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February 1, 1987

THE PACIFIC SALMON COMMISSION

CHINOOK TECHNICAL COMMITTEE REPORT

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DATA REPORT OF THE CHINOOK TECHNICAL COMMITTEE ON UNACCOUNTED FOR SOURCES OF FISHING ASSOCIATED MORTALITIES OF CHINOOK SALMON IN WESTCOAST SALMON FISHERIES

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Prepared by the Chinook Technical Committee's Working Group on Induced Mortalities

This document was prepared as an interim report in order to provide data available for the Feb. 14, 1987 meetings of the Pacific Salmon Commission, a final report will be submitted after full consideration and discussion of each agency report. Information presented in this data report does not imply agreement amongst the members of the Chinook Technical Committee, only that is has been provided for the Committee's evaluation.

PROGRESS REPORT ON

FISHING ASSOCIATED MORTALITY

The Working Group on Fishing Associated Mortality has made substantial progress in preparing a report for review by the Joint Technical Committee on Chinook Salmon. Because the report is not complete and has not been reviewed by the full Committee, this progress report was written to meet the immediate need of the Commission during its February and March meeting. We caution, that this progress report has not received the editorial review of the full Joint Committee and is therefore subject to revision.

In our report we will identify factors that affect fishing associated mortality and provide an assessment of the likely direction and magnitude of those factors since implementation of the Pacific Salmon Treaty in 1985. We will make comparisons of changing associated mortality conditions in relation to the period 1977 - 1982 because data from these years were used by the Committee to estimate harvest rate reductions required to rebuild depressed north migrating stocks of chinook salmon by 1998.

We categorized sources of associated fishing mortality into three classes: retained or discarded, catch and release, and unobserved encounters. The working group also identified parameters needed by the Committee to make a quantitative assessment of the impact (in numbers of fish) of increased and decreased sources of associated fishing mortality. However, estimates of number of fish encountered or not encountered because of changes in abundance or fishing effort are not available for each area and gear and this has limited our quantitative assessment. Furthermore, even if we knew the number of fish encountered, we lack estimates of other key parameters which are needed in order to estimate impacts in terms of number of spawning fish which are members of depressed naturally spawning stocks.

In this progress report we present data provided by responsible management agencies regarding each class of associated mortality for each gear type. A qualitative assessment is provided in Table 1 and available quantitative data are summarized in Table 2. A discussion of key data sets provided by each responsible management agency is also provided.

Southeastern Alaska

Catch and release regulations in the purse seine fishery were adopted by the Alaska Board of Fisheries beginning in 1985. During the 1985 season, we estimate that approximately 11,106 chinook salmon were encountered during the non-retention portion of the season. During the 1986 season, we estimate that 18,206 chinook salmon were encountered. By multiplying these estimates by the upper and lower bound of the likely mortality rates (0.50 to 0.90) we estimated the magnitude of this associated mortality to be from 5,553 to 9,995 in 1985, and from 9,103 to 16,385 in 1986. Because non-retention regulations were not in effect during the period 1977 to 1982,(except for a 28 inch size limit in 1977 and 1978) associated mortality of type and magnitude was not included in the base period years.

In the troll fishery, a fewer number of days were fished in 1985 and 1986, as compared to 1977 - 1982. This reduction in effort probably reduced the number of sub-legal sized chinook salmon caught and released in the troll fishery. A reduction of about 44 percent is indicated. By multiplying the differences in the number of fish encountered between the periods by the range of mortalities (0.20 to 0.30) the estimated reduction in number of dead sub-legal sized fish is between 26,226 and 39,340. Log book data obtained through the Alaska Trollers Association is also being examined to compare with these estimates and will be available shortly.

Catch and release regulations for legal size chinook salmon were adopted for the troll fishery by the Alaska Board of Fisheries beginning in 1981. These regulations were implemented after chinook salmon catch limits had been reached and surplus production for other species was available for harvest. Available data indicate that in 1985 and 1986, an average of about 73 thousand more legal size chinook salmon were caught and released than during the base period years. The estimated number of legal sized fish that may have died from these encounters ranges from 14,647 to 21,971.

Creel survey data are insufficient to make accurate and precise comparisons of recent years catch and release of sub-legal size chinook salmon in the recreational fishery with base period years. We have made a rough approximation of the direction and magnitude by presuming that abundance has been constant and computing the change in effort. The mean effort during the base period was 250,260 angler days. In 1985, the effort was 349,767 angler days (data for 1986 are not available yet). A 39.8 percent increase in angler days is indicated and this increased effort has probably increased the number of sub-legal size chinook salmon that were hooked and released.

Fishing Associated non-catch impacts in B.C. Fisheries

Quantitative estimates of unaccounted for impacts of fishing for salmon in British Columbia are only available for the troll fisheries (catch and release type impacts) and for the non-reported catch of small chinooks in seine fisheries (retained and discarded type ipacts). Information on the catch of chinooks under 5 lb. is routinely available but this data is not accounted for in statistics presented to the Pacific Salmon Commission. Estimated numbers of chinooks caught and released in recreational fisheries are considered unreliabe estimates because provision of this data is voluntary in interviews or logbooks and the accuracy of species identification in these reports is uncertain. Actual surveys to observe shaker incidence in the recreational fisheries have not been undertaken. Only qualitative assessments of changes in other sources of unaccounted for impacts, such as gillnet drop-out or sorting of catch by sport fishermen, can be presented. When quantitative estimates of non-reported impacts can be developed the calculations are only taken to the point of estimating the number of chinooks encountered (eg. numbers of fish caught and released). Estimates of the mortality associated with each type of encounter have not been made because the evaluation of the mortality rates to apply was part of the assignment to the Joint Technical Committee. In most cases, a mortality rate applied will be constant and will, therefore, not influence any interpretation about changes in the direction and/or levels of mortalities since implementation of the Treaty.

Net Fisheries:

Extensive regulatory changes in B.C. net fisheries have been implemented since 1977. The most pronounced change has been the reduction in days open. In northern B.C. (areas 1- 10), days open to fishing by gillnets and seines averaged 22% less days between 1983-1986 but was only reduced by 8% in 1985-1986. Reductions in southern B.C. (areas 11-29) averaged 23% during 1985-1986. The last fishery directly harvesting a natural chinook stock (an early season gillnet fishery in area 8) was closed in 1984. Reductions in days open have not, however, always resulted in a direct reduction in cumulative fishing effort through a season. In northern B.C., the average number of boat days in the 1985 and 1986 seine fisheries increased 20% relative to the base period but in the gillnet fishery it decreased 12%. The increased effort per day is accountable for by the large run of sockeye to the Skeena River in 1985 and the recorded return of pink and chum salmon to the central coast in 1986. During 1985 and 1986 the catch of target species by seines in northern B.C. was 2.2 times the catch in these fisheries during the base period, and the catch by gillnets was 1.5 times the base period. Further, the numbers of salmon caught per chinook caught during 1985 and 1986 was 2.3 times greater than during the base period (Canadian agency report, Figure 2b). In southern B.C., seine effort was reduced in 1985 and 1986 but gillnet effort increased by 20% in areas outside the Fraser River. These changes are associated with strong gillnet fishing for sockeye in 1986 but reduced seine

effort in this fishery and poor sockeye returns to Barkley Sound.

In terms of catch, the catch of chinooks under 5 lb. during 1985 and 1986 northern net fisheries averaged a 7% increase relative to the base period but the catch of chinooks over 5 lb. decreased by 31%. Catch of chinooks under and over 5 lb. in southern B.C. nets was reduced 22% and 15% respectively relative to the base period.

Information on non-reported catch of small chinooks in seine fisheries has recently been developed. Sampling of landed catch in order to recover coded-wire tagged chinook and coho salmon has revealed that a significant number of small chinooks are not recorded as chinook in catch statistics. In several situations the number of small chinooks sampled from a fishery exceed the number of chinooks in the final catch records. Preliminary analysis of data from 1980-82 fisheries suggest that catch of chinooks under 5 lb. may be underestimated by 15 to 40 per cent depending on the fishery and year of catch.

Hook and Line Fisheries:

Assessment of non-reported catches in hook and line gears are largely restricted to commercial troll fishing. Information on catch and release in sport fisheries is very limited and of uncertain validity.

Quantitative estimates of the change in numbers of shakers in the west coast and Georgia Strait troll fisheries were developed. Numbers of chinook shaken by the outside west coast troll fishery (area 1-11,21-27) are estimated to have been reduced by 34% from the base period. This level of reduction is the net result of reduced fishing time (approx. 60% reduction in days open) but increased fishing effort per day. The estimated number of chinook caught and released in the outside troll fishery average 536,000 during 1985 and 1986 fisheries and represents a 1.03:1.0 ratio with chinooks retained. This ratio is an increase from 0.87:1.0 in the 77-82 base period but is attributable to unusually intense fishing during 1985 in area 21, an area of high shaker abundance. A very limited chinook non-retention fishery (5 days in 1985) was the only occurance of such a fishery along the west coast during 1985 and 1986. This limited fishery occurred at the end of the season and was not sampled for encounter rates.

Extensive changes to the Strait of Georgia troll fishery have occurred since the base period. These changes include reduced fishing effort through area licensing, increased size limits in 1983 and 1986, reduced seasons, and extensive periods of chinook non-retention. These changes substantially complicated the assessment of changes in the catch and release of chinooks and resulted in uncertainty about the degree of change that has occurred. The estimated reduction in numbers of chinook hooked and released (including sublegal and legal during non-retention periods) is 64% (range 39-89%) from the base period. The lower bound of the range was the reduction estimated based on chinook hooked and released per day and the upper bound was based on the number of shakers per keeper. The only years with sampling information are 1983 and 1984. Since these years are after

several regulations had been changed, extrapolating back to 1977 is of uncertain validity. The estimation procedures are detailed in the Canadian agency report. A large portion of the reduction in numbers of chinook shaken is likely attributable to the two-area troll licensing implemented in 1981. This regulation reduced the total number of troll days in the Strait of Georgia by 40% immediately following implementation (1981-83 average compared to the 1977-80 average cumulative number of troll days). However, many of the chinooks shaken in 1983 and 1984 were likely retained during the base period because of the small size limit during the base period. Further, the 1985-86 average reduction is alittle misleading since the size limit increased again in 1986. A more realistic evaluation of change since the base period would probably be the average of the 1986 values only, but there is no measurable difference between this value and the previous value (-64%). The average number of chinooks caught and released during 1985 and 1986 troll fisheries (during chinook retention and non-retention periods) was 62,400. Chinooks hooked and released per chinook retained during the 85/86 fisheries was a 1.22:1.0 ratio; compared to an estimated range for the base period of 1.96:1.0 (based on chinooks shaken per chinook kept) to 0.56:1.0 (based on chinooks shaken per day trolling). The numbers of chinook shakers encountered has decreased since the base period but whether there is a higher encounter rate with shakers now than there was during the base period is highly uncertain based on the available data.

Other sources of non-reported impacts (such as catch and escape, or losses due to predators) occur in B.C. troll fisheries, but estimates of their magnitudes are not available. There does not seem to be any reason why these impacts should be greater in 1985 and 1986 than previously.

Regulation changes in the sport fishery have probably increased the numbers of chinook shaken but there has been a trade-off between increasing numbers of shakers and reduced level of catch. The net effect of changes in the sport fishery is probably positive (i.e. reduced total impact) but several counter balancing factors are involved in changes in these fisheries. Unfortunately, the lack of data for portions of the base period prohibits associating much confidence with the suggested direction of change. Our best estimate of the number of chinook shakers per keeper in the largest Canadian recreational fishery (the Strait of Georgia sport fishery) is a 1:1 ratio. The likelihood of a non-reporting bias suggests that this ratios should be considered a minimum value but this bias could be off-set by mis-identification of species shaken if the number of coho shaken exceeds the number of chinooks.

Puget Sound

The evaluation of Puget Sound associated mortality impacts has been confined to presentation of general management trends throughout Puget Sound and, where available, estimates of harvests. These estimates have not been "converted" to mortality estimates since assumed constant rates would be applied to the

catch figures presented here thereby not changing the trends associated with the individual fisheries.

Purse Seine

Associated impacts of Puget Sound purse sein fisheries were directly evaluated by estimating incidental harvests and potential impacts on juvenile chinooks (Shepard, 1987). This analysis indicates that the incidental harvest of chinook salmon in purse seins has been relatively stable between 1976 and 1985. Major, directed purse sein harvests have not occured since 1978 and these fisheries are not likely to be scheduled in the future. There has been a small average (1977-82) incidental average catch of about 800 chinook in eastern Juan de Fuca Strait (Catch Areas 6 and 6A). The trend in this area hs been declining. In northern Puget Sound (San Juan and Point Roberts; Catch Areas 7 and 7A) the average incidental catch has been about 32,000 and the overall trend is also declining. In southern Puget Sound (Catch Areas 8-13) the 1977-82 average incidental catch was approximately 2,500 fish and the 1984-85 average was about 3,500.

An attempt was made to estimate juvenile chinook harvests by purse seins. The available data for making these estimates was quite limited. Consequently, the exact impacts to juvenile chinook remain unknown. However, throughout the analysis conservative choices were made such that the estimates presented below should represent overestiamtes of the real juvenile harvest. With this qualification in mind the analysis indicates that the juvenile chinook catches in the San Juan - Point Roberts Area may have averaged (1977-82) as high as approximately 101,000. Over the last decade the trend has been declining with the 1984-85 average at about 38,000. In the southern Puget Sound area (Catch Areas 8 to 13) the 1977-82 average may have been as high as 46,000 juvenile chinook. The 1984-85 average was approximately 55,000.

Gill-Net

Combined directed and incidental gill net harvests of chinook in Puget Sound have been stable over the last decade. Chinook gill net fisheries in Puget Sound are targeted upon mature adults returning to spawn. During these fisheries juveniles chinook are not heavily harvested due to mesh size restrictions which allow most juvenile chinook to pass through the nests. Gill net fisheries for coho and chum salmon with smaller mesh nets does occur but the bulk of the harvest occuring in terminal areas targeting on health chinook runs and where larges mesh regulations apply. In mixed-stock areas, where the incidental problem would be greatest, the total harvest has ragnged from approximately 22,000 to 52,000 in a year. The general trend has been declining over the last decade. It was not possible to assess juvenile chinook impacts in gill net fisheries.

Recreational Fisheries

The overall trend in Puget Sound recreational fishery chinook harvests and total fishing effort has been decreasing since 1977 (Geist, 1987). No direct data were available to estimate incidental catches associated with these landed catches. These catch and effort trends indicates a declining associated mortality trend if an assumption of stable encounter rates can be made.

Troll Fishery

The Puget Sound troll fishery occurs in Juan de Fuca Strait. There has been an increasing harvest trend in this fishery in recent years and a shift of fishing patterns to more inside areas.

Oregon-Washington Coastal

Non-Treaty troll fishery effort and chinook salmon catch north of Cape Falcon, Oregon have declined significantly in recent years in response to management actions to limit catches of depressed Bonneville Pool hatchery fall chinook salmon stocks and depressed Washington coastal coho salmon stocks. The 1985 - 1986 average chinook salmon catch of 36,600 was only 23% of the base period average catch of 162,100 fish. Troll effort has declined from a base period average of about 36,000 vessel days to a 1985 - 1986 average of only 6,300 vessel days. The 77% reduction from base level catch has significantly reduced induced mortality from release of sublegal chinook salmon asuming no significant shift in the ratio of sublegal to legal encounter rates over time.

A similar pattern for sport and commercial fisheries north of Cape Falcon, Oregon has occurred in recent years. The 1985 - 1986 average chinook salmon catch of 27,300 fish was only 25% of the base period average chinook catch of 109,400 fish. Recreational effort declined from a base level of about 393,000 angler days to a 1985 - 1986 average of only 138,100 angler days. Again, the 75% reduction from the base level catch has significantly reduced induced mortality from the release of sublegal chinook salmon.

Columbia River

Columbia River Gillnet catches during the base period (1977-1982) averaged 169,400 chinook salmon, with the bulk of the catch occurring during the fall. The 1983 - 1984 average catch declined to 92,800 fish in response to management protection provided for depressed returns for upriver bright fall chinook salmon in 1983 and depressed returns of Bonneville Pool hatchery fall chinook salmon in 1983 and 1984. The 1985 - 1986 average catch increased significantly to 213,200 fish as management strategies to target on surplus upriver brights were implemented. No estimates for unobserved encounters (i.e. net dropout) have

been made, but with the increased effort and landings of 1985 - 1986, it is likely that this source of induced mortality has increased somewhat from the base period.

Columbia River sport catch during the base period averaged 37,600 chinook salmon. The 1983 - 1984 average chinook salmon catch increased by 31 % to 49,100 fish, and the 1985 - 1986 average sport catch increased by another 10% to 53,900 fish. The recent sport catch increases are primarly attributable to increased catches of lower river hatchery and upriver bright fall chinook salmon in Buoy 10 fisheries and the initiation of an upriver bright fall chinook salmon fishery in the area above McNary Dam. Since jacks have been legal in the sport catch except in the Buoy 10 area, release of sublegal chinook salmon for the bulk of the fishery (i.e. the area above the Astoria - Megler Bridge) probably has not been a significant factor contributing to induced mortality for most years. The expanding sport fishery in the Buoy 10 area, with a 24 inch minimum size limit and several limited periods of chinook salmon non-retention in recent years, is probably a small source of increased induced mortality from the base period level.

LITERATURE CITED

Geist, D. 1987. Requested Puget Sound sport salmon catch and effort data for the years 1977 - 1986. Washington Department of Fisheries memo to Mike Fraidenburg, 1/17/87.

Shepard, S. 1976 to 1985 Puget Sound Chinook (Oncorhynchus tshawytscha) net catch with regard to Pacific Salmon Treaty obligations. Washigton Department of Fisheries Progress Report Number 251.

Table 1. Qualitative summary of catch and associated induced non-catch encounters.
Quality of information available on induced mortalities and an assessment of the impact of various sources of induced mortalities are indicated.
Qualifiers in each cell are: Rel = reliable data, Uncer. = uncertain quality data, None indicates no data, and N/A indicates the topic is not appropriate to the gear or the situation has not occurred. Trend indicates the direction of change (UP, DOWN, or no change-NCH) or that the direction of change is unknown (UKN).

		TROLL					SPORT					GILLNET					SEINE				
AREA	DATA	CATCH KEPT	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.	UNOBS	CATCH KEPT	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.	UNOBS	CATCH KEPT	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.	UNOBS	CATCH KEPTED	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.	UNOBS
S.E.ALASKA:																					
	DATA QUALITY	Rel	Rel	Rel	None	Rel	Rel	Rel	Rel	None	Rel	Rel	N/A	N/A	None	Rel	Rel	Uncer.	Rel	Uncer	Uncer
	TREND	DOWN	DOWN	UP	UKN	DOWN	UP	UP	UP	UKN	UP	DOWN			UKN	DOWN	UP	UKN	UP	UP	UP
NORTHERN and CENTRAL B.C.:																					
	DATA QUALITY	Rel	Rel	N/A	None	None	Uncer.	None	None	None	None	Rel.	N/A	N/A	None	None	Rel	None	N/A	Uncer.	None
	TREND	DOWN	DOWN		UKN	UKN	Up	UNK	UKN	UKN	UKN	DOWN			UKN	UKN	DOWN	UKN		NCH	UKN
WEST CST. (*) VAN. IS.:																					
	DATA QUALITY	Rel	Rel	N/A	None	None	Uncer.	None	None	None	None	Rel.	N/A	N/A	None	None	Rel	None	N/A	Uncer.	None
	TREND	DOWN	DOWN		UKN	UKN	Up	UNK	UKN	UKN	UKN	DOWN			UKN	UKN	DOWN	UKN		NCH	UKN
GEORGIA (*) ST.:	DATA QUALITY	Rel	Uncer.	Rel	None	None	Rel	Uncer.	None	None	None	Rel.	N/A	N/A	None	None	Rel	None	N/A	Uncer.	None
	TREND	DOWN	DOWN	Up	UKN	UKN	Down	Up	UKN	UKN	UKN	DOWN			UKN	UKN	DOWN	UKN		NCH	UKN
PUGET SD.:		SUMMARY YET TO BE PROVIDED																			
	DATA QUALITY																				
	TREND																				
WEST CST. WASHINGTON:		SUMMARY YET TO BE PROVIDED																			
	DATA QUALITY																				
	TREND																				
COLUMBIA R.:	DATA QUALITY	SUMMARY YET TO BE PROVIDED																			
	TREND																				

(*) Georgia Strait catch area includes net fisheries in Johnstone Strait and the West Coast catch area includes net fisheries in Juan de Fuca.

Table 2. Estimated catch and associated non-reported catch in west salmon fisheries impacting chinook salmon along the Pacific west coast. Blanks in the table indicate that quantitative estimates of the induced mortality area not available. BP = base period (1977-1982).

AREA	PERIOD	TROLL				SPORT				GILLNET				SEINE			
		CATCH KEPT	CATCH SUB-LEGAL	RELEASED LEGAL	CATCH NON-REPT.	UNOBS	CATCH KEPT	CATCH SUB-LEGAL	RELEASED LEGAL	CATCH NON-REPT.	UNOBS	CATCH KEPT	CATCH SUB-LEGAL	RELEASED LEGAL	CATCH NON-REPT.	UNOBS	CATCH KEPTED	CATCH SUB-LEGAL	RELEASED LEGAL	CATCH NON-REPT.	UNOBS
S.E.ALASKA:																					
	BP	298,257	301,000	17,888			17,754					12,154					13,912		0		
	1983-84	247,049	190,920	81,000			21,599					8,666					17,179		0		
	1985-86	211,308	169,867	91,125			22,304					10,853					18,227		18,206		
NORTHERN and CENTRAL B.C.:																					
	BP	252,225	174,566	0								26,800			10,100		43,900			33,100	
	1983-84	265,794	270,710	0								9,200			6,300		22,400			22,400	
	1985-86	208,272	200,757	0								22,100			9,500		27,050			36,700	
WEST CST.(*) VAN. IS.:																					
	BP	500,327	478,960	0								26,400			8,600		10,700			31,300	
	1983-84	422,838	442,590	0								41,145			3,510		2,700			11,100	
	1985-86	345,825	368,680	0								10,950			7,185		13,020			34,085	
GEORGIA (*) ST.:	BP	23,600	297,200	0			332,400	332,400				48,600			7,600		31,600			16,700	
	1983-84	96,800	78,100	0			283,900	283,900				21,650			11,750		20,400			21,900	
	1985-86	50,900	53,600	8,800			208,600	208,600				35,050			4,050		25,200			4,800	
PUGET SD.:																					
	BP																				
	1983-84																				
	1985-86																				
WEST CST. WASHINGTON:																					
	BP																				
	1983-84																				
	1985-86																				
COLUMBIA R.:	BP																				
	1983-84																				
	1985-86																				

(*) Georgia Strait catch area includes catch in the Johnstone Strait net fisheries, and West Coast catch area includes the net fisheries in Juan de Fuca

Table 1. Qualitative summary of catch and associated induced non-catch encounters.
Quality of information available on induced mortalities and an assessment of the impact of various sources of induced mortalities are indicated.
Qualifiers in each cell are: Rel = reliable data, Uncer. = uncertain quality data, None indicates no data, and N/A indicates the topic is not appropriate to the gear or the situation has not occurred. Trend indicates the direction of change (UP, DOWN, or no change-NCH) or that the direction of change is unknown (UKN).

		TROLL					SPORT					GILLNET					SEINE				
AREA	DATA	CATCH KEPT	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.	UNOBS	CATCH KEPT	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.	UNOBS	CATCH KEPT	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.	UNOBS	CATCH KEPTED	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.	UNOBS
S.E.ALASKA:	DATA QUALITY	Rel	Rel	Rel	None	Rel	Rel	Rel	Rel	None	Rel	Rel	N/A	N/A	None	Rel	Rel	Uncer.	Rel	Uncer	Uncer
	TREND	DOWN	DOWN	UP	UKN	DOWN	UP	UP	UP	UKN	UP	DOWN			UKN	DOWN	UP	UKN	UP	UP	UP
NORTHERN and CENTRAL B.C.:	DATA QUALITY	Rel	Rel	N/A	None	None	Uncer.	None	None	None	None	Rel.	N/A	N/A	None	None	Rel	None	N/A	Uncer.	None
	TREND	DOWN	DOWN		UKN	UKN	Up	UNK	UKN	UKN	UKN	DOWN			UKN	UKN	DOWN	UKN		NCH	UKN
WEST CST. (*) VAN. IS.:	DATA QUALITY	Rel	Rel	N/A	None	None	Uncer.	None	None	None	None	Rel.	N/A	N/A	None	None	Rel	None	N/A	Uncer.	None
	TREND	DOWN	DOWN		UKN	UKN	Up	UNK	UKN	UKN	UKN	DOWN			UKN	UKN	DOWN	UKN		NCH	UKN
GEORGIA (*) ST.:	DATA QUALITY	Rel	Uncer.	Rel	None	None	Rel	Uncer.	None	None	None	Rel.	N/A	N/A	None	None	Rel	None	N/A	Uncer.	None
	TREND	DOWN	DOWN	Up	UKN	UKN	Down	Up	UKN	UKN	UKN	DOWN			UKN	UKN	DOWN	UKN		NCH	UKN
PUGET SD.:		SUMMARY YET TO BE PROVIDED																			
	DATA QUALITY																				
	TREND																				
WEST CST. WASHINGTON:		SUMMARY YET TO BE PROVIDED																			
	DATA QUALITY																				
	TREND																				
COLUMBIA R.:		SUMMARY YET TO BE PROVIDED																			
	DATA QUALITY																				
	TREND																				

(*) Georgia Strait catch area includes net fisheries in Johnstone Strait and the West Coast catch area includes net fisheries in Juan de Fuca.

Table 2. Estimated catch and associated non-reported catch in west salmon fisheries impacting chinook salmon along the Pacific west coast. Blanks in the table indicate that quantitative estimates of the induced mortality area not available. BP = base period (1977-1982).

		TROLL				SPORT				GILLNET				SEINE			
AREA	PERIOD	CATCH KEPT	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.	CATCH KEPT	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.	CATCH KEPT	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.	CATCH KEPTED	CATCH RELEASED SUB-LEGAL	CATCH RELEASED LEGAL	CATCH NON-REPT.
S.E.ALASKA:																	
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	1985-86	211,308	169,867	91,125		22,304				10,853				18,227		18,206	
NORTHERN and CENTRAL B.C.:																	
	BP	252,225	174,566	0						26,800		10,100		43,900			33,100
	1983-84	265,794	270,710	0						9,200		6,300		22,400			22,400
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	1985-86	345,825	368,680	0						10,950		7,185		13,020			34,085
GEORGIA (*) ST.:	BP	23,600	297,200	0		332,400	332,400			48,600		7,600		31,600			16,700
	1983-84	96,800	78,100	0		283,900	283,900			21,650		11,750		20,400			21,900
	1985-86	50,900	53,600	8,800		208,600	208,600			35,050		4,050		25,200			4,800
PUGET SD.:	BP																
	1983-84																
	1985-86																
WEST CST. WASHINGTON:	BP																
	1983-84																
	1985-86																
COLUMBIA R.:	BP																
	1983-84																
	1985-86																

(*) Georgia Strait catch area includes catch in the Johnstone Strait net fisheries, and West Coast catch area includes the net fisheries in Juan de Fuca