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REVIEW OF STEELHEAD STOCK STATUS, HARVEST PATTERNS, ENHANCEMENT AND MIGRATIONS IN THE NORTHERN BOUNDARY AREA

Prepared for

Northern Panel

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EXECUTIVE SUMMARY

In February 1990, the Northern Panel of the Pacific Salmon Commission (PSC) instructed the Northern Boundary Technical Committee to prepare a document which presented the available information regarding the status of steelhead stocks in the Northern Boundary Area.

This report reviews the information relating to the historical catch and escapement, distribution and life histories, enhancement activities and the migration and timing of steelhead stocks returning to northern B.C. and S.E. Alaska systems. The Canadian portion of this report is a preliminary review with a more detailed document in preparation for the fall of 1991.

In Alaska, steelhead are found from Dixon Entrance to the Alaska Peninsula. However, the majority are located in Southeast Alaska coastal streams. Most systems contain relatively small populations (200 or fewer adults) with the largest system, the Situk River, supporting a run from 3,000 to 6,000 adult steelhead. Typically Alaskan steelhead are of the "fall" or "spring" run timing variety with the latter type dominating the return.

Alaskan sport harvest of steelhead is almost exclusively in freshwater with average harvests increasing from 1,820 (1977-1981) to 4,441 (1985-1989). Commercial fisheries in southeast Alaska averaged approximately 1,500 steelhead harvested annually prior to 1983. Since 1983 harvests have increased annually with a peak catch of 11,540 in 1986. The majority of the steelhead harvest occurs in Districts 101 and 104 with 1980 to 1989 average catches of 1,975 and 1,438.

Steelhead enhancement in Southeast Alaska has been conducted at moderate levels with combined smolt and fry releases averaging approximately 100,000 from 1985 to 1989. Various release strategies have been attempted with a standard release size established based on hatchery steelhead programs in Oregon and Washington.

The lack of a time series of reliable escapement and harvest rate information precludes making a quantitative, or even an accurate qualitative assessment of stock status. Unfortunately, there are no current programs which will further this assessment.

Available northern B.C. sport harvest information for steelhead reports catches occurring in the Nass, Skeena, Stikine and Taku rivers. Sport harvest from 1980 to 1989 has averaged 378 in the Nass River, 2,393 in the Skeena River, 69 in the Stikine River and 18 in the Taku River. Commercial harvest in Areas 3, 4 and 5 have increased from 1963 to 1989 averages of 2,087, 13,326 and 438 to 1985 to 1989 averages of 3,561, 16,198 and 715, respectively. Stikine and Taku rivers show commercial harvests which decrease from 1979 to 1989 averages of 254 and 119 to 1985 to 1989 averages of 140 and 58

respectively. Native harvest of Skeena River steelhead have increased from a 1963 to 1989 average of 2,899 to a 1985 to 1989 average of 5,884.

Steelhead enhancement in Areas 3, 4 and 5 has been minor and exclusively limited to the Skeena watershed. From 1985 to 1988 an average of 232,000 fry have been released annually in several Skeena tributaries.

Preliminary stock assessment information for the Skeena steelhead return indicates a 1963 to 1990 average terminal stock of 32,099. The preliminary estimates of a minimum escapement goal based on fry capacity estimates for the Skeena watershed is 26,000 spawners.

INTRODUCTION

This report has been prepared by the Northern Boundary Technical Committee in response to a request from the Northern Panel in February, 1990 (Appendix A). The intent of this report is to provide a review of available information relating to steelhead stocks in Southeast Alaska and northern British Columbia. Included are descriptions of the distribution of steelhead stocks in the region, life histories, migration patterns, harvest patterns in the sport, commercial and native/subsistence fisheries, escapement information, and present enhancement activities. This information was used to assess the status of these stocks.

In Southeast Alaska the lack of a time series of reliable escapement and harvest rate information precludes making a quantitative, or even an accurate qualitative assessment of stock status. Unfortunately, there are no current programs which will further this assessment.

This report is organized in two main sections. Southeast Alaska steelhead stocks are discussed first and northern British Columbia stocks second. We caution the reader that further information is needed to make a comprehensive assessment of the status of these stocks. In particular, additional information is needed to reasonably evaluate the status of Canadian stocks.

ALASKA

This information is taken verbatim from a report by Aloysius J. Didier, Jr. (A.J. Didier. 1991. A review of steelhead stock status, harvest patterns, enhancement, and migrations in Southeast Alaska. Alaska Department of Fish and Game, Division of Sport Fish, Juneau, unpublished report).

Stock Descriptions

Distribution and Life History

Steelhead *Oncorhynchus mykiss* are found in coastal streams of Alaska from Dixon Entrance, north and westward around the Gulf of Alaska to the Cold Bay area on the Alaska Peninsula. The majority of steelhead streams in Alaska, however, are located in Southeast Alaska. Most of the 331 known steelhead populations in Southeast Alaska contain 200 or fewer adults, but some of the larger systems like the Naha River, Karta River, and Thorne River probably support runs in excess of one thousand spawning adult

steelhead. The largest known steelhead producer in Southeast Alaska is the Situk River in Yakutat, which supports a run of 3,000 to 6,000 adult steelhead.

Steelhead in Alaska generally spend two to five years in fresh water before migrating to the ocean as smolts with a three-year fresh water residency being most common. Adult steelhead return to spawn after spending one to three years at sea. The timing of the adult immigration may be characterized as either "spring or "fall". In stocks that display a "spring" run timing, immigrations of adult fish are typically at their highest levels during late April or early May. Immigrations of adult "fall" run steelhead are typically greatest from September through October. Both stock types spawn during the spring and adult steelhead that survive spawning (kelts) emigrate to the sea again from mid-May through June. In those populations from which significant numbers of samples have been collected, initial spawning fish are evenly divided between males and females. In Southeast Alaska and Yakutat, steelhead stocks displaying "spring" run timings are most common, but fish displaying a "fall" run timing do comprise a minor component of some populations. North and west of Yakutat, "fall" run timing patterns are prevalent.

Adult steelhead kelts may survive to spawn again; steelhead that have spawned as many as five times have been observed in some Southeast Alaska systems. Repeat spawning fish usually comprise 25 to 33 percent (sampled range = 11% to 38%) of the total adult return (Van Hulle, 1985). The observed rate of repeat spawning has been greater in Kodiak and Southeast Alaska stocks and lower in more northerly stocks. Sixty-five (65) to 80 percent of repeat spawning fish are typically female.

Stock Status

There have been few evaluations of the status of steelhead stocks in individual stream systems in Southeast Alaska. Weir or visual counts have been conducted sporadically on the Situk River (Yakutat), Sitkoh Creek (Chichagof Island), Karta River (Prince of Wales Island), and Peterson Creek (Juneau) (Figure 1).

Situk River

The Situk River, located on the Gulf of Alaska near Yakutat (Figure 1) contains the largest known steelhead population in Alaska. The Situk River supports a very popular steelhead fishery that attracts anglers from around the world.

Adult steelhead enter the Situk River from the ocean during August-December (fall run) and again during March-June (spring run). The ADF&G Division of Sport Fish has conducted visual float counts of the steelhead in Situk River annually since 1984, with the exception of 1986 when water levels prevented a full estimate. The visual estimates were 2,889 steelhead in 1984, 2,048 in 1985, 3,206 in 1987, 2,595 in

1988, 2,251 in 1989, and 1,640 steelhead in 1990. While no weirs have been operated during the immigration, a weir operated by the Commercial Fisheries Division to count returning chinook and sockeye salmon has been used to count steelhead leaving the river during 1989 and 1990. A total of 5,755 steelhead were counted downstream through this weir in 1989, and 3,611 were counted in 1990.

While visual estimates and the weir information appear to indicate that the population is declining, harvests and levels of effort on the Situk River have been steadily increasing. The department has conducted an annual creel survey during the spring Situk River steelhead fishery since 1985. Levels of effort for steelhead have more than doubled from the estimated 6,490 hours in 1985 to 14,907 hours in 1990 (Table 1). The harvest of steelhead (fish caught and kept) has also increased, although less dramatically than effort levels. An estimated 201 steelhead were harvested in during the peak of the 1985 season, and harvest increased to an estimated 392 steelhead in 1990. Release rates for steelhead on the Situk River stayed near 90% from 1985 to 1988, but dropped in 1989 to 85.6% and again in 1990 to 77.1%. The rate of steelhead catch per hour (CPUE), which includes both the number of fish released and the number of fish kept, has dropped from 0.44 in 1988 to 0.11 fish per hour in 1990 (Figure 2).

Sitkoh Creek

Sitkoh Creek, located on Chichagof Island (Figure 1), supports one of the best steelhead runs in northern Southeast Alaska after the Situk River. It is located about 56 km northeast of Sitka and 88 km southwest of the state capital in Juneau. Most steelhead return to Sitkoh Creek in a spring run that begins in April and peaks during early May. There are unconfirmed reports of a smaller winter steelhead run that enters the system in mid-December.

A weir has been operated to count adult steelhead at Sitkoh Creek in 1936, 1937, 1982, and 1990. Seven hundred and sixty (760) steelhead were counted in 1936, 1,108 were counted in 1937, 690 were counted in 1982, and 661 were counted in 1990. While the count of 1990 is the lowest to date, it is comparable to the 1982 weir count.

Creel surveys have been conducted five times in the Sitkoh Creek system (Table 2). In 1976, a partial creel survey showed that about 111 anglers kept 49 fish. An average of one fish was taken per 21.5 hours of effort (CPUE = 0.05 fish per hour), and an estimated 50% of the catch was released. The population of adult steelhead was estimated to be 200 to 300 fish, based on stream counts and angler success.

A 33-inch size limit on steelhead was in effect from 1978 to 1983, and creel surveys were conducted during two of those years (1978 and 1982). In 1978 a weekend creel survey indicated that an estimated 150 anglers fished 763 hours to catch 70 steelhead. An average of one fish was taken per 10.9 hours of effort (CPUE = 0.09). An estimated 32 steelhead were kept for consumption; 54.3% of the fish caught

were released. In 1982, 116 anglers caught 348 steelhead (Jones 1983). Forty-five (45) fish that exceeded the 33-inch size limit were kept; the remaining 303 fish (87.1%) were released.

In 1987 a stratified creel survey was conducted with three day randomly selected sampling periods. Twelve of the 32 possible fishing days from April 19 to May 20 were sampled. All anglers who completed fishing trips during the sample periods were interviewed. Expanding the sample results produced an estimate of 123 anglers, a total estimated catch of 216 steelhead, and a CPUE of 0.27. An estimated 163 steelhead (75.5%) were caught and released.

During a 1990 creel survey, 134 anglers caught a total of 278 steelhead. Only 35 of those fish were kept; the release rate (87.4%) was the highest observed in any study year. The CPUE of 0.23 was lower than that observed during the 1982 and 1987 creel studies, but was well above the 1976 and 1978 catch rates of 0.05 and 0.09 hours respectively.

Karta River

Karta River is located on the east coast of Prince of Wales Island (Figure 1), approximately 57 miles northwest of Ketchikan. Access is by float plane to the bay or into one of two lakes on the Karta River system. U.S. Forest Service public use cabins are located on Karta Lake, Little Salmon Lake, and Karta Bay.

A steelhead weir has been operated twice on Karta River, once in 1983 and again in 1989. In 1983, an estimated total of 1,022 steelhead returned (Jones 1984). The weir was installed on April 7, 1983 and a number of steelhead were observed already upstream at that time. In 1989, the weir was installed in late March; 1,220 immigrating and 842 emigrating adult steelhead were counted (Hoffman et al. 1990). Most of the escapement into Karta River in 1989 occurred between April 1 and May 23, and the highest level of daily escapement occurred during the last week of April.

According to statewide harvest survey estimates for 1977 through 1989, the number of steelhead caught and kept at Karta River have ranged from 36 in 1981 to 1,095 in 1986. The creel survey at the weir in 1989 estimated that a total of 174 steelhead were caught and 124 (72.9%) of those fish were released. An estimated 1,568 angler-hours were expended.

Peterson Creek

Peterson Creek is a small stream that supports the most important steelhead fishery on the Juneau roadside (Figure 1). Peterson Creek has received much local attention, as well as several transplants of steelhead

fry in the past 30 years. A study was initiated by the ADF&G Division of Sport Fish in 1989 to evaluate the level of escapement, the age structure, and harvest of the steelhead population.

The total return to Peterson Creek is very small, 222 steelhead in 1989 and 179 fish in 1990. Run timing in Peterson Creek is later than either Karta River or Sitkoh Creek. Steelhead were counted through the weir between May 2 and June 4 during 1989, and between April 29 and June 4 during 1990.

The steelhead harvest from Peterson Creek, like the population size, is small. An estimated 2,121 angler hours were expended in 1989 to catch only 39 steelhead; only 17 (43.5%) of these fish were released (Harding and Jones 1990). In 1990, an estimated 2,653 angler hours were expended to catch 34 steelhead, of which only 16 (47.1%) were released.

Harvest Patterns

Sport Fisheries

Steelhead trout harvests in Southeast Alaska by sport fishermen typically occur in freshwater and have steadily increased since the statewide harvest surveys were started in 1977 (Table 3). The five-year average steelhead harvest has increased 144%, from 1,820 (1977-1981) to 4,441 (1985-1989). The 1989 harvest in Southeast Alaska was a record 5,409 steelhead. Sport harvests represent only those fish that are caught and kept, and do not include any fish that were caught and released. Sport harvests alone are not necessarily an accurate reflection of stock status, since the rates at which anglers catch and release steelhead vary between watersheds and between years (Johnson and Marshall 1990, Hoffman et al. 1990).

Commercial Fisheries

Steelhead are also harvested in the marine commercial fisheries of Southeast Alaska. Reported harvests ranged from 533 steelhead in 1975 to 11,540 in 1986 (Table 4). Before 1983, reported steelhead harvests in commercial fisheries averaged approximately 1,500 fish per year. Harvests increased annually from 1984 through 1986, to peak at 11,540 fish in 1986. During 1987 through 1989, reported steelhead harvests averaged approximately 3,700 fish. Total steelhead harvests in commercial and sport fisheries in Southeast Alaska ranged from an estimated 2,455 steelhead in 1979 to 16,262 in 1986 (Figure 3).

Most commercial landings of steelhead were made by drift gill net (1969-1989 average = 70.8%, range = 46.8% to 98.5%) and seine gear (1969-1989 average = 27.1%, range = 1.1% to 52.8%). The combination of all other gear types took only 2.1 percent (range = 0.2% to 9.3%) of the commercial harvest. Most of the commercial steelhead landings were from Districts 101 and 104 in southern part of Southeast Alaska (Figure 4 and Table 5). Steelhead were also taken regularly in the District 106 fishery near the Stikine River and in the District 111 fishery at the mouth of the Taku River.

Steelhead harvests reported through landing records for commercial fisheries should be considered minimum estimates of the actual harvest. Since steelhead are not consistently purchased by processors, some portion of the harvest is probably retained by fishermen for their personal use and goes unreported. There may also be some misidentification and sale of steelhead as other species.

District 101

Drift gill net, seine, and troll gear all operate in District 101 commercial fisheries. The Tree Point/Portland Canal drift gill net fishery targets on sockeye and summer chum salmon early in the season, on pink salmon during the mid-season, and on coho and fall chum salmon late in the season. The purse seine fishery in the inside waters of Southeast Alaska targets primarily on pink salmon during the mid-season. Approximately 93 percent of the reported steelhead harvest in District 101 was taken by gill net, approximately seven percent was taken by seine, and less than one percent was taken by troll gear.

Harvests of steelhead in District 101 fisheries during 1980 through 1989 are listed by statistical week in Table 6. Steelhead were typically harvested in increasing numbers after early July (Statistical Week 28), and harvests were greatest during mid-August (Statistical Week 33) (Figure 5).

District 104

Both purse seine and troll gear operate in District 104 commercial fisheries. The Noyes Island purse seine fishery targets primarily on sockeye salmon early in the season, and on pink salmon later in the season. Nearly all steelhead harvested in District 104 were taken by seine gear; troll gear accounted for only about one percent of the total steelhead harvest.

Harvests of steelhead in District 104 fisheries during 1980 through 1989 are listed by statistical week in Table 7. The general pattern of steelhead harvests was similar to that for District 101, but harvests typically peaked somewhat earlier in August (Statistical Week 32) (Figure 6).

District 106

Drift gill net, seine, and troll gear all operate in District 106 fisheries. The largest of these is the Prince of Wales drift gill net fishery that targets on sockeye salmon early in the season, on pink salmon during the mid-season, and on coho salmon late in the season. Nearly all of the steelhead harvested in District 106 were taken by gill net gear; less than one percent was taken by the seine and troll gear.

Harvests of steelhead in District 106 fisheries during 1980 through 1989 are listed by statistical week in Table 8. Steelhead harvests were typically greatest the beginning of the season in mid-June, and declined as the season progressed (Figure 7). During some years, harvests increased briefly during mid-July and early August (Statistical Weeks 29 through 33).

District 111

Both drift gill net and troll gear operate in District 111. The Taku/Snettisham drift gill net fishery targets primarily on sockeye salmon early in the season, on pink and sockeye salmon during the mid-season, and on fall chum and coho salmon late in the season. Nearly all steelhead harvested in District 111 were taken by gill net gear; less than one percent was taken by troll gear.

Harvests of steelhead in District 111 fisheries during 1980 through 1989 are listed by statistical week in Table 9. Steelhead harvests in District 111 were typically bimodal (Figure 8), with the highest levels of catch occurring at the beginning of the fishery during June (Statistical Weeks 25 - 27) and again during September (Statistical Week 36).

Enhancement

Historical Summary

The United States Forest Service (USFS) incubated and reared 450,000 steelhead fry in the Ward Creek Hatchery (Ketchikan) and released them in both Ward Creek and Ward Lake in 1937. Similarly, the USFS in conjunction with the U.S. Navy transplanted 50,000 eyed-eggs from Sashin Lake to Blue Lake (Sitka) in 1939. Steelhead were first stocked in northern Southeast Alaska near Juneau in 1941, as eyed-eggs at Peterson Creek and Windfall Lake.

In an attempt to create a resident trout fishery, the Alaska Department of Fish and Game (ADF&G) stocked Peterson Lake with approximately 161,000 steelhead fry and fingerlings from 1961 through 1968

using broodstocks that originated from Pleasant Bay, Lake Eva, "a remote Southeast Alaska lake", and the Cowlitz Hatchery, Washington. A small indigenous steelhead run reportedly existed in Peterson Creek at that time. Peterson Lake and Creek were treated with rotenone before the 1961 stocking, but that did not totally eradicate resident species. Peterson Creek currently supports an annual steelhead return of approximately 200 fish (Harding and Jones 1990). It is not known what portion of the current population are descendants of the stocked fish.

No additional steelhead stocking occurred in Southeast Alaska until after the construction of ADF&G Crystal Lake Hatchery at Petersburg in 1972. The first steelhead broodstock for the hatchery was acquired from Petersburg Creek in 1974. Approximately 99,200 steelhead smolt were produced at the hatchery between 1974 and 1984, almost all of which were stocked in the immediate Petersburg area (Table 10).

Montana Creek near Juneau was stocked with 6,500 steelhead smolts from Crystal Lake Hatchery in 1976. This plant was not properly evaluated and the single steelhead known to have been caught in Montana Creek may or may not have been from the plant.

Steelhead enhancement began in the Ketchikan area in 1980 as the result of a major chlorine spill in Ward Creek by the Ketchikan Pulp Company. Additionally, enhancement of the Ketchikan Creek, as well as the Klawock River on Prince of Wales Island, began in 1980. All three sites were stocked at varying levels and using a variety of brood sources. From 1980 to 1984, approximately 93,500 fry or smolts averaging from just under 5 grams to over 155 grams in weight were stocked. Releases were evaluated using harvest estimates obtained from a statewide harvest survey and from public comments.

1985 - 1989 Summary

The ADF&G Division of Sport Fish conducted a steelhead workshop in 1985, a primary objective of which was to establish an optimum size for steelhead smolt released from Alaskan hatcheries. A size standard of 170-180 mm for hatchery-reared steelhead smolt was established, based on hatchery steelhead programs in Oregon and Washington, and on limited size data from wild steelhead smolt in Alaska (Van Hulle 1985). Based on the experience of Oregon and Washington, a smolt to adult survival goal of 5% was also established. To date, these standards have not been consistently achieved in Southeast Alaska.

For the period 1984-1989, approximately 485,000 steelhead eggs were collected for incubation and rearing in Crystal Lake Hatchery, which have or will result in the release of 178,200 smolt (36.7% egg to smolt survival). The weighted average of those smolt released from 1985 through 1988 was 9.4 grams and the average length was 98.6 mm, substantially less than the desired 170-180 mm size. Mechanical equipment and fish culture practices have been changed at Crystal Lake Hatchery in order to produce 2-year-old steelhead smolt of the desired size.

Steelhead eggs were taken annually from 1983 through 1987 from Peterson Creek on the Juneau road system. The objective of the program was to produce steelhead smolts at Snettisham Hatchery for release into Montana Creek. The overall success of the program was low due to the small brood stock, the extended rearing time needed to produce smolts in the cold water at Snettisham Hatchery, and disease problems incurred in the hatchery. Approximately 27,000 steelhead smolts were transplanted to Montana Creek from Klawock Hatchery in 1987. Additional plants of less than 2,500 fish occurred in 1986 from the Crystal Lake Hatchery and in 1987 from the Snettisham Hatchery. A creel program on Montana Creek during 1989 showed that only 16 steelhead were taken in the sport fishery. Additional steelhead were observed in the stream, but the overall return from enhancement efforts was poor (Suchanek 1990). Additional returns of adult steelhead are expected through 1991.

From 1985 through 1989, both the Klawock River and Ward Creek were stocked with 20,000 to 50,000 steelhead smolts of various sizes. The resulting returns have been evaluated via on-site creel survey projects. Contributions to angler catchers at the Klawock River approached 50% (Freeman and Hoffman 1989), but only 10% to 20% of angler catches in Ward Creek were of hatchery origin (Hubartt 1989, 1990). The best enhancement results appeared to be produced when steelhead smolts averaging at least 45 grams and 170-180 mm in length were released. Future enhancement in the Ketchikan area will be limited to the Klawock River and Ketchikan Creek to evaluate time and size of release criteria.

Stock Migrations

The information describing the migration and ocean distribution of North American steelhead stocks is limited. Hartt and Dell (1986) reported that the migrations of juvenile steelhead were apparently different from those of other salmonids. Juvenile steelhead appeared to migrate directly offshore during their first ocean summer from whatever point they entered the sea, rather than migrating northward and westward along the Pacific coast. Light et al. (1988) reported that the ocean distribution of North American steelhead stocks extended northward from approximately 41 N. latitude to the Aleutian Islands in the central North Pacific, and eastward from 167 E. longitude to the North American coastline. Steelhead stocks from all regions appeared to be extensively intermingled.

In Southeast Alaska, some indication of steelhead stock migrations can be obtained from recoveries of fish marked with a clipped adipose fin and a coded-wire tag (CWT). A total of 1,126 steelhead marked with adipose fin clips have been examined since 1980 (Table 11). Most of the recoveries are evenly distributed between commercial fisheries, sport fisheries, and rack returns of hatchery fish. For this report, only recoveries from commercial and sport fisheries will be considered.

There have been no attempts to systematically recover tagged steelhead in Southeast Alaska sport and commercial fisheries, but steelhead are recovered in programs designed to sample the harvests of other species. Approximately 87 percent of the recoveries of adipose fin-clipped steelhead in commercial fisheries result from these random samples. Random samples produced 86 percent of drift gill net recoveries and 92 percent of seine recoveries. Most (94%) of the fish with adipose fin clips that have been examined from sport fisheries, however, are select or voluntary recoveries. Recoveries from Southeast Alaska sport fisheries are probably enhanced by sport fishing regulations that increase the daily bag limit from one to two steelhead over 16 inches in length if at least one of those fish is marked with a clipped adipose fin.

These data can indicate the presence or absence of stocks in Southeast Alaska fisheries but there are limitations to their use. Tags have been applied to some of the fish released from hatchery enhancement projects, but there have been no attempts to systematically tag wild steelhead smolt from representative systems throughout this region.

The recovery pattern of marked steelhead in sport and commercial fisheries is shown in Figure 9. Steelhead recoveries in sport fisheries generally correspond to the known pattern of freshwater residence for adult steelhead in Southeast Alaska. Sport recoveries of marked steelhead are most common from early December (Statistical Week 49) through late May (Statistical Week 22). Commercial recoveries generally correspond to the periods of intense net fisheries during the summer (Statistical Weeks 26 - 36). Approximately 66 percent of these commercial recoveries were from fisheries in District 104 and another 23 percent were from fisheries in District 101.

Of the 731 steelhead marked with missing adipose fins and recovered in sport and commercial fisheries, 277 did not carry a CWT. The proportion of marked steelhead bearing a CWT has generally declined in recent years. During 1983, the first year of substantial marked steelhead recoveries, only 11 percent of the marked steelhead did not bear a CWT; that proportion increased to 60 percent in 1990. A similar pattern has been described by Light et al. (1988) for high seas recoveries and has been attributed to a 1983 change in Pacific Marine Fishery Commission (PMFC) rules regarding the use of the adipose fin clip.

Agency identification and release location could be determined for 448 of the CWT recoveries. All of the sport recoveries originated from release sites in Alaska (Table 12) and most of these were located near Ketchikan (Ward L., Talbot L.) or on Prince of Wales Island (Klawock systems). Commercial CWT recoveries originated primarily (93%) from release sites in British Columbia (Table 13); most of these were Vancouver Island systems (Puntledge R., Robertson Ck., Somass R.). Southeast Alaska release sites comprised only 3 percent of identified commercial steelhead recoveries; steelhead from release sites in Washington, Idaho, and California were also recovered.

CANADA

Stock Descriptions

The Canadian contribution to this report represents a very preliminary review. All of the data and assessments are subject to change. The Canadian Provincial Fish and Wildlife Branch is currently conducting a detailed stock assessment of Skeena steelhead and information from this review will be available in the fall of 1991.

Distribution and Life History

A description of steelhead distribution and life history is not available for this report.

Harvest Patterns

Sport Fisheries

Estimates of the Steelhead harvest by anglers in the Nass, Stikine and Taku drainages is outlined in Tables 14 and 15. These data are derived from mailed questionnaire sampling of licensees from 1967 through 1989. The 1990 estimates are not yet available. The Skeena angler harvest by river is outlined in Table 16. The Skeena sport harvest data has been adjusted downward by 32 percent to adjust for a positive response bias common to questionnaire surveys. An adjustment factor has not been applied to other northern B.C. areas. The preliminary estimate of the 1990 Skeena steelhead angler catch is 600. Sport harvest in the Skeena had fluctuated between 1500 and 4500 prior to 1989 when the catch declined significantly, in a large part due to harvest restrictions. Nass, Stikine and Taku sport harvests show a slight increasing trend in the late 1980's. Sport harvests over the last decade averaged 378 in the Nass River, 69 in the Stikine and 18 in the Taku. Sport harvest does not necessarily reflect stock size or angling effort since harvest regulations and a continuing trend toward voluntary catch and release are important influences. The remoteness and inaccessibility of most tributaries of the upper Skeena, Nass, Stikine and Taku rivers are the primary factors controlling effort and therefore harvest. The annual angling effort on the Nass, Skeena, Stikine and Taku Rivers combined averaged approximately 60,000 steelhead angler days over the decade of the eighties, with 50,000 angler days attributed to the Skeena.

Commercial Fisheries

The weekly Area 3 and 5 (Figure 10) gill net and seine steelhead catches, as reported in sales slips, are outlined in Tables 17-20. There is a fluctuating trend in the gill net and seine catches in both Area 3 and 5 with the catches peaking in the 1984 to 86 period and a reported decline in catches over the past three years. The catches are believed to reflect the general trends in abundance, but there has been an increasing problem in recent years with a higher proportion of the steelhead catch going unreported. The origin of steelhead caught in the Area 3 and 5 fisheries in July and August is presumed to be predominantly Skeena-Nass because of the lack of other significant summer run steelhead in Northern British Columbia or S.E. Alaskan. The relative weekly catch comparisons generally reflect the magnitude of the commercial effort rather than steelhead run timing, particularly after mid-August.

Estimates of the Area 4 steelhead commercial net catch are outlined in Table 21. Steelhead catches averaged 13,177 from 1963 to 1969, 10,558 during the 1970's and 15,228 over the past 11 years. In particular, there has been a relatively low catch in three of the last four years, an indication of a steep decline in steelhead abundance, and reduced fishing effort (in 1989). Again there is a strong concern that the proportion of the steelhead catch that is reported is declining. The relative weekly abundance indicates a presence of steelhead throughout the July through September period. Changes in fishery openings and in effort are a strong influence on the steelhead catches and the weekly catches are not necessarily accurate indicators of relative steelhead abundance.

The Stikine and Taku gill net catches are outlined in Tables 22 and 23. The steelhead catches are low up to the first week of August in the Stikine, and remain low in the Taku up to the first week of September. This offers a general indication of steelhead run timing, however the annual fishing pattern is a major influence on the relative weekly steelhead catch.

Native Fisheries

Steelhead catch estimates for native fisheries in the Skeena River are provided in Table 24. The native harvest has increased from decade averages of between 800 and 900 for the 1960's and 1970's to 6,906 during the 1980's. Native catch information for other northern British Columbia rivers is sparse and is not presented at this time.

Stock Status

Data for stocks other than the Skeena River is very limited. In general terms, the primary stock status issues relate to the cumulative impacts of commercial, sport and native harvest of summer run steelhead in Northern British Columbia. Steelhead that enter rivers in September or later, or in the spring prior to mid-June are assumed to be relatively free from exploitation in commercial fisheries and have remained relatively abundant. In the Skeena, one of the key stock assessment issues is the need to establish the contribution of late run fish, and their genetic influence relative to the overall population run timing. The steelhead that enter the Skeena in the July and August period are the backbone of the traditional summer and fall sport fishery. Minimum spawning escapement goals based on fry capacity estimates have been developed for Skeena steelhead stocks (Table 25) and are a key component of the Skeena steelhead stock assessment review process. The preliminary estimate of a minimum spawning escapement goal for all stocks is 26,000 spawners. Assessment of the feasibility of further dividing the stock specific minimum escapement goals into run timing components is continuing. The number of steelhead escaping past the Skeena test fishery averaged 20,068 during the sixties, 15,073 in the seventies and 22,461 in the eighties (Table 26). This gives a misleading impression of the last decade, since three of the last four years have been weak escapements past Tyee. These escapements past the test fishery are obviously derived only from the period of operation of the test fishery, generally up to August 25, and do not include escapements after this period. The steelhead that migrate after the closure of the test fishery do contribute to the reported sport and native catches, and to the actual, but not the reported escapements. This means the spawner estimates are underestimated to some unknown extent for all years. The terminal steelhead abundance, is represented by adding the Area 4 catch and the escapement past Tyee. The steelhead run in the terminal area averaged 31,937 in the sixties, 24,419 in the seventies and 38,340 over the last decade (Table 27). The 1987, 1989 and 1990 terminal runs averaged only 20,786 well below the decade average. Table 28 outlines the distribution of the escapement past Tyee among native harvest, sport harvest and spawners. The sport harvest pattern indicates a decreasing harvest possibly as a result of increases in voluntary catch and release. The 1989 and 1990 harvests were limited by severe catch restrictions. Table 28 provides an estimate of spawners derived by subtracting estimates of sport and native harvest from the escapement past Tyee. Estimates of spawners have been highly variable, particularly in the 1980's with estimates of spawning escapement ranging from 4,000 to 31,000. These escapements cannot be directly compared to the Skeena escapement targets outlined in Table 14, because Table 28 outlines escapement past Tyee relative to the summer run only.

Enhancement

Steelhead culture in northern British Columbia has been confined to minor experimental programs aimed at refining stock specific run timing knowledge or colonizing inaccessible headwater areas. These programs employed fall releases of coded wire tagged fry, generally in the 2-3 gm range. A summary of fall releases of hatchery steelhead fry from Skeena River tributaries is provided in Table 29. A review of the 1989 and 1990 cwt recoveries will be available by the fall of 1991.

Stock Migrations

Information on coded wire tagged recoveries in the Canadian Northern Boundary area is not available for this report.

LITERATURE CITED

Freeman, G. and S. Hoffman. 1989. Steelhead *Oncorhynchus mykiss* creel survey on the Klawock River, Southeast Alaska, 1987-1988. Alaska Department of Fish and Game, Division of Sport Fish, Fisheries Data Series No. 118. 19 pp.

Harding, R. and D. Jones. 1990. Peterson creek and lake system steelhead evaluation, 1989. Alaska Department of Fish and Game, Division of Sport Fish, Fisheries Data Series No. 90-37. 32 pp.

Hartt, A.C. and M.B. Dell. 1986. Early oceanic migrations and growth of juvenile Pacific salmon and steelhead trout. International North Pacific Fisheries Commission, Bulletin No. 46. 105 pp.

Hoffman, S.H., J. Koerner, and D. Magnus. 1990. Steelhead creel and escapement statistics, in-river distribution, and recreational use survey, Karta River, Southeast Alaska, 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-45. 68 pp.

Hubartt, D. 1989. Ward Creek steelhead creel survey, Ketchikan, Alaska, 1988. Alaska Department of Fish and Game, Division of Sport Fish, Fisheries Data Series No. 119. 23 pp.

_____. 1990. Ward Creek steelhead creel survey, Ketchikan, Alaska, October 1988 - May 1989. Alaska Department of Fish and Game, Division of Sport Fish, Fisheries Data Series No. 90-40. 27 pp.

Johnson, R.E. 1990. Steelhead Studies: Situk River, 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-47. 20 pp.

Johnson, R.E. and R.P Marshall. 1990. Harvest estimates for selected sport fisheries in Yakutat, Alaska in 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-36. 25 pp.

Jones, D.E. 1983. A study of cutthroat - steelhead in Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report 1982-1983, Project AFS-42-10-A, Volume 24. 17 pp.

Jones, D.E. 1984. A study of cutthroat - steelhead in Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report 1983-1984, Project AFS-42-11, Volume 25. 16 pp.

LITERATURE CITED (Cont.)

Light, J.T., S. Fowler, and M.L. Dahlberg. 1988. High seas distribution of North American steelhead as evidenced by recoveries of marked or tagged fish. (Document submitted to the International North Pacific Fisheries Commission) Fisheries Research Institute, University of Washington, FRI-UW-8816. 21 pp.

Marriott, R.A., A.E. Schmidt, and D.E. Jones. 1979. Harvest estimates of selected fisheries throughout Southeast Alaska. Federal Aid in Fish Restoration, Annual Performance Report, 1978.1979, Project F-9-11, 20 (G-I-Q). 58 pp.

Mills. M. J. 1979. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1978.1979, Project F-9-11, 20 (SW-I-A). 112 pp.

_____. 1980. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1979-1980, Project F-9-12, 21 (SW-I-A). 65 pp.

_____. 1981a. Alaska statewide sport fish harvest studies (1979). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22 (SW-I-A). 77 pp.

_____. 1981b. Alaska statewide sport fish harvest studies (1980). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981. Project F-9-13, 22 (SW-I-A). 107 pp.

_____. 1982. Alaska statewide sport fish harvest studies (1981). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1981-1982, Project F-9-14, 23 (SW-I-A). 115 pp.

_____. 1983. Alaska statewide sport fish harvest studies (1982). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1982-1983, Project F-9-15, 24 (SW-I-A). 119 pp.

_____. 1984. Alaska statewide sport fish harvest studies (1983). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1983-1984, Project F-9-16, 25 (SW-I-A). 123 pp.

LITERATURE CITED (Cont.)

_____. 1985. Alaska statewide sport fish harvest studies (1984). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1984-1985, Project F-9-17, 26 (SW-I-A). 137 pp.

_____. 1986. Alaska statewide sport fish harvest studies (1985). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1985-1986, Project F-10-1, 27 (RT-2). 137 pp.

_____. 1987. Alaska statewide sport fisheries harvest report. Alaska Department of Fish and Game, Fishery Data Series No 2. 140 pp.

_____. 1988. Alaska statewide sport fisheries harvest report, 1987. Alaska Department of Fish and Game, Fishery Data Series No. 52. 142 pp.

_____. 1989. Alaska statewide sport fisheries harvest report, 1988. Alaska Department of Fish and Game, Fishery Data Series No. 122. 142 pp.

_____. 1990. Harvest and participation in Alaska sport fisheries during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-44. 152 pp.

Suchanek, P.M. 1990. Harvest estimates for selected enhanced roadside sport fisheries near Juneau, Alaska during 1989. Alaska Department of Fish and Game, Division of Sport Fish, Fishery Data Series No. 90-38. 40 pp.

Van Hulle, F. 1985. Alaska steelhead workshop. Alaska Department of Fish and Game, Division of Sport Fish, Juneau, Alaska. 134 pp.

Table 1. Estimated peak angling effort, steelhead harvest, and release during the spring Situk River sport fishery, 1985-1990.

Year	Hours Fished	Steelhead Kept	Steelhead Released	Percent Released	Catch per Hour
1985[a]	6,490	201	2,485	92.5%	0.41
1986[a]	9,338	239	2,025	89.4%	0.24
1987[a]	9,136	279	3,603	92.8%	0.42
1988[a]	11,382	374	4,658	92.6%	0.44
1989[a]	11,078	332	1,974	85.6%	0.21
1990[b]	14,907	392	1,317	77.1%	0.11

[a] (Johnson 1990)
[b] 1990 data is preliminary and subject to revision.

Table 2. Summary of Sitkoh Creek creel survey information.

Year	Number of Anglers	Angler Hours	Total Catch	Number of Fish Kept	Catch Per Hour	Percent Released
1976	111	2,107	98	49	0.05	50.0%
1978[a]	150	763	70	32	0.09	54.3%
1982[b]	116	--[c]	348	45	--[c]	87.1%
1987	123	799	216	53	0.27	75.5%
1990	134	1,205	278	35	0.23	87.4%

[a] (Marriott et al. 1979)
[b] (Jones 1983)
[c] Data not comparable; 238 angler-days reported.

Table 3. Sport harvests of steelhead in southeast Alaska by year and area, 1977-1989.

AREA[a]	1977[b]	1978[c]	1979[d]	1980[e]	1981[f]	1982[g]	1983[h]	1984[i]	1985[j]	1986[k]	1987[l]	1988[m]	1989[n]
Ketchikan	708	496	290	748	480	773	634	791	907	1,002	737	1,400	1,654
Prince of Wales Island	357	660	373	1,445	362	618	1,115	1,698	1,108	1,834	1,950	831	1,277
Petersburg, Wrangell	412	236	281	198	262	313	475	826	305	865	848	756	609
Sitka	70	36	36	35	65	83	176	109	156	145	270	64	193
Juneau	67	45	99	85	11	62	209	33	111	206	382	265	280
Haines, Skagway	0	0	9	0	0	0	0	7	153	168	36	123	142
Glacier Bay	0	0	0	0	0	0	0	0	0	8	0	0	42
Yakutat	136	145	336	258	357	519	860	696	348	494	454	870	1,212
TOTAL	1,750	1,618	1,424	2,769	1,537	2,368	3,469	4,160	3,088	4,722	4,677	4,309	5,409

[a] Sport fishing harvest areas are described in Appendix A.
[b] (Mills 1979)
[c] (Mills 1980)
[d] (Mills 1981a)
[e] (Mills 1981b)
[f] (Mills 1982)
[g] (Mills 1983)
[h] (Mills 1984)
[i] (Mills 1985)
[j] (Mills 1986)
[k] (Mills 1987)
[l] (Mills 1988)
[m] (Mills 1989)
[n] (Mills 1990)

Table 4. Reported commercial harvest of steelhead by gear type in southeast Alaska, 1969-1989.

Year	Seine	Drift Gill Net	Set Gill Net	Troll	Other[a]	Total
1969	1,130	1,203	0	81	0	2,414
1970	427	1,933	6	33	2	2,401
1971	148	1,639	2	13	0	1,802
1972	19	1,629	0	5	0	1,653
1973	290	1,529	7	10	0	1,836
1974	629	1,253	5	53	0	1,940
1975	34	485	0	14	0	533
1976	153	861	0	11	2	1,027
1977	274	682	0	4	3	963
1978	362	1,239	0	9	0	1,610
1979	210	795	0	26	0	1,031
1980	746	661	0	5	0	1,412
1981	315	613	0	6	0	934
1982	371	1,596	1	21	0	1,989
1983	2,133	1,931	0	9	1	4,074
1984	2,554	2,795	0	39	2	5,390
1985	1,822	5,257	0	32	1	7,112
1986	5,697	5,638	0	195	10	11,540
1987	363	3,097	55	99	7	3,621
1988	1,639	2,362	209	108	21	4,339
1989	837	2,073	242	57	0	3,209

[a] Includes trap, longline, and unidentified.

Table 5. Reported commercial harvest of steelhead by district in southeast Alaska, 1969-1989.

YEAR	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	Yakutat	Total
1969	167	0	26	1,065	0	618	0	66	1	1	369	48	0	8	45	0	0	2,414
1970	529	3	17	324	0	481	44	109	4	0	824	19	0	12	29	0	6	2,401
1971	180	3	31	103	0	597	0	62	0	0	632	0	0	4	190	0	0	1,802
1972	42	0	0	7	1	697	1	193	5	1	574	1	0	2	128	1	0	1,653
1973	379	4	0	281	0	506	0	67	3	2	554	0	2	1	30	0	7	1,836
1974	377	2	5	648	0	339	4	57	1	1	466	0	0	6	27	1	6	1,940
1975	155	7	0	25	0	223	1	6	0	0	89	0	0	2	25	0	0	533
1976	154	16	6	125	0	130	6	20	0	1	508	0	0	0	59	0	0	1,027
1977	202	24	0	226	0	68	2	24	0	0	363	0	0	0	54	0	0	963
1978	585	7	4	316	0	204	8	60	0	0	397	1	0	0	28	0	0	1,610
1979	219	11	3	201	0	320	3	3	0	0	245	1	1	2	22	0	0	1,031
1980	329	101	1	600	0	91	0	8	3	0	246	0	0	1	32	0	0	1,412
1981	146	15	3	274	0	187	0	9	0	2	262	8	15	4	9	0	0	934
1982	787	8	1	330	0	282	0	32	1	5	476	7	3	1	54	1	1	1,989
1983	1,582	24	11	1,847	3	274	4	81	0	2	183	23	18	0	22	0	0	4,074
1984	2,061	93	7	2,042	0	513	6	5	17	2	366	69	35	15	159	0	0	5,390
1985	5,156	0	19	1,379	4	0	0	5	2	2	499	12	28	6	0	0	0	7,112
1986	4,339	193	21	5,180	2	1,071	3	8	11	0	529	12	145	6	13	3	4	11,540
1987	2,359	25	5	319	3	494	0	6	9	4	273	9	30	14	10	4	57	3,621
1988	1,517	38	13	1,625	3	590	1	9	13	0	233	2	31	5	39	7	213	4,339
1989	1,474	8	5	788	3	407	1	12	10	3	215	5	18	4	7	7	242	3,209

Table 6. Harvests of steelhead in District 101 commercial fisheries by statistical week, 1980-89.

STAT WEEK	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	AVERAGE[a]
23	16										16
24	4										4
25	8	6			47	22	96			35	36
26	10		7	6	33	77	56	46	58	9	34
27	5	5	16	7	68	111	32	53	22	16	34
28	13	5	20	3	113	224	212	32	36	18	68
29	48	4	56	19	149	207	762	43	96	55	144
30	46	7	94	70	108	375	796	85	103	143	183
31	14	5	60	169	129	397	595	45	162	429	201
32	61	30	173	422	305	716	469	299	269	267	301
33	24	33	110	471	658	1,207	339	466	408	185	390
34	58	16	140	166	236	832	393		154	198	244
35	14	14	40	127	126	552	360	103	26	75	144
36	8	10	36	50	53	272	121	614	71	26	126
37		8	9	59	31	99	75	272	30	8	66
38		3	26	9	5	64	31	265	27	10	49
39				4			2	36	55		24
40						1					1
Total	329	146	787	1,582	2,061	5,156	4,339	2,359	1,517	1,474	1,975

[a] Estimated as the average of all those years for which there are data.

Table 7. Harvests of steelhead in District 104 commercial fisheries by statistical week, 1980-89.

STAT WEEK	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	AVERAGE[b]
16									1		1
21			11								11
27					3	2		1		5	3
28	53	7	32	73	41	17	27	13	11	4	28
29	121	20	130	101	156	64	526	19	166	12	132
30	90	38	35	104	157	348	523	48	126	53	152
31	176	56	4	428	597	403	951	15	8	201	284
32	122	49	25	476	433	415	2,209	155	504	168	456
33	31	29	53	453	361	17	671	25	464	250	235
34	4	74	10	106	286	50	139	41	147	20	88
35	3		21	106	8	63	84	2	145	75	56
36		1	9				50		53		28
Total	600	274	330	1,847	2,042	1,379	5,180	319	1,625	788	1,438

[a] Estimated as the average of all those years for which there are data.

Table 8. Harvests of steelhead in District 106 commercial fisheries by statistical week, 1980-89.[a]

STAT WEEK	1980	1981	1982	1983	1984	1986	1987	1988	1989	AVERAGE[a]
24						2				2
25	13	12	32	1	8	298		2	120	61
26	16	10	68	44	28	120	164	89	40	64
27	2	25	55	19	56	53	64	155	21	50
28	9	9	51	9	16	1	85	34	24	26
29	11	47	17	11	131	33	43	85	32	46
30	4	34	32	10	78	68	15	31	38	34
31	22	19	10	22	116	117	28	65	51	50
32		14		8	27	116	25	52	14	37
33	2	12		43	11	82	51	14	31	31
34	8	3	1	36	25	88		23	26	26
35	2		8	21	9	48	8	36	7	17
36	2	2	7	32	5	29	2	4	2	9
37			1	4	3	5	3		1	3
38				11		9	6			9
39						2				
40				3						
Total	91	187	282	274	513	1,071	494	590	407	434

[a] There was no District 106 fishery in 1985.

[b] Estimated as the average of all those years for which there are data.

Table 9. Harvests of steelhead in District 111 commercial fisheries by statistical week, 1980-89.

STAT WEEK	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	AVERAGE[a]
25	57	13	10		55	7	19			110	39
26	27	55	69	25	28	26	87	47	8	44	42
27	1	46	128	10	11	101	32	48	6	5	39
28	2	30	42	1	3	30	32	16	3	4	16
29		12	9		6	12	9	5		3	8
30		1	2		6	4	1	1	1		2
31	1	1	3	7	19	4	8	4	1		5
32	11	1	9	18	20	10	1	5		5	9
33	5	21	23	24	30	21	43	8	3	6	18
34	10	20	23	13	28	58	83	23	25	13	30
35	32	23	22	15	44	30	59	40	7	8	28
36	21	26	6	50	47	59	57	34	25	2	33
37	47	13	60	8	57	49	62	34	95	6	43
38	9		70	11	12	57	36	8	15	9	25
39	23			1		31			44		25
Total	246	262	476	183	366	499	529	273	233	215	328

[a] Estimated as the average of all those years for which there are data.

Table 10. Stockings of steelhead in southeast Alaska, 1975-89.

HATCHERY	STOCKING SITE	STOCKING DATE	BROODSTOCK	BROOD YEAR	WEIGHT (g)	DEVELOPMENT STAGE	NUMBER RELEASED	RATIO RELEASED VS. TAGGED	CWT[a] ID CODE
Crystal Lake	Crystal Ck.	05-Jun-75	Petersburg Ck.	74	16.3	Smolt	9,500		
Crystal Lake	Petersburg Ck.	10-Jun-75	Petersburg Ck.	74	16.8	Smolt	8,000		
Crystal Lake	Falls Ck.	01-Jun-76	Falls Ck.	75	41.2	Smolt	1,950		
Crystal Lake	Montana Ck.	01-Jun-76	Falls Ck.	75	37.8	Smolt	6,500		
Crystal Lake	Petersburg Ck.	07-Jun-76	Petersburg Ck.	75	41.2	Smolt	6,500		
Crystal Lake	Crystal Ck.	08-Jun-76	Falls Ck.	75	45.4	Smolt	1,515		
Crystal Lake	Crystal Ck.	17-Jun-77	Falls Ck.	76	60.5	Smolt	630		
Crystal Lake	Blind Slough	26-May-78	Falls Ck.	77	37.8	Smolt	10,741	1.16	4187, 4188
Deer Mountain	Ketchikan Ck.	02-Jun-80	Ketchikan Ck.	78	30.2	Smolt	1,025	1.05	041753
Deer Mountain	Ward Ck.	02-Jun-80	Ketchikan Ck.	78	45.4	Smolt	545	1.05	041905
Deer Mountain	Ward Ck.	19-Jun-80	Ketchikan Ck.	78	30.2	Smolt	1,178	1.00	041909
Klawock	Klawock R.	02-Jun-80	Klawock R.	79	45.4	Smolt	2,608	1.27	041756
Deer Mountain	Ketchikan Ck.	01-Jun-81	Ketchikan Ck.	79	65.4	Smolt	1,146	1.03	041914
Deer Mountain	Ward Ck.	08-Jun-81	Ketchikan Ck.	78	155.5	Smolt	2,471	1.14	041915
Deer Mountain	Ward Ck.	08-Jun-81	Ketchikan Ck.	78	81.4	Smolt	345	1.11	041903
Klawock	Klawock R.	17-Jun-81	Klawock R.	80	42.4	Smolt	6,422	1.09	041912
Crystal Lake	Crystal Ck.	03-Jun-82	Crystal Ck.	80	38.1	Smolt	10,500	1.00	042050
Crystal Lake	Falls Ck.	03-Jun-82	Crystal Ck.	80	38.1	Smolt	10,503	1.00	042050
Deer Mountain	Ward L.	25-May-82	Ketchikan Ck.	80	28.4	Smolt	1,479	1.06	042163
Klawock	Klawock R.	10-Jun-82	Klawock R.	81	45.4	Smolt	29,628	1.00	4221
Crystal Lake	Crystal Ck.	06-Jun-83	Crystal Ck.	81	47.4	Smolt	10,026	1.08	042204
Crystal Lake	Falls Ck.	06-Jun-83	Crystal Ck.	81	47.4	Smolt	10,458	1.08	042204
Crystal Lake	Ohmer Ck.	07-Jun-83	Crystal Ck.	81	47.4	Smolt	9,076	1.08	042204
Deer Mountain	Talbot L.	20-Apr-83	Ketchikan Ck.	82	4.6	Fingerling	12,036	1.19	042221
Klawock	Klawock R.	23-Jun-83	Klawock R.	82	45.0	Smolt	14,139	1.01	042219
Klawock	Klawock R.	23-Jun-83	Klawock R.	82	45.0	Smolt	1,639	1.09	042241
Crystal Lake	Crystal Ck.	04-Jun-84	Crystal Ck.	82	28.9	Smolt	3,322	1.02	042234
Klawock	Klawock R.	07-May-84	Klawock R.	83	45.5	Smolt	18,855	1.44	042338
Crystal Lake	Willie Lowe Ck.	20-Mar-85	Crystal Ck.	84	3.4	Fingerling	30,300		
Crystal Lake	Crystal Ck.	24-May-85	Crystal Ck.	83	18.2	Smolt	3,625		
Crystal Lake	Crystal Ck.	03-Dec-85	Crystal Ck.	84	20.1	Fingerling	31,900		
Klawock	Klawock L.	30-May-85	Klawock R.	84	25.0	Smolt	29,000		
Klawock	Ward L.	07-Jun-85	Klawock R.	84	25.0	Smolt	7,544	1.08	041614
Klawock	Ward L.	07-Jun-85	Klawock R.	84	25.0	Smolt	7,323	1.08	041613
Klawock	Ward L.	07-Jun-85	Klawock R.	84	25.0	Smolt	7,051	1.08	041615
Crystal Lake	Montana Ck.	08-Jun-86	Falls Ck.	83	48.1	Smolt	2,440	1.00	042510
Klawock	Klawock L.	04-Jun-86	Klawock R.	85	35.6	Smolt	30,200		
Klawock	Ward L.	23-Jun-86	Klawock R.	85	30.5	Smolt	16,712	1.01	042544
Klawock	Ward L.	23-Jun-86	Klawock R.	85	30.5	Smolt	11,613	1.01	042545
Crystal Lake	Crystal Ck.	01-Jun-87	Crystal Ck.	85	26.5	Smolt	8,600		
Klawock	Klawock L.	19-May-87	Klawock R.	86	39.7	Smolt	1,100	1.03	042610
Klawock	Ward Ck.	19-May-87	Klawock R.	86	39.7	Smolt	28,687	1.03	042610
Klawock	Montana Ck.	28-May-87	Klawock R.	86	32.7	Smolt	27,000		
Klawock	Klawock L.	15-Jun-87	Klawock R.	86	35.0	Smolt	34,000		
Snettisham	Montana Ck.	20-Jun-87	Peterson Ck.	84	41.4	Smolt	2,353	1.00	042551
Crystal Lake	Crystal Ck.	13-May-88	Crystal Ck.	87	4.6	Fingerling	90,392		
Klawock	Klawock L.	11-May-88	Klawock R.	87	45.0	Smolt	19,959		
Klawock	Ward L.	18-May-88	Klawock R.	87	45.0	Smolt	18,470	1.00	042954
Klawock	Ward L.	18-May-88	Klawock R.	87	45.0	Smolt	1,178		

(Continued)

Table 10. (page 2 of 2)

HATCHERY	STOCKING SITE	STOCKING DATE	BROODSTOCK	BROOD YEAR	WEIGHT (g)	DEVELOPMENT STAGE	NUMBER RELEASED	RATIO RELEASED VS. TAGGED	CWT[a] ID CODE
Deer Mountain	Ketchikan Ck.	07-Aug-89	Ketchikan Ck.	89	0.6	Fed fry	16,757		
Deer Mountain	Ketchikan Ck.	16-Nov-89	Ketchikan Ck.	89	10.0	Smolt	2,693		
Klawock	Ward L.	13-Jun-89	Klawock R.	88	14.2	Smolt	21,124	1.01	042952
Klawock	Ward L.	19-Jun-89	Klawock R.	88	15.3	Smolt	10,668	1.01	042835
Klawock	Ward L.	19-Jun-89	Klawock R.	88	15.3	Smolt	6,875	1.02	043020
Klawock	Klawock L.	22-Jun-89	Klawock R.	88	22.2	Smolt	50,314		

[a] Coded-wire tag

Table 11. Sources of steelhead marked with adipose fin clips and recovered in southeast Alaska, 1980-1990.

Year	Commercial	Sport	Rack Returns	Other[a]	Total
1980	0	0	0	0	0
1981	2	0	0	0	2
1982	4	0	12	0	16
1983	78	7	6	0	91
1984	13	43	111	0	167
1985	15	92	65	0	172
1986	96	74	143	0	313
1987	9	35	50	1	95
1988	48	50	0	0	98
1989	27	27	0	5	59
1990	81	5	0	1	87
No Date	1	24	1	0	26
Total	374	357	388	7	1,126

[a] Includes recoveries in escapement surveys and subsistence fisheries.

Table 12. Recoveries of steelhead marked with coded wire tags in southeast Alaska sport fisheries during 1980-1990.

State	Release Location	Number of Recoveries	Percent
Alaska	Crystal Creek	12	4.5
	Crystal/Ohmer/Falls Cks.	25	9.4
	Klawock Lake	49	18.4
	Klawock River	133	50.0
	Klawock/Ward Lks.	2	0.8
	Montana Creek	1	0.4
	Talbot Lake	2	0.8
	Ward Lake	42	15.7
	Subtotal Alaska	266	100.0

Table 13. Recoveries of steelhead marked with coded wire tags in southeast Alaska commercial fisheries during 1980-1990.

State	Release Location	Number of Recoveries	Percent by State
Alaska	Crystal Creek	2	33.3
	Crystal/Ohmer/Falls Creeks	2	33.3
	Klawock Lake	1	16.7
	Ward Lake	1	16.7
	Subtotal Alaska	6	100.0
British Columbia	Babine River (SKNA)	2	1.2
	Bulkley River (SKNA)	2	1.2
	Morice River (SKNA)	7	4.1
	Zymoetz (SKNA)	4	2.4
	Campbell River (JNST)	11	6.5
	Sucwoa River (NWVI)	7	4.1
	Capilano River (GSML)	4	2.4
	Big Qualicum River (GSVI)	1	0.6
	Puntledge River Upper (GSVI)	29	17.2
	Puntledge River (GSVI)	1	0.6
	Robertson Creek (SWVI)	56	33.1
	Robertson Ck. H. - Unknown Site	4	2.4
	Somass River (SWVI)	40	23.7
	Coquihalla River (LWFR)	1	0.6
	Subtotal British Columbia	169	100.0
Washington	Icicle Creek	1	33.3
	Lyons Ferry	1	33.3
	Skagit River	1	33.3
	Subtotal Washington	3	100.0
Idaho	Salmon River	3	100.0
California	Yuba City	1	100.0

Table 14. Unadjusted Nass, Stikine and Taku River sport steelhead harvest from B.C. steelhead harvest analysis, 1967-68 to 1978-79 (from mailout questionnaires).

	YEAR											
System	1967/68	68/69	69/70	70/71	71/72	72/73	73/74	74/75	75/76	76/77	77/78	78/79
Nass	62	82	1	42	23	28	41	3	25	24	37	41
Bell-Irving						0	10				10	2
Cranberry			237	130	217	93	139	63	241	259	157	170
Damdochax	8				22				0		0	28
Ishkheenickh	8	8	44	0	6	0	4	13	38	18	15	27
Kiteen	12	32	100	11	0	46	0	12	22	6	1	3
Kwinageese			0		6	0				0	4	8
Meziadin		0	8	61	33	53	51	31	40	14	10	5
Tseax	166	20	27	22	26	25	25	7	67	11	47	51
Seaskinnish												
	256	142	417	266	333	245	270	129	433	332	281	335
Stikine						0	3	0	10	1	0	18
Sheslay												
Tahltan	2	0	11	5	0		27	0	10	3	14	56
Tuya												
Total Stikine	2	0	11	5	0	0	30	0	20	4	14	74
Taku									0		0	0
Inklin											3	
Nakina								0	17			
Tatsamenie								3	4			
Total Taku								3	21		3	0

Table 15. Unadjusted Nass, Stikine and Taku River sport steelhead harvest from B.C. steelhead harvest analysis, 1979-80 to 1988-89 (from mailout questionnaires).

	YEAR									
System	1979/80	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89
Nass	82	68	42	17	29	52	44	81	84	50
Bell-Irving		0	0		4		0		0	7
Cranberry	268	86	148	99	92	184	229	250	68	92
Damdochax	1	14	3	4	4	18	2	4	6	3
Ishkheenickh	16	5	29	0	21	39	42	72	101	132
Kiteen	10	0	0	22	20	6	32	107	19	12
Kwinageese	0	0	0		4		0		0	0
Meziadin	0	26	39	4	37	3	21	8	21	45
Tseax	98	76	69	29	63	83	76	117	58	75
Seaskinnish									4	2
	475	275	330	175	274	385	446	639	361	418
Stikine	4	0	9	3	2	8	10	2	11	0
Sheslay			0	0					84	0
Tahltan	43	40	8	78	15	78	112	68	67	51
Tuya			0					0	0	0
Total Stikine	47	40	17	81	17	86	122	70	162	51
Taku	0	3			2	12	7	4	15	8
Inklin	0	0	11	0	3					4
Nakina	0			9	10	2	20	49	10	21
Tatsamenie			0	2						2
Total Taku	0	3	11	11	15	14	27	53	25	35

Table 16. Adjusted Skeena steelhead sport harvest from B.C. steelhead harvest analysis, 1963-1989 (from mailout questionnaires).

Year	Babine	Bu/Nor	Kispiox	Kits'la	Kitwanga	Kluat'a	Suskwa	Sustut	Telkwa	Zy/Clor	Skeena	Lakelse	Kalum	Total
1963														
1964														
1965														
1966														
1967	323	2067	537	0	68	0	45	41	7	1017	102	0	0	4207
1968	491	1521	617	9	24	0	55	83	3	899	186	0	0	3888
1969	519	1841	525	24	74	0	99	37	0	1074	294	0	0	4489
1970	406	1965	507	16	61	3	27	130	3	702	241	82	81	4222
1971	265	1805	511	9	71	91	57	78	0	919	279	41	63	4190
1972	157	2077	354	16	147	0	24	80	8	989	320	40	134	4347
1973	74	1515	317	0	12	4	43	30	3	860	901	69	153	3980
1974	99	1242	256	3	10	7	65	23	3	563	549	56	88	2965
1975	117	1442	168	2	20	14	26	29	5	539	974	61	127	3524
1976	107	1102	112	2	46	3	43	21	0	459	386	60	87	2428
1977	99	974	58	16	4	3	41	38	4	436	303	41	87	2104
1978	73	1089	65	18	3	2	29	35	14	267	418	41	45	2100
1979	112	1391	56	0	22	6	18	35	6	200	552	12	39	2450
1980	103	1581	100	3	24	2	73	24	2	80	679	18	54	2744
1981	80	675	61	0	12	0	22	42	2	135	387	29	64	1508
1982	71	1409	29	0	19	0	25	46	3	193	711	39	103	2648
1983	61	1095	60	0	0	0	86	39	0	236	810	47	93	2526
1984	58	768	56	14	0	1	0	48	7	198	879	136	331	2496
1985	91	661	97	3	10	0	0	41	3	297	1302	133	293	2930
1986	120	1048	95	10	0	0	0	74	10	375	1864	112	322	4029
1987	57	836	50	3	5	0	22	36	3	185	746	70	164	2178
1988	18	497	99	0	5	0	0	27	0	137	951	209	128	2071
1989	3	44	3	0	0	0	9	0	0	33	411	148	152	802
1990														
Averages:														
- general	152	1245	206	6	28	6	35	45	4	469	619	63	113	2992
	5.1%	41.6%	6.9%	0.2%	0.9%	0.2%	1.2%	1.5%	0.1%	15.7%	20.7%	2.1%	3.8%	100.0%
- 10 year	62	781	61	3	6	0	18	39	3	199	895	102	183	2354
	2.6%	33.2%	2.6%	0.1%	0.2%	0.0%	0.8%	1.7%	0.1%	8.4%	38.0%	4.4%	7.8%	100.0%

Table 17. Area 3 gillnet weekly catch of steelhead 1963-1989.

	Statistical Week															
Year	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Total
1963	2	2	35	15	16	0	0	0	178	49	90	3	2	39	27	458
1964	3	2	3	44	33	26	189	180	107	58	81	60	61	55	26	928
1965	0	0	1	87	32	95	86	58	192	65	141	87	84	64	107	1099
1966	1	109	75	115	214	300	611	260	394	151	198	134	95	76	38	2771
1967	5	3	58	27	87	381	396	249	60	0	39	26	96	47	22	1496
1968	1	5	56	71	146	206	440	267	168	132	416	85	93	81	28	2195
1969	14	8	82	28	30	41	176	41	65	38	175	225	58	15	0	996
1970	8	8	56	73	68	38	66	14	116	120	102	68	37	24	14	812
1971	3	3	7	10	13	68	222	0	0	124	158	154	281	133	83	1259
1972	15	2	6	229	97	83	168	74	296	64	157	236	171	91	85	1774
1973	5	182	139	114	23	115	69	159	77	13	0	43	39	4	6	988
1974	3	123	148	100	37	68	74	70	0	0	26	144	67	0	0	860
1975	4	4	74	41	17	0	69	36	2	54	8	97	44	82	0	532
1976	1	2	67	125	34	9	6	19	21	0	0	104	104	0	91	583
1977	0	89	82	59	86	108	130	60	158	81	220	0	236	97	0	1406
1978	93	99	47	64	97	11	155	326	152	70	53	56	55	81	0	1359
1979	0	157	0	0	13	80	78	47	0	0	149	0	132	0	0	656
1980	0	0	0	18	47	261	142	227	226	184	95	36	21	0	0	1257
1981	0	86	80	1	140	393	71	38	138	229	1	0	0	0	0	1177
1982	0	179	212	175	220	102	141	310	165	376	96	126	46	67	0	2215
1983	0	0	0	0	0	46	465	322	255	661	602	113	0	0	0	2464
1984	0	1	66	2	239	787	764	285	593	625	496	269	106	0	0	4233
1985	0	0	0	92	1711	49	612	917	144	107	80	0	0	0	0	3712
1986	0	0	0	0	154	162	256	431	306	244	444	325	151	0	0	2473
1987	0	0	0	9	7	47	190	40	156	288	18	0	0	0	0	755
1988	0	0	0	14	101	159	142	388	74	44	0	0	0	0	0	922
1989	0	104	34	9	32	26	3	0	133	114	12	0	0	0	0	467
Averages:																
Overall	6	43	49	56	137	136	212	178	155	144	143	89	73	35	20	1476
	0.4	2.9	3.3	3.8	9.3	9.2	14.4	12.1	10.5	9.8	9.7	6.0	5.0	2.4	1.3	100.0
Recent																
5 years	0	21	7	25	401	89	241	355	163	159	111	65	30	0	0	1666
	0.0	1.2	0.4	1.5	24.1	5.3	14.4	21.3	9.8	9.6	6.7	3.9	1.8	0.0	0.0	100.0

Table 18. Area 3 seine weekly catch of steelhead 1963-1989.

	Statistical Week															
Year	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Total
1963	0	0	0	3	1	0	0	0	1	0	3	0	0	0	0	8
1964	0	0	0	1	0	0	5	75	29	3	4	15	21	0	0	153
1965	0	0	0	3	5	7	26	15	17	12	2	10	6	4	1	108
1966	0	0	5	0	35	31	65	2	11	40	8	0	0	0	0	197
1967	0	0	2	3	17	112	70	203	30	0	10	1	0	0	0	448
1968	0	0	6	5	23	13	11	31	10	36	5	0	6	0	1	147
1969	0	0	1	0	0	6	45	12	25	11	5	35	26	1	0	167
1970	0	0	2	0	1	6	3	0	2	8	2	0	1	3	0	28
1971	0	0	0	0	7	4	30	0	0	47	14	64	31	0	0	197
1972	0	0	0	4	7	2	14	236	7	23	0	3	4	0	0	300
1973	0	0	2	2	0	5	11	17	7	1	0	0	0	0	0	45
1974	0	3	1	2	3	7	13	44	0	0	3	0	0	0	0	76
1975	0	0	0	0	3	6	8	21	6	8	0	0	1	5	0	58
1976	0	0	22	1	4	0	16	26	61	0	0	1	0	0	4	135
1977	0	1	1	1	15	65	72	124	108	47	13	0	14	10	0	471
1978	1	4	7	33	119	27	107	95	151	123	79	0	2	0	0	748
1979	0	2	0	0	1	97	70	71	0	0	14	0	2	0	0	257
1980	0	0	0	0	58	94	108	300	35	6	31	16	1	0	0	649
1981	0	0	0	0	54	282	116	143	80	30	0	0	0	0	0	705
1982	0	1	1	1	102	126	180	281	166	254	33	18	21	13	0	1197
1983	0	0	0	0	1	12	428	191	194	410	358	0	0	0	0	1594
1984	0	0	0	0	0	422	505	69	184	318	256	45	20	0	0	1819
1985	0	0	0	0	0	153	371	883	283	306	42	0	0	0	0	2038
1986	0	0	0	0	0	152	319	542	406	473	275	39	27	0	0	2233
1987	0	0	0	0	12	177	197	253	277	308	0	0	0	0	0	1224
1988	0	0	0	0	44	112	134	345	97	53	0	0	0	0	0	785
1989	0	0	0	0	0	77	21	34	398	159	12	0	0	0	0	701
Averages:																
Overall	0	0	2	2	19	74	109	149	96	99	43	9	7	1	0	611
	0.0	0.1	0.3	0.4	3.1	12.1	17.9	24.3	15.7	16.2	7.1	1.5	1.1	0.2	0.0	100.0
Recent																
5 years	0	0	0	0	11	134	208	411	292	260	66	8	5	0	0	1396
	0.0	0.0	0.0	0.0	0.8	9.6	14.9	29.5	20.9	18.6	4.7	0.6	0.4	0.0	0.0	100.0

Table 19. Area 5 gillnet weekly catch of steelhead 1963-1989.

	Statistical Week															
Year	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Total
1963	0	0	75	42	88	0	27	13	183	94	31	0	0	4	10	567
1964	0	11	63	58	50	21	36	50	47	49	32	33	0	0	0	450
1965	0	84	73	54	99	104	90	34	106	77	26	5	1	0	0	753
1966	0	0	115	197	217	95	56	41	62	19	43	64	18	9	0	936
1967	0	2	90	33	38	7	0	3	12	0	25	6	0	0	0	216
1968	0	47	62	22	28	34	59	36	7	38	33	6	5	1	8	386
1969	0	0	0	14	13	9	2	15	10	19	7	33	11	1	0	134
1970	0	42	10	18	36	91	57	104	141	25	52	22	8	8	10	624
1971	0	0	0	1	36	16	20	55	48	23	11	44	11	2	6	273
1972	0	14	19	15	30	59	63	140	30	36	12	2	0	0	0	420
1973	0	0	4	4	0	1	13	1	17	50	0	1	1	0	0	92
1974	0	0	18	1	1	2	2	0	0	0	5	19	44	0	0	92
1975	0	0	5	4	3	0	9	0	0	5	1	36	10	0	0	73
1976	0	5	7	0	1	7	2	0	24	14	20	22	17	2	0	121
1977	0	0	0	2	5	6	5	18	101	25	31	15	9	21	0	238
1978	0	0	33	16	22	3	34	82	16	34	21	32	18	5	0	316
1979	0	3	0	45	3	6	4	18	12	0	1	0	9	14	0	115
1980	0	0	0	0	10	23	113	18	13	11	37	58	15	0	0	298
1981	0	0	65	0	33	5	4	10	0	0	0	9	4	0	0	130
1982	0	0	0	40	19	16	56	21	0	6	12	8	0	0	0	178
1983	0	0	0	0	18	11	18	4	13	42	9	0	0	0	0	115
1984	0	0	0	0	21	14	0	95	157	66	14	0	4	0	0	371
1985	0	0	0	7	7	11	33	32	176	99	0	0	0	0	0	365
1986	0	0	0	0	8	1	33	21	136	131	173	75	34	43	0	655
1987	0	0	0	3	5	18	10	34	54	3	0	0	0	0	0	127
1988	0	0	0	1	18	16	17	8	14	20	6	0	0	0	0	100
1989	0	0	9	5	12	4	1	0	19	23	5	3	0	0	0	81
Averages:																
Overall	0	8	24	22	30	21	28	32	52	34	22	18	8	4	1	305
	0.0	2.5	7.9	7.1	10.0	7.1	9.3	10.4	17.0	11.1	7.4	6.0	2.7	1.3	0.4	100.0
Recent																
5 years	0	0	2	3	10	10	19	19	80	55	37	16	7	9	0	266
	0.0	0.0	0.7	1.2	3.8	3.8	7.1	7.2	30.0	20.8	13.9	5.9	2.6	3.2	0.0	100.0

Table 20. Area 5 seine weekly catch of steelhead 1963-1989.

	Statistical Week															
Year	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Total
1963	0	0	0	2	4	0	1	0	23	10	3	0	0	0	0	43
1964	0	0	0	7	2	4	8	14	8	10	8	8	0	0	0	69
1965	0	8	0	2	4	5	0	0	32	1	17	3	1	0	0	73
1966	0	0	7	6	5	2	0	10	15	7	15	0	1	0	0	68
1967	0	0	0	1	8	0	0	5	18	0	6	0	0	0	0	38
1968	0	2	0	4	1	0	9	4	0	21	6	2	1	0	0	50
1969	0	0	0	1	0	0	0	0	8	4	0	4	0	0	0	17
1970	0	0	1	1	1	1	5	10	47	10	11	0	0	0	0	87
1971	0	0	0	0	2	0	12	30	9	18	8	5	2	0	0	86
1972	0	0	0	0	0	0	21	12	22	15	1	0	0	0	0	71
1973	0	0	0	0	0	0	3	3	3	14	0	0	0	0	0	23
1974	0	0	0	0	0	0	0	0	0	2	3	1	2	0	0	8
1975	0	0	0	0	1	0	1	6	83	9	13	1	1	0	0	115
1976	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	6
1977	0	0	0	0	0	0	0	0	5	17	3	0	0	1	0	26
1978	0	0	0	0	7	2	0	0	1	14	3	3	0	0	0	30
1979	0	0	0	0	0	5	6	11	0	0	0	0	1	0	0	23
1980	0	0	0	0	2	0	2	1	0	0	19	11	4	0	0	39
1981	0	0	22	0	0	0	7	0	0	0	0	0	0	0	0	29
1982	0	0	0	0	10	13	28	3	0	0	0	1	0	0	0	55
1983	0	0	0	0	0	0	0	3	1	47	1	0	0	0	0	52
1984	0	0	0	0	0	2	0	240	115	74	7	0	0	0	0	438
1985	0	0	0	0	0	6	192	92	141	160	0	0	0	0	0	591
1986	0	0	0	0	0	2	31	58	80	183	277	47	24	2	0	704
1987	0	0	0	0	30	18	13	35	121	257	0	0	0	0	0	474
1988	0	0	0	0	17	6	2	37	35	48	15	135	0	0	0	295
1989	0	0	0	0	0	1	18	1	23	30	0	19	0	0	0	92
Averages:																
Overall	0	0	1	1	3	2	13	21	29	35	15	9	1	0	0	133
	0.0	0.3	0.8	0.7	2.6	1.9	10.0	16.0	21.9	26.5	11.6	6.7	1.0	0.1	0.0	100.0
Recent 5 years	0	0	0	0	9	7	51	45	80	136	58	40	5	0	0	431
	0.0	0.0	0.0	0.0	2.2	1.5	11.9	10.3	18.6	31.4	13.5	9.3	1.1	0.1	0.0	100.0

Table 21. Area 4 adjusted commercial net catch of steelhead, 1963-1990.

The recorded harvest of steelhead has been adjusted to account for steelhead taken home for personal use from 1963-83. An additional 5700 fish have therefore been apportioned to each week's catch prior to 1984. The use of hail data after 1983 negates the need for this adjustment.

	Statistical Week												
Year	27	28	29	30	31	32	33	34	35	36	37	38	Total
1963	457	479	0	461	1030	2959	958	856	644	349	124	81	8399
1964	370	732	557	1821	3860	3903	1788	1713	503	490	103	14	15854
1965	613	407	1471	970	1623	0	1738	0	746	553	246	34	8402
1966	512	1229	3279	2417	4335	2444	2154	1408	1302	327	401	189	19997
1967	925	990	2459	4345	2933	1934	0	1424	3	266	111	33	15423
1968	684	412	2508	3137	2094	2025	1268	705	251	114	222	68	13487
1969	356	244	350	1630	1973	2290	1836	19	1338	343	300	0	10680
1970	562	345	375	1961	214	2863	1586	1099	708	278	194	52	10237
1971	25	35	218	763	2056	1606	3272	1484	2205	983	643	689	13980
1972	480	632	720	1984	1412	3191	2202	996	915	336	234	0	13103
1973	179	231	1557	1202	2004	2773	1125	56	485	158	140	75	9985
1974	885	949	482	1111	2776	2385	52	928	7	2	241	0	9817
1975	807	383	6	971	928	1443	2321	824	1055	104	0	0	8843
1976	12	268	208	460	1526	2124	1938	220	102	882	641	156	8537
1977	7	221	657	1233	2116	3329	1315	1103	424	20	2	0	10426
1978	622	1301	968	1494	74	1499	2578	654	121	173	94	0	9579
1979	37	157	666	2183	1260	5421	1338	4	2	0	0	0	11068
1980	0	1042	2735	1250	4288	235	0	70	39	46	0	0	9706
1981	5	1104	3983	4082	1945	1583	1327	579	0	0	0	0	14607
1982	32	1951	2237	5657	4198	1364	2424	61	0	158	0	0	18083
1983	0	49	396	2150	1082	2322	1865	1801	686	0	0	0	10350
1984	0	687	7021	6702	9150	2854	4283	403	272	0	0	0	31372
1985	1296	1251	2910	5376	6625	2796	6914	2132	0	0	0	0	29300
1986	0	290	740	5217	3795	875	3467	3447	1640	64	0	0	19535
1987	0	137	96	525	977	2268	2313	1689	283	0	0	0	8288
1988	510	1030	1738	477	7306	2891	3155	447	0	0	0	0	17554
1989	86	302	287	119	673	428	858	427	0	0	0	0	3180
1990	68	144	524	1159	1365	911	664	410	138	98	5	0	5486
Averages:													
- general	350	624	1430	2211	2676	2215	2003	909	509	209	137	52	13326
	2.6%	4.7%	10.7%	16.6%	20.1%	16.6%	15.0%	6.8%	3.8%	1.6%	1.0%	0.4%	100.0%
- 10 year	193	784	2214	3156	4004	1762	2661	1106	292	27	0	0	16198
	1.2%	4.8%	13.7%	19.5%	24.7%	10.9%	16.4%	6.8%	1.8%	0.2%	0.0%	0.0%	100.0%

Table 22. Stikine River gill net catch of steelhead, 1979-1989 (from saleslips).

	Statistical Week																	
Year	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Total
1979	0	0	0	6	0	0	1	1	1	31	54	61	56	13	26	10	4	264
1980	0	0	0	1	0	0	0	2	22	20	29	88	83	60	19	36	3	363
1981	0	0	0	0	1	0	4	39	9	47	102	23	55	7	4	0	0	291
1982	0	0	0	1	4	5	18	28	82	71	197	52	72	90	121	53	26	820
1983	0	2	0	2	0	0	0	9	36	52	94	18	23	0	0	0	0	236
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	7	0	3	6	5	12	21	76	12	36	56	0	0	0	0	234
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	2	0	0	0	0	7	7	20	19	2	103	30	24	0	0	214
1988	0	0	0	0	0	0	5	12	48	48	60	18	53	8	0	0	0	252
1989	0	0	0	0	0	0	1	0	9	3	13	63	11	27	0	0	0	127
1979-1989 average:																		
	0	0	1	1	1	1	3	10	21	33	53	33	47	21	18	9	3	255
1979-1989 average % by week:																		
	0.0	0.1	0.3	0.4	0.3	0.4	1.2	3.9	8.4	13.1	20.7	12.9	18.3	8.4	6.9	3.5	1.2	100.0
1985-1989 average:																		
	0	0	2	0	1	1	2	6	17	29	21	24	45	13	5	0	0	165
1985-1989 average % by week:																		
	0.0	0.0	1.1	0.0	0.4	0.7	1.3	3.7	10.3	17.8	12.6	14.4	27.0	7.9	2.9	0.0	0.0	100.0

Table 23. Taku River gill net catch of steelhead, 1979-1989 (from saleslips).

	Statistical Week																	
Year	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Total
1979	0	0	0	2	0	2	6	2	4	3	6	9	36	7	71	89	9	246
1980	0	0	1	2	1	0	0	3	5	2	3	15	43	39	75	122	153	464
1981	0	0	0	8	3	1	0	2	2	14	21	17	15	0	0	0	0	83
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	2	8	6	0	0	7	28	34	70	17	172
1984	0	0	0	1	0	3	5	3	1	0	0	0	0	0	0	0	0	13
1985	0	0	3	1	0	3	2	2	8	8	8	0	0	0	0	0	0	35
1986	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	3
1987	0	0	1	4	0	0	0	0	7	15	11	21	25	72	104	5	0	265
1988	0	0	0	0	0	0	0	0	0	2	2	5	4	0	0	0	0	13
1989	0	0	0	2	0	0	0	0	9	0	11	0	0	0	0	0	0	22
1979-1989 average:																		
	0	0	0	2	0	1	1	1	4	5	6	6	12	13	26	26	16	120
1979-1989 average % by week:																		
	0.0	0.0	0.4	1.5	0.3	0.8	1.1	1.1	3.3	3.8	4.7	5.1	9.9	11.1	21.6	21.7	13.6	100.0
1985-1989 average:																		
	0	0	1	1	0	1	1	0	5	5	6	5	6	14	21	1	0	68
1985-1989 average % by week:																		
	0.0	0.0	1.2	2.1	0.0	1.5	0.9	0.6	7.1	7.4	9.5	7.7	8.6	21.3	30.8	1.5	0.0	100.0

Table 24. Area 4 native harvest of steelhead, 1963-1989.

Year	below Terrace	above Terrace	Hazelton	Smithers	Total
1963				484	484
1964		280		80	360
1965	110	325		177	612
1966	97	1188		418	1703
1967	17	681		111	809
1968	176	717		160	1053
1969	27	680		75	782
1970	30	700		221	951
1971	139	1125		54	1318
1972	65	725		228	1018
1973					
1974		1000		101	1101
1975		1000		53	1053
1976				205	205
1977		700		67	767
1978					
1979			500		500
1980	400	1000	2500		3900
1981	550		4500	1265	6315
1982	350	2000	5500	500	8350
1983	95		1505		1600
1984		1500	7000		8500
1985	282	847	4001	1368	6498
1986	250	1750	5000	2000	9000
1987	466	142	5000	800	6408
1988	198	460	4000	1625	6283
1989	78	111	1500	300	1989
1990					
Averages:					
- general	203	885	3951	500	2899
	7.0%	30.5%	136.3%	17.2%	100.0%
- 10 year	297	976	4051	1123	5884
	5.0%	16.6%	68.8%	19.1%	100.0%

Table 25. Summary of summer steelhead production by system for the Skeena drainage based on fry capacity estimates.

System	Total Stream Length (km)	Usable Habitat for fry (ha)	Estimated fry capacity (ha)	% Total fry	Potential smolt production	% Total smolt	Potential adult production	Minimum required escapement	Allowable C/E ratio (N:1)
Kispiox	176	85	1,481,339	18	84,644	18	10,157	3,453	1.9
Babine	221	118	1,457,808	18	116,236	24	13,948	4,984	1.8
Sustut	138	75	566,524	7	27,011	6	3,241	1,937	0.7
Bulkley	489	238	1,804,629	22	84,648	18	10,158	6,058	0.7
Upper Skeena	337	193	398,057	5	13,757	3	1,651	1,361	0.2
Lower Skeena	566	348	1,361,856	29	149,117	31	17,894	8,241	1.2
	1,927	1,057	7,070,213	99	475,413	100	57,049	26,034	7

NOTE: Upper Skeena includes all streams above Bulkley River confluence except Babine, Kispiox and Sustut.

Table 26. Estimated number of steelhead entering the Skeena River (from Tyee test fishery indices).

The cumulative weekly test fishery index is multiplied by: 223.7 to give these estimates.

	Statistical Week												
Year	27	28	29	30	31	32	33	34	35	36	37	38	Total
1963	344	736	3915	5590	3993	1174	1018	955					17726
1964	1065	329	1237	1488	3054	1863	2130	1253					12418
1965	282	501	1769	3617	3179	4071	1895	1629					16943
1966	1535	2944	7360	3586	4651	6373	3335	4118					33902
1967	1174	658	783	1065	2772	4478	8534	3946					23410
1968	1002	689	2051	2458	2067	4134	3147	1159					16708
1969	344	329	266	736	2443	2693	6655	5903					19370
1970	485	908	1033	2192	7657	6154	2803	3508					24741
1971	485	204	454	1300	1895	4431	2333	3570					14672
1972	548	63	2599	2098	2787	1801	2333	2130					14359
1973	501	470	376	329	1707	3774	4635	1863					13655
1974	532	673	423	454	376	4134	2380	1722					10695
1975	0	172	188	517	908	2161	1754	4713					10413
1976	0	235	298	517	673	3116	7078	8487					20404
1977	219	407	1331	877	1206	3805	1722	4024					13592
1978	517	391	1754	2161	3382	4024	4103	1691					18024
1979	0	94	251	1033	1691	2208	2944	1957					10178
1980	0	376	501	1394	3147	6953	3147	2960					18478
1981	1049	987	1112	4103	5167	3868	3147	1347					20779
1982	1879	1143	2631	3147	2318	4901	3445	3821					23285
1983	157	329	485	1691	1629	1049	1206	1503					8049
1984	2083	5637	7219	2662	4745	9505	5794	3977					41622
1985	1425	2411	4080	3870	4389	3568	4273	1519					25535
1986	1125	1069	2765	5049	6709	6011	4053	6091					32873
1987	1329	443	1112	1094	1389	2215	2114	2805					12500
1988	519	629	866	2669	5492	9011	4843	4069					28097
1989	132	371	338	962	2861	1687	4414	2626					13391
1990	67	1262	3765	3013	2391	2843	2617	2259					18218
Averages:													
- general	694	859	1748	2098	3048	4043	3527	3087					19324
	3.6%	4.4%	9.0%	10.9%	15.8%	20.9%	18.3%	16.0%					100.0%
- 10 year	970	1340	2111	2664	3785	4877	3644	3072					22461
	4.3%	6.0%	9.4%	11.9%	16.8%	21.7%	16.2%	13.7%					100.0%

Table 27. Estimated Skeena steelhead terminal abundance (catch plus escapement past Tyee).

	Statistical Week												
Year	27	28	29	30	31	32	33	34	35	36	37	38	Total
1963	802	1215	3915	6051	5023	4134	1976	1811					24927
1964	1435	1061	1794	3308	6913	5767	3917	2966					27161
1965	894	908	3240	4587	4802	4071	3633	1629					23765
1966	2047	4173	10638	6003	8985	8817	5489	5527					51679
1967	2099	1647	3242	5410	5705	6412	8534	5371					38419
1968	1686	1101	4559	5595	4161	6159	4415	1864					29540
1969	700	573	616	2366	4416	4984	8491	5923					28069
1970	1047	1253	1408	4153	7872	9017	4389	4606					33746
1971	511	239	672	2063	3951	6037	5605	5054					24133
1972	1028	695	3320	4082	4200	4992	4535	3126					25977
1973	681	700	1932	1531	3711	6547	5761	1919					22782
1974	1417	1622	904	1565	3151	6518	2433	2650					20262
1975	807	555	194	1487	1837	3604	4075	5538					18097
1976	12	503	505	977	2199	5241	9016	8707					27159
1977	226	628	1988	2110	3321	7134	3037	5127					23572
1978	1139	1693	2722	3655	3456	5523	6681	2346					27215
1979	37	251	917	3217	2951	7629	4282	1961					21244
1980	0	1418	3237	2644	7436	7188	3147	3030					28099
1981	1054	2090	5095	8184	7112	5450	4474	1926					35386
1982	1911	3094	4868	8805	6516	6265	5869	3882					41210
1983	157	378	882	3841	2710	3371	3071	3304					17713
1984	2083	6324	14240	9364	13895	12359	10077	4380					72722
1985	2721	3662	6990	9246	11014	6364	11187	3651					54835
1986	1125	1359	3505	10266	10504	6886	7520	9538					50704
1987	1329	580	1208	1619	2366	4483	4427	4494					20505
1988	1029	1659	2604	3146	12798	11902	7998	4516					45651
1989	218	673	625	1081	3534	2115	5272	3053					16571
1990	135	1406	4289	4172	3756	3754	3281	2669					23463
Averages:													
- general	1044	1484	3178	4310	5724	6258	5530	3996					32099
	3.3%	4.6%	9.9%	13.4%	17.8%	19.5%	17.2%	12.4%					100.0%
- 10 year	1163	2124	4325	5820	7789	6638	6304	4177					38340
	3.0%	5.5%	11.3%	15.2%	20.3%	17.3%	16.4%	10.9%					100.0%

Table 28. Skeena steelhead catch and escapement distribution.

Year	Comm. Fishery	Native Nets	Sport Kill	Spawners	Total
1963	8399	484	0	17242	26125
1964	15854	360	0	12058	28272
1965	8402	612	0	16331	25345
1966	19997	1703	0	32199	53899
1967	15423	809	4207	18394	38833
1968	13487	1053	3888	11768	30195
1969	10680	782	4489	14100	30050
1970	10237	951	4222	19568	34978
1971	13980	1318	4190	9164	28652
1972	13103	1018	4347	8994	27462
1973	9985	0	3980	9675	23640
1974	9817	1101	2965	6629	20512
1975	8843	1053	3524	5836	19256
1976	8537	205	2428	17770	28941
1977	10426	767	2104	10721	24018
1978	9579	0	2100	15924	27603
1979	11068	500	2450	7228	21246
1980	9706	3900	2744	11834	28184
1981	14607	6315	1508	12956	35386
1982	18083	8350	2648	12287	41368
1983	10350	1600	2526	3923	18399
1984	31372	8500	2496	30625	72994
1985	29300	6498	2930	16107	54835
1986	19535	9000	4029	19844	52408
1987	8288	6408	2178	3914	20788
1988	17554	6283	2071	19742	45651
1989	3180	1989	802	10600	16571
* 1990	5400	3000	600	16000	25000
Averages:					
- general	12850	2556	2458	13408	31272
	41.1%	8.2%	7.9%	42.9%	100.0%
- 10 year	16198	5884	2393	14183	38658
	41.9%	15.2%	6.2%	36.7%	100.0%

* 1990 FIGURES PRELIMINARY

Table 29. Summary of fall releases of hatchery steelhead fry from Skeena River tributaries.

Brood Year	Stock	Number Released				
		Ad/CWT	Ad Only	Pelvic	Max	Unmarked
1979	Suskwa			15000		
1980	Suskwa					11107
1981	Zymoetz				61500	39000
1982	Suskwa				48312	
1983	Morice					70000
1983	Zymoetz					134000
1984	Morice					61700
1984	Suskwa					50350
1985	Bulkley	57000				
1985	Kalum			9000		
1985	Morice	83300				
1985	Suskwa	132500				
1985	Zymoetz	73000				
1986	Bulkley	61963				
1986	Kalum	15296				
1986	Kispiox					5000
1986	Morice	76952				
1987	Bulkley	87787				
1987	Kalum	16200				
1987	Kispiox					19708
1987	Morice	83300				
1987	Suskwa	123462				
1987	Zymoetz	25150				
1988	Bulkley	93732	10415			
1989	Bulkley		14818			

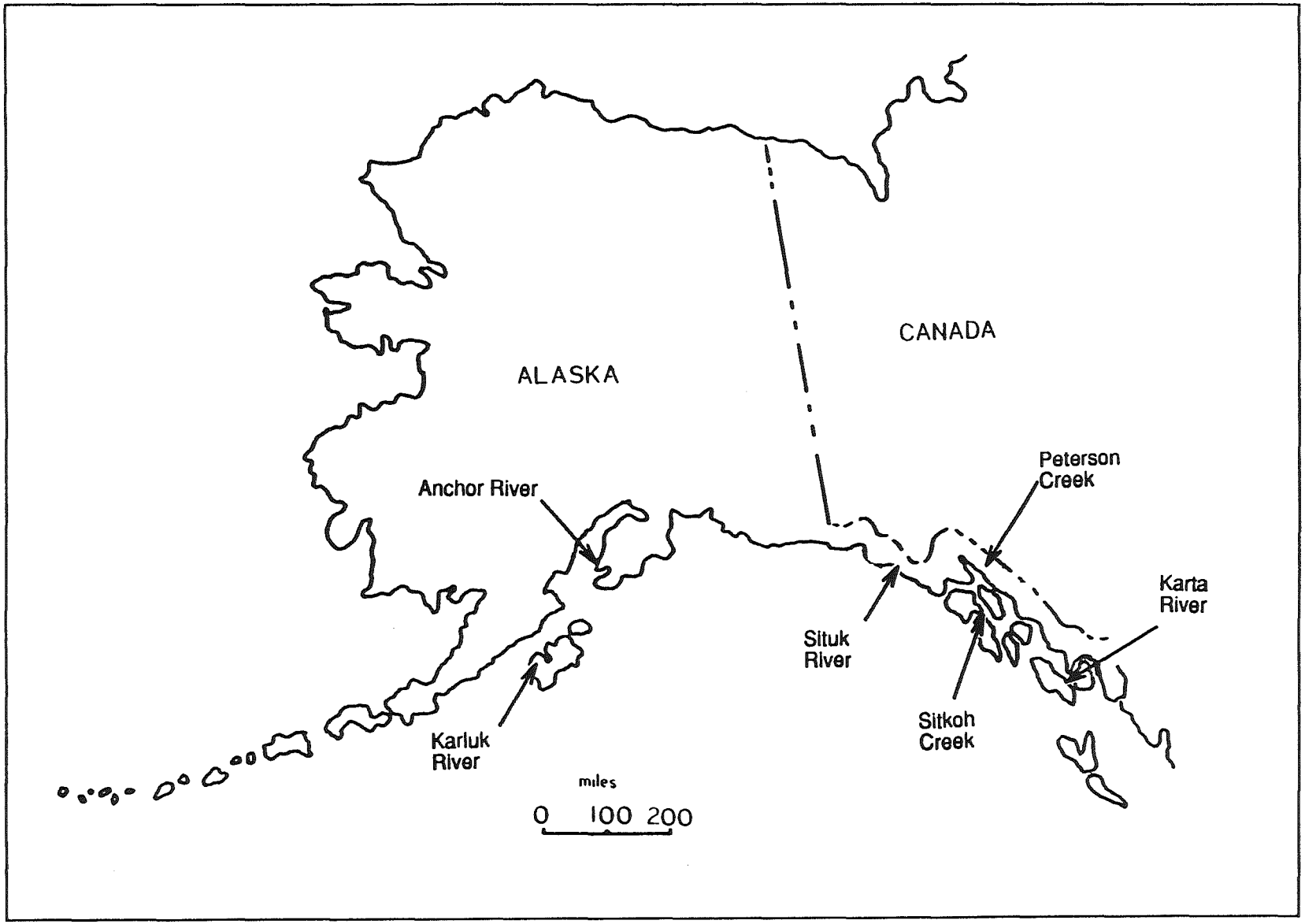

Figure 1. Location of important steelhead streams in Alaska.

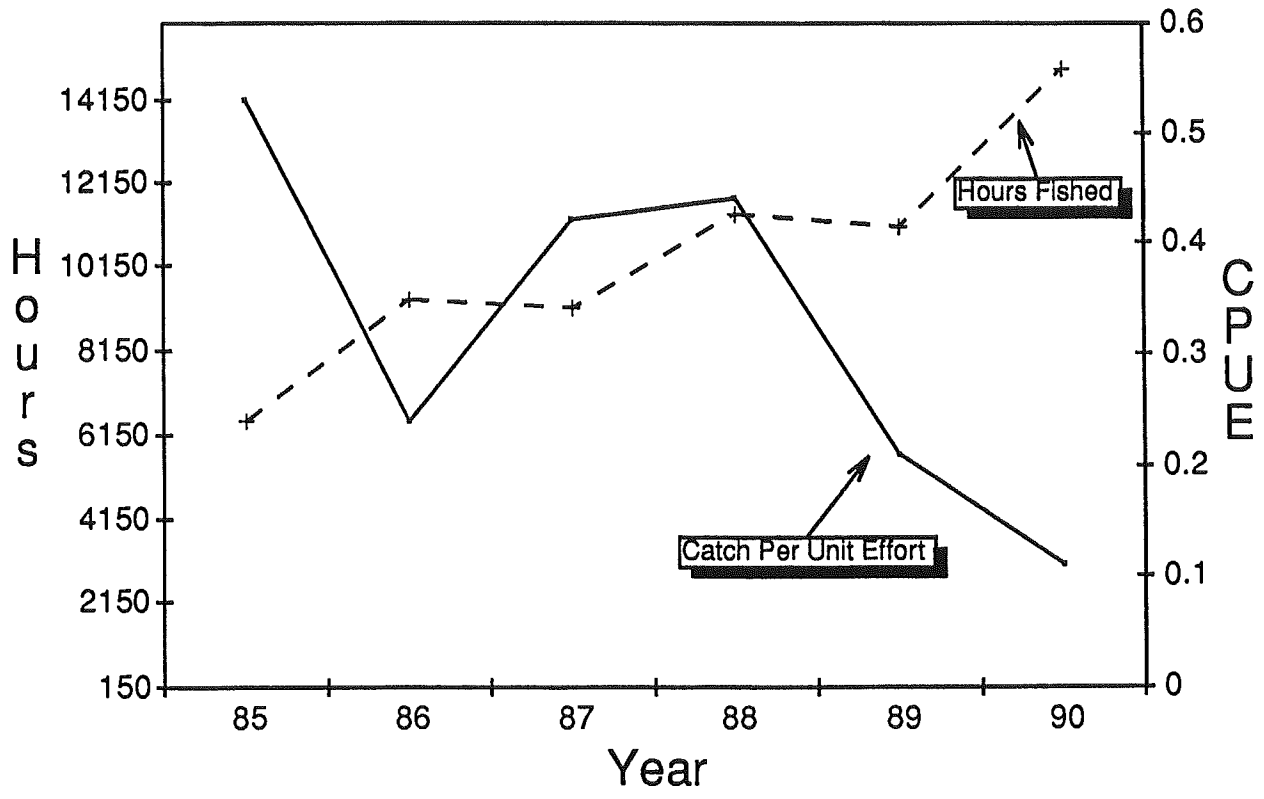

Figure 2. Situk River Steelhead effort in hours and catch per unit effort (CPUE = catch per hour).

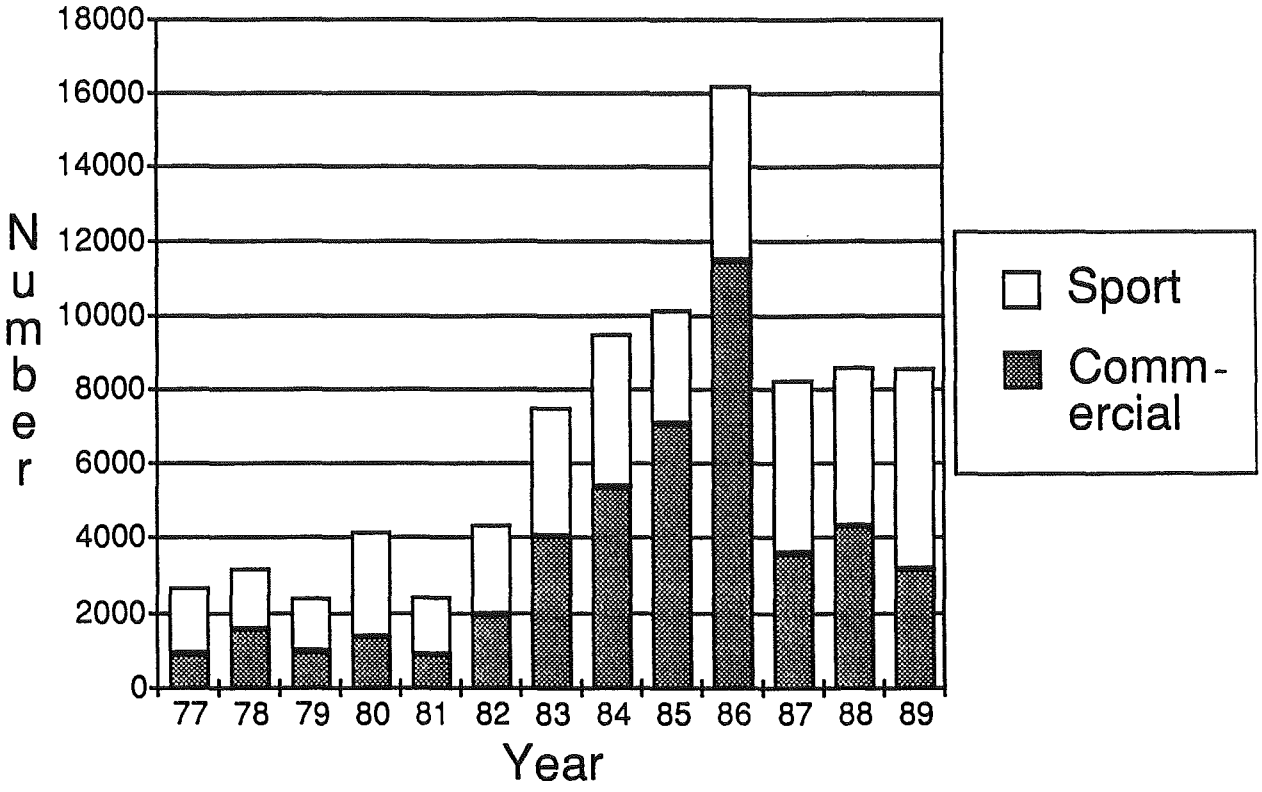

Figure 3. Harvests of steelhead in Alaskan sport and commercial fisheries, 1977-1989.

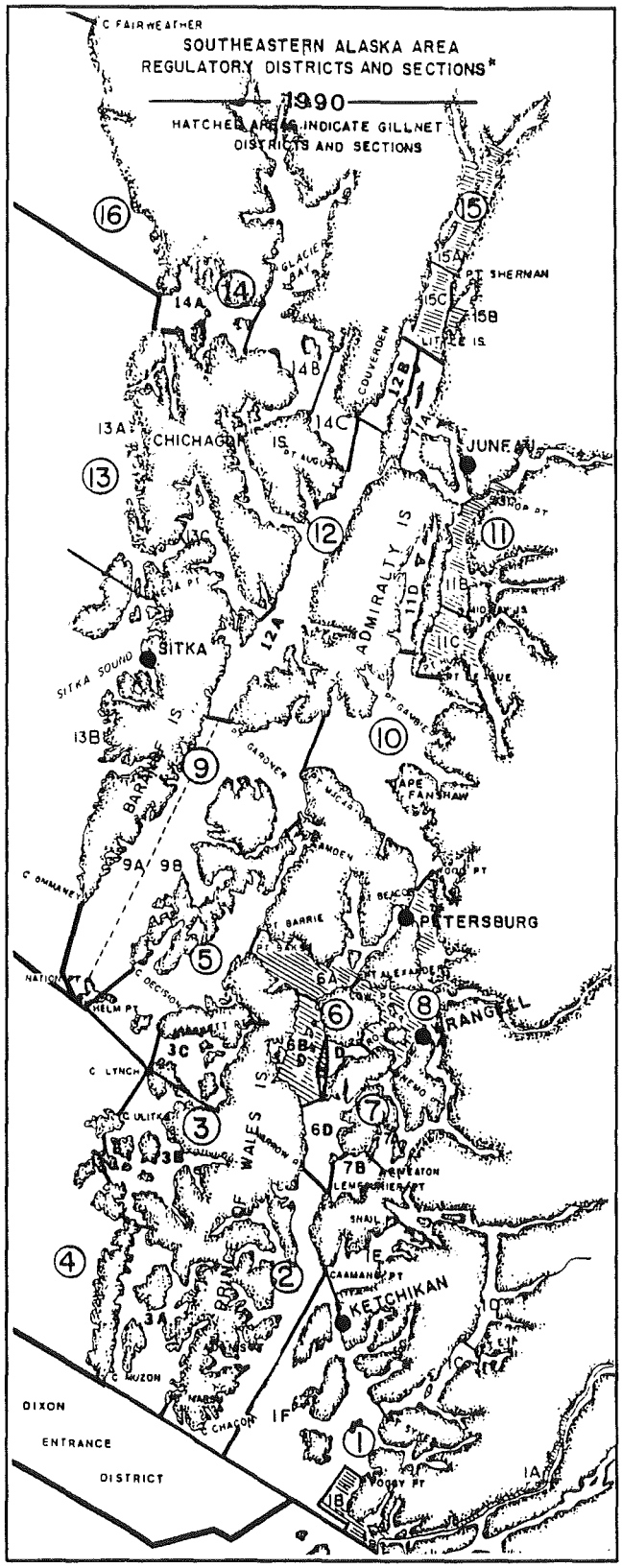

Figure 4. Southeast Alaska commercial fishing districts.

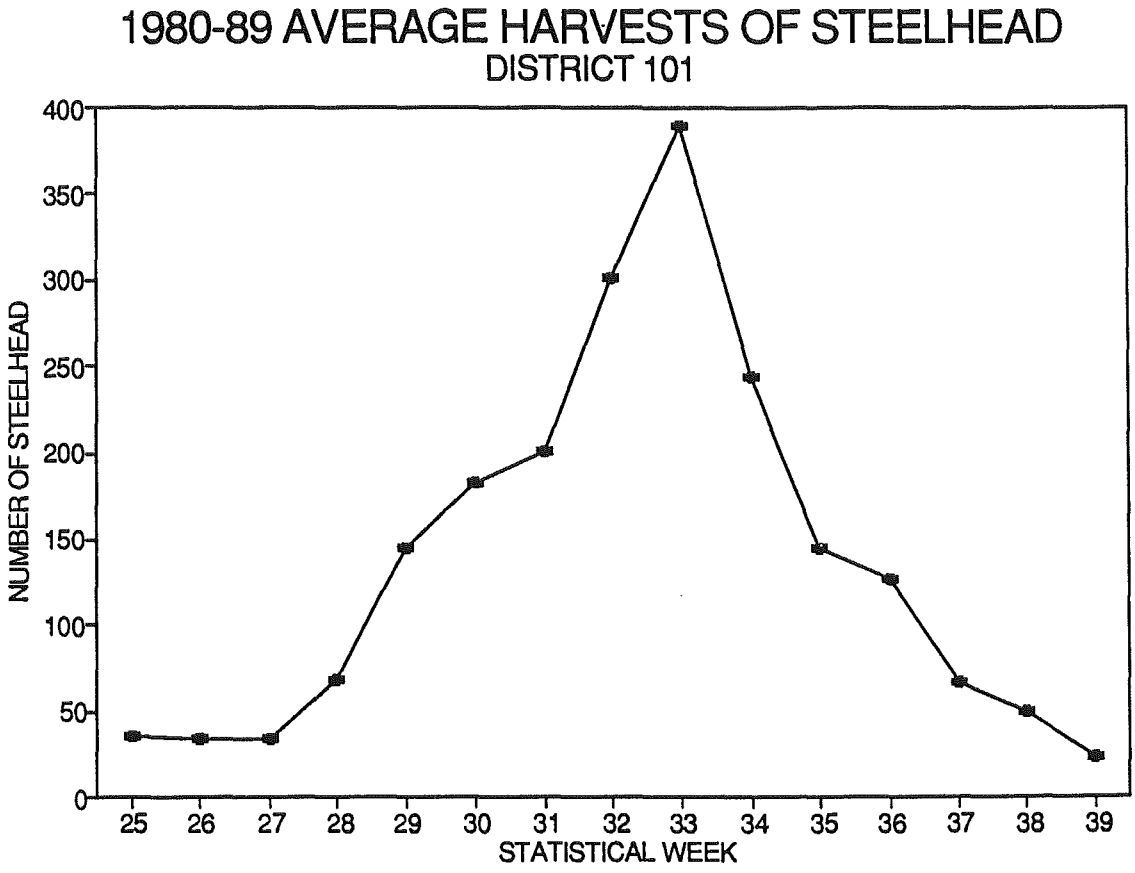

Figure 5. Harvests of steelhead in District 101 commercial fisheries, 1980-89 average by statistical week.

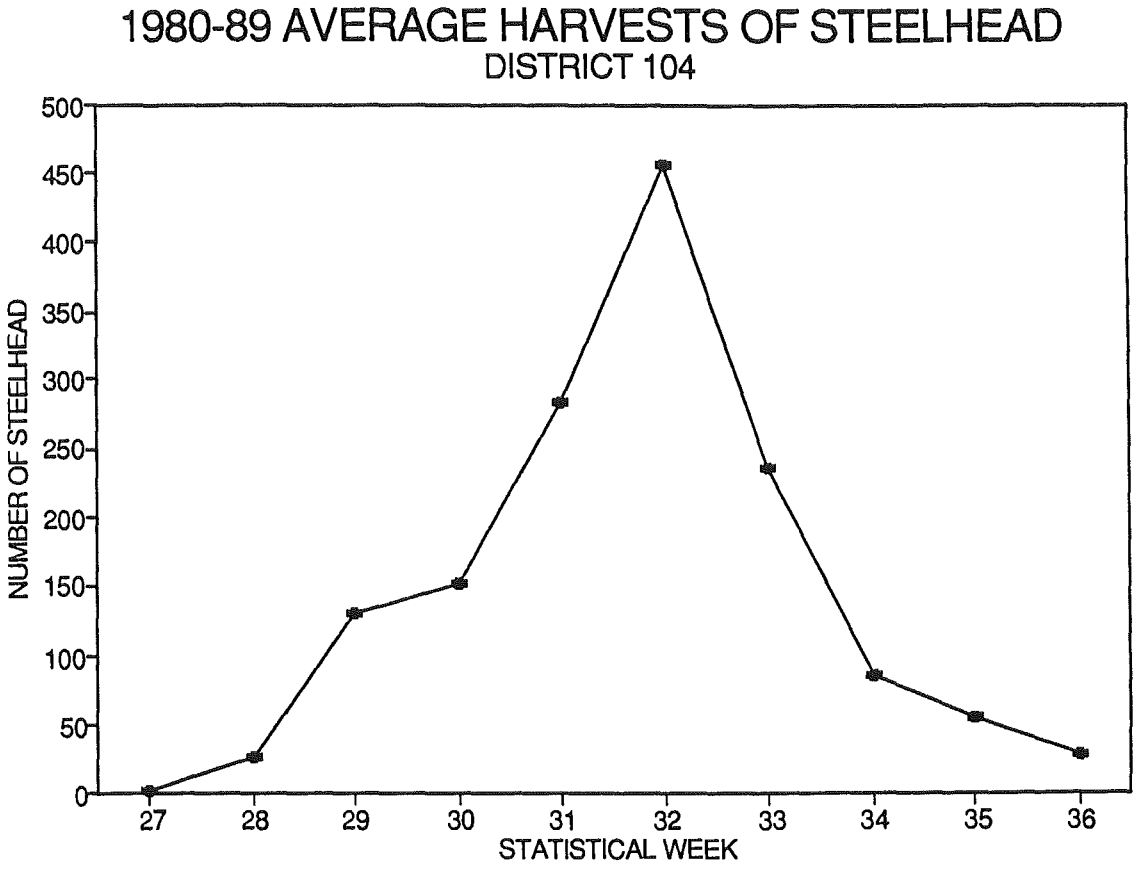

Figure 6. Harvests of steelhead in District 104 commercial fisheries, 1980-89 average by statistical week.

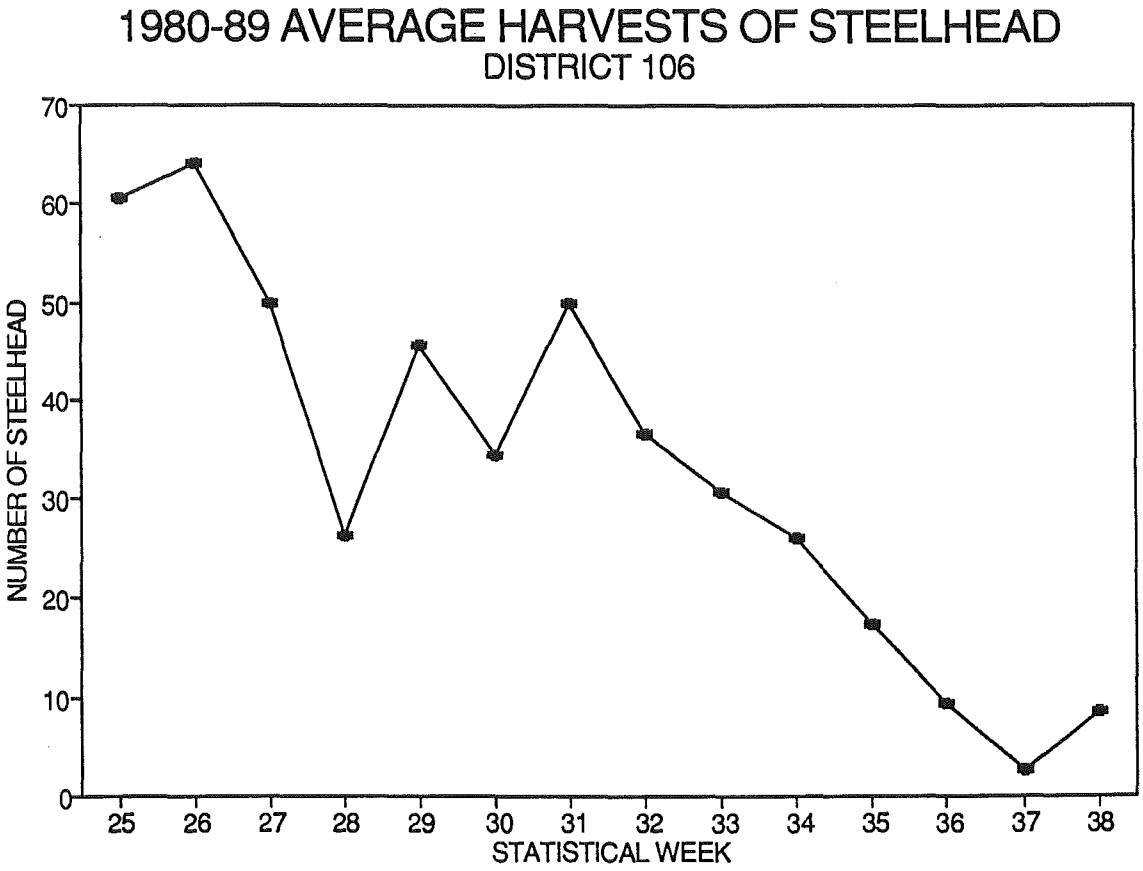

Figure 7. Harvests of steelhead in District 106 commercial fisheries, 1980-89 average by statistical week.

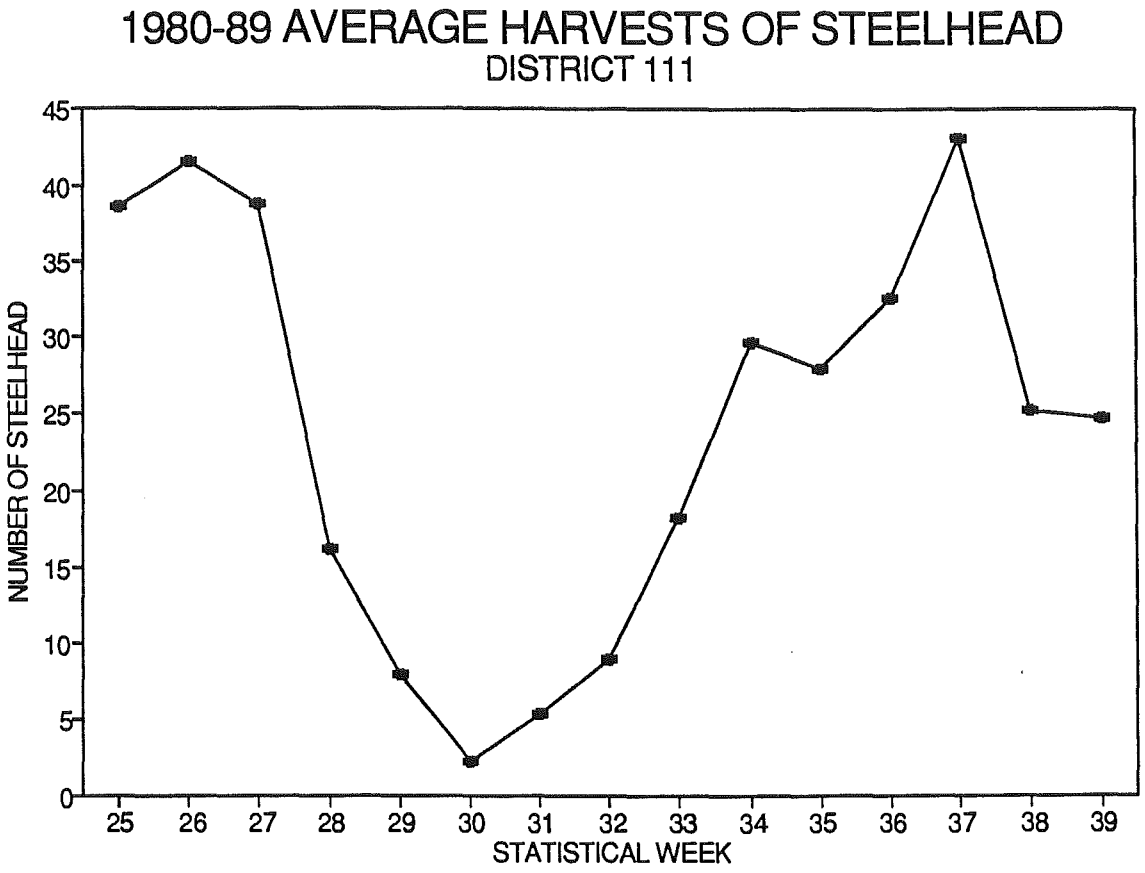

Figure 8. Harvests of steelhead in District 111 commercial fisheries, 1980-89 average by statistical week.

Dec. 9, 1991

ADDENDUM TO REPORT TCNB (91)-1

REVIEW OF STEELHEAD STOCK STATUS, HARVEST PATTERNS, ENHANCEMENT AND MIGRATIONS IN THE NORTHERN BOUNDARY AREA

Report Dated: February 1991

The following attachments should have been published with the report:

(1) Figure 9. Timing of the recoveries of adipose-clipped steelhead in southeast Alaska commercial and sport fisheries, 1980-89. [insert as Page 56]

(2) Appendix A. Steelhead data request from the Northern Panel to the Northern Boundary Technical Committee, February 1990. [insert as Pages 57 and 58]

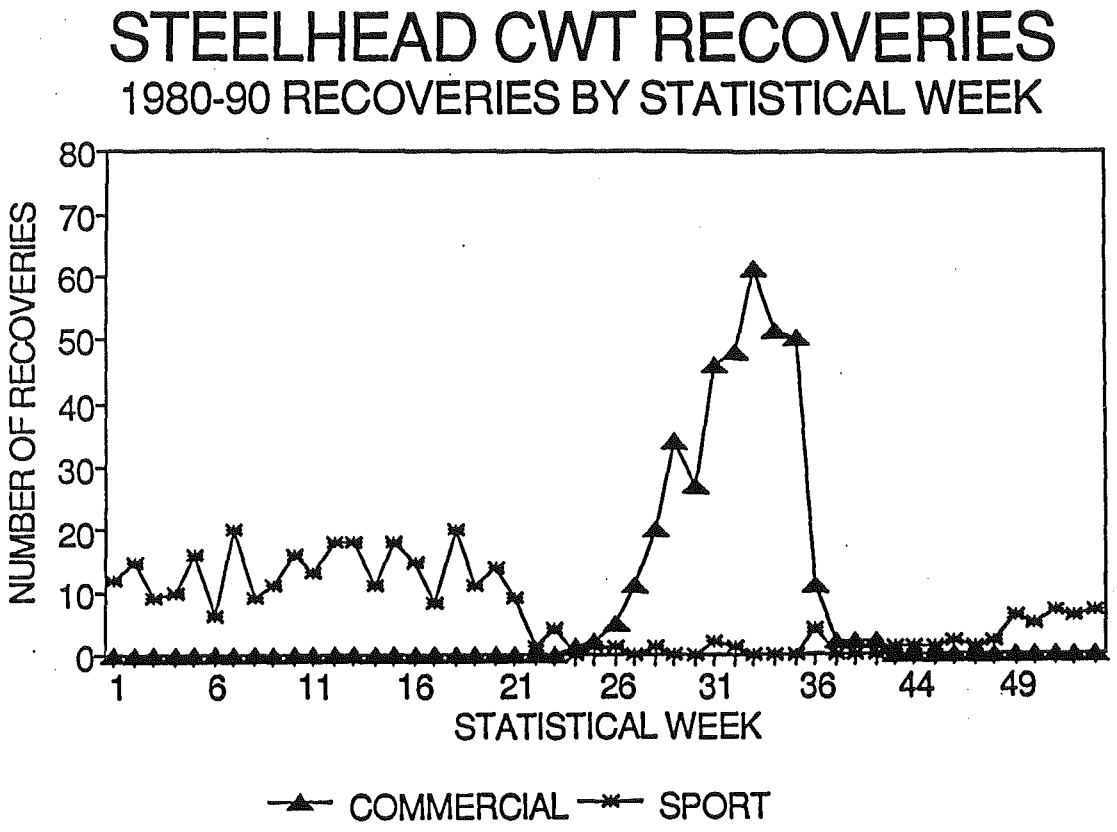

Figure 9. Timing of the recoveries of adipose-clipped steelhead in southeast Alaska commercial and sport fisheries, 1980-89.

Appendix A.

Steelhead data request from the Northern Panel to the Northern Boundary Technical Committee, February 1990.

Appendix A.

NORTHERN PANEL

STEELHEAD DATA REQUEST

In recognition of the need for improved information, the Bilateral Northern Panel instructs the Northern Boundary Technical Committee (NBTC) to complete the following assignments and report to the Bilateral Northern Panel at the fall meeting in 1990.

A review of the status and harvest patterns of steelhead to include:

1. A summary of steelhead catch trends by appropriate geographic area.

2. An assessment of knowledge of stock status by appropriate geographic area, highlighting any specific conservation concerns.

3. A summary of knowledge of stock migration.

4. A summary of steelhead sport fisheries.

5. A summary of past, present or future enhancement.