal rivers. Coded wire tag data (Figures 1 and 3) indicate a lower availability of Georgia Strait hatchery stocks to the WCVI troll fishery in 1985 compared to previous years and a higher availability to Georgia Strait fisheries. Furthermore, the year by year pattern of availability since 1979 to the WCVI troll fishery and Georgia Strait troll and sport fisheries is similar for all four Georgia Strait hatchery stocks; some years are characterized by strong residence, others by migration to the ocean. There is also some indication from Canadian recoveries of Northern Puget Sound coded wire tags that these stocks might have been more available to inside fisheries than in past years. This might indicate that these stocks (and perhaps other hatchery and wild stocks originating in the same geographic area) behave similarly with respect to their ocean distribution patterns. If this is the case, the availability of Georgia Strait coho to the WCVI troll fishery, including Fraser River stocks, was very low in 1985.

4. **Was the 1985 troll management regime on the West Coast of Vancouver Island designed in a manner to allow the harvest of the 1.75 M?**

Response: Yes, a coho management plan was implemented that did not restrict access to coho.

5. **Were there any in-season management actions that could have been taken to provide greater opportunity to harvest the 1.75 M coho without creating conservation problems?**

Response: From a fisheries management perspective, there were no practical or desirable in-season actions that could have been taken to provide greater opportunity to harvest coho in the West Coast Vancouver Island troll fishery. Increasing opportunity for coho would have meant measures such as re-opening the Big Bank and Swiftsure Bank areas which would have increased the rate of catch on chinook and the chinook shaker loss during this period. Additionally, an accelerated rate of chinook harvest would have resulted in longer chinook non-retention fisheries at the end of the season, increasing chinook hooking mortality losses. Late September or October openings would have had little benefit since catch rates are extremely low at this time; shaker loss of both chinook and coho would be high, and the chinook ceiling would have been exceeded. Reducing access to pink and sockeye as a means of redirecting effort onto coho was not considered as a reasonable management action.

6. **What fisheries and stocks benefited from the 324 K shortfall in the troll catch on the West Coast of Vancouver Island?**

Response: A WCVI troll catch of coho below 1.75 million coho should not be regarded as being highly unusual. The 1978-82 average WCVI troll coho catch is 1.63 million. Harvest by this fishery is highly dependent upon availability.

The shortfall in the WCVI troll catch from the harvest ceiling resulted in an increase in the number of fish available to contribute to spawning escapements and fisheries impacting the stocks identified in Table 5.

Fisheries benefiting are stock–dependent. From coded wire tag and catch analysis, fisheries in Georgia Strait and Puget Sound were the main benefactors of the low catch off the west coast of Vancouver Island. Stocks which are normally available to the WCVI troll fishery were less available to this fishery in 1985 and more available to inside fisheries. It is difficult to determine if escapements benefited since we only have information on harvest rates from hatcheries. However, hatchery harvest rates for Georgia Strait stocks suggest that there was little if any increase in escapement, while inside catch rates increased substantially over previous years.

Other stocks and fisheries: As noted in the response to question 3, the harvest rate by the WCVI troll fishery was comparable to previous years. A significantly higher than average exploitation rate by the WCVI troll fishery would have been required to take 1.75 million coho. This increased exploitation rate would obviously have reduced the number of fish available to contribute to other fisheries and escapements from levels actually occurring in 1985. Because migration and feeding patterns of coho are highly variable, to an extent which cannot be readily determined, the lower than anticipated catch levels in the West Coast of Vancouver Island troll fishery may have increased coho availability to U.S. ocean fisheries north of Cape Falcon. However, U.S. ocean fisheries were regulated under quotas so any increased availability would have a minor effect on catches. For Georgia Strait, Fraser River, and Puget Sound stocks, both Canadian inside and U.S. Puget Sound net and sport fisheries benefited. For Washington Coastal and Columbia River stocks, in–river fisheries benefited.

7. Evaluate the impact of the following 1986 fishery regimes on Strait of Georgia, Fraser, Puget Sound, Washington coastal wild stock complexes if:

a) Repeat of the 1985 fishery regime in 1986 in 7–7A; Juan de Fuca; Area 20; West Coast of Vancouver.

b) Repeat of the 1985 fishery regime in the above areas with a 324 K add–on of coho in the West Coast of Vancouver Island troll fishery.

c) Repeat of the 1985 fishery regime in the above areas with an add–on of 162 K in the West Coast of Vancouver Island troll fishery.

d) a), b), c) with coho fisheries (patterns) being reinstituted in 7–7A, Juan de Fuca and Area 20.

e) Defer add–on until 1987.

Response: There are two basic ways the question can be answered: (i) assume that the fishing regimes would limit catch; or (ii) assume that the WCVI ceiling would be taken.

(i) Given the July 1 through September 30 coho fishery, average stock distribution patterns, and 1986 preseason abundance forecasts, catch ceilings of 1.75 million coho or above would not be expected to be limiting. If a higher than normal proportion of Georgia Strait and Puget Sound stocks migrate off WCVI or if abundance is significantly higher than forecast, then ceilings would become operable.

(ii) There are very few management actions that could be taken to increase exploitation rates of stocks in the WCVI troll fishery. However, a "What if?" analysis was performed to estimate impacts if the fishery was "forced" to catch the specified ceilings. Quantitative answers under the second approach are difficult to develop due to the absence of abundance forecasts for Canadian stocks and unknowns concerning wild stock distributions. To address this question, several management scenarios were run using the WDF/NBS model calibrated for 1986 abundance expectations for U.S. stocks and estimates for Canadian stocks. For all fisheries except the West Coast Vancouver Island troll, all scenarios employed effort scale factors that are required to reproduce catches equivalent to those experienced in 1985 (the 1979–84 average catch was used as an estimate for Puget Sound sport harvest), assuming a West Coast Vancouver Island troll fishery catch of 1.75 million coho. These effort scaling factors were not adjusted to maintain constant catch levels. Results of these simulation runs follow:

a) WCVI troll fishery 1.75 million coho. Returning run sizes of some Washington natural stocks would fall below the low end of their established escapement goal ranges (e.g. Quillayute fall 5% and Queets 14%). Expected spawning escapements would depend upon regimes for terminal fisheries.

b) WCVI troll fishery 2.074 million coho. Returning run sizes of some Washington natural stocks would fall below the low end of their established escapement goal ranges (Quillayute fall 17% and Queets 22%). Additionally, Hoh coho would be expected to return at levels slightly above the low end of its spawning escapement range. The increased catch off the West Coast of Vancouver Island would be expected to reduce terminal run sizes of other stocks of concern compared to scenario a) (Strait of Juan de Fuca 17%, Skagit River 8%, Stillaguamish/Snohomish 12% and Fraser 4%). Expected spawning escapements would depend upon regimes for terminal fisheries.

c) WCVI troll fishery 1.912 million coho. Results of this scenario would fall between those for a) and b).

d) Reinstitution of Canadian area 20, Strait of Juan de Fuca and area 7/7A net fisheries for coho coupled with various catch levels for WCVI troll fisheries. Expectations are presented relative to their corresponding scenarios as described above.

(i) WCVI 1.75 million. Puget Sound and Canadian stocks would be the primary stocks affected. River returns of Washington coastal stocks would be expected to be reduced by approximately 1%. Terminal run sizes of Fraser, Skagit, Stillaguamish/Snohomish and Strait of Juan de Fuca stocks would be reduced by 26%, 24%, 22% and 14%, respectively.

(ii) WCVI 2.074 million coho. Puget Sound and Canadian stocks would be the primary stocks affected (reductions in returning run sizes, compared to regime [b], are Fraser 26%, Skagit 25%, Stillaguamish/Snohomish 21%, Strait of Juan de Fuca 17%).

(iii)WCVI 1.912 million coho. Percentage reductions in terminal runs, compared to regime [c], similar in magnitude to those for scenario (ii).

e) This question cannot be answered fully until stock status projections become available for 1987. For Puget Sound wild stocks, extremely low summer flow conditions indicate poor smolt production from the 1984 brood. Escapement trends indicate that Fraser River coho can be expected to be more abundant in 1987 than 1986.

8. What affects (sic) will the Canadian Expo coho production have on fisheries in the Strait of Georgia and on the West Coast of Vancouver Island troll fishery?

Response: The doubling of coho smolt production to 10.8 million from Georgia Strait hatcheries from the 1983 brood year will increase the adult population above levels that would be generated by 1982 brood release levels. As we saw in 1985, the ocean distribution of these stocks can vary widely; this will have a great effect on which fisheries these fish will be available to. Ocean survival rates can also vary widely and the over-all good survivals experienced by hatchery coho returning in 1985 might not be repeated for the 1986 return.

There are considerable uncertainties regarding the actual contribution of the substantial increase in coho releases from southern B.C. hatcheries. During the past decade, increasing Georgia Strait hatchery production has not been matched by corresponding increases in Georgia Strait catches. This could be indicative of either declining wild coho production from Canadian stocks or in hatchery survival rates or a combination of both. Wild stock abundance in 1986 might be poor if the Fraser terminal run-size trend is used as an indicator. This could lead to the appearance of average abundance even with higher hatchery contributions. In the WCVI troll fishery poor expectations for Puget Sound and Fraser River stocks could mask any increase in Georgia Strait hatchery production.

An effort response to high coho abundance did not appear to take place in the Georgia Strait sport fishery in 1985. The response in 1986 by Expo visitors and residents is uncertain but expected to be minor.

In summary, the only forseeable effect of the increased Georgia Strait hatchery production is for an increase in this component of the catch relative to the production from a 1982 brood level release. An increase over 1985 catch levels cannot be forecast at this time since ocean survival rates are not predictable. An effort response is uncertain in the Georgia Strait sport fishery but is highly unlikely in the WCVI troll fishery. Increased Georgia Strait production would be expected to decrease exploitation rates of stocks contributing to the West Coast of Vancouver Island troll fishery, assuming that the catch ceiling would be reached.

9. What are the 1986 forecasts for stocks of concern in the West Coast of Vancouver Island troll fishery compared with 1985?

Response: Quantitative Canadian preseason abundance forecasts are not available. Available stock assessment information for Fraser River coho indicates a conservation concern exists on the 1986 cycle. This concern is heightened by the expected high exploitation rate on Adams sockeye in 1986. Three main indicators are:

(a) returns to the river have declined by an average of 13% (20,900 pieces) per cycle since 1971, resulting in a 1983 return of only 34% of the 1971 level. This trend is similar to the decline recorded by the test fishery.

(b) escapements have declined by an average of 15% (18,100 pieces) per cycle since 1971, resulting in a 1983 escapement (32,900) of only 30% of the 1971 level and the poorest ever recorded on this cycle.

(c) recent harvest rates, estimated from one wild and three enhanced 1980 brood CWT release groups from Salwein Creek (Vedder-Chilliwack system), averaged approximately 80%. This level is considerably above the 70% level currently thought to be sustainable.

Forecasts for U.S. stocks are presented in Table 4.

10. Which stocks are available to the West Coast of Vancouver Island troll fishery and what is the historical exploitation rate of this fishery on these stocks?

Response: See Table 5.

Information Request

A. Stock composition of known coho stocks in:

- –Strait of Georgia
- –7 & 7A
- –Area 20
- –N.W.V.I.
- –S.W.V.I.

Response: This question is difficult to address because of the lack of specifics with respect to the time period and the absence of quantitative abundance estimates for Canadian stocks. Stock composition is likely to vary substantially from year to year. A listing of stocks contributing to these fisheries and the historical exploitation rates is all that can be provided (table 5).

B. Troll catches on the West Coast of Vancouver Island for the last 15 years.

Response: see Table 6 and 7 for NWVI and SWVI catches, respectively.

TABLE 1. PERCENT OF CANADIAN COHO CATCH FROM FOUR GEORGIA STRAIT HATCHERIES CAUGHT IN THE GEORGIA STRAIT TROLL AND SPORT FISHERIES.

	BROOD YEAR						
HATCHERY	1976	1977	1978	1979	1980	1981	1982
BQR	75.58	65.78	44.73	52.97	42.49	39.47	59.42
CAP	85.08	81.48	66.41	72.15	67.19	60.27	83.92
PUNTLEDGE		54.17	20.74	46.78	19.54	40.52	58.85
QUINSAM	56.04	41.88	30.07	34.56	27.92	38.89	58.52

NOTE 1: PERCENTAGES ARE DERIVED FROM CODED WIRE TAG RECOVERY DATA.

FIGURE 1.

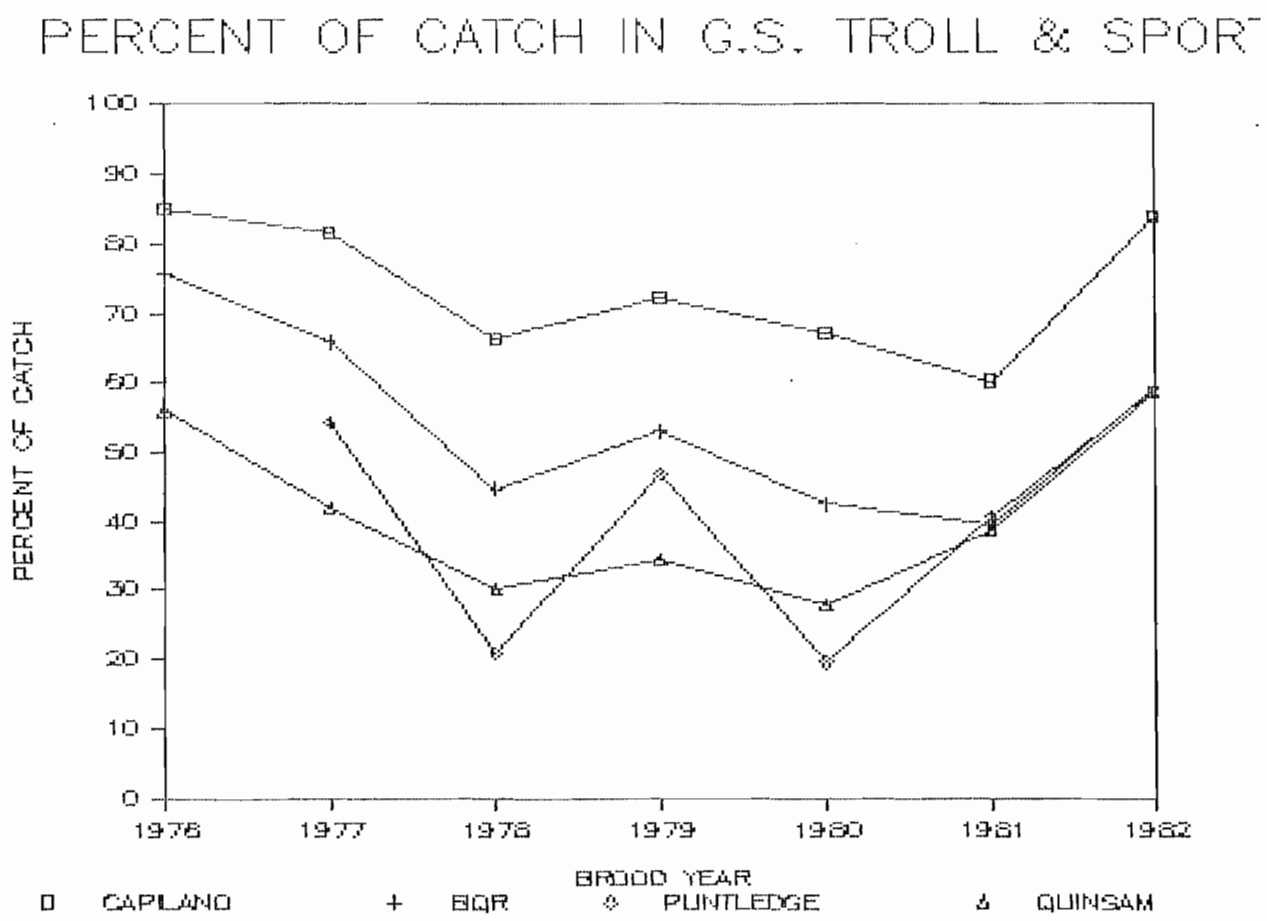

TABLE 2. WESTCOAST VANCOUVER ISLAND TROLL COHO CATCH
1985 EXPECTED AND ACTUAL CUMULATIVE CATCH

	EXPECTED		ACTUAL		WEEKLY DIFFERENCE		CUMUL. DIFFERENCE	
WEEK	WEEKLY	CUMUL.	WEEKLY	CUMUL.	NO.	PERCENT	NO.	PERCENT
6-4	0	0	0	0	0	0	0	0
7-1	353369	353369	178389	178389	174980	49.52	174980	49.52
7-2	219641	573010	164082	342471	55559	25.30	230539	40.23
7-3	237728	810738	132718	475189	105010	44.17	335549	41.39
7-4	172667	983405	149104	624293	23563	13.65	359112	36.52
7-5	141665	1125070	133450	757743	8215	5.80	367327	32.65
8-1	113509	1238579	128298	886041	-14789	-13.03	352538	28.46
8-2	119800	1358379	121490	1007531	-1690	-1.41	350848	25.83
8-3	86512	1444891	122449	1129980	-35937	-41.54	314911	21.79
8-4	84196	1529087	91171	1221151	-6975	-8.28	307936	20.14
9-1	66695	1595782	72474	1293625	-5779	-8.66	302157	18.93
9-2	79404	1675186	56678	1350303	22726	28.62	324883	19.39
9-3	36340	1711526	41903	1392206	-5563	-15.31	319320	18.66
9-4	38474	1750000	20916	1413122	17558	45.64	336878	19.25
10-1	0	1750000	10527	1423649	-10527	ERR	326351	18.65

NOTE 1: EXPECTED CATCH BASED ON 1981 TO 1984 AVERAGE CATCH TIMING AND CATCH CEILING OF 1.75 MILLION.
NOTE 2: ACTUAL CATCH IS FROM FEB. 17/86 SALES SLIPS.
NOTE 3: DIFFERENCES ARE CALCULATED BY SUBTRACTING ACTUAL FROM EXPECTED CATCH.
NOTE 4: PERCENT DIFFERENCE IS THE DIFFERENCE DIVIDED BY THE EXPECTED CATCH MULTIPLIED BY ONE HUNDRED.

FIGURE 2.

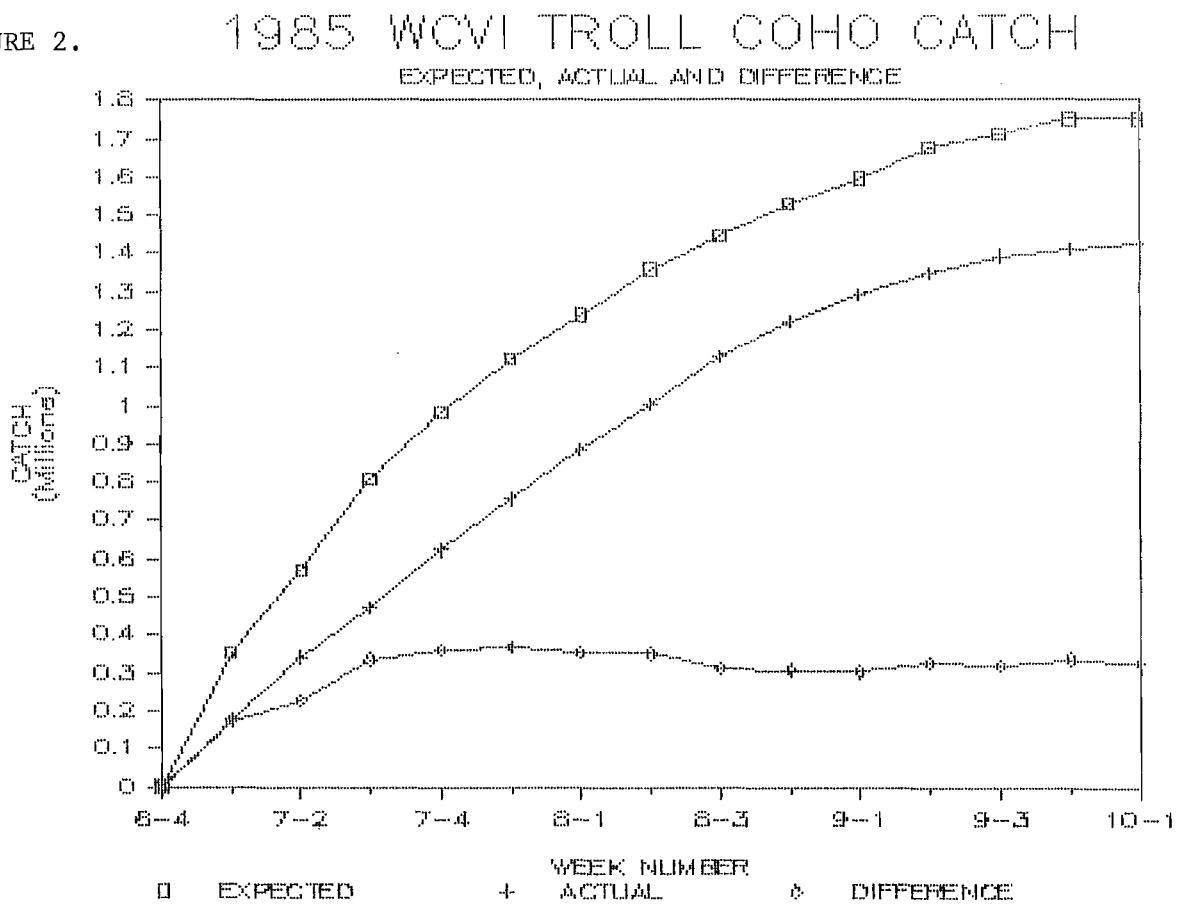

TABLE 3. PERCENT OF CANADIAN COHO CATCH IN FOUR GEORGIA STRAIT HATCHERIES CAUGHT IN THE WCVI TROLL FISHERY

	BROOD YEAR						
HATCHERY	1976	1977	1978	1979	1980	1981	1982
CAPILANO	9.61	10.92	10.88	15.48	16.36	23.56	5.87
BQR	8.78	13.75	19.25	18.11	14.56	28.14	12.46
PUNTLEDGE		17.37	23.81	12.82	8.67	21.02	13.56
QUINSAM	10.67	13.72	10.14	14.68	14.27	19.53	7.74

NOTE 1: PERCENTAGES ARE DERIVED FROM CODED WIRE TAG RECOVERY DATA.

FIGURE 3.

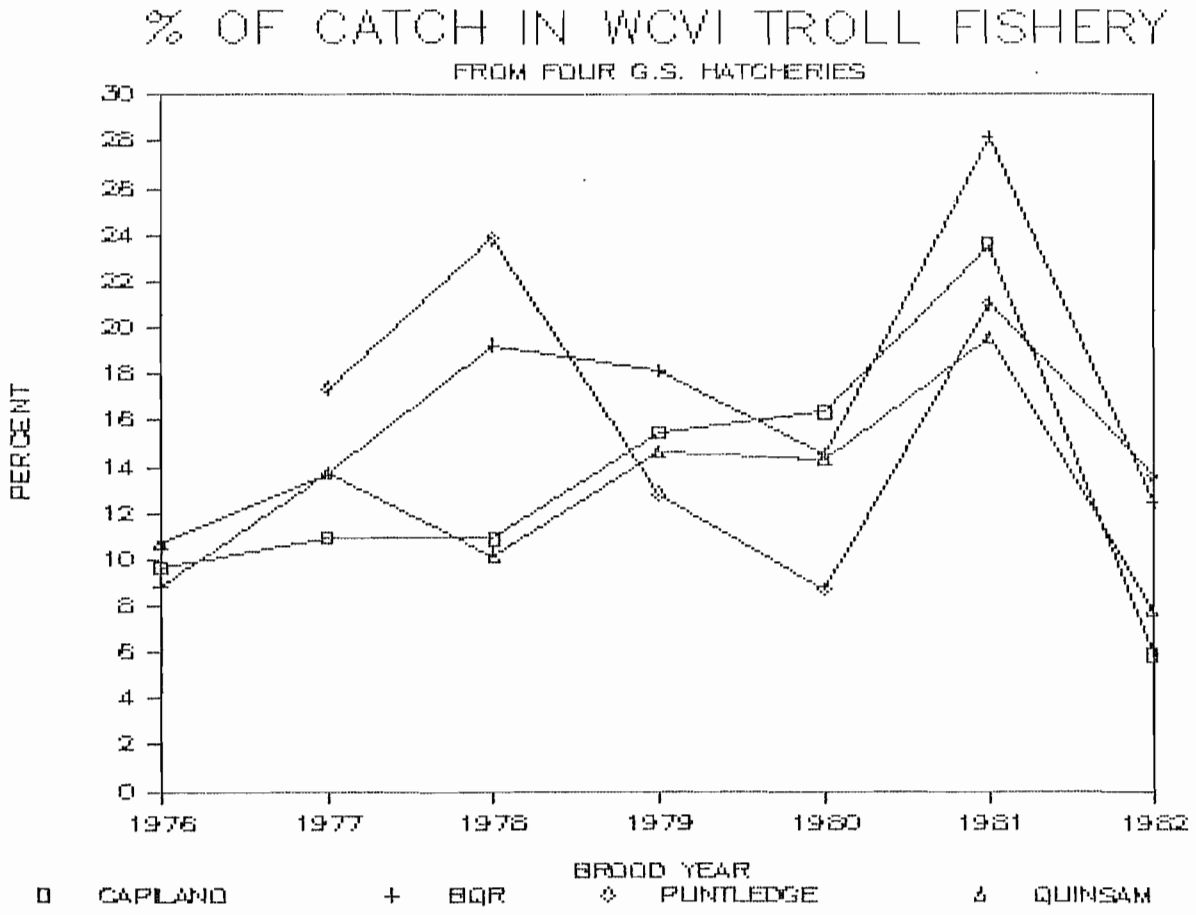

TABLE 4. # COHO SALMON FORECASTS

Area & Type	Stock	(Thousands) 1986	1985	% Chg
CA/OR & Columbia	OPI	1793.0	615.9	191
OR COAST	Private Hatchery	285.5	96.8	195
Ocean Abundance				
WASHINGTON COAST				
Ocean Escapement	Willapa Bay (H)	92.0	101.7	(10)
Average Fishery				
	Grays Harbor (N)	44.0	40.0	10
	Grays Harbor (H)	25.6	31.9	(20)
	Quinault (N)	7.7	7.1	8
	Quinault (H)	7.3	15.9	(54)
	Queets (N)	3.9	6.6	(41)
	Queets (H)	4.2	4.9	(14)
	Hoh (N)	3.0	3.9	(23)
	Hoh (H)	0.0	0.0	0
	Quillayute Fall (N)	4.8	11.3	(62)
	Quillayute Fall (H)	2.2	1.8	39
	Quillayute Summer (N)	1.4	1.6	(12)
	Quillayute Summer (H)	5.2	3.2	63
PUGET SOUND				
US Puget Sound	Strait (N)	9.9	13.5	(27)
Catch + Escmt	Strait (H)	17.7	14.7	20
	Nooksack–Samish (N)	36.6	48.0	(24)
	Nooksack–Samish (H)	122.2	180.7	(32)
	Skagit (N)	37.6	18.6	102
	Skagit (H)	25.3	13.7	85
	Stillaguamish (N)	32.7	21.0	56
	Snohomish (N)	136.6	184.4	(26)
	Snohomish (H)	34.4	45.3	(24)
	South Sound (N)	157.6	196.3	(20)
	South Sound (H)	484.4	541.3	(11)
	Hood Canal (N)	53.9	67.1	(20)
	Hood Canal (H)	59.1	65.8	(10)

TABLE 5. Average Exploitation Rate of Total Run (1979-81)

COHO STOCK	NWVI Troll	SWVI Troll	G.Str Troll	G.Str Sport
CANADIAN				
Quinsam	6.0%	3.6%	7.1%	24.6%
Puntledge	6.2%	6.2%	15.3%	26.2%
Big Qualicum	3.4%	6.4%	14.2%	33.3%
Capilano	0.9%	6.6%	7.4%	37.1%
Robertson Creek	26.0%	28.7%	0.1%	0.2%
Fraser River	2.3%	13.6%	8.1%	23.3%
PUGET SOUND				
Lummi-Nooksack	1.8%	17.1%	7.9%	14.4%
Skagit	3.4%	17.2%	1.5%	3.1%
Stillaguamish/Snohomish	3.7%	26.6%	0.6%	1.2%
South Sound Normal	2.7%	23.2%	0.1%	0.4%
South Sound Delayed	1.1%	17.9%	0.1%	0.4%
Hood Canal	2.5%	26.6%	0.1%	0.9%
Strait of Juan de Fuca	5.7%	35.4%	0.2%	0.7%
WASHINGTON COAST				
Quillayute Summer	3.6%	22.6%	-	-
Quillayute/Hoh Fall	1.9%	31.1%	-	-
Queets/Quinault	7.9%	26.3%	-	0.2%
Grays Harbor	9.9%	28.6%	-	-
Willapa Bay	0.6%	5.4%	-	-
COLUMBIA RIVER				
Late Stock	0.4%	4.8%	-	0.1%
Early Stock	0.3%	2.3%	-	-

Source: Joint Coho Technical Committee Report, Dec 6, 1984.

TABLE 6

CATCH BY SPECIES AND GEAR IN PIECES 1970-1985

AREA : NORTHWEST VANCOUVER ISLAND

	L. RED			M. RED			JACK			WHITE		
YEAR	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL
1970	541	78	25094	0	0	11369	65	147	5582	2	2	817
1971	1571	130	38571	0	0	15689	391	317	11723	12	9	1847
1972	764	203	37750	0	0	11905	164	318	7553	6	0	1315
1973	1017	1221	27577	0	0	19856	156	4099	11568	32	4	2767
1974	3560	636	42332	0	0	27760	715	4713	22878	85	91	3766
1975	5087	786	38859	0	0	21142	944	3458	14283	201	27	4392
1976	2086	1235	46884	0	0	24514	324	1142	26671	631	2	3459
1977	404	535	29935	0	0	16263	109	944	11537	9	4	3002
1978	107	58	53993	0	0	31100	7	136	19918	40	1	6165
1979	62	105	37030	0	0	22133	13	46	17092	0	0	3395
1980	52	45	41469	0	0	27655	28	698	21719	0	12	4793
1981	42	20	33792	0	0	22174	20	310	20454	0	1	5333
1982	82	130	47908	124	95	27627	48	506	20917	7	9	9873
1983	0	0	36799	0	0	29855	0	0	25603	0	0	3514
1984	43	144	59018	123	242	35293	84	1814	34897	6	2	2996
1985	135	107	32239	199	58	20497	60	421	17661	9	1	3157

CATCH BY SPECIES AND GEAR IN PIECES 1970-1985

AREA : NORTHWEST VANCOUVER ISLAND

	ALL SPRING			SOCKEYE			COHO			PINK		
YEAR	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL
1970	608	227	42862	7460	59	116643	9516	12497	252839	5331	50152	187918
1971	1974	456	67830	26184	60	329077	23863	7104	666334	5675	73	395113
1972	934	521	58523	7282	0	9630	17579	6144	387038	3885	4313	35732
1973	1205	5324	61768	28369	1	19661	14069	9539	278553	3546	12849	325558
1974	4360	5440	96736	87642	293	107029	54434	9456	413520	20237	725	89265
1975	6232	4271	78676	151554	14874	11624	62062	10344	256741	25719	8819	368785
1976	3041	2379	101528	115481	84557	22588	22339	6397	503476	20145	60208	79161
1977	522	1483	59837	14230	30476	26911	19406	21754	323383	1134	3570	662282
1978	154	195	111076	5108	173	485036	1176	1938	404946	1748	17	95787
1979	75	151	79650	821	761	90613	677	1644	547801	246	2133	1266056
1980	80	755	95636	24	25	10480	1211	1940	412868	758	611	152941
1981	62	331	81753	96	580	24525	566	507	358408	2043	1	1470137
1982	261	740	106325	91	409	1275795	2494	6957	461621	1	5739	31702
1983	0	0	95771	0	0	25653	0	0	478188	0	0	764763
1984	256	2202	132204	21	208	13143	772	2000	503757	530	187	37320
1985	403	587	73554	4128	49	413230	2397	2140	376579	7877	8	1196172

CATCH BY SPECIES AND GEAR IN PIECES 1970-1985

AREA : NORTHWEST VANCOUVER ISLAND

	CHUM			STEELHEAD			DAYS OPEN			DELIVERIES		
YEAR	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL
1970	15871	90804	6759	37	0	63	0	0	0	350	120	14380
1971	28079	46196	4492	159	1	341	0	0	0	670	130	19950
1972	61387	58190	816	187	1	97	0	0	0	610	120	15800
1973	75942	101085	3222	96	0	60	0	0	0	860	210	14120
1974	89797	138954	3956	227	0	150	0	0	0	1940	290	17890
1975	68066	58935	6218	383	2	108	0	0	0	2520	280	15460
1976	25084	18269	3154	92	3	125	0	0	0	1870	220	15390
1977	4960	6210	5236	35	2	55	0	0	0	410	110	17070
1978	3035	3885	26249	6	0	209	0	0	0	60	0	22740
1979	94	264	11258	3	0	637	0	0	0	20	0	23450
1980	93524	289423	14575	8	5	124	0	0	0	410	310	25400
1981	31992	63505	5942	4	0	108	0	0	0	140	70	24860
1982	126192	356307	52823	644	23	97	0	0	0	450	240	28410
1983	0	0	5734	0	0	89	0	0	0	0	0	23150
1984	42023	103876	11581	2	7	148	0	0	0	690	420	21840
1985	84600	168014	175758	44	10	2783	0	0	0	1020	180	22130

TABLE 7 CATCH BY SPECIES AND GEAR IN PIECES 1970-1985

AREA : SOUTHWEST VANCOUVER ISLAND

	L. RED			M. RED			JACK			WHITE		
YEAR	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL
1970	1445	9	87540	0	0	115065	805	65	98048	0	0	10274
1971	1939	2431	186907	0	0	153169	604	1988	179820	0	10	28121
1972	1895	232	153427	0	0	148727	975	104	190163	93	0	27584
1973	2173	566	120611	0	0	157926	1555	1635	215635	30	2	54484
1974	1994	1162	116879	0	0	147789	1199	1673	221264	16	33	45643
1975	4549	4524	99635	0	0	147416	5140	7142	199608	55	4	33067
1976	8431	3432	152485	0	0	142085	10675	9858	235995	679	163	23087
1977	5313	6542	108875	0	0	133471	8646	11714	217003	719	219	47335
1978	21946	2719	161293	0	0	126791	9727	14778	129571	216	156	26538
1979	31436	3867	100413	0	0	123007	18446	6228	162809	92	71	14494
1980	30948	3563	108541	0	0	119153	5746	17800	139821	35	61	25004
1981	31332	4833	69228	0	0	86389	12095	24050	142696	102	78	17452
1982	37109	290	97139	3084	92	127046	3148	234	173587	36	112	39686
1983	35224	190	73267	1361	416	87845	1928	2307	110912	328	10	17560
1984	39914	133	81054	2746	274	95975	3789	1296	134534	199	5	16550
1985	2569	173	67485	8619	322	85060	9612	924	109901	173	11	11795

CATCH BY SPECIES AND GEAR IN PIECES 1970-1985

AREA : SOUTHWEST VANCOUVER ISLAND

	ALL SPRING			SOCKEYE			COHO			PINK		
YEAR	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL
1970	2250	74	310927	47531	4296	160836	5432	586	526594	598	279	48924
1971	2551	4429	548017	23106	20053	255996	4559	5742	1509385	46	806	564061
1972	2963	336	519881	112173	220	16586	6143	2649	601387	162	10729	3586
1973	3758	2203	548656	190139	37653	78592	9095	2385	1127748	374	6	477017
1974	3209	2868	531574	140018	81968	342578	1257	1315	1230483	127	243	26219
1975	11744	13670	468726	126708	98471	42910	3713	328	524507	629	479	237446
1976	20588	12483	554633	324301	404925	42194	9535	1512	1136783	1864	2463	71281
1977	14678	18475	506734	390977	711337	38395	5339	4297	1244496	291	1067	1038859
1978	31789	17653	444183	111578	82919	225752	24176	2043	955328	92	1568	9356
1979	49964	10166	400723	203733	524676	240343	22320	737	1365077	682	5843	1798353
1980	36729	21424	392519	292428	374997	12796	7059	4445	1325602	1552	2496	48962
1981	43529	28961	315765	391955	617495	19908	3864	2193	1026915	2805	1143	1283817
1982	43379	728	437458	229288	246756	914660	2954	995	1315815	5	383	4978
1983	38839	2923	289584	315336	603264	10948	1979	7074	1688961	1323	11445	326264
1984	46648	1708	328113	455373	463971	28654	6585	1204	1668414	56	1529	28651
1985	20972	1330	274241	254797	188847	616750	8314	10304	964107	2741	2604	634230

CATCH BY SPECIES AND GEAR IN PIECES 1970-1985

AREA : SOUTHWEST VANCOUVER ISLAND

	CHUM			STEELHEAD			DAYS OPEN			DELIVERIES		
YEAR	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL	GN	SEINE	TROLL
1970	16585	3847	2878	483	0	129	0	0	0	1680	50	50360
1971	15574	12505	1205	569	15	381	0	0	0	1110	140	51660
1972	34749	39341	466	904	0	167	0	0	0	2180	130	49780
1973	62365	33463	4193	396	20	342	0	0	0	3620	180	54800
1974	110	2371	1115	322	94	1051	0	0	0	2500	290	48160
1975	1549	59	2031	232	46	161	0	0	0	2870	580	46000
1976	8523	61697	1566	219	47	2234	0	0	0	5800	1250	47680
1977	446	1862	4731	283	113	237	0	0	0	5200	2650	57330
1978	31412	164076	4305	138	42	244	0	0	0	3700	990	51220
1979	1880	1402	7734	131	51	321	0	0	0	3930	1410	61950
1980	47612	78435	7302	291	49	461	0	0	0	6580	2250	68470
1981	20173	20249	3431	241	60	617	0	0	0	6490	1810	55610
1982	9596	29328	20603	140	27	171	0	0	0	5640	840	60600
1983	93	277	3341	158	167	457	0	0	0	7380	1590	55610
1984	11011	176106	1349	966	90	394	0	0	0	13950	2630	77210
1985	175373	1334597	36965	401	44	946	0	0	0	7820	1950	40170

RESEARCH NEEDS FOR COHO SALMON

The Pacific Salmon Treaty Coho Technical Committee met on February 3–4, 1986 to discuss, among other issues, current research activities and identify future research needs. Annex III of the treaty "establishes a joint coho technical committee to evaluate stock status and make management recommendations for the resolution of conservation and international allocation problems" and as a result, information on coho stocks and management strategies must be developed. The Joint Coho Technical Committee recommends that the following categories of research and monitoring be conducted by the parties, recognizing the importance of close cooperation to the utility of research results:

1) Improvement of spawning escapement estimation techniques.
2) Determination of wild stock productivity.
3) Determination of stock composition for fisheries of concern.
4) Establishment of an indicator stock program.
5) Development and improvement of run strength forecasting and estimation techniques.
6) Simulation model development.

The Coho Technical Committee recommends that integrated research be undertaken to fulfill the information needs in each of the above categories and proposes the guidelines described below. The above information needs do overlap to some extent, so cost–effective research can be done that combines more than one information need. For example, indicator stock tagging can be used to estimate spawning escapement and, to some extent, stock identification in mixed–stock areas, while spawning escapement estimates can be used to improve run strength predictions. Managing coho stocks according to the standards of the Pacific Salmon Treaty will require a commitment to fund necessary research.

1. Improvement of Spawning Escapement Estimation Techniques:

Applicability: Reliable escapement estimates are needed to determine optimum escapement and production potential, to monitor the status of wild stocks, to evaluate progress towards rebuilding depressed stocks, and to develop more accurate run size forecasts. If CWT recoveries become the key tool for stock identification in mixed stock fisheries, accurate escapement estimates will be needed to account for wild production.

Current Knowledge: In many cases, current escapement estimates for coho require validation. Coho escapement is estimated in many areas by counting spawning adults and/or redds during surveys. It is impractical to attempt to survey all known spawning habitats because coho spawn in many small rivers and streams. In some areas, a series of index streams is established, and a counting methodology is explicitly defined and utilized year after year. From these counts, a total escapement figure is derived. Many of these escapement estimates are more appropriately indices, since the true escapement is not available for comparative purposes. This is not necessarily a problem for monitoring stock status as long as the year to year patterns are consistent indices of true escapement and the escapement goal is expressed in the same terms. However, if the escapement index is used to estimate total production (for stock composition purposes), or if the escapement goal number is not comparable to the index, accurate estimates of true escapement will be required.

Coho often migrate up–river during or after freshets when water visibility is poor.

Inclement weather and poor light typical of the late fall and winter periods when coho spawn affect visibility during counting. The protracted spawning timing and difficulty of observing coho in streams also contribute to the estimation problem. The use of weirs to trap and count coho can provide accurate counts, however, weirs are expensive and can be washed out by freshets.

Research Needs: Studies are needed to develop, validate and improve spawning escapement estimation procedures in all areas. Such studies include mark–recovery studies, comparisons of weir counts to various indexing methods, acoustic studies, exploitation rate studies on hatchery returns, and validation of indexing as a tool to obtain estimates of escapements within and between systems.

2. Determination of Wild Stock Productivity:

Applicability: Coho productivity, in terms of the harvest rates associated with maximum sustainable harvests, is likely to vary between stocks. This variation largely results from the impacts of the physical and biological characteristics of habitat on stocks. There are two basic approaches that could be taken to address stock productivity: (a) cause–effect inferences drawn from results of programs involving indicator stocks to monitor harvest patterns and escapement estimation; and (b) quantification of relationships between habitat, spawner density and productivity. The first alternative is capable of providing productivity information only in the long term. The second alternative may more quickly identify problem areas as well as provide information of potential value in stock abundance forecasting. In addition, if controlling relationships between habitat and productivity can be determined, the status of the resource can be assessed and the harvest management and/or habitat management activities needed for optimal productivity can be defined.

Current Knowledge: Current activities involving estimation of spawning escapement and indicator stock programs are summarized in other sections of this report.

For coho salmon, wild stock productivity data is restricted to some specific southern U.S. stocks for which spawner, smolt and recruitment data are available.

Guidelines such as the number of spawners required to produce maximum sustainable harvests based on stock–recruit data, and the optimal number of spawners per kilometer required to fully seed available habitat are regularly used by management agencies in Washington and Oregon to set management objectives. Average values collected from past studies are most often used. The available information does not allow for the calibration of individual streams based on their own attributes. Data are unavailable for interior and northern coho stocks.

Current Research: Productivity studies are being conducted on a few selected streams. Most of these studies are in the southern U.S. and B.C., and are often being conducted to determine impacts of certain activities, such as logging or urban development, on productivity.

Research Needs: Research needs for spawning escapement estimation and indicator stock programs are described in their respective sections of this report.

The factors which determine the capability of a given stream to produce coho should be identified and measurement parameters quantified so that generally applicable production models can be developed. In particular, research on the productivity of interior Canadian, Northern B.C. and SE Alaska coho stocks is needed because the habitat criteria controlling

productivity in these areas are probably not the same as in Southern B.C., Washington and Oregon. The ability to model the relative and actual productivity of a particular stock based on habitat and other environmental parameters should be investigated to enable escapement targets and harvest rates to be established in a manner that is sensitive to regional differences in management philosophy and capabilities. An area requiring particular attention is the determination of the contribution to adult production of coho fry that emigrate from their brood stream.

3. Research on Stock Identification Methods:

Applicability: Almost all marine area fisheries catch coho that originate from more than one river system, and many fisheries catch coho that originate from more than one country. Stock composition information is necessary for determining the production potential of each stock, the current status of the stocks, the stocks that contribute to a given fishery, and for the construction of simulation models to evaluate the impacts of proposed management regimes.

Current Knowledge: Three methods have been used to estimate stock composition. None of these methods are currently used for in-season coho management. However, by assuming that the population distributions of the stocks have not changed, and the relative change in abundance from the historical base period to the current time period is known for each stock, these methods have found use in pre-season planning.

The first method utilizes data from the adult tagging studies (i.e., fish caught, tagged and released at sea) conducted in the late sixties to estimate stock composition in net fisheries in Puget sound, Georgia Strait and Juan De Fuca Strait. Adult tagging as a means to estimate stock composition in marine areas is unsatisfactory because of high costs associated with tagging enough fish in each fishery to get adequate tag recoveries, and bias in estimates associated with the tags that are not recovered, especially those on wild spawning fish.

The second method for estimating stock composition, which has been used widely in recent years, is to expand the coded wire tag (CWT) recoveries selected as being representative of each stock, by a production factor to get estimates of total stock contributions. This approach requires the determination of production factors for each component contributing to a fishery of interest. It has been difficult to derive a consistent and straight-forward means of estimating production factors for both the hatchery and wild stocks; Canadian researchers are currently working on methodology that could lead to a solution to this problem.

A third method, which has been used in the Oregon ocean fisheries, is scale analysis. Only three broad stock categories (hatchery, wild and accelerated hatchery) are distinguishable with current techniques, but estimates have been revised several times to correct for classification judgments by scale readers.

Current Research: Coded wire tagging programs are being conducted coastwide and the information gained from these studies will be useful for stock identification.

At this time, the most active area of stock identification research is Genetic Stock Identification (GSI). This method involves identifying unique genetic marks in the protein structure of enzymes, which can be separated and identified using electrophoresis techniques. Fred Utter of the National Marine Fisheries Service reported favorable results from a preliminary baseline study of eight southern U.S. and Canadian coho stocks. Twelve genetic

Stock identification techniques should be evaluated with respect to their applicability to the full range of mixed–stock problems. For example, is the technique likely to discern catches of intermingled wild stocks from adjacent river systems or from major geographic regions? What level of detail is feasible and practical to attain, with the technique, in the estimation of catch composition for fisheries exploiting a large number of stocks?

Adult tagging studies in marine areas are not recommended because of the bias associated with the resulting stock identification estimates and the large costs.

At this time, the CWT is the only developed and successfully applied method of stock identification. Some of the imprecision surrounding the production factor can be reduced as improvements are made in hatchery counting techniques and marking strategies, wild stock escapement estimates, and as information from comparative CWT studies on the relative distribution of wild and hatchery stocks becomes available. However, the imprecision in estimates of production factors will never be entirely eliminated. Reliance on CWT's for stock identification requires more extensive tagging than necessary for the indicator stock program. The indicator stock tagging program will ultimately involve those stocks that are of key management interest, while stock identification would require representative tagging of all stocks. Representative tagging of all stocks for the purpose of stock identification is not the most cost–effective research priority at this time.

Genetic Stock Identification (GSI) research should be conducted to extend the number of stocks in the coho baseline and determine the feasibility of employing the technique for stock identification. GSI may prove to be operationally expensive, but it could potentially prove valuable in identifying wild stocks.

Pending the preliminary results in using optical scanners to discriminate stock–specific scale patterns, the committee recommends conducting an expanded pilot program to develop a limited scale baseline for the 1985 or 1986 brood of coho, and determine its effectiveness in stock identification.

Scale marking is a potential method of hatchery stock identification that would be precise and cost effective. Coho is an excellent candidate for this method because of the long hatchery rearing time. Scale marking should be a topic for investigation.

Daily growth rings can be identified on fish otoliths using high resolution techniques. A pilot study on the use of this technique for identifying or marking coho stocks needs to be initiated, perhaps concurrent with the scale marking research recommended above. Otoliths may provide better resolution for identifying different natural and induced marks than scales because scale growth is more affected by external environmental events that will differ for each fish and between different scales on the same fish. Thus, it might prove worth the extra effort of extracting and handling otoliths.

Fin–clipping of the entire hatchery stock production is similar to scale tagging of hatchery production. The method is simple, and needs no further development. Because of labor and induced mortality costs, it is not likely to see a lot of use if the scale tagging experiments prove to be a success. Fin–clipping is not recommended for the purpose of stock identification at this time.

4. **Indicator Stock Programs:**

Applicability: In order to monitor and evaluate the results of coho management actions, a

marks were found to have different frequencies among the baseline populations. Another technique which has had some success in distinguishing between bird populations is nuclear DNA analysis.

Stock identification by scale pattern analysis is currently an area of renewed interest. A computerized optical scanner has been developed that is capable of rapidly reading many scale characteristics and will eliminate the time and subjectiveness from the task of reading scales. This tool is currently being evaluated to determine its ability to discriminate stocks by using scales of known origin in existing collections. A pilot study currently in progress is attempting to discriminate different hatchery and wild stocks in the Stillaguamish, Snohomish, and Skagit rivers, and the nearby marine net fisheries based on naturally–occurring scale characteristics.

Another area of research is the marking of scales through deliberate hatchery practices and dietary changes. Canadian scientists have had experimental success in marking scales using tetracycline and rare earth markers that can be detected in the scale tissue of the returning adults. The University of Washington is currently experimenting with scale marking of hatchery chinook by altering the photoperiod and adding phosphate to the diet to induce or suppress scale ring formation.

The entire Georgia Strait coho hatchery production of the brood returning in 1986 has been fin–clipped. Samplers will be collecting information on the incidence of left and right ventral clips in the catches on both sides of the southern international border. An evaluation of this method as a means of stock composition analysis should be made.

Research Needs: The potential value of stock identification methods needs to be evaluated in light of the following criteria: accuracy, cost, potential in–season applicability, applicability to wild stocks, and stage of development. Accuracy, the most important criterion, can be measured by two parameters: unknown bias, which must be kept to a minimum, and variability, which must be taken into account when more data or better methods are not available. Given these criteria, the following qualitative assessment can be made, rating each method from favorable (+) to unfavorable or not applicable (–). The following table is a crude assessment, and future research should clarify matters substantially. The final criterion is the stage of development, which is an issue of concern in the short term.

	CRITERIA					
	(1)	(2)	(3)	(4)	(5)	(6)
Adult Tagging	–	–	–	–	–	+
Coded Wire Tags	–	+	–	+	+	+
Genetic Stock Identification	?	?	–	–	?	–
Scale Reading–Natural Marks	?	?	+	+	?	–
Scale Reading–Induced Marks	+	+	+	+	–	–
Fin Clipping	+	–	–	+	–	+
Otolith Reading	?	?	–	–	?	–

where: (1) = Bias; (2) = variability; (3) = Costs; (4)= In–Season; (5)= Wild Stock applicability; and (6)= Development.

system of indicator stocks must be established. While there are several techniques that might eventually prove useful as research results become available, currently indicator stocks can best be identified through coded– wire–tagging programs. Indicator stock tagging involves consistent tagging of stocks that are considered representative of stocks from a given geographic region. Harvest rates and interception rates on these stocks, and changes in these rates under different management regimes, are intended to be indicative of rates on all stocks from the region represented. Indicator stock tagging is necessary to determine stock status, and to evaluate impacts of management actions. An additional use is to tag stocks that are known resource problems, in order to directly monitor the effectiveness of management actions in providing additional protection for weak stocks.

Current Knowledge: In the southern U.S. areas some hatchery stocks have been tagged for many years, and therefore, their general catch distribution and harvest rates are known. Unfortunately, much of this tagging has been sporadic, so that data are not available that are consistent for all major regions. Therefore, differences between years and between regions cannot be readily and adequately assessed. Much of the past tagging has been for the purpose of hatchery research and evaluation, rather than for stock monitoring. In southern British Columbia, a comprehensive tagging program has been conducted on all major hatcheries since at least the mid–1970's. Catch distribution and harvest rates are known for these stocks for this time period. In northern British Columbia and SE Alaska, less tagging has been conducted, and therefore, the migration, catch distribution and exploitation rates for these stocks are not as well understood. For all areas, knowledge of catch distributions and ocean harvest rates for wild stocks is poor. The degree to which hatchery stocks are indicative of distribution and harvest rate patterns of local wild stocks is poorly known.

Current Research: Much of the current tagging is being applied for the purpose of hatchery research and evaluation. There is a limited amount of hatchery stock tagging for the purpose of stock monitoring. Several wild stock tagging programs are being conducted, but most have limited scope.

Research Needs: A consistent, annual program of marking key indicator stocks should be established. Currently, CWT is the most suitable method of marking individual stocks. The specific stocks to be tagged and the number of tags per release group should be identified through consultation by management agencies and the Coho Technical Committee. In the southern U.S., this program will require increased and/or redirected tagging efforts on hatchery stocks to be used as indicators. In addition, wild stock tagging is necessary to evaluate similarity in distribution to hatchery stocks, and to determine which, if any, should be included in the indicator stock tagging program. In British Columbia and S.E. Alaska, wild stock tagging efforts should be expanded to fully identify different stocks, their catch distribution and harvest rates.

5. Run Strength Predictors

Applicability: Run strength estimates are indicators of stock abundance, and they are necessary to determine the permissible harvest level for different fisheries, which will meet harvest rate, escapement, or allocation objectives. These predictions would be input to simulation models to evaluate the impacts of proposed management regimes, and their effect on future production.

Current Knowledge: Run strength predictors vary from region to region. The Columbia River, Oregon and California run strengths (i.e., the OPI index region) are predicted by jack

returns to the hatchery racks. Run strengths to this region are most variable from year to year, and this appears to be associated with variability in marine survival. Run strengths to Puget Sound are more stable, and have been correlated to low river flow levels during juvenile rearing. British Columbia and Alaska have made only qualitative run strength predictions. Even with accurate forecasts, the Georgia Strait stocks would be difficult to evaluate because of variations in distributions.

Current Research: The Oregon Department of Fish and Wildlife has ongoing research to improve the OPI index predictor and improve the understanding of the interaction of upwelling and the survival of outmigrating juvenile coho.

Research Needs: Both Alaska and Canada need to start collecting and evaluating predictive variables for their coho runs. For Georgia Strait and Puget Sound stocks, predictions of distributions between inside and outside fisheries should also be investigated. Formal jack counts at Washington Coast and Puget Sound hatchery facilities, and accurate estimates of brood escapement and smolt outmigration, may lead to improved abundance predictors for Washington stocks.

6. Simulation Model Development

Applicability: Simulation models are necessary to determine whether a proposed management plan will meet predetermined escapement, harvest rate, and allocation objectives.

Current Knowledge: The Washington Department of Fisheries/National Bureau of Standards Model has demonstrated the utility of models as analytical tools for the management of Washington and Oregon fisheries. At present, there are several U.S. and Canadian models simulating fisheries, stock distribution and migration. Present limitations to these models have been the timeliness of the data input, limited data availability, and the time and costs of using these models. The development of the U.S./Canada chinook model as a simplified fisheries model for joint assessment of the coast-wide rebuilding plan has shown the value of having agreed-upon analytical tools.

Current Research: Recently, Canada has been working to make their mark-recovery and catch data available on a more timely basis and with easier access. Analytical procedures are being developed to account for total hatchery production in a specific fishery and for wild stocks associated with specific marked hatchery releases. This will provide a powerful tool for constructing models in the future.

Several stock separation models are currently under development by Canada. Information on stock distribution and harvest rates will be expanded with the development of a key stream or indicator stock program.

Currently, a micro-computer spreadsheet model by Morishima and Cooney is being evaluated and utilized by the Washington and Oregon coastal resource managers for preliminary assessment of ocean management options. It has an advantage over the WDF/NBS model because it is easier and less expensive to use. It can be used"on-line" during management negotiations.

Research Needs: One or more models need to be developed for use by the Coho Technical Committee. Important features of these models include ease of construction from raw data, accessibility, interaction with chinook models (i.e., season scenarios developed for

management of one species can easily be assessed on a model for another species), ease of use, and simplicity. The committee believes that model development should be a joint effort to assure mutual confidence in application. If possible, models should be developed by members of the Coho Technical Committee directly, or in close cooperation with other experts in responsible management agencies.

CANADIAN AGENCY REPORT ON COHO SALMON

June 16, 1986

prepared by the

Canadian Section of the Coho Technical Committee

as an Appendix to the 1985 Report of the

U.S./Canada Joint Coho Technical Committee

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INTRODUCTION

Coho salmon (Oncorhynchus kisutch) in British Columbia are harvested in significant numbers by the commercial, sport and Indian food fisheries (IFF). The total catch of coho salmon, which averaged 3.98 million during the period 1980 to 1984 (Tables 1 to 3), has shown no distinct trend since 1951 (Fig. 1). The commercial and sport catches have been relatively stable while the IFF catch has been increasing in recent years (Figs. 2 to 4).

This document is the Canadian agency report for coho salmon. It will be appended to the joint report to be prepared by the Coho Technical Committee for presentation to the Northern and Southern Panels and the Pacific Salmon Commission. It presents available stock and fishery information for British Columbia coho salmon as well as descriptions of enhanced production and data collection methodologies and limitations. Detailed fishery reports on the 1985 season have been prepared by Canada and submitted to the Southern and Northern Panel and will not be included in this report.

FACTORS AFFECTING THE ASSESSMENT OF COHO STOCK STATUS IN BRITISH COLUMBIA

Stock Productivity

In determining the status of coho stocks there is a temptation to compare current spawning densities against historic levels. Stock problems are believed to exist when current densities are below historic levels. Very little attention is paid to stock productivity or the ability of a stock to produce a surplus to spawning requirements. This section addresses the subject of coho productivity and its effect on the evaluation of stock status.

a) An overview of the freshwater biology of coho salmon

It has been well known among stream ecologists since at least the 1950's that coho smolt production is more often limited by biological and physical characteristics of rearing habitat than by spawning escapement. The availability of high quality spawning gravel is not relevant for coho if it is not associated with quality rearing habitat. Mundie (1969) pointed out that the features that make British Columbia streams such excellent fry producers (largely abiotic with a constant flow of turbulent cold water for oxygen transport) are opposed to the features required to produce smolts. He states that because of this,

"...coho are likely to be produced in countless streams in excess of their holding capacity as,determined by food production and suitable space."

It is well documented that smolt output from many coho streams is fairly constant over a wide range of spawner numbers (Salo and Bayliff 1958, Chapman 1962, Holtby 1985) and fry densities (Lister and Walker 1966). The mechanisms which control this constancy have been described by Chapman (1962, 1965), Mason and Chapman (1965), Ruggles (1966), Mundie (1969, 1971) and Holtby and Hartman (1982). These mechanisms include a limited food supply, the territorial behaviour characteristic of juvenile coho and limited protective cover. Emigration from the natal stream is the result when fry supply exceeds the rearing capacity (Tschaplinski 1982, Hartman et al 1982, Chapman 1962, Mason 1974, Crone and Bond 1976). Although there is evidence from scale pattern analysis that these emigrant fry do not contribute to the adult spawning population (Mason 1976, Crone and Bond 1976) it is not conclusive and Tschaplinski (1982) and Crone and Bond (1976) were able to demonstrate that fry could survive for a period of time in brackish water. Coho fry are commonly observed in estuary areas throughout the summer but their survival to the smolt stage has not been documented. Mason (1976) found emigrant coho fry that had been marked in Sandy Creek on Vancouver Island rearing in an adjacent Georgia Strait stream a few hundred meters away. In tributaries of larger rivers emigrating fry can also rear in adjacent streams and lakes without the physiological stresses experienced by fry in coastal areas.

Marshall and Britton (1980) surveyed the literature and concluded that smolt production in numbers or biomass could be predicted if the length or area of accessible stream habitat was known. Holtby and Hartman (1982) developed a multiple regression model that used summer thermal summations, minimum winter temperatures and maximum mean daily winter flow. Slaney et al (1980) considered wetted area and length, nutrient levels, habitat complex, discharge or flow and stream temperature to be important. McIntyre (1983) recognized the need to determine smolt carrying capacities for streams before hatchery outplants were made. He found that late summer discharge was related to both the smolt capacity and the egg to smolt survival rate. Oswood and Barber (1982) used stepwise regression analysis and principle components analysis on 24 stream habitat variables to predict juvenile abundance. Stream features predictive of fish density differed substantially among stocks. None of these approaches considers the number of parent spawners or the number of emergent fry as primary indicators of smolt production.

b) Optimum spawning density

Beidler et al (1980) suggest that 40 spawners per mile or 25 per kilometer might be optimal for Oregon coastal wild coho. Oregon's current escapement goal of 200,000 wild coho represents a density of 26 spawners per kilometer. In Puget Sound, smolt

capacity per unit surface area of habitat is used to calculate escapement goals (Zillges 1977); on the average, a spawning density of approximately 15 spawners per kilometer length of rearing area is required (calculations by the authors of this report). After an extensive analysis of spawner densities and smolt outputs Marshall (1980) suggested that 60 spawners per kilometer of stream is adequate for a small stream and 100 spawners per kilometer for a large stream. He also cautioned that stream escapement targets should be set relative to their individual productivity. Based on fry rearing capacity, Holtby (1985) estimated the upper and lower bounds of desirable escapement for Carnation Creek on the WCVI at 30 and 120 females respectively. This translates into a density of 17 to 68 spawners per kilometer. Kadowaki (1985) performed a stock-recruit analysis on three coastal coho stocks and suggested that maximum sustained harvest (MSH) could be achieved at 40 to 60 spawners per kilometer.

c) Summary

As one of the initial steps in developing a sound assessment program for coho it is important that guidelines be established to set escapement goals. There appears to be sufficient data to determine the boundaries of the problem and what remains is to fine tune the numbers given our management capabilities and objectives. In addition, a monitoring system that accurately measures at least a consistent portion of the escapement for a network of key streams should be established.

Escapement Enumeration

In general, estimates of spawning escapements for coho are not considered to be reliable enough to be useful for stock assessment purposes. They are used in this report as indicators of trends in abundance but the relationship of these indices with actual escapements is not known for any stock at present.

Factors which affect the reliability of the coho escapement record include the following;

a) very protracted duration of spawning run

b) poor visibility due to late fall and winter weather conditions and coho behavioural characteristics

c) reduction in manpower for this activity

d) inconsistency in streams and sections of streams surveyed each year

Figs. 5 to 12 show the variation in number of streams surveyed each year between 1953 and 1983 (data from Wong et al 1985). They indicate a remarkable constancy in the total number of streams monitored for coho throughout this time period. The record by production area is interesting, however, because of the obvious trends in some areas. On the Queen Charlotte Islands there is an increasing trend since the mid-fifties with a noticeable dip in the early seventies. Skeena/Nass and Central coast areas have reported a fairly stable number of streams overall but year to year variation, even recently has been up to 50 percent of low years. Johnstone Strait and the west coast of Vancouver Island have shown the sharpest decline in number of streams surveyed, especially in the most recent five years of the time series. Fraser area streams surveyed have shown a steady increase since the mid-fifties while Georgia Strait has been fairly stable.

These inconsistencies make the analysis of aggregate escapement estimates meaningless and indicate that a stream by stream approach to the escapement record is required.

Analysis of Catch Data

Stock status is difficult to infer from catch data without a reasonable understanding of the stocks contributing to the fishery and the regulation and gear patterns in the fishery. This means that all enhanced production should be identifiable in the catch so that the aggregate wild stock composition is known. All of this information should be documented since the analysis of catch data could be an important source of stock assessment information for coho. Our current understanding of catch data is presented in the section on Fisheries below.

Coded Wire Tag Data

In order to calculate exploitation rates from CWT data, a reliable estimate of tags in the spawning escapement and in fisheries is required; however, for most hatcheries, the escapement of tags is generally unknown because straying rates within the hatchery stream or to nearby streams is not normally assessed. A positive bias in the exploitation rate estimate can result if escapement is underestimated. For the purpose of this report, only two hatchery stocks are used as exploitation rate indicators. The Big Qualicum River and Capilano River have very little spawning area that is not assessed by hatchery staff and are considered to be reliable exploitation rate indicators.

In addition to biases due to incomplete recoveries in the escapement, problems with recoveries in some fisheries also exist. In particular, there is no program to systematically recover CWT's from most Indian food fisheries. Stock specific harvests can be estimated only from gross harvest rate estimates

calculated from catch and escapement data. Estimates of the sport fishery catch of CWT's are confounded by uncertainties in the awareness factor (proportion of tags caught which are turned in by the sport fishery).

Potential Enhancement Effects on Wild Coho Production

The potential effects of enhancement on wild coho production is largely dependant on the enhancement technique used. As discussed above, there are several methods of coho enhancement in British Columbia. The most common technique, used in major facilities, is the release of coho smolts from the hatchery site (on-site smolt release). Coho can also be incubated and reared artificially prior to outplanting as fry or smolts into streams with existing coho stocks (augmentation). Augmentation of native stocks usually occurs when the perceived wild production is well below optimal levels. Coho can also be incubated and outplanted as either fed or unfed fry or smolts into streams without existing native stocks (colonization). Colonization normally occurs in streams above barriers which exclude anadromous salmonids. An often overlooked method of enhancing coho production involves the improvement of stream rearing and spawning habitat. This could take the form of creating cover, controlling flow or improving gravel quality. The potential impact of each technique on wild coho production is reviewed briefly below.

a) On-site smolt release

The vast majority of enhanced coho production comes from this source. Contributions made to the commercial and sport fisheries are well assessed through the recovery of CWT'd adults. Estimates of the contribution in 1985 indicate that hatchery coho accounted for 12.7 percent of the combined sport and commercial catch.

Impacts of this type of enhancement on wild stocks include; 1) the creation of mixed stock fishery problems and 2) genetic effects due to interbreeding.

In addition to these impacts, benefits to wild stocks can also result from judicious hatchery and management strategies. For example, exploitation rates on depressed wild stocks can be reduced by increasing the enhanced component of the catch under a ceiling or quota management scenario. Large enhanced runs, which can be harvested in discrete locations, can also divert fishing effort away from depressed wild stocks.

b) Augmentation of native stocks

The augmentation of native stocks is a technique whereby fry or smolts from the native stock are planted at a level which, in combination with existing wild production, will result in the full utilization of available rearing habitat either by the outplanted coho or by their progeny. This technique can mitigate situations where harvest pressures on a stock are excessive or where the availability of spawning gravel is limiting production. Augmentation can entail either;

i) temporary enhancement over one or two cycles of stocks which are thought to be sufficiently productive to withstand planned harvest rates, or

ii) long term, small scale enhancement of stocks which may be unable to withstand planned harvest rates.

The augmentation of native stocks with fry plants requires very intensive assessment and the greatest degree of operational flexibility. It also has the greatest potential for impacting natural stream rearing salmonids.

The outplanting of smolts is the simplest form of this strategy, and the form which entails the least risk since instream interactions are minimized. The information required for the successful implementation of this strategy appear to be simple: a knowledge of the escapement level associated with optimum production and the number of additional smolts required to return that number of adults (i.e. current escapement level and smolt output, survival levels and harvest rates). Possible impacts include lost production through over-escapement and associated superimposition on the spawning grounds, and interbreeding with wild coho.

Enhancement facilities often produce fry which are substantially larger than wild fry at the time of planting. Assessment studies in Oregon have attributed massive displacement of wild fry to this factor. Given the concern over displacement of wild fry by outplants and over the interbreeding of hatchery and wild origin adults, genetic studies to determine the consequences of hatchery versus wild incubation and rearing are recommended.

c) Colonization

Potential impacts of colonization on wild production are much less than for augmentation since wild stocks do not inhabit the outplant area. Colonization can impact wild production, however, through interbreeding with stocks downstream from the outplant site. Thorough assessments of the rearing capability of the habitat to be colonized is essential in determining stocking densities; overloading the target area could result in downstream

diplacement of fry into inhabited areas. Since this technique is largely experimental intensiye assessment of fish production and potential impacts on wild stocks should be carried out before it becomes a source of major production. In addition, a means of harvesting or transporting returning adults impeded by the stream barrier to barren spawning grounds should be developed.

DATA SOURCES

Escapement data is currently being organized into a regionally accessible central computer (VAX) format. For this report estimated escapements are from data sets maintained by fishery management units in New Westminster and Prince Rupert. They will be updated in future stock assessment reports when escapement estimates in the new data base are verified. Data on the number of coho streams monitored, however, are derived from this data base and contained in a report by Wong et al (1985). Escapement data are only used in this report to give an indication of escapement trends and not to reflect absolute abundances.

Catch data come from a number of sources. All commercial catch data prior to 1970 are from the catch data system on the VAX computer at the Pacific Biological Station (PBS) in Nanaimo (Wong 1983). Commercial catch data from 1970 to 1984 are from published catch statistics of the Department of Fisheries and Oceans. In the past these data have not included information from late sales slips; however, this data set has been used for management and international negotiations. Since discrepancies with the revised data base are small these data will be used in this report to avoid confusion.

Sport catch data for 1980 to 1985 are from the Georgia Strait Creel survey program conducted by contractors for the Department of Fisheries and Oceans. The data for 1972 to 1978 are extracted from Argue et al. (1983) and the 1979 estimate is an average of the 1973, 1976 and 1982 cycle year catches. Sport catch data for other coastal areas are not available in a compiled and verified form and are excluded from this report.

Fraser River Indian food fishery (IFF) catch has been summarized and reported by Schubert (1983, 1984 and 1985). IFF catch data for the rest of B.C. are contained in an unpublished manuscript (James 1984). Data are collected by fishery officers and are probably the least accurate of all catch data.

CWT data from the 1975 brood year to the present were obtained from a data base maintained on the PBS VAX computer in Nanaimo. Earlier data (back to the 1972 brood year) will be available on this data base in the near future.

STOCK STATUS

The assessment of salmon stock status requires the evaluation of escapement and catch against values which represent the maximum long term sustainable yield of each stock. For wild coho, stock specific escapement and catch levels are not known with sufficient accuracy to permit conclusive evaluations at this time. Circumstantial evidence, however, such as trends in terminal run size permit some subjective evaluation of major stocks like the Fraser and Skeena. In addition, high harvest rates on some Georgia Strait hatchery stocks might indicate that wild stocks are being over-harvested. Despite the deficiency in the escapement record the data will be referred to in this report as indicators of trends in escapement in areas with a consistent reporting pattern.

It will not be possible, given the analytical tools available, to assess the status of each individual stock in B.C.. Instead, the stocks are divided into the following stock aggregates which are broken down further into statistical areas (Fig. 13) in some cases;

Queen Charlotte Islands - Areas 1, 2E, 2W
Skeena/Nass - Areas 3 to 5
Central Coast - Areas 6 to 10
Johnstone Strait - Areas 11 and 12
Georgia Strait - Areas 13 to 19
Fraser Region - Areas 28 and 29
West Coast Vancouver Island - Areas 20 to 27

Queen Charlotte Islands

a) Area 1

Coho are reported in 15 Area 1 streams with the majority located in Masset Inlet and Naden Harbor. Two-thirds of these streams are significant producers (escapements estimated to be in excess of 1,000). The Yakoun River, which empties into Masset Inlet is thought to be the largest producer. Based on sport fishery catches these stocks are believed to enter spawning streams in September and are available to ocean troll fisheries in July and August.

Current escapement is estimated to be one-half of the 1960's level. There is currently no information on ocean harvest distribution and exploitation rates for these stocks.

b) Area 2E

Coho have been reported in 106 Area 2E streams with current surveys covering around 60 of them. Major production comes from Skidegate and Cumshewa Inlets and the Tlell and Copper Rivers. CWT studies of Cumshewa Inlet coho at the Pallant Creek Hatchery indicates that the majority of the catch is taken in the north coast of B.C. and south-east Alaska troll fisheries. Exploitation rates are in the 30 to 40 percent range. Coho are also caught incidentally in terminal fisheries directed at pink and chum. In addition, there are small but growing tidal and non-tidal sport fisheries on many of the more accessible coho stocks. This is due, at least in part, to the large size of coho in this area and improved access to the Islands from the mainland.

Most stocks in this area enter spawning streams from mid-August to the end of October and are probably susceptible to ocean troll fisheries in July and August. Although escapement estimates are below historic levels, the low harvest rates estimated for the Cumshewa Inlet hatchery stock should be sustainable by most wild coho stocks.

c) Area 2W

Coho production from the west coast of the Queen Charlotte Islands is believed to be very minor. Chum are the most abundant and net fisheries directed at this species harvest very few coho incidentally. We currently have no ocean harvest information on these stocks.

Skeena/Nass

a) Area 3

Although Nass River tributaries account for most of the coho producing streams in this area, the coastal stocks have probably been more intensively surveyed. In the coastal area the major stocks are the Kwinimass, Khutzeymateen and Kincolith Rivers. These stocks are believed to migrate through the terminal Area 3 sockeye and pink fishery in August and September. They are caught in net fisheries directed at sockeye and pink and in ocean troll fisheries. The major Nass River stocks spawn in the Tseax, Cranberry and Meziadin Rivers. The Meziadin stock has been partially enumerated at a sockeye counting facility since the early seventies. The timing of this stock at the fishway (early August to mid-September) indicates a mid-July to mid-August timing through the terminal fishery. Net fishery interception is probably very intense during the sockeye fishery.

A total of 40 to 50 streams are surveyed for coho in Area 3. Escapement has been stable for the last fifteen years and appears

to be increasing in some areas. In the Meziadin, the 1985 fishway count (4,300) was the highest on record. There are currently no net fisheries targeting on coho but as recently as 1983, targeted fisheries were conducted if coho abundance was high. No information is currently available on the ocean distribution and harvest rate for any Area 3 stock but beginning in 1987 CWT'd smolts will be released from at least two rivers, the Kincolith and Tseax.

b) Area 4

Tributaries of the Skeena River constitute over 90 percent of the coho producing streams in Area 4. Upper Skeena and Bulkley River stocks, like the Babine and Morice Rivers respectively, probably migrate through the terminal fishery from mid-July to mid-September. The coho count through the Babine River fence peaks in September and tapers off very quickly through October. Lower Skeena stocks, like the Lakelse River, are later spawning and probably peak in the terminal fishing area in September. These stocks are probably impacted more heavily in the ocean troll fisheries than the up-river stocks but escape most of the terminal net fishery. Coastal Area 4 stocks are even later in timing than the lower Skeena stocks.

Current CWT information is very limited. Beginning in 1986, however, smolts from small enhancement facilities on the Babine and Kispiox Rivers will be tagged.

Terminal run size to the Skeena River appears to be stable at a level much lower than the 1950's and 1960's. Estimates of escapement, the Babine fence count and test fishery indices all point to a decline (Figs. 14, 15 & 17); while terminal gillnet catch per unit effort (CPUE) (Fig. 16) does not indicate a clear trend. Whether this level is below optimum is impossible to determine at this time. Ocean harvest data are critical for this assessment since the total catch will indicate if over-all production has declined. In response to the decline in terminal run, however, net fisheries have been restricted in recent years to those directed at sockeye and pink only. Despite these restrictions, a considerable overlap in timing still produces a significant coho harvest in these fisheries.

c) Area 5

The production from this area comes from about 30 small coastal streams. Many are lake fed and also support sockeye, pink and chum stocks. The timing of these coho stocks through the terminal net fishery is probably in August (backdating appearance dates on the spawning grounds). Ocean distribution is unknown. Current escapements are very low compared with the 1960's mean.

Central Coast

a) Area 6

The 46 coho producing streams in the northern half of Area 6 (Gardener Canal, Kitimat Arm and Douglas Channel) currently accounts for 75% of the Area 6 escapement. The remaining 73 streams in the southern half of Area 6 account for the remainder. Most of these streams are of the small coastal variety with none estimated to have more than 5,000 spawners. Ocean distribution, indicated by CWT recoveries from the Kitimat hatchery, show a predominant northward migration with most of the catch taken in the Alaskan and northern B.C. troll fisheries. Significant catches are also reported in northern net fisheries targeting on pink and chum and in the north-west Vancouver Island and central coast troll fisheries. Further tagging of Kitimat stock and of pre-smolts being outplanted from a community run hatchery in Hartley Bay will provide more information on these stocks in the future.

The escapement levels in Area 6 are currently less than half of previous highs with escapements to southern stocks more severely depressed than the northern ones. Stock status is unclear but declining troll catches in this area could be signalling less than optimum production.

b) Area 7

Coho production in this area is minor with current escapements estimated at less than 2,000. This is less than 10 percent of historical levels. There is currently no information on ocean harvest patterns. Tagged smolt releases from the McGlaughlin Bay community hatchery beginning in 1987 should provide some ocean distribution information in the near future.

c) Area 8

The Bella Coola River is the major coho producer in Area 8 with escapements estimated to be in excess of 20,000. This represents approximately 60 percent of the estimated Area 8 escapement. Escapements have shown a steady decline to less than one half the 1950's level.

CWT recoveries from the Atnarko River stock, tributary to the Bella Coola, indicate a more resident distribution than the Kitimat stock. Very few recoveries were made outside of the northern and central net and N.W. Vancouver Island and central coast troll fisheries.

d) Area 9

Of the 24 coho producing streams in Area 9, four currently average more than 1000 spawners. The current estimated escapement is slightly higher than historic levels.

e) Area 10

Area 10 has only seven coho streams, with only the Nekite River averaging more than 1,000 spawners. Current total escapements for the area is less than 2,000 spawners which is only slightly below historic levels.

Fraser River Region

The Fraser River region encompasses statistical areas 28 and 29. The major stocks in this region spawn in the Fraser, Squamish, Capilano and Seymour River systems and in the streams draining into Boundary Bay. For each of these stocks, escapement status (as indicated by mean escapements during the period 1980 - 1984), ocean harvest distribution, harvest in the terminal area, run timing in the terminal area and the magnitude of the current enhancement activities will be discussed.

a) Fraser River

The Fraser River is the largest coho producer in this region, with recent escapements (53,800) averaging 52 % of the Area 28/29 total. Until recently, Fraser River coho production was almost entirely wild; however, since 1980, six major and a number of minor enhancement facilities have become operational. The projected production from these facilities will constitute a substantial proportion of the Fraser River coho resource.

Coho return to the Fraser River between late August and mid-December and are harvested terminally in the commercial gillnet fishery, the Indian food fishery and the non-tidal sport fishery. The terminal commercial fishery harvests coho incidentally in the late sockeye, pink and chum fisheries; catches have declined sharply since 1951 and now average approximately 15,700. The Indian food fishery targets on coho later in the year, and catches are strongly influenced by the magnitude of pink and chum returns. Catches have gradually increased over the period of record and now average 30,900. The non-tidal sport fishery harvests coho most intensively in the terminal tributary areas and on the mainstem bars in the lower Fraser River. Catches in this fishery have not been monitored on a consistent basis; however, an intensive creel survey in 1984 reported a catch of 8,300 adults and 8,100 jacks in the lower Fraser River bar fishery. A similar survey was also conducted in 1985.

The migratory timing of coho through the lower Fraser River was estimated by examining trends in mean coho CPUE in the sockeye and chum test fisheries, in the Area 29D commercial gillnet fishery and in the Indian food fishery between Mission and Hope. The test fishery index is a combination of the coho indices in the sockeye (5.25 inch mesh) and chum (6.75 inch mesh) test fisheries during the periods August 1 to October 4 and October 5 to December 21 respectively (Fig. 18). Gear related differences in catchability resulted in a discontinuous index which was corrected by scaling the chum index by a factor of 4.66 (derived from paired comparisons on 91 days when both test fisheries operated concurrently) (Figs. 19 and 20). The resulting index indicates that migratory peaks normally occur in late September and mid-October, a pattern similar but not identical to that observed in the Indian food fishery and the commercial gillnet fisheries (Fig. 21). The above indices provide only gross estimates of migratory timing due to a number of problems with each: the scaled test fishery index assumes a linear relationship between the two gears which may not exist at all levels of abundance or in all years; the Indian food fishery index is biased by errors in catch estimation and by a lack of consistency over time in the unit of effort; the Area 29D gillnet fishery index is biased by relatively few data points after mid-September and by the use of a larger mesh net later in the year. The measurement of migratory timing at the level of precision required for management purpose requires a consistent test fishery spanning the entire migratory period.

The Fraser River coho resource can conveniently be divided into two main production groups comprising the upper and lower Fraser River areas. The upper Fraser group consists of an estimated 77 stocks which migrate past Hope and spawn as far upstream as the Quesnel River system, although the majority of spawning occurs in the Thompson River system. The upper Fraser group constituted approximately 24 percent of the Fraser River coho escapement during the period 1980 to 1984.

Current knowledge of the marine harvest distribution of these stocks is limited to a single year (1981 brood) of CWT data for several stocks in the North Thompson system. These data indicated that the majority of these fish were caught by the southwest Vancouver Island troll fishery, with a much smaller proportion taken by the northwest Vancouver Island troll and Georgia Strait sport fisheries. The Georgia Strait troll fishery and the net fisheries took few North Thompson River coho; however, the apparent high proportion of coho migrating outside of Georgia Strait in 1983/1984 may not have been typical of normal patterns. A more detailed assessment of marine harvest distributions will be available when CWT marked production groups return to the Upper Fraser enhancement facilities in 1987. Facilities now in operation in the Nicola (Spius Creek), North Thompson (Clearwater River, Barriere River, Louis Creek) and South Thompson (Eagle River, Shuswap River, Kingfisher Creek)

systems are expected to produce an estimated 78,700 adults through fry outplants.

The migratory timing of upper Fraser coho stocks was estimated from trends in mean coho CPUE in the Indian food fishery in the Fraser canyon between Hope and North Bend. (Fig. 22). The upper Fraser stocks are present in the river between late August and early December; however, the timing pattern is skewed right, with the mid-point occurring in the first week of October. This timing is approximately three weeks earlier than that observed in the Indian food fishery (IFF) between Mission and Hope. As a result of their earlier timing of migration, terminal harvest rates are felt to be considerably higher for the upper Fraser than for the lower Fraser stocks. This is due to their more concentrated presence in the terminal area during the commercial fisheries for sockeye and pink and during a period when the IFF is more intensive.

The lower Fraser coho group consists of an estimated 110 stocks which spawn in streams tributary to the Fraser downstream from Hope.

The marine harvest distribution of lower Fraser coho has been assessed through CWT studies in the Vedder-Chilliwack, Salmon, upper Pitt and Birkenhead River systems. These stocks are harvested most heavily in the sport, troll and net fisheries in Georgia Strait and Puget Sound, with substantial catches also occurring in the southwest Vancouver Island troll fishery and in the Johnstone Strait and Juan de Fuca net fisheries. Smaller but still significant catches are also taken in troll fisheries as far north as the central coast and in the Indian food and non-tidal sport fisheries.

Intensive enhancement of lower Fraser coho stocks, primarily through smolt releases, has occurred since 1980. Major facilities on the Chilliwack and Chehalis rivers and Inch Creek as well as a number of minor facilites are currently producing in excess of 2 million coho smolts.

Return to the river and escapement data for the Fraser River system are felt to be reasonable indicators of stock trends due to a high correlation (r^2=0.71) between the test fishery index and gross return (Fig. 23). Coho escapements have declined by an average rate of 1 percent per year since 1970, the period during which test fishery information is available (Fig. 24). Upper Fraser stocks have declined more sharply than lower Fraser stocks, averaging 2.2 percent and 1.8 percent per year respectively since 1970 (Fig. 25). Escapement trends since 1970 have varied considerably between cycle years. Escapements on the 1984 cycle have generally improved, increasing by an average 20 percent per cycle year since 1972 (Fig. 26). The 1984 escapement was the largest on this cycle since 1963. Escapements on the 1985 cycle have shown a general decline averaging 5.5 percent per cycle year since 1970 (Fig. 27). Escapements on the 1986 cycle

have shown a sharp decline averaging 15.1 percent per year since 1971 (Fig. 28). The 1983 escapement is the lowest ever recorded on this cycle and represents a serious conservation concern.

b) Capilano River

The Capilano River is the second largest coho producer in this region, with recent escapments (22,900) averaging 22 percent of the Area 28/29 total. Returns to the Capilano River have been dominated by the production of the Capilano River hatchery, a facility with a capacity to produce 167,000 adults. Current management is based entirely on hatchery production requirements. Escapements in excess of hatchery requirements have occurred virtually every year since hatchery construction.

Capilano coho are harvested primarily in inside waters (Georgia Strait and Puget Sound), especially in the Georgia Strait sport fishery, although significant numbers are also taken in the Georgia Strait troll, Puget Sound net and southwest Vancouver Island troll fisheries. The migratory timing of coho to the Capilano River is the earliest and most protracted in this region, ranging from June through November and generally peaking in early October. Coho are harvested in the terminal area by both the Indian food and sport fisheries.

c) Squamish River

The Squamish River is the third largest coho producer and the second largest wild coho producer in this region, with recent escapements (11,200) averaging 11 percent of the Area 28/29 total. The Squamish River coho resource is an aggregate of approximately 19 stocks, the most important of which spawn in the Squamish and Cheakamus rivers and Tenderfoot Creek. The harvest distribution of Squamish River coho was assessed by CWT recoveries of 1982 brood Tenderfoot hatchery stock. The major harvester is the Georgia Strait sport fishery, with the WCVI troll fishery also catching significant numbers. Washington State recoveries are not available at this time but wild stock tagging in the mid-seventies indicated significant interceptions by Washington troll and net fisheries. Squamish coho return to the river between mid-August and December and are harvested terminally in the Indian food and sport fisheries.

Since 1970 wild stock escapements have declined at an average rate of six percent per year, representing a serious conservation concern.

d) Seymour River

The Seymour River is the fourth largest coho producer in this region, with recent escapements (10,600) averaging ten

percent of the Area 28/29 total. Recent increases in escapement reflect in part the influence of a small hatchery, with a production potential of 9,750 adults, which was established in the watershed in 1977. These fish are caught primarily in the Georgia Strait sport fishery with significant numbers taken in the WCVI troll and Johnstone Strait net fisheries.

e) Boundary Bay

The Boundary Bay area consists of stocks in the Serpentine, Nicomekl and Little Campbell rivers which together average five percent of the Area 28/29 escapement. Current knowledge of the marine harvest distribution of these stocks is limited to a single year (1980 brood) of CWT data for Little Campbell River coho. In that year Little Campbell coho were taken largely in outside waters, especially in the southwest Vancouver Island troll fishery, with large numbers also taken in the northwest Vancouver Island and south central troll fisheries, the Johnstone Strait net fishery and the Georgia Strait sport fishery; however, this distribution may be atypical due to unusual environmental conditions (unusually warm water) during 1983.

Johnstone Strait

a) Area 11

This Statistical Area includes Seymour and Belize inlets which are on the mainland just north of Vancouver Island. The Seymour River is the main coho producer in the area but escapement levels are unknown. CPUE by anglers in this river has been very high in recent years, indicating that abundance is probably higher than for southern Georgia Strait stocks. Gillnet chum fisheries on local stocks were eliminated in the early eighties in response to declining abundance (based on fishery officer observations) and this has undoubtedly increased coho as well as chum escapements. There are no CWT data for these stocks and there are no plans to begin this type of assessment work in the near future.

b) Area 12

The major coho stocks in this area, which spans the most northern portion of Johnstone Strait, are on the mainland side. The Kakweikan, Glendale and Wakeman rivers support the largest stocks while on the Vancouver Island side the Nimpkish and Keogh rivers are the most important coho producers. Stocks on the Vancouver Island side are believed to be declining and enhancement activities have been redirected from other species onto coho in some streams. Coho in this area are very large and the sport fishery on these stocks has been increasing in recent

years. Some streams such as the Kluxewe River have been particularly impacted by logging activity and this, along with fishery impacts, both targeted (sport and troll) and incidental (during net fisheries on other species) have probably contributed to the declining trend.

CWT returns from 1976 brood wild Keogh River smolts indicate that the majority of the catch is taken in troll fisheries off the west coast of Vancouver Island and in the central coast area. Significant catches are also taken in the Johnstone Strait net fishery. At the time of tagging very few fish were caught in sport fisheries but this component of the catch has probably increased for reasons mentioned above. Coho pre-smolts from the Devereaux River in Knight Inlet were tagged in 1986 and more current information on catch distribution and exploitation rates will be available in the near future.

c) Area 13 north

The Salmon River on Vancouver Island and the Homathko River in Bute Inlet are the major stocks in this portion of Area 13. There is currently no catch distribution information for these stocks.

Georgia Strait

Georgia Strait coho production comes from a variety of sources that can be grouped into four categories; a) mid-Vancouver Island, b) south Vancouver Island, c) mainland inlets and d) hatcheries.

a) Mid-Vancouver Island

These streams drain the eastern slope of the Vancouver Island mountain range which bisects the island into two very different climatic zones. The east side is arid in summer with precipitation increasing from south to north while the west side is a typical west coast rain forest with high rainfall year round. Coho producing streams are typically limited by natural barriers to fish access formed by an escarpment running parallel to Georgia Strait. In summer, low flow conditions are believed to limit available rearing habitat and ultimately determine smolt production from these streams. Urbanization and agricultural demands for water in some areas further reduce the available habitat. Major wild stocks in this area are the Nanaimo River, Black Creek and the Little Qualicum River.

Fishery demand on these stocks is very intense. Georgia Strait supports by far the largest sport fishery in B.C.. The northern part of this area is the most intensely sport fished area within Georgia Strait. An abundance of feed, possibly due to converging currents, provides ideal conditions for coho during

their final summer of growth. In addition, net fisheries targeting on sockeye, pink and chum stocks are also very intense both in adjacent waters and in Johnstone Strait. Troll fisheries are another source of exploitation.

Spawning escapements to these streams are believed to be depressed. Whether this represents a decline in production is unclear because of the impact of summer low flow conditions on smolt production. Remedial enhancement measures are being taken in most of these streams in an attempt to rebuild stocks to previous levels. Spawner and smolt enumeration fences are currently in place on the Trent River and Black and French creeks; data from these operations should provide evidence on the status of these stocks. Black Creek is scheduled to continue as part of a key stream monitoring program, which will permit annual evaluation of stock status and eventually a better understanding of the stock-recruit parameters which are applicable to coho.

Coded wire tagging of 1976 and 1977 brood Black Creek coho smolts indicated that over 40 percent of the B.C. catch of this stock was taken in each of the sport and troll fisheries. Troll catch was distributed between fisheries in Georgia Strait, the west coast of Vancouver Island and the central coast. The net fishery in Johnstone Strait had a smaller but still significant impact. Recent CWT data from the nearby Puntledge River hatchery indicates an increasing net fishery catch and variable distribution between the sport and troll fisheries. This variability could be due to interannual differences in the rate of outmigration of these stocks from Georgia Strait suggested by changes in the catch distribution of Georgia Strait hatchery stocks (Fig. 29 and Table 4).

In summary, the stocks in the mid-Vancouver Island area are impacted by both rearing habitat limitations and fishery exploitation. Arid summers and competing demands on water can create a severe "bottle-neck" to coho smolt production. Intense fishing pressure by sport and commercial fisheries, both targeted and incidental, could be driving spawning escapements below levels which produce maximum sustainable harvests.

b) South Vancouver Island

The Cowichan River system, the largest watershed in this area, supports the largest wild coho spawning escapement on Vancouver Island. Escapements of over 20,000 have been reported in recent years with historic levels being in excess of 50,000 in some years. The Chemainus River is the only other significant coho producer in this area.

Limits to stream production of smolts in the Cowichan system are similar to mid-Vancouver Island streams, but the presence of accessible lake rearing areas could mitigate the impact. Lake production of coho has not been well studied and this will be one

of the subjects for investigation in a research program scheduled to begin in this area in 1986.

CWT's from the 1973 brood release of wild Cowichan River coho were recovered primarily in Washington (49%) and the west coast of Vancouver Island (30%) (Argue et al 1983). This contrasts with more northerly Strait of Georgia stocks which are caught primarily in inside waters. In light of changes in exploitation patterns in recent years and the importance of this stock there is a need to update this information.

c) Georgia Strait mainland inlets

Stock information for this area is very meagre. The Skwawka and Vancouver rivers in Jervis Inlet are the major stocks in this area based on estimated escapement.

CWT recovery data for 1979 and 1982 brood Sliammon River enhanced stock suggests that these fish are caught primarily in Georgia Strait sport and troll fisheries and in small numbers in the Johnstone Strait net fishery. Contribution to outside fisheries seems to be minor.

d) Hatchery production

Georgia Strait hatchery production is contributing a significant and increasing number of coho to sport and commercial fisheries in Georgia Strait, troll fisheries on the west coast of Vancouver Island and the central coast and to in-river Indian fisheries. In 1985, Canadian enhancement accounted for 29 percent of the Georgia Strait sport catch. Escapements of hatchery produced fish to natural spawning areas is significant in the hatchery stream and probably a factor in adjacent "wild streams". All B.C. hatchery smolt production is representatively tagged for evaluation purposes; however, fry are not marked as intensively.

West Coast of Vancouver Island

Stock information on WCVI coho is limited to extrapolations from hatchery catch distribution and harvest rates. The number of streams surveyed for escapement estimation has declined sharply in recent years making analysis of an already questionable source of information impossible.

Robertson Creek hatchery CWT recovery data indicate that almost all of the catch of this stock is taken by the troll fishery along the west coast of Vancouver Island. A smaller component is also taken in the central coast troll fishery. Exploitation rates are typically in the 50 to 60 percent range with the 1976 to 1978 brood year average being 52.3 percent (Anon. 1984). While there is some indication (declining

escapement estimates in some streams) that stocks are declining, this level of exploitation should be sustainable by most wild coho populations.

The Somass River in Barclay Sound is believed to be the major coho producer in this area and Robertson Creek is a tributary to this system. Declining survival rates of Robertson Creek hatchery releases in recent years has created some concern and apparent parallel declines in Carnation Creek survival (B. Holtby, DFO, Nanaimo pers. com.) could indicate an ocean mortality agent rather than a hatchery related one.

FISHERIES

The total B.C. coho catch in the commercial, sport and Indian food fisheries has averaged just under four million fish during the five year period from 1980 to 1984 (Tables 1 to 3). Of these, the commercial troll fishery has accounted for the largest share (70.0 percent).The remaining fisheries in descending order of catch are the commercial net fisheries (15.7 percent), the sport fishery (11.8 percent) and the Indian food fishery (2.5 percent).

Commercial Troll Fisheries

Commercial trollers have been the major harvester of coho in B.C. since the 1920's. In 1980 a two area licence was instituted in which vessels commit on an annual basis to fishing either inside or outside of Georgia Strait. In both cases trollers are permitted in a common area formed by Statistical Area 12 and the upper half of Statistical Area 13. Those vessels which opted for an inside troll licence could not use any other gear type for salmon while those who opted for an outside troll licence were free to fish with nets during net fishery openings. In 1984, 263 trollers opted to fish in the Strait of Georgia.

There are two major coho directed troll fisheries in B.C.. The largest in terms of coho catch and effort is on the west coast of Vancouver Island (Statistical Areas 21 to 27). The other major fishery is in the north coast (Areas 1-5). The troll fishery for coho has been managed with a set season each year. The only major change has been the reduction of the coho season from June 15 - October 30 to July 1 - September 30 in 1981. Most regulations have been aimed at harvesting the resource at its largest biomass recognizing the rapid growth which takes place in the final few months of ocean life. Other regulations such as the six gurdie restriction, the barbless hook requirement and nursery area closures have conservation benefits.

The Pacific Salmon Treaty, which was ratified prior to the 1985 fishing season, has identified certain fisheries in southern B.C. and northern Washington as major coho interception

fisheries. A catch ceiling of 1.75 million coho was placed on the WCVI troll fishery for the 1985 and 1986 seasons to limit the catch of Washington coho stocks, particularly those in the outer coastal area. In addition, Strait of Juan de Fuca (Area 20) net fisheries were to remain closed after the sockeye and pink fishery to reduce harvest of Puget Sound coho stocks. On the U.S. side net fisheries in the border area were restricted to prevent targeting on coho which were believed to be largely of Georgia Strait and Fraser River origin.

Figures 30 to 35 illustrate the troll catch in six statistical area groupings from 1951 to 1985. The northern troll catch has been trendless over this period with current catches (1981 to 1985) averaging 507,000 pieces. The north central coast catch has declined from over 200,000 in the early seventies to an average of 79,000 for 1981 to 1985. The 1985 catch in the south-central troll fishery was the lowest on record but there is no clear trend since the mid-sixties. Interpretation of catch data in the Georgia Strait troll fishery is confounded by changes in regulation changes noted above. Recent catch levels are below historic levels but could reflect effort reduction rather than reduced availability. The southwest Vancouver Island troll fishery shows a marked increasing trend since the late fifties. This could be due either to increasing abundance coincident with increasing hatchery output or increased effort; a combination of both is likely. The northwest Vancouver Island troll fishery has increased slightly over the period of record, perhaps due again to increasing hatchery contributions.

Net Fisheries

Since the mid-seventies coho directed net fisheries have been uncommon and have occured only in terminal areas where surpluses have been identified.

Almost the entire catch is taken incidentally during fisheries targeting on sockeye, pink or chum. In the south, the Johnstone Strait and Juan de Fuca fisheries are the major harvesters. The catch in Juan de Fuca Strait has been greatly reduced in recent years since coho fisheries after decontrol by the International Pacific Salmon Fisheries Commission (IPSFC) have been eliminated. In the north, most of the net catch is taken during the pink and sockeye fisheries in the approaches to the Skeena and Nass Rivers and pink fisheries in the central coast.

Net catches have been declining since the early seventies due largely to the elimination in most areas of directed coho fisheries.

The net catch of coho by statistical area groupings is presented in Figs. 36 to 42. Total B.C. net catch is summarized in Fig. 43. The total B.C. net catch has declined since the mid-

sixties from 1,472,000 (1964 to 1968) to an average catch of 511,000 in recent years (1981 to 1985).

Sport Fisheries

Sport fishing in British Columbia occurs mainly in Georgia Strait. The Georgia Strait sport fishery extends from Sheringham Point, near Sooke, to Stuart Island, north of Campbell River. The 1985 catch in this fishery was estimated to be 730,000, the highest since 1978. In addition to this tidal fishery there is also a non-tidal sport fishery in streams draining into Georgia Strait. Other areas in B.C. with smaller sport fisheries include Barkley Sound, Rivers Inlet, the Skeena, Nass and Fraser rivers and many of the inlets and streams on the Queen Charlotte Islands.

Tidal sport fishing is open to anglers year round and in Georgia Strait involves approximately 600,000 boat trips annually. Peak fishing activity occurs in the summer months from June to September when 80 percent of the coho are caught. The minimum size limit for coho is 30 cm. and daily bag limits in tidal waters are for 4 salmon per day of which only 2 can be chinook. There is a seasonal bag limit of 20 fish per angler for chinook but no limit for coho.

Catch and effort distribution by month and statistical area within Georgia Strait for 1984 and 1985 are shown in Figs. 44 to 47 and in Table 5.

Indian Food Fishery

The Indian food fishery is a traditional fishery which is regulated in order to meet both the subsistence and ceremonial needs of native people. Departmental policy recognizes the Indian food fishery as second in priority only to conservation.

The food fisheries generally occur in localized terminal areas close to reserve land and coho catch levels are ususally low. However, some fisheries use commercial gear in marine interception areas (eg. Johnstone Strait) and more recently surplus hatchery returns have been provided to local bands for food and commercial purposes (eg. Big Qualicum River). Fishing techniques are adapted to the geo-physical characteristics and species composition unique to each area. Gear types include dip-nets, set gillnets, drifted gillnets, angling, gaffs, spears, harpoons, weirs and traps.

The fisheries are regulated through the issuance of food fishing licences which may specify area, gear, fishing time, and species and quantity of fish which may be taken.; however, most fisheries are managed through gear and time restrictions rather than quotas.

Catch and effort levels in the Indian food fisheries are monitored by Fishery Officers. Enumeration techniques may include interviews with fishermen, direct observation, or catch sub-samples which are extrapolated to estimate total catch. The accuracy of the catch estimates is believed to be poor and most Fishery Officers believe that catches are underestimated.

Coho salmon constitute 10 to 15 percent of the coast-wide Indian food fishery salmon catch. Coho catches have averaged approximately 100,000 during the period 1980 to 1984 and have generally increased over the period of record (Fig. 1 and Table 3). An estimated 64 percent of the coast-wide Indian food fishery coho catch is taken in the Fraser River and Skeena/Nass regions. The food fishery in the Fraser River is the largest on the coast, taking an average (1980 to 1984) of 30,900 coho, 31 percent of the coast-wide total. The fishery is conducted primarily with set gillnets, although dip nets, drifted gillnets, gaffs and spears are used in some areas. Coho are the target species in most areas from late September through November and harvest rates can reach 50 percent, especially in even years when the small coincident pink salmon run does not reduce coho catchability. The food fishery in the Skeena and Nass Rivers harvested an average of 21,200 coho during the same period, 21 percent of the coast-wide total. Set gillnets are the primary gear used on the upper Nass River, while commercial gear is used on the lower Nass during commercial fishery closed periods. In the Skeena River, the Indian food fishery in the estuary is conducted with commercial gillnets during times of closure to commercial fisheries, while set nets, dip nets and gaffs are used in-river.

ENHANCEMENT

Smolt Production

Smolt releases from major facilites and small community hatcheries have increased from around 0.5 million in the early seventies to 13.5 million in 1985 (1983 brood year) (Fig. 48 and Table 6). Approximately 82 percent of the 1983 brood production was from Georgia Strait and Fraser River hatcheries; one half of this production is due to increases implemented for one year for EXPO 86 visitors. These hatcheries contribute primarily to the Georgia Strait sport and troll fisheries and secondarily to the west coast of Vancouver Island troll fishery. Most of the remaining production (13 percent of total) comes from the Robertson Creek Hatchery on the west coast of Vancouver Island. These fish contribute almost exclusively to the west coast of Vancouver Island troll fishery. The 1983 brood release of 0.7 million smolts represents the first year of production from hatcheries in the north and central coast of B.C.

The catch of Canadian hatchery fish by Canadian fisheries (commercial and sport) averaged 290,000 over the period 1978 to

1985 (Fig. 49). The catch has increased in the last three years (350,000 average) after a relatively stable period. Prior to 1985, Canadian hatchery coho made up from 5.5 to 7.6 percent of the total B.C. catch; the 1985 hatchery component was 12.7 percent.

Coho hatchery production (Fig. 49) has been about two-thirds of projected levels during the period 1981 to 1985. During the 1970's, overall production rates were higher but this reflected exceptionally high survival of Big Qualicum coho. Big Qualicum production now appears to have stabilized at a rate similar to that of other hatcheries.

The future trend in hatchery smolt releases is expected to be relatively stable since some EXPO production increase will be eliminated while near-new facilities will be building towards their capacities.

Pre-smolt Releases

Pre-smolt coho releases from major facilities and community hatcheries have shown a highly variable but increasing trend since 1971 (Fig. 48 and Table 7). The 1984 brood release of 9.2 million was the largest on record. Fraser River and Georgia Strait releases accounted for 72 percent of the total while the west coast of Vancouver Island contributed about 20 percent.

Pre-smolts are released in either a fed or unfed condition in accessible or inaccessible portions of the hatchery watershed or adjacent watersheds.

Contributions to catch have been measured for some releases but generally the level of assessment for these releases is poor because spawners do not return to the hatchery facility. Survival rates, when measured, have been highly variable ranging from less than 0.5 percent to as high as 5.0 percent (B. Tutty DFO, Nanaimo, pers. com.). Thus, while pre-smolt numbers are high, contributions to fisheries and escapements are much less than for smolt releases.

CATCH DISTRIBUTION AND EXPLOITATION RATES

Analysis of CWT data provides information on the distribution of coho catches from various hatchery and wild stocks. Since the distribution of catch depends on the location and harvest rate of fisheries impacting the stocks only inferrences about migration routes can be made.

The Canadian mark recovery database is limited at present because it:

a) Includes only Canadian recoveries.

b) Does not account for all Washington and Oregon unmarked releases (only tagged fish reported to P.M.F.C.)

c) Does not include escapement data.

U.S. recoveries have been added manually to the data presented, however, they are not complete. All 1982 brood year data should be regarded as preliminary since they rely on preliminary catch estimates for 1985. Catch data for 1985 will be finalized shortly.

The following sections summarize the stock assessment functions that can be served by the mark recovery database. Other uses of the data base will become apparent as coho stock assessment activities progress.

Catch Distribution

Tables 8 to 16 present information on catch distribution of hatchery and wild coho stocks derived from CWT recoveries. Interannual variability in distribution patterns, although relatively minor when compared with between stock variability, does exist (Table 4 and Fig. 29) and explains variations in fishery catch levels in some years (eg. high 1985 Georgia Strait sport catch could be explained by an above average residency of local coho stocks within Georgia Strait and a lower level of migration to outside feeding grounds). In analyzing these data, it is important to appreciate that catch distribution only provides clues to migration and rearing patterns and does not necessarily represent the distribution of the entire stock. Catch distribution can change with regulatory changes and it is therefore crucial that fishery patterns are known before inferences about stock behavior are drawn from CWT data. Percentage distributions are based on Canadian and U.S. recoveries in years when both are available but only on Canadian recoveries in recent years. Percentages in recent years will decline once U.S. data is added.

Considerable CWT information is available for Georgia Strait, lower Fraser River and southwest Vancouver Island hatchery stocks and lower Fraser River wild stocks. Information on Georgia Strait mainland and northern stocks is lacking and should be the subject of future work.

Exploitation Rates

Fishery exploitation rates are calculated for the Big Qualicum River hatchery (Table 8) on the east coast of Vancouver Island, the Capilano River hatchery (Table 9) in the lower mainland protion of Georgia Strait. Escapement estimation methodologies for other hatcheries will require evaluation before the data can be used for stock assessment purposes. Exploitation

rates for the 1980 to 1982 brood years are minimum estimates since the catch of U.S. fish is not included. These rates will increase slightly once these data become available.

a) Big Qualicum River

The exploitation rate on this stock has varied between 68.7 and 81.2 percent over the period of record (1976 to 1982 brood years). The availability of these fish in Georgia and Johnstone straits and off the west coast of Vancouver Island throughout the peak period of commercial and sport fishing (June to September) ensures a relatively high exploitation rate.

b) Capilano River

This is an early timing stock which is caught primarily in Georgia Strait sport and in-river Indian food fisheries. The early timing significantly reduces the availability of these fish during peak fishing times. The resulting low exploitation rates (60.9 to 73.4 percent) are probably not characteristic of most stocks in the area.

Timing of Stock Availability

The CWT data base permits extraction of recovery data by week for commercial fisheries and by month for sport fisheries for all fishing areas. These data, in combination with an understanding of the regulations and attributes of a particular fishery, permit an analysis of the relative timing of availability of various stocks within a fishery. This can be useful in establishing management plans which attempt to selectively target on or avoid specific stock groups.

At this time computer programs are being developed to extract this data in a more efficient manner; however, the data presented in Figs. 51 and 52 are examples of what will be available.

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TABLE 1.

BRITISH COLUMBIA TROLL AND SPORT COHO CATCH 1951-85

YEAR	NORTH 1-5	CENTR/N 6-8	CENTR/S 9-11,30	GEOR ST 12-20,29	SWVI 21-24	NWVI 25-27	US WTRS SOUTH	US WTRS NORTH	TOTAL TROLL	STRAIT SPORT
1951	788446	270375	383548	120032	398212	658965	0	0	2619578	NA
1952	529010	206231	198963	214947	624511	451846	44779	0	2270287	NA
1953	391104	176076	204387	204998	485727	274151	23305	0	1759748	NA
1954	462712	72813	175673	138150	392363	231862	2779	0	1476352	NA
1955	652257	107910	176953	204065	256154	377185	559	0	1775083	NA
1956	482790	132704	239582	164408	297848	341572	8300	0	1667204	NA
1957	579219	180608	309474	249967	362292	299410	116	0	1981086	NA
1958	362558	211507	218386	300508	366516	457239	0	0	1916714	NA
1959	302188	134462	224905	200782	610504	308926	16	0	1781783	NA
1960	290762	141783	117342	428299	199485	170105	16	50	1347842	NA
1961	379724	141720	183920	230412	696627	399220	67	419	2032109	NA
1962	612549	208304	195385	222286	778236	290972	3137	3	2310872	NA
1963	578828	222636	239434	98265	736401	342848	2295	963	2221670	NA
1964	742912	279892	280902	187645	853764	355842	949	188	2702094	NA
1965	488937	143732	302008	123246	1241764	458166	5401	120	2763374	NA
1966	899186	194291	756496	189590	1082622	337804	9530	518	3470037	NA
1967	375572	115558	347779	80506	719052	283166	166348	842	2088823	NA
1968	910940	279484	476336	88874	1313155	525805	113170	1732	3709496	NA
1969	357140	98980	177758	33265	827950	212392	59820	6969	1774274	NA
1970	414289	221846	143476	313192	526594	252839	585383	4511	2462130	NA
1971	409166	247687	116781	327318	1509339	666312	177542	2923	3457068	NA
1972	672641	275636	162028	122339	601387	387038	145297	2294	2368660	335000
1973	365243	226238	169794	123197	1127784	278508	192113	239	2483116	373000
1974	349750	172532	138571	211282	1230482	413434	182908	551	2699510	772000
1975	227422	49882	97886	141010	524507	256682	105240	1190	1403819	454000
1976	344834	193228	312107	172882	1136029	503861	213062	0	2876003	415000
1977	202028	86330	141850	197604	1245107	323302	52022	1	2248244	682000
1978	516033	140764	178145	374250	955494	405458	0	0	2570144	1103000
1979	448329	114555	172979	256974	1365221	547809	0	0	2905867	414000
1980	519129	85494	205655	178888	1297543	408280	0	0	2694989	642000
1981	375614	69829	185391	95512	1026915	358408	0	0	2111669	406000
1982	393568	50046	128245	148834	1324420	464096	0	0	2509209	454000
1983	732885	108409	324539	121209	1690720	478424	0	0	3456186	404000
1984	531096	117976	210098	116907	1668254	503781	0	0	3148112	443000
1985	500084	48064	79193	199341	1033682	369882	0	0	2230246	728000

NOTES: 1) COMMERCIAL CATCH DATA FOR THE YEARS 1951 TO 1969 WERE TAKEN FROM THE COMMERCIAL CATCH DATA SYSTEM DESCRIBED BY WONG (1983). DATA FOR 1970 TO 1984 ARE FROM PUBLISHED CATCH STATISTICS (DEPT. FISH. AND OCEANS). HATCHERY RACK SALES WHICH WERE PLACED IN THE GILLNET CATCH FOR AREAS 13, 23 AND 28 IN THE YEARS 1978 AND 1979 HAVE BEEN REMOVED.

2) ALL 1985 COMMERCIAL DATA ARE PRELIMINARY. TROLL DATA COMES FROM SALES SLIPS SUMMARIZED BY THE IN-SEASON CATCH MONITORING PROGRAM (MARCH 7,1986 VERSION). NET DATA ARE SUMMARIZED FROM THE JAN. 31,1986 COMPUTER RUN FROM DFO CATCH STATISTICS. SPORT CATCH ESTIMATES ARE FOR GEORGIA STRAIT ONLY (GEORGIA STRAIT CREEL SURVEY).

3) 1972 TO 1978 SPORT CATCH ESTIMATES ARE FROM ARGUE ET AL . THE SPORT CATCH FOR 1979 IS THE AVERAGE OF THE BROOD YEAR DATA (1973, 1976, 1982). SPORT CATCH ESTIMATES ARE FOR GEORGIA STRAIT ONLY (AREAS 13-20 28 AND 29) (GEORGIA STRAIT CREEL SURVEY 1980-85). DATA FOR OTHER AREAS HAVE NOT BEEN COMPILED AND VERIFIED AT THIS TIME.

TABLE 2.

BRITISH COLUMBIA NET COHO CATCH 1951-85

YEAR	Q.C.I. (1,2E,2W)	NASS/SK (3-5)	CENTR/N (6-8)	CENTR/S (9-10)	JOHNST ST (11-13)	GEORG ST (14-18)	FRASER (29)	WCVI (21-27)	JU DE F (20)	TOTAL NET
1951	64097	281028	396803	71142	378058	58528	135374	83362	208150	1676542
1952	6566	78350	168561	44167	125604	47784	86943	16878	31280	606133
1953	12051	141007	151739	24186	249361	49917	84013	39893	356271	1108438
1954	69596	191131	191185	35626	186107	41318	135738	42266	111724	1004691
1955	28733	218599	151624	50519	268353	45879	78479	55447	255871	1153504
1956	34189	182783	290724	46859	312711	35243	127485	192316	126103	1348413
1957	12694	146448	183687	28040	191429	15259	49095	8103	451988	1086743
1958	11408	145535	198335	31947	217218	38818	77025	18968	258181	997435
1959	2336	111906	126531	35744	249991	32634	59296	16251	400767	1035456
1960	6507	120923	180272	51095	75386	28524	56453	12484	82010	613654
1961	16198	123007	273018	88053	150267	19874	32139	15564	456401	1174521
1962	30675	250286	293315	54024	133716	16302	68006	7877	390409	1244610
1963	29967	208837	334814	32399	161426	2916	36188	6629	344946	1158122
1964	76647	260841	343821	73446	124319	8396	133749	8636	303103	1332958
1965	60575	240173	375488	262800	127661	1593	42917	11261	453659	1576127
1966	60125	376390	337097	131852	269302	1602	37109	23375	564169	1801021
1967	62107	100756	64976	230587	141169	1573	33466	40950	459976	1135560
1968	113913	245367	348336	134863	173106	727	82277	14171	399708	1512468
1969	47701	93850	70853	52390	56544	2505	22892	3075	258609	608419
1970	104548	205632	315627	46998	190041	20157	99085	28031	463978	1474097
1971	77039	162940	98089	30480	226741	26663	69672	41268	597715	1330607
1972	76970	180677	318423	55990	73636	11841	80923	33640	158261	990361
1973	18729	70853	174809	55218	146095	17357	53550	36799	474053	1047463
1974	18854	75852	229537	16846	106514	16033	26176	66549	438102	994463
1975	24087	77028	134063	25855	116496	21751	43242	76506	408849	927877
1976	18317	67771	158041	58352	204492	12160	14145	40152	248983	822413
1977	18671	132779	48674	54116	228658	11378	42230	50333	505648	1092487
1978	19570	175227	150695	26829	191024	7900	51021	12374	103230	737870
1979	41736	99344	131636	10698	116685	1147	7710	8339	255358	672653
1980	50124	75702	141996	3896	162995	6677	33369	14905	157071	646735
1981	28160	57853	108490	4480	201216	12353	5181	7392	278186	703311
1982	14775	172464	102838	7913	194317	9028	19312	13346	127601	661594
1983	9995	206717	146863	6550	243281	16293	11322	9210	16943	667174
1984	19439	143689	52409	7961	119116	13585	9192	10561	74859	450811
1985	41584	122737	83061	13755	147520	32141	16685	23147	231794	712424

NOTES: 1) COMMERCIAL CATCH DATA FOR THE YEARS 1951 TO 1969 WERE TAKEN FROM THE COMMERCIAL CATCH DATA SYSTEM DESCRIBED BY WONG (1983). DATA FOR 1970 TO 1984 ARE FROM PUBLISHED CATCH STATISTICS (DEPT. FISH. AND OCEANS). HATCHERY RACK SALES WHICH WERE PLACED IN THE GILLNET CATCH FOR AREAS 13, 23 AND 28 IN THE YEARS 1978 AND 1979 HAVE BEEN REMOVED.

2) ALL 1985 COMMERCIAL DATA ARE PRELIMINARY. TROLL DATA COMES FROM SALES SLIPS SUMMARIZED BY THE IN-SEASON CATCH MONITORING PROGRAM (MARCH 7,1986 VERSION). NET DATA ARE SUMMARIZED FROM THE JAN. 31,1986 COMPUTER RUN FROM DFO CATCH STATISTICS.

TABLE 3.

BRITISH COLUMBIA INDIAN FOOD FISH COHO CATCH 1951-84 AND TOTAL CATCH ALL GEAR

YEAR	QCI (1,2E,2W)	NASS/SK (3-5)	CENTRAL (6-10)	JOHNST ST (11-12)	GEOR ST (13-18)	FRASER (28-29)	WCVI (19-27)	TOTAL INDIAN CATCH	TOTAL CATCH ALL GEAR
1951	800	5892	300	25	5600	5287	1488	19392	4315512
1952	700	4431	2025	0	5328	8021	655	21160	2897580
1953	300	11024	125	0	2906	9172	50	23577	2891763
1954	200	16233	125	0	585	9766	630	27539	2508582
1955	400	13136	300	0	1487	12694	1052	29069	2957656
1956	0	18183	250	100	1634	7202	950	28319	3043936
1957	0	19382	1102	356	1398	6930	350	29518	3097347
1958	46	19829	1631	107	1137	6495	360	29605	2943754
1959	0	15740	276	863	1657	8735	1150	28421	2845660
1960	0	5090	895	890	1875	9080	760	18590	1980086
1961	0	7016	930	785	2265	15257	1210	27463	3234093
1962	0	8374	752	1101	2227	18370	1270	32094	3587576
1963	0	7082	700	510	1245	16580	0	26117	3405909
1964	833	9282	40	912	2884	19717	375	34043	4069095
1965	950	13270	5472	388	1445	24793	319	46637	4386138
1966	50	11079	3090	1891	2235	24747	908	44000	5315058
1967	0	7501	2151	27	1345	8069	460	19553	3243936
1968	450	13253	4460	853	1872	19142	496	40526	5262490
1969	400	3864	1847	143	1317	15579	321	23471	2406164
1970	350	3420	4175	639	4709	21710	673	35676	3971903
1971	190	7427	3487	451	3919	20574	430	36478	4824153
1972	80	4127	4550	631	2201	21026	1162	33777	3727798
1973	115	3089	2440	201	2191	18534	753	27323	3930902
1974	34	3936	2490	265	3679	30794	1297	42495	4508468
1975	80	7696	3439	400	5613	21142	653	39023	2824719
1976	125	5211	4994	500	8306	28024	195	47355	4160771
1977	200	4536	3469	478	4666	22662	80	36091	4058822
1978	50	9976	2669	300	3416	32220	92	48723	4459737
1979	0	5054	1525	1200	38679	25532	1153	73143	4065663
1980	125	7609	4449	0	42094	44492	2863	101632	4085356
1981	350	7457	3522	6	64100	20558	2330	98323	3319303
1982	175	28521	3405	219	20287	64027	2952	119586	3744389
1983	130	31189	3284	298	25062	13804	630	74397	4601757
1984	20	31114	3350	552	6775	71303	2465	115579	4157502
1985	NA	NA	NA	NA	NA	NA	NA	NA	3670670

NOTE: 1) INDIAN FOOD FISH FIGURES ARE FROM JAMES (UNPUBLISHED, 1984). SOME CATCH DATA ORIGINALLY REPORTED IN CWT UNITS WAS CONVERTED IN PIECES USING PIECE PER CWT CONVERSION FROM COMMERCIAL GILLNET FISHERIES IN APPROPRIATE AREA AND YEAR. 1984 DATA IS PRELIMINARY. 1985 DATA IS UNAVAILABLE AT THIS TIME.

Table 4. Proportion of Canadian catch from four Georgia Strait hatcheries caught in the Georgia Strait troll and sport fisheries.

	Brood Year						
Hatchery	1976	1977	1978	1979	1980	1981	1982
Big Qualicum	75.58	65.78	44.73	52.97	42.49	39.47	59.42
Capilano	85.08	81.48	66.41	72.15	67.19	60.27	83.92
Puntledge		54.17	20.74	46.78	19.54	40.52	58.85
Quinsam	56.04	41.88	30.07	34.56	27.92	38.89	58.52

Note: 1) Percentages are derived from coded wire tag recoveries.
2) Production tag codes only; experimenatl releases are not included.
3) U.S. catch is not considered since it is not available for brood years 1980 to 1982.

TABLE 5. GEORGIA STRAIT CREEL SURVEY CATCH AND EFFORT BY STATISTICAL AR AND MONTH FOR 1984 AND 1985

	1985			1984		
STAT AREA	EFFORT	COHO	CHINOOK	EFFORT	COHO	CHINOOK
13	132934	25B627	51662	142774	152065	93242
14	118224	215116	44245	105409	106498	5517B
15	12095	16329	5436	10549	7757	6240
16	87292	79650	26463	B1352	519B2	499B5
17	69B6B	95294	31480	B6445	574B1	52731
18	3244B	B071	11992	42404	4586	24654
19A	33244	2752	17631	37478	3081	2431B
19B+	81824	25304	27B43	66967	41B26	24354
2B	34415	12560	9513	39961	7130	16555
29	26170	14494	B573	37751	111B4	22188
TOTAL	628514	72B197	234B38	651090	443590	369445
MONTH	EFFORT	COHO	CHINOOK	EFFORT	COHO	CHINOOK
JAN	4391	536	291B	6595	599	4406
FEB	4390	536	2918	6595	599	4407
MAR	11066	6202	3901	9649	3700	5365
APR	26859	44272	B1B5	33BB2	30908	17B10
MAY	71B17	96789	44B09	61070	58224	353B1
JUN	100667	173635	56492	111713	B6436	96795
JUL	121383	192520	3620B	153083	136076	95904
AUG	152554	141475	3B144	1564B1	74660	5B166
SEP	103605	66370	21275	79769	46231	29673
OCT	16436	5460	3553	13589	3983	6717
NOV	7673	201	B218	9332	10B6	7413
DEC	7672	201	8217	9332	1087	7413

Table 6 COHO SMOLT RELEASES BY SEP OPS AND CDP PROJECTS

PRODUCT. AREA	STATISTL. AREAS			BROOD YEAR:	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QCI	1,2	SMOLTS	OPS									0	0	0	0	0	0	0
			CDP									0		10186	0	0	66000	0
				TOTAL:	0	0	0	0	0	0	0	0	0	10186	0	0	66000	0
NORTH COAST	3-5	SMOLTS	OPS															
			CDP										0	0	0	0	26256	0
				TOTAL:	0	0	0	0	0	0	0	0	0	0	0	0	26256	0
CENTRAL COAST	6-10	SMOLTS	OPS												0	0	602022	0
			CDP													0	0	0
				TOTAL:	0	0	0	0	0	0	0	0	0	0	0	0	602022	0
WCVI	20-27	SMOLTS	OPS			44536	92824	253707	794227	469997	387536	485213	1117774	991262	1029084	1269181	1676371	0
			CDP									0	0	0	0	45058	53267	0
				TOTAL:	0	44536	92824	253707	794227	469997	387536	485213	1117774	991262	1029084	1314239	1729638	0
FRASER	28,29	SMOLTS	OPS		284607	255090	384807	0	529994	681622	524680	574637	649235	768497	821803	1622844	4917210	0
			CDP										0			0	0	0
				TOTAL:	284607	255090	384807	0	529994	681622	524680	574637	649235	768497	821803	1622844	4917210	0
JOHNSON	11,12	SMOLTS	OPS															
			CDP												0	0	0	0
				TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GEORGIA	13-19	SMOLTS	OPS		183245	182055	377765	2112323	1444748	1398925	1986192	2404735	3120489	3459838	3050457	3698858	6109222	0
			CDP							540	10424	40166	40000	65075	18739	70406	650	0
				TOTAL	183245	182055	377765	2112323	1444748	1399465	1996616	2444901	3160489	3524913	3069196	3769264	6109872	0
ALL AREAS		SMOLTS			467852	481681	855396	2366030	2768969	2551084	2908832	3504751	4927498	5294858	4920083	6706347	13450998	0

Table 7 COHO FRY RELEASES BY SEP OPS AND CDP PROJECTS

PRODUCT. AREA	STATISTL. AREAS			BROOD YEAR:	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
QCI	1,2	FRY	OPS									18817	9120	73230	192857	447973	243371	349762
			CDP									0		7500	1905	60300	18368	0
				TOTAL:	0	0	0	0	0	0	0	18817	9120	80730	194762	508273	261739	349762
NORTH COAST	3-5	FRY	OPS															
			CDP										26880	27036	24534	118000	175194	51000
				TOTAL:	0	0	0	0	0	0	0	0	26880	27036	24534	118000	175194	51000
CENTRAL COAST	6-10	FRY	OPS												110600	62758	95841	107511
			CDP													23171	38911	47881
				TOTAL:	0	0	0	0	0	0	0	0	0	0	110600	85929	134752	155392
WCVI	20-27	FRY	OPS				160578				781994	122196	0	0	51381	204528	101643	229485
			CDP									63000	514845	94765	512415	1860451	1093333	1546776
				TOTAL:	0	0	160578	0	0	0	781994	185196	514845	94765	563796	2064979	1194976	1776261
FRASER	28,29	FRY	OPS							440316	379724	429057	273627	189227	988896	783343	1139475	2312585
			CDP										18930			25291	61005	157259
				TOTAL:	0	0	0	0	0	440316	379724	429057	292557	189227	988896	808634	1200480	2469844
JOHNSON	11,12	FRY	OPS															
			CDP												430	10005	120200	330719
				TOTAL	0	0	0	0	0	0	0	0	0	0	430	10005	120200	330719
GEORGIA	13-19	FRY	OPS		785855			136835			831546	242665	2259301	1489035	3794951	4234104	3275955	3591325
			CDP							54200	60555	53500	49674	105833	155448	452589	337123	514220
				TOTAL	785855	0	0	136835	0	54200	892101	296165	2308975	1594868	3950399	4686693	3613078	4105545
ALL AREAS		FRY			785855	0	160578	136835	0	494516	2053819	929235	3152377	1986626	5833417	8282513	6700419	9238523

Table 8. Fishery descriptions used in coded wire tag data presentation.

Fishery	Description
NTR	Northern troll - Areas 1 to 5
NCTR	North-central troll - Areas 6 to 8
SCTR	South-central troll - Areas 9 to 10
NWTR	Northwest Vancouver Island troll - Areas 25 to 27
SWTR	Southwest Vancouver Island troll - Areas 21 to 14
GSTR	Georgia Strait troll - Areas 13 to 19
JFTR	Juan de Fuca troll - Area 20
NN	Northern net - Areas 1 to 5
CN	Central net - Areas 6 to 10
NWVN	Northwest Vancouver Island net - Areas 25 to 27
SWVN	Southwest Vancouver Island net - Areas 21 to 24
JSN	Johnstone Strait net - Areas 11 to 13
GSN	Georgia Strait net - Areas 14 to 19
FGN	Fraser River gillnet - Areas 28 and 29
JFN	Juan de Fuca net - Area 20
NSPT	Northern sport - Areas 1 to 5
CSPT	Central sport - Areas 6 to 10
WSPT	Westcoast of Vancouver Island sport - Areas 21 to 27
GSPT	Georgia Strait sport - Areas 13 to 20
FWSP	Freshwater sport
Wash.	All Washington State fisheries
Alaska	All Alaska fisheries

Table 9. Recoveries of Capilano River hatchery CWT tagged coho in Canadian and U.S. fisheries
(Production tag codes only; experimental releases are not included.)

	Brood Year													
	1976		1977		1978		1979		1980		1981		1982	
Fishery	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
NTR	0	0.00	0	0.00	0	0.00	3	0.01	42	0.18	5	0.05	0	0.00
NCTR	25	0.10	10	0.06	8	0.07	15	0.05	45	0.19	15	0.14	0	0.00
SCTR	164	0.66	48	0.30	125	1.11	160	0.53	628	2.70	94	0.89	9	0.03
NWTR	338	1.36	190	1.17	183	1.63	313	1.04	871	3.74	260	2.46	134	0.38
SWTR	1728	6.98	1169	7.19	651	5.80	2926	9.69	2526	10.84	1644	15.57	1030	2.96
GSTR	1712	6.91	712	4.38	214	1.91	1235	4.09	310	1.33	466	4.41	1542	4.43
JFTR	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
NN	0	0.00	0	0.00	2	0.02	0	0.00	0	0.00	0	0.00	0	0.00
CN	0	0.00	0	0.00	13	0.12	2	0.01	44	0.19	0	0.00	0	0.00
NWVN	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
SWVN	11	0.04	43	0.26	56	0.50	62	0.21	0	0.00	0	0.00	95	0.27
JSN	271	1.09	62	0.38	582	5.19	892	2.95	1623	6.97	413	3.91	57	0.16
GSN	0	0.00	10	0.06	128	1.14	6	0.02	171	0.73	17	0.16	37	0.11
FGN	479	1.93	532	3.27	67	0.60	259	0.86	742	3.18	197	1.87	500	1.44
JFN	138	0.56	241	1.48	737	6.57	1126	3.73	56	0.24	458	4.34	812	2.33
NSPT	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
CSPT	19	0.08	0	0.00	13	0.12	40	0.13	43	0.18	4	0.04	14	0.04
WSPT	35	0.14	0	0.00	11	0.10	23	0.08	23	0.10	0	0.00	49	0.14
GSPT	16579	66.95	9427	57.96	4878	43.49	13863	45.92	13645	58.56	4406	41.72	15099	43.35
FWSP	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	104	0.98	452	1.30
Wash.	1812	7.32	1961	12.06	1677	14.95	4063	13.46	NA		NA		NA	
IFF	1451	5.86	1861	11.44	1872	16.69	5204	17.24	2530	10.86	2477	23.46	15000	43.07
Catch	24762		16266		11217		30192		23299		10560		34830	
Escape	15276		8103		7215		15454		10815		3829		15962	
Total	40038		24369		18432		45646		34114		14389		50792	
Exploit. Rate (%)	61.8		66.7		60.9		66.1		68.3		73.4		68.6	

Note: 1) NA means that data is not yet available.
2) Exploitation rates for 1980 to 1982 brood years do not include washington recoveries.
3) All 1982 brood year data is preliminary.
4) IFF stands for Indian Food Fishery in the Capilano River

Table 10. Recoveries of Big Qualicum River hatchery CWT tagged coho in Canadian and U.S. Fisheries.
(Production tag codes only; experimental releases are not included.)

	Brood Year													
	1976		1977		1978		1979		1980		1981		1982	
Fishery	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
NTR	307	0.27	403	0.33	0	0.00	79	0.08	0	0.00	293	0.44	0	0.00
NCTR	510	0.45	646	0.53	768	1.15	430	0.42	381	0.34	246	0.37	0	0.00
SCTR	4980	4.39	5953	4.84	8439	12.62	5457	5.30	20569	18.37	7537	11.33	1085	2.20
NWTR	3772	3.32	6162	5.01	4740	7.09	4165	4.05	9426	8.42	9792	14.73	2209	4.48
SWTR	6069	5.35	9426	7.66	7734	11.56	13406	13.02	6864	6.13	8861	13.33	3937	7.98
GSTR	16201	14.27	16019	13.02	6583	9.84	11537	11.21	758	0.68	3563	5.36	4439	9.00
JFTR	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
NN	160	0.14	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
CN	853	0.75	592	0.48	281	0.42	300	0.29	688	0.61	0	0.00	146	0.30
NWVN	0	0.00	0	0.00	0	0.00	163	0.16	0	0.00	0	0.00	0	0.00
SWVN	0	0.00	12	0.01	21	0.03	0	0.00	0	0.00	73	0.11	0	0.00
JSN	9286	8.18	13815	11.23	11326	16.93	17516	17.02	18962	16.94	8057	12.12	4636	9.40
GSN	43	0.04	415	0.34	1137	1.70	2131	2.07	6655	5.94	3810	5.73	5751	11.66
FGN	208	0.18	0	0.00	0	0.00	93	0.09	23	0.02	0	0.00	0	0.00
JFN	833	0.73	1192	0.97	1237	1.85	1035	1.01	44	0.04	508	0.76	1659	3.36
NSPT	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
CSPT	343	0.30	194	0.16	131	0.20	771	0.75	632	0.56	565	0.85	235	0.48
WSPT	0	0.00	0	0.00	0	0.00	86	0.08	0	0.00	0	0.00	0	0.00
GSPT	68472	60.33	58576	47.62	22396	33.48	39851	38.72	46768	41.78	22600	33.99	24864	50.42
FWSP	0	0.00	0	0.00	0	0.00	0	0.00	90	0.08	377	0.57	352	0.71
Wash.	1246	1.10	9543	7.76	2103	3.14	5768	5.60	NA	ERR	NA	ERR	NA	ERR
Alaska	215	0.19	49	0.04	0	0.00	142	0.14	91	0.08	214	0.32	NA	ERR
Catch	113498		122997		66896		102930		111951		66496		49313	
Escape	44434		38073		23669		25511		25983		30279		20000	
Total	157932		161070		90565		128441		137934		96775		69313	
Exploit. Rate (%)	71.9		76.4		73.9		80.1		81.2		68.7		71.1	

Note: 1) NA means data is not yet available
2) Exploitation rates for 1980 to 1982 brood years do not include Washington recoveries.
3) Exploitation rate for 1982 brood year does not include Alaska recoveries.
4) All 1982 brood year data is preliminary.

Table 11. Recoveries of Chehalis River, Chilliwack River and Inch Creek hatchery CWT tagged coho in Canadian and U.S. fisheries. (Production codes only; experimental releases are not included.

Chehalis River

	Brood Year	
	1982	
Fishery	Number	Percent
NTR	91	0.35
NCTR	98	0.38
SCTR	488	1.88
NWTR	2079	8.02
SWTR	5955	22.98
GSTR	3533	13.63
JFTR	0	0.00
NN	0	0.00
CN	0	0.00
NWVN	0	0.00
SWVN	101	0.39
JSN	680	2.62
GSN	249	0.96
FGN	541	2.09
JFN	1104	4.26
NSPT	0	0.00
CSPT	46	0.18
WSPT	0	0.00
GSPT	10848	41.86
FWSP	100	0.39
Wash.	NA	
Alaska	NA	
Total	25913	

Chilliwack River

	Brood Year			
	1980		1981	
Fishery	Number	Percent	Number	Percent
NTR	60	0.43	19	0.10
NCTR	94	0.67	39	0.20
SCTR	1169	8.28	841	4.26
NWTR	878	6.22	2283	11.57
SWTR	2428	17.20	6313	31.98
GSTR	730	5.17	1886	9.55
JFTR	0	0.00	0	0.00
NN	5	0.04	25	0.13
CN	42	0.30	0	0.00
NWVN	0	0.00	0	0.00
SWVN	0	0.00	38	0.19
JSN	1308	9.27	787	3.99
GSN	103	0.73	37	0.19
FGN	159	1.13	294	1.49
JFN	26	0.18	263	1.33
NSPT	0	0.00	0	0.00
CSPT	38	0.27	52	0.26
WSPT	0	0.00	0	0.00
GSPT	5543	39.28	5092	25.80
FWSP	1513	10.72	1731	8.77
Wash.	NA	ERR	NA	ERR
Alaska	17	0.12	39	0.20
TOTAL	14113		19739	

Inch Creek

	Brood Year					
	1980		1981		1982	
Fishery	Number	Percent	Number	Percent	Number	Percent
NTR	0	0.00	0	0.00	6	0.19
NCTR	2	0.40	0	0.00	2	0.06
SCTR	35	7.04	20	3.50	11	0.35
NWTR	36	7.24	6	1.05	75	2.37
SWTR	161	32.39	256	44.83	451	14.23
GSTR	6	1.21	79	13.84	693	21.87
JFTR	0	0.00	0	0.00	0	0.00
NN	0	0.00	0	0.00	0	0.00
CN	2	0.40	0	0.00	5	0.16
NWVN	0	0.00	0	0.00	0	0.00
SWVN	0	0.00	0	0.00	0	0.00
JSN	25	5.03	15	2.63	53	1.67
GSN	5	1.01	2	0.35	59	1.86
FGN	1	0.20	0	0.00	38	1.20
JFN	0	0.00	15	2.63	88	2.78
NSPT	0	0.00	0	0.00	0	0.00
CSPT	4	0.80	5	0.88	8	0.25
WSPT	0	0.00	0	0.00	0	0.00
GSPT	211	42.45	168	29.42	1660	52.38
FWSP	9	1.81	5	0.88	20	0.63
Wash.	NA		NA		NA	
Alaska	0	0.00	0	0.00	NA	
Total	497		571		3169	

Table 12. Recoveries of Puntledge River hatchery CWT tagged coho in Canadian and U.S. fisheries (Production tag codes only; experimental releases are not included.)

	Brood Year											
	1977		1978		1979		1980		1981		1982	
Fishery	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
NTR	35	0.91	222	1.00	195	0.31	1680	2.49	363	0.86	62	0.04
NCTR	30	0.78	309	1.40	202	0.32	414	0.61	133	0.31	125	0.09
SCTR	289	7.55	3820	17.25	4230	6.74	16568	24.59	5180	12.21	5052	3.53
NWTR	340	8.88	2973	13.43	2428	3.87	4365	6.48	4708	11.09	8173	5.71
SWTR	295	7.70	2076	9.38	5302	8.45	1446	2.15	4202	9.90	11242	7.85
GSTR	694	18.12	408	1.84	5871	9.36	1006	1.49	3756	8.85	13224	9.23
JFTR	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
NN	0	0.00	61	0.28	57	0.09	187	0.28	0	0.00	0	0.00
CN	23	0.60	218	0.98	224	0.36	543	0.81	51	0.12	542	0.38
NWVN	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
SWVN	7	0.18	16	0.07	0	0.00	0	0.00	0	0.00	160	0.11
JSN	607	15.85	6386	28.84	16724	26.65	26166	38.83	7952	18.74	20993	14.66
GSN	0	0.00	94	0.42	596	0.95	1818	2.70	1352	3.19	3897	2.72
FGN	0	0.00	0	0.00	0	0.00	152	0.23	32	0.08	252	0.18
JFN	41	1.07	511	2.31	1226	1.95	36	0.05	123	0.29	7416	5.18
NSPT	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
CSPT	8	0.21	123	0.56	713	1.14	531	0.79	967	2.28	589	0.41
WSPT	0	0.00	0	0.00	184	0.29	0	0.00	0	0.00	128	0.09
GSPT	1286	33.58	3991	18.03	22326	35.58	12084	17.93	13418	31.62	71048	49.61
FWSP	0	0.00	0	0.00	0	0.00	0	0.00	148	0.35	305	0.21
Wash.	175	4.57	932	4.21	2340	3.73	NA		NA		NA	
Alaska	0	0.00	0	0.00	128	0.20	384	0.57	49	0.12	NA	
Catch	3830		22140		62746		67380		42434		143208	

Note: 1) NA means that data is not yet available.
2) All 1982 brood year data is preliminary.

Table 13 Recoveries of Quinsam River hatchery CWT tagged coho in Canadian and U.S. fisheries.
(Production tag codes only; experimental releases are not included.)

	Brood Year													
	1976		1977		1978		1979		1980		1981		1982	
Fishery	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
NTR	79	0.38	672	0.94	273	0.53	65	0.26	235	0.35	67	0.65	0	0.00
NCTR	164	0.79	1825	2.54	401	0.78	192	0.77	1189	1.78	65	0.63	0	0.00
SCTR	1586	7.63	9276	12.92	9095	17.68	2895	11.67	15406	23.01	1872	18.14	1737	6.75
NWTR	1413	6.80	5562	7.75	3041	5.91	2214	8.93	7861	11.74	1053	10.21	1161	4.51
SWTR	780	3.75	4087	5.69	2055	4.00	1376	5.55	1684	2.52	962	9.32	833	3.24
GSTR	1153	5.55	5809	8.09	1205	2.34	1297	5.23	1900	2.84	422	4.09	992	3.85
JFTR	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
NN	227	1.09	174	0.24	0	0.00	25	0.10	0	0.00	0	0.00	21	0.08
CN	507	2.44	1102	1.54	127	0.25	357	1.44	484	0.72	53	0.51	136	0.53
NWVN	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
SWVN	0	0.00	144	0.20	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
JSN	4071	19.60	16819	23.43	18277	35.53	8122	32.75	19989	29.86	2012	19.50	5882	22.84
GSN	0	0.00	47	0.07	115	0.22	51	0.21	154	0.23	39	0.38	61	0.24
FGN	15	0.07	6	0.01	125	0.24	49	0.20	67	0.10	38	0.37	0	0.00
JFN	23	0.11	699	0.97	928	1.80	256	1.03	31	0.05	0	0.00	357	1.39
NSPT	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
CSPT	169	0.81	397	0.55	710	1.38	395	1.59	949	1.42	144	1.40	306	1.19
WSPT	0	0.00	57	0.08	0	0.00	8	0.03	109	0.16	0	0.00	0	0.00
GSPT	10365	49.90	23637	32.93	13906	27.04	7157	28.86	16772	25.05	3591	34.80	14075	54.66
FWSP	0	0.00	0	0.00	0	0.00	0	0.00	46	0.07	0	0.00	187	0.73
Wash.	192	0.92	1187	1.65	1176	2.29	328	1.32	NA		NA		NA	
Alaska	29	0.14	289	0.40	0	0.00	15	0.06	71	0.11	0	0.00	NA	
Total	20773	100	71789	100	51434	100	24802	100	66947	100	10318	100	25748	100

Note: 1) NA means that data is not yet available.
2) All 1982 brood year data is preliminary.

Table 14 Recoveries of wild Keogh River and Black Creek CWT tagged coho in Canadian and U.S. fisheries.

Keogh River

Brood Year	1976	
Fishery	Number	Percent
NTR	65	2.00
NCTR	993	30.52
SCTR	493	15.15
NWTR	731	22.46
SWTR	485	14.90
GSTR	21	0.65
JFTR	0	0.00
NN	41	1.26
CN	55	1.69
NWVN	0	0.00
SWVN	0	0.00
JSN	322	9.90
GSN	0	0.00
FGN	0	0.00
JFN	0	0.00
NSPT	0	0.00
CSPT	24	0.74
WSPT	0	0.00
GSPT	24	0.74
FWSP	0	0.00
Wash.	NA	
Alaska	NA	
Total	3254	

Black Creek

Brood Year	1976		1977	
Fishery	Number	Percent	Number	Percent
NTR	32	0.63	14	0.25
NCTR	66	1.31	125	2.20
SCTR	427	8.45	660	11.60
NWTR	378	7.48	627	11.02
SWTR	317	6.27	383	6.73
GSTR	477	9.44	576	10.12
JFTR	0	0.00	0	0.00
NN	0	0.00	3	0.05
CN	27	0.53	46	0.81
NWVN	0	0.00	0	0.00
SWVN	3	0.06	17	0.30
JSN	860	17.02	1034	18.17
GSN	0	0.00	5	0.09
FGN	0	0.00	0	0.00
JFN	71	1.40	73	1.28
NSPT	0	0.00	0	0.00
CSPT	0	0.00	16	0.28
WSPT	4	0.08	0	0.00
GSPT	2392	47.33	2112	37.11
FWSP	0	0.00	0	0.00
Wash.	NA		NA	
Alaska	NA		NA	
Total	5054		5691	

Table 15. Recoveries of Robertson Creek hatchery CWT tagged coho in Canadian and U.S. fisheries.
(Production tag codes only; experimental releases are not included.)

	Brood Year													
	1976		1977		1978		1979		1980		1981		1982	
Fishery	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
NTR	461	1.79	28	0.29	0	0.00	49	0.31	623	1.83	772	1.73	28	0.18
NCTR	297	1.16	170	1.77	55	0.86	333	2.12	673	1.98	696	1.56	50	0.32
SCTR	900	3.50	646	6.71	186	2.90	439	2.80	2136	6.27	2346	5.25	968	6.11
NWTR	12485	48.60	3493	36.28	2920	45.59	5410	34.52	12301	36.13	17537	39.22	8389	52.97
SWTR	9968	38.80	4225	43.88	2630	41.06	8544	54.51	15031	44.15	19984	44.70	5802	36.64
GSTR	19	0.07	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
JFTR	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
NN	402	1.56	53	0.55	0	0.00	0	0.00	105	0.31	141	0.32	0	0.00
CN	245	0.95	68	0.71	0	0.00	302	1.93	174	0.51	5	0.01	0	0.00
NWVN	0	0.00	0	0.00	9	0.14	0	0.00	0	0.00	3	0.01	0	0.00
SWVN	87	0.34	554	5.75	142	2.22	0	0.00	568	1.67	1693	3.79	0	0.00
JSN	32	0.12	31	0.32	0	0.00	114	0.73	692	2.03	0	0.00	0	0.00
GSN	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
FGN	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	12	0.08
JFN	93	0.36	15	0.16	136	2.12	0	0.00	0	0.00	246	0.55	254	1.60
NSPT	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
CSPT	0	0.00	0	0.00	37	0.58	91	0.58	168	0.49	105	0.23	16	0.10
WSPT	173	0.67	90	0.93	148	2.31	91	0.58	655	1.92	326	0.73	284	1.79
GSPT	173	0.67	0	0.00	0	0.00	91	0.58	275	0.81	104	0.23	33	0.21
FWSP	0	0.00	0	0.00	37	0.58	0	0.00	92	0.27	116	0.26	0	0.00
Wash.	355	1.38	233	2.42	105	1.64	210	1.34	NA		NA		NA	
Alaska	0	0.00	23	0.24	0	0.00	0	0.00	555	1.63	635	1.42	NA	
Catch	25690		9629		6405		15674		34048		44709		15836	
Escape	14343		6268		6280		8894		21593		14522		10765	
Total	40033		15897		12685		24568		55641		59231		26601	
Exploit. Rate (%)	64.2		60.6		50.5		63.8		61.2		75.5		59.5	

Note: 1) NA means data is not yet available.
2) Exploitation rates for brood years 1980 to 1982 do not include Washington recoveries.
3) Exploitation rate for brood year 1982 does not include Alaskan recoveries.
4) All 1982 brood year recovery data is preliminary.

Table 16. Recoveries of Pallant Creek and Snootli Creek hatchery CWT tagged coho in Canadian and U.S. fisheries. (Production tag codes only; experimental releases are not included.)

Pallant Creek

	Brood Year					
	1980		1981		1982	
Fishery	Number	Percent	Number	Percent	Number	Percent
NTR	608	77.65	403	52.13	231	33.67
NCTR	7	0.89	0	0.00	0	0.00
SCTR	0	0.00	12	1.55	0	0.00
NWTR	8	1.02	28	3.62	0	0.00
SWTR	0	0.00	16	2.07	9	1.31
GSTR	0	0.00	0	0.00	0	0.00
JFTR	0	0.00	0	0.00	0	0.00
NN	12	1.53	64	8.28	283	41.25
CN	0	0.00	9	1.16	0	0.00
NWVN	0	0.00	0	0.00	0	0.00
SWVN	0	0.00	0	0.00	0	0.00
JSN	0	0.00	0	0.00	0	0.00
GSN	0	0.00	0	0.00	0	0.00
FGN	0	0.00	0	0.00	0	0.00
JFN	0	0.00	0	0.00	0	0.00
NSPT	25	3.19	164	21.22	140	20.41
CSPT	0	0.00	0	0.00	0	0.00
WSPT	0	0.00	0	0.00	0	0.00
GSPT	4	0.51	0	0.00	16	2.33
FWSP	0	0.00	9	1.16	7	1.02
Alaska	119	15.20	68	8.80	NA	
Total	783	100	773	100	686	100

Snootli Creek

	Brood Year			
	1981		1982	
Fishery	Number	Percent	Number	Percent
NTR	100	25.25	99	40.41
NCTR	40	10.10	28	11.43
SCTR	35	8.84	5	2.04
NWTR	12	3.03	30	12.24
SWTR	0	0.00	0	0.00
GSTR	0	0.00	0	0.00
JFTR	0	0.00	0	0.00
NN	0	0.00	11	4.49
CN	74	18.69	57	23.27
NWVN	0	0.00	0	0.00
SWVN	0	0.00	0	0.00
JSN	9	2.27	15	6.12
GSN	0	0.00	0	0.00
FGN	0	0.00	0	0.00
JFN	0	0.00	0	0.00
NSPT	0	0.00	0	0.00
CSPT	0	0.00	0	0.00
WSPT	0	0.00	0	0.00
GSPT	0	0.00	0	0.00
FWSP	0	0.00	0	0.00
Alaska	126	31.82	NA	
Total	396	100	245	100

Note: 1) NA means data is not yet available.
2) All 1982 brood year data is preliminary.

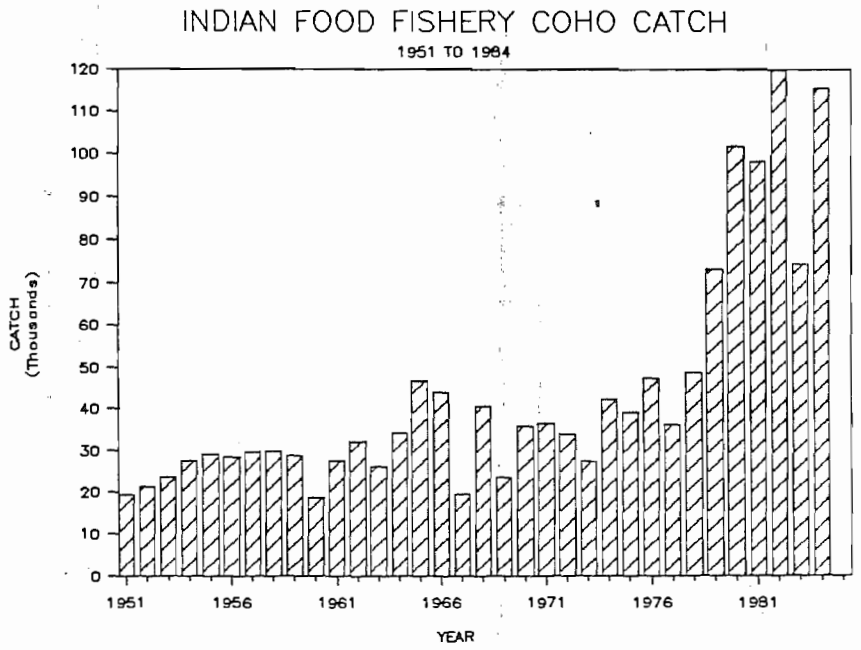


Fig. 1

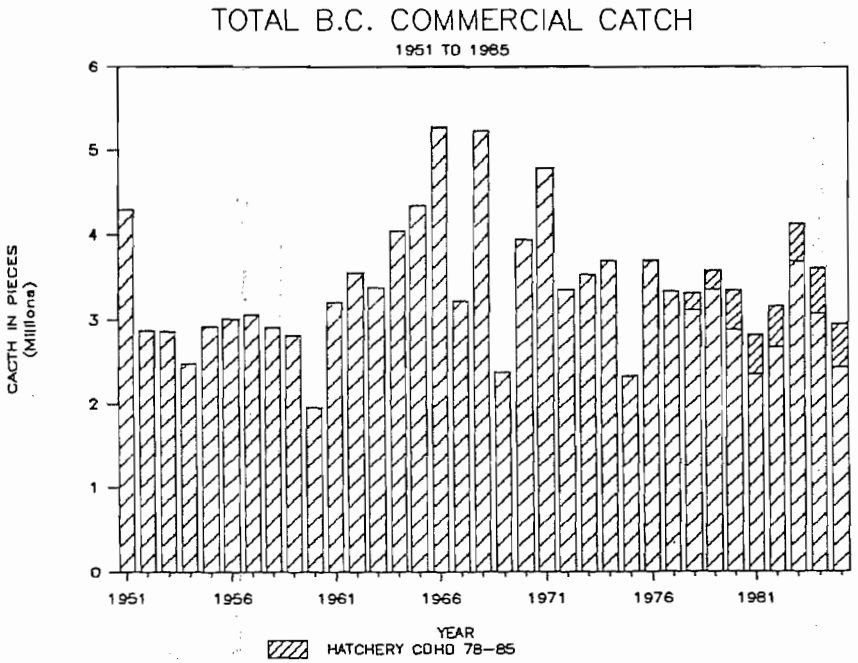


Fig. 3

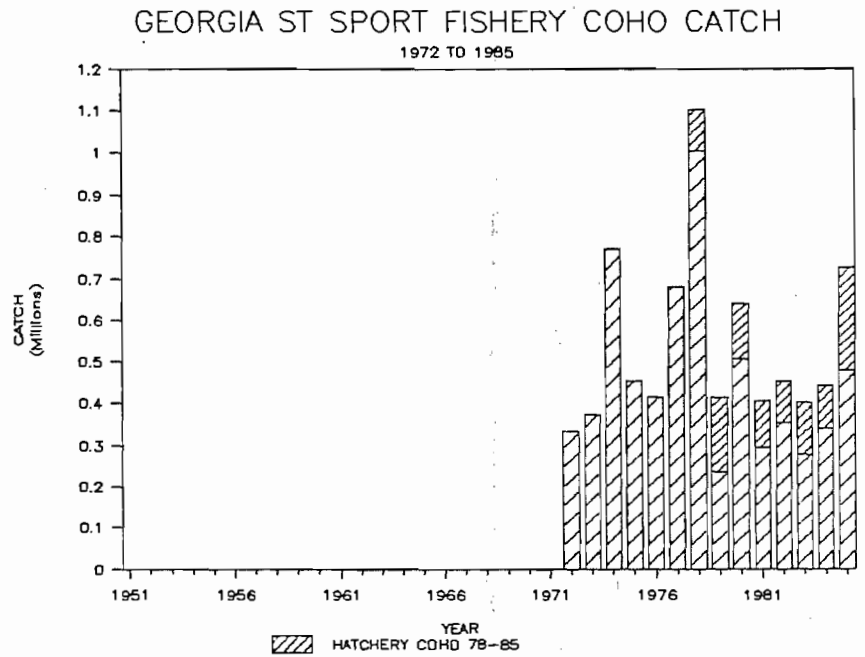


Fig 2

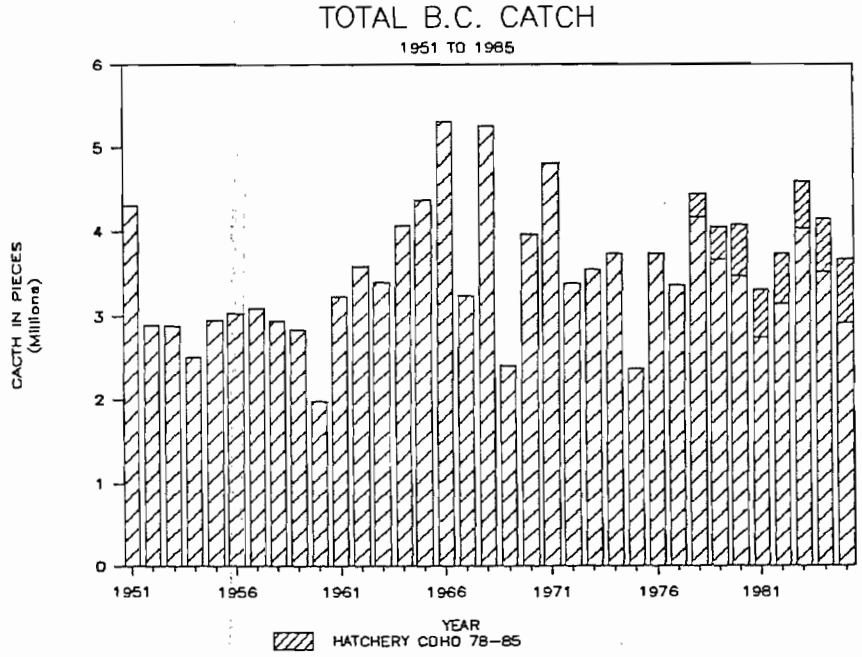


Fig. 4.

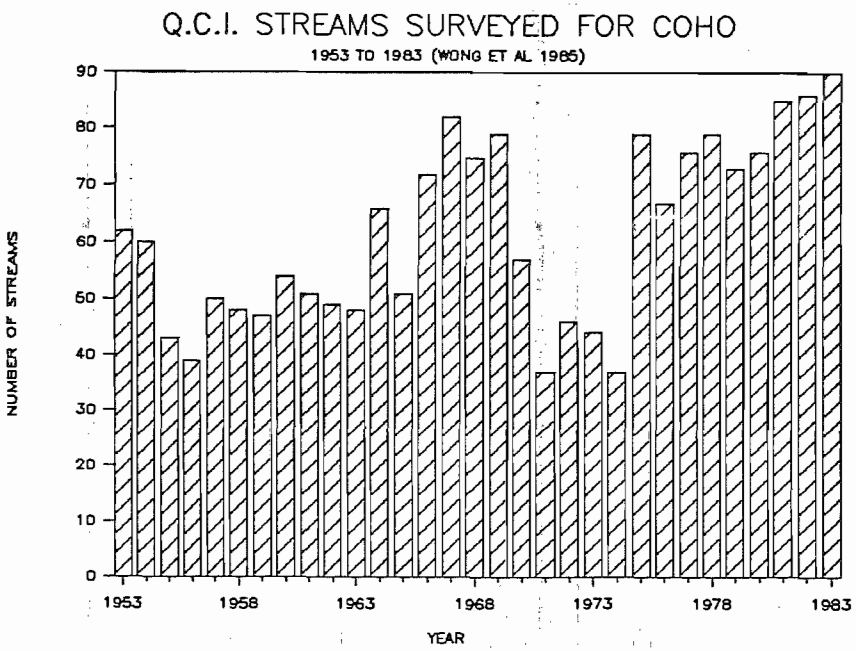


Fig. 5

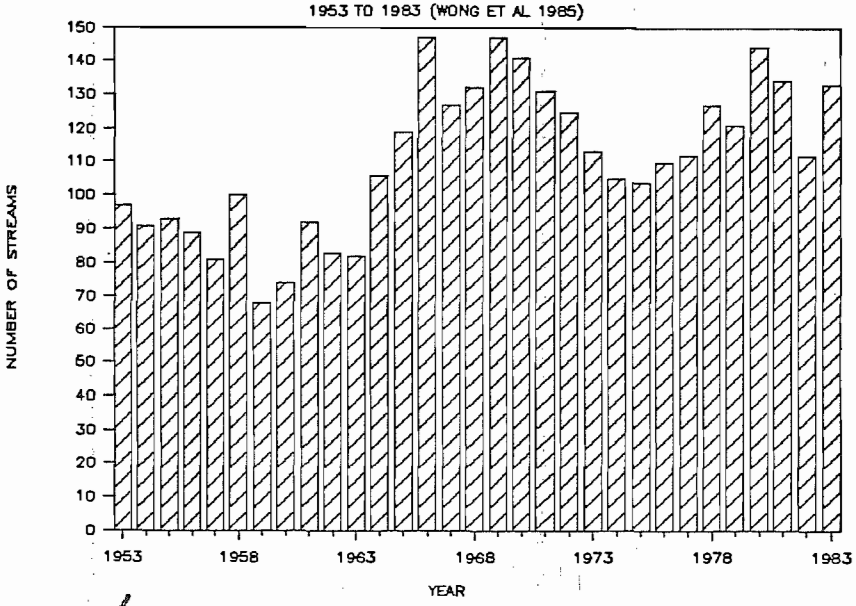


Fig. 6

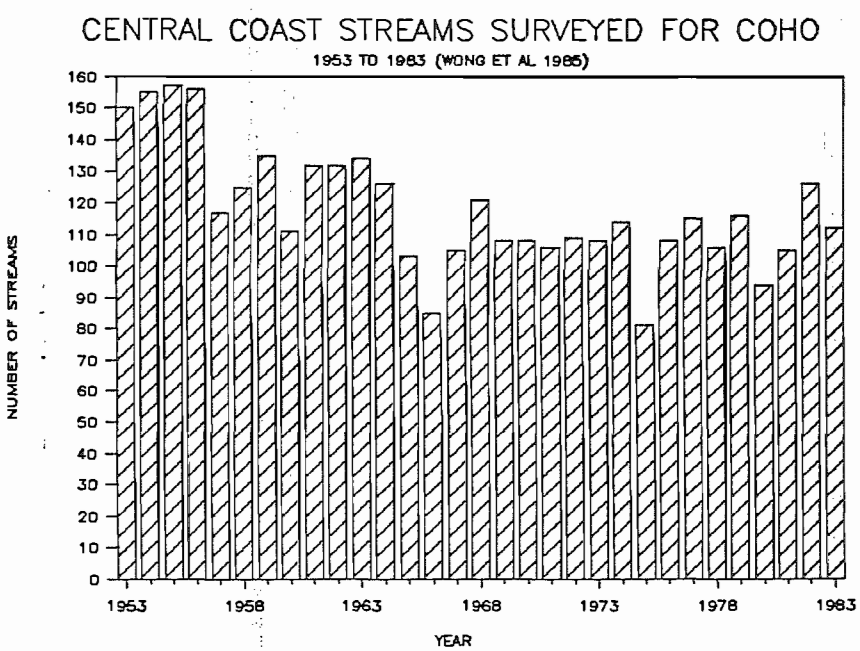


Fig. 7

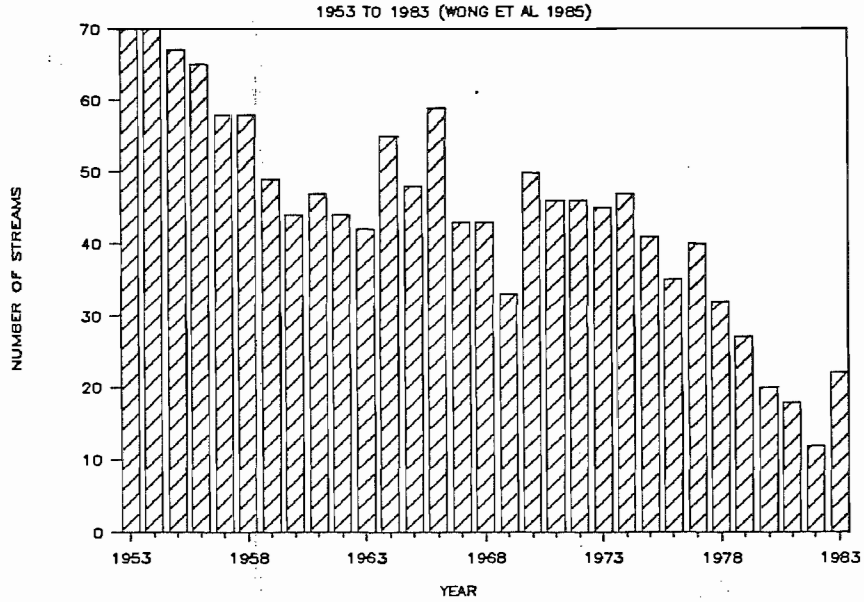


Fig. 8

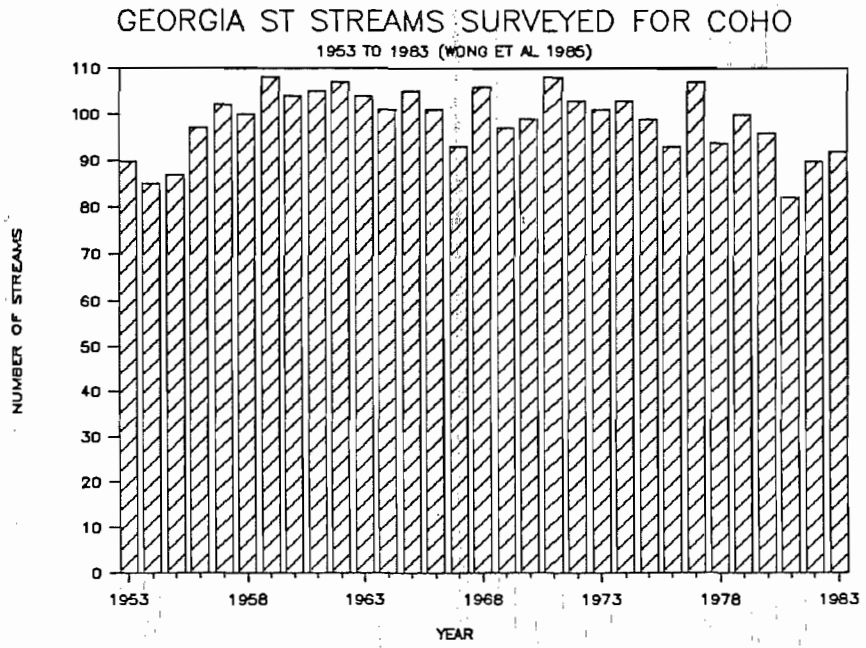


Fig. 9

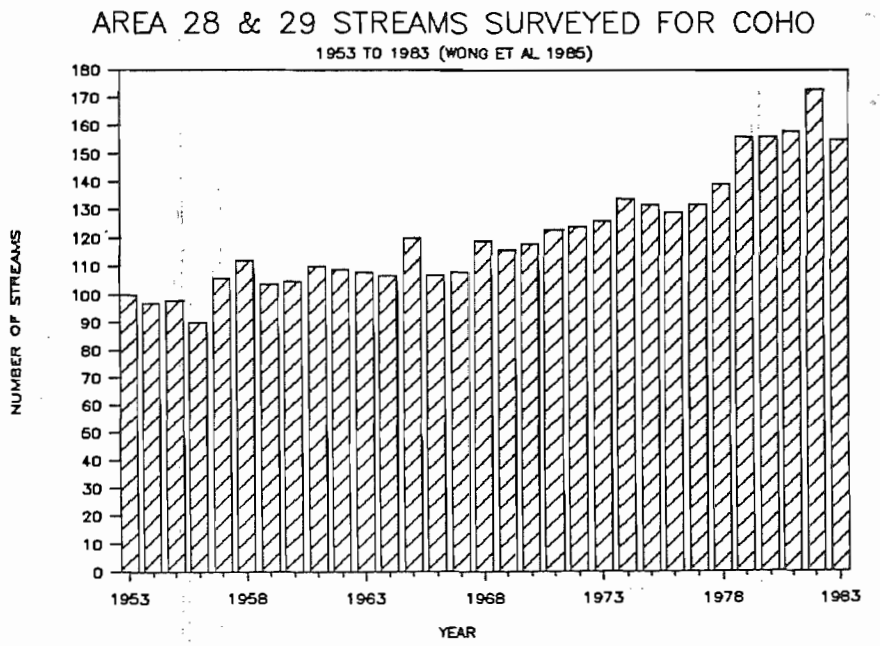


Fig. 11

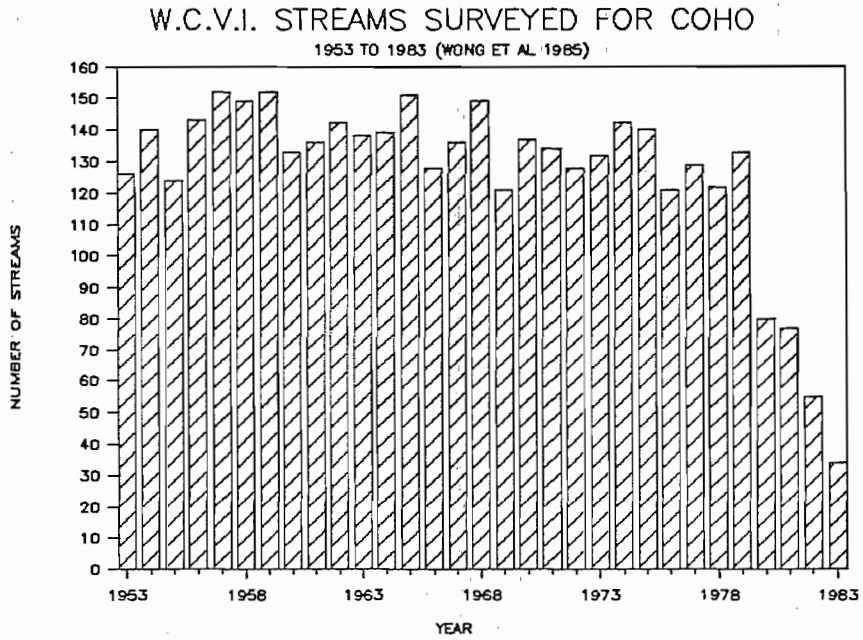


Fig. 10

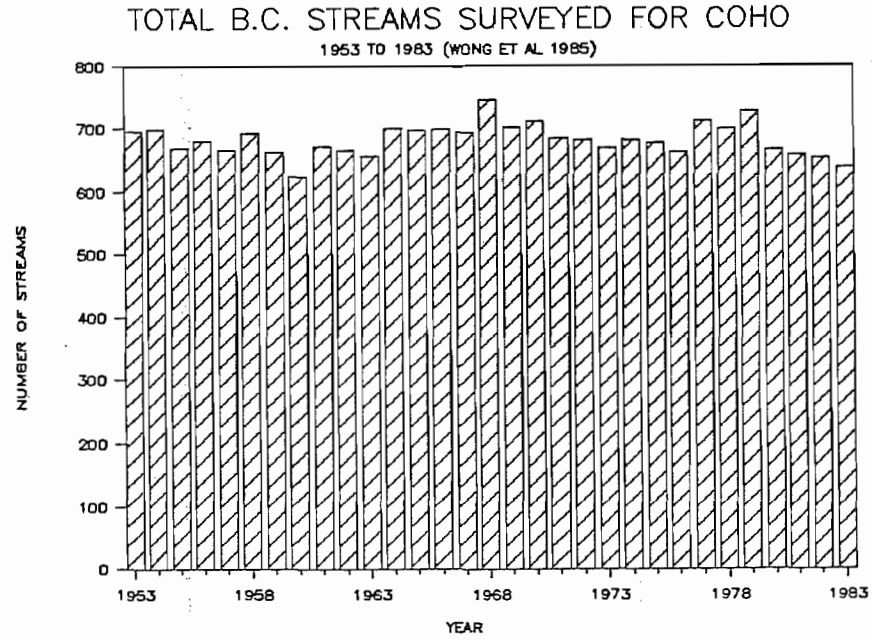


Fig. 12

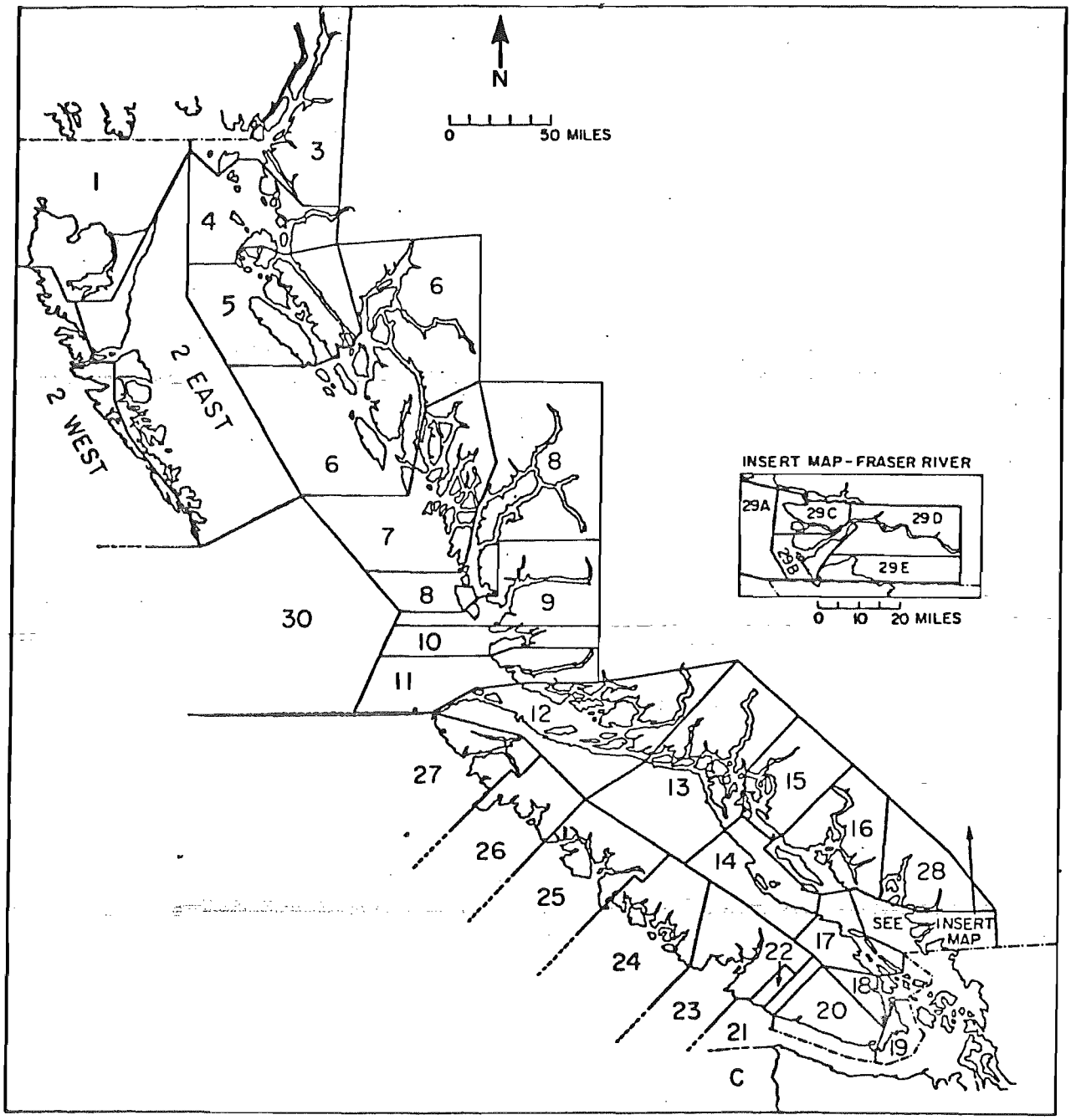


Fig. 13 Map of statistical areas in British Columbia.

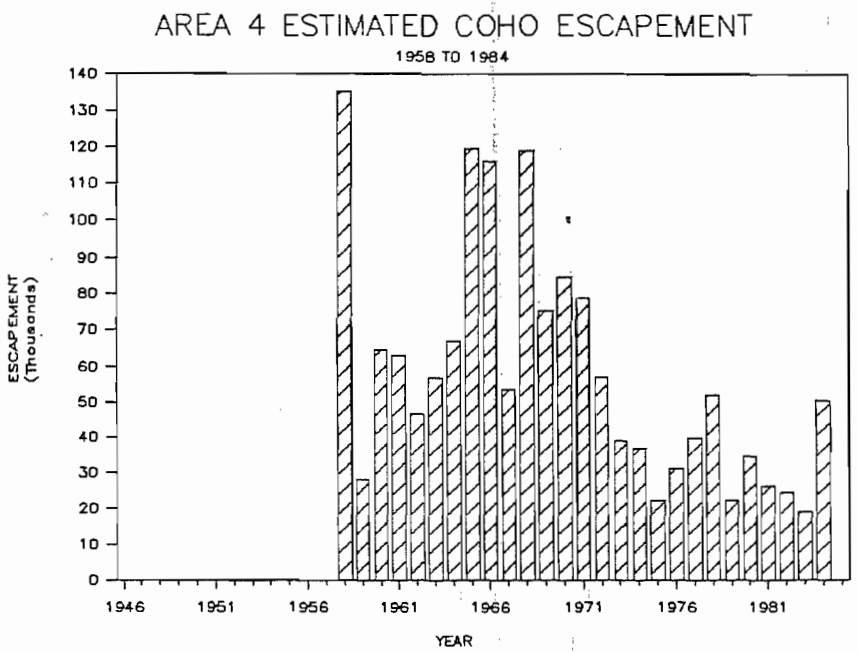


Fig. 14.

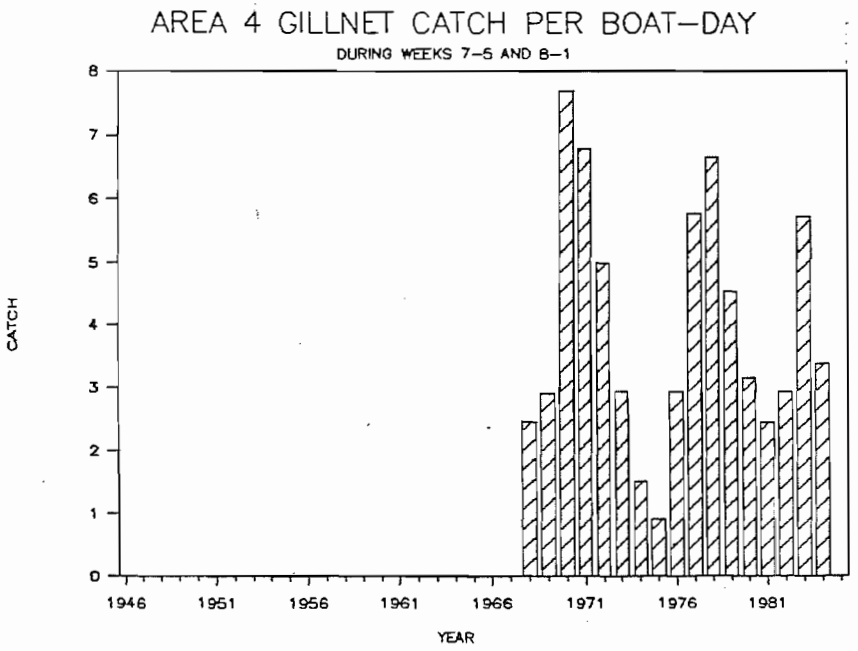
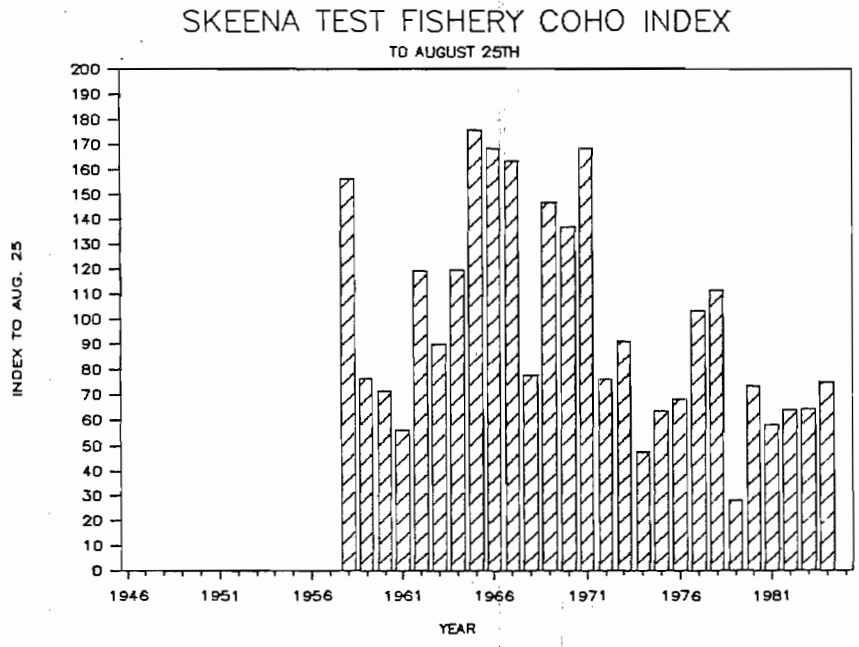


Fig 16.



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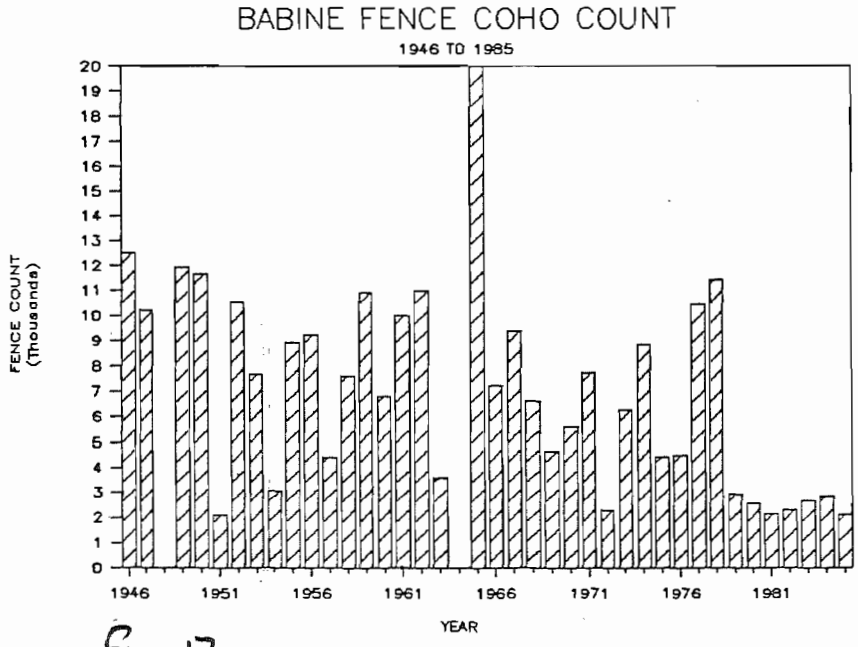

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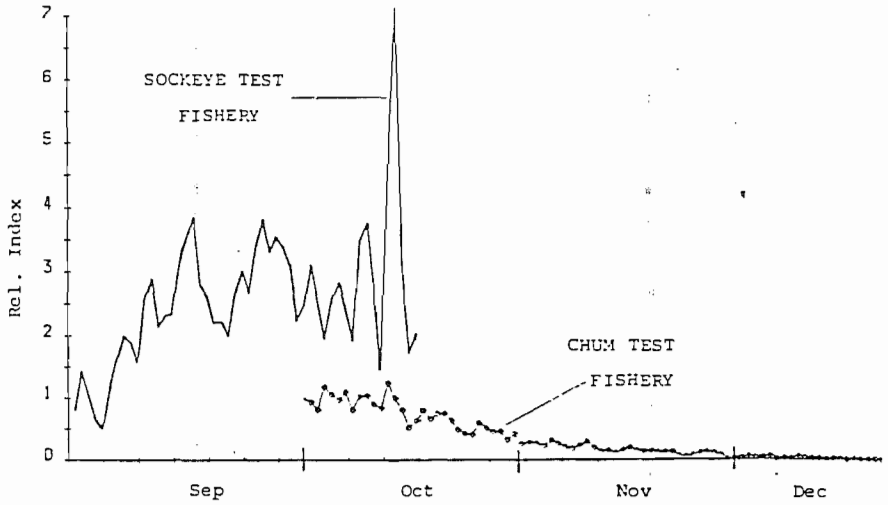


Fig. 18 Coho catch per unit effort in the chum and sockeye test fisheries in the lower Fraser River, 1970 to 1984.

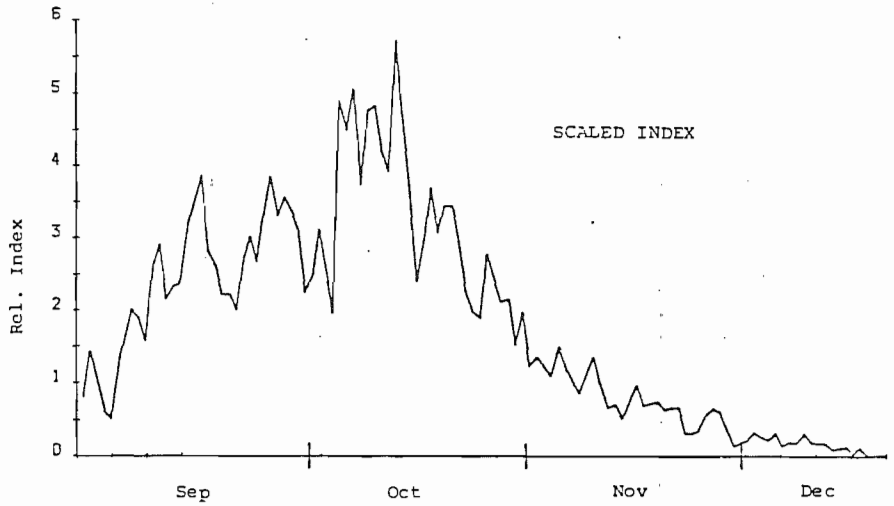


Fig. 19 Scaled coho catch per unit effort index in the sockeye/chum test fisheries in the lower Fraser River, 1970 to 1984.

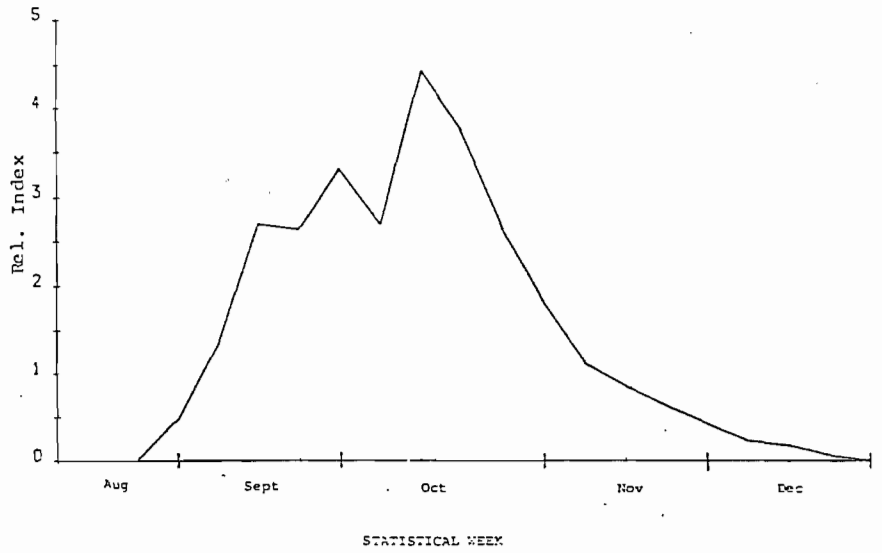


Fig. 20 Coho catch per unit effort (scaled, weekly) in the sockeye/chum test fisheries in the lower Fraser River.

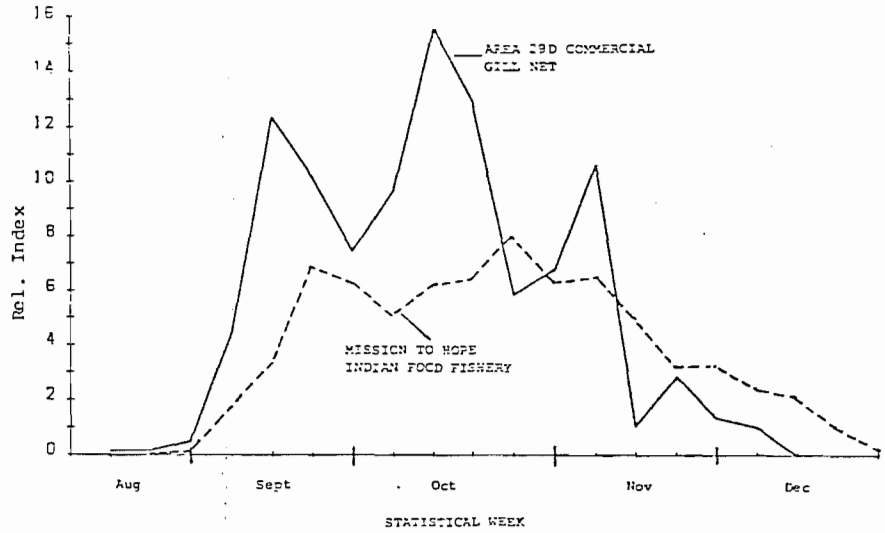


Fig. 21 Coho catch per unit effort in the Area 29D commercial gill net fishery and the Indian food fishery between Mission and Hope.

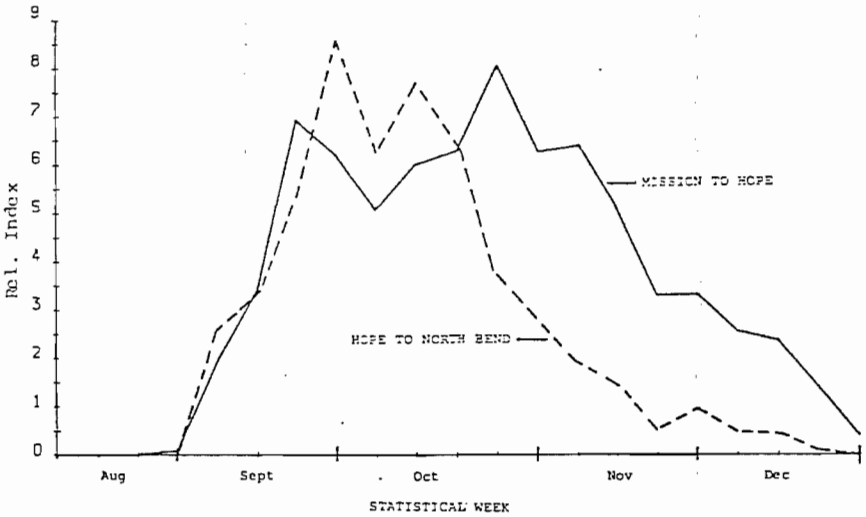


Fig. 22. Coho catch per unit effort in the Indian food fisheries between Mission and Hope and Hope and North Bend.

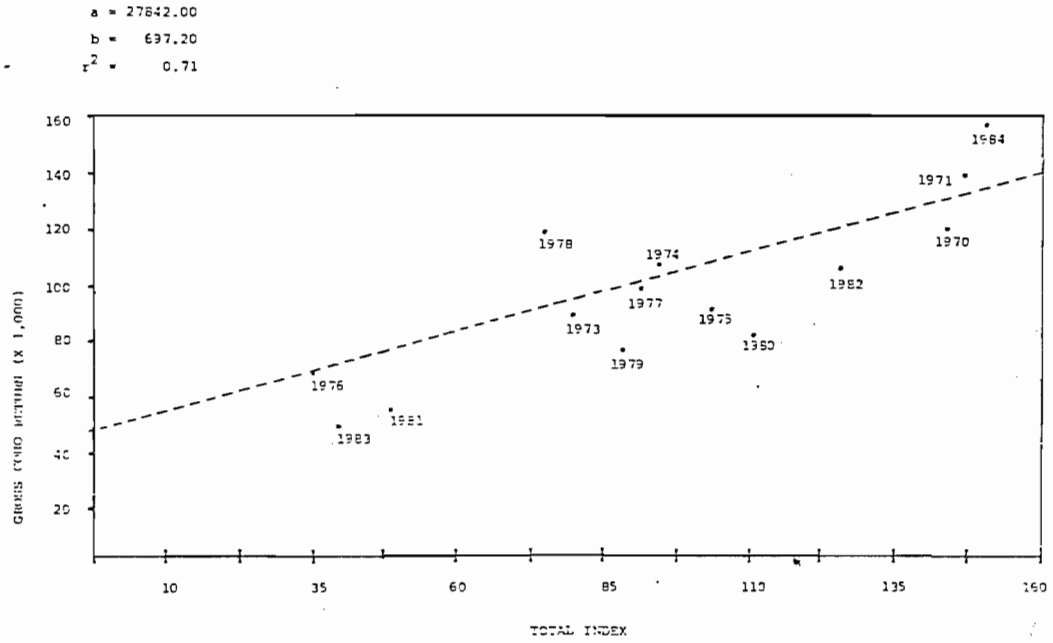


Fig. 23 Fraser River coho test fishery index vs gross return (Area 29D commercial gill net catch, Indian food fishery catch and escapement); 1970 through 1984.

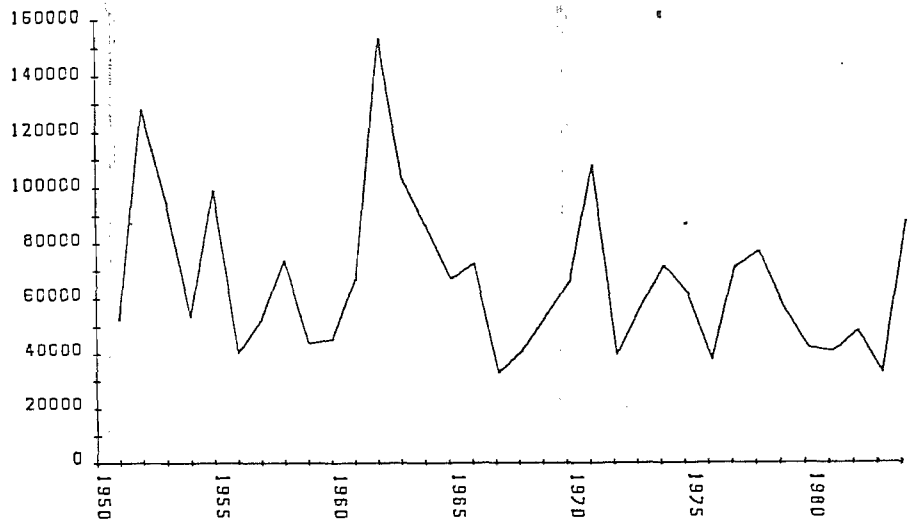


Fig. 24 Escapement of coho salmon to the Fraser system, 1951 to 1984.

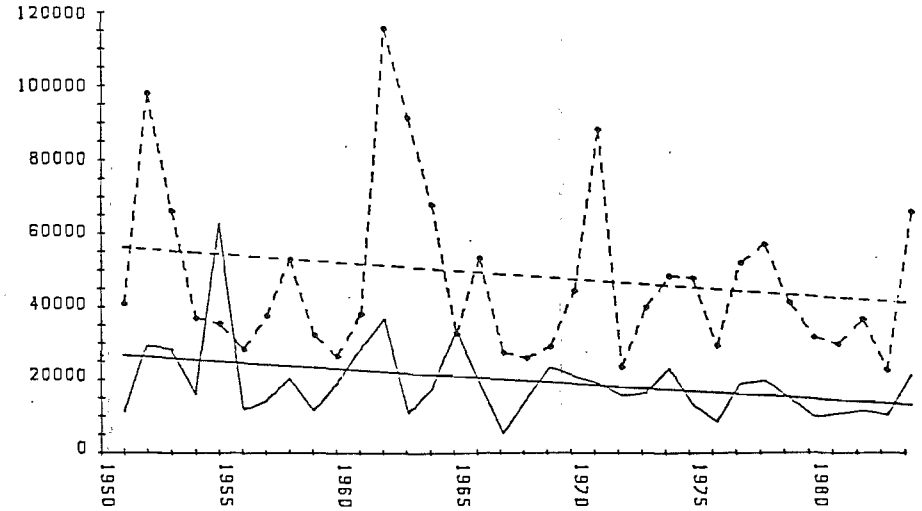
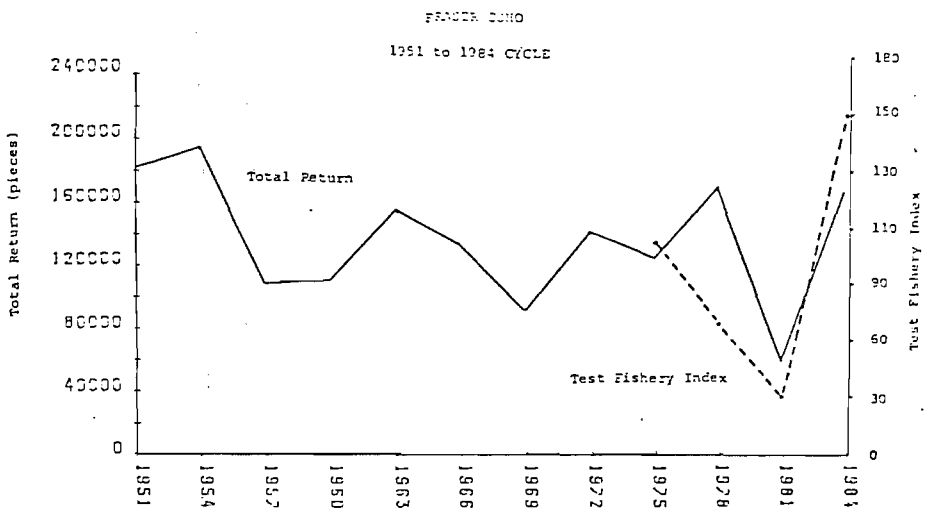


Fig. 25 Escapement of coho salmon to the upper and lower Fraser River systems, 1951 to 1984.



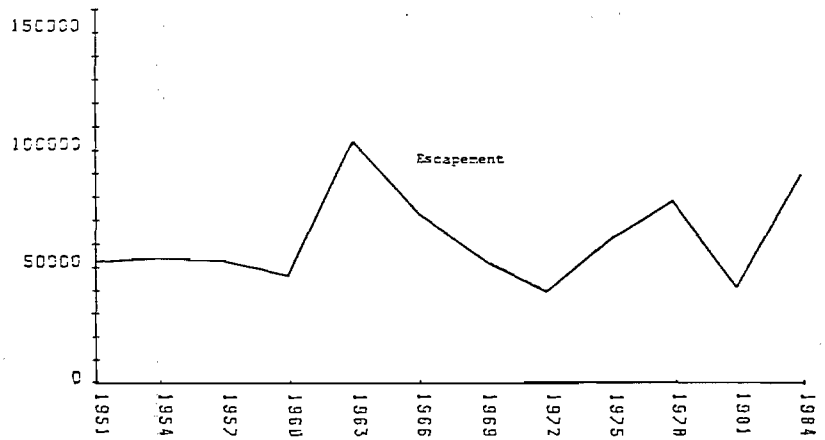


Fig. 26 Trends in Fraser River coho return, escapement and test fishery indices for the 1951 to 1984 cycle.

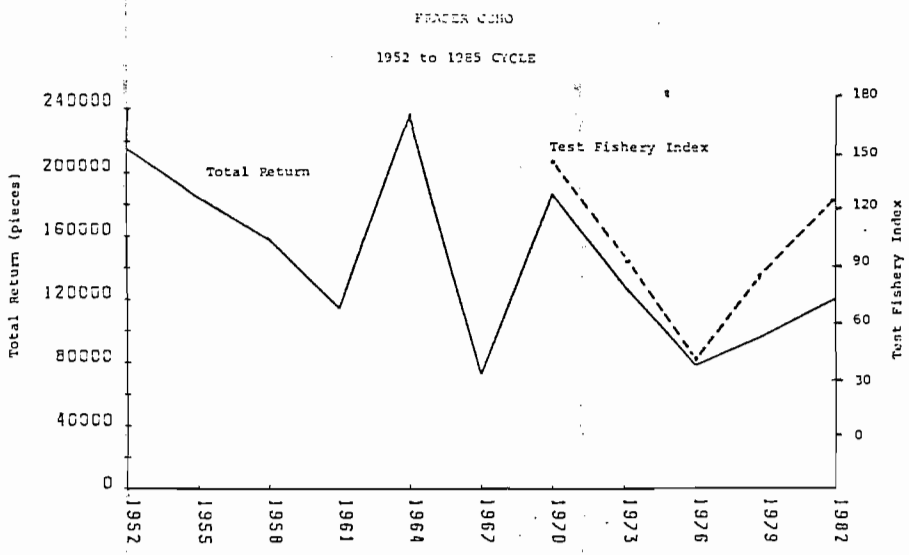


Fig. 27 Trends in Fraser River coho return, escapement and test fishery indices for the 1952 to 1985 cycle.

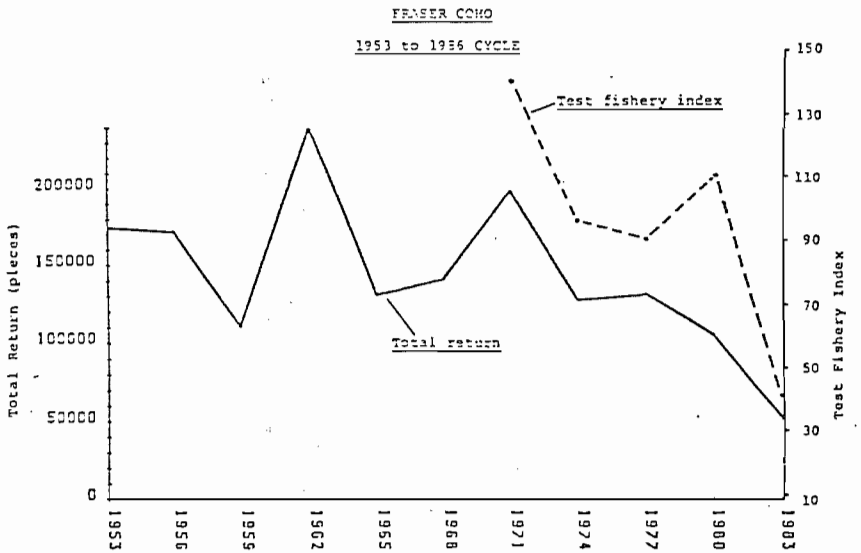
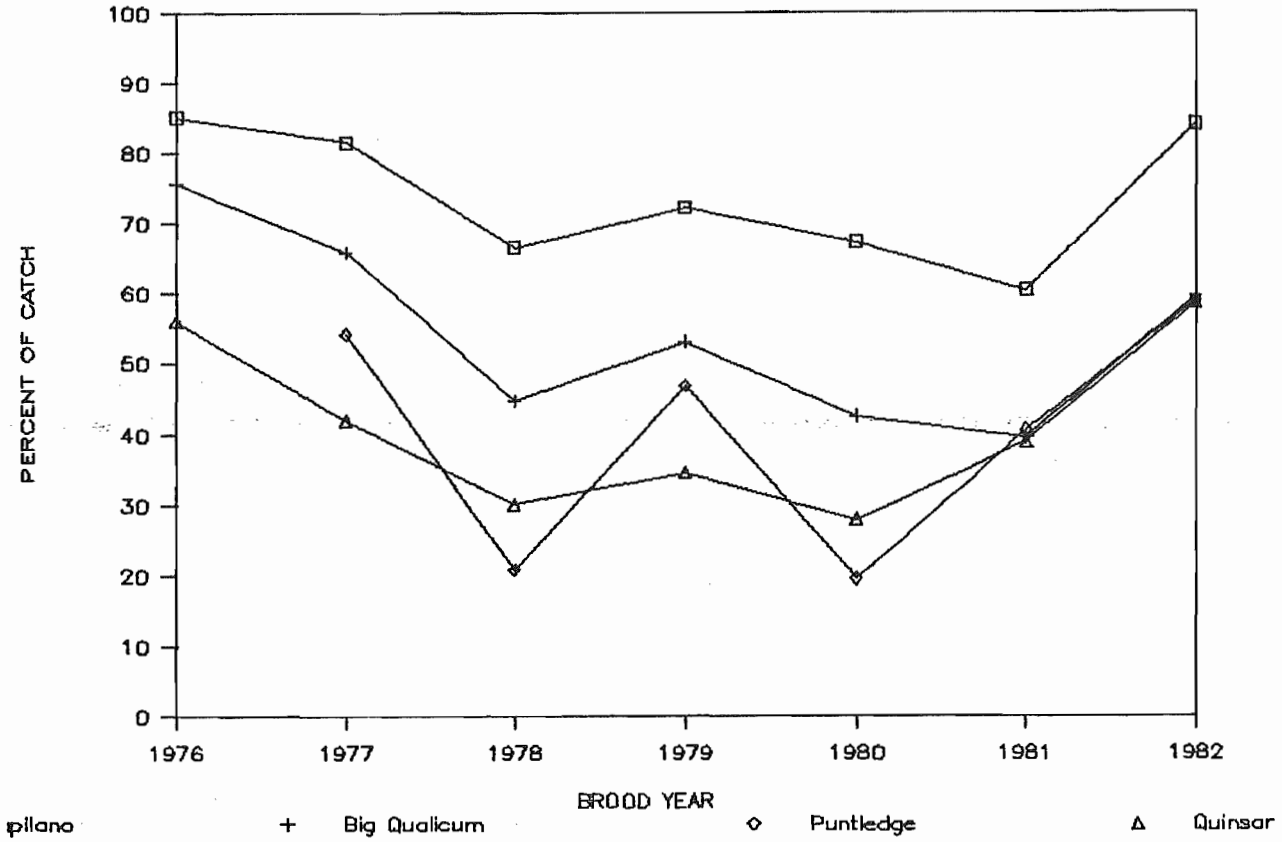


Fig. 28 Trends in Fraser River coho return, escapement and test fishery indices for the 1953 to 1986 cycle.

Fig. 29

PERCENT OF CATCH IN G.S. TROLL & SPORT

OF FOUR GEORGIA STRAIT HATCHERIES



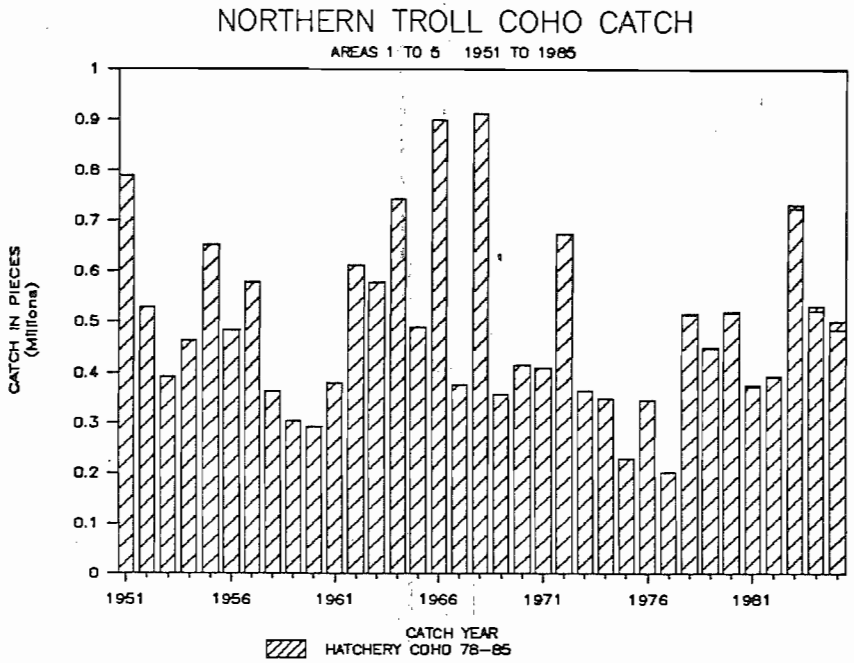


Fig. 30

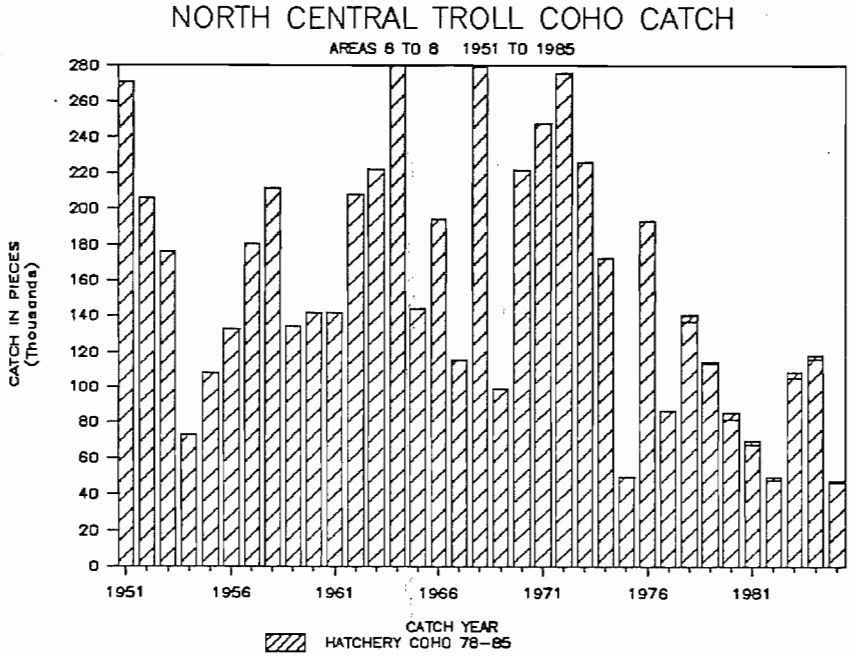


Fig 31

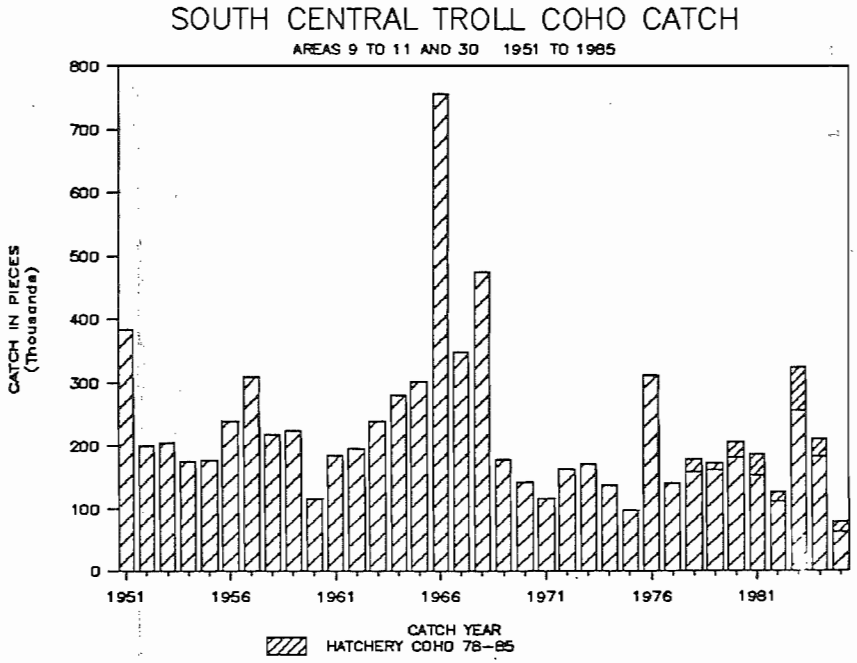


Fig. 32

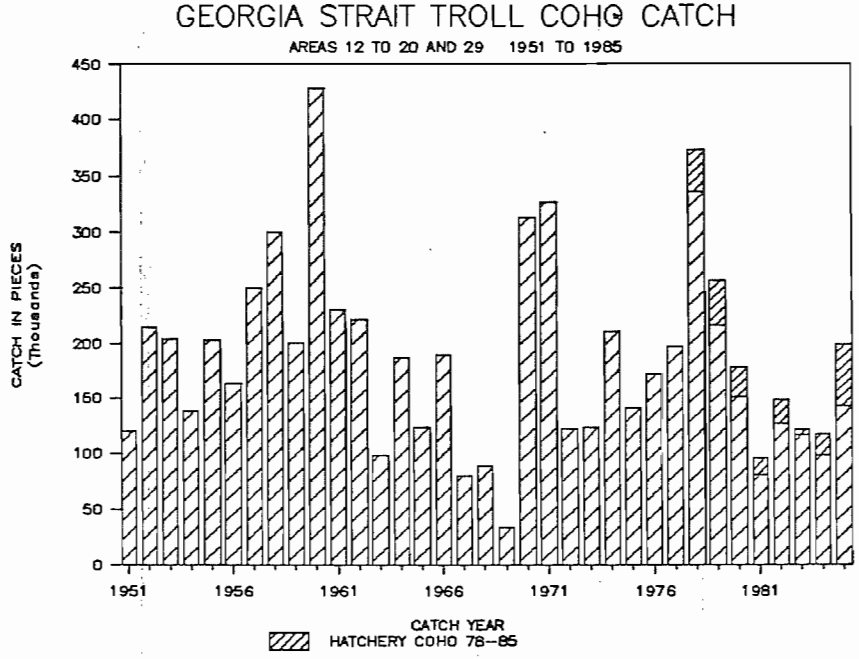


Fig. 33

Fig 34 N.W. VANCOUVER ISLAND TROLL COHO CATCH

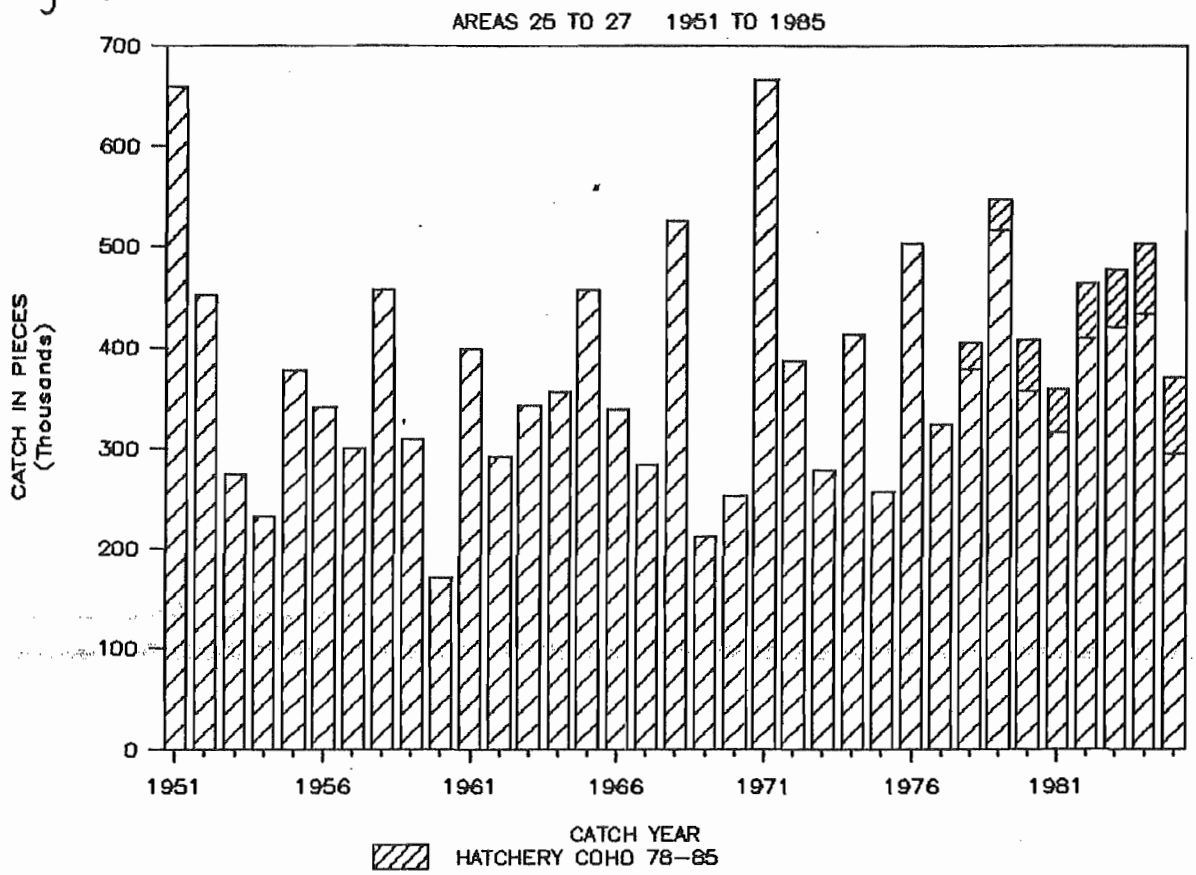


Fig 35 S.W. VANCOUVER ISLAND TROLL COHO CATCH

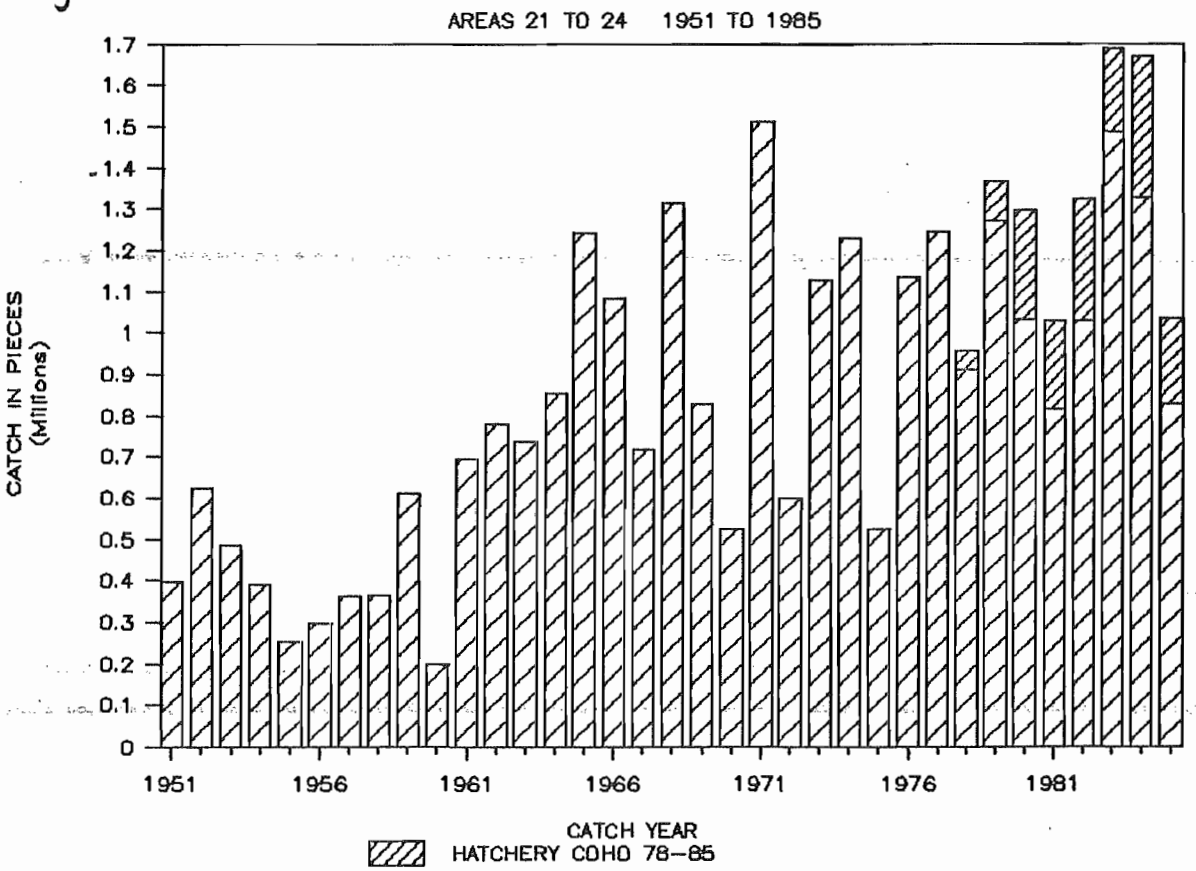


Fig 2.6

Fig. 36 NORTHERN NET COHO CATCH

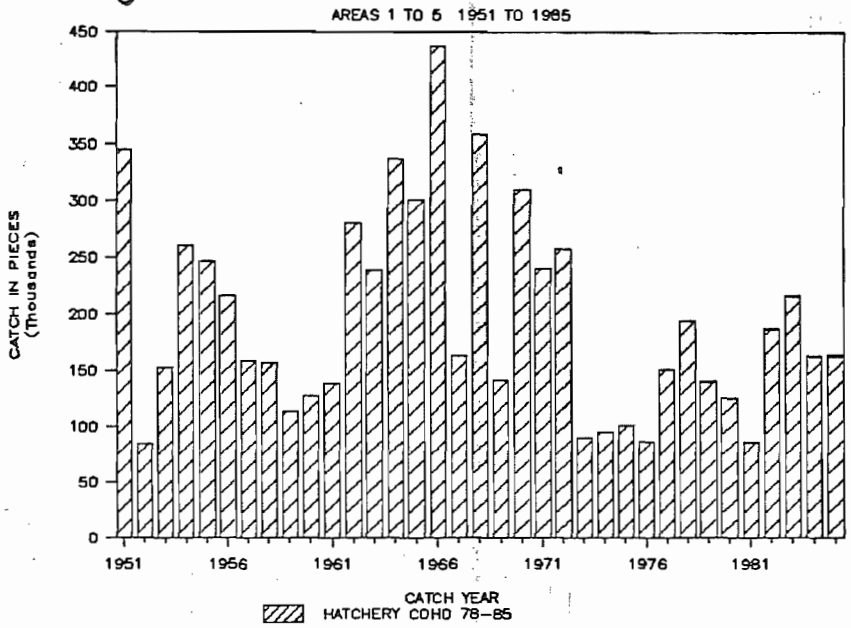


Fig. 37. CENTRAL NET COHO CATCH

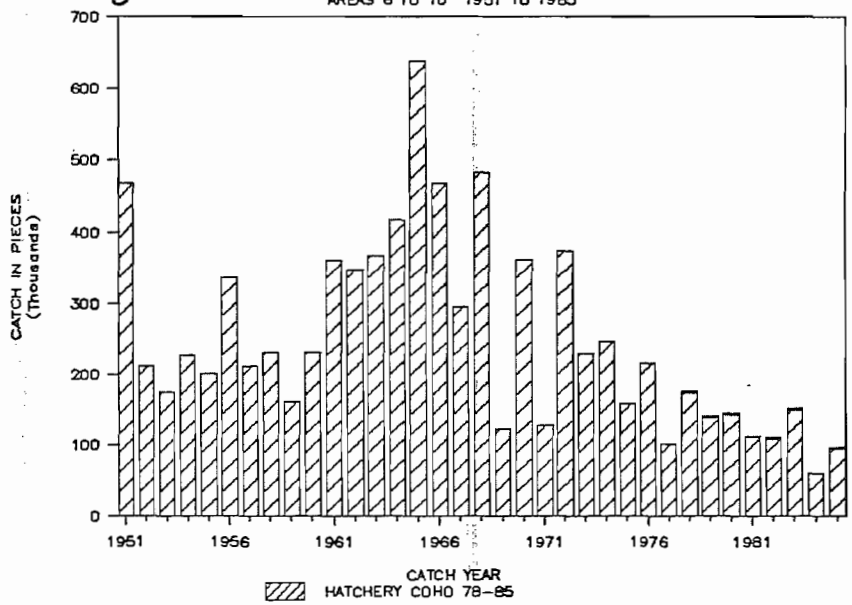


Fig. 38 JOHNSTONE STRAIT NET COHO CATCH

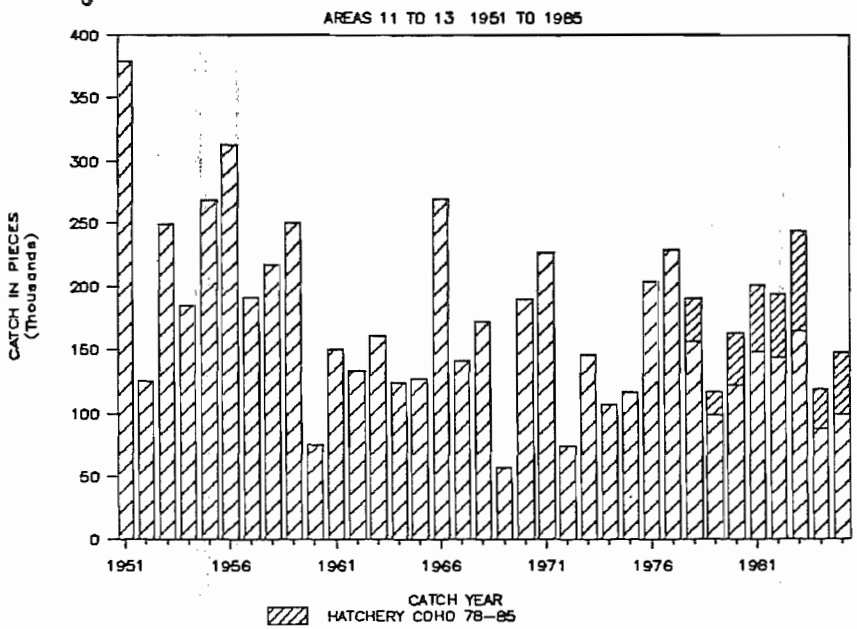


Fig. 39 GEORGIA STRAIT NET COHO CATCH

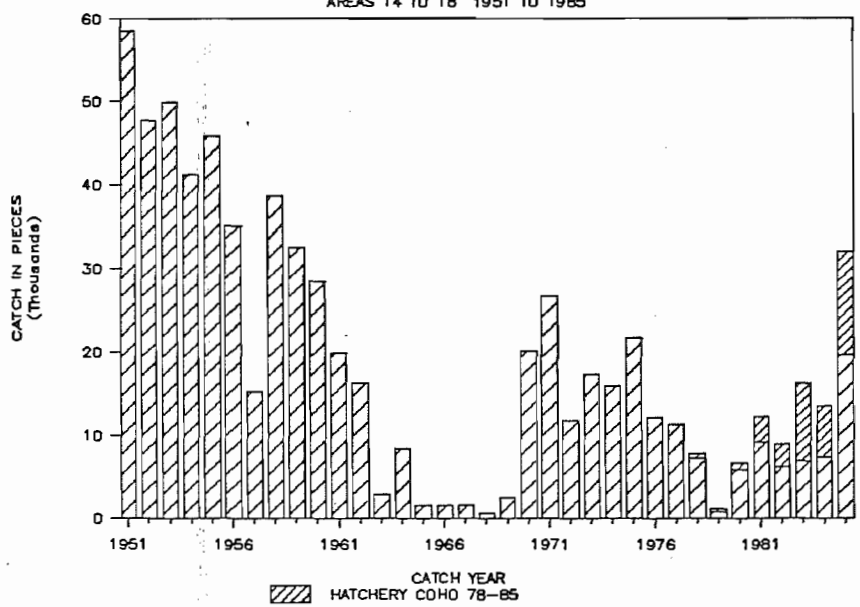


Fig. 40 JUAN DE FUCA NET COHO CATCH

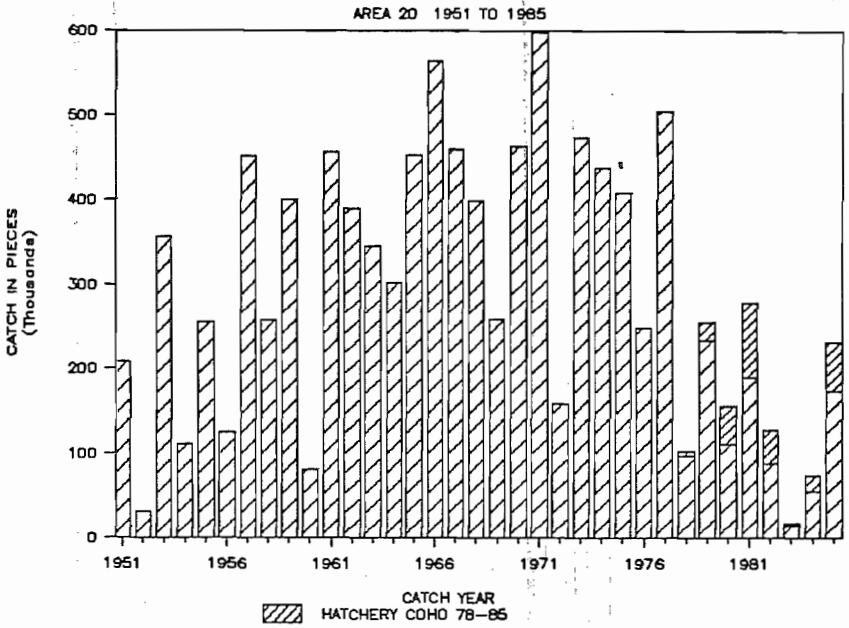


Fig. 42 FRASER RIVER NET COHO CATCH

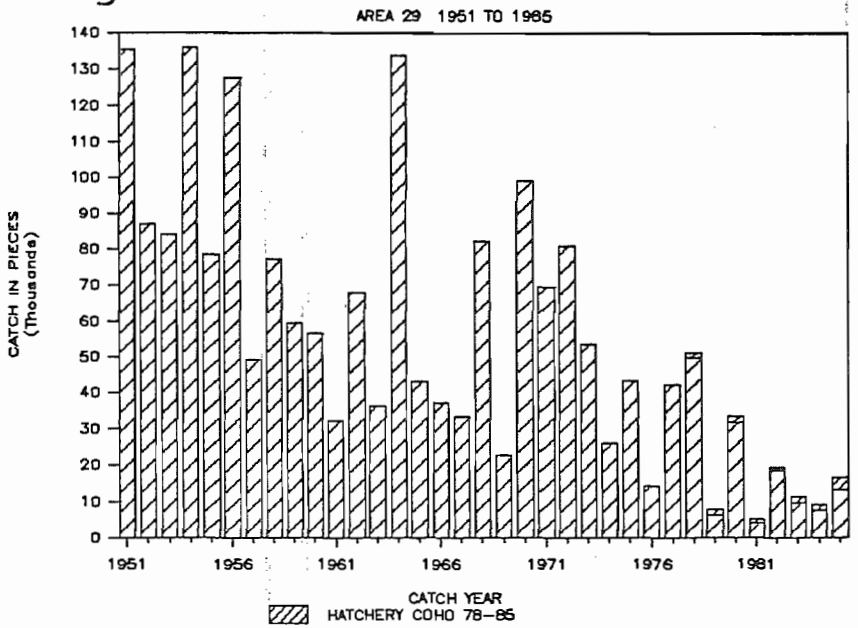


Fig 41 WESTCOAST VANCOUVER IS. NET COHO CATCH

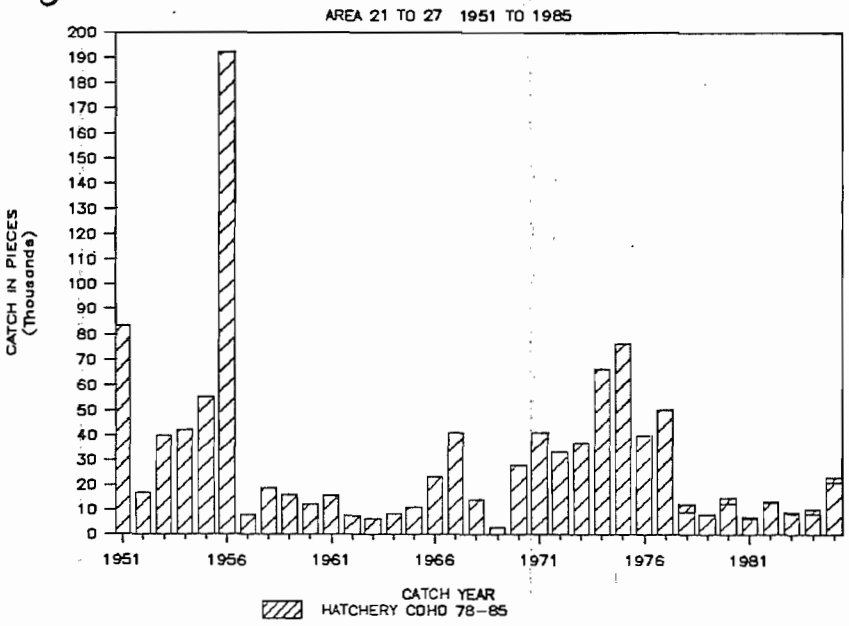


Fig 43 TOTAL B.C. NET COHO CATCH

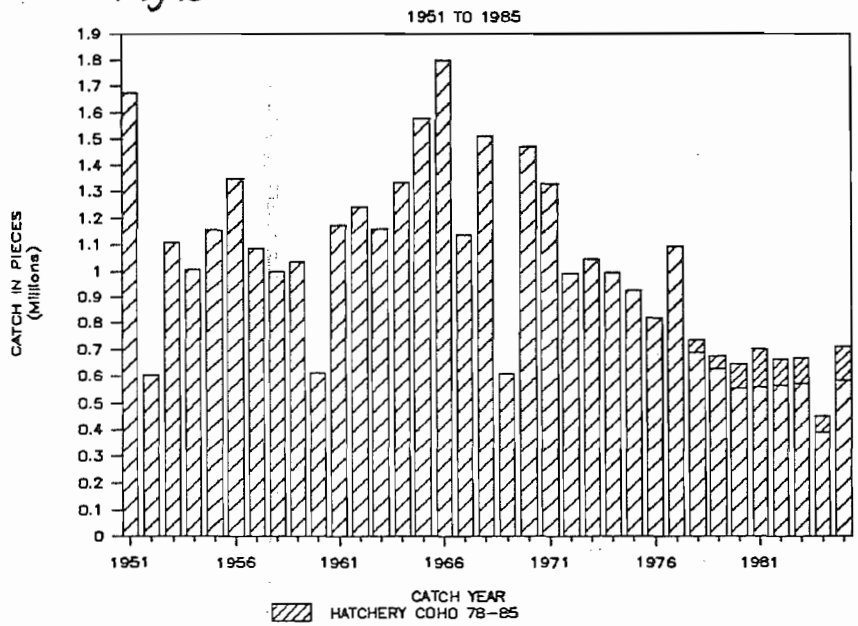


Fig. 44 1984 GEORGIA ST SPORT EFFORT & CATCH

BY MONTH (GEORGIA ST CREEL SURVEY DATA)

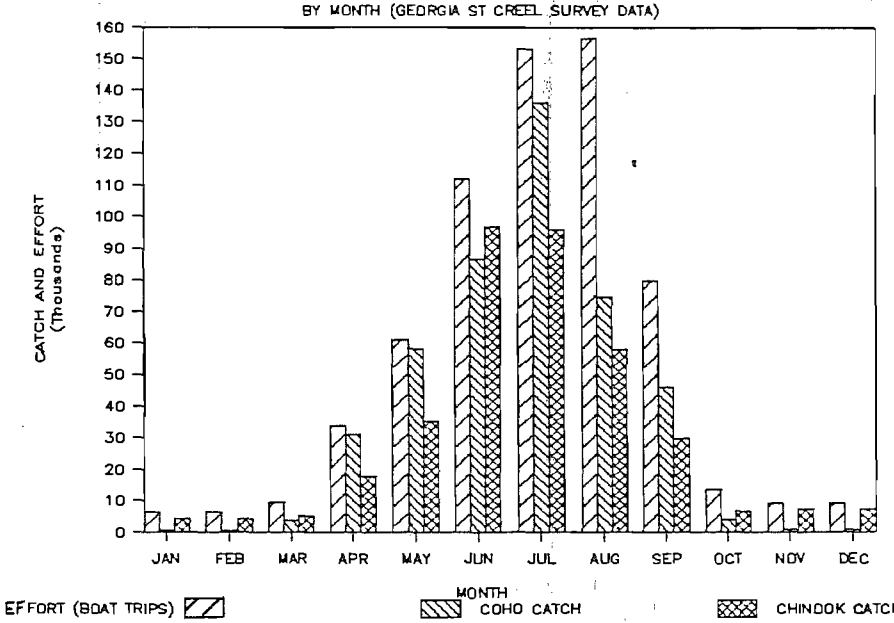


Fig 46 1984 GEORGIA ST SPORT EFFORT & CATCH

(DATA FROM GEORGIA ST CREEL SURVEY)

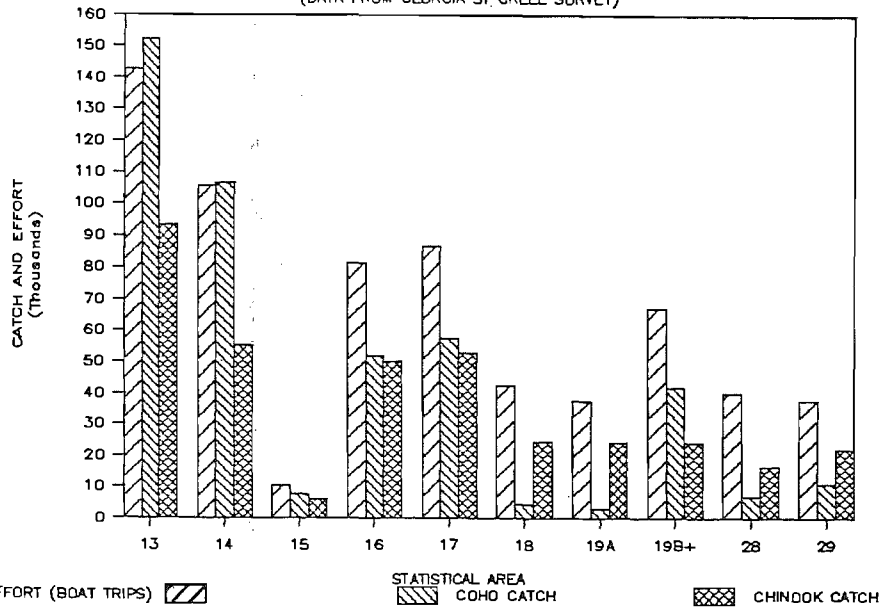


Fig. 45 1985 GEORGIA ST SPORT EFFORT & CATCH

BY MONTH (GEORGIA ST CREEL SURVEY DATA)

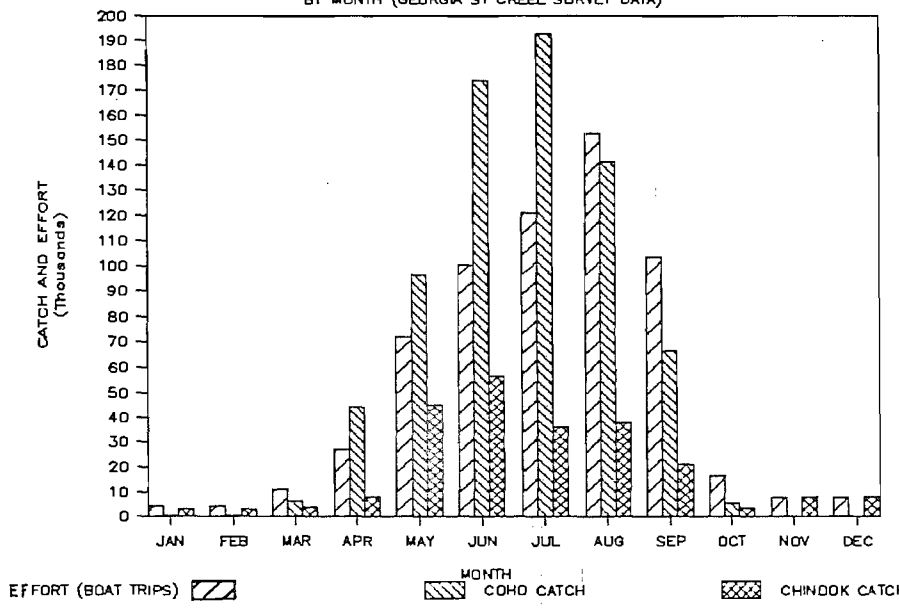


Fig. 47 1985 GEORGIA ST SPORT EFFORT & CATCH

(DATA FROM GEORGIA ST CREEL SURVEY)

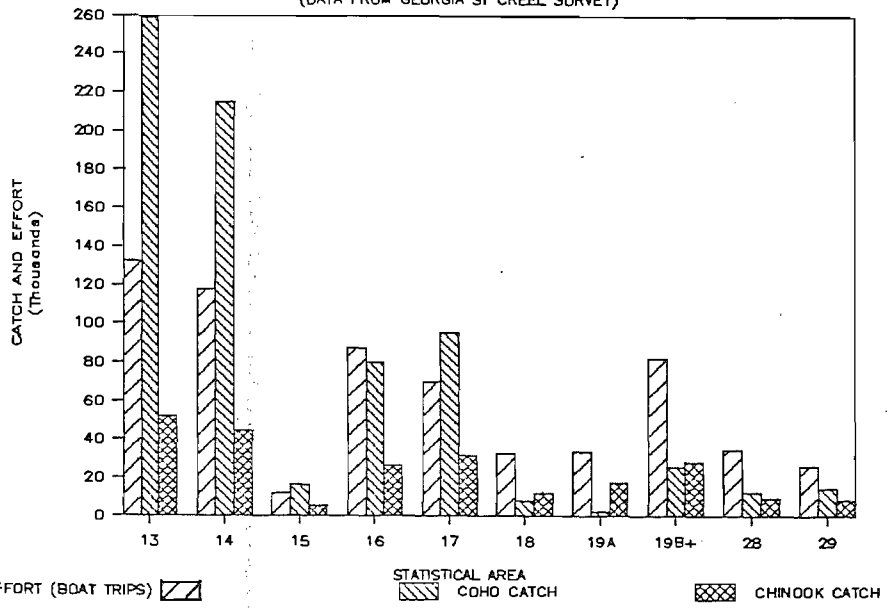


Fig. 49 PRODUCTION FROM MAJOR FACILITIES

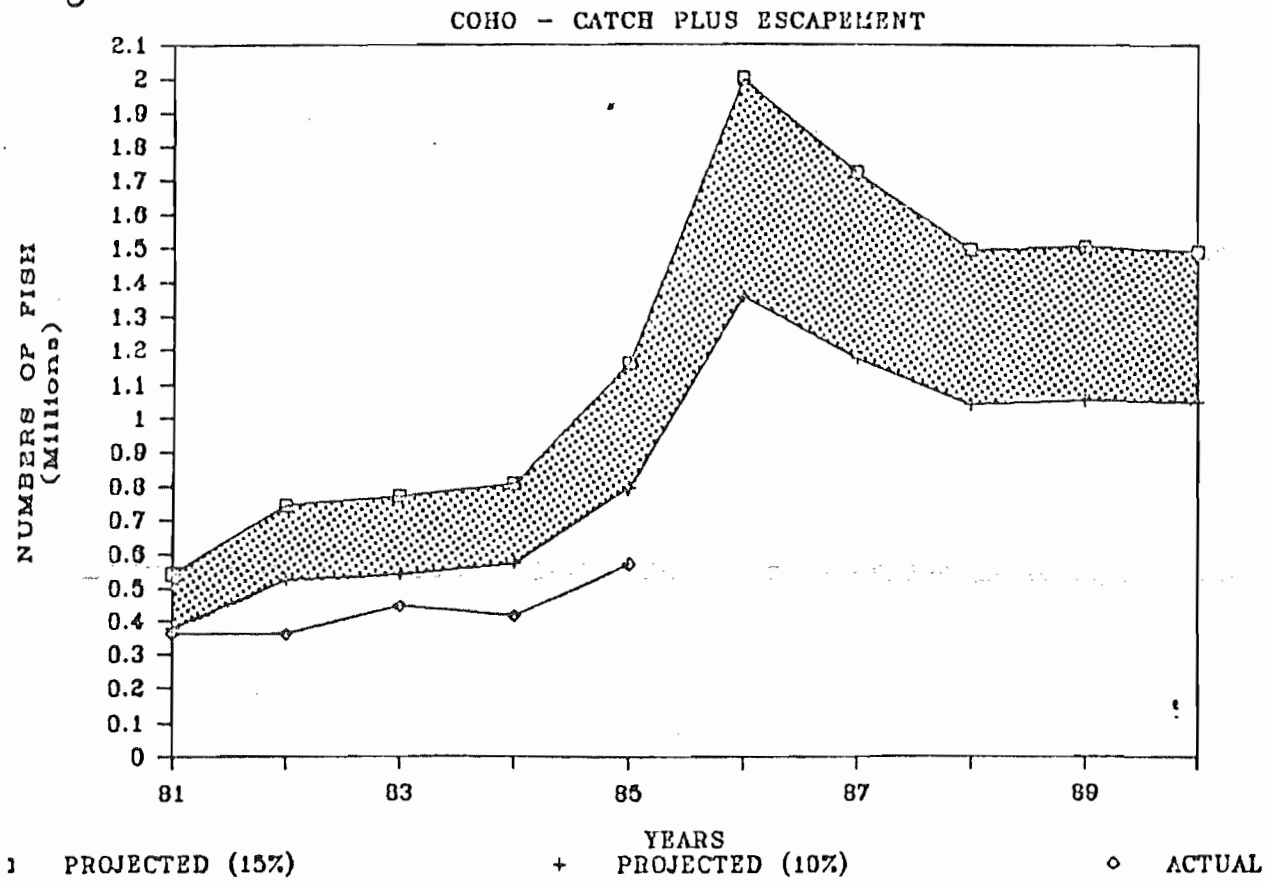
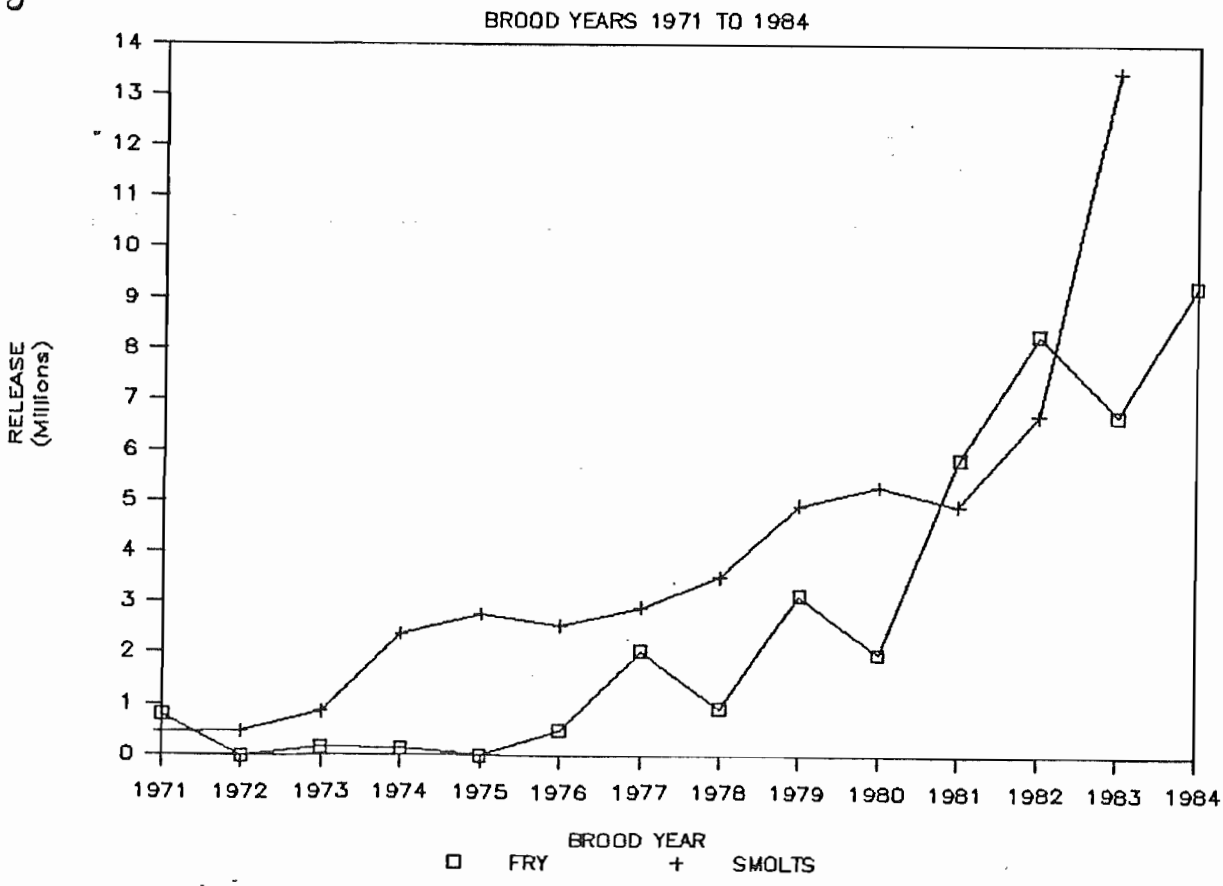
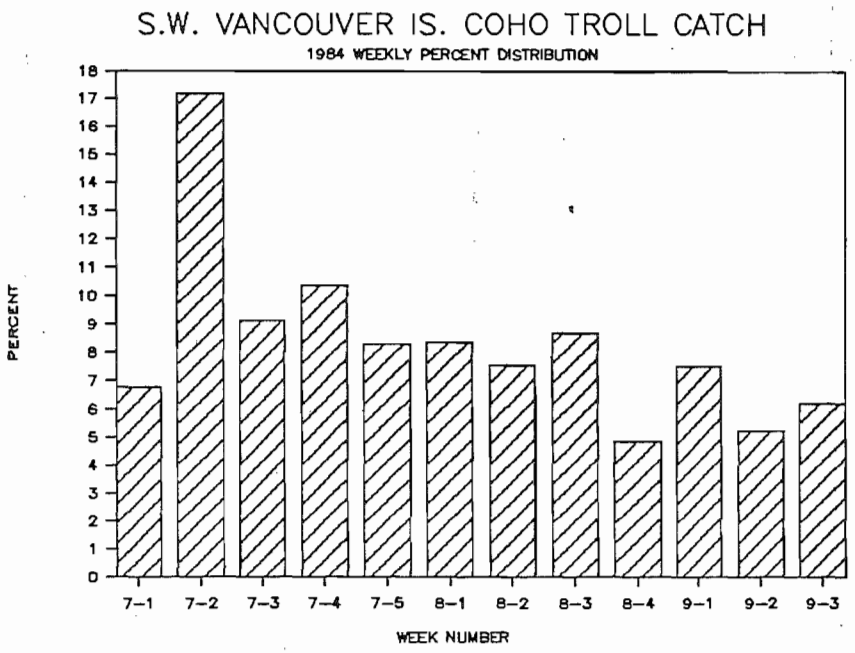
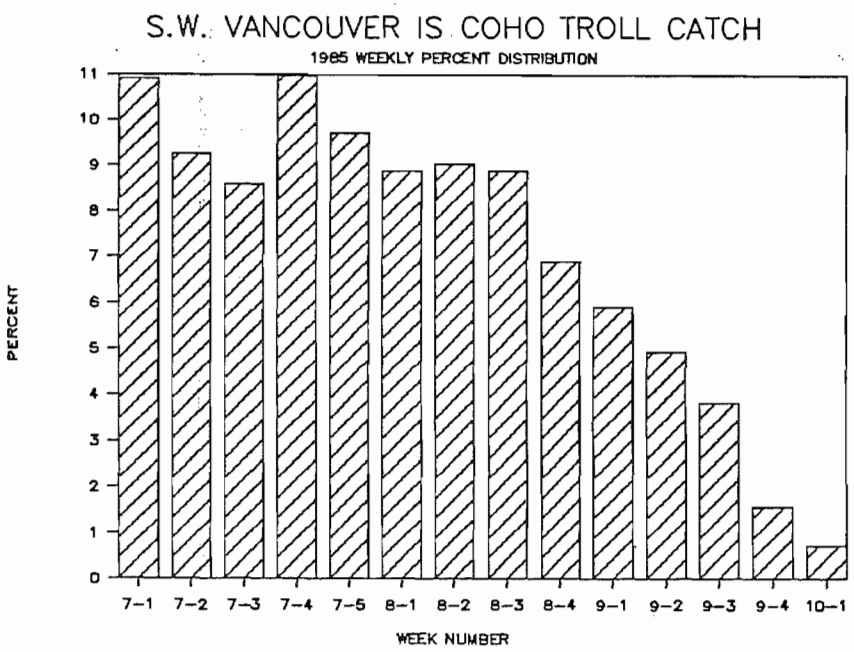


Fig. 48. B.C. HATCHERY COHO FRY & SMOLT RELEASES




S.W. VANCOUVER IS. COHO TROLL CATCH
1984 WEEKLY PERCENT DISTRIBUTION
PERCENT
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
7-1 7-2 7-3 7-4 7-5 8-1 8-2 8-3 8-4 9-1 9-2 9-3
WEEK NUMBER


S.W. VANCOUVER IS COHO TROLL CATCH
1985 WEEKLY PERCENT DISTRIBUTION
PERCENT
0 1 2 3 4 5 6 7 8 9 10 11
7-1 7-2 7-3 7-4 7-5 8-1 8-2 8-3 8-4 9-1 9-2 9-3 9-4 10-1
WEEK NUMBER

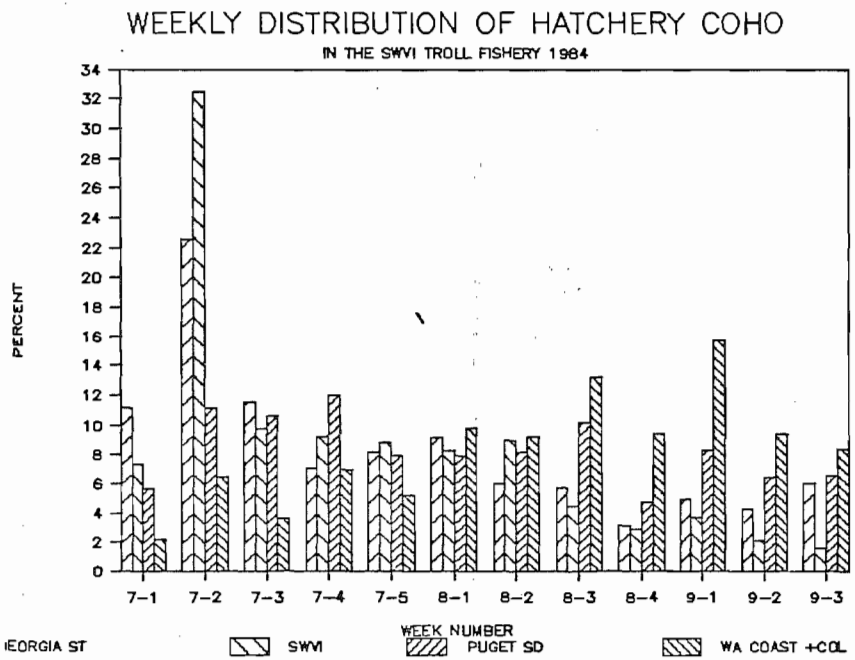

WEEKLY DISTRIBUTION OF HATCHERY COHO
IN THE SWVI TROLL FISHERY 1984
PERCENT
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34
7-1 7-2 7-3 7-4 7-5 8-1 8-2 8-3 8-4 9-1 9-2 9-3
WEEK NUMBER
IEORGIA ST
SWVI
PUGET SD
WA COAST +COL

Fig. 51

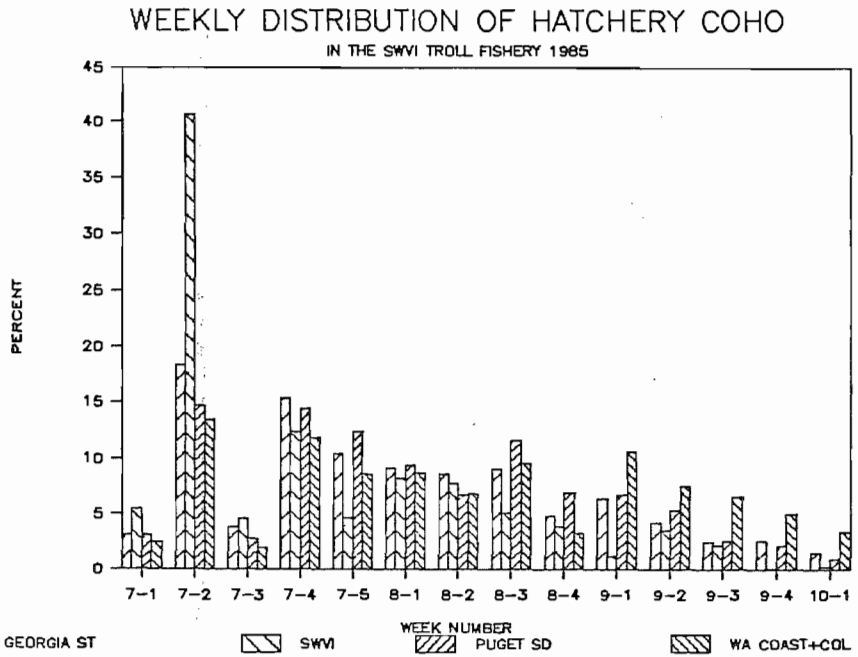

WEEKLY DISTRIBUTION OF HATCHERY COHO
IN THE SWVI TROLL FISHERY 1985
PERCENT
0 5 10 15 20 25 30 35 40 45
7-1 7-2 7-3 7-4 7-5 8-1 8-2 8-3 8-4 9-1 9-2 9-3 9-4 10-1
WEEK NUMBER
GEORGIA ST
SWVI
PUGET SD
WA COAST+COL

Fig. 52.

INFORMATION ON COHO SALMON STOCKS AND FISHERIES OF SOUTHEAST ALASKA

Prepared for the

Coho Salmon Technical Committee

U.S./Canada Pacific Salmon Commission

January 1986

Prepared by:

Southeast Region
Fisheries Divisions Staff
Alaska Department of Fish and Game

Juneau, Alaska

IMPORTANT NOTE

THIS REPORT HAS BEEN PREPARED TO PROVIDE GENERAL BACKGROUND INFORMATION ON COHO SALMON STOCKS AND FISHERIES OF SOUTHEAST ALASKA. SOME INFORMATION CONTAINED IN THE REPORT IS BASED ON PRELIMINARY CATCH REPORTS FOR RECENT YEARS AND ON PRELIMINARY FINDINGS FROM RESEARCH PROGRAMS CURRENTLY BEING CONDUCTED. READERS ARE CAUTIONED TO USE THIS INFORMATION ACCORDINGLY.

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INFORMATION ON COHO SALMON STOCKS AND FISHERIES OF SOUTHEAST ALASKA

EXECUTIVE SUMMARY

This report provides some general background information on coho salmon stocks and fisheries of Southeast Alaska. Although no coho salmon fishery regimes are currently established for Southeast Alaska or northern British Columbia under the coho annex of the U.S./Canada Pacific Salmon Treaty (harvest sharing and coordinated management of coho originating in the transboundary rivers are addressed in the transboundary rivers annex), the Treaty does specify that the Coho Technical Committee will compile information on other coho stocks and fisheries of mutural concern. Some intermingling of Southeast Alaska and northern B.C. coho salmon stocks is known to occur in fisheries of both countries, although quantitative information on the degree of intermingling is very limited.

Coho salmon are produced in some two to three thousand streams and rivers in Southeast Alaska from Dixon Entrance to Yakutat. While commercial catches as high as 3.3 million (1951) have been recorded, the highest decade average was 2 million during the 1940s. This level probably represented overfishing as catches subsequently declined significantly during the next three decades to an average of approximately 1 million during the 1970s. The severe winters of the late 1960s and early 1970s apparently contributed to the decline during the latter part of the period. In response to milder winters and more restrictive management, coho stocks have increased in recent years with commercial catches averaging 1.9 million coho during 1980-85. Based on historical catch patterns, maximum sustainable harvest for Southeast Alaska natural coho stocks is currently thought to be in the range of about 1.3 to 1.6 million fish per year. At present under the existing favorable environmental conditions, Southeast Alaska coho stocks overall are considered to be in healthy condition. However, some stocks harvested in a number of gauntlet commercial and recreational fisheries experience high harvest rates in some years.

Migratory pattern and harvest rate studies utilizing mark/recovery methods have been conducted on Southeast Alaska coho stocks since the early 1970's. These studies have shown that adult coho generally make initial landfalls in the more northerly coastal areas of the region, continuing their migration in a southerly direction. Overall, coho abundance tends to peak in early to mid-August in outer coastal areas, in mid-September in inside, near terminal areas, with migrations into freshwater peaking in mid-September to mid-October. Coded wire tagging studies have indicated that recent overall harvest rates for Southeast Alaska coho stocks have averaged about 60 percent. However, some stocks are consistently fished more intensively than others so that average harvest rates for individual systems have ranged from as low as 30 to 40 percent to as high as 85 to 90 percent. In general, stocks originating in central outer coastal areas which are exposed primarily to the troll fishery exhibit moderate harvest rates (average 40 to 45%)

while some stocks originating in more inside areas which pass through troll, seine, gillnet and sport fisheries exhibit higher harvest rates up to 85 to 90 percent.

Coho are an important commercial and recreational species in Southeast Alaska. Direct targeting, and subsequently directed management on coho occurs primarily in troll, gillnet, and recreational fisheries. Commercial fisheries generally harvest more that 97% of the coho, with troll gear accounting for about 60 percent of the commercial harvest and seine and gillnet fisheries each taking about 20 percent (1970-84 averages). Coho stocks are managed primarily on the basis of inseason abundance utilizing catch and catch per unit effort data from the various fisheries to assess run strength and develop regulations to achieve conservation and allocation objectives. Post-season assessment is made of observed spawning escapements and harvest rates of coded wire tagged stocks.

Coho production from hatcheries and other enhancement projects was small relative to total harvest prior to 1980, but has increased significantly since then. In 1985 the estimated harvest of hatchery coho by Southeast Alaska fisheries was about 170,000 fish and this is projected to increase to approximately 700,000 by 1989.

Current management and research priorities for Southeast Alaska coho salmon stocks include (1) expanded escapement monitoring and optimum escapement studies, (2) continued migratory pattern and harvest rate studies and (3) development of stock identification techniques.

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INFORMATION ON COHO SALMON STOCKS AND FISHERIES OF SOUTHEAST ALASKA

1.0 Introduction

The U.S./Canada Pacific Salmon Treaty establishes a Joint Coho Technical Committee (Annex IV, Chapter 5) to provide technical expertise to the Commission and Panels on management and research of coho salmon stocks of mutual concern to the two countries. (A copy of the coho annex is included as Appendix A for reference.) Under current provisions of the Treaty, specific management regimes were established for several coho fisheries in southern B.C. and Washington in 1985-86. No specific management regimes were initially established under the Treaty for coho fisheries in Southeast Alaska or northern B.C. except for those operating on coho originating in the transboundary rivers as described in the transboundary annex (Annex IV, Chapter 1).

Some coho stocks originating in Southeast Alaska and northern B.C. systems other than the transboundary rivers are known to intermingle to some extent in fisheries of the two countries. Information on degree of intermingling, migratory patterns, status, harvest rates and other stock characteristics is generally very limited, particularily for natural spawning stocks. To begin the process of developing a data base on coho stocks of mutual concern which will be needed to satisfy provisions of the Treaty relating to conservation and coordinated management, the Coho Technical Committee is presently compiling available information on coho stocks and fisheries. This is also intended to provide basic background information on coho stocks and fisheries for Commissioners, Panel members and other persons involved in the Commission process.

This report summarizes some general information on coho stocks and fisheries of Southeast Alaska including information on stock status; distribution, migratory patterns and harvest rates; fisheries; enhancement; and current management and research issues. (More detailed information relating specifically to transboundary coho stocks and fisheries is contained in reports prepared by the Transboundary Technical Committee.) A list of reference documents is included as Appendix B.

2.0 Stock Status

Information is not available on which to base direct assessment of the status of Southeast Alaska coho salmon stocks. This would normally require some estimate of optimum escapements and an assessment of the degree to which these escapement levels are being attained. Spawner/recruit data is not currently available for Southeast Alaska coho stocks due to the large number of coho systems (two to three thousand), the difficulty of obtaining accurate annual escapement estimates for late fall spawning coho, and the extensive mixed stock harvest with no applicable stock identification techniques. Assessment of stock status is currently based on comparison of historical and current catch patterns and on estimated harvest rates for a number of select stocks.

2.1 Historical Harvest Patterns

Figure 2-1 shows historical commercial catches of coho salmon in Southeast Alaska (including Yakutat) since the late 1800s. Harvest by recreational and subsistence fisheries has been small relative to commercial harvest, representing only a fraction of a percent of the total harvest during earlier years and, at present, only 2 to 3 percent. Thus, commercial

catches can be used to closely approximate total coho catches taken by Southeast Alaska fisheries.

Similar to many other Alaskan salmon fisheries, the commercial harvest of coho in Southeast Alaska began in the late 1800s increasing to peak levels in the 1940s and declining significantly thereafter to lower levels until recent years. During the early part of the century developing fisheries were operating on virtually unexploited stocks, a condition which changed by mid-century as fisheries expanded and stocks apparently became overexploited. (The relative effects of overexploition and an onset of colder weather during the late 1940s and early 1950s on triggering the decline of coho production after the 1940s is not known, however it is probable that overexploitation occurred or continued to occur as coho stocks were depressed to lower levels by some combination of these factors.) The initial decline in catches following the 1940s was not associated with more restrictive regulation of fisheries or any general decline in fishing effort. Following statehood in 1959, more restrictive regulations were implemented in Southeast Alaska as well as other areas of the state in an attempt to rebuild seriously depressed salmon stocks.

If one assumes that the peak decade average catch of 2.1 million during the 1940s was achieved at the cost of escapement, i.e. through overexploitation as suggested by the subsequent long term decline in harvest, then maximum sustained yield (MSY) for coho stocks contributing to these fisheries would be at some lower level. On the other hand, as seen in Figure 2-1, catch levels during the 1920s (1.3 million average) and the 1930s (1.6 million average) were sustained and actually increased during subsequent decades suggesting that overexploitation was probably not occuring, at least on a broad scale. Thus, based on this analysis, the range of 1.3 to 1.6 million might at least represent a first estimate of

MSY, under "average" environmental conditions, for natural coho stocks contributing to these fisheries.

An average catch of approximately 1.9 million coho has occurred during 1980-85. While the associated strong returns appear to be partly due to the unusually favorable environmental conditions currently contributing to exceptional salmon production in most areas of Alaska, escapements during the late 1970s and early 1980s were sufficient to produce such returns albeit under favorable environmental conditions. Furthermore, it appears that escapements during the past several years were probably as large or larger based on general run strength and relative abundance of coho in inside terminal fisheries. On the basis of this information, it appears that, overall, Southeast Alaska coho stocks are currently in healthy condition.

2.2 Harvest Rates

Harvest rate information obtained from coded wire tagging studies also provides some indication of the status of Southeast Alaska coho stocks, particularily when viewed in the context of catch patterns described above. If, at optimum levels, these coho stocks exhibit average productivity in the range of 2:1 to 4:1 returning adults per parent spawner (consistent with observations on many other natural spawning salmon stocks), the corresponding harvest rates at optimum population levels would be 50 to 75 percent with a mid-point of about 67 percent. (It should be emphasized that under an optimum escapement management strategy, such harvest rates would not necessarily be considered "optimum" but rather would be the harvest rates expected when the stock was producing at the optimum population level. To achieve optimum escapements, harvest rates would necessarily be lower when runs fluctuated below the optimum population level and higher

when runs fluctuated above the optimum level.)

While results of harvest rate studies on a number of Southeast Alaska coho stocks will be discussed in detail in a later section, for purposes of this section it suffices to summarize these results as indicating an average harvest rate of about 60 percent in recent years. (Harvest rates for some outer coastal stocks exposed primarily to the troll fishery have been lower, in the range of 35 to 50 percent, while certain stocks harvested in several commercial and recreational fisheries have shown harvest rates as high as 85 to 90 percent.) The observed average harvest rate of about 60 percent would lie in the range which might be expected for natural salmon stocks with average productivity producing at near optimum levels.

Thus, available information on average harvest rates combined with historical and current harvest patterns suggests that, overall, status of these coho stocks appears to be reasonably healthy. However, while somewhat higher harvest rates might be expected given the strength of recent coho returns, there is concern that rates as high as 85 to 90 percent for some stocks exposed to gauntlet fisheries may be too high.

3.0 DISTRIBUTION, MIGRATORY PATTERNS AND HARVEST RATES

3.1 Stock Distribution

Most coho salmon harvested in Southeast Alaska originate in local streams, while some contribution is also attributed to northern British Columbia coastal streams and Canadian portions of three major transboundary rivers (Alsek, Taku and Stikine). Although a few coded-wire tagged coho salmon from Oregon, Washington, and southern B.C. have been recovered

annually, there is no evidence of significant harvest of the more southern stocks. Southeast Alaska hatcheries are making an increasingly more important contribution to the region-wide catch and are expected to contribute 25-30% of the harvest by the 1990's.

Coho salmon habitat types vary substantially between mainland and island areas. On the mainland, most coho salmon habitat occurs in valleys that drain major rivers such as the Chilkat, Berners, Taku, Stikine, Chickamin, Unuk, and others. Many of these are glacial and coho salmon spawning is limited largely to tributaries. Island streams are typically clear, smaller, and more numerous than mainland systems. Many have excellent spawning habitat, but only limited rearing areas, and support small coho salmon populations that often number fewer than 100 spawners. Others that drain lakes or beaver ponds support larger populations numbering a thousand or more spawners.

For management purposes, Southeast Alaska coho salmon stocks can logically be separated into nine major area groupings that correspond to the Pacific Marine Fisheries Commission (PMFC) areas used for reporting coded-wire tag data (Figure 3-1). The following is a brief description of the stocks in these areas and the fisheries in which they are harvested.

Northern Outside:

Coho salmon production in the northern outside area extending from Cape Spencer to Cape Suckling is concentrated primarily in rivers in the Yakutat and Yakataga Districts. Major producing rivers in the Yakutat District (Cape Fairweather to Icy Cape), are the Yahtse, Lost, Situk, Italio, Akwe, Alsek, and East Rivers. In the Yakataga District (Icy Cape to Cape Suckling) major fisheries are supported by the Kaliakh and

Tsiu Rivers. The majority of the harvest of coho salmon originating in streams in these districts is taken in inriver setnet fisheries which have harvested an average of 95 thousand (range 30-194 thousand) coho salmon annually during 1970-1985. In addition, these stocks contribute significantly to the highly mixed-stock troll fishery in the northern outside area. There may be some harvest of Yakutat stocks by net fisheries in Prince William Sound but whether or not this harvest is significant is unknown.

Central Outside:

Coho salmon produced in the central outside area originate in numerous small streams scattered along the coasts of Baranof and Chichagof Islands and other smaller islands. Some of the more productive streams drain lakes. These stocks are harvested primarily along the adjacent coast and northward by an intensive troll fishery while a small incidental coho salmon harvest occurs in purse seine fisheries for pink and sockeye salmon in a few local bays. The private non-profit Medvejie Hatchery near Sitka has recently begun to raise coho salmon which are reared primarily in inaccessible lakes on Baranof Island. Also, a few hundred adult coho salmon are produced by the Sheldon Jackson College Hatchery in Sitka.

Southern Outside:

Coho salmon producing systems in the southern outside area are widely distributed throughout the outer coast of Prince of Wales Island and on adjacent islands. A few including Staney Creek, Sarkar River and Klawock River are major producers with documented escapements of more than 5,000 spawners. The Klawock Hatchery, operated by the State of Alaska, has recently begun to contribute significantly to coho salmon

production on the outer coast.

Most of the harvest of southern outside area stocks occurs in the local troll and purse seine fisheries and in the intensive troll fishery farther north. There is also some harvest of these stocks by the Northern B.C. troll fishery.

Central Intermediate and Southern Intermediate:

Streams in the intermediate areas consist primarily of small island and mainland systems bordering Icy and Chatham Straits and Frederick Sound. Some limited supplemental production of coho salmon is produced by the Little Port Walter Hatchery, a National Marine Fisheries Service research facility on South Baranof Island. Coho salmon stocks in these areas are harvested primarily by the troll fishery in northern Southeast and incidentally to pink salmon in purse seine fisheries in local straits and bays.

Lynn Canal:

Coho salmon production in Lynn Canal is concentrated in large mainland systems. The most important of these is the Chilkat River, while the Berners and Chilkoot rivers are other known major producers. The Berners River is an index stock for coded-wire tagging and escapement studies. Estimated total returns to this system in recent years have ranged from 8 to 33 thousand while escapements have ranged from 2 to 10 thousand. Lynn Canal stocks are harvested primarily by the troll and drift gillnet fisheries, but also contribute to purse seine, sport, and subsistence fisheries. The most important fishery impacting Lynn Canal stocks is the District 115 drift gillnet fishery in which over 300 boats often participate during the fall. Coho salmon are secondary to

chum salmon in this fishery in both number and value. The drift gillnet harvest of Lynn Canal coho salmon during 1970-1985 averaged 59 thousand fish (range 26-109 thousand). The harvest of Lynn Canal stocks by purse seine and marine sport fisheries is relatively minor because of the late migratory timing of these stocks. Significant freshwater sport and subsistence fisheries occur near Haines.

Stephens Passage:

The Taku River, a major transboundary system, is the most important coho salmon producing stream in Stephens Passage. Important contributions are also made by the Speel and Whiting Rivers in Port Snettisham and numerous other streams throughout the area. Coho salmon production is in a period of expansion at the state operated Snettisham Hatchery and small contributions have been made by the NMFS research facility at Auke Creek. A private non-profit hatchery contributed substantially to local coho salmon returns in 1984 and 1985, but the future of coho salmon production by private hatcheries in the Juneau area is uncertain.

Stephens Passage stocks that have been studied are characterized by an earlier and more protracted marine migration compared with Lynn Canal stocks. Because of this characteristic, they are more available to the purse seine and marine sport fisheries as well as contributing to troll and drift gillnet catches. An average of 35 thousand coho salmon (range 1 to 55 thousand) have been harvested annually in a drift gillnet fishery near the mouth of the Taku River during 1970-1985. An inriver gillnet fishery on the Canadian portion of the Taku River has taken an average of 4,969 fish annually (range 51 to 8,390) during 1979-1984.

Central Inside:

Coho salmon produced in the central inside area originate in the Stikine river, a major transboundary system, and numerous smaller systems on islands and the mainland. The Crystal Lake Hatchery also produces a substantial number of coho salmon.

Coho salmon from the central inside area contribute to troll, purse seine, drift gillnet, and sport fisheries. Local drift gillnet fisheries in Districts 106 and 108 have harvested an annual average of 54 thousand (range 20 to 132 thousand) coho salmon during 1970-1985. However, these fisheries harvest not only local stocks, but fish returning to the southern inside area and probably northern B.C. coastal systems. An inriver fishery on the Canadian portion of the Stikine River has harvested an average of 4,229 coho salmon during 1975-1984, with a maximum annual harvest of 15,944 fish in 1982.

Southern Inside:

Coho salmon production in the southern inside area (Districts 101 and 102) is widely distributed among a large number of small and medium producing streams. Known major producers include the Unuk, Chickamin, Naha, Keta, Wilson-Blossum, and Karta Rivers. Three hatcheries in the area produce coho salmon. These include the Herring Cove and Neets Bay facilities operated by the Southern Southeast Regional Aquaculture Association (SSRA) and the Tamgas Creek Hatchery operated by the Metlakatla Indian Community on Annette Island. Hatchery coho salmon production in this area is in a period of rapid expansion.

The harvest of coho salmon returning to southern inside systems is distributed over a wide range of fisheries from offshore of Yakutat to Northern B.C. including five gear types (troll, purse seine, drift gillnet, trap, and sport).

3.2 Migratory Patterns

3.2.1 Migration Routes

Seasonal catch patterns and high seas tagging experiments indicate that nearly all coho salmon leave Southeast Alaska waters during their winter at sea and migrate southward returning to the coast during June-September of their second summer in marine waters. Most coho salmon returning to Southeast Alaska streams approach the coast to the northwest of their systems of origin and migrate southeastward. Therefore most of the harvest of individual stocks occurs locally and in more outside waters to the northwest, while a relatively small percentage is taken southward (Figures 3-2 through 3-8). For example, the troll harvest of Lynn Canal stocks is restricted largely to more northern areas of the outside coast and the most northern straits leading to inside waters (Figures 3-2 and 3-3) while the troll catch of southern inside stocks such as Hugh Smith lake is more evenly distributed throughout the region particularly in outside areas (Figure 3-8). The harvest of outside area stocks occurs primarily in outside waters near and northward of their systems of origin (Figures 3-5 and 3-7).

These migratory patterns largely explain the distribution of the troll fishery which is most concentrated in outside areas

of northern Southeast where stocks from throughout the region intermingle.

3.2.2 Migratory Timing

The coho salmon migration in the Southeast Alaska troll fishery builds rapidly from mid-June to mid-July remains strong until late August, and then declines until the season ends on 20 September. Runs peak in most of the more terminal fisheries in mid-September. Most coho salmon return to freshwater during early August-late October with the peak migration usually occurring in September or early October.

Most stocks that have been studied show relatively protracted central migratory timing in the troll fishery that coincides closely with the timing of the overall mixed-stock harvest. However, marked differences in timing are apparent among some stock groups. For example, the major Lynn Canal stocks are characterized by an exceptionally late migration with a definite peak in the northern troll fishery in late August-early September while the major Stephens Passage stocks are characterized by an earlier and exceptionally protracted migration (Figure 3-9).

There also appear to be sharp contrasts in timing among stocks available in southern Southeast. Hatchery stocks and wild stocks in the southern inside area (Districts 101 and 102) that have been studied all show a relatively protracted and centrally peaked migration in outside waters that largely coincides with the total catch of all stocks. A typical example of this pattern is the Hugh Smith lake stock (Figure 3-10). However, these stocks do not enter southern and central inside fishing districts until relatively late in the season and reach peak abundance in those areas in late August or early September. If most local stocks follow this pat-

tern, a relatively large proportion of the early catch in July is unaccounted for (Figure 3-11). It is likely that northern B.C. coastal systems make a significant contribution to this early season catch. Very limited coded-wire tag data indicates that stocks in northern and central B.C. are most available to Southeast Alaska fisheries early in season, primarily in July (Figure 3-12).

3.3 Harvest Rates

Harvest rate information based on coded-wire tagging studies is available for coho salmon stocks in most major producing areas in Southeast Alaska (Figure 3-13). Recent harvest rates for tagged stocks have averaged approximately 60%. However, some stocks are consistently fished more intensively than others so that average harvest rates for individual systems range from as low as 30-40% to as high as 85-90%.

The troll harvest is quite evenly distributed over most stocks in the region (Figure 3-13). Overall, recent harvest rates by the troll fishery for index systems have averaged about 40%, with individual estimates ranging from just under 30% to slightly more than 50%. Most of the variability in harvest rates among stocks is attributed to net fisheries which are usually somewhat more terminal in nature and are often managed for species other than coho salmon. Purse seine effort is linked closely with pink salmon returns while major drift gillnet fisheries in northern Southeast target primarily on chum salmon. Exceptionally strong chum salmon returns to Lynn Canal in recent years have resulted in greatly increased drift gillnet effort and high harvest rates (85-90%) for upper Lynn Canal coho salmon stocks. Indirect estimates for the Taku River indicate that overall harvest rates on stocks in that system have exceeded 80% in some years.

Outside area stocks in northern Southeast receive relatively moderate harvest rates averaging 40-45% because they are significantly available to only the troll fishery. Harvest rates for index stocks in southern inside and outside areas have averaged from 60-70%. The harvest of southern inside stocks, in particular, is spread over several gear types and numerous management areas from Yakutat to northern B.C.

The stock composition of the troll catch in northern Southeast has probably changed significantly since the first major restrictions on the troll fishery were implemented beginning in 1979. Substantial time and area restrictions were established in passages and inside areas in northern Southeast which has been a factor leading to shifts in troll effort to outside areas where stocks are more mixed. Limited coded-wire tag data indicates that average troll harvest rates for Lynn Canal and Stephens Passage coho salmon were reduced from over 50% in 1978 to 35-45% in more recent years. Shifts in troll effort to outside waters have most likely spread the harvest more evenly and increased harvest rates on more southern and outer coastal stocks by fisheries in northern Southeast.

Harvest rates have fluctuated relatively little between years since 1982 as runs have remained relatively strong, overall, and fishing patterns have not changed substantially.

4.0 Fisheries

Coho salmon are important to commercial, recreational and subsistence fisheries in Southeast Alaska. Commercial fisheries currently account for 97 percent or more of the region's total coho harvest. Since 1970, total catches by all

fisheries have ranged from a low of about 450,000 in 1975 to a high of about 2.6 million in 1985. The 1985 harvest was the largest recorded since 1951 when over 3.3 million coho were harvested.

4.1 Commercial Fisheries

Annual coho salmon catches by Southeast Alaska commercial fisheries since the late 1800s are shown graphically in Figure 2-1. These catches reached a peak decade average of 2.1 million during the 1940s and a peak single year catch of 3.3 million in 1951. Catches generally declined after the 1940s to a low decade average of 1.1 million during the 1970s but have rebounded to an average annual catch of 1.9 million during 1980-85.

Annual commercial coho salmon catches by gear since 1970 are shown in Table 4-1. Average catches by major gear types during 1970-84 are as follows: troll - 760,000 (60%); seine - 250,000 (20%); drift gillnet - 167,000 (13%); set gillnet - 89,000 (7%).

The troll fishery currently accounts for about 60 percent (1970-84 average) of the Southeast region commercial coho harvest. As shown in Table 4-1, troll coho catches since 1970 have ranged from 214,000 in 1975 to 1.6 million in 1985. The troll coho season normally extends from June 15 through September 20, with inseason closures being made for conservation and catch allocation on the basis of run strength assessment and fisheries performance. Overall coho catches in the troll fishery generally peak near mid-August as shown in Figure 4-1, with catches in inside areas peaking somewhat later. Due to chinook management considerations, the troll coho season opening date has been modified in recent years; in 1985 it was delayed until July 1. Since 1980, a region-

wide 10-day closure has been implemented annually during the main part of the coho season for coho conservation and for outside/inside fisheries catch allocation objectives established by the Board of Fisheries. Following the 10-day closure which presently occurs August 15-24, area specific closures are implemented by emergency order as required for stock conservation.

Gillnet fisheries occur on coho in four major drift gillnet areas (Figure 4-2) and in a number of inriver set net fisheries in the Yakutat area. Drift gillnet fisheries operating in the Lynn Canal (District 15), Taku/Snettisham (District 11) and Stikine (District 8) gillnet areas for the most part harvest local stocks while fisheries in the Prince of Wales (District 6) and Tree Point (District 1) areas harvest a larger mix of stocks. Coho catches by gillnet generally peak in early to mid-September during the "fall" fisheries. Drift gillnet effort during the fall fisheries is directed at fall chum and/or coho which exhibit similar run timing patterns. Management of the fall drift gillnet fisheries is complicated by the intermingling of these two species. Preliminary 1985 catches of coho and other species of salmon by gillnet fisheries in each district are shown in Table 4-2.

In Southeast Alaska purse seine fisheries, coho are for the most part taken incidental to the harvest of the primary target species - pink, sockeye and chum - with management of the seine fleet being directed primarily toward the target species. As, seen in Table 4-1, however, the seine catch of coho is relatively large, averaging 250,000 during 1970-84 and reaching 387,000 in 1985. Preliminary 1985 catches of coho and other species by seine fisheries in each district are shown in Table 4-3.

4.2 Recreational Fisheries

Since 1977 when estimates of total Southeast region recreational salmon catches became available, coho catches by recreational fishermen have ranged from 23,000 in 1979 to 60,000 in 1984, averaging about 42,000 during 1977-84. Recreational coho catches by major management area are shown in Table 4-4 for 1977-84. Catches are estimated through a statewide mail survey conducted annually by the ADF&G Sport Fish Division.

Recreational fisheries near Juneau and Ketchikan account for the majority of the sport catch of coho in the region, averaging 42 and 20 percent respectively during 1977-84. These percentages have changed in recent years with 1982-84 averages being 30 and 36 percent respectively for Juneau and Ketchikan.

Since 1983, the recreational daily limit for coho has been six fish, however, actual catch rates are low enough so that the limit is not often achieved. Prior to 1983 the daily limit was a total of 6 salmon of all species (of which no more than three could be chinook), which, while having the appearance of being more restrictive for a particular species, generally had little effect on the average angler.

In recent years, recreational fisheries have benefited from increased harvest of hatchery produced coho, particularily in the Ketchikan area.

4.3 Subsistence Fisheries

Catches of coho by subsistence fisheries are small relative to the total all gear catch. During 1975-84, subsistence catches averaged approximately 1,000 fish with about 85 per-

cent occurring in the Yakutat area. By regulation, subsistence harvesting of coho is currently allowed in the Yakutat area, in the Chilkat River adjacent to the Klukwan Reserve and in Salt Lake in Kootznahoo Inlet near Angoon. Subsistence fisheries are managed under a permit system with the provisions of each permit being formulated on historical practices in each management area and according to resource availability.

5.0 Enhancement

Hatchery production of coho salmon in Southeast Alaska was small prior to 1980 but has increased significantly since then. In 1985, the estimated contribution to Southeast Alaska fisheries was approximately 170,000 fish or about 7 percent of the total harvest of 2.6 million coho. While eleven hatcheries contributed to the 1985 hatchery harvest, the bulk of this production originated in two state operated hatcheries (Crystal Lake and Klawock) and two private non-profit hatcheries near Ketchikan (Neets Bay and Whitman Lake) operated by the Southern Southeast Region Aquaculture Association (SSRAA).

Contributions of hatchery produced coho to Southeast Alaska fisheries are projected to reach nearly 700,000 fish by 1989. Projected contributions by hatchery are shown in Table 5-1, with locations of facilities shown in Figure 5-1. Approximately 70 percent of this production is expected from two southern Southeast Alaska facilities, the SSRAA hatchery at Neets Bay (235,400) and a Metlakatla Indian facility at Tamgas Bay on Annette Island (252,300).

A percentage of hatchery produced coho salmon are coded-wire tagged prior to release to allow estimation of contributions from tags recovered in harvesting fisheries. The target sampling rate for commercial fisheries is 20 percent although

actual sampling rates have been somewhat higher in recent years. Sampling rates for commercial fisheries in 1985 are summarized in Table 5-2. Tags recovered during catch sampling are decoded inseason with estimated contributions being available to managers via telephone communications to a central computerized data processing system maintained by the ADF&G coded wire tag processing lab in Juneau.

6.0 Management Problems and Research Needs

Management of coho salmon in Southeast Alaska is difficult due to the highly mixed stock nature of most of the fisheries, lack of stock identification techniques, the existence of gauntlet fisheries on many stocks, and very limited information on annual escapements and optimum spawning requirements. Management is further complicated by the fact that significant catches of coho can occur in mixed species fisheries targeting on, and managed primarily for species other than coho such as seine and some gillnet fisheries. Although, as stated earlier, Southeast Alaska coho stocks generally appear to be in relatively healthy condition now due to the strength of returns in recent years and more conservative management since 1980, the management problems described above can again become acute when stocks are depressed by less favorable environmental conditions. Even at present, conservation problems are probably occurring in some years on some stocks exposed to harvest in a number of different fisheries. A number of specific management and applied research problems relating to overall coho management have been identified.

6.1 Management Problems

Management of coho stocks is currently based on inseason

assessment of run strength relative to past average levels. While some limited information is available on resulting spawning escapements for post-season assessment of the effectiveness of regulations, primary assessment is based on the magnitude of subsequent returning runs relative to historical levels. The most immediate management need is for annual monitoring of coho escapements, at least for a number of index stocks located throughout the region. In conjunction with escapement monitoring, studies are needed to establish target escapement goals for such index stocks to allow better assessment of the effectiveness of regulations. Such a program is currently being undertaken through a joint effort of the ADF&G Commercial and Sport Fisheries Divisions.

Coho salmon contributing to Southeast Alaska fisheries originate in some two to three thousand systems in Southeast Alaska and additional systems in northern British Columbia. Little is known of the productivity of individual stocks in most systems. Escapement records are available for only a few systems and most are based on a single annual survey or incomplete weir counts. Most annual aerial or foot counts are of doubtful comparative value because of poor visibility in many streams during the fall, the protracted nature of coho migrations and interannual timing variability. After entering freshwater, coho usually remain for long periods in large pools or lakes where visibility is ofter poor, and then move rapidly into shallow spawning areas following periods of heavy rain. Spawned out fish can be removed quickly by predators and high water runoff.

There has been increased emphasis on coho escapement assessment since 1982. Total escapement counts or estimates are obtained for several systems, usually with weirs. These are supplemented with survey data from additional streams to develop a regional profile of coho escapements. In 1985, complete counts were obtained for seven systems (Figure 6-1

and Table 6-1) and peak escapement surveys were conducted on 48 additional streams. Further improvement of escapement assessment methods is needed, particularily for the more heavily harvested mainland rivers.

A second management problem which is currently being addressed but requires further work is the inseason estimation of hatchery contributions to various fisheries. As discussed in a prior section, hatchery production of coho in Southeast Alaska has increased significantly in recent years and further increases are projected. Hatchery contributions to certain drift gillnet fisheries are already significant enough to affect inseason measures of stock abundance. Inseason estimates of hatchery contributions must be available to fishery managers in a timely manner to allow for appropriate management of natural stocks. Recent development of a computerized system with telephone dialup access for obtaining estimated contributions from coded wire tags recovered during catch sampling has significantly increased fishery manager access to such information. However, this information can still lag actual management decisions by some 2 to 4 weeks. While some forward projections can be made from contribution information already available, there is a need to both shorten the lag time for availability of direct contribution estimates, and to develop methods to improve forward projection procedures.

A third problem is that of stock identification. While prospects do not look good for developing stock identification methods which can be used to identify the many individual stocks contributing to some mixed stock fisheries, identification of certain major stocks and/or groups of stocks could improve coho management considerably.

6.2. Research Needs

6.2.1 Harvest Rate and Migration Studies

The Department plans to continue coded-wire tagging and recovery programs to determine harvest rates, migration routes, and timing of wild coho salmon stocks. These studies will be conducted annually in conjunction with escapement assessment programs on a fixed set of index systems throughout the region. Tagging without instream recovery will be conducted on additional systems as time and funding permit to further determine variability in migration routes and timing among wild stocks.

Minimum coded-wire tag sampling objectives for the fisheries are 20% of the catch by area, gear type, and week for coho salmon. Overall, recent sampling rates for this species have averaged about 25%.

Presently, little is known about contributing stocks that originate in northern B.C. coastal systems. Very limited available data suggests that many of these stocks migrate through Southeast Alaska waters relatively early in the season, but no information exists concerning their harvest rates in the various fisheries.

6.2.2 Escapement Enumeration and Optimum Escapement Studies

Stock-recruitment relationships are relatively unclear for most coho salmon stocks throughout the coast. This is particularly true for more northern stocks because of a lack of long term studies and the complicating effect of more extended and variable freshwater residence in northern areas. Also, the wide variety of important habitat types in Southeast Alaska makes it impractical to develop reasonable escapement

goals based on simple habitat attributes such as accessible stream length as has been done in Puget Sound.

Development of coho salmon escapement goals in Southeast Alaska is dependent first on improving escapement assessment and developing a history of escapement estimates for index streams. In the short term, escapement objectives will be based on average or better past escapement levels in an attempt to insure that the number of spawners is at least sufficient to maintain average past production. This approach seems warranted since, based on catch and fishery CPUE indicators the stocks appear to be in good overall condition, although this has certainly been related, in part, to favorable environmental conditions. Harvest rates are presently high enough so that, even if sustained yield can be increased by taking a greater harvest and reducing escapement, the gains are not likely to be large compared with the present magnitude of the catch.

Return-per-spawner estimates based on coded-wire tag data and age composition estimates are made for most index systems where total escapement is estimated. Over a series of years, this information will be used, when possible, to determine stock-recruitment relationships for the purpose of developing more objective escapement goals.

6.2.3 Stock Identification Studies

Estimation of the stock composition of the highly mixed-stock fisheries for coho salmon is a very difficult problem. Some of the more conventional techniques such as scale pattern analysis, electrophoresis, and adult tagging studies presently hold little promise for addressing this problem.

Scale pattern analysis and electrophoresis require the presence

of significant, consistent, and detectable natural differences among the desired groupings of stocks. There is little indication that these conditions exist for coho salmon populations over the coast as a whole.

Adult tagging studies usually require total escapement estimates for all contributing stock groupings in order to develop unbiased stock composition estimates. That condition would be impractical to meet for coho salmon stocks which are widely scattered and difficult to assess.

Coded-wire tagging studies can provide contribution and harvest rate estimates for individual stocks, but since tagging all contributing stocks is impractical, much of the catch remains unaccounted for. However, in theory it should be possible to estimate the contribution to different fisheries by broad stock groupings if harvest rate and distribution estimates were available for representative stocks in all contributing areas. This method would be dependent on relatively consistent migration patterns and harvest rates among individual stocks representing larger stock groups. With the availability of this information, it would be possible to determine the most likely combination of stock group contributions that accounts for the total catch. Estimates of this type would depend on a coordinated large-scale coded-wire tagging and recovery program throughout the coast.

The feasibility of potential techniques for coho salmon stock identification needs to be addressed through further research and interaction among researchers in different agencies.

6.2.4 Age Determination

Age and size data is collected from all fisheries and from escapements when possible. Minimum fishery sampling objec-

tives for coho salmon are 250 samples per week from the troll fishery within four major areas, and a total of 600 samples by district and gear type for the net fisheries. Escapement sampling objectives are 600 fish distributed throughout the run. Four scales per fish are taken from coho salmon because of high regeneration rates.

Southeast Alaska coho salmon stocks have a more variable stream residence period compared with more southern stocks which typically rear in freshwater for one year. The predominant freshwater age for most Southeast Alaska coho salmon stocks is 2 years while age 1. fish form the second most important group. Smolts as old as 6 years have been reported migrating from some systems.

There is substantial disagreement and uncertainly in aging of coho salmon scales. Wide variability in age and difficulty in determining freshwater age for some stocks greatly complicates the process of determining production from individual brood year escapements which is essential for developing objective escapement goals.

Much of the difficulty in determining freshwater age is undoubtably a result of the diversity of habitat types utilized by rearing coho salmon in Southeast Alaska. Known important habitat types include very small to large clearwater streams, glacial rivers, sloughs, beaver ponds, lakeshores, and estuaries. There appears to be significant movement of juveniles among habitat types that often have contrasting temperature regimes. These movements tend to confound interpretation of seasonal changes in scale patterns.

Verification of aging techniques is an area of research that needs more attention.

FIGURES

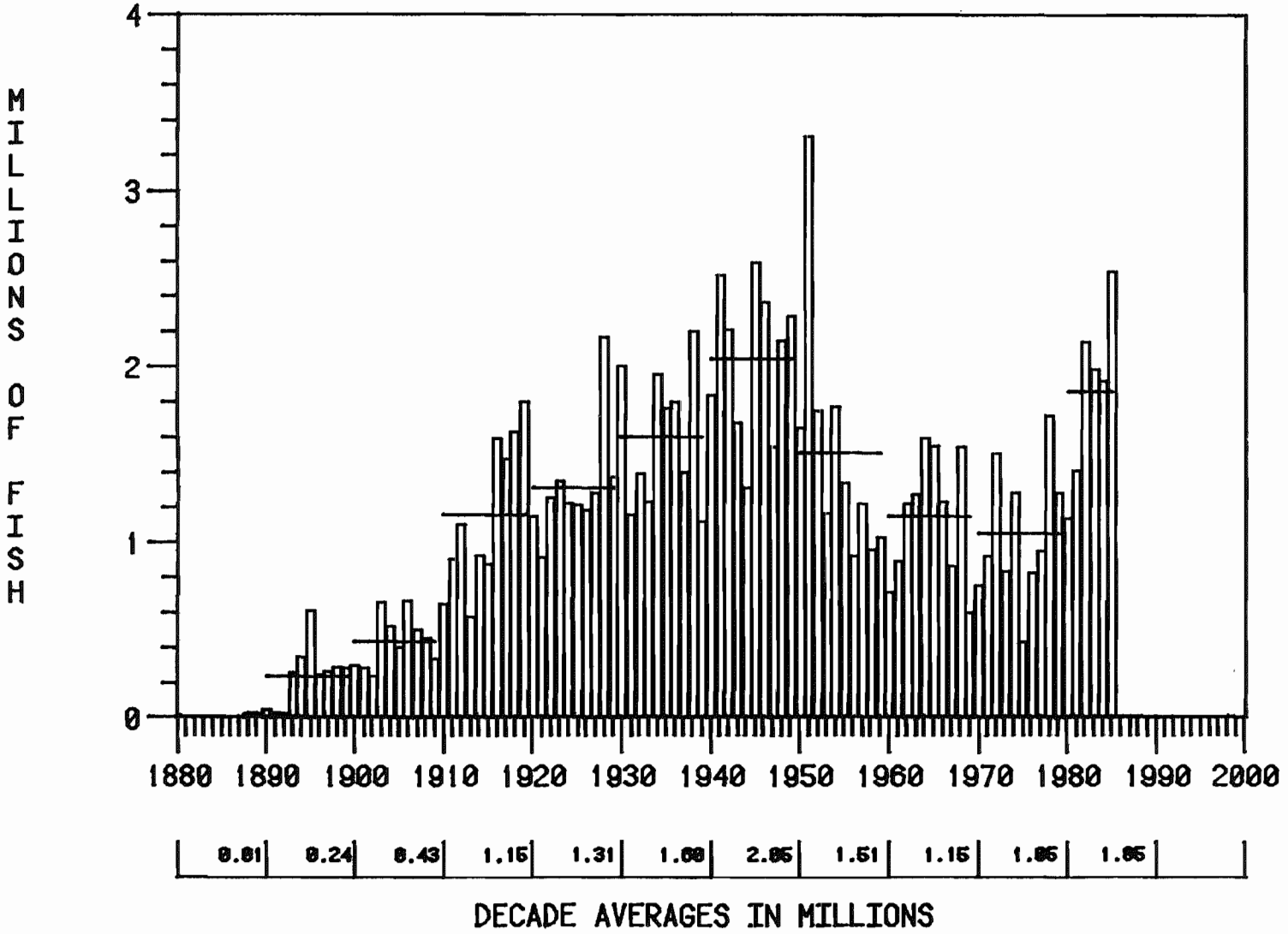

FIGURE 2-1. SOUTHEAST ALASKA REGION HISTORICAL COMMERCIAL COHO SALMON CATCHES BY ALL GEAR, 1888 TO PRESENT. PREPARED: ADF&G 12/20/85.

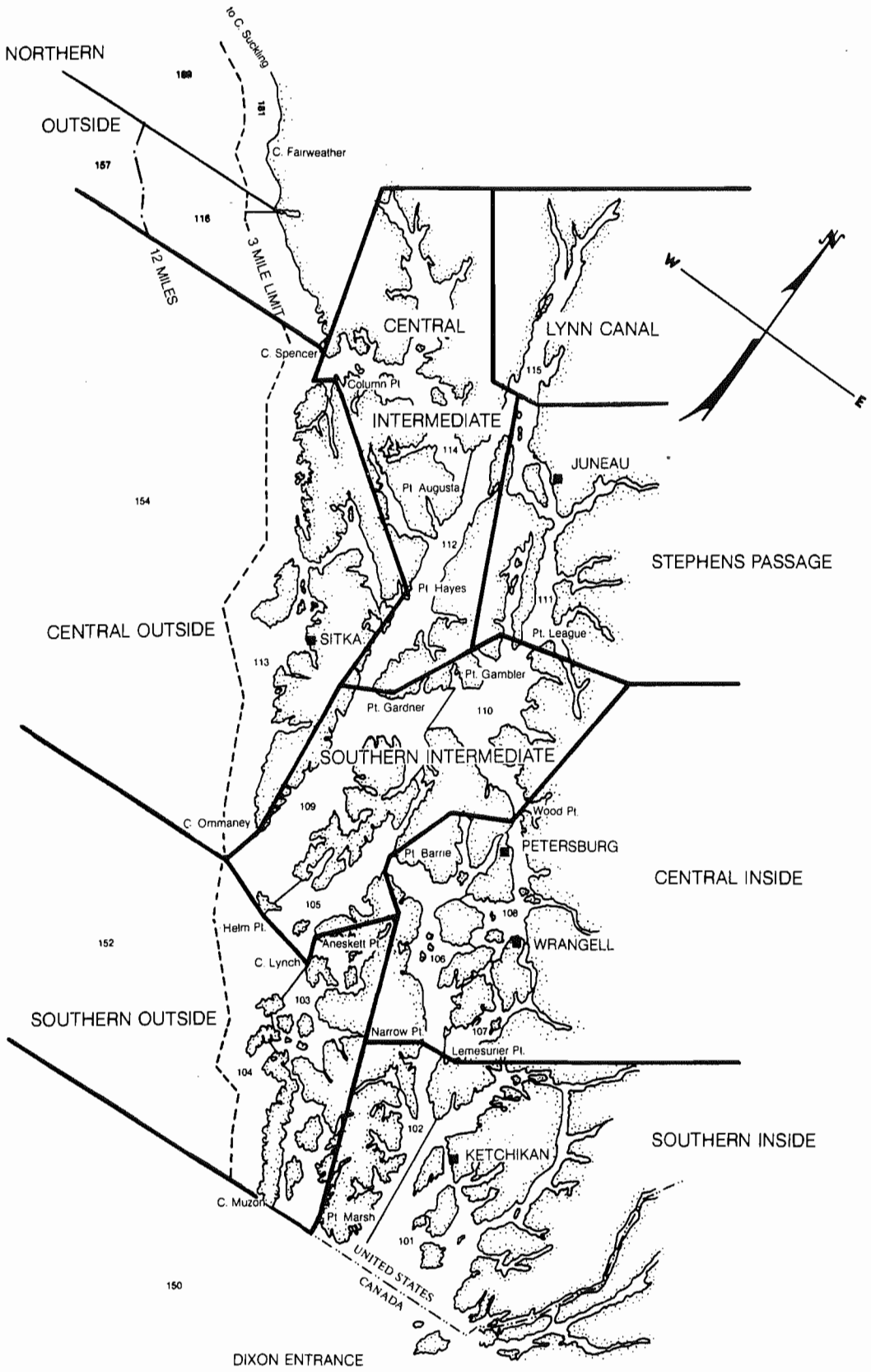

Figure 3-1. Coho salmon management areas in Southeast Alaska.

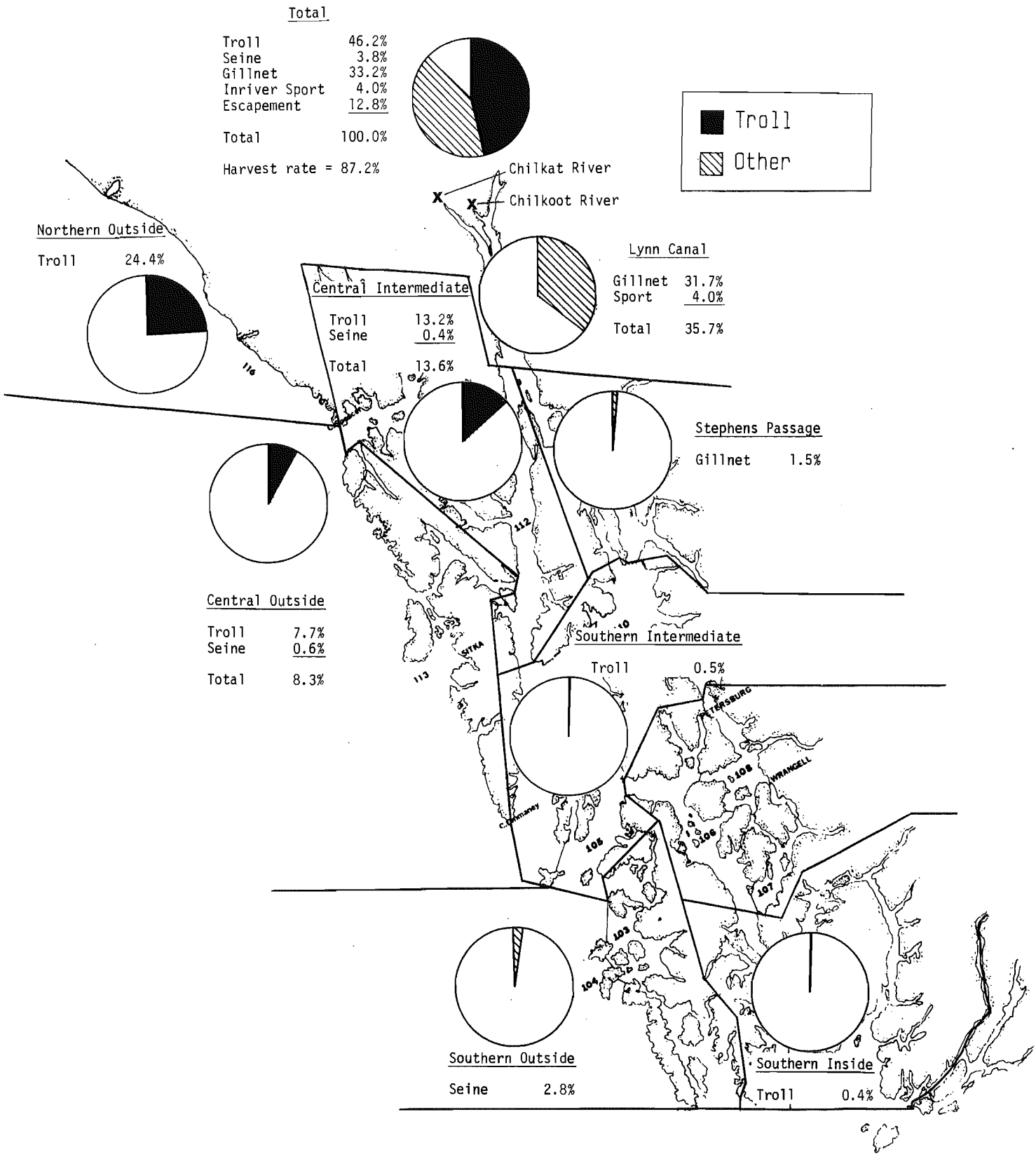

Figure 3-2. Estimated average harvest distribution and escapement as a percentage of the total return of coded-wire tagged coho salmon to Upper Lynn Canal systems (Chilkoot and Chilkat Rivers), 1983.

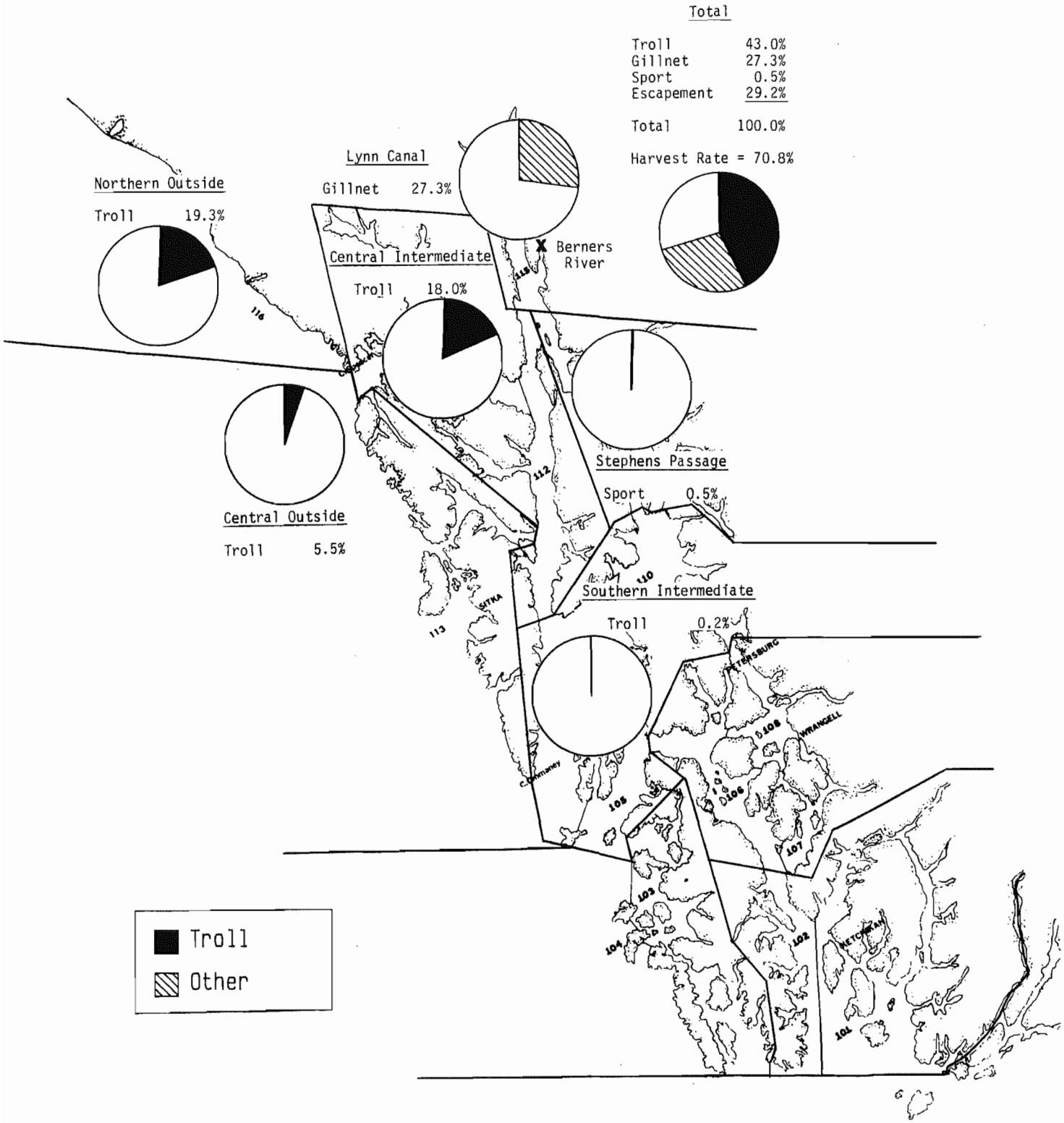

Figure 3-3. Estimated average harvest distribution and escapement as a percentage of the total return of coded-wire tagged coho salmon to the Berners River in Lower Lynn Canal, 1982-1983.

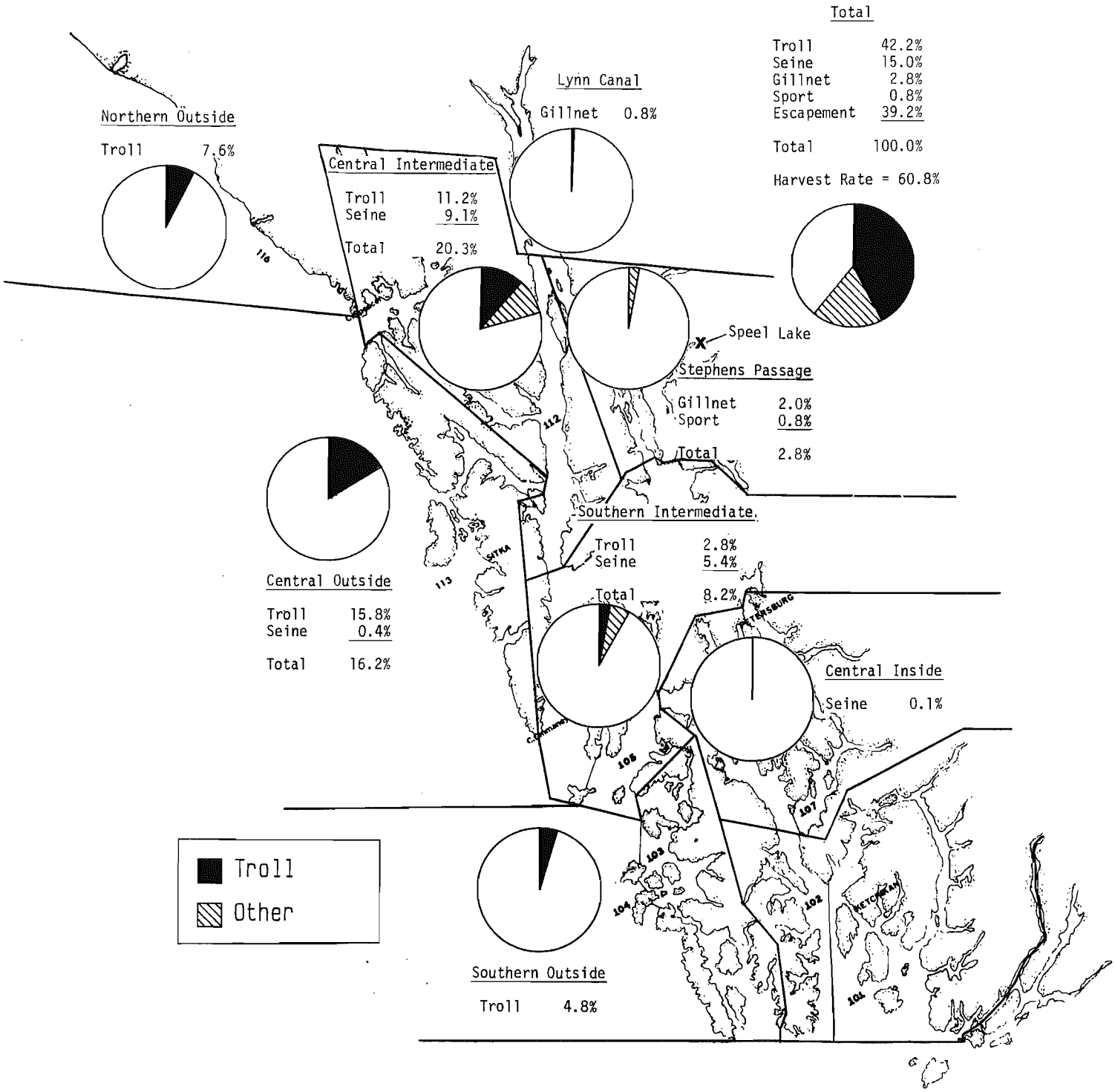

Figure 3-4. Estimated average harvest distribution and escapement as a percentage of the total return of coded-wire tagged coho salmon to Speel Lake near Stephens Passage, 1982-1983.

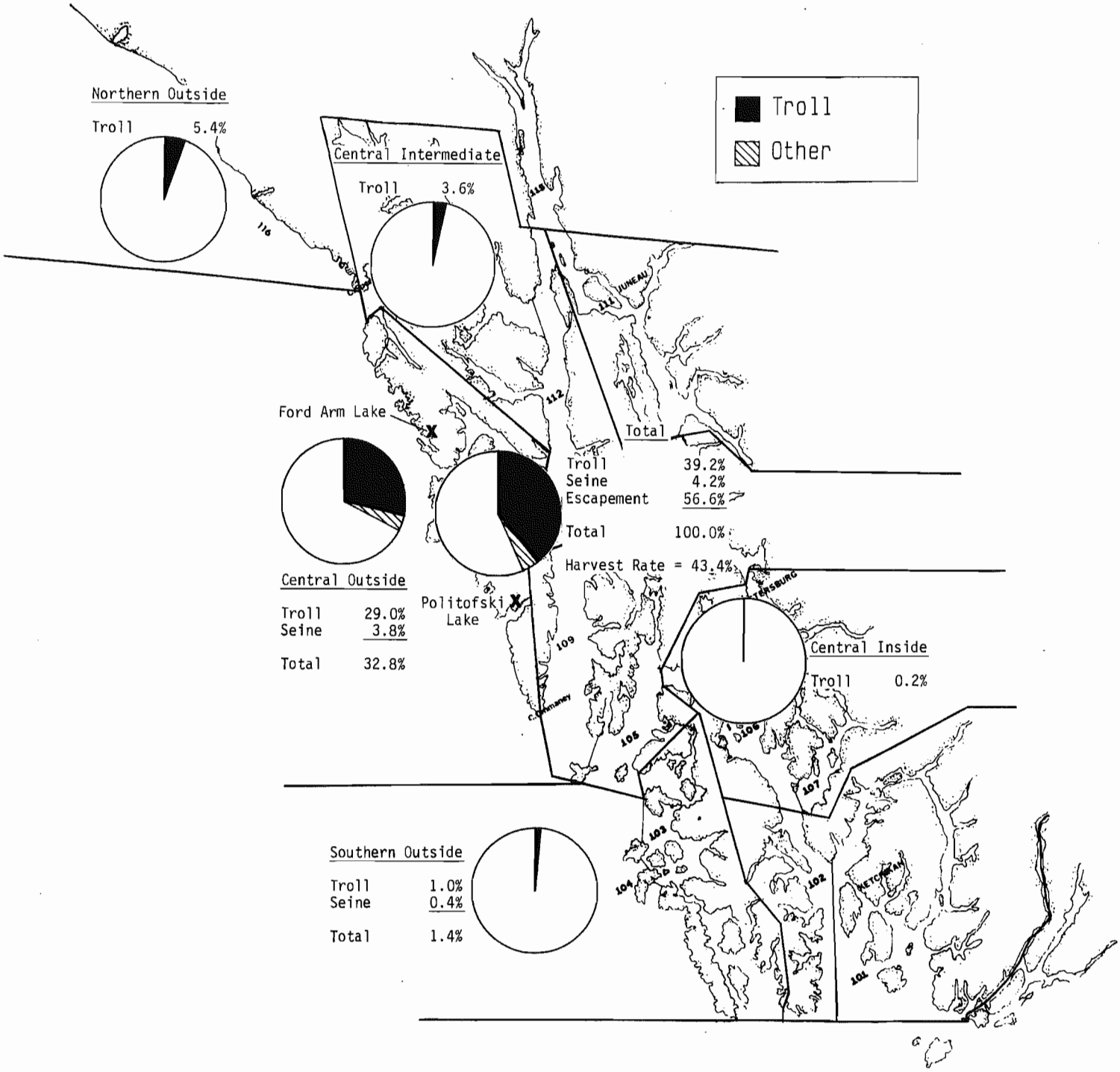

Figure 3-5. Estimated average harvest distribution and escapement as a percentage of the total return of coded-wire tagged coho salmon to Ford Arm and Politofski Lakes in the central outside area, 1982-1983.

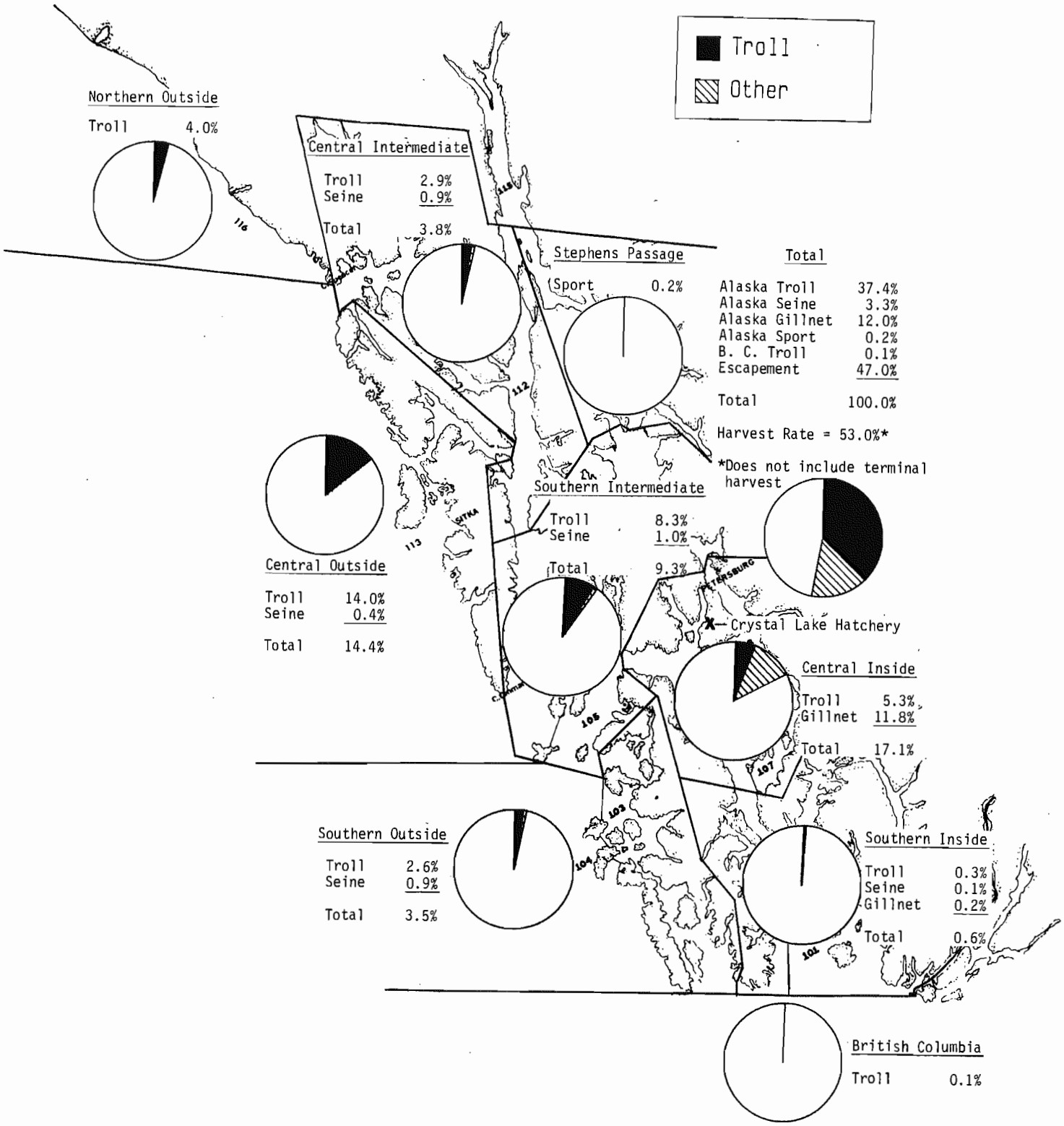

Figure 3-6. Estimated average harvest distribution and escapement as a percentage of the total return of coded-wire tagged coho salmon to Crystal Lake Hatchery in the central inside area, 1982-1983.

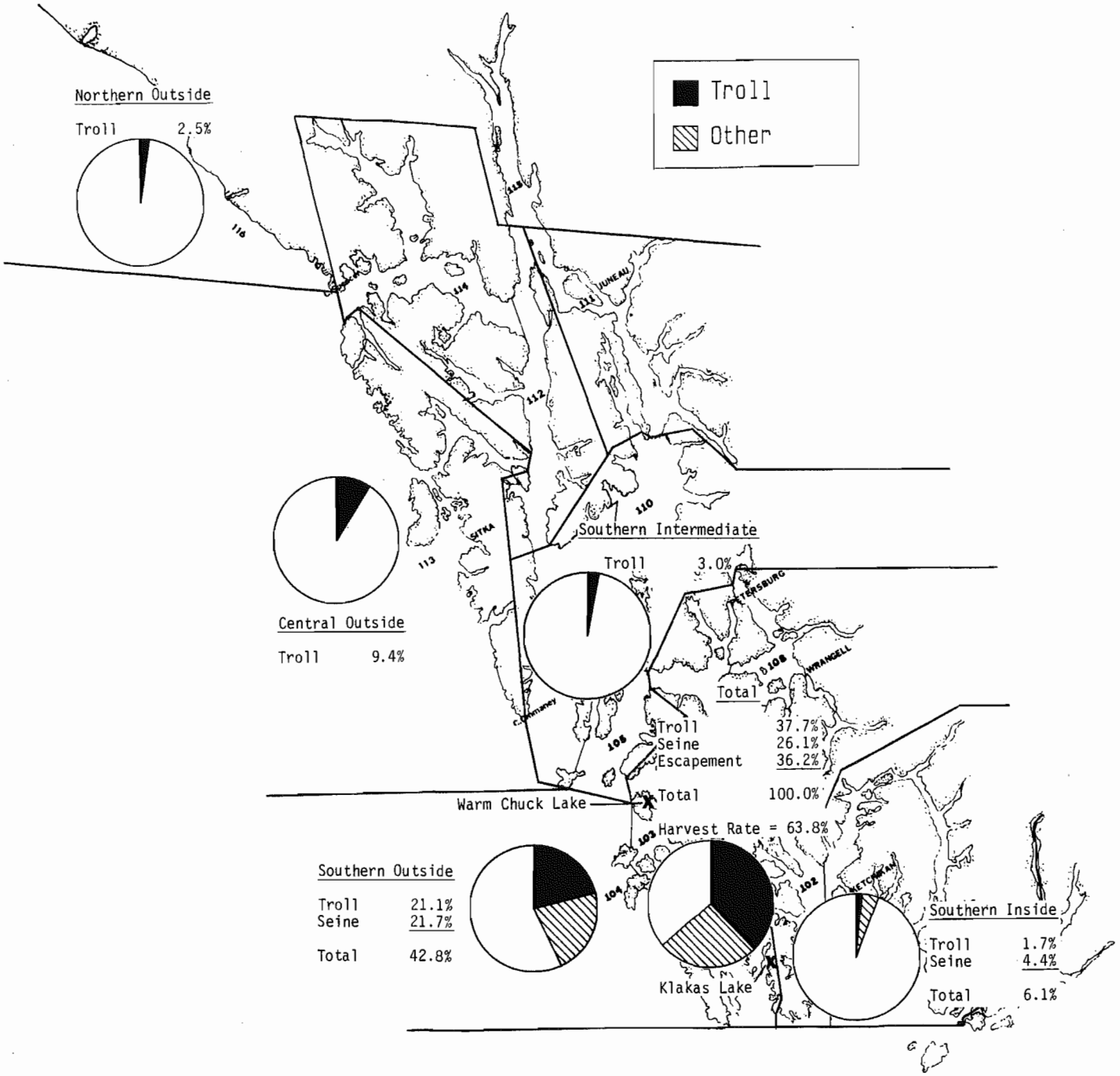

Figure 3-7. Estimated average harvest distribution and escapement as a percentage of the total return of coded-wire tagged coho salmon to Warm Chuck and Klakas Lakes in the southern outside area, 1982-1983.

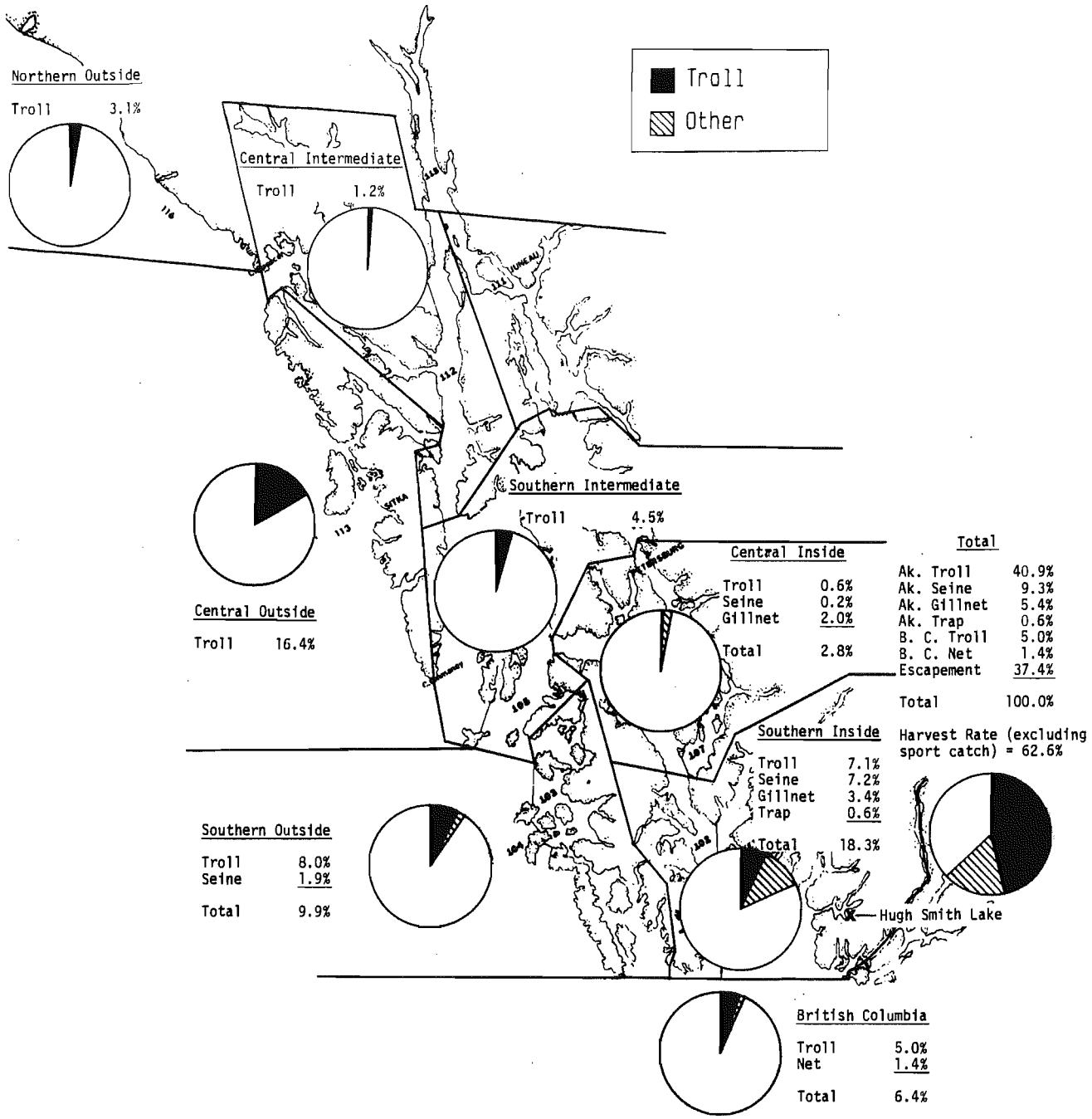

Figure 3-8. Estimated average harvest distribution and escapement as a percentage of the total return of coded-wire tagged coho salmon to Hugh Smith Lake in the southern inside area, 1982-1983.

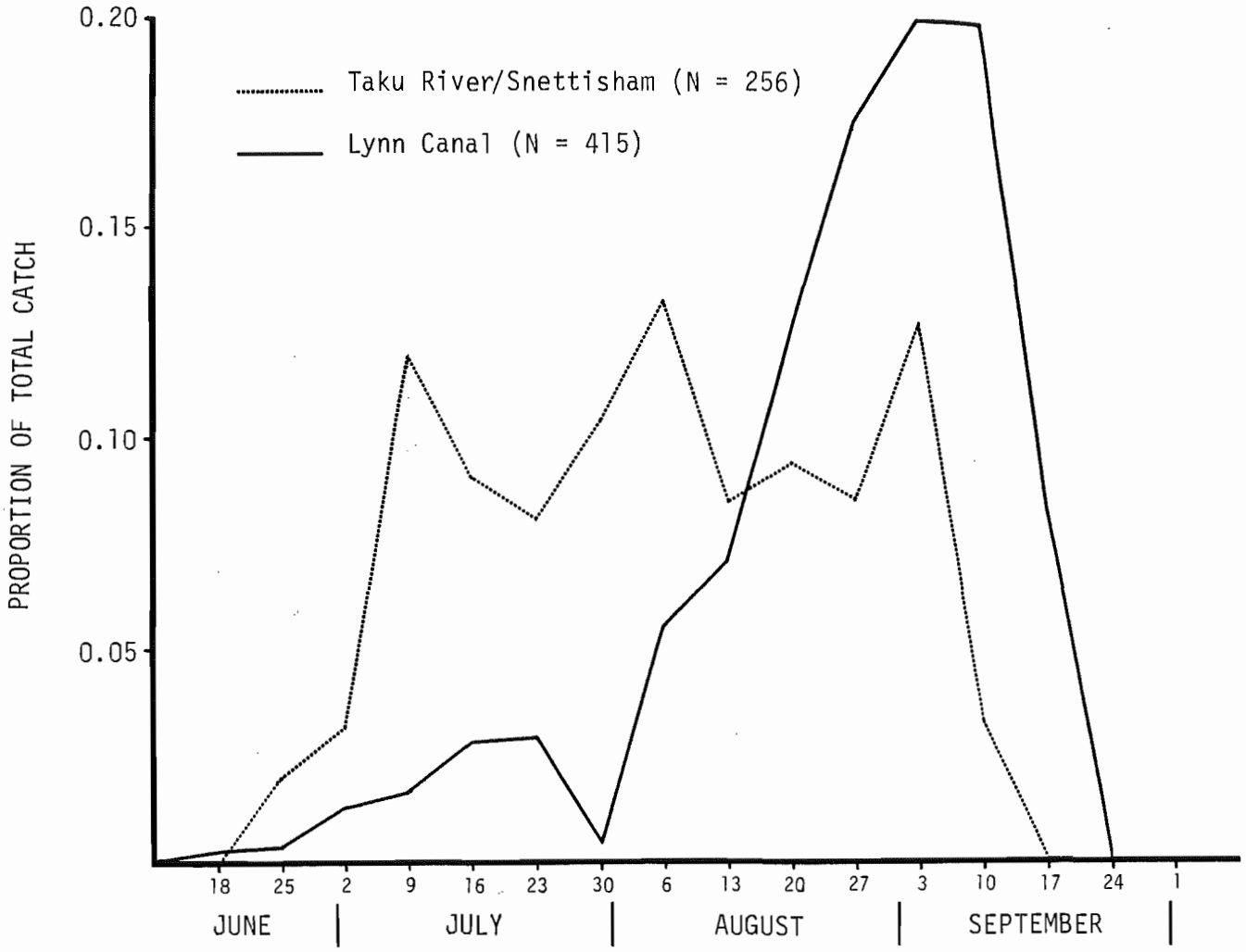

Figure 3-9. Estimated average weekly proportion of the catch of coho salmon returning to the Taku River and Port Snettisham systems, and Lynn Canal by fisheries in Icy Strait and outside waters north of Cape Ommaney, 1974, 1978, and 1979. The estimates are based on recoveries of pigment marked and coded-wire tagged wild fish from the Taku River; Speel and Crescent Lakes in Port Snettisham; and the Berners, Chilkoot, and Chilkat Rivers in Lynn Canal (N = number of tags recovered).

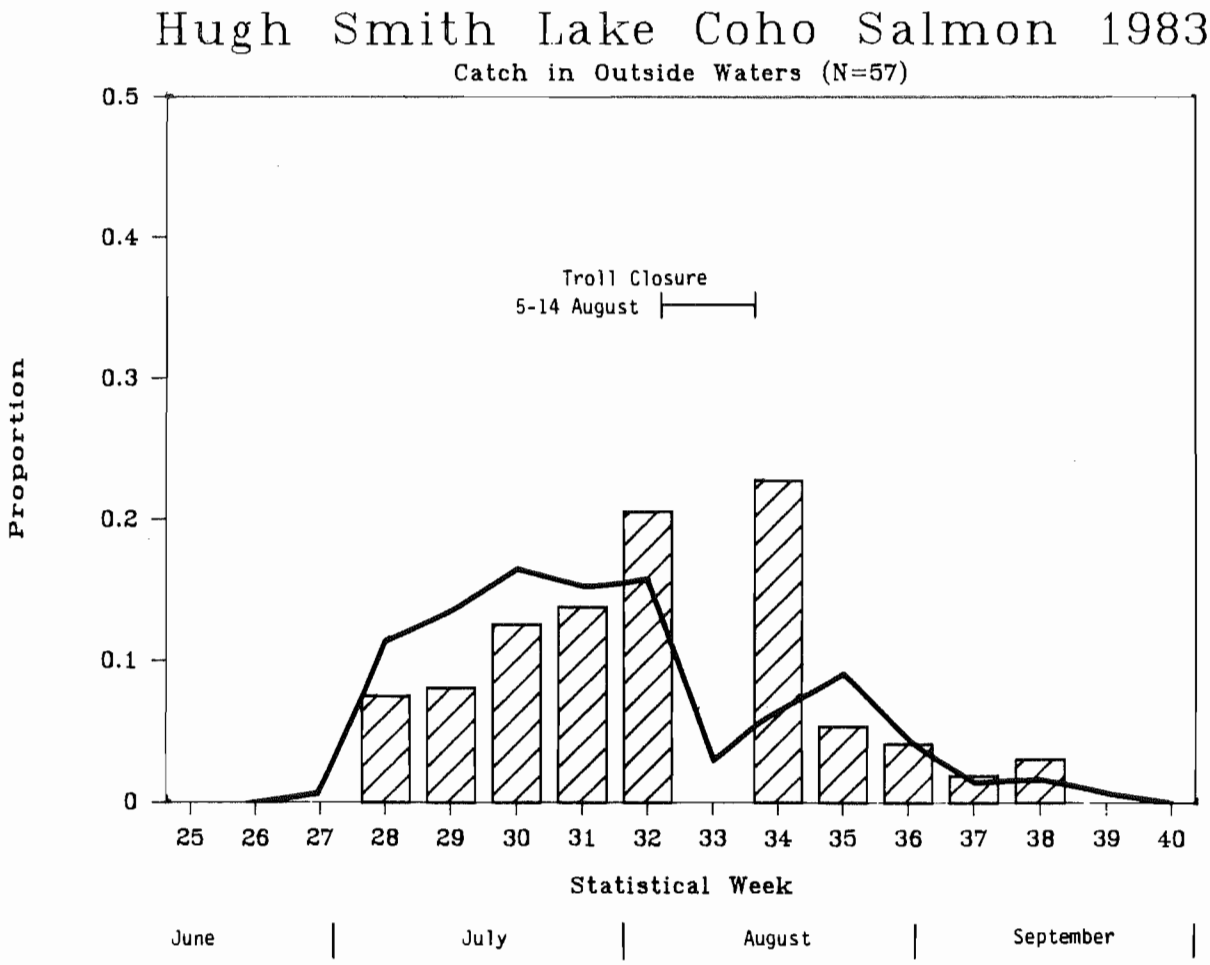

Figure 3-10. Weekly proportion of the total coho salmon catch (line graph) and estimated catch of coded-wire tagged Hugh Smith Lake coho salmon (bar graph) in outside waters, 1983.

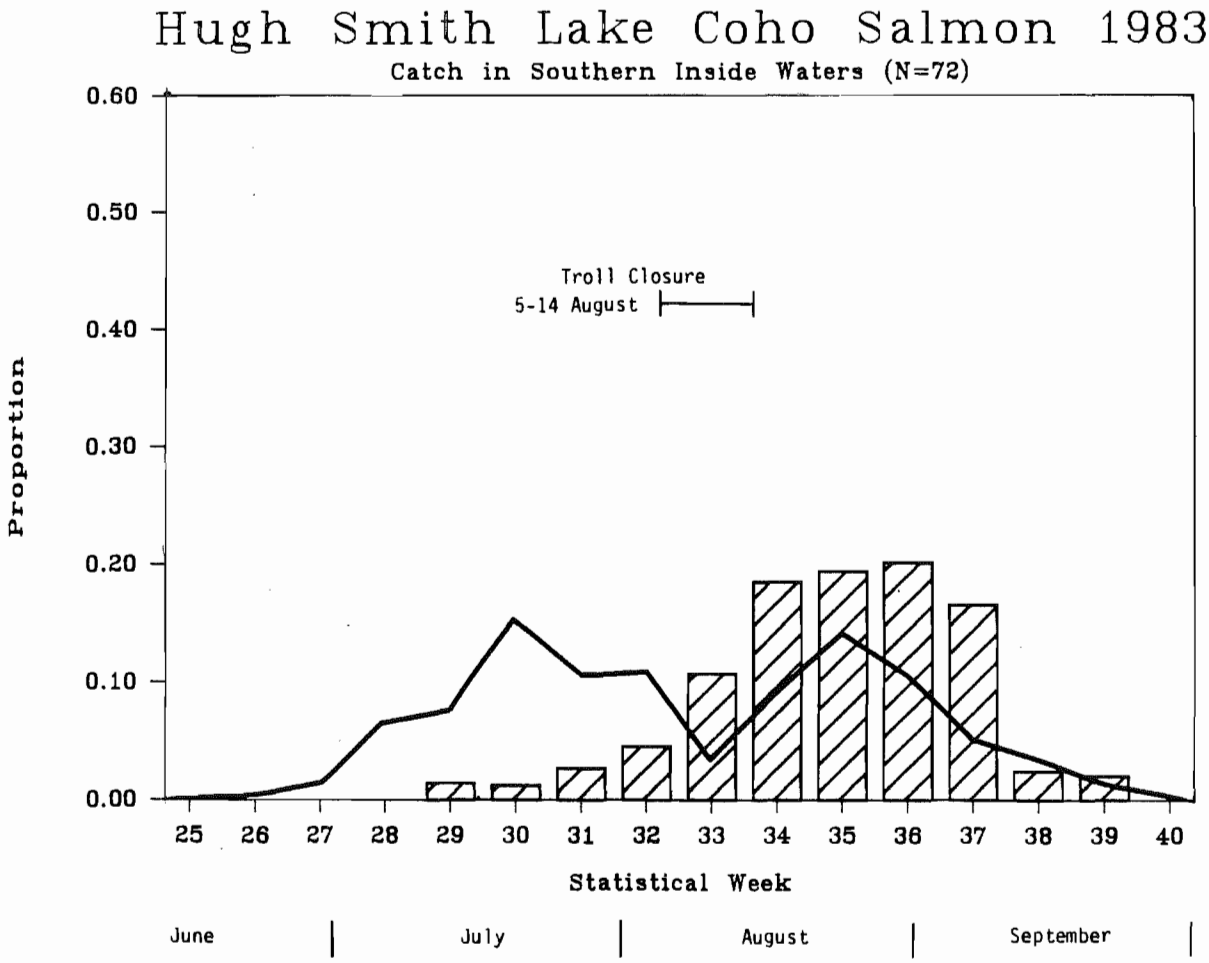

Figure 3-11. Weekly proportion of the total coho salmon catch (line graph) and estimated catch of coded-wire tagged Hugh Smith Lake coho salmon (bar graph) in southern inside waters (Districts 101 and 102), 1983.

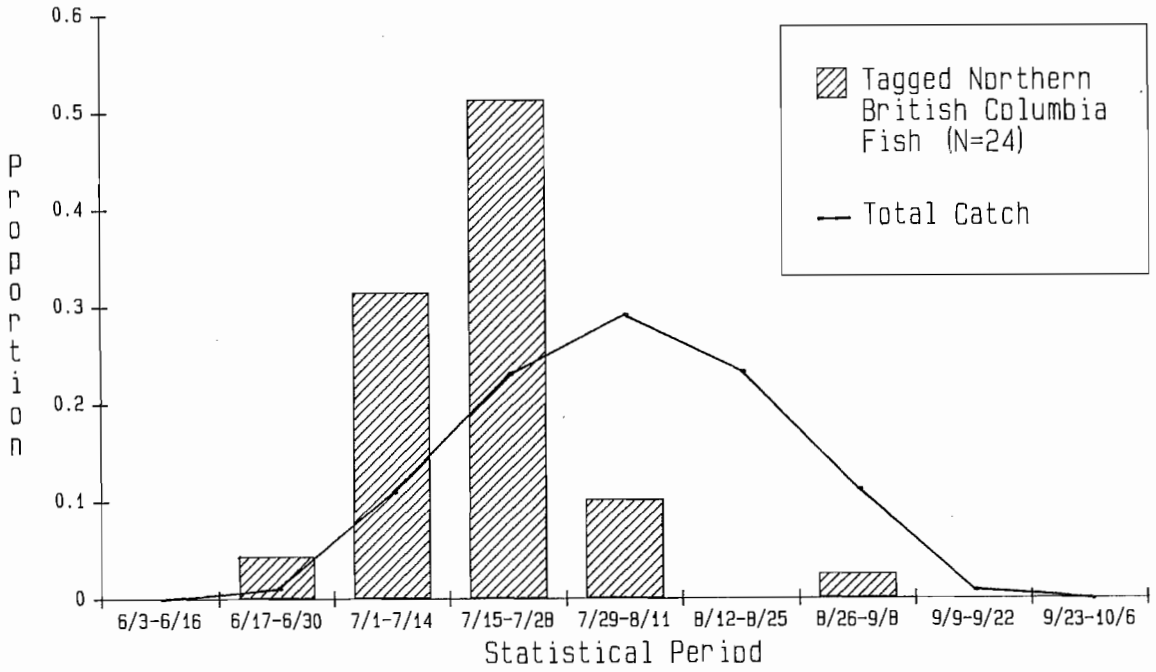

Figure 3-12. Biweekly proportion of the total coho salmon catch (line graph) and the estimated catch of coded-wire tagged wild coho salmon from northern British Columbia rivers (bar graph) in outside, intermediate, and southern inside areas of Southeast Alaska, 1979. Stocks represented include the Atnarko, Kitimat, and Kitsumkalum Rivers. The fishing area includes Southeast Alaska Districts 101-105, 109, 110, 112-114, 116, 152, 154, 157, 181, 183, 186, and 189.

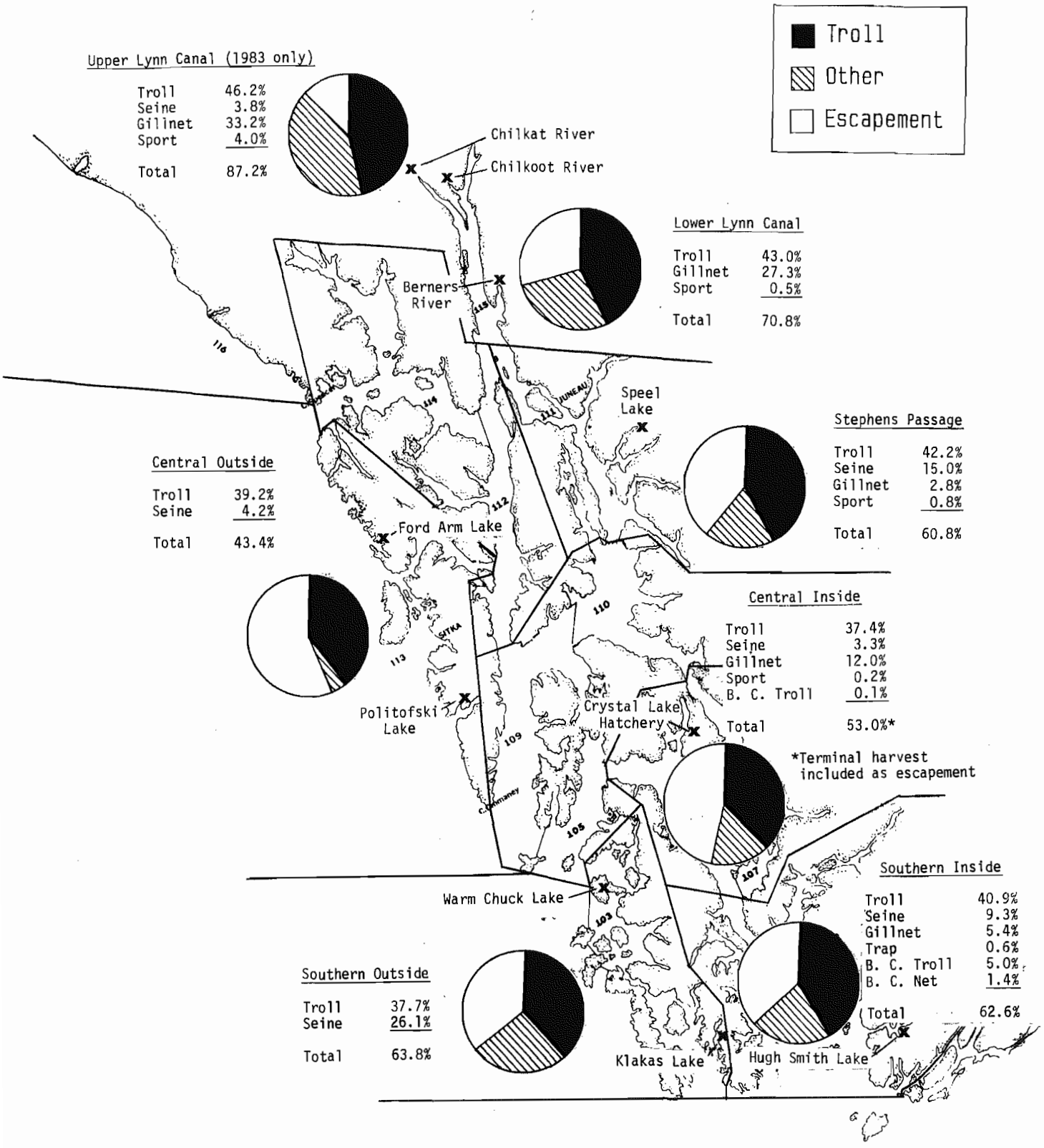

Figure 3-13. Average estimated harvest by gear type as a percentage of total coho salmon returns to selected systems in different management areas of Southeast Alaska, 1982-1983.

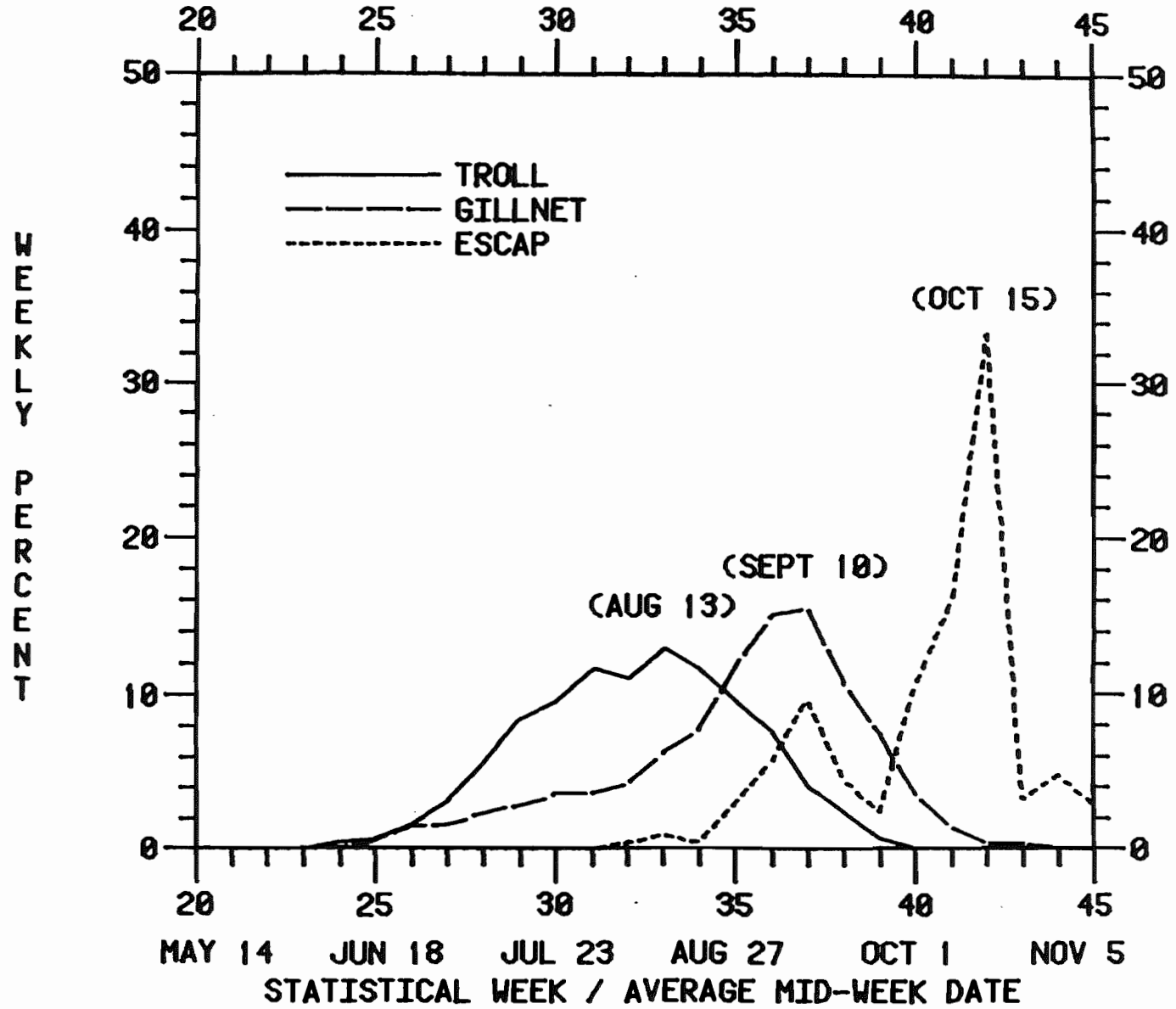

FIGURE 4-1. AVERAGE TIMING DISTRIBUTION OF COHO SALMON IN THE SOUTHEAST ALASKA TROLL AND DRIFT GILLNET FISHERIES (1969-82 AVERAGES) AND AT SELECTED WEIR SITES (1982). (ADF&G 7/20/83)

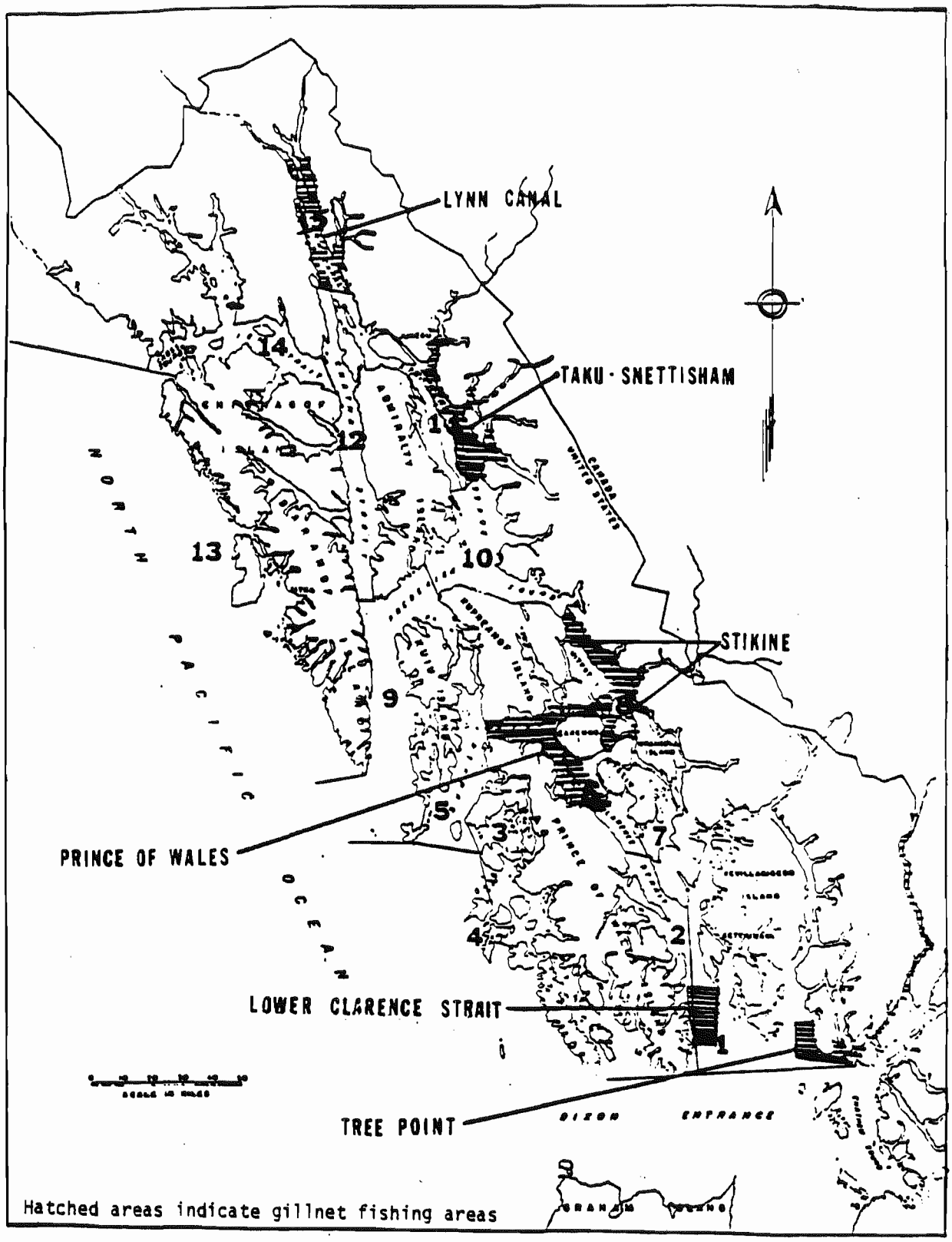

Figure 4-2. Map showing Southeast Alaska regulatory fishing districts and drift gillnet fishing areas.

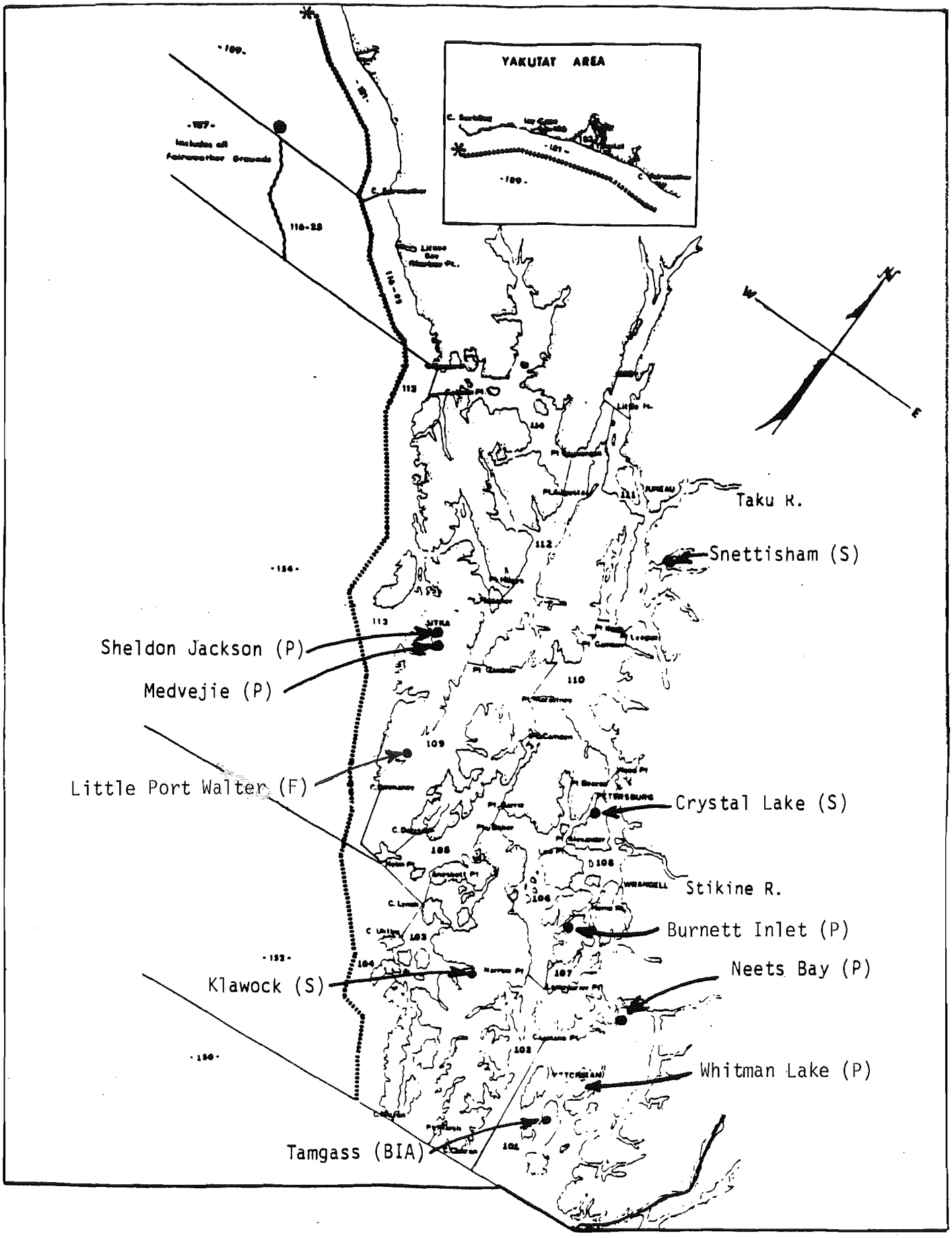

Figure 5-1. Locations of State(S), Private(P) and Federal(F) Hatcheries in Southeast Alaska with planned coho salmon production.

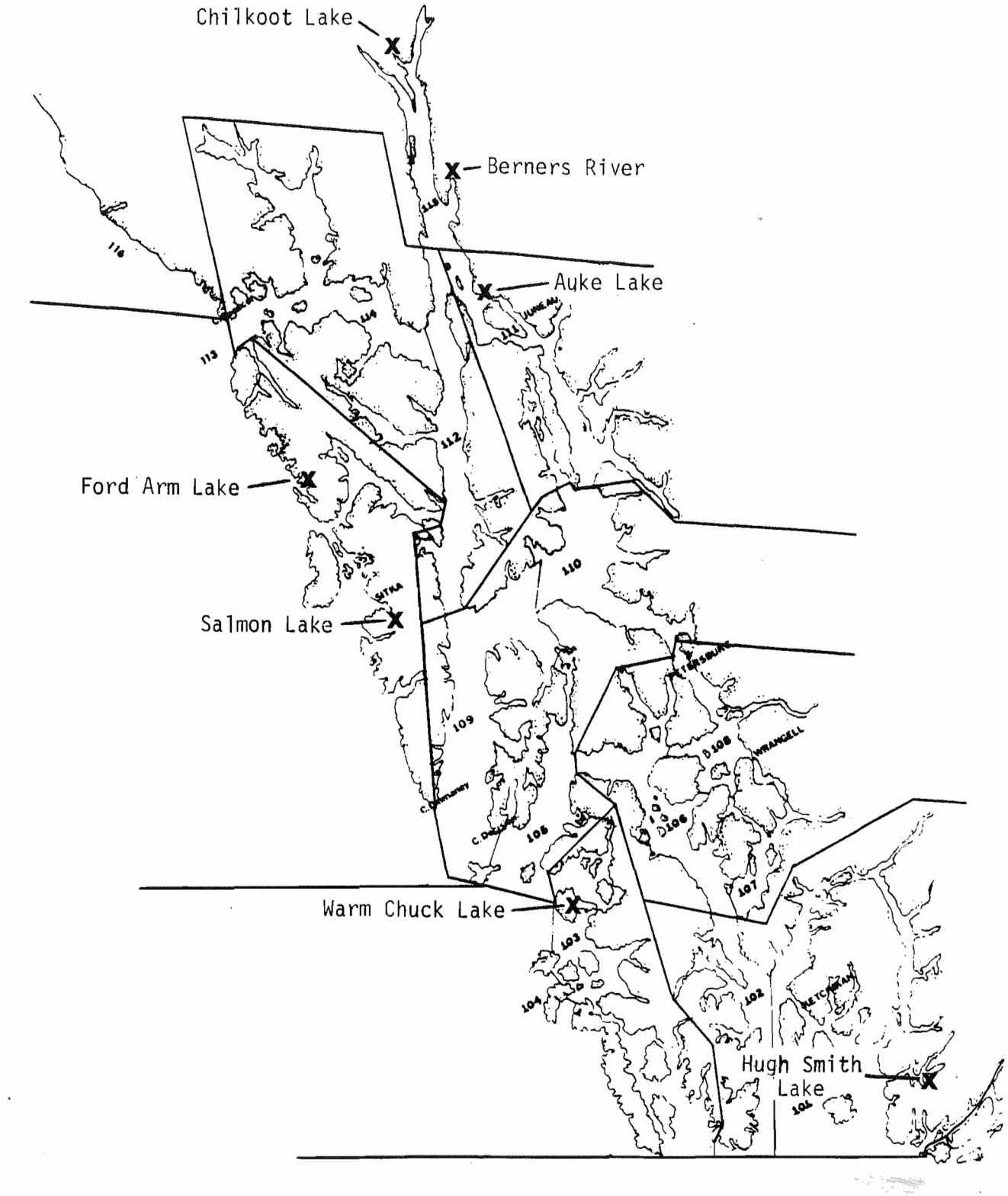

Figure 6-1. Index systems in Southeast Alaska where total coho salmon escapement was enumerated, 1985.

TABLES

Table 4-1. Southeast Alaska region annual commercial coho salmon catch by gear type in numbers and percent, 1970-1985 (ADF&G 11/14/85).

Year	Seine	Drift Gillnet	Set Gillnet	Troll	Trap & Misc.	Terminal Hatchery	Total
1970	294,574 (39)	164,432 (22)	29,748 (4)	267,647 (35)	11 (0)	0 (0)	756,412 (100)
1971	326,264 (36)	159,457 (17)	37,420 (4)	391,282 (43)	0 (0)	0 (0)	914,423 (100)
1972	390,343 (26)	275,978 (18)	45,704 (3)	791,964 (53)	0 (0)	0 (0)	1,503,989 (100)
1973	129,593 (16)	124,349 (15)	41,213 (5)	540,125 (65)	796 (0)	0 (0)	836,076 (100)
1974	166,687 (13)	186,583 (15)	77,556 (6)	845,109 (66)	0 (0)	0 (0)	1,275,935 (100)
1975	70,201 (17)	102,321 (24)	37,403 (9)	214,170 (51)	0 (0)	0 (0)	424,095 (100)
1976	87,604 (11)	156,469 (19)	51,743 (6)	524,762 (64)	0 (0)	0 (0)	820,578 (100)
1977	160,519 (17)	182,090 (19)	92,228 (10)	506,927 (54)	0 (0)	0 (0)	941,764 (100)
1978	245,074 (14)	223,321 (13)	137,408 (8)	1,100,902 (64)	3,432 (0)	0 (0)	1,710,137 (100)
1979	176,593 (14)	83,048 (7)	95,873 (8)	918,845 (72)	699 (0)	0 (0)	1,275,058 (100)
1980	194,250 (17)	112,609 (10)	118,077 (10)	707,360 (62)	2,384 (0)	0 (0)	1,134,680 (100)
1981	286,010 (20)	119,667 (9)	132,127 (9)	862,177 (61)	582 (0)	5,524 (0)	1,406,087 (100)
1982	449,459 (21)	201,678 (9)	148,994 (7)	1,321,546 (62)	63 (0)	11,510 (1)	2,133,250 (100)
1983	399,279 (20)	218,109 (11)	81,298 (4)	1,279,518 (65)	418 (0)	4,220 (0)	1,982,842 (100)
1984	373,289 (19)	201,690 (10)	194,466 (10)	1,132,992 (58)	0 (0)	35,037 (2)	1,937,474 (100)
Average 1970-1984	249,983 (20)	167,453 (13)	88,084 (7)	760,355 (60)	559 (0)	3,753 (0)	1,270,187 (100)
1985 PRELIM	386,521 (15)	315,333 (12)	193,522 (8)	1,588,658 (63)	3,476 (0)	51,850 (2)	2,539,360 (100)

Footnotes: (1) Average percent harvest by gear type calculated from average harvest in numbers by gear type.
(2) Percents may not sum exactly to 100 due to rounding.
(3) Seine and drift gillnet catches include salmon harvested by Annette Island Reserve fisheries.

Table 4-2. Preliminary 1985 salmon catches by Southeast Alaska gillnet fisheries.

fishery	last week reported	ending date	Catch - Cumulative through last week reported Chinook	Sockeye	Coho	Pink	Chum	Total
(1) Portland Canal	38	Sep 21	2776	167011	46949	649685	218245	1084666
(2) Annette Island	36	Sep 7	284	49776	13979	394344	34773	493156
(3) Prince of Wales	40	Oct 5	1689	265323	91074	584946	69638	1012670
(4) Blind Slough	42	Oct 19	0	0	0	0	0	0
(5) Stikine River	38	Sep 21	19	1060	1926	5325	1892	10222
(6) Taku/Snettisham	39	Sep 28	2950	87100	52329	312801	107854	563034
(7) Lynn Canal	42	Oct 19	3367	337232	109076	260259	803566	1513500
(8) Akwe River	40	Oct 5	81	4661	4044	19	46	8851
(9) Alsek River	40	Oct 5	212	5595	5085	10	423	11325
(10) East River	40	Oct 5	67	185503	8147	801	10545	205063
(11) Italio River	40	Oct 5	3	1146	9550	356	473	11528
(12) Kaliakh	38	Sep 21	0	0	20733	0	0	20733
(13) Tsiu	40	Oct 5	0	0	61937	0	0	61937
(14) Yahtse	40	Oct 5	0	0	3871	0	0	3871
(15) Lost River	40	Oct 5	7	1272	9129	315	13	10736
(16) Mamby Shore	39	Sep 28	5	5485	16340	46	8	21884
(17) Situk River	40	Oct 5	472	18724	51481	9054	160	79891
(18) Yakutat Bay	40	Oct 5	182	10985	3205	5506	623	20501
Southern Subtotals (Fisheries (1) - (5))			4768	483170	153928	1634300	324548	2600714
Northern Excluding Yakutat Subtotals (Fisheries (6) - (7))			6317	424332	161405	573060	911420	2076534
Yakutat Subtotals (Fisheries (8) - (18))			1029	233371	193522	16107	12291	456320
Totals			12114	1140873	508855	2223467	1248259	5133568

Cautionary note: In-season catch data shown above should be considered VERY PRELIMINARY. Changes may occur daily as data is edited and updated. Data is computed in this form primarily for in-season management use and general catch reporting.

Table 4-3. Preliminary 1985 salmon catches by Southeast Alaska purse seine fisheries.

District	last week reported	ending date	Catch - Last week reported cumulative to date Chinook	Sockeye	Coho	Pink	Chum	Total
(0) Annette Island	36	Sep 7	47	6108	3270	493533	5872	508830
(1) District 1	40	Oct 5	1065	119540	97661	7148301	247797	7614364
(2) District 2	40	Oct 5	2180	34675	45733	2446401	95403	2624392
(3) District 3	36	Sep 7	0	26258	47094	7696378	79148	7848878
(4) District 4	35	Aug 31	11688	427636	127441	8297157	212836	9076758
(5) District 5	36	Sep 7	10	1612	2321	1961177	38610	2004330
(6) District 6	35	Aug 31	0	500	2100	170000	500	173100
(7) District 7	35	Aug 31	0	0	40	20000	200	20240
(9) District 9	40	Oct 5	90	6630	10191	3236016	80344	3333271
(10) District 10	34	Aug 24	2147	16479	10872	2666914	42466	2738878
(11) District 11	0		0	0	0	0	0	0
(12) District 12	37	Sep 14	2643	37034	25423	6241521	314810	6621431
(13) District 13	37	Sep 14	2048	9419	8998	5406169	159056	5585690
(14) District 14	36	Sep 7	586	3733	4777	1043415	56950	1109461
Southern Subtotals (Districts (1) - (7))			14990	616329	326260	28232947	680366	29870892
Northern Subtotals (Districts (9) - (14))			7514	73295	60261	18594035	653626	19388731
Totals			22504	689624	386521	46826982	1333992	49259623

Cautionary note: In-season catch data shown above should be considered VERY PRELIMINARY. Changes may occur daily as data is edited and updated. Data is computed in this form primarily for in-season management use and general catch reporting.

Table 4-4. Coho salmon catches by Southeast Alaska recreational fisheries, 1977-1984.

Area Fished	1977	1978	1979	1980	1981	1982	1983	1984
Southeast								
Ketchikan	4,583	7,667	2,336	6,914	5,132	11,442	14,181	21,296
Prince of Wales Island	1,917	2,677	1,681	3,986	2,561	4,125	8,374	7,487
Petersburg-Wrangell	3,048	5,493	2,917	2,874	1,864	3,051	4,133	4,046
Sitka	3,116	2,364	1,708	2,202	3,306	3,887	4,648	2,644
Juneau	20,068	24,348	10,825	13,750	10,066	25,015	18,861	15,677
Haines-Skagway	1,270	1,898	455	551	2,172	1,944	2,259	1,616
Glacier Bay	744	880	227	216	573	1,163	619	371
Yakutat	1,406	3,181	2,963	2,315	2,484	2,809	2,328	6,675
Total	36,152	48,508	23,112	32,808	28,158	53,436	55,403	59,812

Table 5-1. Projected hatchery production of coho salmon from facilities in Southeast Alaska, 1986-95.

PROJECTED COHO AVAILABLE FOR HARVEST FROM STATE FACILITIES (Broodstock removed)

Facility	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Crystal Lake	59,000	22,000	22,000	8,000	5,000	5,000	5,000	5,000	5,000	5,000
Klawock	19,000	25,000	21,200	21,200	21,200	21,200	21,200	21,200	21,200	21,200
Snettisham	3,300	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
FRED TOTAL	81,300	62,000	58,200	44,200	41,200	41,200	41,200	41,200	41,200	41,200

PROJECTED COHO AVAILABLE FOR HARVEST FROM PNP FACILITIES AT PERMITTED CAPACITY (Broodstock removed)
(Cost-recovery harvest included)

Facility	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Burnett Inlet	0	500	2,700	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Medvejie	25,400	24,600	700	29,600	29,600	29,600	29,600	29,600	29,600	29,600
Neets Bay	224,500	274,100	235,400	235,400	235,400	235,400	235,400	235,400	235,400	235,400
Sheldon Jackson	100	1,500	2,200	2,700	2,700	2,700	2,700	2,700	2,700	2,700
Whitman Lake	41,000	38,100	38,100	133,900	133,900	133,900	133,900	133,900	133,900	133,900
PNP TOTAL	291,000	338,800	279,100	404,600	404,600	404,600	404,600	404,600	404,600	404,600

PROJECTED COHO AVAILABLE FROM OTHER FACILITIES (Broodstock removed)

Facility	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Tamgas	293,900	252,900	252,900	252,300	252,300	252,300	252,300	252,300	252,300	252,300
OTHER TOTAL	293,900	252,900	252,900	252,300	252,300	252,300	252,300	252,300	252,300	252,300

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
SOUTHEAST TOTAL	666,200	653,700	590,200	701,100	698,100	698,100	698,100	698,100	698,100	698,100

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Table 5-2a. Preliminary estimates of 1985 coded wire tag sampling rates for coho salmon harvested in the Southeast Alaska troll fishery.

Stat Week	Dates		Northern Outside	Southern Outside	Northern Inside	Southern Inside	Total
27	06/30-07/06	C	24,381	32,858	6,553	3,950	67,742
		S	1,688	4,126	1,053	1,248	8,115
		%	6.92	12.56	16.07	31.59	11.98
28	07/07-07/13	C	95,773	44,489	9,824	14,242	164,328
		S	3,901	13,161	4,190	6,106	27,358
		%	4.07	29.58	42.65	42.87	16.65
29	07/14-07/20	C	169,876	48,749	10,563	33,349	262,537
		S	25,723	12,578	2,966	14,960	56,227
		%	15.14	25.80	28.08	44.86	21.42
30	07/21-07/27	C	174,884	27,559	10,355	17,685	230,483
		S	27,333	5,638	5,077	9,174	47,222
		%	15.63	20.46	49.03	52.11	20.50
31	07/28-08/03	C	163,392	23,252	6,593	24,103	217,340
		S	29,473	9,764	2,491	8,982	50,710
		%	18.04	41.99	37.78	37.27	23.33
32	08/04-08/10	C	92,388	25,481	13,619	9,723	141,211
		S	23,166	6,061	1,056	2,191	32,474
		%	25.07	23.79	7.75	22.53	23.00
33	08/11-08/17	C	84,095	25,723	16,708	20,741	147,267
		S	32,084	10,382	5,066	10,247	57,779
		%	38.15	40.36	30.32	49.40	39.23
			- Fishery Closed 8/15-8/24-				
35	08/25-08/31	C	92,587	25,995	5,962	9,634	134,178
		S	17,761	4,725	1,201	2,109	25,796
		%	19.18	18.18	20.14	21.89	19.23
36	09/01-09/07	C	95,982	10,872	4,685	9,679	121,138
		S	20,401	1,798	299	3,386	25,884
		%	21.27	16.54	6.38	34.98	21.37
37	09/08-09/14	C	55,974	3,332	2,839	5,241	67,386
		S	7,775	2,627	373	3,202	13,977
		%	13.89	78.84	13.14	61.10	20.74
38	09/15-09/21	C	26,786	439	3,382	4,324	34,931
		S	11,188	310	0	2,059	13,557
		%	41.77	70.62	0.00	47.62	38.81
Total (Based on in-season log book)		C	1,076,038	268,749	91,083	152,591	1,588,461
		S	200,493	71,170	23,772	63,664	359,099
		%	18.63	26.48	26.10	41.72	22.61
Total (Based on Tag Lab total)		C	1,076,038	268,749	91,083	152,591	1,588,461
		S	239,396	76,987	23,683	64,810	404,876
		%	22.25	28.65	26.00	42.47	25.49

Table 5-2b. Preliminary estimates of 1985 coded wire tag sampling rates for chinook, coho and sockeye salmon harvested in Southeast Alaska net fisheries.

		Chinook			Coho			Chum			Sockeye [1]		
Gear Type	District	Catch	Sample	%	Catch	Sample	%	Catch	Sample	%	Catch	Sample	%
Gillnet	101 [2]	3,064	1,573	51.3	64,024	33,364	52.1	276,879	125,920	45.5	216,993	81,902	37.7
	102	4	0	0.0	295	0	0.0	288	0	0.0	255	0	0.0
	106	1,697	638	37.6	97,454	33,691	34.6	70,145	23,741	33.8	264,966	57,087	21.5
	108	20	11	55.0	5,092	3,479	68.3	2,006	738	36.8	1,066	433	40.6
	111	2,674	996	37.2	55,138	14,973	27.2	106,804	30,517	28.6	86,962	602	0.7
	115	3,234	962	29.7	96,279	26,675	27.7	167,462 [3]	30,169	18.0	303,239	1,943	0.6
Seine	101 [4]	1,113	822	73.9	105,450	30,320	28.8	349,303	73,834	21.1	125,637	38,651	30.8
	102	2,176	208	9.6	50,203	8,027	16.0	128,888	22,604	17.5	34,495	4,176	12.1
	103	4	12	300.0	47,900	4,443	9.3	81,277	7,906	9.7	26,599	1,647	6.2
	104	11,616	3,836	33.0	126,637	23,882	18.9	212,382	41,319	19.5	418,860	42,428	10.1
	105	21	51	242.9	3,959	1,209	30.5	53,828	15,755	29.3	2,195	63	2.9
	106	0	84		5,264	1,545	29.4	2,446	924	37.8	1,073	187	17.4
	107	0	0		5	0	0.0	11	0	0.0	3	0	0.0
	109	337	198	58.8	21,084	5,801	27.5	115,863	38,751	33.4	17,901	990	5.5
	110	2,136	2,310	108.1	10,257	3,334	32.5	40,531	9,345	23.1	15,934	2,198	13.8
	112	2,544	2,202	86.6	25,311	5,180	20.5	611,207	162,964	26.7	36,987	618	1.7
	113	2,389	844	35.3	15,270	1,958	12.8	158,939	24,413	15.4	24,202	999	4.1
	114	586	238	40.6	4,777	1,397	29.2	56,950	10,321	18.1	3,733	0	0.0
Trap	101	366	172	47.0	3,476	2,305	66.3	1,520	0	0.0	10,873	6,787	62.4
Total		33,981	15,157	44.6	737,885	201,583	27.3	2,436,729	619,221	25.4	1,591,973	240,711	15.1

1) No directed sampling in Districts 107 to 115 for sockeye cwt.
2) Includes gillnet catches in the Annette Island Fishery Reserve of 284 chinook, 13,979 coho, 34,773 chum, and 49,776 sockey salmon.
3) District 115 chum catch through week 36 only.
4) Includes seine catches in the Annette Island Fishery Reserve of 47 chinook, 3,270 coho, 5,872 chum, and 6,108 sockey salmon.

Table 6-1. Adult coho salmon escapement to index systems in Southeast Alaska, 1985, compared with previously recorded escapements.

System	1985 Escapement	Year	Past Escapements No. of Adults
Auke Lake	942	1977	908
		1978	683
		1979	596
		1980	698
		1981	644
		1982	447
		1983	694
		1984	651
		Average	665
Berners River	6,169	1974	4,121
		1975	4,342
		1976	1,820
		1978	3,108
		1979	3,460
		1982	7,505
		1983	9,840
		1984	2,825
		Average	4,628
Chilkoot Lake (excluding freshwater sport catch above the weir)	2,188	1976	942
		1978	1,178
		1979	1,008
		1983	1,733
		Average	1,215
Ford Arm Lake	2,325	1982	2,662
		1983	1,944
		Average	2,303
Salmon Lake	1,388	1983	403
		1984	1,514
		Average	959
Warm Chuck Lake	956	1982	1,017
		1983	1,238
		Average	1,128
Hugh Smith Lake	903	1982	2,144
		1983	1,490
		1984	1,367
		Average	1,667

Appendix A

Coho Salmon Annex

U.S./Canada Pacific Salmon Treaty

APPENDIX A

U.S./CANADA PACIFIC SALMON TREATY (Annex IV, Chapter 5)

COHO SALMON

1. Recognizing that for the past several years some coho stocks have been below levels necessary to sustain maximum harvest and that recent fishing patterns have contributed to a decline in United States catch of coho stocks of United States origin, and in order to prevent further decline in spawning escapements, adjust fishing patterns, and initiate, develop or improve management programs for coho stocks, the Parties shall

(a) establish a Joint Coho Technical Committee (Committee), reporting unless otherwise agreed to the Panels and the Commission. The membership of the Committee shall include representation from the Northern and Southern Panel Areas. The Committee, *inter alia*, shall

(i) evaluate the effectiveness of management actions;

(ii) identify and review the status of stocks;

(iii) present the most current information on harvest rates and patterns on these stocks, and develop a joint data base for assessments;

(iv) collate available information on the productivity of coho stocks in order to identify escapements which produce maximum sustainable harvests and allowable harvest rates;

(v) present historical catch data, associated fishing regimes, and information on stock composition in fisheries harvesting these stocks;

(vi) devise analytical methods for the development of alternative regulatory and production strategies;

(vii) identify information and research needs, including future monitoring programs for stock assessments;

(viii) for each season, make stock and fishery assessments and recommend to the Commission conservation measures consistent with the principles of the Treaty;

(b) unless otherwise agreed, in any area where fisheries of one Party may intercept coho stocks originating in the rivers of the other, endeavour to limit incidental coho catches by fisheries targeting on other species.

2. For coho stocks shared by Washington and southern British Columbia fisheries, each Party shall establish regimes for its ocean troll, ocean sport, and inside troll, net and sport fisheries consistent with management objectives approved by the Commission.

3. In 1985, the Parties shall adhere to presently agreed management objectives for Canadian Area 20, U.S. Areas 7 and 7A, and Juan de Fuca Strait.

4. The Parties agree

(a) that in 1985 and 1986 the total annual troll catch of coho in Canadian Management Areas 21, 23, 24, 25, 26, 27, 121, 123, 124, 125, 126, 127, and 130-1 shall not exceed 1.75 million;

(b) to avoid any alterations in coho fisheries along the west coast of Vancouver Island that would increase the proportional interception of U.S. coho stocks;

(c) to develop, in 1986 and thereafter fishery regimes for the west coast of Vancouver Island that

(i) implement conservation measures approved by the Commission and take into account any increased contributions by Canada to the fishery, and

(ii) provide for the sharing of benefits of coho production of each Party consistent with the principles of Article III.

5. If management measures result in a significant deviation from catch levels set out in paragraph 4 in any year, differences shall be compensated by adjustments to the fishery in subsequent years, provided that conservation objectives for natural coho stocks and other principles of Article III are not adversely affected.

6. Notwithstanding any other provisions of this Chapter, the Commission, for 1987 and thereafter, shall set specific harvest levels for coho salmon in the intercepting fisheries in areas described in paragraph 4.

Appendix B

List of Reference Documents on Coho Salmon Stocks and Fisheries of Southeast Alaska

LIST OF REFERENCES ON SOUTHEASTERN ALASKA COHO SALMON RESOURCE STATUS AND RESEARCH

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POST-SEASON REPORT FOR 1985 U.S. COHO FISHERIES FROM CAPE FALCON, OREGON TO THE WASHINGTON/CANADIAN BORDER and 1986 COHO STOCK STATUS EXPECTATIONS

June 20, 1986

Prepared for the Pacific Salmon Commission

INTRODUCTION

U.S. coho salmon fisheries north of Cape Falcon, Oregon during 1985 are reviewed in this report. Ocean fisheries from 3-200 miles off the coasts of Washington, Oregon and California are managed by the Department of Commerce through the Pacific Fishery Management Council (PFMC). State territorial waters within 3 miles of the coast are managed by state and tribal managers in coordination with regional plans developed through the PFMC. Fisheries in inside waters are regulated by state and tribal managers.

A Pacific Salmon Treaty between the United States and Canada became effective in March 1985. The Pacific Salmon Commission charged with the responsibility for implementing the Treaty has been established. Because many of the stocks under the jurisdiction of the Pacific Fishery Management Council (PFMC) are significantly affected by management actions taken in Canadian and Alaskan waters, considerable interaction between the PFMC and the new Commission will be necessary at both the policy and technical levels.

The Treaty established a 1.75 million coho harvest ceiling for the Canadian troll fishery off the West Coast of Vancouver Island for 1985 and 1986. The actual 1985 catch by this fishery was approximately 1.405 million coho. The only coho management actions for U.S. fisheries specified in the Treaty involved continuation of net fishery restrictions for certain northern Puget Sound and Strait of Juan de Fuca areas. The coho catch by U.S. net fisheries in management areas 6, 7, and 7A totaled 141,800, approximately 82% of which was taken during fisheries under the control of the International Pacific Salmon Fisheries Commission (IPSFC) directed at Fraser River sockeye and pink salmon. The IPSFC has been replaced by the Pacific Salmon Commission and the Fraser River Panel established under the Treaty. The Fraser Panel will be responsible for in-season management of Fraser River sockeye and pink stocks during the times and in the areas formerly under the jurisdiction of the IPSFC. In contrast to the past operation of the IPSFC, the Fraser Panel will be required to directly consider management of stocks and species other than Fraser River sockeye and pink salmon.

This report is presented in two major parts. Part I describes 1985 U.S. fisheries harvesting coho in the area from Cape Falcon, Oregon north to the Washington-Canadian border. Part II consists of two appendices. Appendix A summarizes 1985 management of ocean fisheries under the jurisdiction of the PFMC. Appendix B describes the sequence of events in 1985 ocean fishery management.

I. SUMMARY OF 1985 U.S. COHO FISHERIES NORTH OF CAPE FALCON AND SOUTH OF THE WASHINGTON CANADIAN BORDER

OCEAN FISHERIES

Management Goals and Preseason Expectations

Management goals for U.S. ocean fisheries which impact coho in the area north of Cape Falcon are described in the 1985 Report of the Joint Coho Technical Committee. The stock composition in this area is complex, varying by time and area according to stock specific migration patterns and abundance. Annually the total allowable coho impact is determined based upon the status of particular critical, relatively depressed stocks which are significantly affected by ocean recreational and troll fisheries. Allowable stock impacts are translated into harvest quotas which include both catch and noncatch mortality. Ocean fisheries operating under quotas for more than a single species in the Pacific Fishery Management Council (PFMC) management area north of Cape Falcon, Oregon are generally closed upon attainment of any of the quotas.

In the area north of Leadbetter Point, primary consideration is given to Washington coastal and Puget Sound origin stocks. In the Columbia River management area, south of Leadbetter Point, contribution to the catch made by stocks originating from the Columbia River and Oregon coastal rivers increases significantly, and management emphasis changes accordingly.

Preseason estimates of stock abundance for 1985 indicated that the escapement goal for natural coho from the Skagit River would not be achieved without complete elimination of U.S. ocean and Puget Sound fishery impacts. Other stocks identified as having critically low abundance and affecting management in the area north of Cape Falcon were Columbia River late hatchery and Oregon Coastal natural. The PFMC adopted an overall ocean fishery regulatory scheme which, coupled with inside fishery management agreements, would result in a minimum spawning escapement for Skagit River coho of 18,000 adults. Generally, seasons were structured to avoid the relatively higher concentration of Skagit River coho in the northern areas while providing harvest opportunities for the various participating fisheries.

While these critical stocks were the primary focus for management in the area north of Cape Falcon in 1985, the impact on other stocks was considered in terms of the effect on allowable harvest in other fisheries (e.g., Grays Harbor, coastal rivers, Puget Sound) and spawning escapement objectives. Additionally, the allowable harvest in this area was influenced by fishery regulatory plans south of Cape Falcon.

> Non-treaty Troll - Non-treaty troll opportunity for coho harvest occurred in two separate, quota-constrained, all-species fisheries. The total troll impact on coho stocks was estimated, including hooking mortality loss during an

all-species-except-coho pink directed fishery.

An all-species fishery in the area between Cape Alava and Leadbetter Point beginning July 15th was constrained by a harvest quota of 78,500 coho and was scheduled to operate until July 31, or until the quota was reached. The fishery was closed on July 18 with a catch of 136,300 coho. Unexpectedly high effort, partly explained by large numbers of Oregon troll fishermen and extremely good catch success, resulted in the rapid achievement of the quota. To compensate for exceeding this quota, the PFMC adjusted planned regulations for the pink directed fishery north of Carroll Island and the all-species fishery in the Columbia River catch area. For the pink fishery, the originally adopted harvest quota of 31,200 coho was eliminated and coho landings were not allowed. Fishery induced mortality (hooking and release) was estimated at 3,500 coho based on projected pink landings, incidence of coho per pink from a 1983 pink fishery gear study, and a mortality rate of 30 percent. Actual coho incidence in the fishery was not measured.

The all-species troll fishery, scheduled to begin August 21 in the Columbia River management area with a coho harvest quota of 32,000, was altered by the Council by: (1) reducing the fishery boundary to that part of the Columbia River area between the red buoy line and Cape Falcon; (2) reducing the quota to 10,000 coho; and (3) limiting the duration of the fishery to one 24 hour period. The resulting season represented the smallest distinctly identified salmon troll fishery on record, in terms of time (planned or inseason) and allowable harvest. The coho catch in this fishery was 32,800, 225% above the quota.

Historical monthly effort and catch statistics for Oregon and Washington non-Indian troll fisheries by area of catch are presented in Tables II-1 and II-2, respectively.

Treaty Troll - The treaty Indian ocean troll fishery was constrained by a 75,000 coho quota for May through September. This quota was apportioned by tribal fishery managers into separate periods to control the rate of coho and chinook harvest. The Makah, Quileute, Hoh, and Quinault tribes closed their ocean troll fisheries on September 4 upon attainment of the quota. A one-day fishery conducted in ocean management areas by the Makah Tribe from September 10-11 and a coho only ceremonial and subsistence fishery in Area 4B during three weeks in September harvested approximately 700 coho. The total May-September coho catch in ocean management areas by treaty Indian troll fisheries was 87,200. East of Area 4B, treaty Indian troll fisheries conducted by the Makah and Klallam tribes harvested an estimated 800 coho.

Historical monthly effort and coho catch statistics for

treaty Indian troll fisheries by port of landing are presented in Table II-3.

Recreational - The recreational fishery north of Cape Falcon was managed on the basis of three subareas. The total allowable coho harvest was apportioned among these subareas according to the 1979-82 average harvest pattern. As planned preseason, inseason management actions were primarily directed at controlling the rate of chinook harvest because a normal fishery would have resulted in the chinook quota being reached with a significant portion of the coho quota left uncaught.

The coho harvest quota for the Neah Bay-LaPush area (28,400) was reduced by 3,000 fish on August 14 as part of a species/fishery "trade" of 750 chinook from the non-treaty troll quota. Without quota modification, the fishery would have been stopped on the basis of the chinook quota, with approximately half the coho quota remaining. The recreational fishery within the Neah Bay-La Push area harvested a total of 25,400 coho (within 100 fish of the quota) and was closed on September 2.

The Westport area recreational fishery harvested a total of 73,600 coho, about 400 fish less than the quota established for this subarea. No inseason actions directed at coho were enacted in this area.

The Columbia River area recreational fishery was constrained by a harvest quota of 99,000 coho. Stock specific fishery impacts estimated during the preseason did not include impacts of a Buoy 10 area recreational fishery. On August 18, the area inside Buoy 10 at the Columbia River mouth was opened to recreational fishing under an agreement that coho harvested in that area would be included in the ocean quota. The ocean and Buoy 10 area fisheries were closed concurrently on August 23 when it was estimated the coho quota was reached. The combined coho catch was 11,800 fish in excess of the quota. Following the closure, a small number of landings were made of fish caught in the ocean area South of Leadbetter Point. The total coho harvest, including the Buoy 10 area catch for the period August 18-22 (10,200) and illegal ocean catches, was 110,800 fish.

Monthly effort and coho catch statistics for Oregon and Washington ocean recreational fisheries by port are summarized in Tables II-4 and II-5, respectively.

INSIDE FISHERIES

Columbia River - The Columbia River non-treaty gillnet fishery harvested 190,000 coho, compared to 189,100 coho caught in 1984 and a 1971-75 average of 199,400 (Table II-6). The treaty Indian mainstem commercial setnet catch was 4,600 coho, compared to 1,600 coho taken in 1984 and an average of 9,100 during the 1971-

75 period. The recreational fishery in the area between Buoy 10 and the Megler-Astoria bridge reopened following closure of the Columbia River ocean management area on August 23rd, first for three days over the Labor Day weekend and then from September 6-29. The total Buoy 10 catch, including the August 18-22 opening, was 25,400 coho compared to a catch of 74,400 in 1984. Angler trips for the 1985 fishery totaled 32,200 compared to 67,400 in 1984. Table II-7 summarizes weekly catch and effort statistics for the 1985 Buoy 10 fishery. Approximately 600 coho were taken in upriver mainstem recreational fisheries.

Washington Coast

Willapa Bay - Willapa Bay coho are managed for hatchery production. Total gillnet catch was 34,800 coho compared to 50,600 in 1984 and a recent five-year average of 36,900 (Table II-8). The catch was well below expected levels due to a lower than predicted return. Sport fishery harvest for 1985 is unavailable at this time.

Grays Harbor - Grays Harbor coho returned well below predicted levels. The total gillnet catch was 10,600 including 9,200 by the Quinault Tribe, 900 by the Chehalis Tribe and 500 by the non-Indian fishery. This total catch compares with 13,200 harvested in 1984 and a recent five-year average of 29,500 (Table II-9). Estimates of sport catch are not available at this time, but were well below the record high observed in 1984.

Quinault River - The treaty Indian gillnet fishery, directed at hatchery stocks, operated from late September through mid-November. Total gillnet harvest was 7,300 coho, one third of the 1984 record harvest and 40 percent below the 1980-84 average. A few coho were caught by a treaty Indian commercial hook and line fishery.

Queets River - The estimated total return of fall coho to the Queets River is 9,500. The preliminary natural run size estimate is 6,100, 46 percent below expectations. The gillnet fishery was conducted in accordance with a management agreement between the Washington Department of Fisheries and the Quinault Nation. The gillnet fishery targeted on hatchery coho during the early part of the season and then shifted emphasis to fall chinook management at the conclusion of the inseason run size evaluation period. The season total harvest of fall coho by the net fishery was 3,800, about 70 percent above the 1980-84 average. The catch was comprised of approximately equal numbers of hatchery and naturally spawning fish. The river sport fishery catch is estimated at 300 adults.

Hoh River - The return of fall coho to the Hoh River was predominantly natural fish. The gillnet fishery operated in accordance with a management agreement between the Washington Department of Fisheries and the Hoh Tribe. Due

to the poor reliability of the inseason run size estimator for Hoh coho, the preseason forecast of 6,400 was used for management. This run size allowed a season-long Indian gillnet fishery of from two to five days per week. The total catch was 3,400 coho, approximately three times the recent five-year average. The river sport fishery is estimated to have taken 100 adult coho.

Quillayute River - The summer coho run was managed primarily for its hatchery component. The treaty gillnet fishery targeted on this run from mid-August through mid-September. The total gillnet harvest was 1,800 coho, 29 percent of the recent five year average. The nontreaty river sport catch was 100 adults.

The Quillayute River fall coho run is managed for natural production. The gillnet fishery operated in accordance with a management agreement between the Washington Department of Fisheries and the Quileute Tribe. The total terminal run size of fall coho is estimated at 16,900, comprised of 15,300 natural and 1,600 hatchery fish. This run size allowed a season-long fishery ranging from two to five days per week. Treaty gillnet catch was 8,800 fall coho (7,700 natural and 1,100 hatchery), nearly three times the recent five year average. The river sport catch of fall coho is estimated at 300 adults.

Historical terminal catch, escapement and terminal run size statistics for Quinault, Queets, Hoh, and Quillayute coho runs are presented in Table II-10.

Puget Sound - In Puget Sound, coho are harvested by non-Indian commercial net, treaty Indian net, and marine and freshwater recreational fisheries. Non-Indian commercial net fisheries operate primarily in mixed-stock areas of Puget Sound. Treaty Indian net fisheries are conducted in both mixed-stock and terminal areas. Marine recreational fisheries occur year-around on resident and migrant coho in nearly all marine waters of Puget Sound. River recreational fisheries are permitted in parts of the mainstems and tributaries of most Puget Sound rivers.

Fisheries are managed according to the Puget Sound Salmon Management Plan, an agreement between the State of Washington and the Puget Sound treaty tribes that was signed in 1977 and extensively revised in 1985. Under this plan, all fisheries are to be managed to achieve the spawning escapement goal for each management unit (a run that returns to a river system, inlet, or separate enhancement complex).

The spawning escapement goal for hatchery coho runs is set at the hatchery's broodstock requirement derived from enhancement plans that are mutually agreed to by the state of Washington and affected tribes. For natural runs, the goals, lacking other agreement, are the escapements which will provide the Maximum Sustained Harvest (MSH) escapement to Washington fisheries. MSH

escapements are not precisely known for natural Puget Sound coho runs; escapement goals for these stocks are required to be either best estimates of MSH escapement or an alternative agreed upon by the state and the tribes. Alternative escapement goals may reflect rebuilding schedules or incorporate impacts of test fisheries, incidental catches in fisheries targeting on harvestable runs, ceremonial fisheries or other circumstances specifically agreed upon. The harvestable number is the difference between the run size and the escapement goal. Allocations between treaty Indian and nontreaty fisheries are based on numbers of harvestable fish. Where management units consist of both hatchery and natural runs, the State of Washington and affected tribes must agree on whether to manage for the hatchery escapement goal or the natural escapement goal. The unit which is managed to achieve the desired escapement is defined as the primary management unit. Meeting the escapement goal for a primary management unit may intentionally result in over or under escapement of secondary management units.

For purposes of treaty Indian and non-Indian sharing in Puget Sound, the harvestable numbers from separate management units are aggregated into the following allocation groups: Canadian, tributaries to the Strait of Juan de Fuca, Nooksack-Samish, Skagit, Stillaguamish-Snohomish, South Sound, and Hood Canal. All these groups except the Skagit are comprised of more than one management unit. This grouping minimizes the need for non-Indian commercial fisheries in extreme terminal areas. Harvest of coho for each unit is regulated according to the natural spawning escapement or hatchery program goal established for management of that unit. Fisheries are regulated to achieve proper sharing for each allocation group.

Under the Puget Sound Management Plan, the procedure for managing these units requires close cooperation between the Washington Department of Fisheries and tribal managers. The annual process for coho management begins in January, when agreement is reached on a preliminary preseason run size forecast for each management unit for use in planning PFMC ocean fisheries. Because these forecasts may require return rate and escapement data that are not available at that time, it is recognized that these preliminary run size estimates are subject to change.

Preliminary run size forecasts are used to evaluate impacts of ocean fishing regulations during late February and March. If a Puget Sound management unit is expected to be a critical concern for PFMC planning (only Skagit and Stillaguamish natural runs have thus far been in this category), then the tribal managers with interests in that unit become involved in negotiating the ocean and inside fisheries that affect that unit. In April, the PFMC develops recommendations for regulation of ocean fisheries and submits them to the Department of Commerce for adoption.

By mid-April, final run size estimates for the previous year are available, and final preseason forecasts are made. There is presently no procedure for integrating these final forecasts back

into the PFMC process; the effects of changes in forecasts are handled by adjusting management of Puget Sound fisheries.

Once the preseason forecasts are developed, WDF and tribal managers must agree on issues pertaining to escapement goals, allocations, and general management recommendations which may not have been resolved during the PFMC planning process. Agreements as to the methodologies to be employed for updating run sizes and allocation status for inseason management must be reached. All planning is scheduled to be completed two months before coho management for commercial net fisheries begins in Puget Sound.

Once the harvestable number for a management unit is agreed to, then it is the responsibility of WDF and the individual tribal managers to each regulate their own fisheries, consistent with their own laws, to take their share, as long as they don't interfere with another manager's attempt to take its share, or with the needs of another management unit. In the event of disputes, the Puget Sound Management Plan provides for a dispute resolution process that involves policy-level negotiation, technical input, and, as a final resort, court action.

Management emphasis and strategies differ depending upon the area of Puget Sound involved. In the Strait of Juan de Fuca marine areas (Areas 4B, 5 and 6C), net catches of coho occur incidentally during fisheries on Fraser sockeye and pinks, and during directed treaty Indian coho fisheries later in the year. In recent years, these directed fisheries have operated on a fixed schedule of 5 days/week during the coho management period. The Strait of Juan de Fuca streams that are managed for natural production (all except Dungeness and Elwha) are frequently closed because most natural runs have for years been returning below escapement goals. Management measures to protect these runs have thus far been limited to those enacted in terminal areas.

In the San Juan Islands (Area 7), Pt. Roberts (Area 7A), West Beach (Area 6A), and Area 6, coho are caught incidentally during Fraser sockeye and pink fisheries. Directed coho net fisheries in these areas have not been conducted for several years in order to protect weak coho stocks and as a result of agreements with Canada. Fraser coho are primarily a concern in Areas 7, 7A, and to some extent 6A while weak Puget Sound stocks are primarily a concern in Areas 6, 6A and 7.

The Nooksack-Samish area is managed for the large hatchery runs that return to the Nooksack River and Lummi Bay, although a natural run bound for the Samish River is intermixed. Fisheries are usually conducted in Bellingham Bay and the Nooksack River on a 7 days/week schedule. It is usually assumed that all harvestable Samish coho are caught in the Bellingham Bay fishery, so Samish Bay and River are usually closed. If Samish Bay is closed, it is also assumed that this closure is sufficient to meet the escapement needs of Samish coho, and no further restrictions to protect Samish coho are applied in other areas.

Skagit coho are managed for natural production. Because the harvestable number is frequently low, ocean and terminal fisheries have been severely restricted, and the hatchery run often has a large overescapement.

The Port Susan-Gardner area (Area 8A) is managed for the natural runs that return to the Stillaguamish and Snohomish Rivers. There is a discrete area (Tulalip Bay) where hatchery stocks are targeted separately. Prior to 1984, Area 8A was managed for an aggregate escapement goal for the Stillaguamish and Snohomish. Most of the escapement occurred in the Snohomish while the Stillaguamish escapement was well below its goal. Since 1984 there has been an effort to manage escapements to these river systems separately. As a result, ocean and Puget Sound fisheries have been restricted and there have been substantial overescapements to the Snohomish.

In the mixed-stock areas of South Sound, coho are fished at hatchery harvest rates. Conservation needs for natural stocks are handled through restrictions in terminal areas. Because much of the harvest is taken in mixed-stock areas, intermingled weak management units may be fished below their escapement goals, even with terminal area closures. Shortfalls in natural escapements are supplemented by fry plants.

Hood Canal is the only Puget Sound area for which a specific regional management plan has been completed. Under this plan, which was negotiated between the State of Washington and the Point No Point Treaty tribes, different parts of Hood Canal are managed for natural and hatchery production. Area 12A (Quilcene Bay) and Area 9A (Port Gamble Bay) are fished at hatchery rates. The remainder of Hood Canal is fished at rates appropriate for natural stocks. This approach usually results in a hatchery overescapement to the Skokomish River.
Coho net fisheries are opened in Admiralty Inlet (Area 9) only if there are sufficient harvestable fish returning to each of the Stillaguamish, Snohomish, South Sound and Hood Canal. Due to concerns for the Stillaguamish, Area 9 has been closed the last two years.

Marine recreational catches are controlled by bag limits and gear restrictions such as barbless hook requirements, and are generally open year-around. Recreational fisheries may be closed to coho retention during coho management periods in specific terminal areas such as Skagit Bay, where conservation problems are identified. River recreational fisheries are conducted downstream of most coho spawning areas, and are controlled by bag limits. These fisheries are generally open through the coho management period, but if a coho conservation problem is identified in a specific river, these regulations are usually modified to require the release of coho larger than 20 inches.

An effort to develop comprehensive resource production and management plans on a watershed by watershed basis and mixed-stock fishing plans for Puget Sound was initiated in 1985.

Management emphasis for different stocks may change as long-term strategies are developed through this planning process. Initial versions of these plans are scheduled for completion in December 1986.

The 1985 coho harvest by Puget Sound fisheries is summarized below.

Puget Sound Commercial Fishery - Mixed-stock net fisheries occurred in both north Puget Sound and the Strait of Juan de Fuca. The coho catch in northern Puget Sound (Areas 6, 7 and 7A) occurred primarily in conjunction with fisheries directed at Fraser River sockeye and pink salmon. These fisheries occurred between July 23 and September 22, and harvested 116,400 coho, compared to a 1980-84 average of 76,000. As provided in the Pacific Salmon Treaty Annex, no coho directed fisheries were operated in Areas 7 and 7A (or Area 6) following relinquishment of management control by the IPSFC. A catch of 25,500 coho occurred in Areas 7 and 7A during a directed chum fishery in late October. Area 6A was closed to fishing throughout the year.

Coho catches in the Strait of Juan de Fuca (Areas 4B, 5 and 6C) occurred both during treaty Indian and nontreaty fisheries directed at Fraser River sockeye and pink, and directed coho and chum fisheries by the Makah and Klallam Tribes. The coho catch during IPSFC controlled fisheries in the Strait of Juan de Fuca was 59,200, compared to a 1980-84 average of 25,600. A five day per week treaty Indian fishery following IPSFC control occurred from September 15 to November 23. This fishery harvested 25,000 coho, compared to a 1980-84 average of 33,400.

The coho harvest in Puget Sound as a whole has increased over the last 15 years (Table II-11). The 1985 commercial catch was 48 percent greater than the 1984 harvest and 40 percent above the 1971-80 average. Nontreaty net fisheries harvested 422,200 coho compared to 296,900 caught in 1984 and an average of 468,500 for 1971-80. Treaty Indian net fisheries harvested 733,300 coho compared to 482,700 in 1984 and an average of 356,600 for 1971-80. A total of 1,500 coho were caught in Puget Sound waters east of the Sekiu River by treaty Indian and nontreaty hook and line fisheries. The 1985 commercial coho catch by gear and area is summarized in Table II-12. Regulatory histories for U.S. net fisheries in north Puget Sound and the Strait of Juan de Fuca are summarized in Tables II-12a and II-12b, respectively.

Puget Sound Recreational Fishery - Harvest data for 1985 Puget Sound recreational fisheries are unavailable at this time. Historical recreational harvests are summarized in Table II-13.

ESCAPEMENTS

Columbia River - The Columbia River coho ocean escapement of late and early stock components combined was 353,500 adults, 8 percent lower than 1984. The 1985 return was approximately double preseason expectations. The late and early stock component ocean escapement estimates are 128,900 adults and 224,800 adults, respectively. Ocean escapements of both production components was sufficient to meet hatchery production goals and provide for significant in-river fisheries.

Washington Coastal

Cold, dry weather conditions during the late fall affected run entry patterns and timing for spawning of natural stocks returning to rivers along the Washington coast and in Puget Sound. Estimates presented are preliminary and are likely to be changed when spawning ground survey data are complete.

Willapa Bay - Escapement of hatchery coho to Willapa Bay facilities was 24,900 adults, meeting all program requirements.

Grays Harbor- Escapement of hatchery coho to Grays Harbor facilities totaled only 7,900, well below the goal of 14,000 adults. Estimates of naturally spawning coho are not yet available, but evidence suggests that escapement will be well below the goal of 35,400.

Quinault River - Estimates of escapement are not available at this time.

Queets River - The escapement of naturally spawning coho is estimated at 4,000 adults, about 29% below the 1980-84 average.

Hoh River - The escapement of naturally spawning coho is estimated at 2,100 adults.

Quillayute River - The escapement of naturally spawning summer coho was 300, the lowest on record. Fall coho natural escapement is estimated at 7,500.

Puget Sound - Generally, hatchery egg take goals were achieved. Estimates of 1985 escapements are presented below for major production regions within Puget Sound.

1985 Preliminary Escapement Estimates

Region	Hatchery	Natural
Strait of Juan de Fuca	7,100	2,600
Nooksack/Samish	32,000	5,700
Skagit	7,200	18,000
Stillaguamish/Snohomish	14,200	80,000
South Puget Sound	47,000	39,600
Hood Canal	7,400	14,900

Escapement goals were not achieved for Skagit, Stillaguamish, Hood Canal and Strait of Juan de Fuca natural stocks.

Historical estimates of terminal catch, escapement and run sizes for Puget Sound coho stocks are summarized in Table II-14.

PRESEASON AND INSEASON COHO RUN SIZE ESTIMATES USED FOR 1985 MANAGEMENT

A variety of preseason abundance estimators for Columbia River, Washington coastal and Puget Sound coho stocks are currently employed in the ocean management planning process. For natural stocks, estimates are derived by: (1) average recruits per spawner; (2) jack to adult relationships; and (3) summer stream flow conditions. For hatchery stocks, run size predictions involve: (1) survival rates derived from analysis of coded-wire-tag recoveries; and (2) average adult return per smolt released. These preseason run size estimates are developed by state and tribal managers.

Inseason abundance estimates are not made for ocean fisheries management. The experience of the PFMC's Salmon Plan Development Team indicates that in-season data are not sufficient to update the status of individual stocks.

Inseason abundance estimates are made for most Columbia River, Washington coastal and Puget Sound coho stocks through various run size update procedures involving evaluation fisheries.

Data are not yet available to fully evaluate the performance of abundance estimators employed for the regulation of 1985 fisheries. Preliminary assessment of preseason expectations for coho stocks critical to management of 1985 ocean fisheries is summarized in Table II-15.

PRESEASON EXPECTATIONS FOR 1986

Preseason stock abundance forecasts for 1986, compared to 1985 and 1984 are summarized in the following table.

COHO STOCK		Preseason Forecast (Thousand coho) 1986	1985	1984
Willapa Bay	(H)	92.0	101.7	31.9
Grays Harbor	(N)	44.0	40.0	24.2
	(H)	25.6	31.9	16.4
Quinault	(N)	7.7	7.1	4.1
	(H)	7.3	15.9	12.6
Queets	(N)	3.9	6.6	4.1
	(H)	4.2	4.9	1.9
Hoh	(N)	3.0	3.9	2.1
Quillayute Fall	(N)	4.8	11.3	5.5
	(H)	2.2	1.8	1.9
Quillayute Summer	(N)	1.4	1.6	1.1
	(H)	5.2	3.2	4.4
Strait of Juan de Fuca	(N)	9.9	13.5	8.3
	(H)	17.7	14.7	4.5
Nooksack-Samish	(N)	36.6	48.0	28.5
	(H)	122.2	180.7	102.0
Skagit	(N)	37.6	18.6	27.9
	(H)	25.3	13.7	19.8
Stillaguamish/Shohomish	(N)	169.3	205.5	123.8
	(H)	34.4	45.3	14.6
South Puget Sound	(N)	157.6	196.3	107.3
	(H)	484.4	541.3	459.1
Hood Canal	(N)	53.9	67.1	45.1
	(H)	59.1	65.8	63.9

N = Natural
H = Hatchery

Many naturally spawning coho stocks will be produced by depressed escapements from the 1983 brood. Due to unpredictable low ocean survival conditions during the 1983 El Nino event, stock sizes were substantially reduced. Escapements were not only lower than desired, the smaller size and reduced fitness of spawners (resulting in fewer, less viable eggs per spawner) is also a concern for some stocks. Production of several important natural stocks in 1986 is anticipated to be significantly lower than 1985 levels (Washington coastal natural stocks are expected to be particularly reduced). Overall, the abundance of Puget Sound coho stocks is anticipated to be 15% lower than 1985 levels. The Skagit and Stillaguamish natural runs, however, are expected to be substantially larger than comparable 1985 projections.

Table II-1 Oregon troll salmon effort in deliveries (fish tickets) and vessel days by catch area and statistical month for 1976-1985, with 1971-1975 average. Landings do not include catches made off California, Washington, and Alaska which were landed in Oregon.

Catch Area[a] / Year	April	May	June	July	August	September	October	November	Season[b]
				DELIVERIES (thousands)					
Columbia River[c]									
1971-1975 Average	d/	0.2	0.4	0.5	0.5	0.3	d/	-	1.9
1976	-	0.4	0.9	1.2	0.9	0.6	0.1	-	4.1
1977	-	0.3	0.4	2.7	0.6	0.3	0.1	-	4.3
1978	-	0.1	0.2	1.0	0.4	0.3	0.1	d/	2.0
1979	-	0.1	d/	0.8	1.5	d/	d/	-	2.4
1980	-	0.1	d/	0.5	0.8	0.1	d/	-	1.6
1981	-	0.2	d/	1.0	0.7	d/	d/	-	1.9
1982	-	0.3	d/	0.6	d/	d/	d/	-	0.9
1983	-	0.2	d/	d/	0.2	0.1	d/	-	0.6
1984	-	d/	d/	d/	0.1	d/	0	-	0.2
1985[e]	-	0.2	d/	0.1	0.2	d/	d/	-	0.4
Tillamook Area									
1971-1975 Average	d/	d/	0.8	2.6	2.8	0.5	d/	-	6.8
1976	-	d/	2.3	3.3	3.7	0.6	0.1	-	10.0
1977	-	d/	1.4	7.3	1.9	0.4	0.1	-	11.0
1978	-	d/	1.5	3.4	1.5	0.4	0.1	d/	6.9
1979	-	d/	d/	3.1	2.8	d/	d/	-	6.0
1980	-	d/	0.1	1.4	3.3	0.3	d/	-	5.1
1981	-	d/	-	4.1	2.7	0.1	d/	-	7.0
1982	-	0.1	d/	2.4	0.3	0.1	0.1	-	3.0
1983	-	d/	d/	1.0	1.1	0.2	0.2	-	2.5
1984	-	d/	d/	0.1	0.4	d/	d/	-	0.5
1985[e]	-	d/	0.1	0.5	0.5	0.1	0.1	-	1.3
Newport Area									
1971-1975 Average	d/	0.1	1.8	4.3	5.6	1.7	0.5	-	14.6
1976	-	0.2	3.6	8.1	8.4	2.2	0.9	-	23.4
1977	-	0.7	1.9	10.8	5.5	1.2	0.2	-	20.2
1978	-	0.1	2.0	5.5	3.6	1.3	0.4	d/	12.7
1979	-	0.3	d/	5.9	5.4	0.2	0.1	d/	11.8
1980	-	0.3	0.6	2.0	3.8	0.5	0.2	d/	7.3
1981	-	0.5	d/	3.7	3.9	d/	0.1	-	8.3
1982	-	0.3	0.3	3.0	0.2	0.2	0.2	-	4.2
1983	-	0.1	0.1	3.0	1.4	0.3	0.1	d/	5.0
1984	-	d/	0.1	0.4	0.3	d/	0		0.8
1985[e]		0.4	0.3	0.8	0.5	0.1	0.1	-	2.2

Table II-1. (continued)

Catch Area[a/] Year	April	May	June	July	August	September	October	November	Season[b/]
				DELIVERIES (thousands)					
Coos Bay Area[c/]									
1971-1975 Average	d/	0.1	2.7	6.6	4.7	1.7	0.6	d/	16.4
1976	-	0.4	5.3	11.3	8.7	2.6	0.2	-	28.5
1977	-	1.0	3.3	20.8	7.5	1.9	0.4	-	35.0
1978	d/	0.3	3.1	7.1	3.2	1.1	0.2	d/	15.0
1979	-	0.7	d/	8.2	5.8	0.3	0.3	-	15.3
1980	-	0.3	1.3	2.8	3.8	0.7	0.4	d/	9.3
1981	-	0.5	d/	5.8	4.2	0.1	0.1	d/	10.7
1982	-	0.7	0.7	6.6	1.7	0.6	0.2	d/	10.7
1983	-	0.4	0.5	4.7	0.2	0.1	0.1	-	5.9
1984	-	0.1	0.2	0.6	0.9	0.1	0		1.9
1985[e/]	-	1.3	1.5	3.8	3.2	1.1	0.3	-	11.1
Brookings Area									
1971-1975 Average	d/	0.1	0.9	2.1	1.1	0.7	0.9	0.2	5.9
1976	-	d/	1.0	2.8	2.7	1.2	1.6	0.6	9.9
1977	-	0.2	0.6	7.7	2.5	1.3	1.2	0.9	14.5
1978	-	0.1	1.3	2.4	1.5	1.5	1.3	1.0	9.1
1979	-	d/	d/	2.7	2.8	0.7	1.2	0.7	8.1
1980	-	0.5	0.3	0.9	2.0	1.5	0.8	0.5	6.6
1981	-	0.5	d/	1.5	3.0	0.8	1.0	0.5	7.3
1982	-	0.3	0.2	2.6	2.6	0.7	0.8	0.6	7.8
1983	-	0.2	0.5	1.4	0.5	d/	0.7	0.1	3.4
1984	-	0.1	d/	0.5	1.1	d/	0.2	0.1	2.1
1985[e/]	-	d/	d/	0.1	0.1	0.1	0.2	0.2	0.7
All Areas									
1971-1975 Average	0.1	0.5	6.6	16.6	14.6	5.0	2.1	0.2	45.6
1976	-	0.9	13.1	26.5	24.3	7.4	3.0	0.6	75.8
1977	-	2.3	7.6	49.3	18.0	5.0	2.0	0.9	85.1
1978	d/	0.5	8.0	14.3	10.2	4.5	2.0	1.0	45.7
1979	-	1.1	d/	20.8	18.2	1.2	1.6	0.7	43.6
1980	-	1.3	2.2	7.5	13.6	3.3	1.5	0.5	29.9
1981	-	1.8	d/	16.1	14.5	1.1	1.2	0.5	35.1
1982	-	1.7	1.5	15.1	4.8	1.7	1.3	0.6	26.5
1983	-	1.0	1.1	10.1	3.4	0.7	1.0	0.1	17.4
1984	-	0.3	0.3	1.6	2.8	0.2	0.3	0.1	5.6
1985[e/]	-	2.0	1.9	5.2	4.5	1.4	0.6	0.2	15.7

Table II-1. (continued)

Catch Area[a/] Year	April	May	June	July	August	September	October	November	Season[b/]
				VESSEL DAYS (thousands)					
Columbia River[c/]									
1971-1975 Average	NA	NA	NA	NA	NA	NA	NA	NA	NA
1976	NA	NA	NA	NA	NA	NA	NA	NA	NA
1977	NA	NA	NA	NA	NA	NA	NA	NA	NA
1978	NA	NA	NA	NA	NA	NA	NA	NA	NA
1979	d/	d/	d/	0.9	1.5	d/	d/	NA	2.4
1980	d/	0.2	d/	0.6	0.7	0.1	d/	NA	1.7
1981	d/	0.5	d/	1.1	0.8	NA	d/	NA	2.5
1982	d/	0.3	0.1	0.4	NA	NA	NA	NA	0.8
1983	d/	0.4	0.1	0.1	0.3	0.2	NA	NA	1.1
1984	NA	0.1	NA	NA	0.4	NA	NA	NA	0.5
1985[e/]	NA	0.4	NA	NA	0.3	NA	NA	NA	0.6
Tillamook Area									
1971-1975 Average	NA	NA	NA	NA	NA	NA	NA	NA	NA
1976	NA	NA	NA	NA	NA	NA	NA	NA	NA
1977	NA	NA	NA	NA	NA	NA	NA	NA	NA
1978	NA	NA	NA	NA	NA	NA	NA	NA	NA
1979	d/	d/	NA	3.6	2.6	d/	d/	NA	6.3
1980	NA	0.1	0.1	2.0	3.3	0.4	d/	NA	6.0
1981	NA	0.2	d/	5.6	2.7	0.1	d/	NA	3.6
1982	NA	0.2	0.1	2.8	0.3	0.1	0.1	NA	3.6
1983	NA	0.1	0.1	1.1	1.3	0.3	0.2	d/	3.0
1984	NA	d/	d/	0.1	0.3	0.1	d/	NA	0.5
1985[e/]	NA	d/	0.1	0.6	0.5	0.1	0.1	NA	1.4
Newport Area									
1971-1975 Average	NA	NA	NA	NA	NA	NA	NA	NA	NA
1976	NA	NA	NA	NA	NA	NA	NA	NA	NA
1977	NA	NA	NA	NA	NA	NA	NA	NA	NA
1978	NA	NA	NA	NA	NA	NA	NA	NA	NA
1979	d/	0.3	d/	7.0	5.0	0.2	0.2	NA	12.8
1980	d/	0.6	1.1	3.5	4.0	0.9	0.6	NA	10.7
1981	d/	1.2	d/	5.1	4.5	0.1	0.1	NA	11.0
1982	d/	0.6	0.7	3.6	0.3	0.3	0.4	NA	5.8
1983	d/	0.2	0.3	4.0	1.9	0.5	0.2	d/	7.1
1984	NA	0.1	0.2	0.9	0.8	d/	NA	NA	1.9
1985[e/]	NA	0.9	0.4	1.6	0.9	0.1	0.1	NA	4.1

Table II-1. (continued)

Catch Area[a/] Year	April	May	June	July	August	September	October	November	Season[b/]
				VESSEL DAYS (thousands)					
Coos Bay Area									
1971-1975 Average	NA	NA	NA	NA	NA	NA	NA	NA	NA
1976	NA	NA	NA	NA	NA	NA	NA	NA	NA
1977	NA	NA	NA	NA	NA	NA	NA	NA	NA
1978	NA	NA	NA	NA	NA	NA	NA	NA	NA
1979	0.1	0.6	0.2	9.5	5.5	0.4	0.5	NA	16.8
1980	d/	0.4	2.0	4.6	3.6	1.2	0.7	d/	12.4
1981	d/	0.6	d/	7.4	5.1	0.2	0.2	d/	13.4
1982	d/	0.7	1.0	8.4	2.1	1.1	0.3	d/	13.6
1983	d/	0.5	0.7	5.5	0.1	0.1	0.1	d/	6.9
1984	NA	0.1	0.2	0.7	1.2	0.1	NA	NA	2.3
1985[e/]	NA	1.7	1.6	4.0	4.8	1.5	0.5	NA	14.0
Brookings Area									
1971-1975 Average	NA	NA	NA	NA	NA	NA	NA	NA	NA
1976	NA	NA	NA	NA	NA	NA	NA	NA	NA
1977	NA	NA	NA	NA	NA	NA	NA	NA	NA
1978	NA	NA	NA	NA	NA	NA	NA	NA	NA
1979	d/	d/	0.1	3.4	3.6	0.7	1.4	0.6	9.9
1980	d/	0.7	0.3	1.4	2.4	2.0	1.1	0.5	8.3
1981	d/	0.7	d/	1.9	3.5	1.2	1.6	0.4	9.3
1982	d/	0.3	0.2	2.9	2.9	0.9	1.1	0.6	8.9
1983	d/	0.2	0.7	1.6	0.3	0.1	0.7	0.1	3.7
1984	NA	0.2	d/	0.4	1.6	d/	0.2	0.2	2.6
1985[e/]	NA	d/	0	d/	0.1	0.1	0.2	0.2	0.6
All Areas									
1971-1975 Average	NA	NA	NA	NA	NA	NA	NA	NA	NA
1976	NA	NA	NA	NA	NA	NA	NA	NA	NA
1977	NA	NA	NA	NA	NA	NA	NA	NA	NA
1978	NA	NA	NA	NA	NA	NA	NA	NA	NA
1979	0.1	1.0	0.3	24.4	18.2	1.3	2.2	0.6	48.2
1980	d/	2.0	3.4	12.2	4.0	4.5	2.3	0.5	39.1
1981	0.1	3.1	0.1	21.1	16.7	1.5	1.9	0.4	44.8
1982	0.1	2.2	2.0	13.1	5.6	2.4	1.9	0.6	32.8
1983	d/	1.4	1.8	12.2	3.8	1.1	1.2	0.1	21.7
1984	NA	0.4	0.4	2.1	4.3	0.2	0.3	0.2	7.8
1985[e/]	NA	3.0	2.1	6.1	6.6	1.9	0.9	0.2	20.8

a/ Port of landing data used prior to 1980.
b/ Season totals may vary from monthly summation due to rounding.
c/ Columbia River area includes Oregon ports from Astoria through Nehalem Bay; Tillamook area, Garibaldi through Pacific City; Newport area, Depoe Bay through Yachats; Coos Bay area, Florence through Bandon; Brookings area, Port Orford to Oregon-California border.
d/ Less than 50.
e/ Preliminary.

Table II-1. (continued)

Catch Area[a/] Year	April	May	June	July	August	September	October	November	Season[b/]
				COHO LANDINGS (thousands of fish)					
Columbia River[c/]									
1971-1975 Average	-	-	19.2	21.9	15.4	5.5	0.3	-	62.3
1976	-	-	70.1	64.6	23.0	19.2	1.7	-	176.7
1977	-	-	26.7	38.4	5.6	2.2	0.4	-	73.1
1978	-	-	17.8	26.8	8.1	2.2	1.1	-	56.2
1979	-	-	d/	27.8	19.9	1.0	-	-	48.7
1980	-	-	-	14.9	7.8	0.7	-	-	23.5
1981	-	-	-	29.8	12.1	-	-	-	41.9
1982	-	-	-	24.1	-	-	-	-	24.1
1983	-	-	-	0.2	2.2	2.5	-	-	4.9
1984	-	-	-	-	13.9	-	-	-	13.9
1985[e/]	-	-	-	-	18.3	-	-	-	18.3
Tillamook Area									
1971-1975 Average	-	-	17.9	53.4	58.7	4.2	0.1	-	136.3
1976	-	-	87.5	145.1	67.5	7.1	0.2	-	307.5
1977	-	-	21.6	60.5	14.2	1.9	0.1	-	98.4
1978	-	-	40.7	39.6	12.0	1.1	0.1	-	93.4
1979	-	-	-	56.2	21.7	d/	-	-	77.9
1980	-	-	-	36.1	43.2	1.3	-	-	80.6
1981	-	-	-	117.8	42.6	-	-	-	160.4
1982	-	-	-	114.7	-	-	-	-	114.8
1983	-	-	-	43.3	18.3	1.7	-	-	63.3
1984	-	-	-	-	-	-	-	-	-
1985[e/]	-	-	-	1.6	-	-	-	-	1.6
Newport Area									
1971-1975 Average	-	-	46.4	101.2	121.0	10.7	1.4	-	280.7
1976	-	-	99.9	175.6	148.2	18.1	3.7	-	445.6
1977	-	-	8.6	61.0	30.4	2.6	0.2	-	102.7
1978	-	-	73.3	68.6	41.8	2.6	0.1	-	186.5
1979	-	-	-	159.4	51.8	0.5	-	-	211.8
1980	-	-	-	86.9	45.3	5.2	-	-	137.3
1981	-	-	-	77.9	114.5	-	-	-	192.4
1982	-	-	-	117.8	-	-	-	-	117.8
1983	-	-	-	99.5	14.3	4.2	-	-	118.0
1984	-	-	-	-	-	-	-	-	-
1985[e/]	-	-	-	12.6	-	-	-	-	12.6

Table II-1. (continued)

Catch Area[a/] Year	April	May	June	July	August	September	October	November	Season[b/]
				COHO LANDINGS (thousands of fish)					
Coos Bay Area									
1971-1975 Average	-	d/	107.1	169.5	91.1	7.8	1.4	-	377.0
1976	-	-	195.2	423.7	152.4	6.9	0.4	-	778.6
1977	-	-	33.8	85.2	26.7	2.6	0.3	-	148.6
1978	-	-	120.3	74.0	20.7	2.3	0.1	-	217.4
1979	-	-	6.5	219.0	37.6	0.1	-	-	263.1
1980	-	-	-	71.9	23.0	4.3	-	-	99.2
1981	-	-	-	96.7	64.7	-	-	-	161.4
1982	-	-	-	227.9	-	-	-	-	227.9
1983	-	-	-	109.7	-	d/	-	-	109.7
1984	-	-	-	-	-	-	-	-	-
1985[e/]	-	-	-	29.4	-	-	-	-	29.4
Brookings Area									
1971-1975 Average	-	d/	35.4	68.1	19.6	1.4	1.1	d/	124.7
1976	-	-	24.1	74.6	17.3	1.9	0.3	d/	118.7
1977	-	-	1.3	18.7	2.9	0.3	d/	-	23.2
1978	-	-	27.5	18.2	10.2	2.2	0.2	d/	58.2
1979	-	-	1.8	86.4	13.1	0.1	-	-	101.2
1980	-	-	-	15.7	14.4	3.4	-	-	33.5
1981	-	-	-	18.2	35.3	-	-	-	53.5
1982	-	-	-	22.3	-	-	-	-	22.3
1983	-	-	-	22.5	-	-	-	-	22.5
1984	-	-	-	-	-	-	-	-	-
1985[e/]	-	-	-	0.2	-	-	-	-	0.2
All Areas									
1971-1975 Average	-	d/	226.0	414.1	305.8	29.6	3.3	d/	981.0
1976	-	-	476.8	883.6	408.9	51.2	6.3	d/	1,827.0
1977	-	-	92.0	263.8	79.8	9.6	1.0	-	446.1
1978	-	-	279.6	227.2	92.8	10.4	1.6	d/	611.6
1979	-	-	8.3	548.8	144.1	1.5	-	-	702.7
1980	-	-	-	225.5	133.7	14.9	-	-	374.2
1981	-	-	-	340.4	269.2	-	-	-	609.6
1982	-	-	-	506.6	-	-	-	-	506.6
1983	-	-	-	275.2	34.8	8.4	-	-	318.4
1984	-	-	-	-	13.9	-	-	-	13.9
1985[e/]	-	-	-	43.8	18.3	-	-	-	62.1

a/ Port of landing data used prior to 1980.
b/ Season totals may vary from monthly summation due to rounding.
c/ Columbia River area includes Oregon ports from Astoria through Nehalem Bay; Tillamook area, Garibaldi through Pacific City; Newport area, Depoe Bay through Yachats; Coos Bay area, Florence through Bandon; Brookings area, Port Orford to Oregon-California border.
d/ Less than 50.
e/ Preliminary.
f/ Late season fishery for chinook in state waters off Elk and Chetco rivers only (began in 1974). Average for November includes only 1974-1975, thus season totals do not agree with the 1971-1975 average in Table II-8.

Table II-2. Washington non-Indian troll effort (days fished) and catch of chinook, coho, and pink salmon (thousands of fish) by statistical month and catch area for 1976-1985 and 1971-1975 average (1973-1975 average for days fished).[a/]

	May[b/]	June	July	August	September[c/]	Total
			DAYS FISHED (thousands)			
Cape Flattery[d/]						
1973-1975 Average	0.3	1.1	2.6	2.9	1.9	8.8
1976	0.1	0.7	2.9	3.8	2.2	9.6
1977	0.4	0.6	3.6	4.8	2.5	12.0
1978	0.4	0.6	3.2	3.6	2.3	10.2
1979	1.2	0.1	3.7	6.1	0.1	11.1
1980	1.2	0.2	1.9	2.7	e/	6.0
1981	1.0	e/	2.6	3.6	e/	7.2
1982	0.4	0.1	2.9	0.1	e/	3.5
1983	0.5	e/	1.0	1.0	e/	2.6
1984	0.1	e/	e/	0.3	e/	0.4
1985	0.2	0.0	0.1	1.3	e/	1.7
Quillayute						
1973-1975 Average	0.9	1.8	5.5	4.1	2.9	15.1
1976	0.4	1.5	4.5	4.6	2.1	13.1
1977	0.8	0.6	5.0	3.6	1.0	11.1
1978	0.4	0.5	4.0	3.0	1.5	9.4
1979	0.9	0.1	3.1	4.3	e/	8.4
1980	0.4	e/	2.5	2.6	e/	5.4
1981	0.5	e/	1.8	1.8	e/	4.2
1982	0.1	e/	1.9	0.0	e/	2.0
1983	0.2	e/	0.5	0.2	e/	0.9
1984	e/	e/	e/	e/	e/	e/
1985	e/	0.0	0.5	0.1	e/	0.7
Grays Harbor						
1973-1975 Average	2.7	2.5	5.2	3.4	4.2	18.2
1976	2.8	3.5	6.3	4.9	4.7	22.3
1977	2.2	1.7	6.7	4.1	3.8	18.4
1978	2.0	1.4	4.4	2.4	2.6	12.9
1979	2.1	e/	4.7	6.2	e/	13.1
1980	2.3	e/	3.2	3.6	e/	9.0
1981	2.8	e/	3.9	3.4	e/	10.1
1982	2.8	0.5	5.0	e/	e/	8.3
1983	2.7	0.4	1.2	e/	e/	4.3
1984	0.4	e/	e/	e/	e/	0.4
1985	1.9	e/	1.1	0.0	e/	3.0
Columbia River						
1973-1975 Average	1.0	1.2	3.3	3.1	1.5	10.1
1976	0.9	0.9	4.4	3.7	3.0	13.9
1977	1.2	0.5	4.0	3.1	2.6	11.3
1978	0.2	0.4	3.0	1.6	2.3	7.4
1979	0.5	e/	3.3	3.8	e/	7.6
1980	0.7	0.0	1.4	2.3	0.5	4.8
1981	0.9	e/	1.9	1.7	e/	4.5
1982	0.9	0.1	1.3	e/	e/	2.3
1983	0.6	0.2	0.1	0.6	0.6	2.1
1984	e/	e/	e/	0.2	e/	0.2
1985	0.5	0.0	0.0	0.3	e/	0.8
Total						
1973-1975 Average	5.0	6.6	16.6	13.6	10.5	52.2
1976	4.4	7.6	18.0	17.0	11.9	58.9
1977	4.6	3.3	19.3	15.7	9.9	52.8
1978	2.9	2.9	14.6	10.7	8.7	39.9
1979	4.7	0.2	14.8	20.4	0.2	40.2
1980	4.5	0.2	8.9	11.1	0.5	25.2
1981	5.2	e/	10.2	10.5	e/	26.0
1982	4.3	0.7	11.1	0.1	e/	16.1
1983	4.0	0.6	2.8	1.8	0.6	9.8
1984	0.6	e/	e/	0.5	e/	1.1
1985	2.6	e/	1.8	1.7	e/	6.2

Table II-2. (continued)

	May[b/]	June	July	August	September[c/]	Total
			COHO LANDINGS (thousands of fish)			
Cape Flattery[d/]						
1971-1975 Average	0.0	17.9	41.9	47.1	19.4	126.3
1976	0.0	19.0	99.6	62.0	35.3	216.0
1977	0.0	e/	63.1	74.3	51.3	188.7
1978	0.0	e/	67.1	51.4	45.6	164.1
1979	0.0	0.2	74.8	69.6	1.0	143.5
1980	0.0	0.0	32.4	36.7	e/	69.0
1981	0.0	0.0	46.3	48.6	e/	95.0
1982	0.0	0.0	84.2	14.3	0.2	98.7
1983	0.0	0.0	1.8	0.7	e/	2.6
1984	0.0	0.0	0.0	16.9	0.0	16.9
1985	0.0	0.0	0.0	e/	0.0	e/
Quillayute						
1971-1975 Average	0.0	49.5	119.3	65.7	21.5	256.0
1976	0.0	46.4	208.0	110.2	39.2	403.8
1977	0.0	e/	106.1	53.7	19.4	179.2
1978	0.0	e/	96.9	34.9	30.4	162.2
1979	0.0	0.5	81.0	74.2	0.8	156.4
1980	0.0	0.0	71.1	43.9	0.0	115.0
1981	0.0	0.0	38.6	18.3	0.0	56.9
1982	0.0	0.0	46.8	e/	0.0	46.8
1983	0.0	0.0	1.0	0.3	0.0	1.3
1984	0.0	0.0	0.0	0.0	0.0	e/
1985	0.0	0.0	32.5	0.0	0.0	32.5
Grays Harbor						
1971-1975 Average	0.0	48.7	97.2	51.1	38.2	235.3
1976	0.0	69.5	191.9	86.5	53.4	401.4
1977	0.0	0.27	137.4	39.7	12.3	189.7
1978	0.0	e/	92.8	14.0	21.8	128.6
1979	0.0	0.1	128.8	85.8	0.7	215.4
1980	0.0	0.1	65.3	37.2	0.0	102.6
1981	0.0	0.0	90.2	32.4	0.0	122.7
1982	0.0	0.0	49.0	0.2	e/	49.3
1983	0.0	0.0	1.1	0.2	0.0	1.3
1984	0.0	0.0	0.0	0.0	0.0	e/
1985	0.0	0.0	81.8	0.0	0.0	81.8
Columbia River						
1971-1975 Average	0.0	44.5	89.8	66.6	31.1	232.0
1976	0.0	92.9	130.1	62.9	40.3	326.1
1977	0.0	1.9	62.6	18.3	16.2	99.0
1978	0.0	e/	56.2	12.1	23.5	91.8
1979	0.0	0.1	79.3	31.5	1.7	112.6
1980	0.0	0.0	30.3	20.2	4.7	55.1
1981	0.0	0.0	45.3	29.5	1.8	76.5
1982	0.0	0.0	44.0	e/	e/	44.0
1983	0.0	0.0	0.1	4.9	13.4	18.4
1984	0.0	0.0	0.0	6.5	0.0	6.5
1985	0.0	0.0	0.0	14.2	e/	14.2
Total[d/]						
1971-1975 Average	0.0	160.6	348.2	230.5	110.3	849.6
1976	0.0	227.7	629.6	321.7	168.3	1,347.3
1977	0.0	2.2	369.2	185.9	99.2	656.6
1978	0.0	e/	313.0	112.4	121.3	546.7
1979	0.0	0.9	363.9	261.1	4.2	630.1
1980	0.0	0.0	199.0	138.0	4.8	341.8
1981	0.0	0.0	219.1	128.8	1.8	351.0
1982	0.0	0.0	224.4	14.7	0.1	239.1
1983	0.0	0.0	4.0	6.1	13.4	23.5
1984	0.0	0.0	0.0	23.4	0.0	23.4
1985	0.0	0.0	114.3	14.3	0.0	128.6

a/ Summary of WDF fish receiving ticket information by statistical month, excluding Washington landings from Oregon, California, and Alaska. Data for 1984-1985 are preliminary. Does not include effort or catch from Oregon or California landings.
b/ May catch and effort includes pre-May data.
c/ September catch and effort includes post-September data.
d/ Cape Flattery area includes catches from Strait of Juan de Fuca.

Table II-3. Catch delivery and statistics by statistical month and port of landing for treaty Indian troll fisheries, 1976-1985.

Year	January-April	May	June	July	August	September	October	November-December	Total May-September	Year Total
					DELIVERIES					
Area 48										
1976	516	47	28	23	11	4	0	61	113	690
1977	609	29	69	37	62	41	3	82	238	932
1978	812	114	118	27	74	42	10	112	375	1,309
1979	479	68	60	61	85	16	2	102	290	873
1980	665	13	6	19	12	11	4	122	61	852
1981	839	106	60	37	54	19	10	223	276	1,348
1982	1,097	109	57	48	103	31	26	77	348	1,548
1983	1,495	284	135	106	107	16	10	112	645	2,262
1984	1,104	130	51	23	5	1	27	88	210	1,429
1985	668	134	0	22	3	7	31	73	166	938
Cape Flattery										
1972-1975 Average	4	31	64	108	97	45	8	1	345	358
1976	0	3	51	210	89	37	6	9	390	405
1977	10	71	79	51	108	38	0	0	347	357
1978	1	3	31	56	8	11	0	0	109	110
1979	7	10	11	59	44	4	1	0	128	136
1980	0	0	140	89	13	14	0	0	256	256
1981	0	4	41	118	56	190	3	0	409	412
1982	0	6	242	461	389	555	16	0	1,653	1,669
1983	0	11	230	143	410	337	0	0	1,131	1,131
1984	0	37	30	120	208	0	6	0	395	401
1985	0	27	29	218	235	125	0	0	634	634
Quillayute										
1972-1975 Average	2	18	19	77	56	36	11	0	206	219
1976	0	2	23	35	19	6	2	0	85	87
1977	0	4	8	37	36	16	0	0	101	101
1978	0	5	17	25	12	13	0	0	72	72
1979	2	11	15	30	29	0	0	0	85	87
1980	1	26	60	37	14	0	0	0	137	138
1981	0	21	30	63	15	114	4	2	243	249
1982	0	5	61	36	128	51	0	0	281	281
1983	0	17	30	30	31	0	0	0	108	108
1984	0	4	1	35	49	0	0	0	89	89
1985	0	2	11	69	58	14	0		154	154
Grays Harbor										
1972-1975 Average	10	4	12	22	14	12	26	1	64	101
1976	0	4	3	4	0	0	0	0	11	11
1977	0	0	0	0	6	2	0	0	8	8
1978	0	0	0	2	0	0	0	0	2	2
1979	0	1	0	27	26	0	0	0	54	54
1980	0	0	1	10	13	0	0	0	24	24
1981	0	2	19	59	14	0	0	0	94	94
1982	0	80	24	46	27	7	0	0	184	184
1983	0	3	5	0	1	0	0	0	9	9
1984	0	6	1	2	50	0	0	0	59	59
1985	0	22	5	29	28	1	0	0	85	85
Total Treaty Troll Deliveries										
1972-1975 Average	380	171	169	240	176	96	49	96	852	1,377
1976	516	56	105	272	119	47	8	70	599	1,193
1977	619	104	156	125	212	97	3	82	694	1,398
1978	813	122	166	110	94	66	10	112	558	1,493
1979	488	90	86	177	184	20	3	102	557	1,150
1980	666	39	207	155	52	25	4	122	478	1,270
1981	839	133	150	277	139	323	17	225	1,022	2,103
1982	1,097	200	384	591	647	644	42	77	2,466	3,682
1983	1,495	315	400	276	549	353	10	112	1,893	3,510
1984	1,104	177	83	180	312	1	33	88	753	1,978
1985	668	185	45	338	324	147	31	73	1,039	1,811

Table 11-3. (continued)

Year	January-April	May	June	July	August	September	October	November-December	Total May-September	Year Total
					COHO LANDINGS					
Area 48										
1975	0	0	132	548	82	4	1	2	766	769
1976	0	0	48	27	26	13	6	4	114	124
1977	0	50	35	97	432	248	4	4	862	870
1978	1,805	53	910	119	116	362	8	266	1,560	3,639
1979	175	7	1,443	629	677	95	3	30	2,854	3,062
1980	52	3	59	81	7	40	6	3	190	251
1981	117	1,129	454	453	616	180	13	14	2,832	2,976
1982	37	33	232	912	2,356	559	41	9	4,092	4,179
1983	30	61	209	1,263	1,894	143	17	4	3,570	3,621
1984	19	0	0	1,180	44	12	65	5	1,236	1,325
1985	6	0	25	152	85	95	35	7	357	405
Cape Flattery										
1972-1975 Average	0	0	1,007	1,335	1,285	434	9	0	4,061	4,070
1976	0	0	634	3,110	1,043	79	10	10	4,866	4,886
1977	0	191	115	692	540	182	0	0	1,720	1,720
1978	5	0	486	824	24	133	0	0	1,467	1,472
1979	0	2	495	789	224	11	1	0	1,521	1,522
1980	0	78	14,466	3,511	113	650	0	0	18,818	18,818
1981	0	23	2,503	2,730	740	9,673	19	0	15,669	15,688
1982	0	1	9,663	18,005	24,871	38,782	61	0	91,322	91,383
1983	0	26	2,430	2,362	11,842	11,221	0	0	27,881	27,881
1984	0	0	165	13,878	16,243	0	76	0	30,283	30,362
1985	0	1	1,214	14,945	21,231	15,557	0	0	52,948	52,948
Quillayute										
1972-1975 Average	0	4	838	1,480	765	487	19	0	3,574	3,593
1976	0	0	403	1,287	481	32	2	0	2,203	2,205
1977	0	0	1,644	2,137	506	90	0	0	4,377	4,377
1978	0	94	733	1,720	110	318	0	0	2,975	2,975
1979	41	1,213	2,627	970	724	0	0	0	5,534	5,575
1980	0	1,981	7,844	2,430	202	0	0	0	12,457	12,457
1981	0	132	3,071	3,425	362	3,772	0	0	10,762	10,762
1982	0	0	5,254	2,672	10,029	5,716	0	0	23,671	23,671
1983	0	0	2,047	1,495	2,429	0	0	0	5,971	5,971
1984	0	0	0	2,079	7,803	0	0	0	9,882	9,882
1985	0	0	429	14,324	10,546	4,416	0	0	29,715	29,715
Grays Harbor										
1972-1975 Average	0	0	526	1,263	252	60	203	3	2,101	2,307
1976	0	0	135	8	0	0	0	0	143	143
1977	0	0	0	0	7	6	0	0	13	13
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	6	184	0	0	0	190	190
1980	0	0	0	341	41	0	0	0	382	382
1981	0	0	668	1,426	29	0	0	0	2,123	2,123
1982	0	3	455	886	140	87	0	0	1,571	1,571
1983	0	1	303	15	3	0	0	0	322	322
1984	0	0	0	436	1,352	0	0	0	1,788	1,788
1985	0	0	146	3,687	391	0	0	0	4,224	4,224
Total Treaty Troll Coho Landings										
1972-1975 Average	0	4	2,503	4,626	2,384	985	232	5	10,502	10,739
1976	0	0	1,220	4,432	1,550	124	18	14	7,326	7,358
1977	0	241	1,794	2,926	1,485	526	4	4	6,972	6,980
1978	1,810	147	2,129	2,663	250	813	8	266	6,002	8,086
1979	216	1,222	4,565	2,394	1,809	109	4	30	10,099	10,349
1980	52	2,062	22,369	6,363	363	690	6	3	31,847	31,908
1981	117	1,284	6,696	8,034	1,747	13,625	32	14	31,386	31,549
1982	37	37	15,604	22,475	37,396	45,144	102	9	120,656	120,804
1983	30	88	4,989	5,135	16,168	11,364	17	4	37,744	37,795
1984	19	0	165	17,573	25,442	12	141	5	43,192	43,357
1985	6	1	1,814	33,108	32,253	20,068	35	7	87,244	87,292

Table II-4. Oregon ocean recreational effort in salmon angler trips and chinook and coho landings (thousands of fish) by catch area and month for 1976-1985, with 1974-1975 average.

Catch Area[a/] Year	April	May	June	July	August	September	October	November	Season[b/]
				ANGLER TRIPS (thousands)					
Columbia River									
1974-1975 Average	NA	NA	NA	NA	NA	NA	NA	NA	75.9
1976									
1977									
1978	NA	NA	NA	NA	NA	NA	NA	NA	63.4
1979	-	0.8	5.0	14.8	19.7	2.9	-	-	43.3
1980	-	1.3	7.8	13.7	19.7	3.8	-	-	46.3
1981	-	1.0	4.9	14.1	20.1	4.6	-	-	44.7
1982	-	-	4.9	22.3	-	-	-	-	27.2
1983	-	-	2.7	12.9	11.5	3.8	-	-	30.9
1984	-	-	-	2.0	5.1	-	-	-	7.1
1985[c/]	-	-	0.6	7.8	11.6	-	-	-	20.0
Tillamook Area									
1974-1975 Average	NA	NA	NA	NA	NA	NA	NA	NA	40.9
1976									
1977									
1978	NA	NA	NA	NA	NA	NA	NA	NA	31.7
1979	-	0.9	3.2	11.8	14.5	0.6	-	-	31.0
1980	-	0.4	8.5	17.3	18.1	3.6	-	-	47.8
1981	-	1.3	2.2	11.5	16.5	6.6	-	-	38.0
1982	-	0.1	2.7	21.8	-	-	-	-	24.6
1983	-	-	1.2	12.6	7.8	3.7	-	-	25.3
1984	-	-	-	11.8	10.8	1.2	-	-	23.8
1985[c/]	-	-	-	13.0	21.7	2.2	1.6		38.6
Newport Area									
1974-1975 Average	NA	NA	NA	NA	NA	NA	NA	NA	91.3
1976									
1977									
1978	NA	NA	NA	NA	NA	NA	NA	NA	115.6
1979	-	2.0	8.2	33.2	28.7	0.2	-	-	72.4
1980	-	1.8	16.7	39.0	22.6	3.8	-	-	83.9
1981	-	2.3	8.2	27.6	31.7	7.5	-	-	77.3
1982	-	0.2	7.3	46.0	-	-	-	-	53.5
1983	-	-	3.6	22.8	10.9	5.2	-	-	42.6
1984	-	-	-	24.0	19.2	0.8	-	-	44.0
1985[c/]	-	-	-	24.3	44.4	1.8	-	-	70.6

Table II-4. (continued)

Catch Area[a/] Year	April	May	June	July	August	September	October	November	Season[b/]
				ANGLER TRIPS (thousands)					
Coos Bay Area									
1974-1975 Average	NA	NA	NA	NA	NA	NA	NA	NA	104.3
1976									
1977									
1978	NA	NA	NA	NA	NA	NA	NA	NA	104.4
1979	-	4.8	21.5	42.9	25.2	0.3	-	-	94.7
1980	-	2.2	32.1	46.2	14.3	2.6	-	-	97.4
1981	-	6.6	13.9	35.2	22.7	5.5	-	-	83.9
1982	-	0.1	12.0	47.3	-	-	-	-	59.4
1983	-	-	14.2	36.9	13.6	6.9	-	-	71.6
1984	-	-	-	22.0	17.9	0.3	-	-	40.2
1985[c/]	-	-	-	33.1	29.2	1.2	-	-	63.5
Brookings Area									
1974-1975 Average	NA	NA	NA	NA	NA	NA	NA	NA	59.2
1976									
1977									
1978	NA	NA	NA	NA	NA	NA	NA	NA	88.6
1979	-	0.3	4.9	27.1	18.5	3.3	5.0	0.9	59.9
1980	-	0.2	13.3	23.9	10.0	5.3	2.9	0.4	56.0
1981	-	2.7	16.5	23.7	19.3	2.3	2.3	0.3	67.1[c/]
1982	-	0.4	5.2	39.7	10.2	3.0	2.6	0.3	61.4
1983	-	0.8	9.8	22.7	11.2	6.1	5.0	0.1	55.7
1984	-	-	-	15.1	16.8	2.9	3.1	-	38.0
1985[c/]	-	4.6	-	28.5	19.3	2.6	4.0	-	59.0
All Areas									
1974-1975 Average	1.8	9.8	39.3	124.7	129.8	61.3	5.1	-	371.7
1976									
1977									
1978	NA	NA	NA	NA	NA	NA	NA	NA	403.7
1979	-	8.9	42.8	129.8	106.7	7.3	5.0	0.9	301.3
1980	-	5.9	78.4	140.0	84.7	19.1	2.9	0.4	331.4
1981	-	13.8	45.7	112.2	110.3	26.4	2.3	0.3	311.0
1982	-	0.7	32.1	177.1	10.2	3.0	2.6	0.3	226.0
1983	-	0.8	31.5	108.0	55.1	25.5	5.0	0.1	226.0
1984	-	-	-	74.9	69.8	5.3	3.1	-	153.1
1985[c/]	-	4.6	0.6	106.8	126.2	7.8	5.6	-	251.6

Table II-4. (continued)

Catch Area[a/] Year	April	May	June	July	August	September	October	November	Season[b/]
				COHO LANDINGS[d/] (thousands of fish)					
Columbia River									
1974-1975 Average	0.2	0.8	3.9	17.6	35.0	11.7	0.1	-	70.7
1976	NA	NA	NA	NA	NA	NA	NA	NA	116.7
1977	NA	NA	NA	NA	NA	NA	NA	NA	55.3
1978	NA	NA	NA	NA	NA	NA	NA	NA	60.2
1979	-	0.4	6.5	13.3	16.3	1.5	-	-	38.0
1980	-	1.8	17.3	19.8	15.6	1.2	-	-	55.6
1981	-	1.7	8.3	18.1	20.2	6.0	-	-	54.3
1982	-	-	5.3	30.2	-	-	-	-	35.5
1983	-	-	3.6	18.9	9.7	5.1	-	-	37.2
1984	-	-	-	3.6	7.3	-	-	-	10.9
1985[c/]	-	-	0.7	11.6	18.8	-	-	-	31.0
Tillamook Area									
1974-1975 Average	e/	0.1	1.5	5.0	15.3	4.5	0.2	-	27.2
1976	NA	NA	NA	NA	NA	NA	NA	NA	50.0
1977	NA	NA	NA	NA	NA	NA	NA	NA	15.6
1978	NA	NA	NA	NA	NA	NA	NA	NA	8.5
1979	-	0.1	1.1	2.6	5.6	e/	-	-	9.4
1980	-	0.1	7.1	10.8	10.3	0.6	-	-	28.9
1981	-	0.3	1.0	5.6	9.6	1.3	-	-	17.8
1982	-	-	1.3	21.8	-	-	-	-	23.1
1983	-	-	0.2	6.1	1.6	0.9	-	-	8.8
1984	-	-	-	9.3	10.6	0.5	-	-	20.3
1985[c/]	-	-	-	8.9	21.7	0.4	-	-	31.0
Newport Area									
1974-1975 Average	0.1	0.1	8.1	24.8	26.4	4.5	0.1	-	65.1
1976	NA	NA	NA	NA	NA	NA	NA	NA	118.1
1977	NA	NA	NA	NA	NA	NA	NA	NA	34.0
1978	NA	NA	NA	NA	NA	NA	NA	NA	61.4
1979	-	0.2	3.7	18.7	13.6	e/	-	-	36.3
1980	-	0.2	18.5	41.5	10.8	1.4	-	-	72.4
1981	-	0.4	6.3	20.7	30.5	7.0	-	-	61.9
1982	-	-	3.6	40.5	-	-	-	-	44.0
1983	-	-	0.6	13.5	4.3	3.5	-	-	21.8
1984	-	-	-	24.7	16.4	0.1	-	-	41.2
1985[c/]	-	-	14.9	45.7	1.4	-	-	-	61.9

Table II-4. (continued)

Catch Area[a/] Year	April	May	June	July	August	September	October	November	Season[b/]
				COHO LANDINGS[d/] (thousands of fish)					
Coos Bay Area									
1974-1975 Average	0.3	3.4	17.9	39.1	21.0	6.7	0.2	-	90.1
1976	NA	NA	NA	NA	NA	NA	NA	NA	164.8
1977	NA	NA	NA	NA	NA	NA	NA	NA	76.3
1978	NA	NA	NA	NA	NA	NA	NA	NA	82.8
1979	-	4.9	22.7	16.7	14.6	e/	-	-	79.0
1980	-	3.8	53.6	70.6	7.1	0.8	-	-	135.9
1981	-	6.3	8.1	25.1	16.5	1.7	-	-	57.6
1982	-	-	12.2	43.4	-	-	-	-	55.6
1983	-	-	20.7	28.3	9.2	4.5	-	-	62.7
1984	-	-	-	19.6	19.7	0.1	-	-	39.4
1985[c/]	-	-	-	30.9	19.7	0.5	-	-	51.2
Brookings Area									
1974-1975 Average	0.1	0.9	4.1	16.0	5.3	3.1	0.1	-	30.2
1976	NA	NA	NA	NA	NA	NA	NA	NA	51.8
1977	NA	NA	NA	NA	NA	NA	NA	NA	14.0
1978	NA	NA	NA	NA	NA	NA	NA	NA	47.1
1979	-	e/	1.6	14.5	2.1	-	-	-	18.2
1980	-	0.1	17.7	13.4	1.4	0.5	-	-	33.0
1981	-	0.5	2.6	1.4	3.8	<0.1	-	-	8.3
1982	-	e/	1.7	15.2	-	-	-	-	16.9
1983	-	0.5	4.9	8.9	1.6	0.5	-	-	16.3
1984	-	-	-	7.4	4.0	0.2	-	-	11.5
1985[c/]	-	e/	-	4.9	2.5	e/	-	-	7.4
All Areas									
1974-1975 Average	0.8	5.8	36.5	102.5	103.0	33.9	0.9	-	283.4
1976	NA	NA	NA	NA	NA	NA	NA	NA	501.3
1977	NA	NA	NA	NA	NA	NA	NA	NA	193.3
1978	NA	NA	NA	NA	NA	NA	NA	NA	259.8
1979	-	5.7	35.6	85.8	52.2	1.6	-	-	180.8
1980	-	6.0	114.2	156.1	45.1	4.4	-	-	325.8
1981	-	9.2	26.3	70.8	80.6	12.9	-	-	199.8
1982	-	e/	24.1	151.0	-	-	-	-	175.1
1983	-	0.5	30.0	75.6	26.4	14.4	-	-	146.9
1984	-	-	-	64.6	57.9	0.9	-	-	123.3
1985[c/]	-	e/	0.7	71.1	108.3	2.3	-	-	182.5

a/ Columbia River area includes Astoria, Warrenton, and Hammond; Tillamook area includes Garibaldi and Pacific City; Newport area includes Depoe Bay and Newport; Coos Bay area includes Florence, Winchester Bay, and Coos Bay; Brookings area includes Gold Beach and Brookings.

b/ Data by area and calendar month for 1979-1985. Prior to 1979, data summarized by port of landing. Season totals may vary from summarized months due to rounding. Season totals for individual catch areas for 1974-1975 data may not equal the sum of combined months due to some effort/landings not identified by port of landing. "All Areas" summary includes unidentified data. Effort for 1979-1985 consists of salmon angler trips only. Data prior to 1979 includes combined bottom fish and salmon trips.

c/ Preliminary.

d/ The 1974-1975 average and 1976-1980 catch is combined salmon-steelhead punch card and sampled port data. Since 1981, data from sampled ports only.

e/ Less than 50.

Table II-5. Washington ocean recreational salmon fishery effort (angler trips) and catch[f/] of chinook, coho, and pink salmon (thousands of fish) by port and statistical month for 1976-1985[a/] and 1971-1975 average.

	April[b/]	May	June	July	August	September	October[c/]	Total
				ANGLER TRIPS (thousands)				
Neah Bay								
1971-1975 Average	1.2	2.6	5.0	14.4	23.3	11.0	0.2	57.6
1976	1.0	1.5	3.1	12.6	17.7	8.2	0.2	44.3
1977	0.3	0.8	5.1	13.0	25.5	10.9	0.5	56.2
1978	0.3	1.9	5.0	17.2	20.7	12.2	1.8	59.1
1979	0.0	0.6	3.8	10.7	13.8	1.0	0.0	30.0
1980	0.0	0.6	3.4	11.6	11.7	1.1	0.0	28.5
1981	0.1	1.2	2.2	9.8	12.0	3.2	0.0	28.5
1982	0.0	0.6	1.5	10.9	17.3	5.8	0.0	36.1
1983	0.0	0.5	1.8	14.4	22.2	7.7	0.0	46.6
1984	0.1	0.0	0.0	2.5	5.9	0.2	0.0	8.6
1985	0.0	0.0	0.2	7.3	9.5	0.1	0.0	17.1
La Push								
1971-1975 Average	0.1	0.4	2.1	9.0	17.5	6.5	0.6	36.2
1976	0.0	0.9	2.9	13.0	19.9	9.3	0.1	46.1
1977	0.0	0.5	1.1	7.5	15.4	4.4	0.1	29.0
1978	0.0	0.1	1.4	9.3	9.5	1.9	1.2	23.4
1979	0.0	0.1	0.2	4.4	7.9	0.0	0.0	12.5
1980	0.0	0.1	1.1	5.4	6.0	0.0	0.0	12.6
1981	0.0	0.0	0.0	0.0	1.4	0.0	0.0	1.4
1982	0.0	0.0	0.2	3.5	3.7	0.0	0.0	7.4
1983	0.0	0.0	0.0	1.3	4.3	0.5	0.0	6.1
1984	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.2
1985	0.0	0.0	e/	0.9	0.9	0.0	0.0	1.8
Westport								
1971-1975 Average	5.2	14.6	30.9	65.0	69.0	30.8	5.0	220.6
1976	2.0	10.4	39.4	77.8	73.0	38.3	5.9	247.0
1977	7.4	11.8	40.0	70.4	88.6	42.3	2.8	263.2
1978	2.1	11.9	42.3	79.5	73.0	31.2	4.8	244.7
1979	0.0	14.4	34.6	53.2	55.1	1.3	0.0	158.6
1980	0.0	11.1	30.6	51.5	41.8	0.8	0.0	135.9
1981	0.0	6.5	23.4	48.0	39.1	0.0	0.0	117.1
1982	0.0	2.1	29.6	55.0	26.4	0.0	0.0	113.2
1983	0.0	2.5	25.6	36.7	21.8	6.3	0.0	92.9
1984	0.0	2.2	1.2	3.4	7.1	0.0	0.0	13.9
1985	0.0	0.0	1.8	27.6	23.0	3.4	0.0	55.8
Ilwaco[d/]								
1971-1975 Average	0.9	4.8	13.2	39.0	72.2	36.0	2.5	168.5
1976	0.3	5.7	24.5	51.2	81.5	34.1	3.2	200.7
1977	1.3	6.0	21.2	43.3	81.1	26.5	2.1	181.5
1978	0.5	3.3	23.0	42.7	56.2	27.9	1.9	155.6
1979	0.0	4.2	15.6	37.2	50.9	1.5	0.0	109.5
1980	0.0	3.8	19.7	35.5	42.1	2.0	0.0	103.1
1981	0.0	3.1	12.3	28.2	39.9	4.3	0.0	87.8
1982	0.0	0.0	10.2	38.5	7.9	4.5	0.3	61.4
1983	0.0	0.3	6.7	26.6	24.1	6.2	0.0	63.9
1984	0.0	0.2	0.1	3.9	9.8	0.0	0.0	14.0
1985	0.0	0.0	1.0	19.1	30.8	2.2	0.0	53.1
Total								
1971-1975 Average	7.4	22.3	51.2	127.4	182.0	84.3	8.3	482.9
1976	3.4	18.5	70.0	154.7	192.1	89.9	9.4	538.1
1977	9.0	19.1	67.4	134.2	210.6	84.2	5.5	530.0
1978	2.9	17.3	71.6	148.7	157.4	73.2	9.7	482.8
1979	0.0	19.3	54.2	105.6	127.7	3.9	0.0	310.7
1980	0.0	15.7	54.9	104.1	101.5	3.9	0.0	280.1
1981	0.1	10.7	38.0	86.0	92.4	7.5	0.0	234.7
1982	0.0	2.7	41.6	107.9	55.3	10.3	0.3	218.1
1983	0.0	3.2	34.1	79.0	72.5	20.7	0.0	209.5
1984	0.1	2.4	1.3	9.8	23.0	0.2	0.0	36.8
1985	0.0	0.0	3.0	54.9	64.3	5.8	0.0	127.9

Table II-5. (continued)

	April[b/]	May	June	July	August	September	October[c/]	Total
				COHO LANDINGS (thousands of fish)				
Neah Bay								
1971-1975 Average	0.1	0.3	2.3	9.9	25.9	11.2	0.2	50.4
1976	0.0	0.8	3.2	14.2	27.8	10.3	0.1	56.6
1977	0.3	1.0	2.7	13.3	38.1	12.2	0.6	68.1
1978	0.1	0.2	2.7	11.3	17.7	12.6	0.4	45.0
1979	0.0	0.1	2.5	9.8	11.5	0.9	0.0	24.8
1980	0.0	0.6	5.7	8.6	8.1	1.0	0.0	23.9
1981	0.0	0.5	1.1	6.8	12.9	4.4	0.0	25.7
1982	0.0	0.1	0.8	10.4	22.4	5.8	0.0	39.5
1983	0.0	0.4	2.4	15.3	26.9	6.7	0.0	51.8
1984[d/]	0.0	0.0	0.0	0.9	5.2	0.3	0.0	6.4
1985	0.0	0.0	0.1	5.0	14.7	0.1	0.0	23.3
La Push								
1971-1975 Average	0.0	0.3	1.9	10.0	19.9	5.4	0.3	37.9
1976	0.0	0.5	2.7	17.0	32.6	10.1	0.1	63.0
1977	0.0	0.5	1.3	9.4	18.6	2.7	0.0	32.6
1978	0.0	0.1	2.1	7.7	9.0	2.7	0.0	21.7
1979	0.0	0.1	0.2	2.9	8.4	0.0	0.0	11.6
1980	0.0	0.2	2.0	5.9	7.3	0.0	0.0	15.4
1981	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.3
1982	0.0	0.0	0.2	3.1	5.5	0.0	0.0	8.8
1983	0.0	0.0	0.0	0.6	5.8	0.5	0.0	6.9
1984	0.0	0.0	0.0	e/	0.1	0.0	0.0	0.2
1985	0.0	0.0	e/	0.3	1.5	0.0	0.0	2.1
Westport								
1971-1975 Average	2.5	20.8	35.8	73.7	80.2	37.8	5.1	256.0
1976	0.8	17.9	70.4	155.4	133.4	68.2	5.3	451.3
1977	0.1	14.9	33.6	92.8	45.6	17.2	2.3	206.6
1978	0.2	7.2	48.7	72.6	51.8	22.4	1.4	204.4
1979	0.0	4.9	25.7	57.7	43.0	0.5	0.0	131.6
1980	0.0	16.3	40.6	68.6	41.9	0.4	0.0	167.8
1981	0.0	2.5	23.9	36.4	29.2	0.0	0.0	92.0
1982	0.0	0.0	9.6	40.4	24.7	0.0	0.0	74.8
1983	0.0	0.0	12.2	25.0	20.3	7.4	0.0	65.0
1984[e/]	0.0	0.0	0.0	1.7	8.9	0.0	0.0	10.6
1985	0.0	0.0	1.4	29.9	31.8	5.9	0.0	73.6
Ilwaco								
1971-1975 Average	0.2	4.7	16.8	56.5	105.0	38.6	1.4	223.1
1976	0.2	6.4	47.3	95.8	127.1	66.2	3.8	371.9
1977	0.0	4.6	35.2	61.3	58.3	20.8	2.7	183.0
1978	1.0	6.2	51.9	58.0	49.3	30.6	1.8	198.8
1979	0.0	2.8	19.5	45.4	53.8	0.7	0.0	122.3
1980	0.0	7.8	48.0	60.4	37.7	0.6	0.0	154.5
1981	0.0	5.4	22.4	41.6	43.4	5.8	0.0	118.5
1982	0.0	0.0	10.0	58.8	6.0	7.7	0.5	82.9
1983	0.0	0.0	7.4	41.3	26.8	10.0	0.0	85.6
1984	0.0	0.0	0.0	7.2	16.1	0.0	0.0	23.3
1985	0.0	0.0	1.4	24.8	44.0	1.5	0.0	79.8
Total								
1971-1975 Average	2.9	26.6	56.9	150.0	231.1	92.9	7.0	567.4
1976	1.1	25.6	123.7	307.5	320.9	154.7	9.3	942.8
1977	0.4	21.1	72.8	176.8	160.6	52.9	5.6	490.2
1978	1.4	13.6	105.4	149.5	127.9	68.3	3.6	469.8
1979	0.0	7.9	47.8	115.7	116.8	2.1	0.0	290.3
1980	0.0	24.8	96.3	143.4	95.0	2.0	0.0	361.5
1981	0.0	8.3	47.5	84.8	86.8	10.1	0.0	237.6
1982	0.0	0.1	20.6	112.7	58.7	13.4	0.5	206.0
1983	0.0	0.4	22.0	82.2	80.0	24.7	0.0	209.3
1984	0.0	0.0	0.0	9.9	30.2	0.3	0.0	40.4
1985	0.0	0.0	2.8	59.9	92.0	7.5	0.0	178.9

a/ Data for the 1985 season are preliminary.
b/ Data for April includes any catch or effort prior to April.
c/ Data for October includes any catch or effort following October.
d/ Ilwaco statistics do not include catch and effort reported as occurring inside the Columbia River mouth.
e/ Less than 50.

Table II-6. Estimates of minimum inriver run size, catch, and escapement (thousands of fish) of adult coho entering the Columbia River, 1971-1985.[a/]

Year	Min. Inriver Run Size	Below Bonneville Dam				Above Bonneville Dam			
		Lower River Catch[b/]		Lower River Escapement		Bonneville Dam Count	Mainstem Com. Treaty Catch	Bonneville Escapement[e/]	Hatchery Escapement[c/]
		Commerical	Sport	Hatchery[c/]	Trib. Dam Counts[d/]				
1971	528.4	264.3	1.4	187.6	21.3	53.8	13.1	40.7	20.4
1972	268.7	131.3	0.9	91.3	11.0	34.2	8.7	25.5	6.2
1973	283.8	183.7	0.3	68.2	5.8	25.8	11.1	14.7	4.6
1974	448.3	261.0	0.5	152.8	2.4	31.6	6.8	24.8	10.0
1975	282.4	156.6	0.6	85.4	7.0	32.8	5.7	27.1	16.7
1971-1975 Average	362.3	199.4	0.7	117.1	9.5	35.6	9.1	26.6	11.6
1976	326.2	168.4	0.3	117.3	3.5	36.7	4.0	32.7	14.4
1977	87.8	39.0	0.5	37.1	1.9	9.3	1.0	8.3	2.0
1978	298.3	132.7	1.0	131.4	2.9	30.3	3.7	26.6	7.8
1979	262.5	127.6	0.2	101.1	4.0	29.6	3.9	25.7	7.5
1980	288.7	150.1	0.1	120.4	5.1	13.0	0.3	12.7	3.4
1981	162.5	59.8	0.1	77.9	2.8	21.9	1.8	20.1	9.2
1982	435.6	201.7	19.0	154.1	5.0	55.8	4.3	51.5	32.4
1983[f/]	94.6	6.6	2.9	74.2	2.5	13.6	0.2	8.2	2.3
1984[f/]	382.9	189.1	75.1	98.5	3.5	25.5	1.6	15.1	7.1
1985[f/]	353.7	190.0	26.5	91.1	7.6	38.5	4.6	33.9	11.6

a/ These numbers differ slightly from the OPI data base since no adjustments were made to the escapement figures.
b/ Includes some upriver origin coho. Sport catches listed in this table are mainstem only and include catches in the Buoy 10 area which were 74,400 coho in 1984 and 25,400 in 1985.
c/ Includes hatcheries operated by all agencies.
d/ Willamette Falls, Clackamas River (N.F. Dam), and Sandy River (Marmot Dam).
e/ Bonneville Dam count minus mainstem commercial treaty Indian harvest.
f/ Preliminary.

Table II-7. Estimated effort and catch in the 1985 Buoy 10 sport fishery by weekly and open fishing periods.

Week No.	Ending Date or Period	Angler Trips	Catch		Catch/ Trip
			Chinook	Coho	
33	Aug. 18	2,535	630	2,520	1.24
34	Aug. 25	6,134	1,467	7,675	1.49
35	Sept. 1	11,579	235	7,982	0.70
36	Sept. 8	5,543	176	2,983	0.56
37	Sept. 15	2,306	70	2,341	1.04
38	Sept. 22	1,057	3	868	0.82
39	Sept. 29	579	0	407	0.70
Clatsop Spit (bank fishing)		2,423	74	611	0.28
Total		32,156	2,655	25,387	0.87
	Aug. 18-Aug. 22	8,669	2,097	10,195	
	Aug. 31-Sept. 2	15,093	303	10,082	
	Sept. 6-Sept. 30	5,971	181	4,499	
		29,733	2,581	24,776	
Clatsop Spit (bank fishing)		2,423	74	611	
Grand Total		32,156	2,655	25,387	

Table II-8.
Willapa Bay coho run size, harvest, and escapement, 1976-1985.

Year	Terminal		Escapement		Terminal Run Size
	Gillnet	Sport[a/]	Natural	Hatchery	
1976	9,000	800	7,000	10,100	26,900
1977	3,100	600	2,300	4,400	10,400
1978	7,000	600	3,300	7,600	18,500
1979	31,100	4,800	6,600	23,600	66,100
1980	25,000	800	5,000	15,200	46,000
1981	30,000	700	7,500	22,900	61,100
1982	70,000	3,600	2,100	33,400	109,100
1983	9,000	2,100	1,100	18,600	30,800
1984	50,600	2,900	0	33,400	86,900
1985[a/]	34,800	NA	NA	24,900	NA
Goal			0	8,000	

a/ Adults.
b/ Preliminary.

Table II-9 Grays Harbor coho terminal run size, catch, and escapement estimates, 1976-1985.

Year	Gillnet Harvest			Sport[a/] Harvest	Escapement		Terminal Run Size
	Non-treaty	Treaty	Chehalis		Natural	Hatchery	
1976	13,800	14,600	4,000	2,700	43,900	2,500	81,500
1977	1,500	2,500	1,500	800	26,800	400	33,500
1978	800	4,300	1,900	2,300	11,700	7,300	28,300
1979	0	3,300	5,900	5,200	35,400	28,400	78,200
1980	10,000	24,100	4,200	1,700	29,400	8,200	77,600
1981	3,000	25,800	3,200	900	12,900	19,900	65,800
1982	17,400	26,100	6,000	3,100	18,100	11,300	82,000
1983	1,800	11,800	800	1,800	25,400	14,800	56,300
1984[b/]	3,200	6,600	3,400	16,200	105,200	36,100	170,700
1985[b/]	500	9,200	900	NA	NA	7,900	NA
Goal					35,400		

a/ Adults.
b/ Preliminary.

Table II-10. Estimated inriver run size, catch, and escapement (thousands of fish) of Quinault, Queets, Hoh, and Quillayute river coho stocks, 1976-1985.

Stock by Year	Terminal Catch: Gillnet	Terminal Catch: Ceremonial & Subsistence	Terminal Catch: River Sport	Escapement: Natural	Escapement: Hatchery	Terminal Run Size: Natural	Terminal Run Size: Hatchery	Terminal Run Size: Total
Quinault[a/]								
1976	NA							
1977	1.9			1.5	0.3	3.0	0.6	3.6
1978	6.9			2.5	1.6	6.6	4.2	10.9
1979	17.8			7.2	4.7	18.0	11.7	29.7
1980	12.4			2.5	4.9	6.3	13.4	19.7
1981	10.4			2.2	7.3	4.5	15.4	19.9
1982	11.0			7.2	4.9	14.4	8.7	23.2
1983	3.7			7.0	6.4	9.0	8.1	17.1
1984	21.1			3.2	9.8	7.8	26.2	34.0
1985[b/]	7.3			NA	NA	NA	NA	NA
Goal				Hatchery Production				
Queets[c/d/]								
1976	2.9	NA	0.1	1.2	0.1	~~4.1~~ 4.0	0.3	4.4
1977	1.0	NA	0.1	1.9	0.3	2.6	0.5	3.1
1978	2.4	NA	0.1	2.7	0.6	4.1	0.9	5.0
1979	2.7	0.1	0.2	6.8	1.6	8.7	2.1	10.8
1980	3.2	<0.05	0.2	4.7	2.4	6.0	4.4	10.4
1981	4.2	NA	0.2	4.8	2.4	6.1	4.5	10.5
1982	1.6	NA	0.05	7.0	4.5	7.8	5.4	13.2
1983	1.0	<0.05	<0.05	2.3	1.1	2.4	1.8	4.2
1984	1.3	<0.05	<0.05	9.2	4.0	9.7	4.4	14.1
1985[e/]	3.8	<0.05	0.3	4.0	1.7	6.1	3.4	9.5
Goal				5.8 to 14.5				
Hoh[c/]								
1976	1.8	<0.05	0.1	2.3	0.0	4.2	0.0	4.2
1977	1.0	<0.05	<0.05	2.4	0.0	3.4	0.0	3.4
1978	2.8	0.1	<0.05	2.1	0.0	5.1	0.0	5.1
1979	2.9	0.1	0.1	5.0	0.4	8.2	0.9	9.1
1980	1.3	0.1	<0.05	1.7	0.1	2.6	0.6	3.2
1981	2.1	<0.05	<0.05	1.9	0.1	3.3	0.8	4.1
1982	2.0	0.1	<0.05	3.6	0.1	5.4	0.4	5.8
1983	0.1	<0.05	<0.05	1.7	0.3	1.8	0.3	2.2
1984	0.3	<0.05	<0.05	7.4	0.0	7.8	<0.05	7.8
1985[e/]	3.4	<0.05	0.1	2.1	0.0	5.5	<0.1	5.6
Goal				2.0 to 5.0				

Table 11-10. (continued)

Stock by Year	Terminal Catch: Gillnet	Terminal Catch: Ceremonial & Subsistence	Terminal Catch: River Sport	Escapement: Natural	Escapement: Hatchery	Terminal Run Size: Natural	Terminal Run Size: Hatchery	Terminal Run Size: Total
Quillayute[f/g/h/] (summer run)								
1976	0.6	<0.05	<0.05	1.2	0.9	1.6	1.2	2.8
1977	1.2	<0.05	<0.05	1.0	1.0	1.6	1.6	3.2
1978	0.6	<0.05	0.1	1.5	1.0	1.9	1.3	3.2
1979	10.9	0.1	0.6	1.5	9.7	3.0	19.8	22.8
1980	12.1	0.1	0.5	0.8	9.0	1.8	20.7	22.5
1981	2.4	<0.05	0.1	0.8	0.5	2.4	1.5	3.9
1982	12.6	0.1	0.1	0.9	3.7	3.4	14.0	17.4
1983	0.4	<0.05	0.1	0.8	4.1	0.8	4.6	5.4
1984	4.0	<0.05	0.2	1.0	4.5	1.7	8.0	9.7
1985[e/]	1.8	<0.05	0.1	0.3	0.8	1.2	1.8	3.0
Goal				Hatchery Production				
Quillayute[f/g/h/] (fall run)								
1976	8.5	0.1	0.1	3.9	1.2	10.4	3.3	13.7
1977	2.9	<0.05	<0.05	3.5	0.4	6.2	0.7	6.8
1978	4.4	<0.05	0.1	10.3	3.5	13.7	4.6	18.3
1979	7.0	0.1	0.1	20.2	5.0	26.0	6.4	32.4
1980	6.9	0.1	0.1	7.5	2.1	13.1	3.7	16.7
1981	3.7	<0.05	0.2	6.4	0.6	10.0	1.0	11.0
1982	4.5	<0.05	0.2	10.4	2.1	14.3	2.9	17.2
1983	0.7	<0.05	<0.05	2.7	0.9	3.2	1.1	4.3
1984	0.4	<0.05	0.1	10.5	7.3	10.9	7.5	18.4
1985[e/]	8.8	<0.05	0.3	7.5	0.3	15.3	1.6	16.9
Goal				6.3 to 15.8				

a/ Ceremonial and subsistence included in gillnet catch. Sport catch negligible.
b/ Preliminary.
c/ Sport catch of adults.
d/ Natural escapement and run-size estimates include fish taken for broodstock.
e/ Preliminary. Incomplete spawning escapement surveys indicate actual natural escapement may be lower.
f/ Sport catch predominantly fish under 24 inches in total length.
g/ Natural escapement includes hatchery strays.
h/ Hatchery terminal run size excludes hatchery strays.

Table II-11. Puget Sound commercial net fishery salmon catches (thousands of fish), 1981-1985 and three recent five-year averages.[a/]

Year		Thousands of Fish				
		Chinook	Coho	Pink	Chum	Sockeye
1971-1975 Average	Treaty Non-Indian	103.9	523.6	1,942.9[b/]	331.1	2,159.0
	Treaty Indian	54.0	224.7	114.4[b/]	78.2	37.8
	Total	157.9	748.3	2,057.3[b/]	409.3	2,196.8
1976-1980 Average	Treaty Non-Indian	103.5	413.4	2,626.1[b/]	408.0	1,095.6
	Treaty Indian	126.1	488.5	464.4[b/]	294.9	277.8
	Total	229.6	901.9	3,090.5[b/]	702.9	1,373.4
1981	Treaty Non-Indian	76.7	276.5	2,725.9	222.7	755.8
	Treaty Indian	137.6	467.3	1,172.7	274.2	549.1
	Total	214.3	743.8	3,898.6	496.9	1,304.9
1982	Treaty Non-Indian	81.6	394.1	0.0	531.3	1,476.0
	Treaty Indian	123.1	746.0	0.0	445.3	1,392.1
	Total	210.6	1,140.1	0.0	976.6	2,868.1
1983	Treaty Non-Indian	48.5	337.3	1,033.5	211.7	181.4
	Treaty Indian	129.2	588.5	790.5	274.4	220.7
	Total	177.7	925.8	1,824.0	486.1	402.1
1984[c/]	Treaty Non-Indian	73.5	296.9	.1	320.7	846.4
	Treaty Indian	146.4	482.7	<.1	462.9	851.4
	Total	219.9	779.6	.2	783.6	1,697.8
1985[c/]	Treaty Non-Indian	72.9	422.2	1,974.6	555.5	1,365.2
	Treaty Indian	151.4	733.3	2,185.9	521.9	1,549.5
	Total	224.3	1,155.5	4,170.5	1,077.4	2,914.7
1981-1985 Average	Treaty Non-Indian	70.6	372.1	1,914.7[b/]	341.7	925.0
	Treaty Indian	140.2	561.3	1,383.0[b/]	438.0	912.6
	Total	210.8	933.4	3,297.7[b/]	779.7	1,837.6

a/ Data do not reflect treaty allocations. Includes U.S. and Canadian-origin salmon and fish caught in test fisheries.
b/ Odd-year average.
c/ Preliminary data.

Table II-12. PRELIMINARY 1985 PUGET SOUND COMMERCIAL COHO CATCHES

AREA	Hook & Line	TOTAL U.S. HARVEST P.Seine	Gillnet	Reefnet	B.Seine	TOTAL	% BY AREA
Area 4B	455	0	22,173	0	0	22,628	1.96%
Ozette River	0	0	71	0	0	71	0.01%
Area 5	1,370	0	60,916	0	0	62,286	5.39%
Clallam River	0	0	3	0	0	3	.00%
Hoko River	0	0	16	0	0	16	.00%
Pysht River	0	0	18	0	0	18	.00%
Sekiu River	5	0	3	0	0	8	.00%
Area 6	1	0	1,144	0	0	1,145	0.10%
Area 6B	0	0	0	0	0	0	0.00%
Area 6C	84	0	1,126	0	0	1,210	0.10%
Area 6D	0	0	1,156	0	0	1,156	0.10%
Elwha River	4	0	9,494	0	0	9,498	0.82%
Area 7	0	74,964	21,489	1,490	0	97,943	8.48%
Area 7A	0	23,583	18,730	0	0	42,313	3.66%
Area 7B	0	6,573	116,050	0	0	122,623	10.62%
Area 7C	0	0	237	0	0	237	0.02%
Area 7E	0	486	4,432	0	0	4,918	0.43%
Nooksack River	0	0	32,941	0	0	32,941	2.85%
Area 8	0	666	3,360	0	34	4,060	0.35%
Area 8A	0	17,787	66,167	0	7,002	90,956	7.88%
Area 8D	0	0	11,196	0	69	11,265	0.98%
Skagit River	0	0	9,324	0	0	9,324	0.81%
Stillaguamish R	0	0	1,965	0	0	1,965	0.17%
Area 9	0	1,991	4,575	0	0	6,566	0.57%
Area 9A	0	0	5,841	0	0	5,841	0.51%
Area 10	0	127,161	163,027	0	0	290,188	25.13%
Area 10A	0	65	17,596	0	0	17,661	1.53%
Area 10D	0	0	401	0	0	401	0.03%
Area 10E	0	0	2,114	0	0	2,114	0.18%
Area 10F	0	0	12,093	0	0	12,093	1.05%
Area 10G	0	0	25,452	0	0	25,452	2.20%
Duwamish River	0	0	15,530	0	0	15,530	1.34%
Area 11	0	41,159	27,849	0	232	69,240	6.00%
Area 11A	0	0	17,558	0	0	17,558	1.52%
Puyallup River	0	0	20,604	0	0	20,604	1.78%
Area 12	0	10,340	16,223	0	0	26,563	2.30%
Area 12A	0	0	2,995	0	2,127	5,122	0.44%
Area 12B	0	0	2,289	0	0	2,289	0.20%
Area 12C	0	16	4,491	0	0	4,507	0.39%
Area 12D	0	0	0	0	0	0	0.00%
Quilcene River	0	0	188	0	0	188	0.02%
Skokomish River	0	0	6,761	0	0	6,761	0.59%
Area 13	0	0	2,872	0	5,319	8,191	0.71%
Area 13A	0	0	13,180	0	5,598	18,778	1.63%
Area 13C	0	0	885	0	41	926	0.08%
Area 13D	0	0	34,566	0	32,037	66,603	5.77%
Area 13F	0	0	22	0	0	22	.00%
Area 13G	0	0	10	0	0	10	.00%
Area 13H	0	0	10	0	0	10	.00%
Area 13I	0	0	0	0	0	0	0.00%
Area 13J	0	0	0	0	858	858	0.07%
Area 13K	0	0	0	0	7,918	7,918	0.69%
Nisqually River	0	0	6,078	0	0	6,078	0.53%
McAllister Cree	0	0	133	0	0	133	0.01%
Totals	1,919	304,791	785,354	1,490	61,235	1,154,789	
% By Gear	0.17%	26.39%	68.01%	0.13%	5.30%	100.00%	

Table II-12 a.

REGULATION AND CATCH SUMMARY FOR COHO
COMMERCIAL NET FISHERIES — NORTH PUGET SOUND (AREAS 6-7-7A)

YEAR	FISHERY	PRIOR TO IPSFC CONTROL REGULATION	CATCH	DURING IPSFC CONTROL REGULATION	CATCH	AFTER IPSFC CONTROL REGULATION	CATCH	TOTAL CATCH	COMMENTS
1985	TREATY	CLOSED	0	31 FISHING PERIODS 7/23 TO 9/22	63,098	4 FISHING PERIODS 10/16 TO 10/26	11,460	74,558	5" MINIMUM MESH; 5 7/8" MAXIMUM MESH DURING IPSFC FISHERY
	NON-TREATY	CLOSED	0	9 FISHING PERIODS 7/30 TO 9/22	53,263	3 FISHING PERIODS 10/21 TO 10/29	14,007	67,270	5" MINIMUM MESH; 5 7/8" MAXIMUM MESH
							TOTAL	141,828	
1984	TREATY	CLOSED	0	25 FISHING PERIODS 7/23 TO 9/9	10,082	CLOSED	6	10,088	5" MINIMUM MESH; 5 7/8" MAXIMUM MESH DURING IPSFC FISHERY
	NON-TREATY	CLOSED	0	11 FISHING PERIODS 7/23 TO 9/9	13,712	CLOSED	0	13,712	5" MINIMUM MESH; 5 7/8" MAXIMUM MESH
							TOTAL	23,800	
1983	TREATY	CLOSED	0	23 FISHING PERIODS 7/25 TO 10/2	27,362	CLOSED	421	27,783	5" MINIMUM MESH; 5 7/8" MAXIMUM MESH DURING IPSFC FISHERY
	NON-TREATY	CLOSED	0	13 FISHING PERIODS 7/27 TO 10/2	33,185	CLOSED	5	33,190	5" MINIMUM MESH; 5 7/8" MAXIMUM MESH
							TOTAL	60,973	
1982	TREATY	5 DAYS/WEEK 6/2 TO 6/19	0	29.5 FISHING PERIODS 7/25 TO 9/27	24,702	10.5 FISHING PERIODS 10/14 TO 10/29	14,551	39,253	MIN. MESH: 5" DURING AND 6" AFTER IPSFC CONTROL; MAX. MESH; 5 1/4" BEFORE AND 5 7/8 DURING IPSFC CONTROL
	NON-TREATY	CLOSED	101	9 FISHING PERIODS 7/26 TO 9/27	76,756	3 FISHING PERIODS 10/17 TO 10/27	16,145	93,002	MIN. MESH; 5" DURING AND 6" AFTER IPSFC CONTROL; 5 7/8" MAXIMUM MESH DURING IPSFC FISHERY; REEF NETS ONLY FISHED 9/27 TO 11/30, 3 DAYS/WEEK
							TOTAL	132,255	
1981	TREATY	9 FISHING PERIODS 6/3 TO 6/19	0	53.5 FISHING PERIODS 7/4 TO 9/27	27,633	CLOSED	249	27,882	5" MIN. AND 5 7/8" MAX. MESH DURING IPSFC CONTROL; 5 1/4" MAXIMUM MESH BEFORE IPSFC CONTROL
	NON-TREATY	CLOSED	1	23 FISHING PERIODS 7/6 TO 9/27	133,327	3 DAYS/WEEK 9/27 TO 10/13	1,829	135,157	5" MIN. AND 5 7/8" MAX. MESH DURING IPSFC CONTROL; ONLY REEF NETS FISHED AFTER IPSFC CONTROL
							TOTAL	163,039	
1980	TREATY	CLOSED	0	(SEE COMMENT) 7/20 TO 8/31	10,097	7 DAYS/WEEK 8/31 TO 11/22	265,828	275,925	5" MIN. AND 5 7/8" MAX. MESH DURING IPSFC CONTROL; 5" MIN. AND 6 1/2" MAX. AFTER IPSFC CONTROL; DURING IPSFC; 15 GILL NET AND 19 PURSE SEINE FISHING PERIODS
	NON-TREATY	CLOSED	0	8 FISHING PERIODS 7/21 TO 8/31	23,164	3 DAYS/WEEK 8/31 TO 11/22	254,007	277,171	5" MIN. AND 5 7/8" MAX. MESH DURING IPSFC CONTROL; 5" MIN. AND 6 1/2" MAX. AFTER IPSFC CONTROL
							TOTAL	553,096	
1979	TREATY	CLOSED	0	(SEE COMMENT) 7/15 TO 9/23	17,591	2 FISHING PERIODS 10/7 TO 10/9	6,324	23,915	5" MIN. AND 5 7/8" MAX. MESH DURING IPSFC CONTROL; DURING IPSFC; 34.5 GILL NET AND 28.5 PURSE SEINE FISHING PERIODS
	NON-TREATY	CLOSED	24	15 FISHING PERIODS 7/16 TO 9/23	109,216	3 DAYS/WEEK 9/23 TO 10/21	2,356	111,596	5" MIN. AND 5 7/8" MAX. MESH DURING IPSFC CONTROL; ONLY REEF NETS FISHED AFTER IPSFC CONTROL
							TOTAL	135,511	
1978	TREATY	5 DAYS/WEEK 4/1 TO 6/25	25	17.5 FISHING PERIODS 7/16 TO 9/10	4,199	7 DAYS/WEEK 9/10 TO 11/30	6,601	10,825	MIN. MESH; 6 1/2" BEFORE, 5" DURING, 5 1/2" AFTER IPSFC CONTROL
	NON-TREATY	5 DAYS/WEEK 5/14 TO 6/25	708	11 FISHING PERIODS 7/17 TO 9/10	36,680	3 DAYS/WEEK 9/10 TO 11/30	196,949	234,337	MIN. MESH; 6 1/2" BEFORE AND 5" DURING IPSFC CONTROL; MIN. MESH; 5" (9/10 TO 10/15) AND 6" (10/15 TO 11/30)
							TOTAL	245,162	

Table II-12 a (continued)

1977	TREATY	: 7 DAYS/WEEK : 5/9 TO 6/26	8	: 26 FISHING PERIODS : 6/27 TO 9/20	9,142	: 7 DAYS/WEEK : 9/20 TO 10/11	8,431	:	17,581	:
	NON-TREATY	: 5 DAYS/WEEK : 5/15 TO 6/26	171	: 18 FISHING PERIODS : 6/27 TO 9/20	149,541	: 3 DAYS/WEEK : 9/20 TO 10/11	131,834	: :	281,546 ------	: :
							TOTAL		299,127	
1976	TREATY	: 7 DAYS/WEEK : 5/16 TO 6/27	4	: 9 FISHING PERIODS : 7/19 TO 9/7	3,234	: 7 DAYS/WEEK : 9/8 TO 11/30	19,539	:	22,777	:
	NON-TREATY	: 5 DAYS/WEEK : 5/16 TO 6/27	1,116	: 9 FISHING PERIODS : 7/19 TO 9/7	37,685	: 3 DAYS/WEEK : 9/8 TO 11/30	305,182	: :	343,983 ------	: :
							TOTAL		366,760	
1975	TREATY	:	0	: 27 FISHING PERIODS : 7/7 TO 9/28	4,111	:	1,053	:	5,164	:
	NON-TREATY	:	434	: 27 FISHING PERIODS : 7/7 TO 9/28	224,119	:	140,615	: :	365,168 ------	: :
							TOTAL		370,332	
1974	TREATY	:	0	: 19 FISHING PERIODS : 7/15 TO 9/8	466	:	9,613	:	10,079	:
	NON-TREATY	:	411	: 19 FISHING PERIODS : 7/15 TO 9/8	26,375	:	357,356	: :	384,142 ------	: :
							TOTAL		394,221	
1973	TREATY	:	0	: 38 FISHING PERIODS : 6/25 TO 9/30	650	:	471	:	1,121	:
	NON-TREATY	:	107	: 38 FISHING PERIODS : 6/25 TO 9/30	169,114	:	168,096	: :	337,317 ------	: :
							TOTAL		338,438	
1972	TREATY	:	0	: 17 FISHING PERIODS : 7/17 TO 9/3	18	:	554	:	572	:
	NON-TREATY	:	482	: 17 FISHING PERIODS : 7/17 TO 9/3	8,459	:	201,699	: :	210,640 ------	: :
							TOTAL		211,212	
1971	TREATY	:	0	: 43 FISHING PERIODS : 7/10 TO 9/26	371	:	327	:	698	:
	NON-TREATY	:	517	: 43 FISHING PERIODS : 7/10 TO 9/26	99,441	:	97,660	: :	197,618 ------	: :
							TOTAL		198,316	
1970	TREATY	:	0	: 24 FISHING PERIODS : 7/13 TO 9/6	0	:	0	:	0	:
	NON-TREATY	:	1,159	: 24 FISHING PERIODS : 7/13 TO 9/6	49,112	:	304,028	: :	354,299 ------	: :
							TOTAL		354,299	

Table II-12 b

REGULATION AND CATCH SUMMARY FOR COHO (DRIFT GILL NET ONLY)
COMMERCIAL NET FISHERIES STRAIT OF JUAN DE FUCA (AREAS 48-5-6C)

YEAR	FISHERY	PRIOR TO IPSFC CONTROL REGULATION	PRIOR TO IPSFC CONTROL CATCH	DURING IPSFC CONTROL REGULATION	DURING IPSFC CONTROL CATCH	AFTER IPSFC CONTROL REGULATION	AFTER IPSFC CONTROL CATCH	TOTAL CATCH	COMMENTS
1985	TREATY	CLOSED	0	49 FISHING PERIODS 6/30 TO 9/15	54,174	5 DAYS/WEEK 9/15 TO 11/23	24,984	79,158	5" MINIMUM MESH 5 7/8" MAXIMUM MESH DURING IPSFC FISHERY
	NON-TREATY	CLOSED	0	9 FISHING PERIODS 7/30 TO 9/15	5,051	CLOSED	0	5,051	5" MINIMUM MESH 5 7/8" MAXIMUM MESH
							TOTAL	84,209	
1984	TREATY	CLOSED	0	28.5 FISHING PERIODS 7/19 TO 8/26	5,971	5 DAYS/WEEK 8/26 TO 11/17	38,650	44,621	5" MINIMUM MESH 5 7/8" MAXIMUM MESH DURING IPSFC FISHERY
	NON-TREATY	CLOSED	0	11 FISHING PERIODS 7/23 TO 8/26	1,286	CLOSED	0	1,286	5" MINIMUM MESH 5 7/8" MAXIMUM MESH
							TOTAL	45,907	
1983	TREATY	CLOSED	0	24.5 FISHING PERIODS 7/24 TO 9/11	7,868	5 DAYS/WEEK 9/11 TO 11/19	27,600	35,468	MIN. MESH; 5" - MAX. MESH; 5 7/8" DURING IPSFC CONTROL MAKAH OPENNING EXTENDED TO 11/30
	NON-TREATY	CLOSED	0	10 FISHING PERIODS 7/27 TO 9/11	2,855	CLOSED	0	2,855	5" MINIMUM MESH 5 7/8" MAXIMUM MESH
							TOTAL	38,323	
1982	TREATY	CLOSED	17	38.5 FISHING PERIODS 7/22 TO 9/5	40,108	5 DAYS/WEEK 9/5 TO 11/30	49,309	89,434	PT. NO PT. OPENNING EXTENDED TO 12/25 MIN. MESH; 5" - MAX. MESH; 5 7/8" DURING IPSFC CONTROL
	NON-TREATY	CLOSED	0	8 FISHING PERIODS 7/26 TO 9/5	22,035	CLOSED	0	22,035	5" MINIMUM MESH 5 7/8" MAXIMUM MESH
							TOTAL	111,469	
1981	TREATY	CLOSED	103	50 FISHING PERIODS 6/30 TO 9/13	28,013	5 DAYS/WEEK 9/13 TO 10/18	20,803	48,919	MAKAH - 13 ADDITIONAL FISHING PERIODS FROM 11/3 TO 11/27 MIN. MESH; 5" - MAX. MESH; 5 7/8" DURING AND 6 1/2" AFTER IPSFC CONTROL
	NON-TREATY	CLOSED	0	17 FISHING PERIODS 7/6 TO 9/13	6,212	CLOSED	0	6,212	5" MINIMUM MESH 5 7/8" MAXIMUM MESH
							TOTAL	55,131	
1980	TREATY	CLOSED	0	24.5 FISHING PERIODS 7/20 TO 8/25	7,304	5 DAYS/WEEK 8/25 TO 11/30	30,625	37,929	CLOSED EAST OF SHERINGHAM-PILLAR PT. LINE ON 10/7 MIN. MESH; 5" - MAX. MESH; 5 7/8" DURING IPSFC CONTROL PT. NO PT. OPENNING EXTENDED TO 12/7
	NON-TREATY	CLOSED	0	8 FISHING PERIODS 7/21 TO 8/25	6,253	CLOSED	55	6,308	5" MINIMUM MESH 5 7/8" MAXIMUM MESH
							TOTAL	44,237	
1979	TREATY	CLOSED	0	34.5 FISHING PERIODS 7/15 TO 9/12	27,549	5 DAYS/WEEK 9/19 TO 10/22	10,155	37,704	OPENINGS APPLY ONLY TO WEST OF SHERINGHAM-PILLAR PT. LINE MIN. MESH; 5" - MAX. MESH; 5 7/8" DURING IPSFC CONTROL
	NON-TREATY	CLOSED	0	14 FISHING PERIODS 7/16 TO 9/12	36,396	CLOSED	29	36,425	5" MINIMUM MESH 5 7/8" MAXIMUM MESH
							TOTAL	74,129	
1978	TREATY	7 DAYS/WEEK 5/19 TO 6/25	5	22 FISHING PERIODS 7/17 TO 9/10	4,043	7 DAYS/WEEK 9/10 TO 11/30	8,818	12,866	PT. NO PT. OPEN ONLY 11/11 TO 12/12 (5 DAYS/WEEK) MIN. MESH; 6 1/2" MAKAH -7 1/2" PT. NO PT. BEFORE, 5" DURING, 5 7/8" AFTER IPSFC CONTROL OPENINGS DURING IPSFC CONTROL APPLY ONLY TO WEST OF SLIP PT.
	NON-TREATY	CLOSED	8	11 FISHING PERIODS 7/17 TO 9/10	11,100	CLOSED	3	11,111	5" MINIMUM MESH
							TOTAL	23,977	

Table II-12 b (continued)

1977	TREATY	: 7 DAYS/WEEK : 5/1 TO 6/26	9	: 23 FISHING PERIODS : 6/27 TO 9/11	10,922	: 7 DAYS/WEEK : 9/11 TO 9/26	7,661	18,592	: MIN. MESH; 6 1/2" BEFORE, 5" DURING, IPSFC CONTROL : AREA 4B OPEN 30.5 FISHING PERIODS DURING IPSFC CONTROL	
	NON-TREATY	: CLOSED	5	: 17 FISHING PERIODS : 6/27 TO 9/11	24,887	: CLOSED	114	25,006	: 5" MINIMUM MESH	
							TOTAL	43,598		
1976	TREATY	: 7 DAYS/WEEK : 5/15 TO 6/27	99	: 9 FISHING PERIODS : 7/19 TO 8/29	815	: 7 DAYS/WEEK : 8/29 TO 9/19	8,034	8,948	: MIN. MESH; 6 1/2" BEFORE, 5" DURING, IPSFC CONTROL	
	NON-TREATY	: CLOSED	0	: 9 FISHING PERIODS : 7/19 TO 8/29	3,033	: CLOSED	0	3,033	: 5" MINIMUM MESH	
							TOTAL	11,981		
1975	TREATY	:	0	: 25 FISHING PERIODS : 7/7 TO 9/20	2,944	:	3,060	6,004	:	
	NON-TREATY	:	0	: 25 FISHING PERIODS : 7/7 TO 9/20	12,485	:	154	12,639	:	
							TOTAL	18,643		
1974	TREATY	:	3	: 19 FISHING PERIODS : 7/15 TO 9/7	949	:	9,600	10,552	:	
	NON-TREATY	:	0	: 19 FISHING PERIODS : 7/15 TO 9/8	9,037	:	4,236	13,273	:	
							TOTAL	23,825		
1973	TREATY	:	0	: 34 FISHING PERIODS : 6/25 TO 9/16	658	:	1,561	2,219	:	
	NON-TREATY	:	0	: 34 FISHING PERIODS : 6/25 TO 9/16	9,767	:	2,079	11,846	:	
							TOTAL	14,065		
1972	TREATY	:	0	: 15 FISHING PERIODS : 7/17 TO 8/20	108	:	790	898	:	
	NON-TREATY	:	0	: 15 FISHING PERIODS : 7/17 TO 8/20	1,833	:	7,430	9,263	:	
							TOTAL	10,161		
1971	TREATY	:	139	: 52 FISHING PERIODS : 6/21 TO 9/19	4,760	:	267	5,166	:	
	NON-TREATY	:	0	: 52 FISHING PERIODS : 6/21 TO 9/19	50,800	:	2,322	53,122	:	
							TOTAL	58,288		
1970	TREATY	:	0	: 24 FISHING PERIODS : 7/13 TO 8/30	540	:	3,613	4,153	:	
	NON-TREATY	:	0	: 24 FISHING PERIODS : 7/13 TO 8/30	7,486	:	43,418	50,904	:	
							TOTAL	55,057		

Table II-13. Summary of Puget Sound marine recreational salmon catches (thousands of fish), 1971-1985 and the 1971-1975 average.[a/]

Year	Species		
	Chinook	Coho	Pink
1971-1975 Average	225.6	119.3	
1976	307.2	223.9	0.2
1977	196.1	177.3	24.0
1978	228.7	223.6	0.1
1979	285.7	258.2	69.6
1980	244.5	118.2	0.2
1981	164.4	177.4	25.5
1982	120.2	209.7	0
1983	194.5	274.1	16.5
1984	174.6	140.7	0.1
1985	NA	NA	NA

a/ Washington Department of Fisheries Statistical Areas 5-13, which include the Strait of Juan de Fuca, San Juan Islands, and inner Puget Sound.

Table II-14. Preliminary Puget Sound Coho Data

DUNGENESS RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	900	4,629	3,100	0	1,300	6,995	0	2,934	9,929
1980	605	5,728	8,700	0	2,400	13,664	0	3,769	17,433
1981	1,847	6,372	11,400	0	1,000	18,956	0	1,663	20,619
1982	9,596	20,805	5,000	0	1,500	28,386	0	8,515	36,901
1983	1,060	6,059	4,900	0	1,500	10,351	0	3,168	13,519
1984	0	0	1,000	0	1,100	1,000	0	1,100	2,100
1985	12	1,156	988	0	500	1,771	0	885	2,656

ELWHA RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	6,423	0	10,100	0	200	16,398	0	325	16,723
1980	9,508	0	2,300	0	400	10,399	0	1,809	12,208
1981	1,790	0	3,000	0	100	4,732	0	158	4,890
1982	10,493	0	4,800	0	200	14,873	0	620	15,493
1983	15,298	0	1,800	0	100	16,293	0	905	17,198
1984	6,042	0	2,600	0	200	8,210	0	632	8,842
1985	9,502	0	6,097	0	300	15,154	0	745	15,899

MISCELLANEOUS STRAIT STREAMS COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	276	0	0	300	5,000	0	316	5,260	5,576
1980	928	0	0	4,200	5,200	0	4,615	5,713	10,328
1981	816	0	0	1,600	2,100	0	1,953	2,563	4,516
1982	2,359	0	0	1,700	8,400	0	2,097	10,362	12,459
1983	2	0	0	0	2,800	0	0	2,802	2,802
1984	139	0	0	0	4,000	0	0	4,139	4,139
1985	46	0	0	0	1,800	0	0	1,846	1,846

TOTAL STRAIT OF JUAN DE FUCA COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	7,599	4,629	13,200	300	6,500	23,393	316	8,519	32,228
1980	11,041	5,728	11,000	4,200	8,000	24,063	4,615	11,291	39,969
1981	4,453	6,372	14,400	1,600	3,200	23,688	1,953	4,384	30,025
1982	22,448	20,805	9,800	1,700	10,100	43,259	2,097	19,497	64,853
1983	16,360	6,059	6,700	0	4,400	26,644	0	6,875	33,519
1984	6,181	0	3,600	0	5,300	9,210	0	5,871	15,081
1985	9,560	1,156	7,085	0	2,600	16,925	0	3,476	20,401

Table II-14. cont

MISCELLANEOUS AREA 7 COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	100	0	0	100	400	0	100	500	600
1980	100	0	0	0	400	0	0	500	500
1981	600	0	0	1,000	200	500	1,000	300	1,800
1982	2,200	0	0	4,000	400	2,100	4,000	500	6,600
1983	100	0	0	2,000	400	0	2,000	500	2,500
1984	2,100	0	0	2,000	500	2,000	2,000	600	4,600
1985	5,270	0	900	2,000	600	5,643	2,000	1,127	8,770

MISCELLANEOUS SAN JUAN COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	(100)	0	0	0	100	0	0	0	0
1980	(100)	0	0	0	100	0	0	0	0
1981	(600)	0	500	0	100	0	0	0	0
1982	(2,200)	0	2,100	0	100	0	0	0	0
1983	(100)	0	0	0	100	0	0	0	0
1984	(2,100)	0	2,000	0	100	0	0	0	0
1985	NA	0	NA	0	NA	0	0	0	0

TOTAL MISCELLANEOUS 7-7A COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	0	0	100	500	0	100	500	600
1980	0	0	0	0	500	0	0	500	500
1981	0	0	500	1,000	300	500	1,000	300	1,800
1982	0	0	2,100	4,000	500	2,100	4,000	500	6,600
1983	0	0	0	2,000	500	0	2,000	500	2,500
1984	0	0	2,000	2,000	600	2,000	2,000	600	4,600
1985	NA	0	NA	2,000	NA	5,643	2,000	1,127	8,770

Table II-14. cont

NOOKSACK RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	18,118	72,339	8,100	700	2,000	75,943	6,563	18,751	101,257
1980	6,416	51,612	4,200	0	5,000	30,691	0	36,537	67,228
1981	21,124	35,709	6,700	3,700	1,000	40,102	22,146	5,985	68,233
1982	31,846	83,519	8,800	900	500	108,331	11,079	6,155	125,565
1983	36,396	89,935	10,900	400	1,000	122,851	4,509	11,271	138,631
1984	40,756	76,197	16,000	0	1,000	126,074	0	7,879	133,953
1985	33,353	96,428	20,892	0	2,000	139,339	0	13,334	152,673

SAMISH RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	317	15,051	0	0	5,700	0	0	21,068	21,068
1980	207	21,835	0	0	6,400	0	0	28,442	28,442
1981	45	11,249	0	3,700	6,500	0	7,797	13,697	21,494
1982	63	7,872	0	0	3,900	0	0	11,835	11,835
1983	38	14,697	0	0	7,900	0	0	22,655	22,655
1984	4	11,219	0	0	8,500	0	0	19,723	19,723
1985	330	6,909	0	0	3,700	0	0	10,939	10,939

LUMMI COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	36,772	14,700	0	0	51,472	0	0	51,472
1980	154	10,423	3,000	0	0	13,577	0	0	13,577
1981	1,123	23,412	20,200	0	0	44,735	0	0	44,735
1982	3,592	31,567	12,300	0	0	47,459	0	0	47,459
1983	1,914	10,738	3,900	0	0	16,552	0	0	16,552
1984	57	3,505	2,600	0	0	6,162	0	0	6,162
1985	(37)	19,030	11,137	0	0	30,130	0	0	30,130

TOTAL NOOKSACK-SAMISH COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	18,435	124,162	22,800	700	7,700	127,415	6,563	39,819	173,797
1980	6,777	83,870	7,200	0	11,400	44,268	0	64,979	109,247
1981	22,292	70,370	26,900	7,400	7,500	84,837	29,943	19,682	134,462
1982	35,501	122,958	21,100	900	4,400	155,790	11,079	17,990	184,859
1983	38,368	115,370	14,800	400	8,900	139,403	4,509	33,926	177,838
1984	40,817	90,921	18,600	0	9,500	132,236	0	27,602	159,838
1985	33,646	122,367	32,029	0	5,700	169,469	0	24,273	193,742

Table II-14. cont

SKAGIT RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	SPAWNING ESCAPEMENT OFF STA	SPAWNING ESCAPEMENT WILD	TERMINAL RUN SIZE HATCH	TERMINAL RUN SIZE OFF STA	TERMINAL RUN SIZE WILD	TOTAL
1979	21,116	0	11,800	2,900	33,000	17,024	4,183	47,609	68,816
1980	32,362	0	21,900	500	25,000	36,852	842	42,068	79,762
1981	15,654	0	39,500	2,600	15,000	50,329	3,313	19,112	72,754
1982	28,276	0	4,700	0	9,000	14,400	0	27,576	41,976
1983	13,270	0	10,600	0	24,000	14,665	0	33,205	47,870
1984	5,861	0	41,500	2,600	33,000	44,655	2,797	35,509	82,961
1985	13,336	0	7,216	0	18,000	11,015	0	27,537	38,552

Table II-14. cont

MISCELLANEOUS AREA 9 COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	SPAWNING ESCAPEMENT OFF STA	SPAWNING ESCAPEMENT WILD	TERMINAL RUN SIZE HATCH	TERMINAL RUN SIZE OFF STA	TERMINAL RUN SIZE WILD	TOTAL
1979	0	0	0	0	1,600	0	0	1,600	1,600
1980	0	0	0	1,300	1,900	0	1,300	1,900	3,200
1981	0	0	0	1,400	1,200	0	1,400	1,200	2,600
1982	0	0	0	200	1,500	0	200	1,500	1,700
1983	0	0	0	0	700	0	0	700	700
1984	0	0	0	0	200	0	0	200	200
1985	0	0	0	0	600	0	0	600	600

Table II-14. cont

PORT GAMBLE COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	6	0	0	300	0	0	306	306
1980	65	156	0	0	400	0	0	621	621
1981	4	59	0	0	300	0	0	363	363
1982	17,692	10,349	0	700	15	0	28,153	603	28,756
1983	5,255	3,847	0	700	10	0	9,674	138	9,812
1984	11,281	2,947	0	600	10	0	14,595	243	14,838
1985	6,119	3,787	0	600	10	0	10,344	172	10,516

HOOD CANAL AREA 12 COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	63	0	900	2,100	0	919	2,144	3,063
1980	0	1,140	0	0	2,600	0	0	3,740	3,740
1981	0	309	0	0	1,600	0	0	1,909	1,909
1982	0	1,124	0	0	2,000	0	0	3,124	3,124
1983	0	645	0	0	1,000	0	0	1,645	1,645
1984	0	669	0	0	2,700	0	0	3,369	3,369
1985	0	619	0	0	1,100	0	0	1,719	1,719

HOOD CANAL AREA 12B COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	152	0	900	4,700	0	924	4,828	5,752
1980	0	5,403	0	3,700	5,800	0	5,804	9,099	14,903
1981	0	2,315	0	5,600	3,800	0	6,979	4,736	11,715
1982	6	3,055	0	0	4,500	0	0	7,561	7,561
1983	0	1,395	0	0	2,200	0	0	3,795	3,795
1984	0	1,853	0	0	6,300	0	0	8,153	8,153
1985	0	1,646	0	0	2,500	0	0	4,146	4,146

QUILCENE/DABOB COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	6,718	374	3,200	1,600	2,300	6,397	3,198	4,597	14,192
1980	16,374	16,882	3,400	7,100	2,800	11,902	24,853	9,801	46,556
1981	4,214	3,033	2,900	3,400	1,800	5,495	6,442	3,410	15,347
1982	6,323	10,999	5,100	2,600	2,200	14,023	7,150	6,049	27,222
1983	8,821	11,618	5,500	600	1,100	21,113	2,303	4,223	27,639
1984	11,146	4,691	3,900	0	900	16,767	0	3,870	20,637
1985	5,317	4,375	1,126	0	200	9,323	0	1,695	11,018

MISCELLANEOUS AREA 12C COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	7,976	5,900	1,100	3,900	10,217	1,905	6,754	18,876
1980	0	9,661	9,000	700	4,700	15,038	1,170	7,853	24,061
1981	0	886	100	0	3,100	128	0	3,958	4,086
1982	0	3,606	200	0	3,700	385	0	7,121	7,506
1983	0	2,477	400	0	1,800	850	0	3,827	4,677
1984	0	4,308	7,300	0	5,100	9,836	0	6,872	16,708
1985	(2)	4,613	2,702	0	2,100	5,295	0	4,118	9,413

SKOKOMISH RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	2,331	8,804	3,100	0	6,600	6,659	0	14,176	20,835
1980	8,879	46,009	31,600	0	8,100	99,041	0	15,547	114,588
1981	8,770	10,714	24,600	0	5,300	40,630	0	8,754	49,384
1982	8,042	18,078	5,200	0	6,300	17,010	0	20,610	37,620
1983	3,895	12,492	4,100	0	3,100	13,431	0	10,156	23,587
1984	6,865	10,166	13,600	0	8,800	23,940	0	15,491	39,431
1985	6,537	13,178	3,577	0	3,600	13,446	0	13,446	26,892

Table II-14. cont

MISCELLANEOUS AREA 12D COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	32	7,342	0	0	10,000	0	0	17,374	17,374
1980	243	8,349	0	0	12,200	0	0	20,792	20,792
1981	0	2,188	0	0	7,900	0	0	10,088	10,088
1982	0	8,881	0	0	9,600	0	0	18,481	18,481
1983	788	6,178	0	0	4,700	0	0	11,666	11,666
1984	0	4,586	0	0	13,200	0	0	17,786	17,786
1985	0	5,189	0	0	5,400	0	0	10,589	10,589

TOTAL HOOD CANAL COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	7,081	24,717	12,200	4,300	29,900	23,273	6,946	50,179	80,398
1980	25,561	87,600	64,000	11,500	36,600	125,981	31,827	67,453	225,261
1981	12,988	19,504	27,600	9,000	23,800	46,253	13,421	33,218	92,892
1982	32,063	56,092	10,500	3,300	28,315	31,418	35,303	63,549	130,270
1983	18,759	38,852	10,000	1,300	13,910	35,394	11,977	35,450	82,821
1984	29,292	29,220	24,800	600	37,010	50,543	14,595	55,784	120,922
1985	17,971	33,407	7,405	600	14,910	28,064	10,344	35,885	74,293

Table II-14. cont

TULALIP COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	5,415	0	0	0	5,415	0	0	5,415
1980	0	9,550	0	0	0	9,550	0	0	9,550
1981	0	17,862	600	0	0	18,462	0	0	18,462
1982	0	16,471	400	0	0	16,871	0	0	16,871
1983	0	6,342	500	0	0	6,842	0	0	6,842
1984	0	0	0	0	0	0	0	0	0
1985	16	21,430	2,784	0	0	24,230	0	0	24,230

SNOHOMISH RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	28,621	16,200	1,400	122,000	19,521	1,687	147,013	168,221
1980	0	115,292	11,200	2,200	94,000	23,223	4,562	194,907	222,692
1981	0	43,416	5,500	400	37,000	11,066	805	74,445	86,316
1982	0	26,095	3,300	0	56,000	4,752	0	80,643	85,395
1983	0	41,713	8,500	0	145,000	10,810	0	184,403	195,213
1984	5	32,278	25,900	0	71,000	34,528	0	94,655	129,183
1985	23	66,926	11,377	0	65,000	21,386	0	121,940	143,326

STILLAGUAMISH RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	67	7,832	0	3,100	36,000	0	3,726	43,273	46,999
1980	2,328	30,165	0	2,800	24,000	0	6,193	53,098	59,293
1981	5,496	20,139	0	5,460	9,000	0	15,013	25,022	40,035
1982	2,818	5,192	0	0	9,000	0	0	17,010	17,010
1983	1,398	4,457	0	0	15,000	0	0	20,855	20,855
1984	1,531	6,506	0	0	18,000	0	0	26,037	26,037
1985	1,965	14,892	0	0	15,000	0	0	31,857	31,857

TOTAL STILLAGUAMISH/SNOHOMISH COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	67	41,868	16,200	4,500	158,000	24,936	5,413	190,286	220,635
1980	2,328	155,007	11,200	5,000	118,000	32,773	10,757	248,005	291,535
1981	5,496	81,417	6,100	5,800	46,000	29,528	15,818	99,467	144,813
1982	2,818	47,758	3,700	0	65,000	21,623	0	97,653	119,276
1983	1,398	52,312	9,000	0	160,000	17,652	0	205,258	222,910
1984	1,536	38,784	25,900	0	89,000	34,528	0	120,692	155,220
1985	2,004	103,248	14,161	0	80,000	45,616	0	153,797	199,413

Table II-14. cont

MISCELLANEOUS AREA 10 COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	157	0	0	500	0	0	657	657
1980	0	347	0	0	800	0	0	1,147	1,147
1981	0	333	0	0	700	0	0	1,033	1,033
1982	0	278	0	0	600	0	0	878	878
1983	0	2,433	2,600	0	600	4,594	0	1,039	5,633
1984	0	1,047	1,500	0	1,100	2,104	0	1,543	3,647
1985	(8)	383	208	0	300	353	0	530	883

LAKE WASHINGTON COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	18,628	12,598	10,400	0	11,000	25,575	0	27,051	52,626
1980	35,369	22,300	5,000	0	11,000	23,022	0	50,647	73,669
1981	7,162	13,347	12,900	0	8,000	25,559	0	15,850	41,409
1982	41,351	32,935	21,600	1,100	7,000	75,627	3,851	24,508	103,986
1983	20,042	30,640	13,300	500	8,000	44,221	1,662	26,599	72,482
1984	20,048	16,522	11,700	300	9,000	32,075	822	24,673	57,570
1985	43,848	42,233	10,462	0	800	55,249	0	42,094	97,343

GREEN-DUWAMISH RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	26,347	14,052	14,200	100	4,000	45,548	321	12,830	58,699
1980	27,828	24,800	24,300	0	5,000	67,947	0	13,981	81,928
1981	19,500	19,644	18,500	800	2,500	51,718	2,237	6,989	60,944
1982	37,278	23,816	12,100	0	2,000	64,528	0	10,666	75,194
1983	25,722	48,345	35,300	0	5,000	100,178	0	14,189	114,367
1984	40,250	26,263	21,000	0	4,000	76,871	0	14,642	91,513
1985	32,717	33,792	8,079	300	3,000	55,341	2,050	20,497	77,888

MISCELLANEOUS AREA 10E COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	37	452	0	0	1,400	0	0	1,889	1,889
1980	1,016	1,353	0	0	2,100	0	0	4,469	4,469
1981	274	986	0	0	1,800	0	0	3,060	3,060
1982	968	1,283	0	200	1,600	0	451	3,600	4,051
1983	1,346	2,157	0	0	1,600	0	0	5,103	5,103
1984	3,316	2,502	0	0	2,900	0	0	8,718	8,718
1985	2,230	2,245	0	0	700	0	0	5,175	5,175

MISCELLANEOUS AREA 11 COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	243	0	0	500	0	0	743	743
1980	0	596	200	0	700	333	0	1163	1496
1981	0	509	100	0	600	173	0	1036	1209
1982	0	593	300	0	500	522	0	871	1393
1983	0	927	200	0	500	465	0	1162	1627
1984	0	1011	200	0	900	384	0	1727	2111
1985	38	407	62	0	200	235	0	472	707

PUYALLUP RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	66,484	37,328	8,000	400	2,000	87,856	4,393	21,963	114,212
1980	69,921	64,931	24,200	0	4,000	139,925	0	23,127	163,052
1981	25,682	35,221	17,200	600	5,000	63,145	2,203	18,355	83,703
1982	42,856	40,175	9,200	100	2,000	76,801	834	16,696	94,331
1983	33,733	69,218	14,600	0	4,000	95,411	0	26,140	121,551
1984	50,356	64,071	16,000	400	3,000	110,373	2,759	20,695	133,827
1985	38,116	63,728	3,646	200	5,000	45,283	2,515	62,892	110,690

Table II-14. cont

MISCELLANEOUS AREA 13 COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	750	0	0	1,100	0	0	1,850	1,850
1980	0	540	0	0	600	0	0	1,140	1,140
1981	493	2,218	0	1,000	600	0	2,694	1,617	4,311
1982	3,063	7,214	0	1,000	1,500	0	5,111	7,666	12,777
1983	261	2,138	0	500	300	0	1,999	1,200	3,199
1984	0	1,599	0	200	1,000	0	466	2,333	2,799
1985	104	1,046	0	0	600	0	0	1,750	1,750

CHAMBERS CREEK COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	0	2,060	3,600	0	600	6,032	0	1,008	7,060
1980	0	2,519	2,500	0	300	4,750	0	569	5,319
1981	0	4,770	4,200	0	300	8,652	0	618	9,270
1982	0	9,595	6,600	0	800	15,157	0	1,838	16,995
1983	0	8,470	4,100	0	100	12,368	0	302	12,670
1984	5,384	11,167	2,400	0	600	15,641	0	3,910	19,551
1985	937	1,824	239	0	50	2,033	0	1,017	3,050

NISQUALLY RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	14,958	47,380	0	3,100	2,000	20,496	13,223	33,719	67,438
1980	15,701	21,053	1,700	0	6,000	9,814	0	34,640	44,454
1981	3,702	13,040	0	3,600	5,000	0	10,608	14,734	25,342
1982	7,550	30,534	0	3,000	13,000	0	10,141	43,943	54,084
1983	2,513	19,184	0	3,000	4,000	0	12,299	16,398	28,697
1984	2,597	8,256	0	2,600	1,000	0	10,439	4,014	14,453
1985	6,080	17,525	0	700	5,000	0	3,599	25,706	29,305

MISCELLANEOUS AREA 13A COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	24,468	21,840	7,300	0	300	51,780	0	2,128	53,908
1980	56,168	81,574	34,000	0	500	169,745	0	2,497	172,242
1981	21,119	35,956	12,600	0	200	68,783	0	1,092	69,875
1982	33,649	76,432	25,000	0	300	133,776	0	1,605	135,381
1983	17,955	63,629	13,300	0	300	93,084	0	2,100	95,184
1984	18,809	56,360	23,300	0	200	97,829	0	840	98,669
1985	18,192	63,572	24,340	0	200	105,437	0	867	106,304

SQUAXIN PENS COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	6,610	5,319	1,200	0	0	13,129	0	0	13,129
1980	4,333	4,618	800	0	0	9,751	0	0	9,751
1981	22,414	25,455	1,600	0	0	49,469	0	0	49,469
1982	25,728	41,916	6,600	0	0	74,244	0	0	74,244
1983	29,345	71,514	6,100	0	0	106,979	0	0	106,979
1984	35,315	47,576	400	0	0	83,291	0	0	83,291
1985	39,631	59,353	400	0	0	99,584	0	0	99,584

DESCHUTES RIVER COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	3,513	6,751	0	100	6,300	0	260	16,404	16,664
1980	2,437	4,801	0	100	2,800	0	349	9,789	10,138
1981	1,017	5,000	0	200	3,500	0	525	9,192	9,717
1982	5,139	17,685	0	0	8,500	0	0	31,324	31,324
1983	9,112	27,246	0	0	4,400	0	0	40,758	40,758
1984	7,728	16,352	0	0	4,548	0	0	28,628	28,628
1985	12,164	26,879	0	0	5,903	0	0	44,946	44,946

Table II-14. cont

MISCELLANEOUS AREA 13B COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	5,215	10,022	0	0	9,500	0	0	24,737	24,737
1980	4,439	8,582	0	0	5,100	0	0	18,121	18,121
1981	1,594	7,837	0	0	3,800	0	0	15,231	15,231
1982	8,751	29,499	0	600	13,400	0	2,239	50,011	52,250
1983	4,763	14,242	0	0	2,300	0	0	21,305	21,305
1984	15,798	33,300	0	0	9,200	0	0	58,298	58,298
1985	21,859	48,291	0	0	10,600	0	0	80,750	80,750

TOTAL SOUTH PUGET SOUND COHO

YEAR	EX. TERM CATCH	TERMINAL CATCH	SPAWNING ESCAPEMENT HATCH	OFF STA	WILD	TERMINAL RUN SIZE HATCH	OFF STA	WILD	TOTAL
1979	166,260	139,752	44,700	3,700	39,200	250,436	18,197	144,979	413,612
1980	217,212	230,014	92,700	100	38,900	425,287	349	161,290	586,926
1981	102,957	164,316	47,100	6,200	34,000	267,499	18,267	88,807	374,573
1982	206,333	311,955	81,400	6,000	51,200	440,655	22,627	193,606	656,888
1983	144,812	340,143	89,500	4,000	31,100	457,300	15,960	156,295	629,555
1984	199,601	286,026	76,500	3,500	37,448	418,568	14,486	170,021	603,075
1985	215,908	361,478	47,436	1,200	32,353	363,515	8,164	286,696	658,375

TABLE II-15. Expected and Preliminary Escapement Estimates For Coho Stocks Critical to PFMC Ocean Management in 1985 (Thousand Fish)

Stock	Ocean Escapement Preseason	Ocean Escapement Postseason	Spawning Escapement Postseason	Spawning Escapement Goal
Skagit Natural	26.1	31.5	18.0	30.0
Stillaguamish Natural	25.2	34.1	15.0	17.0
Quillayute Fall Natural	19.2	15.3	7.5	6.3-15.8
Hoh Natural	6.6	5.5	2.1	2.0-5.0
Queets Natural	11.3	6.1	4.0	5.8-14.5
Grays Harbor Natural	56.4	NA	NA	35.4
Columbia River Late Hatchery	47.9	130.0	NA	40.0-50.0
Oregon Coastal Natural	105.2-172.6	NA	145-178	166.7

APPENDIX A. SUMMARY OF 1985 OCEAN SALMON MANAGEMENT

Troll Fishing Regulations

A summary of the actual 1985 non-treaty troll fishing regulations for both the fishery conservation zone (FCZ) and state territorial waters (zero to three miles) is provided in Table I-1. The actual seasons in the FCZ south of Cape Falcon did not vary from the Council's preseason recommendations. However, north of Cape Falcon several inseason management changes were implemented, primarily due to a large over-quota harvest of coho in the July 15 through July 18 troll fishery north of Leadbetter Point.

Adequate abundance of Sacramento fall chinook allowed for a May 1 through September 30 season off California south of Point Delgada. Based on a record low projection of the abundance of Klamath River fall chinook, no general troll season was allowed between Point Delgada and Cape Blanco, Oregon. However, a limited late season fishery for local stocks of chinook was allowed near the mouths of the Elk and Sixes rivers in Oregon state territorial waters. The commercial season off Oregon was primarily a chinook fishery with a small incidental harvest of coho allowed during part of July.

North of Cape Falcon the fisheries were limited primarily by projected low abundance of Skagit River coho and Spring Creek Hatchery tule fall chinook. The May chinook fishery was initially closed on the fourteenth and then reopened for the last eleven days of the month when updated harvest estimates disclosed that the quota had not been met. The fishery north of Leadbetter Point opened on July 15 with exceptionally high coho catch rates. Even though the fishery was closed within 4 days, the harvest of coho exceeded the quota by almost 58,000 fish. This significant over-quota harvest required emergency action by the Council to modify the remaining troll seasons to reduce their coho harvest impacts.

Actual seasons for 1985 treaty Indian troll fisheries in ocean management areas and area 4B are summarized in Table I-2. Treaty troll fisheries were regulated under chinook and coho quotas in response to concerns for projected low abundance of Spring Creek tule hatchery chinook and Skagit naturally-spawning coho. During the season, the Makah, Quileute, Hoh, and Quinault tribes agreed to institute a number of management measures such as monthly catch targets, coho to chinook landing ratios, and size limits in an attempt to meet quotas for both species. A pink only fishery was conducted from August 15 through August 31 after the monthly catch target for coho was reached. The Quinault, Quileute, Hoh, and Makah treaty troll fisheries were closed on September 4 when chinook and coho qutoas were reached. The Makah Tribe opened an all-species troll fishery in ocean and inside areas from September 10 through September 11 and conducted a ceremonial and subsistence coho fishery during the periods September 7 through September 10 and September 11 through September 30 in area 4B.

A summary of troll fishing regulations since 1977 for each of the three Pacific coast states and for treaty Indian troll fisheries is provided in Appendix C, Tables C-1, C-3, C-5, and C-7. Appendix C also contains a chronological summary of ocean salmon management events for 1985.

Table I-1. Summary of actual ocean troll salmon fishing regulations for 1985.

Area	Season			Preseason quota		Special Restrictions[a/b/]
	Salmon Species	Dates	Total Days	Chinook	Coho	
U.S.-CANADA BORDER TO CAPE FALCON, OR	All except coho	May 1-14 May 21-31	25	27,000	-	Conservation Zone 1 (Columbia R. mouth) closed
U.S.-Canada Border to Carroll Island	All except coho	Aug. 3-31[c/]	29	960[c/]	31,200[c/]	Flashers with bare, blued hooks only
Capa Alava to Leadbetter Point	All	July 15-18	4	16,100	78,500	
South Jetty at Columbia River Mouth to Cape Falcon	All	Aug. 21	1	2,700	32,000[d/]	
CAPE FALCON TO CAPE BLANCO, OR	All except coho	May 1-June 30	61	none	-	During the all-salmon season one more coho than chinook may be retained, provided at least one chinook is retained
	All	July 1-26	26	none	e/	
	All except coho	July 27-Oct. 31	97	none	-	
Tower Rock to Cape Blanco	All except coho	Nov. 1-30	30	none	-	Open only inside 3 miles
CAPE BLANCO TO POINT DELGADA, CA						
Cape Blanco to Humbug Mountain, OR	All except coho	Oct. 1-Nov. 30	61	none	-	Open only inside 3 miles
POINT DELGADA TO U.S.-MEXICO BORDER	All except coho	May 1-31	31	none	-	Not more than 6 lines per boat
	All	June 1-Sept. 30	122	none	e/	

a/ Barbless hooks required in all areas in 1985 except for (1) federal regulations could not be changed inseason to match state imposed barbless hook regulation in the August fishery north of Carroll Island and (2) north of Cape Falcon barbed hooks could be used with whole bait or plugs.

b/ Minimum size limits north of Cape Falcon, Oregon were 28 inches for chinook and 16 inches for coho. Minimum size limits south of Cape Falcon were 26 inches for chinook, 16 inches for coho caught off Oregon, and 22 inches for coho caught off California.

c/ Quotas adjusted inseason prior to opening date to 2,150 chinook and zero coho. Effective August 22, WDF restricted landings of chinook to not more than one chinook per twenty pink salmon.

d/ Quota adjusted inseason prior to opening date to 10,000.

e/ Coho quota south of Cape Falcon was 55,000 including a 10,000 hooking mortality during the all-except-coho season. The all-salmon fishery south of Point Delgada does not close for coho when the quota is reached.

Table I-2. Summary of actual treaty Indian troll seasons for 1985.

Tribe and Area	Seasons: Species	Seasons: Dates	Seasons: Days	Minimum Size Limit: Chinook	Minimum Size Limit: Coho
Quinault, Hoh, and Quileute Tribes	Chinook	May 1-22	22	26"	16"
	All	June 15-July 22	37	28"[a/]	16"
	All	Aug. 1-10[b/]	10	26"	16"
	Pink	Aug. 16-31	16	NA	NA
	All	Sept. 1-4	4	26"	16"
Makah Tribe Inside 3 Miles, Areas 3N, 4, 4A	All	Jan. 1-April 30	120	22"	20"
	Chinook	May 1-20	20	24"	NA
	All	June 15-30	16	28"	20"
	All	July 1-20	20	24"	20"
	All	Aug. 1-10[b/]	10	28"	20"
	Pink	Aug. 15-31	17	NA	NA
	All	Sept. 1-4	4	28"	20"
	All	Sept. 10-11	2	28"	20"
	All	Oct. 1-Dec. 31	92	22"	20"
3-200 Miles, Areas 3N, 4, 4A	Chinook	May 1-20	20	24"	NA
	All	June 15-30	16	28"	20"
	All	July 1-20	20	24"	20"
	All	Aug. 1-10[b/]	10	28"	20"
	Pink	Aug. 15-31	17	NA	NA
	All	Sept. 1-4	4	28"	20"
	All	Sept. 10-11	2	28"	20"
Area 4B	Chinook	May 1-20	20	24"	NA
	All	June 15-30	16	28"	20"
	All	July 1-20	20	24"	20"
	All	Aug. 1-10	10	28"	20"
	Pink	Aug. 15-31	17	NA	NA
	All	Sept. 1-4	4	28"	20"
	Coho	Sept. 7-10[c/]	3	NA	0
	All	Sept. 10-11[d/]	2	28"	20"
	Coho	Sept. 11-30[c/]	20	NA	0
	All	Oct. 1-31	31	22"	20"
Klallam Tribes (Area 4B)	All	Jan. 1-Dec. 31	365	22"[e/]	16"

a/ Size limit 28 inches from June 15-30, maximum coho to chinook landing ratio of 10 to 1.
b/ Landing ratio of 13 coho to 1 chinook.
c/ Ceremonial and subsistence fishery.
d/ Landing ratio of 20 coho to 1 chinook.
e/ Maximum size limit of 30 inches for chinook from April 14 through June 15.

Recreational Fishing Regulations

A summary of the actual recreational fishing regulations for both the FCZ and state territorial waters is provided in Table I-3.

Several inseason management changes were made in both state and federal regulations. The season off California was governed by normal regulations except that unexpectedly high harvests of chinook off northern California and concern for depressed chinook stocks led to inseason management actions closing fishing on Mondays and Tuesdays between July 22 and August 31 for the area between the California-Oregon border and Point Delgada. Off Oregon south of Cape Falcon the all-salmon season began July 1 and remained open through Labor Day under its coho quota of 170,000. North of Cape Falcon, where seasons opened on June 30, the special five day per week fishery was effective in extending the fisheries. The Cape Falcon to Leadbetter Point subarea closed on August 22 while the subarea north of Leadbetter Point to the Queets River extended to Labor Day, plus one additional weekend after the state imposed Labor Day closure. Additionally, an inseason quota transfer, nearshore closures, and chinook retention restrictions were employed to extend the fishery north of the Queets River through September 1.

A summary of recreational fishing regulations since 1977 for each of the three Pacific coast states is provided in Appendix C, Tables C-2, C-4, and C-6.

Fishing Effort and Harvest

Coastwide Summary

A coastwide summary of ocean fishing effort and harvest is provided in Tables I-4 through I-8 for chinook, coho, and pink salmon. The combined harvest by the 1985 commercial troll ocean salmon fisheries of California, Oregon, and Washington amounted to 629,000 chinook; 310,000 coho; and 153,000 pinks. The recreational fleet harvested 245,000 chinook; 376,000 coho; and 11,000 pinks.

The commercial chinook harvest was 161 percent of the 1984 catch and 60 percent of the 1971-1975 average. Coastwide recreational chinook harvest was 217 percent of the 1984 catch and 57 percent of the 1971-1975 average.

The commercial coho harvest was 250 percent of the 1984 catch, but only 14 percent of the 1971-1975 average. Coastwide recreational coho harvest was 207 percent of the 1984 catch and 42 percent of the 1971-1975 average.

The commercial pink harvest was 146 percent of the 1983 catch and 251 percent of the 1971-1975 (odd year) average. Coastwide recreational pink harvest was 275 percent of the 1983 catch.

A complete listing of historical effort and harvest data for each state and for treaty Indian troll fisheries is provided in tabular form in Appendix A.

Table I-3. Summary of actual ocean recreational salmon fishing regulations for 1985.

Area	Season			Preseason quota		Bag Limit and Special Restrictions[a/b/]
	Salmon Species	Dates	Total Days	Chinook	Coho	
U.S.-CANADA BORDER TO QUEETS RIVER, WA	All[c/]	June 30-Sept. 1	46	1,700[c/]	28,400[c/]	2 fish, no more than one chinook; closed Fridays and Saturdays[c/]
QUEETS RIVER TO LEADBETTER POINT, WA	All	June 30-Sept. 8[d/]	51	23,300	74,000	2 fish; closed inside 3 miles and closed Fridays and Saturdays thru Aug. 29
LEADBETTER POINT TO CAPE FALCON, OR	All	June 30-Aug. 22	40	12,100	99,000	2 fish; closed (1) Fridays and Saturdays, (2) Red Buoy line at Columbia River mouth to Klipsan Beach 0-200 miles, and (3) north of Klipsan Beach 0-3 miles
CAPE FALCON TO CAPE BLANCO, OR	All	July 1-Sept. 2	64	None	170,000[e/]	First 2 fish per day, no more than 6 fish in 7 days
Twin Rocks to Pyramid Rock	All except coho	Sept. 15-Oct. 31	47	None	-	Open inside the latitude of the Whistle Buoy at the mouth of Tillamook Bay
Tower Rock to Cape Blanco	All except coho	Oct. 1-Nov. 30	61	None	-	Open inside 3 miles
CAPE BLANCO TO OR-CA BORDER	All	May 25-31	7	None	None	First 2 fish per day, no more than 6 fish in 7 days
	All	July 1-Sept. 2	64	None	170,000[e/]	
	All except coho	Sept. 3-Oct. 31	59	None	-	
Cape Blanco to Humbug Mountain	All except coho	Nov. 1-30	30	None	-	Open inside 3 miles
OR-CA BORDER TO U.S.-MEXICO BORDER	All	Feb. 16-Nov. 17[f/]	275	None	None	2 fish; 12-mile square closed at mouth of Klamath River, Aug. 1-Aug. 31

a/ Barbless hooks required in all areas except between Cape Falcon and the Oregon-California border.
b/ Minimum size limits north of Cape Falcon, Oregon were 24 inches for chinook and 16 inches for coho. Between Cape Falcon and the Oregon-California border there were no minimum size limits. Off California the minimum size limits were 20 inches for both chinook and coho.
c/ Effective July 24, the State of Washington closed the area inside a line approximately one mile offshore from Sekiu River to the Umatilla Reef light. Effective August 15 the state changed the bag limit to allow only the retention of coho salmon. An inseason recommendation by the Council for transferring quotas resulted in a quota of 2,450 chinook and 25,400 coho for this area.
d/ Fishing closed by state regulations September 3-6 and reopened September 7-8. Federal closure followed on September 11 at midnight.
e/ Includes all coho caught south of Cape Falcon to U.S.-Mexico border.
f/ Closed north of Point Delgada on Mondays and Tuesdays, July 19-August 31 by state regulation (identical federal regulation effective on August 2).

Table I-4. Coastwide chinook catches (thousands of fish) in the ocean troll and ocean sport fisheries, 1971-1985 and the 1971-1975 average.

Year	California[a/]			Oregon[b/]			Washington[c/]			PFMC Area			Canadian		Southeast Alaska		Grand Total
	Troll	Sport	Total	Troll	Sport	Total	Troll	Sport	Total	Troll	Sport	Total	Troll	Sport	Troll	Sport	
1971	434	188	622	103	30	133	252	160	412	789	378	1,167	1,270	134	334	15	2,920
1972	492	200	692	127	44	171	203	212	415	822	456	1,278	1,223	175	242	15	2,933
1973	817	198	1,015	363	61	424	317	204	521	1,497	463	1,960	1,091	223	308	17	3,599
1974	492	157	649	224	37	261	353	215	568	1,069	409	1,478	1,178	271	322	17	3,266
1975	579	104	683	225	76	301	274	262	536	1,078	442	1,520	1,103	386	287	17	3,313
1971-1975 Average	563	169	732	209	49	258	280	210	490	1,052	429	1,481	1,173	238	299	16	3,206
1976	540	81	621	184	79	263	359	171	530	1,083	331	1,414	1,249	506	231	17	3,417
1977	600	104	704	340	61	401	265	175	440	1,205	340	1,545	1,111	382	272	17	3,327
1978	638	72	710	192	23	215	166	96	262	996	191	1,187	1,033	486	376	17	3,099
1979	727	122	849	245	21	266	147	77	224	1,119	220	1,339	997	440	338	17	3,131
1980	589	84	673	209	19	228	135	54	189	933	157	1,090	1,002	414	300	20	2,826
1981	588	82	670	160	29	189	117	84	201	865	195	1,060	868	285	248	21	2,482
1982	765	144	909	232	39	271	160	107	267	1,157	290	1,447	994	196	242	26	2,905
1983	294	63	357	79	25	104	75	48	123	449	136	585	759	228	271	22	1,865
1984	300	89	389	64	17	81	28	7	35	391	113	504	811	443	236	22	2,016
1985	360	161	521	217	56	273	52	28	80	629	245	874	632	272	217	23	2,018

a/ California troll estimates are preliminary for 1985 and sport estimates are preliminary for 1981-1985.
b/ Includes troll catches from Alaska, Washington, and California landed in Oregon. Preliminary data for 1984-1985.
c/ Includes troll catches from Alaska, Oregon, and California landed in Washington. Preliminary data for 1984-1985.

Table I-5. Coastwide coho catches (thousands of fish) in the ocean troll and ocean sport fisheries, 1971-1985 and 1971-1975 average.

Year	California[a/]			Oregon[b/]			Washington[c/]			PFMC Area			Canadian		Southeast Alaska		Grand Total
	Troll	Sport	Total	Troll	Sport	Total	Troll	Sport	Total	Troll	Sport	Total	Troll	Sport	Troll	Sport	
1971	442	67	509	1,490	312	1,802	1,264	747	2,011	3,196	1,126	4,322	3,457	NA	391	NA	8,170
1972	158	45	203	825	248	1,073	575	542	1,117	1,558	835	2,393	2,369	335	792	NA	5,889
1973	348	32	380	796	232	1,028	702	472	1,174	1,846	736	2,582	2,483	373	540	NA	5,978
1974	656	77	733	1,137	314	1,451	1,038	595	1,633	2,831	986	3,817	2,700	772	845	NA	8,134
1975	204	21	225	657	252	909	774	481	1,255	1,635	754	2,389	1,404	454	214	NA	4,461
1971-1975 Average	362	48	410	981	272	1,253	870	567	1,437	2,214	887	3,101	2,482	484	556	NA	6,526
1976	622	58	680	1,827	501	2,328	1,377	943	2,320	3,827	1,502	5,329	2,876	415	525	NA	9,145
1977	35	27	62	446	195	641	710	490	1,200	1,191	712	1,903	2,248	682	507	36	5,376
1978	238	44	282	612	260	872	610	470	1,080	1,460	774	2,234	2,570	1,103	1,101	49	7,057
1979	164	16	180	715	181	896	667	290	957	1,546	487	2,033	2,906	414	919	23	6,295
1980	50	21	71	383	326	709	389	362	751	823	709	1,531	2,695	642	707	33	5,608
1981	78	10	88	620	200	820	400	238	638	1,100	448	1,548	2,112	406	862	28	4,956
1982	90	25	115	522	175	697	379	206	585	991	406	1,397	2,509	454	1,322	53	5,735
1983	57	27	84	320	147	467	68	209	277	445	383	828	3,456	404	1,280	55	6,023
1984	43	19	62	14	123	137	67	40	107	124	182	306	3,148	443	1,133	60	5,090
1985	11	15	26	84	182	266	216	179	395	310	376	686	2,239	728	1,589	NA	5,241[d/]

a/ California troll estimates are preliminary for 1985 and sport estimates are preliminary for 1981-1985.
b/ Includes troll catches from Alaska, Washington, and California landed in Oregon. Preliminary data for 1984-1985.
c/ Includes troll catches from Alaska, Oregon, and California landed in Washington. Preliminary data for 1984-1985.
d/ Incomplete.

Table I-6. Coastwide pink salmon catches (thousands of fish) in the ocean troll and ocean sport fisheries, 1971-1985 and 1971-1975 average.

Year	California	Oregon			Washington			PFMC Area			Canada	Southeast Alaska	Grand
	Troll	Troll	Sport	Total	Troll	Sport	Total	Troll	Sport	Total	Troll	Troll	Total
1971	1	2	NA	NA	21	9	30	24	NA	NA	1,284	105	NA
1972	a/	a/	a/	a/	4	a/	4	a/	a/	a/	1,033	167	1,200
1973	19	3	2	5	55	8	63	77	10	87	1,232	135	1,454
1974	a/	a/	a/	a/	1	a/	1	1	a/	a/	609	265	874
1975	3	a/	1	1	77	14	91	80	15	95	1,288	77	1,460
1971-1975 Average[b/]	8	2	NA	NA	51	10	61	61	NA	NA	1,089	150	NA
1976	a/	0	0	a/	2	0	2	2	0	2	781	194	977
1977	1	88	4	92	286	29	315	375	33	419	2,677	281	3,368
1978	NA	a/	0	a/	4	0	4	NA	0	NA	428	618	NA
1979	a/	21	1	21	561	18	578	582	19	599	4,036	629	5,264
1980	a/	a/	0	a/	1	0	1	1	0	1	1,295	268	1,564
1981	7	60	2	62	237	10	247	304	12	316	4,150	579	5,035
1982	a/	a/	0	a/	a/	0	a/	1	0	1	NA	534	NA
1983	a/	a/	a/	a/	106	4	110	106	4	110	NA	498	NA
1984[c/]	a/	0	a/	a/	a/	a/	a/	a/	a/	a/	NA	573	NA
1985[c/]	7	45	8	52	108	3	111	160	11	171	4,091	968	5,230

a/ Less than 500 fish.
b/ Odd year average for California, Oregon, Washington, and PFMC.
c/ Preliminary.

Table I-7. Ocean salmon troll effort and landings for California, Oregon, and Washington, 1976-1985 and 1971-1975 averages.

Year	Effort in Thousands: Number of Deliveries	Effort in Thousands: Days Fished	Catch: Numbers (thousands): Chinook	Numbers (thousands): Coho	Numbers (thousands): Pink	Pounds[a/] (thousands): Chinook	Pounds[a/] (thousands): Coho	Pounds[a/] (thousands): Pink
California								
1971-1975 Average	45.2	NA	562.7	361.6	7.8[b/]	5,742.8	2,211.3	37.0[b/]
1976	60.0	NA	539.9	621.8	c/	4,943.9	2,843.9	c/
1977	61.5	NA	600.2	45.2	1.8	5,637.0	283.2	9.3
1978	66.9	98.5	637.7	315.8	c/	5,492.4	1,295.1	c/
1979	56.1	104.4	726.8	184.4	0.7	7,547.8	1,198.0	3.8
1980	51.1	82.4	588.7	49.8	0.1	5,715.2	301.6	0.4
1981	47.8	69.0	588.1	83.9	7.0	5,534.8	477.2	28.3
1982	57.7	92.6	765.2	91.9	c/	7,448.6	551.9	c/
1983	30.4	43.1	294.0	59.9	c/	2,144.4	266.4	c/
1984	25.0	42.5	299.8	47.0	0	2,620.6	348.7	0.0
1985[d/]	32.4	53.3	360.3	11.1	7.0	4,506.2	81.2	39.7
Oregon[e/]								
1971-1975 Average	45.6	NA	208.5	981.0	1.8[b/]	2,127.9	6,015.4	8.0[b/]
1976	75.8	NA	184.3	1,827.0	0	1,921.6	9,061.2	0.0
1977	85.1	NA	340.0	446.1	88.0	3,464.9	2,640.8	396.1
1978	45.7	NA	191.5	611.6	<0.1	1,893.6	2,779.0	0.2
1979	43.6	48.8	245.5	714.6	20.5	2,580.0	4,586.3	106.3
1980	29.9	39.9	209.4	383.3	0.3	2,171.5	2,190.2	1.6
1981	35.1	45.2	160.4	620.3	60.2	1,573.4	3,324.3	324.0
1982	26.5	33.9	232.8	521.9	<0.1	2,351.3	2,708.4	<0.1
1983	17.4	22.1	79.6	319.8	<0.1	654.8	1,098.0	0.2
1984	5.6	7.9	64.3	14.1	0	549.7	71.0	0.0
1985[d/]	15.7	21.1	216.6	84.0	44.9	2,029.8	483.8	258.6
Washington[f/]								
1971-1975 Average	NA	53.8[g/]	279.5	869.0	50.3[b/]	3,211.2	4,804.1	240.6[b/]
1976	NA	60.6[h/]	359.0	1,377.2	1.5	3,802.4	6,231.5	5.8
1977	NA	56.9[h/]	264.6	709.7	285.5	2,834.5	3,713.5	1,384.2
1978	NA	43.5[h/]	166.1	609.8	3.5	2,073.5	2,802.2	13.4
1979	NA	42.5[h/]	147.2	666.7	560.7	1,686.6	3,657.5	2,534.4
1980	NA	27.5[h/]	135.1	388.9	1.7	1,666.4	1,972.1	7.5
1981	NA	28.7[h/]	117.1	400.4	236.6	1,237.8	1,751.5	928.5
1982[d/]	NA	20.1[h/]	160.3	378.9	0.3	1,650.2	1,935.2	0.9
1983[d/]	NA	13.5[h/]	75.4	67.8	106.4	686.9	193.1	374.1
1984[d/]	NA	3.1[h/]	27.5	66.8	0	192.2	212.8	0
1985[d/]	NA	8.1[h/]	52.4	216.4	108.3	524.2	1,053.3	487.3

a/ Dressed weight.
b/ Odd-year average.
c/ Under 50.
d/ Preliminary.
e/ Includes catches made off California, Washington, and Alaska and landed in Oregon.
f/ Includes treaty Indian catches (ocean and 4B only) and catches made off Oregon, California, and Alaska and landed in Washington.
g/ This is a 1973-1975 average; 1971 and 1972 effort data are deliveries and are not comparable.
h/ Includes treaty Indian deliveries which represent a minimum estimate of days fished.

Table I-8. Ocean salmon recreational effort and catch off California, Oregon, and Washington, 1976-1985 and 1971-1975 average.

Year	Angler Trips (thousands) Salmon Trips	Angler Trips (thousands) Total Trips	Catch (thousands of fish) Chinook	Coho	Pinks	Total	Salmon/ Angler Trip
California							
1971-1975 Average	242.2		169.6	48.3		217.9	0.90
1976	182.2		81.0	57.9		138.9	0.76
1977	182.2		103.6	14.2		117.8	0.65
1978	156.1		72.0	41.0		113.0	0.72
1979	163.6		122.2	15.4		137.6	0.84
1980	148.4		84.1	21.0		105.1	0.71
1981	128.0		82.3	9.3		91.6	0.72
1982	170.4		144.3	26.1		170.4	1.00
1983	111.6		63.2	27.7		90.9	0.81
1984	123.6		88.6	19.0		107.6	0.87
1985[a/]	185.6		160.6	15.2		175.8	0.95
Oregon[b/]							
1971-1975 Average	NA	345.8	49.4	271.8	1.1[c/]	321.8	0.93
1976	NA	538.4	79.3	501.3		580.6	1.08
1977	NA	404.5	61.4	195.3	4.0	260.7	0.64
1978	NA	403.7	22.8	259.8		282.6	0.70
1979	301.3	341.8	20.9	180.8	0.6	202.3	0.67
1980	331.4	362.0	19.0	325.8		344.9	1.04
1981	311.0	346.7	29.2	199.8	1.6	230.6	0.74
1982	226.0	249.7	38.7	175.1		213.8	0.95
1983	226.0	261.5	24.7	146.9	<0.1	171.7	0.76
1984	153.1	203.6	17.0	123.3	<0.05	140.3	0.92
1985[a/]	251.6	270.9	55.9	182.5	7.7	246.1	0.98
Washington							
1971-1975 Average	482.9		210.4	567.4	10.1[c/]	787.9	1.60
1976	538.1		170.7	942.8		1,113.5	2.07
1977	530.0		175.0	490.2	29.3	694.5	1.31
1978	482.8		96.4	469.8		566.2	1.17
1979	310.7		76.9	290.3	17.6	384.8	1.24
1980	280.1		53.6	361.5		415.1	1.48
1981	234.7		84.4	237.6	10.2	332.2	1.42
1982[d/]	218.1		106.7	206.0		312.7	1.43
1983	209.5		48.3	209.3	4.5	262.0	1.25
1984	36.8		6.9	40.4		47.3	1.29
1985[a/]	127.9		28.1	178.9	3.1	210.1	1.64

a/ Preliminary.
b/ Oregon fish/angler computed on total angler trips prior to 1979 and on salmon trips beginning in 1979.
c/ Odd-year pink average for 1971-1975.
d/ Includes Washington-based effort and catch from Oregon state waters (July 26-August 1) and Strait of Juan de Fuca after WDF and NMFS ocean closures.

Quota Attainment

South of Cape Falcon, a quota was established at 170,000 coho for recreational fisheries. The actual catch of 166,700 coho in this fishery was 2 percent below the quota.

All ocean non-treaty and treaty Indian troll fisheries in the area north of Cape Falcon, except the winter treaty troll fishery, were regulated by catch quotas for both chinook and coho. The total impact for some fisheries included an additional non-landed component representing estimated numbers of fish killed through the process of hook and release. Table I-9 summarizes the catch quotas and actual landings associated with each fishery.

Non-treaty - Non-treaty troll chinook impacts were within established limits for individual fisheries. The total chinook harvest of 43,200 was 4,300 fish less than the overall non-treaty troll fishery quota of 47,520.

All non-treaty troll fishery coho harvests exceeded established catch quotas. The total coho harvest for non-treaty troll fisheries in the area north of Cape Falcon was 169,100 fish, 77,600 fish greater than the allowable catch quota. The non-treaty troll fishery south of Cape Falcon landed 54,900 coho, 9,900 above the 45,000 catch quota.

The total chinook catch for the recreational fishery north of Cape Falcon was 31,680, and was 6,200 fish less than the overall quota of 37,850 chinook. Individual port or area chinook catches were within the quota harvest amounts, but for the Neah Bay-LaPush area, the total fishery impact including hooking mortality, was approximately 200 fish greater than the catch quota of 2,450 chinook. The total coho catch for the recreational fishery north of Cape Falcon was 209,800, exceeding the overall quota by 11,400 fish. By individual port or area, coho catches were within established quotas, except for the Leadbetter Point to Cape Falcon area, where the catch was 110,800 compared to the quota of 99,000.

Treaty Indian Troll - The summer season (May through September) treaty Indian troll ocean fishery was constrained by harvest quotas of 75,000 coho and 10,500 chinook. Both quotas were exceeded. The summer season catch was 87,200 coho and 12,000 chinook.

California Troll Fishery

Troll effort for California totaled 53,300 days fished (Table I-7). This was a 25 percent increase over the 42,500 days fished in 1984, but was only 60 percent of the 1978-1982 average of 89,400. Chinook landings of 360,300 increased 20 percent over 1984 landings of 299,800 chinook, but were only 64 percent of the 1971-1975 average of 562,700. Coho landings of 11,100 were 24 percent of 1984 landings of 47,000 coho and only 3 percent of the 1971-1975 average of 361,600.

California Recreational Fishery

California recreational fishery effort for the 1985 season totaled 185,600 angler trips (Table I-8). This compares to 123,600 trips in 1984 and an average of 242,200 trips for the 1971-1975 period. Chinook landings in 1985

Table I-9. The PFMC 1985 coho and chinook quotas and actual harvest, in numbers of fish by management area and fishery.

Fishery Management Area	Chinook			Coho		
	Quota	Harvest	Percent of Quota	Quota	Harvest	Percent of Quota
NON-TREATY						
Troll[a/]						
North of Cape Falcon						
May Season	27,000	27,000	100	-	-	-
July Season	16,100	11,300	70	81,500	136,300	167
August (Columbia River)	2,700	1,000	35	10,000	32,800	325
August (Pink)	1,720[b/]	3,900	227	0[c/]	<50	-
Subtotal	47,520	43,200	91	91,500	169,100	185
South of Cape Falcon	-	567,800		45,000[d/]	54,910	122
Recreational						
North of Cape Falcon						
North of Queets River	2,450	2,380	97	25,400	25,400	100
Queets River to Leadbetter Pt.	23,300	18,100	78	74,000	73,600	99
Leadbetter Pt. to Cape Falcon	12,100	11,200[e/]	93	99,000	110,800[e/]	112
Subtotal	37,850	31,680	84	198,400	209,800	106
South of Cape Falcon	-	212,900		170,000	166,700	98
TREATY INDIAN						
Troll	10,500	12,000	114	75,000	87,200	116

a/ A chinook impact limitation of 50,900 fish from the U.S.-Canada border to Cape Falcon, Oregon was established during the season.

b/ The 1,720 chinook listed here is a harvest quota. A hooking mortality limit of 7,430 chinook also was established.

c/ Quota for coho salmon was reduced inseason from 31,200. A hooking mortality limit of 7,500 coho also was established.

d/ In addition, a postseason hooking mortality of 44,000 coho was established. The fishery south of Point Delgada was not closed when the south of Cape Falcon quota was predicted to be reached.

e/ Buoy 10 catches of 2,100 chinook and 10,200 coho from August 18-22 counted towards the area quotas. When the fishery reopened on August 31, coho catches no longer counted towards the area quota. The August 31-September 2 Buoy 10 fishery had a 10,000 coho quota and catches were 300 chinook and 10,100 coho.

were 160,600 fish compared to 88,600 in 1984 and an average of 169,600 for the 1971-1975 period. Coho landings in 1985 were 15,200 fish compared to 19,000 coho in 1984, and an average of 48,300 for the 1971-1975 period.

Oregon Troll Fishery

Troll effort for Oregon totaled 21,100 vessel days, an increase of 13,200 days fished over 1984 (167 percent). Chinook landings increased significantly to 216,600 fish, well above the low 1984 landings of 64,300 fish and 4 percent above the 1971-1975 average (Table I-7). Coho landings of 84,000 fish were well above the record low of 14,100 coho in 1984 but were well below the 1971-1975 average of 981,000. Pink landings of 44,900 compared to less than 100 fish landed in 1983 and a high of 88,000 landed in 1977.

Oregon Recreational Fishery

Oregon recreational fishery effort for the 1985 season totaled 251,600 salmon angler trips compared to 153,100 trips in 1984 (Table I-8). Chinook landings in 1985 were 55,900 fish compared to 17,000 in 1984 and an average 49,400 for the period 1971-1975. Most of the chinook catch was taken during July (31,400 fish) followed by August (20,800 fish). Brookings was the leading port of landing with a record high 36,100 chinook landed, followed by Coos Bay with 9,500 fish. Coho landings in 1985 were 182,500 fish compared to a record low season catch of 123,300 in 1984, and an average of 271,800 for the 1971-1975 period. Pink salmon landings were 7,700 compared to less than 100 fish landed in 1983 and an average of 1,100 fish for odd years of the period 1971-1975.

Washington Troll Fishery

Non-treaty - Non-treaty troll effort for Washington totaled 6,200 days fished (Appendix A, Table A-11). This is a substantial increase over the 1,100 days fished in 1984, but only 12 percent of the 1971-1975 average of 52,400. Chinook landings of 34,400 fish increased significantly above the record low 1984 landings of 9,800 fish, but were only 13 percent of the 1971-1975 average of 264,900 fish. Coho landings of 129,100 compared to the record low 23,400 coho for 1984 and the 1971-1975 average of 858,300. Pink landings of 101,700 compared to 86,600 landed in 1983 and a high of 554,300 landed in 1979.

Treaty Indian - Total deliveries by 1985 treaty Indian ocean troll fisheries were 1,800, approximately 84 percent of the number of deliveries in 1984 (Appendix A, Table A-13). Deliveries in the Strait of Juan de Fuca chinook fishery accounted for 52 percent of all deliveries, but were 34 percent lower than 1984. The total chinook harvest was 17,900 in 1985, compared to 17,700 in 1984. Approximately 42 percent of the total ocean chinook catch was taken in the Strait of Juan de Fuca during the winter season. Chinook catch in ocean management areas during the May to September period was 12,000. The fishery harvested 87,200 coho compared to 43,400 coho taken in 1984. Nearly all the coho harvest was taken in ocean management areas. The pink harvest was 6,600, compared to 19,900 harvested during the 1983 season.

Washington Recreational Fishery

Washington recreational fishery effort for the 1985 season totaled 127,900 angler trips. This compares to 36,800 trips in 1984 and an average of 482,900

trips for the 1971-1975 period. Chinook landings in 1985 were 28,100 fish compared to 6,900 in 1984 and an average of 210,400 for the period 1971-1975. Coho landings in 1985 were 178,900 fish compared to a record low season catch of 40,400 in 1984, and an average of 567,400 for the 1971-1975 period. Pink salmon landings were 3,100 compared to 4,500 landed in 1983 and an average of 10,100 for odd years of the period 1971-1975.

Pacific Salmon Treaty

The Pacific Salmon Treaty between the U.S. and Canada became effective in March 1985 and established the Pacific Salmon Commission with the responsibility for implementing the treaty. Because many of the stocks under the jurisdiction of the Council are significantly affected by management actions taken in Canadian and Alaskan waters, considerable interaction between the Council and the new commission can be expected at both the policy and technical levels.

The treaty established a number of harvest ceilings for chinook salmon for various Canadian and Alaskan fisheries in response to a coastwide program to rebuild depressed stocks of chinook salmon. Ceilings for northern British Columbia and Southeast Alaska fisheries affect far-northerly migrating stocks originating in Washington, Oregon, and Idaho such as Washington coastal, upper Columbia River bright, spring and summer, and northern Oregon coastal. The ceiling for west coast Vancouver Island troll and Georgia Strait troll and sport fisheries affect far-northerly migrating stocks to a lesser degree and have a major impact on more southerly distributed Columbia River tule and Puget Sound stocks. Actual catches compared to Pacific Salmon Treaty harvest ceilings are summarized in Table I-10.

No direct management measures for chinook within the Council management area were specified in the treaty except for a commitment to ensure that depressed naturally spawning chinook stocks, saved as a result of harvest ceilings in the northern area, accrue principally to escapement. The Council's ocean fisheries and inside fisheries on depressed chinook stocks were designed to minimize impacts on spawning escapements of these depressed stocks.

The Pacific Salmon Treaty also established a 1.75 million coho harvest ceiling for the Canadian troll fishery off the west coast of Vancouver Island for 1985 and 1986. The actual 1985 catch by this fishery was approximately 1.405 million coho. The only coho management actions for U.S. fisheries specified in the treaty concerned continuation of net fishery restriction for certain northern Puget Sound and Strait of Juan de Fuca areas. The coho catch by U.S. net fisheries in management areas 6, 7, and 7A totaled 141,800; approximately 82 percent of which was taken during fisheries under the control of the International Pacific Salmon Fisheries Commission (IPSFC) directed at Fraser River sockeye and pink salmon. The IPSFC has been replaced by the Pacific Salmon Commission and the Fraser River Panel established under the treaty. The Fraser River Panel will be responsible for inseason management of Fraser River sockeye and pink stocks during the times and in the areas formerly under the jurisdiction of the IPSFC. In contrast to the past operation of the IPSFC, the Fraser River Panel will be required to directly consider management of stocks and species other than Fraser River sockeye and pink salmon.

Table I-10. Actual catches (thousands of fish) compared to Pacific Salmon Treaty harvest ceilings for 1985.

Area and Fishery	Thousands of Chinook		Difference	
	Ceilings	Catch	Numbers	Percent
Southeast Alaska (T, N, S)[a/]	263	276	13	+5
	269[b/]	276	7	+3
North and Central BC (T, N, S)	263	277	14	+5
West Coast Vancouver Island (T)	360	359	<1	<1
Georgia Strait (T, S)	275	292	17	+6

a/ T = troll; N = net; S = sport.
b/ Adjusted for hatchery add-on of 6,000.

Table C-1. Summary of actual California ocean commercial salmon seasons, 1977-1985.

Year	Area	Dates	Species
1977 & 1978	Statewide	April 15-May 14	All salmon except coho
		May 15-Sept. 30	All salmon
1979	State waters	April 15-May 14	All salmon except coho
		May 15-Sept. 30	All salmon
	FCZ	May 1-23	All salmon except coho
		May 24-June 15	All salmon
		July 1-Sept. 30	All salmon
1980	North of Cape Vizcaino	May 1-15	All salmon except coho
		May 16-31	All salmon
		July 16-Sept. 30[a/]	All salmon
	South of Cape Vizcaino	May 1-15	All salmon except coho
		May 16-31	All salmon
		July 1-Sept. 30	All salmon
1981[b/]	Statewide	May 1-15	All salmon except coho
		May 16-31[c/]	All salmon
		July 1-Sept. 30	All salmon
1982[d/]	North of Pt. Arena	May 1-15	All salmon except coho
		May 16-June 8	All salmon
		July 1-Sept. 30	All salmon
	South of Pt. Arena	April 22-May 15	All salmon except coho
		May 16-June 15	All salmon
		July 1-Sept. 30	All salmon
1983	North of Cape Vizcaino	May 16-31	All salmon except coho
		June 1-15[e/]	All salmon[f/]
		July 1-Aug.31[g/]	All salmon[f/]
	Pt. Arena to Cape Vizcaino	May 1-May 31	All salmon except coho
		June 1-15[e/]	All salmon
		July 1-Sept. 30	All salmon
	South of Pt. Arena	April 22-May 31	All salmon except coho
		June 1-June 15[e/]	All salmon
		July 1-Sept. 30	All salmon
1984	North of Pt. Delgada	May 16-June 6	All salmon except coho
		July 16-Aug. 22[g/]	All salmon except coho[h/]
	Pt. Arena to Pt. Delgada	May 1-Sept. 30	All salmon except coho[h/]
	South of Pt. Arena	May 1-May 31	All salmon except coho
		June 1-Sept. 30	All salmon
1985	North of Pt. Delgada	Closed	
	South of Pt. Delgada	May 1-May 31	All salmon except coho
		June 1-Sept. 30	All salmon

a/ State waters (0-3 miles) open July 4-12.
b/ Season was subject to closure under harvest guidelines of 300,000 and 250,000 chinook north and south of Point Arena, respectively.
c/ State waters (0-3 miles) open to all salmon June 1-30.
d/ Because of delay in approval of 1982 regulations by the U.S. Secretary of Commerce, 1980 regulations were in place through May 31 except that fishing was permitted in state waters (0-3 miles) by order of the CDFG director south of Point Arena from April 22-30. (This was done to conform to the recommended Council option for California submitted for approval by the Secretary of Commerce for 1982.) Prior to June 1, the management boundary was Cape Vizcaino.
e/ State waters (0-3 miles) opened June 17-27.
f/ Except coho which were under a 71,000 fish season quota.
g/ Twelve-mile square off the Klamath River mouth closed August 1 through end of season.
h/ State waters open to coho salmon by action of the California legislature August 16 to end of all-salmon-except-coho season.

Table C-2. Summary of actual California recreational salmon regulations, 1977-1985.

Year	Area	Season	Bag Limit	Minimum Size Limit (inches) Chinook	Coho
1977	North of Tomales Point	All Year	3	22[a/]	22[a/]
	South of Tomales Point	Feb. 12-Nov 13			
1978	North of Tomales Point	All Year	3	22[a/]	22[a/]
	South of Tomales Point	Feb 18-Nov 12	3	22[a/]	22[a/]
1979	Statewide	Feb 17-Oct 14	2	22[a/]	22[a/]
1980	Statewide	Feb 17-Oct 13	2	22[a/]	22[a/]
1981	Statewide	Feb 14-Nov 15	2	22[a/]	22[a/]
1982	Statewide	Feb 13-Nov 14	2	22[a/]	22[a/]
1983	Statewide	Feb 12-Nov 13	2	22[a/]	22[a/]
1984[b/]	North of Cape Vizcaino[c/]	Feb 18-Jun 15; Jul 1-Nov 18	2	20	20
	South of Cape Vizcaino	Feb 18-Nov 18	2	20	20
1985[b/]	Statewide[c/d/]	Feb. 16-Nov. 17	2	20	20

a/ Except that one chinook or coho salmon per day could be less than 22 inches, but not less than 20 inches.
b/ Only single-point barbless hooks could be used.
c/ Twelve-mile square off the Klamath River mouth closed August 1-31.
d/ Closed to salmon fishing north of Pt. Delgada on Mondays and Tuesdays, July 19-August 31 by action of the California Fish and Game Commission.

Table C-3. Summary of actual Oregon troll salmon seasons in state and federal (FCZ) waters, 1979-1985.

Year	Area	Seasons		Number of Days		Size Limits	
		All Species Except Coho	All Species	All Species Except Coho	All Species	Chinook	Coho
1979	North of Cape Falcon	May 1-31	July 1-24; Aug. 4-31[a/]	31	52	28	16
	Cape Falcon to OR-CA Border	May 1-31; Sept. 4-Oct. 31	July 1-Sept. 3[b/]	89	65	26	16
	Cape Blanco to Humbug Mt. and Goat Island to OR-CA border	Nov. 1-30[c/]		30	-	26	-
1980	Leadbetter Pt. to Cape Falcon	May 1-31	July 15-Sept. 8	31	56	28	16
	Cape Falcon to Cape Blanco	May 1-31; June 16-30; Sept. 9-Oct. 31	July 15-Sept. 8	99	56	26	16
	Cape Blanco to OR-CA Border	May 1-31; Sept. 9-Oct. 31	July 15-Sept. 8	84	56	26	16
	Cape Blanco to Humbug Mt. and Goat Island to OR-CA border	Nov. 1-30[c/]		30	-	26	-
1981	North of Cape Falcon	May 1-31	July 15-Aug. 21[d/]	31	38	28	16
	Cape Falcon to OR-CA Border	May 1-31; Aug. 22-Sept. 8[e/]; Sept. 9-Oct. 31	July 1-Aug. 21[f/]	99	55	26	16
	Cape Blanco to Humbug Mt. and Goat Island to OR-CA border	Nov. 1-30[c/]		30	-	26	-
1982	Leadbetter Pt. to Cape Falcon	May 1-31	July 1-8	31	8	28	16
	Cape Falcon to Cape Blanco	May 1-June 15; July 13-Oct. 31	July 1-12	157	12	26	16
	Cape Blanco to OR-CA Border	May 1-June 8; July 13-Oct. 31	July 1-12	150	12	26	16
	Cape Blanco to Humbug Mt. and Goat Island to OR-CA border	Nov. 1-30[c/]		30	-	26	-
1983	Leadbetter Pt. to Cape Falcon	May 1-31	July 1-31[g/];	31	61	28	16
	Cape Falcon to Cape Kiwanda	May 1-31; June 1-15; Sept. 5-Oct. 31	Aug.10-Sept. 8[h/] Aug. 1-Sept. 4	103	35	26	16
	Cape Kiwanda to Heceta Head	May 1-31; June 1-15; Sept. 5-Oct. 31	July 1-25; Aug. 1-Sept. 4	103	60	26	16
	Heceta Head to Cape Blanco	May 1-31; June 1-15; July 26-Oct. 31[i/]	July 1-25	144	25	26	16
	Cape Blanco to OR-CA Border	May 16-31; June 1-15; July 26-Sept. 15[j/]; Oct. 1-31	July 1-25	114	25	26	16
	Cape Blanco to Humbug Mt.	Nov. 1-30[c/]		30	-	26	-
1984	WA/CAN Border to Cape Falcon	May 1-7	-	7		28	-
	Columbia R. to Cape Falcon	-	Aug. 4-6	-	3	28	16
	Cape Falcon to Cape Blanco	May 1-June 15; July 1-Sept. 21[k/]	-	129	-	26	-
	Manhattan Beach to Pyramid Rock	Oct. 1-31[c/]	-	31	-	26	-
	Cape Blanco to OR-CA Border	May 16-June 6 July 16-Aug. 22	-	60	-	26	-
	Cape Blanco to Humbug Mt.	Oct. 1-Nov. 30[c/]		61	-	26	-
1985	North of Cape Falcon	May 1-14 May 21-31	August 21	25	1	28	16
	Cape Falcon to Cape Blanco	May 1-June 30 July 27-Oct. 31	July 1-July 26	158	26	26	16
	Cape Blanco to Humbug Mt.	Oct. 1-Nov. 30	-	61	-	26	-
	Tower Rock to Cape Blanco	Nov. 1-30	-	30	-	26	-

a/ Closed early in response to court order to meet Columbia River fall chinook treaty obligations.
b/ Closed in Oregon waters September 3 for coho. FCZ closed on September 15.
c/ State waters only.
d/ Special lottery-selected, 10-boat only experimental troll fishery off Columbia River mouth out to 12 miles for coho only from September 20 to October 9.
e/ From August 25 in state waters. Cape Falcon to Cape Sebastian, whole bait or ≥ 5 inch plugs.
f/ State waters open until August 24.
g/ Incidental coho allowance ≤ 33 percent per trip; 20,000 coho total. Conservation zone closure off Columbia River mouth, May 1-31 and July 1-31.
h/ Limited to area of Columbia River (south Jetty) to Cape Falcon out to 10 miles only.
i/ From July 26-31 chinook fishing allowed from Cape Perpetua south.
j/ From September 1-15, fishery limited to 12 mile by 24 mile area off Rogue River mouth.
k/ September 1-21 state waters only.

Table C-4. Summary of actual Oregon ocean sport salmon seasons in state and federal (FCZ) waters,[a/] size limits and bag limits, 1977-1985

Year	Area	Season[a/]	Days	Bag Limit	Size Limit (inches) Chinook	Coho
1977	No. of Tillamook Head	April 30-Oct. 9[b/]	163	3	24	16
	Tillamook Head to OR-CA Border	April 30-Oct. 31	185	3	- No limits -	
	Cape Blanco to Humbug Mt. and Goat Island to OR-CA Border	Nov. 1-30 (except coho)	30	3	- No limits -	
1978	No. of Cape Falcon	April 29-Oct. 31	186	3	24	16
	Cape Falcon to OR-CA Border	April 29-Oct. 31	186	3	22	16
	Cape Blanco to Humbug Mt. and Goat Island to OR-CA Border	Nov. 1-30 (except coho)	30	3	22	-
1979	No. of Cape Falcon	May 12-Sept. 3[c/]	115	2+1[d/]	24	16
	Cape Falcon to OR-CA Border	May 12-Sept. 16	128	2	22	16
	Cape Blanco to Humbug Mt. and Goat Island to OR-CA Border	Nov. 1-30 (except coho)	30	2	22	-
1980	Leadbetter Pt. to Cape Falcon	May 10-Sept. 1[e/]	115	3/2[f/]	24	16
	Cape Falcon to OR-CA Border	May 10-Sept. 1[e/]	155	3/2[f/]	22	16
		Sept. 2-Oct. 31 (except coho)				
	Cape Blanco to Humbug Mt. and Goat Island to OR-CA Border	Nov. 1-30 (except coho)	30	2	22	-
1981	Cape Falcon to WA Border	May 23-Aug. 26[g/]	108	2	24	16
	Cape Falcon to OR-CA Border	May 15-Aug. 27[h/]	129	2/3[i/]	22	16
		Sept. 21-Oct. 31[j/] (except coho)	41	2	22	-
	Cape Blanco to Humbug Mt. and Goat Island to OR-CA Border	Nov. 1-30 (except coho)	30	2	22	-
1982	Leadbetter Pt. to Cape Falcon	June 12-Aug. 1[k/]	51	2[l/]	24	16
	Cape Falcon to Cape Blanco	May 29-Aug. 1[m/]	65	2[n/]	None	None
	Cape Blanco to OR-CA Border	May 29-Aug. 1[m/]	65	2[n/]	None	None
		Aug. 2-Oct. 31 (except coho)	90	2[n/]	None	None
	Cape Blanco to Humbug Mt. and Goat Island to OR-CA Border	Nov. 1-30 (except coho)	30	2[n/]	None	-
1983	North Head to South Jetty	July 30-Aug. 15	17	2	24	16
	South Jetty to Cape Falcon	June 18-July 29[o/]	42	2	24	16
		July 30-Sept. 11[p/]	44	2	24	16
	Cape Falcon to Cape Blanco	June 18-Sept. 18	93	2[n/]	None	None
	Twin Rocks to Pyramid Rock[q/]	Sept. 19-Oct. 31 (except coho)	43	2	24	-
	Cape Blanco to OR-CA Border	May 28-Sept. 8	104	2[n/]	None	None
		Sept. 9-Oct. 31 (except coho)	53	2[n/]	None	None
	Cape Blanco to Humbug Mt.	Nov. 1-30 (except coho)	30	2[n/]	None	-
1984	Columbia River South Jetty to Cape Falcon	July 28-Aug. 8[r/]	12	2	-	16
	Cape Falcon to Cape Blanco	July 9-Aug. 7	30	2	20	20
		Aug. 25-Sept. 3[s/]	10	1	20	20
	Manhattan Beach to Pyramid Rock	Sept. 15-21 (except coho)	7	2	20	-
	Cape Blanco to OR-CA Border	July 9-Aug. 7	30	2	20	20
		Aug. 8-Oct. 31 (except coho)	85	2	20	-
		Aug. 25-Sept. 3[s/]	10	2[t/]	20	20
	Cape Blanco to Humbug Mt.	Oct. 1-Nov. 30[s/]	61	2	20	-
1985	Columbia River South Jetty to Cape Falcon	June 30-Aug. 22[u/]	40	2	24	16
	Cape Falcon to Cape Blanco	July 1-Sept. 2	64	2[n/]	None	None
	Twin Rocks to Pyramid Rock[q/]	Sept. 15-Oct. 31 (except coho)[s/]	46	2[n/]	None	None
	Cape Blanco to OR-CA Border	May 25-31 and July 1-Sept. 2	71	2[n/]	None	None
		Sept. 3-Oct. 31 (except coho)	59	2[n/]	None	None
	Tower Rock to Humbug Mt.	Nov. 1-30[s/]	30	2[n/]	None	-

a/ Dates inclusive.
b/ Emergency closure in Washington waters on October 9. FCZ and Oregon waters open through October 31.
c/ Closed on September 3 in Washington waters to protect wild coho. FCZ and Oregon waters closed on September 16, except closed for coho in Oregon waters south of Falcon on September 3.
d/ Two chinook/coho plus one other species.
e/ In Oregon waters, all-salmon season extended through September 14.
f/ Reduced to 2 fish on July 16.
g/ Season remained open through September 7 in Oregon state waters north of Cape Falcon.
h/ Season remained open through September 20 in Oregon state waters.
i/ Increased to 3 on August 14.
j/ For chinook-only in the area from Cape Blanco to Oregon-California border.
k/ Inside 3 miles in Oregon only during July 25-August 1.
l/ Only one coho in bag from July 26-August 1.
m/ Inside 3 miles in Oregon only during July 22-August 1.
n/ First two fish.
o/ Inside 3 miles north of 46°06'00" N. lat.; inside 6 miles south of 46°06'00" N. lat.
p/ Inside 10 miles from line drawn from tip of South Jetty to lightship buoy, then due west to 10 mile line during August 16-September 11.
q/ Twin Rocks (45°35'49"N. lat.), east of longitude of whistler buoy at Tillamook Bay mouth (123°59'40"W. long.), and north of latitude of Pyramid Rock (44°28'45"N. lat.).
r/ Inside 10 miles from line drawn from tip of South Jetty to lightship buoy, then due west to 10-mile line. All-salmon-except chinook.
s/ State waters only.
t/ Only one salmon may be coho.
u/ Open south of the Red Buoy Line which extends seaward along the south jetty to the visible tip of the jetty and then to Buoy 2SJ, then southwesterly to Buoy #4, continuing southwesterly to Buoy #2, then to the Lightship Buoy, then due west along 46°11'06"N. latitude.

Table C-5. Summary of actual Washington non-Indian troll salmon fishing seasons, 1971-1985.

Year	Area	Seasons		Number of Days		Size Limits[a/]	
		All-Species-Except-Coho	All-Species	All-Species-Except-Coho	All-Species	Chinook	Coho
1971-1975	Statewide	April 15-June 14	June 15-Oct. 31	61	139	26	16[b/]
1976	Statewide	May 1-June 14	June 15-22; July 1-Oct. 31	45	131	26	16[b/]
1977	North of Pt. Grenville	May 1-June 14	July 1-Sept. 15	45	77	28[c/]	16[b/]
	South of Pt. Grenville	May 1-June 14	July 1-Oct. 9	45	101	28[c/]	16
1978	North of Pt. Grenville	May 1-June 14	July 1-Sept. 15	45	77	28	16
	South of Pt. Grenville	May 1-June 14	July 1-Oct. 31	45	123	28	16
1979	Statewide	May 1-31	July 1-24; Aug. 4-31[d/]	31	52	28	16
1980	North of Leadbetter Pt.	May 1-31	July 15-Aug. 25	31	42	28	16
	South of Leadbetter Pt.	May 1-31	July 15-Sept. 8	31	56	28	16
1981	Statewide	May 1-31	July 15-Aug. 21	31	38	28	16
1982	North of Leadbetter Pt.	May 1-31	July 15-30	31	16	28	16
	South of Leadbetter Pt.	May 1-31	July 1-8	31	8	28	16
1983	Statewide	May 1-31	July 1-31[e/]	31	31	28	16
1984	Statewide	May 1-7	-	8		28	-
	North of Cape Alava	-	Aug. 4-6		3	-	16
1985	Statewide	May 1-14 May 21-31		25	-	28	-
	Cape Alava to Leadbetter Pt.		July 15-18	-	4	28	16
	Carroll Island to U.S.-Canada Border	Aug. 3-31[f/]		-	29	28	-

a/ In inches.
b/ Effective annually beginning on August 1.
c/ Only partial compliance in 1977.
d/ U.S. District Court ordered ten-day closure of all-species season July 25-August 3.
e/ No more than one coho could be retained for every two chinook retained. North of Carroll Island it was illegal to retain sockeye or pink salmon except during a special season to take only sockeye and pink salmon from August 7-20. Gear in this special August fishery was restricted to bare, blued hooks and flashers.
f/ Pink and chinook salmon only, gear restricted to barbless, bare, blued hooks and flashers. Effective August 22, Washington state landings of chinook restricted to not more than one per 20 pinks.

Table C-6. Summary of actual Washington ocean sport salmon regulations,[a/] 1971-1985 and the 1971-1973 average.

Year	Season	Days	Size (inches) Bag	Chinook	Coho
1971-1973	April 15-Oct. 31	200	3	20	20
1974	April 13-Oct. 31	202	3	20	20
1975	April 12-Oct. 31	203	3	20	20
1976	May 1-Oct. 31	184	3	24	16
1977	April 30-Oct. 9	163	3	24	16
1978	April 29-Oct. 31	186	3	24	16
1979	May 12-Sept. 3	115	2+1[b/]	24	16
1980	May 10-Aug. 25 north[c/]	108	3/2[c/]	24	16
	May 10-Sept. 1 south[c/]	115	3/2[c/]	24	16
1981	May 23-Aug. 26	96	2+1[d/]	24	20
1982[e/]	May 29-June 11 (chinook only)	14	2	24	
	June 12-Aug. 19 north	69	2	24	16
	June 12-July 25 south	44	2	24	16
1983	May 8-June 17[f/] (chinook only)	21	2	24	16
	June 18-July 29[g/]	42	2	24	16
	July 1-29[h/]	29	2	24	16
	July 30-Aug. 15[i/]	17	2	24	16
	July 30-Sept. 11[j/]	44	2	24	16
	Aug. 16-Sept. 11[k/]	27	2	24	16
1984	May 26-28[f/] (chinook only)	3	2	24	
	June 25-July 27[l/] (chinook only)	33	1	34	
	July 28-Aug. 8[m/] (coho only)	11	2		16
	July 28-Aug. 15[h/]	19	1	24	16
1985	June 30-Aug. 22[n/]	40	2	24	16
	June 30-Sept. 1[o/]	46	2[o/]	24	16
	June 30-Sept. 8[p/]	51	2	24	16

a/ All dates inclusive; minimum size measured as total length; no minimum size for species other than chinook and coho.
b/ Bag limit in 1979 restricted to only two chinook/coho; third salmon confined to other three species (to take advantage of large pink abundance).
c/ Seasons differed in 1980 north and south of Leadbetter Point; initial 3-fish bag limit reduced to 2 fish on July 16.
d/ Bag limits in 1981 restricted to only two chinook/coho; north of Queets River a third salmon of other species allowed (La Push-Neah Bay).
e/ Seasons differing north and south of Leadbetter Pt.; some Ilwaco and Chinook based effort continued through August 1 inside Oregon state waters and from August 16-September 30 inside Buoy 10 to the Megler-Astoria Bridge. The August 25-September 30 period was restricted to coho only, with barbless hooks required after August 31. The easterly portion of Neah Bay (inside Koitlah Point) remained open after August 19.
f/ Queets River to Klipsan Beach inside 6 miles.
g/ Queets River to North Head inside 6 miles and South Jetty of Columbia River to Cape Falcon inside a line approximately due south of South Jetty (see Federal Register).
h/ U.S.-Canada border to Queets River inside 3 miles.
i/ Klipsan Beach to Cape Falcon.
j/ U.S.-Canada border to Queets River and Pt. Brown to Klipsan Beach. Ocean waters north of Leadbetter Pt. and west of the Bonilla-Tatoosh line closed September 6 in anticipation of quota achievement.
k/ South Jetty Columbia River to Cape Falcon inside special fishery zone 1 (see Federal Register).
l/ Limited area adjacent to Neah Bay; size limit changed to 24 inches July 17.
m/ Cape Shoalwater to Klipsan Beach (also off Oregon from the South Jetty of the Columbia River to Cape Falcon inside the special fishery zone).
n/ Leadbetter Pt. to Cape Falcon. Waters between Leabetter Pt. and Klipsan Beach inside 3-miles closed. From 0-200 miles between Klipsan Beach and Red Buoy line of Columbia River closed. Fishing allowed Sunday through Thursday only.
o/ U.S.-Canada border to Queets River. Bag limit two salmon only one of which may be a chinook. Effective July 24, fishing closed inside a line approximately 1 mile offshore from Sekiu River to the Umatilla Reef light. Bag limit changed to not allow retention of chinook salmon, effective August 15. Fishing allowed Sunday through Thursday only.
p/ Queets River to Leadbetter Pt., except closed inside 3 miles through August 29. Fishing allowed Sunday through Thursday only through August 29. Fishing closed by states regulations September 3-6 and reopened September 7 and September 8.

Table C-7. Summary of actual treaty troll regulations, 1977-1985.

	Quinault, Quileute, and Hoh Tribes				Makah Tribe								Klallam Tribes			
					FCZ (3-200 Miles)				Inside Areas				(Area 4B)			
			Size (inches)				Size (inches)				Size[a/] (inches)				Size (inches)	
Year	Season	Days	Chinook	Coho	Season	Days	Chinook	Coho	Season	Days	Chinook	Coho	Season	Days	Chinook	Coho
1977	May 1-Oct. 31	184	26	16	May 1-Oct. 31	184	26	16	Jan. 1-Dec. 31	365	22	20	Jan. 1-Dec. 20	354	24	16
1978	May 1-Oct. 31	184	28	16	May 1-Oct. 31	184	28	16	Jan. 1-Dec. 31	365	22	20	Jan. 1-Dec. 20	354	24	16
1979	May 1-Oct. 31	184	28	16	May 1-Oct. 31	184	28	16	Jan. 1-Dec. 31	365	22	20	Jan. 1-Dec. 20	354	26	16
1980	May 1-Oct. 31	184	28	16	May 1-Oct. 31	184	24	16	Jan. 1-Dec. 31	366	22	20	Jan. 1-Dec. 31	365	28	20[b/]
1981	May 1-Oct. 31	184	28	16	May 1-Oct. 31	184	24	16	Jan. 1-Dec. 31	365	22	20	Jan. 1-Dec. 31	365	20[c/]	20[b/]
1982	May 1-Sept. 7[d/]	129	26	16	May 1-Oct. 31	184	24	16	Jan. 1-Dec. 31	365	22[e/]	20	Jan. 1-Dec. 31	366	22[f/]	20[b/]
1983	May 1-Sept. 15	137	26[g/]	16	May 1-Oct. 31	184	24	16[h/]	Jan. 1-Dec. 31	365	22[e/]	20[h/]	Jan. 1-Dec. 31[i/]	304	22[j/]	20[b/]
1984	May 1-Aug. 16	108	26	16	May 1-Aug. 18	110	24	16	Jan. 1-Dec. 31	365	22	20	Jan. 1-Dec. 31[i/]	304	22	16
1985	May 1-Sept. 4	74	26[k/]	16	May 1-Sept. 11	72	24[l/]	20	Jan. 1-Dec. 31[m/]	365	22[e/]	20	Jan. 1-Dec. 31	365	22	16
									Jan. 1-Dec. 31[n/]	283	22[l/]	20				

a/ From May 1-Sept. 15 minimum size limits were 24" for chinook and 16" for coho, except for footnote n.
b/ From early June to the first week in September, the minimum size limit was 16" for coho.
c/ From early May to the first week in September, the minimum size limit was 28" for chinook.
d/ Closure within a 6-mile radius of the Hoh and Queets river mouths when subarea A was closed to non-treaty salmon fishing.
e/ Maximum 30" size limit for chinook from April 15-June 15 to protect Puget Sound adult spring chinook in areas 5 and 6C.
f/ From early May to the first week in September, the minimum size limit was 24" for chinook. From April 15-June 15, a 30" maximum size limit for chinook was enacted to protect Puget Sound adult spring chinook.
g/ A daily limit of two chinook salmon between 24" and 26" could be retained for ceremonial and subsistence purposes.
h/ For all Makah troll areas, minimum size limits were changed to 20" on May 11, to 22" on June 6, and to 16" on July 26.
i/ Two month closure April 15-June 15 to protect Puget Sound adult spring chinook.
j/ From mid-June to the first week in September, the minimum size limit was 24" for chinook.
k/ Minimum size limit changed to 28" from June 15-July 22.
l/ Minimum size limit was changed to 28" on June 15, to 24" on July 1, to 28" on August 1.
m/ Area 5 and 6C only.
n/ Areas 3N, 4, 4A (0-3 miles) and 4B only. Followed FCZ regulations from May 1-September 30.

APPENDIX B.

SEQUENCE OF EVENTS IN OCEAN SALMON FISHERY MANAGEMENT, 1985

January 28	Pacific Salmon Treaty with Canada is signed in Ottawa.
February 16	Ocean all-salmon recreational fishing season opens off the coast of California (opened under 1983 regulations).
February 20-21	Salmon Plan Development Team and Salmon Advisory Subpanel meet to review preliminary data and 1985 stock abundance projections.
March 14	Council adopts proposed 1985 ocean salmon fishery management options for public review under the framework amendment.
March 18	U.S.-Canada Pacific Salmon Treaty is implemented.
March 26-27 and April 4	The Council holds public hearings on its proposed 1985 management options in six locations throughout the Council area.
April 11	The Council adopts final management recommendations for the 1985 ocean salmon fisheries.
April 26	The Secretary of Commerce approves the Council's final 1985 management recommendations for implementation as NOAA regulations.
May 1	Ocean salmon regulations for 1985 are implemented. All-salmon-except-coho troll seasons open coastwide except for the closed area between Point Delgada and Cape Blanco. North of Cape Falcon the fishery is constrained by a chinook quota of 27,000.
May 8	The Council rejects reconsideration of the five day per week, Sunday through Thursday, sport fishery north of Cape Falcon.

Responding to a petition for a seven day per week sport fishery north of Cape Falcon, ODFW Director, Jack Donaldson, requested a meeting of the Council to reconsider its preseason recommendation of five fishing days per week. A telephone poll of the Council members resulted in a rejection of reconsideration by a vote of nine to two. The Council considered this issue extensively in April before recommending the five day per week fishery to extend the total length of the season and help reduce the negative economic impacts of a short season. The Council's original recommendation included a request for emergency regulations to allow for inseason adjustment of the number of fishing days per week after the third and sixth weeks of the fishery.

May 14 **All-salmon-except-coho troll fishery north of Cape Falcon which began May 1 closes at midnight.**

On May 10, WDF projected the May troll fishery north of Cape Falcon should be closed at midnight May 14 to avoid any possibility of exceeding the 27,000 chinook quota. Fishing effort appeared to have doubled compared to the 1984 fishery.

May 21 **The May all-salmon-except-coho troll fishery north of Cape Falcon is reopened to complete harvest of the remaining chinook quota.**

Evaluation of the May 1 through May 14 troll chinook landings disclosed that approximately 10,000 of the 27,000 chinook quota remained available for harvest in the May fishery. Therefore, on May 17, it was announced that the troll fishery would reopen at 12:01 a.m. on May 21 and continue to the earlier of May 31 or the chinook quota.

May 23 **The initial meeting of the Klamath River Salmon Management Group is convened in San Francisco.**

Responding to a motion passed at the April Council meeting, representatives from the U.S. Departments of Interior and Commerce, California Department of Fish and Game (CDFG), ODFW, Council, and the Hoopa Valley Indian Tribe met to develop a new approach to management of the depressed chinook salmon stocks of the Klamath River Basin. The group developed a charter which specifies that they will develop recommendations for the spawning escapement goal and rebuilding schedule, methods of sharing harvest among recreational, Indian, and commercial fishermen, and short- and long-range data needs.

May 25-31 **All-salmon recreational season opens for seven days off southern Oregon south of Cape Blanco and harvests about 2,500 chinook and less than 50 coho.**

May 31 **All-salmon-except-coho troll seasons close south of Point Delgada (California) and north of Cape Falcon.**

Evaluation of landings for the troll fishery north of Cape Falcon provided a harvest estimate of approximately 27,000 chinook which met the quota exactly. The estimated landings in the troll fishery south of Point Delgada were about 63,300 chinook.

June 1 **All-salmon troll season opens off California south of Point Delgada.**

June 30 **All-salmon recreational season off Oregon and Washington from Cape Falcon to the U.S.-Canada border opens with a five day per week, Sunday through Thursday, fishery. Six subarea chinook and coho quotas apply in this area.**

July 1 — All-salmon recreational season opens off Oregon from Cape Falcon south to Oregon-California border under a coho quota of 170,000 (includes coho caught off California).

All-salmon troll season off Oregon opens from Cape Falcon to Cape Blanco. Retention of coho is limited to one more coho than chinook, provided at least one chinook is retained. The quota allows for a harvest of 45,000 coho south of Cape Falcon including coho caught off California.

July 11 — The Council clarifies the annual salmon management regulations by establishing a total non-Indian chinook harvest quota north of Cape Falcon of 83,860 chinook (46,760 for the troll fishery and 37,100 for the recreational fishery).

Acting to make ocean fishing regulations consistent with a court-ordered agreement between the state fishery agencies and the northwest Indian tribes, the Council established an overall chinook harvest quota for non-Indian fisheries north of Cape Falcon of 83,860. The total allowable harvest impact (including hooking mortality) was set at 88,000 chinook (50,900 for the troll fishery and 37,100 for the recreational fishery). The 5,100 chinook harvest guideline for the August pink salmon fishery was clarified to represent a total harvest impact consisting of a harvest quota of 960 chinook and a hooking mortality of 4,140 chinook. Chinook subarea quota surpluses and deficits may be added to or subtracted from later subarea quotas north of Cape Falcon.

July 11 — The Council holds a plan amendment issue scoping session which identifies seven amendment issues.

July 15 — All-salmon troll season opens off Washington between Leadbetter Point and Cape Alava with harvest quotas of 16,100 chinook and 78,500 coho.

July 17 — CDFG conducts a public hearing in Eureka concerning the need for reducing the sport harvest of Klamath River chinook off the northern California coast.

July 18 — All-salmon troll season off Washington between Leadbetter Point and Cape Alava closes at midnight by state regulations as the coho quota is exceeded. Estimates place the coho harvest at 136,300 which exceeds the original quota by almost 58,000 fish. Federal regulations closed the season at 0001 hours July 19.

July 19 — The Council acts to conserve Klamath River fall chinook and to conform state and federal sport fishing regulations by allowing for a Monday and Tuesday sport fishing closure between Point Delgada and the Oregon-California border.

On July 18, CDFG acted to restrict the harvest of Klamath River fall chinook by closing the all-salmon sport fishery on Monday and Tuesday of each week between July 22 and August 31 in state territorial waters between Point

Delgada and the Oregon-California border. On July 19 the Council acted to clarify its April recommendation for emergency regulations to allow inseason changes in the number of sport fishing days per week to include the entire management area. Acting on this clarification the National Marine Fisheries Service (NMFS) conformed federal regulations to those of California. The federal closure was effective beginning August 2.

July 24 — **The State of Washington closed the area inside a line approximately one mile offshore from the Strait of Juan de Fuca to Cape Alava to reduce the proportion of chinook being caught in the all-salmon season north of the Queets River.**

The Council meets by teleconference to discuss needed management action with regard to the overquota harvest of coho in the July 15-18 troll fishery north of Cape Falcon. Action is delayed until July 31 when better harvest estimates are expected to be available.

July 26 — **The all-salmon troll season off Oregon between Cape Falcon and Cape Blanco closes at midnight as the south of Cape Falcon troll coho quota of 45,000 is projected to be met. The actual coho harvest is estimated at 55,000.**

July 27 — **The all-salmon-except-coho troll fishery opens off Oregon between Cape Falcon and Cape Blanco.**

July 31 — **The Council recommends action to reduce the coho harvest impact of the remaining troll fisheries north of Cape Falcon and to extend the sport fishery off northern Washington through a quota transfer.**

Based on an overquota harvest of nearly 56,000 coho, the Council recommended significant reductions in the two remaining troll fisheries scheduled for the area north of Cape Falcon. The coho quota for the commercial fishery north of Carroll Island beginning August 3 was reduced from 31,200 to zero. A hooking mortality allowance of 7,500 coho and a total chinook impact of 1,720 for harvest and 7,430 for hooking mortality were recommended to allow the harvest of approximately 200,000 pink salmon. The fishing area for the commercial fishery scheduled to begin August 21 between Cape Falcon and Leadbetter Point was reduced to the area south of the Columbia River mouth and the coho quota reduced from 32,000 to 10,000. The season was shortened to one day with additional days possible if needed to meet the quota. In addition, the Council recommended the transfer of 3,000 coho from the recreational subarea quota north of the Queets River to the commercial subarea quota of the July troll fishery in exchange for 750 chinook. This action assured additional season length for the recreational fishery while reducing the impacts of the commercial overquota coho harvest. Federal regulations implementing this action became effective on August 2.

August 3	Special pink salmon fishery opens off Washington between Carroll Island and the U.S.-Canada border. After Council action on July 31 this fishery is restricted to the landing of pink and chinook salmon only. Action by the State of Washington requires the use of barbless hooks.
August 14	The recreational all-salmon season off Washington between the Queets River and the U.S.-Canada border is closed to chinook landings by the State of Washington effective at midnight. Angling remains open for coho salmon.
August 18	The Columbia River all-salmon recreational fishery inside of Buoy 10 opens. Harvest in this fishery counts on the ocean quotas.
August 21	The modified troll season between Cape Falcon and the Columbia River mouth opens for one day and harvests an estimated 32,500 coho and 1,000 chinook. This harvest exceeds the coho quota for this subarea by 22,500 fish.
August 22	The all-salmon recreational season between Cape Falcon and Leadbetter Point closes at midnight upon the projection of meeting its subarea coho quota. Actual coho harvest exceeded the quota by over 11,000 fish.
	The Columbia River all-salmon fishery inside Buoy 10 closes at midnight.
	The State of Washington modifies the troll harvest of the pink salmon fishery north of Carroll Island by requiring the landing of 20 pinks for each chinook landed.
August 30	The all-salmon recreational season off Washington between Leadbetter Point and the Queets River is opened for seven days per week (increased from five days per week) and the State of Washington lifts its closure inside of three miles.
August 31	The pink salmon fishery north of Carroll Island closes at midnight.
September 1	The state restricted coho recreational season off Washington north of the Queets River is projected to meet its quota and closes at midnight.
September 2	The all-salmon recreational season off Oregon between Cape Falcon and the Oregon-California border is projected to meet the south of Cape Falcon coho quota (170,000) and closes at midnight. Actual estimated coho harvest fall short of the quota by 4,000 fish.

	The all-salmon recreational season off Washington between Leadbetter Point and the Queets River is closed by state landing law pending evaluation of the total harvest. The season will reopen if a sufficient amount of quota is left to allow at least a one-day fishery.
September 3	The all-salmon-except-coho recreational fishery off Oregon between Cape Blanco and the Oregon-California border opens (immediately following the all-salmon closure).
September 7	The all-salmon recreational season off Washington between Leadbetter Point and the Queets River reopens under state law for one weekend based on the remaining quota.
September 8	The all-salmon recreational season between Leadbetter Point and the Queets River is closed by state landing law with federal closure of the fishery conservation zone (FCZ) to follow.
September 11	Closure of the FCZ to recreational fishing between Leadbetter Point and the Queets River is effective at midnight.
September 15	ODFW opens an all-salmon-except-coho recreational season within territorial waters adjacent to Tillamook Bay as allowed for in the 1985 federal regulations.
September 19	The Council identifies fishery management plan amendment issues for consideration and possible implementation in 1987. They are (1) a new spawning escapement goal for Oregon coastal natural coho based on stock abundance and (2) additional inseason management measures. The Council recommends a technical amendment to the framework amendment implementing regulations which allows for flexibility in setting opening and closing dates for certain commercial and recreational fisheries when long-term escapement goals are met.
September 30	The all-salmon troll season closes off California between the U.S.-Mexico border and Point Delgada.
October 1	ODFW opens all-salmon-except-coho recreational and troll seasons within territorial waters adjacent to the mouth of the Elk and Sixes rivers as allowed for in the 1985 federal regulations.
October 18	The Council's September 19 recommendation for a technical amendment to the framework regulations is implemented to allow limitations on season beginning and ending dates to be lifted once stocks have been rebuilt and long-term escapement goals have been met.
October 31	The all-salmon-except-coho troll fishery off Oregon between Cape Falcon and Cape Blanco closes at midnight.

The all-salmon-except-coho recreational fisheries from the Oregon-California border to Cape Blanco and in Oregon territorial waters adjacent to Tillamook Bay close at midnight.

November 14 — The Council approves four issues for the 1987 amendment schedule: (1) Oregon coastal natural coho spawning escapement goal, (2) inseason management, (3) Klamath River salmon management (pending recommendations of the Klamath River Salmon Management Group), and (4) coho allocation south of Cape Falcon (pending recommendations of the ODFW Commission). The inclusion of habitat considerations in the framework amendment has been deferred to the 1988 amendment schedule.

November 17 — The all-salmon recreational season off California closes.

November 30 — The Oregon all-salmon-except-coho recreational and troll fisheries within territorial waters adjacent to the mouth of the Elk and Sixes rivers close.