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THE PACIFIC SALMON COMMISSION

JOINT CHUM SALMON TECHNICAL COMMITTEE REPORT

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SUMMARY REPORT OF SOUTHERN BRITISH COLUMBIA
AND WASHINGTON CHUM SALMON DATA
FOR THE YEARS PRIOR TO 1985

CHUM TECHNICAL COMMITTEE REPORT

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
I.	TERMS OF REFERENCE	1
II.	SUMMARY OF AGENCY HISTORICAL REPORTS	2

I. TERMS OF REFERENCE

Chapter 6, Annex IV of the Pacific Salmon Treaty (PST) calls for the formation of a Joint Chum Technical Committee and charges that committee with responsibilities as follows:

Considering that anticipated returns of some natural salmon stocks originating in Johnstone Strait, the Strait of Georgia, the Fraser River, Puget Sound, Juan de Fuca Strait and Nitinat Lake are expected to be weak and therefore not likely to provide a harvestable surplus in 1985, although some enhanced stocks originating in these areas may provide harvestable surpluses and anticipating locally directed fisheries on such enhanced stocks, the Parties shall

1. no later than March 31, 1985, establish a Joint Chum Technical Committee (Committee) reporting, unless otherwise agreed, to the Southern Panel and the Commission, to, inter alia,

(a) identify and review the status of stocks of primary concern;

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

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

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

(e) develop analytical methods to permit the exploration of alternative regulatory and production strategies;

(f) identify information and research needs, to include future monitoring programs for stock assessments;

(g) develop fishery regimes for the 1985 season and thereafter.

2. no later than August 15, 1985, instruct the Committee to present a report to the Parties on the activities set out in paragraph 1 herein.

The following report is intended to summarize the majority of the information required by paragraph 1.

II. SUMMARY OF AGENCY HISTORICAL REPORTS

CANADA

Southern British Columbia chum salmon stocks and fishing areas are divided into two major components; the stocks of Johnstone and Georgia straits, herein termed inside chum, and those off the west coast of Vancouver Island including Juan de Fuca Strait, termed west coast chum. The primary fisheries of concern are net and troll fisheries off the west coast of Vancouver Island and net fisheries in Johnstone, Georgia, and Juan de Fuca straits and in the Fraser River.

INSIDE CHUM

Stock Description

Inside chum include stocks spawning along the east and west coasts of Johnstone and Georgia straits from the north end of Vancouver Island to Boundary Bay and Saanich Inlet to the south. The Fraser River is the most productive unit while other major production originates from mid Vancouver Island, Howe Sound, South and Lower Vancouver Island, Jervis Inlet and Loughborough/Bute inlets.

Most inside stocks are fall chum that spawn from October through December although there are a few runs of summer chum which spawn prior to October in some mainland inlets. Fall chum migration through Johnstone Strait generally extends from early September through November, with major abundance occurring during October.

Most chum migrate through Johnstone Strait on their approach to the spawning grounds although there is growing evidence that in some years a significant proportion of Fraser River and some southern Strait of Georgia stocks migrate through Juan de Fuca Strait. While each stock has a characteristic migration timing, there is substantial overlap so that many stocks may be present along the migratory pathways at any given time. Chum salmon overlap with other species including late Fraser River sockeye and pink salmon in September, and chinook, coho and steelhead in September and October. These species are taken into account in designing fishing plans.

Between 1960 and 1984, the estimated total run size of

inside chum averaged 1,743,000 with a range from 445,000 (1965) to 4,507,000 (1973). The 1980-84 average was 1,958,000. The Fraser River component averaged 631,000 since 1964 with a range from 208,000 (1965) to 1,334,000 (1968). The size of the runs and productivity are generally greater in even numbered years. Average even year run size since 1960 was 2,043,000, about 44% greater than the odd year average of 1,418,000. Returns per spawner average 2.0 in the even years compared to 1.6 in odd years.

Since 1960, wild spawning escapements, including spawning channel areas, have averaged 1,093,000 with a range from 404,000 (1965) to 1,829,000 (1972). The 1980-84 average was 1,355,000 indicating a general increase in recent years, but still well below the interim goal of 2,500,000. Fraser River escapements averaged 341,000 since 1960 (range of 173,000 to 822,000). The status of chum throughout Johnstone and Georgia straits varies considerably in different areas. Escapements of some stocks such as those in Loughborough, Bute and Jervis inlets, Howe Sound, and the Fraser River are improving (1980-84 average is 60% of goal). Others, such as Upper Vancouver Island and several of the mainland inlets off Johnstone Strait are well below their escapement goal (1980 to 84 average is 12% of goal).

Canadian commercial inside catches of chum averaged 619,000 since 1960 with a range from 26,000 (1965) to 2,897,000 (1973). The 1980-84 average was 558,000.

Enhancement of inside chum began in 1963 at the Qualicum River with flow control and spawning channel construction. There was little additional enhancement effort until the Salmonid Enhancement Program initiated a number of new projects starting in the late 1970's. Existing facilities throughout the inside waters have the capacity to produce about 1,500,000 chum with full production expected to return in 1989. The major facilities are located in mid Vancouver Island, with a production potential average of 900,000 adults and in the Fraser River with a potential average return of 500,000 adults. An additional 100,000 average production is anticipated various minor facilities. Returns to these facilities were taken into account in the design and implementation of the wild stock rebuilding program.

Management Regime and Fishery Description

The major Canadian commercial fishing areas for inside chum are Johnstone Strait (Areas 12 and 13), mid Vancouver Island (Area 14) and the Fraser River (Area 29). Minor fisheries occasionally occur in Bute Inlet and off the Nanaimo and Cowichan rivers. In the past, chum were taken in the Juan de Fuca Strait (Area 20) fishery directed mainly at coho. Inside chum are also taken in the west coast troll fishery.

The Johnstone Strait mixed stock fishing area is about 200 km in length and harvests the largest catches. Chum caught in

this area are of high quality and fetch a relatively high price compared to those caught in more terminal areas. The fleet size often exceeds 400 purse seines and 500 gill nets with seines harvesting an average of 75% of the catch during the period 1960-1984. Chum catches in Johnstone Strait averaged 458,000 from 1960-84 with a range from 14,000 (1965) to 2,296,000 (1973). The 1980-84 average was 390,000.

The Fraser River commercial fishing area (Area 29) includes the Fraser River up to Mission and may include a portion of the Strait of Georgia adjacent to the river mouth. Chum caught in the Fraser area are generally dark in colour. Fishing is restricted to gill nets with in excess of 500 vessels participating on some openings. The number of chum fishing days permitted has been sharply reduced in recent years, and, in 1984, openings were linked to fisheries in Johnstone Strait. The 1960-84 average catch was 78,000 with a range from 8,000 (1979) to 256,000 (1972). The 1980-84 average was 35,000; however, directed chum fisheries occurred only in 1980 and 1982 with catches of 75,500 and 63,300, respectively.

The mid Vancouver Island fishery (Area 14) is a terminal fishery directed on enhanced chum returning to the area. As the enhanced returns increased and fishing in Johnstone Strait was reduced, catches in this fishery have grown. Average catches for Area 14 during the period 1960-84 were 49,000 with a range from zero (1963-69, 1971 and 1977) to 197,400 (1982). The 1980-84 average was 123,700. In 1984, an attempt was made to limit the harvest to those areas where Fraser chum comprise less than 10% of the anticipated catch.

The catch of chum salmon elsewhere in the Strait of Georgia is minor in most years. The 1960-84 average catch for areas 15-19 was 33,600 with a range from zero (1983, 1984) to 225,100 (1973). The 1980-84 average was 9,000. Since 1980 fisheries directed at chum salmon harvest occurred only in 1982 with a catch of 41,000.

Indian food fisheries in the Fraser River and Johnstone and Georgia straits take a small catch of chum salmon. No sales of Indian food fish are permitted. The catch for all areas combined averaged 31,000 from 1960-84 with a range from 15,000 (1965) to 58,000 (1984). The 1980-84 average was 46,000. The Fraser River catch averaged 15,000 from 1980-84.

Canadian inside and Puget Sound chum are also caught in Canadian west coast troll and net fisheries and in the Juan de Fuca Strait fishery. United States fisheries, mainly in the San Juan Islands, Point Roberts and Juan de Fuca Strait areas also harvest Canadian inside chum.

The strategy for managing inside chum has been modified substantially in recent years. Until 1983, the stated management approach involved harvesting all chum in excess of an escapement goal for all stocks combined. In practice, this approach was

difficult to implement because of the differences in run timing and productivity with the result that some stocks were overharvested while others could potentially be underharvested. A new approach, with the objective of achieving the escapement goal of 2,500,000 within three cycles, was implemented in 1984. The approach involved managing the total run by variable harvest rate in the Johnstone Strait and Fraser River areas. At the lowest run sizes (under 2,600,000), a harvest rate of 10% in Johnstone and Georgia straits and the Fraser River is permitted. At the highest run sizes (over 4,900,000) a 40% harvest rate applies. Harvest rates above 10% are adjusted in a stepwise manner in relation to the estimated increased run size in Johnstone Strait. Escapements above the stated objective were permitted as they provide information about stock productivity.

Management Process

The management process for inside chum had been relatively unstructured but it has recently evolved into a more formalized approach. The first step is the development of preseason quantitative forecasts which are distributed to industry during spring. Until recently, the first meetings with industry advisors were held in late September, after the Johnstone Strait evaluation fishery. Since the management objectives were often unclear and the decision criteria not well defined, the meetings were often unproductive. Dissatisfaction with the advisory process led to the development of the "clockwork" approach which laid out a framework for managing the fisheries. This framework included a definition of objectives, criteria for making management decisions and run size evaluation techniques.

Stock Assessment Techniques

Preseason forecasts of inside chum have been made using various methods since the early 1960's. In general, predictions were made for each age class which were then added to provide the total run size forecast. Age 4 returns were forecast from a relationship with age 3 returns the previous year while age 3's were predicted using brood year escapements, average returns per spawner and average age composition. Starting in 1974, a correlation between rates of return for pink and chum salmon was used to improve the accuracy. The average annual error in the prediction was 33% from 1970-84 and 18% from 1980-84. In most years, Fraser River predictions were made by applying the ratio of Fraser to non-Fraser brood year escapements to the projected total returns for all inside chum. More recently, the Fraser River forecast has been developed independently by applying even and odd year average returns per spawner to the appropriate brood years and then using average age compositions.

Forecasts for returns to enhancement facilities were made by applying expected survival rates to the fry output for each

brood year.

The abundance of chum salmon is estimated inseason by means of test fisheries and through comparative catch data from commercial fisheries. The first indication of run strength is from an evaluation commercial fishery in Johnstone Strait during the third week in September. For the remainder of the season, purse seine test fishing is the primary evaluation tool. Two test fisheries operate in Johnstone Strait; one in Area 12, with a relatively long history, is the main indicator of abundance while a second in Area 13, is comparatively new and is less useful at present. There are also two test fisheries in the Fraser River which are used to provide inseason estimates of run strength in the river. In terminal areas, such as Area 14, and occasionally off other river systems, estimates of abundance are based on a combination of comparative catch data, visual surveys and sporadic test fishing.

Electrophoresis has proven useful in estimating the proportional contribution of major chum stocks in areas where they intermingle. It has been used inseason to determine the proportion of Fraser chum in the outer portions of Area 14 to assist in setting fishing boundaries. In addition, chum have been sampled since 1981 to provide estimates of the proportion of Fraser, Canadian non-Fraser and Puget Sound chum entering Johnstone Strait.

The majority of spawning populations of chum salmon are enumerated visually, either by foot or by air. The methods for deriving escapement estimates are not standardized but usually involve counting live and dead fish then relating these counts to estimates of spawning turnover rate, timing of observations, and possibly other factors, to get a total population estimate. Within the Fraser River tag and recapture programs were used to estimate major populations from 1960-1969 and for several years in the 1970's.

The total run size of inside chum returns is estimated by summing the spawning escapements with the catches in all inside areas, including estimates of Canadian chum in US areas 7 and 7A. At present, the Fraser and Big Qualicum rivers are the only individual stocks for which total return estimates are made. As information from electrophoresis becomes available, more reliable estimates of major stock contribution to fishing areas will be possible with consequent improvements in the accuracy of run reconstructions.

The first reported spawning goal for inside wild chum, developed in 1962, was derived by adding together the highest recorded escapements during the period 1949 to 1961 to provide a target of 2,375,000. Subsequently, the targets for individual sub areas have been modified but the total of 2,500,000 is similar to the original target. The present spawning targets are primarily based on professional judgement. The present goal for the Fraser River wild spawning areas is 700,000 although stock

recruitment analysis suggests that this may be a minimum requirement.

WEST COAST CHUM

Stock Description

Chum salmon returning to Area 22 originate mainly from the Nitinat River with smaller contributions from four other streams. A major hatchery (capacity of 28,000,000 eggs; first egg releases from 1980 brood) is now returning adults to the area with hatchery production expected to dominate the returns from now on. Hatchery returns of up to 400,000 adults are anticipated.

Little information is available on migration routes of Nitinat chum. It is assumed that they make landfall on the north end of Vancouver Island and migrate southeast arriving off Nitinat in early to mid October. This is a fall stock with peak abundance occurring within the lake during mid October to mid November.

The total stock of Nitinat chum has fluctuated wildly over the years ranging from 4,500 (1979) to 1,555,000 (1972) with an average of 134,000 from 1960-84. The 1980-84 average was 147,000. Since 1960, spawning escapements averaged 55,000 with a range from 4,500 (1979) to 265,000 (1972). The 1980-84 average was 55,000. The escapement target of 125,000 was achieved only three times during this period. Rates of return per spawner averaged 3.78:1, with a range from 0.09:1 to 13.99:1, indicating little relationship between escapements and subsequent returns.

Chum salmon production from the Canadian portion of the Juan de Fuca Strait originates from eight streams with the Sooke River being the most important producer. Spawning escapements averaged 30,000 from 1960-84 with a range from 5,000 (1979) to 111,000 (1973). The 1980-84 average was 21,000, indicating a downward trend from earlier years. Fisheries in Juan de Fuca Strait are thought to harvest mainly passing stocks. There is no information on total run sizes or productivity.

Management Regime and Fisheries Description

Fisheries occurred in Nitinat Lake on a more or less regular basis until the late 1950's with substantial catches in some years (217,000 in 1954, for example). However, the stock declined to the extent that the fishery was closed in 1961 and did not reopen until 1972 when there was a huge return and 1,290,000 chum were caught. Fisheries were conducted in 1973 with a catch of 175,000 chum and in 1980 with a catch of 274,000. The next fishery occurred in 1984 when the first hatchery returns were expected and 187,000 chum were caught. To improve fleet safety and fish quality, the fishery took place outside of the

lake in 1984. Future fisheries will be designed to harvest surplus hatchery chum. Nitinat fisheries, like those elsewhere in southern B.C., are discussed with industry advisors to determine timing of fisheries, area to be opened and other relevant matters.

Until the late 1970's, Juan de Fuca Strait (Area 20) was opened for fishing after the International Pacific Salmon Fisheries Commission (IPSFC) relinquished control near the beginning of September until effort dropped off to nothing. The September openings were generally directed at coho while those in October and later were directed at chum. Due to the limited production from streams in this area, the majority of chum caught in this fishery likely were destined for Strait of Georgia, Fraser River or Puget Sound. By agreement with the United States, the area did not open after the IPSFC relinquished control in 1983 and 1984. The catch from 1960-84 averaged 42,000 with a range from 100 (1983) to 202,000 (1972). The catch for 1980-84 averaged 17,000. The catch in the 1980-82 chum fishing years averaged 28,000.

Until the 1970's, troll catches of chum salmon by the west coast Vancouver Island troll fleet were minor with a maximum catch of 2,300 and an average of 1,000. Increased effort directed at chum increased the average catch to 9,000 in the 1970's and to 21,000 from 1980-84. The largest catch up to 1984 occurred in 1982 when 63,000 were taken. The majority of the catch is taken off northwestern Vancouver Island. Peak catch generally occurs during the last or second to last week in July. Stock identification analyses are underway in an attempt to determine the composition of the catch.

Stock Assessment Techniques

Attempts to predict wild chum returns from brood year escapements have been unsuccessful for the Nitinat area, probably because of the marked influence of environmental factors, especially flooding, on survival. Hatchery returns were forecast using average survivals from egg to adult although there are insufficient data to assess the accuracy of the method.

To assess abundance inseason, a test fishery using a chartered purse seine vessel makes sets just off shore from the entrance to the lake. This is considered to provide a qualitative estimate of abundance only. In addition, starting in 1985, a commercial gill net fishery will be permitted to take a previously determined number of chum early in the season to evaluate stock abundance. Further fishing will be contingent on the performance of this fishery.

Electrophoretic stock identification was first applied to chum caught at Nitinat in 1984 in order to acquire information on the proportion of United States and inside Canadian chum.

UNITED STATES

United States chum stocks of interest are grouped into three geographical units: Puget Sound, Washington Coast and Oregon and are discussed in that order.

PUGET SOUND

Stock Description

Chum salmon spawn in a number of rivers throughout Puget Sound as well as in rivers along Juan de Fuca Strait. Some of the major wild chum producers are the Nooksack, Skagit, Stillaguamish and Snohomish rivers as well as the South Sound area. The stocks are grouped into three timing periods based on average peak spawning: early - prior to November, normal - November to early January and late - after early January. The majority of Puget Sound chum are of normal timing.

Most Puget Sound chum are currently believed to migrate through Juan de Fuca Strait where they are present in significant numbers from late September through early November. Recent information from electrophoretic analysis indicates that a portion of the run approaches Puget Sound through Johnstone and Georgia straits.

The estimated total run of chum returning to Puget Sound averaged 734,000 from 1968 to 1984 with a range from 207,000 (1975) to 1,474,000 (1978). The 1980-84 average was 950,000. As is the case with British Columbia's inside chum, in most areas, even year runs tend to be larger than odd year runs. The average even year run size is 975,000 compared to 474,000 for odd years.

Early chum have decreased since 1968 with the recent (1980-84) average at 28,000 for even years and 18,000 for odd years. Previously, runs of up to 190,000 were observed. Returns from enhancement started in 1976 and have averaged 7,000 through 1984 (range 800 to 20,000).

Wild and enhanced normal chum combined have increased in abundance since 1968. The 1968-84 run size averaged 647,000 chum (837,000 even year and 392,000 odd year). The 1980-84 averages for even and odd years are 1,063,000 and 599,000, respectively. The largest run since 1968 was 1,366,000 (1978). Although most regions of Puget Sound are managed on a wild basis, hatchery production contributes substantially to normal runs particularly in Hood Canal where more than half the Puget Sound hatchery production originates. Major hatchery production in regions managed on a wild basis is confined to areas and for time periods

where the stocks can be differentially harvested.

Wild runs of late chum have, on average, changed little since 1968. Even and odd year averages for the 1980-84 period are 57,000 and 35,000, respectively. The maximum run recorded since 1968 was 73,000 (1980).

Wild late chum escapements averaged 26,500 from 1968-84 with a range from 9,900 (1971, 1975) to 41,000 (1980). In general, wild stocks have achieved desired escapement levels in most recent years.

Management Regime and Fishery Description

The long term intent for Puget Sound chum is to return the maximum sustained harvest to Washington fisheries. For Puget Sound regions where the maximum sustained harvest level is undetermined, the management intent is to achieve fixed spawner escapement goals. Most stocks are managed for wild production; the only major stock group and area managed for hatchery production is normal chum in Hood Canal. Fisheries other than the main mixed stock fishing areas (4B, 5, 6, 6C, 7, and 7A) are generally managed to achieve fixed spawning escapement goals. Time periods, reflecting the central 80% of the run timing, have been identified for each species and catch area to establish periods when management actions are to be directed at the needs of each species or stock.

Washington fisheries which harvest a mixture of Puget Sound and Canadian stocks are located in Juan de Fuca Strait (areas 4B, 5, 6, 6C) and the San Juan Islands (Area 7) and Point Roberts (Area 7A) areas. Other fisheries in more terminal areas are considered to harvest only Puget Sound origin chum.

The Juan de Fuca Strait fishery historically took relatively few chum salmon with a maximum of 40,500 (1978) up to 1979. Fisheries prior to 1980 were restricted in duration after IPSFC control. The 1980 catch increased to 17,000 and 15,000 were taken in 1983 and 1984. The 1980-84 average is 9,900. In the 1980's, this area has been managed on a fixed fishing schedule of five days per week for the Treaty tribes gill net fishermen. The number of boats operating currently averages about 25.

Area 7 has historically been managed on the basis of both Canadian and Puget Sound chum while Area 7A is considered to be a harvest area for Fraser River chum. Since 1977, both areas have been managed on the basis of Canadian stock status and associated fisheries in Canadian waters. There have been significant chum fisheries in only two of the last seven years (1978, 1980), and a limited fishery in 1982.

Until the mid 1970's, when court decisions established allocation sharing between Indians and non-Indians, only

Washington Department of Fisheries (WDF) licensed fishermen fished these areas. Three types of gear are currently allowed under the WDF and Tribal regulations: purse seines, gill nets and reef nets. Reef nets have operated intermittently, even when other gear types have been closed. The gear count averages about 245 gill nets (200 non-Indian, 45 Indian), 85 purse seines (70 non-Indian, 15 Indian) and 20 reef nets. Catches in areas 6, 7 and 7A combined fluctuated between 8,100 (1965) and 427,000 (1978) from 1960-84 and averaged 116,800. The 1980-84 average catch was 88,100 with a range from 1600 (1984) to 350,000 (1980); however, at Canada's request fisheries directed at chum salmon during the 1980-84 period occurred only in 1980 and 1982 with catches of 350,000 and 76,000, respectively.

Management Process

The management process for Puget Sound salmon fisheries is embodied in the Puget Sound Salmon Management Plan (PSSMP), a negotiated set of rules for preseason planning and inseason management between the treaty tribes and WDF. A major objective of the PSSMP is to obtain preseason agreement on detailed management strategies to minimize inseason disputes. It lays out procedures for establishing and modifying escapement goals, management periods, harvest rates and test and evaluation fisheries. In addition, there are procedures for regulation notification, schedules for preseason planning and report preparation, and mechanisms for dispute resolution.

Preseason planning is conducted in accordance with a fixed schedule, beginning with preliminary forecast development in April, followed by a technical review of the forecasts and resolution of any disagreements at that level. Proposals on escapement goals, management recommendations and enhancement plans are exchanged between WDF and tribal technical staff in May. A draft management report is then submitted to the administrative/policy level for resolution of any differences of opinion. The final preseason reports are prepared in July. The preseason agreements are binding unless the parties agree to modifications. Disputes generally arise when inseason conditions deviate significantly from preseason expectations. If disputes can not be resolved through the mechanisms within the PSSMP, the Federal Court is the final arbiter.

Stock Assessment Techniques

Preseason forecasts of the magnitude of the chum runs expected to return to Puget Sound have been made since 1974. The forecasting methods for wild chum have varied over the years. From 1974-79, the number of age 4 and 5 fish were predicted from a relationship with previous returns of age 3 fish while the age 3's prediction was based on mean recruits per spawner. The total forecast was then apportioned to individual stocks or management units. Since 1980, environmental variables correlated with the

total return have been employed in the forecast development. The total forecast for Puget Sound is apportioned to regions using parent year escapements. In 1983 and 1984, indices of juvenile abundance were also used for some areas. Forecasts of hatchery chum are based on fry to adult return data for specific facilities. From 1980 to 1984, the average deviation of actual returns from forecast levels was 18%.

Models for inseason updating of run sizes are developed where possible. Run size updates are generally provided after the first week or two of the fishery with successive updates available through the peak of the run. The total run entering U.S. waters is estimated using run reconstruction starting from terminal areas and working through mixed stock fishing areas. Inseason estimates in terminal areas are based on the relationship between catch/effort and run size. If the inseason data base is inadequate, the preseason forecast directs inseason management.

For run reconstruction, modifications (to take into account changes in U.S. and Canadian chum production) of the 1971 U.S./Canada agreed upon stock composition estimates have been used since 1979. Electrophoretic genetic stock identification techniques are just starting to be used for differentiating stocks by country of origin in mixed stock areas and are expected to enhance the accuracy of run reconstruction estimates in the future.

Enumeration of spawning chum salmon is done visually from boats or on foot. For small rivers, escapement curves are constructed using peak live and dead counts and the area under the curve is converted into an estimate of total escapement. Estimates for large rivers are derived by relating index area counts to base year estimates of total escapements developed from tagging studies where available.

Spawning goals have been developed for all management units within Puget Sound using either the average of observed escapements for selected years or spawner/recruit relationships. Where there are differences in odd and even years production, odd year escapement goals have been adjusted by an odd/even year production ratio.

WASHINGTON COAST

Stock Description

There are three chum stocks of interest along the west coast of Washington: Grays Harbor, Willapa Bay and Quinault River.

Grays Harbor chum salmon declined in abundance in the

1960's but have improved slightly in more recent years with escapements now generally at or above the goal of 21,000. The 1980-84 average spawning escapement was 25,000 (while the average run size for this period was 55,000). The timing is one to two weeks earlier than that of normal Puget Sound chum with peak abundance in the terminal area in mid to late October. Age 4 fish predominate in most years although age 3's occasionally are the dominant age class. The average return rate is 4.55 per spawner. There is a poor relationship between spawners and returns. Hatchery production of Grays Harbor chums was low until 1979 when 7,000,000 fry and fingerlings were released. Recent production has been lower.

Willapa Bay chum also declined in the 1960's; although there has been some recovery since 1980. Wild spawning escapements since 1980 have ranged from 21,000 to 66,000 averaging 37,500, slightly above the goal of 35,400. The 1980-84 average run size was 84,000. The migratory timing of Willapa Bay chum tends to be slightly earlier than that of Grays Harbor chum. On average 3.44 fish return from each spawner. Hatchery production began to increase in 1976 and peaked in 1982 with the release of 7,100,000 fingerlings.

Quinault River wild chum salmon suffered a severe decline in abundance during the period from 1935 to 1970 and have failed to recover. The terminal area fishery is supported mainly by hatchery production although survival of hatchery fish has been poor. Release of juveniles at more optimum size for survival is expected to improve production in the future. The goal is to release 3 million fry each year. Additional enhancement is on line at the Makah National Fish Hatchery and returns are anticipated in the near future.

Management Regime and Fishery Description

The Grays Harbor chum gill net fishery takes place within the harbor and the lower portions of the Chehalis and Humptulips rivers. The chum management period is from October 21 to November 10. There is a catch sharing arrangement between the Indian and non-Indian fishermen. In addition, a sport fishery for chum occurs in some freshwater tributaries. Grays Harbor chum are managed to achieve wild escapement goals. Catches since 1960 have averaged 19,400 with a range of 450 (1979) to 61,600 (1982). The 1980-84 average was 29,000 fish. The sport catch is 150-400 most years, but reached 2,300 in 1982, a year of high returns.

The Willapa Bay commercial gill net fishery is conducted in the harbor while sport fisheries occur in the tributaries. The chum management period is from October 15 to November 1. Effort is directed on the early portion of the run to improve fish quality. During the period 1960 to 1984, catches have averaged 27,200, ranging from 1,200 (1979) to 76,000 (1982). The 1980-84 average catch was 42,000.

A treaty Indian fishery for hatchery chum occurs in the lower Quinault River. The historical catch pattern is similar to that of Grays Harbor and Willapa Bay except that the wild chum abundance remains low.

Management Process

Preseason forecasts of returns to Grays Harbor and Willapa Bay are published annually by WDF. Negotiations take place between WDF and the tribes to develop fishing schedules designed to achieve allocation quotas. WDF holds public hearings with non-treaty fishermen to receive their input into the management process. Disputes arising during the season are usually mediated by the Court's Fisheries Advisory Board.

Stock Assessment Techniques

Forecasts of chum returns to Grays Harbor and Willapa Bay have been made for only the last four years. They are based on average returns per spawner, by age group, adjusted by return rates observed for prior ages of the same brood. Separate average return rates are used for odd and even year returns. Expected returns to the Quinault River are based on average survival rates at Quinault National Fish Hatchery.

Inseason adjustment of run sizes in both Grays Harbor and Willapa Bay is based on a one week full fleet test fishery in Willapa Bay. This adjustment is derived from historical relationships between the two stocks.

Escapement estimates are made for Grays Harbor stocks by comparing annual index counts with a base year in which there was a total escapement estimate. For Willapa Bay stocks, the area under the curve for index areas is expanded to take into account uncounted areas.

OREGON

Stock Description

Chum salmon spawn in the lower Columbia River and rivers entering some coastal bays of Oregon, particularly Tillamook and Netarts bays. Both Columbia River and coastal Oregon chum have normal timing with peak spawning occurring from the last week in November to the first week in December. Numerical spawning escapement estimates are not made although trends from index areas indicate that Columbia River and Tillamook Bay chum declined during the period 1950-80. Unlike some other areas, there is no apparent odd/even year pattern.

The first hatchery releases of Oregon chum occurred in Netarts Bay in 1969. Since 1971, 11 private hatcheries have been

issued permits to produce chum. Currently, most hatchery production from Oregon coastal rivers is from private sea ranching operations. There have been some chum fry releases into the lower Columbia River by Oregon Department of Fish and Wildlife and WDF.

Management Regime and Fishery Description

Chum gill net fisheries operated in the lower Columbia River, Tillamook Bay and Nestucca Bay before the stocks declined. Chum catches in the Columbia were as high as 425,000 in 1942 but declined sharply afterwards. Chum salmon are now taken only as an incidental catch in the Columbia River commercial fishery. The 1960-84 average was 1,100 (range from 100 to 3,900) while the 1980-84 average was 500. The Nestucca Bay net fishery was terminated in 1927 while the Tillamook Bay fishery ended in 1961. The Tillamook Bay fishery took an estimated average of 91,000 chum from 1927-36 but the catches declined thereafter with an average of 6,000 taken for the five year period from 1957-61.

Coastal chum are now taken by sport fisheries and at hatchery racks by private operators. The sport catch has increased recently and takes place mainly in the Miami and Kilchis rivers which flow into Tillamook Bay.