

**PACIFIC SALMON COMMISSION
JOINT CHINOOK TECHNICAL
COMMITTEE REPORT**

**DESCRIPTION OF CALIBRATION
PROCEDURES & RESULTS OF MAY 1997
CALIBRATION OF THE PSC
CHINOOK MODEL
REPORT TCCHINOOK (97)-2**

June 27, 1997

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List of Acronyms with Definitions

ADF&G	Alaska Department of Fish & Game	NPS	North Puget Sound
BC	British Columbia	NR	Not Representative
CBC	Central British Columbia - Kitimat to Cape Caution	NWIFC	Northwest Indian Fisheries Commission
CDFO	Canadian Department of Fisheries & Oceans	ODFW	Oregon Department of Fish & Wildlife
CNR	Chinook Nonretention - all species except chinook fisheries	OR	Oregon
CRITFC	Columbia River Intertribal Fish Commission	PFMC	Pacific Fisheries Management Council
CTC	Chinook Technical Committee	PNV	Proportion Non-Vulnerable
CWT	Coded Wire Tag	PS	Puget Sound
GS	Strait of Georgia	PSC	Pacific Salmon Commission
IDFG	Idaho Department of Fish & Game	PSMFC	Pacific States Marine Fisheries Commission
IDL	InterDam Loss	QIN	Quinault Nation
MSY	Maximum Sustainable Yield for a stock, in adult equivalents	SEAK	Southeast Alaska - Cape Suckling to Dixon Entrance
NA	Not Available	SPFI	Stratified Proportional Fishery Index
NBC	Northern British Columbia - Dixon Entrance to Kitimat including Queen Charlotte Islands	SSRAA	Southern Southeast Region Aqualculture Association
NCBC	North Central British Columbia - Dixon Entrance to Cape Caution	USFWS	U.S. Fish & Wildlife Service
NMFS	National Marine Fisheries Service	WCVI	West Coast Vancouver Island - excluding Area 20
		WDFW	Washington Department of Fisheries and Wildlife

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INTRODUCTION

This annual calibration report describes calibration procedure for the Pacific Salmon Commission (PSC) Chinook Model and summarizes the results of the May 1997 calibration (9702). The calibration process estimates the abundance (or cohort size) of the 30 model stocks. The abundances for broods that contributed to catch and escapement for the years 1979 through 1996 are estimated from historical time series of catch by fishery, and stock-specific estimates of escapement, terminal runs, hatchery production, and coded-wire-tag (CWT) recoveries. In addition, 1997 cohort abundances are estimated using preseason forecasts provided by management agencies or model estimates of average survival rates.

This report includes:

- (1) estimates of the abundance indices for the years 1979 through 1997 for the Southeast Alaska (SEAK) troll, North/Central British Columbia (NCBC) troll, West Coast Vancouver Island (WCVI) troll, Strait of Georgia (GS) troll and sport, Washington/Oregon (WA/OR) Ocean sport and troll, and North Puget Sound (NPS) sport fisheries;
- (2) estimates of stock composition of total fishing mortality in the SEAK troll, NCBC troll, WCVI troll, and GS sport and troll fisheries; and
- (3) for each stock, the percent of total fishing mortality occurring in the SEAK all gear, NCBC all gear, the WCVI troll, and GS sport and troll fisheries.

Calibration 9702 will remain unchanged, but other calibrations may be done to update the model as improved forecasts of abundance and/or model enhancements are identified.

CALIBRATION DATA AND PROCEDURES

This section of the report describes the calibration data and procedures. For reference, a list of stocks and fisheries in the current version of the PSC Chinook Model is shown in Appendix A. Names, dates, and times of all input files are provided in Appendix B.

Each calibration relies upon two files with parameter estimates for the model base period (1979 through 1981). The .STK file includes base period exploitation rates, maturation rates, and adult equivalent factors (see Appendix C), while the .BSE file includes the base period Ricker stock-recruit parameters, escapement goals, and terminal fishery flags. Estimation of the model base period parameters is discussed in detail in the model documentation (Analytic Work Group 1991).

Calibration Data

The first step in the annual calibration process is to gather new or revised data and update the appropriate model input files. The frequency of updates depends on the frequency of data changes made by the reporting agencies, the magnitude of the change, and the significance of the change to the current model application. For example, since hatchery production has little effect on abundance in the year of release, the hatchery release data in the .ENH file are usually updated only once per year. Conversely, the file containing runsize data is updated repeatedly each year since abundance predictions are sensitive to preseason forecasts and postseason estimates of terminal runs. Months in which forecasts are made for each stock, and the month when the final return estimate becomes available are presented in Table 1.

The model is usually recalibrated annually to incorporate data from the previous year and available abundance forecasts. In addition, recalibration may also occur when significant changes in one or more of the following model input files are made to the input data set for a year that would affect the calibration results.

CEI (ceiling). This file contains historical catch data for the 17 fisheries that are modeled as ceiling or catch quota fisheries (as opposed to fisheries modeled through control of exploitation rates) through the most recent fishing season (see Appendix D).

CNR (chinook nonretention). Data used by the model to estimate mortalities during CNR periods are read from the .CNR file (see Appendix G). The data included depends on which of the three available options are used to model CNR: (1) encounters during the CNR period; (2) fishing effort in the CNR period relative to the retention period; and (3) exploitation rates in the retention period relative to the model base period.

ENH (enhancement file). This file contains productivity parameters and smolt production for the 13 hatchery stocks and one natural stock with supplementation (Appendix F). Smolt production is expressed as the deviation from the production during the model base period; as a result, production can be negative if a release in a given year is less than during the model base period. Additional discussion of the productivity parameters may be found in the model documentation (Analytic Work Group 1991).

FCS (forecast). Postseason estimates of terminal run sizes or escapements and agency supplied preseason forecasts (Table 2) are included in the .FCS file (Appendix E). Age-specific forecasts are used for those stocks and years for which data are available.

FP (fishery policy). This random access file contains fishery-stock-age-specific scalars to be applied to base period fishery exploitation rates (see Appendix H). The FPs can be used for a variety of purposes. For example, in the WA/OR troll fishery, the FPs are used to model the differential impacts on Columbia River and Puget Sound stocks as the proportion of the catch occurring in the Strait of Juan de Fuca varies. In most instances, the FPs are used to scale fishery exploitation rates relative to the model base period. The source of the FPs may be the fishery index computed from CWT data in the annual exploitation rate analysis (e.g., the

Table 1. Months of availability for postseason estimates of abundance for the return in the previous year and the forecast of abundance for the next fishing year.

Model Stock	Month Final Return Estimate Available	Month(s) Forecast Available	Age Specific
Alaska South SE	February	NA	Yes
North/Central BC	November	NA	No
Fraser Early	November	NA	No
Fraser Late ¹	February	February	Yes
WCVI Hatchery	January	February	Yes
WCVI Natural ²	January	February	Yes
Upper Strait of Georgia ³	January	NA	Yes
Lower Strait of Georgia Natural ²	December	NA	Yes
Lower Strait of Georgia Hatchery ³	December	NA	Yes
Nooksack Fall	June	February	Yes
Puget Sound Fall Fingerling	June	February	Yes
Puget Sound Natural Fall	June	February	Yes
Puget Sound Fall Yearling	June	February	Yes
Nooksack Spring	June	NA	No
Skagit Summer/Fall Wild	June	February	Yes
Stillaguamish Summer/Fall Wild	June	February	Yes
Snohomish Summer/Fall Wild	June	February	Yes
WA Coastal Fall Hatchery	June	NA	Yes
Columbia Upriver Bright	April	Dec, Feb, Apr	No, Yes, Yes
Spring Creek Hatchery	April	Dec, Feb, Apr	No, Yes, Yes
Lower Bonneville Hatchery	April	Dec, Feb, Apr	No, Yes, Yes
Fall Cowlitz Hatchery	April	Dec, Feb, Apr	No, Yes, Yes
Lewis River Wild	April	Dec, Feb, Apr	No, Yes, Yes
Willamette Spring Hatchery	June	December	Yes
Spring Cowlitz Hatchery	June	December	Yes
Columbia River Summer	September	March	No
Oregon Coastal Fall North Migrating	February	February	Yes
WA Coastal Fall Wild	June	NA	Yes
Snake River Wild Fall	April	Feb, Apr	No, No
Mid-Columbia River Bright Hatchery	April	Dec, Feb, Apr	No, Yes, Yes

¹Forecast is for the Harrison River.

²Forecast for natural stock is associated with hatchery stock.

³Forecasts for the Big Qualicum and Quinsam are under development.

Table 2. The 1997 agency supplied escapement and terminal run forecasts assuming the average preterminal exploitation rates in the years in the forecast database. Dash indicates forecast not available.

Model Stock	Type of Prediction	Age 3	Age 4	Age 5	Total Return
Alaska South SE	Escapement	-	-	-	-
North/Central BC	Terminal Run	-	-	-	-
Fraser Early	Terminal Run	-	-	-	-
Fraser Late	Escapement	44,750	32,850	2,440	80,040
WCVI Hatchery and Natural	Terminal Run	17,382	93,028	8,926	119,336
Upper Strait of Georgia	Escapement	-	-	-	-
Lower Strait of Georgia Natural	Escapement	-	-	-	-
Lower Strait of Georgia Hatchery	Escapement	-	-	-	-
Nooksack Fall	Terminal Run	-	-	-	34,000
Puget Sound Fall Fingerling and Yearling	Terminal Run	-	-	-	78,735
Puget Sound Natural Fall	Terminal Run	-	-	-	19,041
Nooksack Spring	Escapement	-	-	-	-
Skagit Summer/Fall Wild	Terminal Run	643	3,722	1,992	6,357
Stillaguamish Summer/Fall Wild	Escapement	-	-	-	928
Snohomish Summer/Fall Wild	Terminal Run	-	-	-	5,200
Columbia Upriver Bright	Terminal Run	10,100	107,000	49,300	166,400
Spring Creek Hatchery	Terminal Run	14,100	7,600	200	21,900
Columbia River Summer	Escapement	-	-	-	16,700
Lower Bonneville and Fall Cowlitz Hatchery	Terminal Run	25,300	26,200	2,700	54,200
Lewis River Wild	Terminal Run	100	3,100	4,300	7,500
Willamette Spring Hatchery	Terminal Run	-	-	-	30,000
Spring Cowlitz Hatchery	Terminal Run	2,400	2,100	100	4,600
Oregon Coastal	Escapement	3,035	41,093	19,283	63,411
Washington Coastal Fall Wild	Terminal Run	-	-	-	-
Washington Coastal Fall Hatchery	Terminal Run	-	-	-	-
Snake River Wild Fall	Escapement	-	-	-	506
Mid-Columbia Bright Hatchery	Terminal Run	4,000	53,200	14,900	72,100

WCVI troll fishery in the years 1983 and 1984), or ratios of harvest rates computed from terminal area run reconstructions (e.g., Columbia River and Puget Sound net fisheries).

IDL (interdam loss). The .IDL file contains stock-specific conversion factors for the Columbia River Summer, Columbia Upriver Bright, and Snake River Fall stocks provided each year by Columbia River fishery managers. The factors represent the fraction of the stock that can be accounted for after mainstem dam passage in the Columbia River; losses can be attributed to direct mortality at the various dams, mortality in the reservoirs between dams, fallbacks, and other factors. The interdam loss factor is equal to one minus the conversion factor. A complete listing of the conversion factors used in the model is provided in Appendix I.

MAT (maturity and adult equivalent factors). Estimates of annual maturation rates and adult equivalent factors for the 11 stocks with a continuous series of CWT data are stored in the .MAT file (Appendix O). The file is updated each year with rates obtained from the annual exploitation rate analysis. The average value is used for years beyond the last year for which estimates are available (due to incomplete broods and the one year lag for completion of the annual exploitation rate analysis).

PNV (proportion nonvulnerable). A .PNV file is created for each fishery for which a size limit change has occurred since the model base period (Appendix J). Each file contains age-specific estimates of the proportion of fish not vulnerable to the fishing gear or smaller in length than the minimum size limit. The PNVs were estimated from empirical size distribution data; in some instances, independent surveys of encounter rates were used to adjust the PNV for age 2 fish to account for the proportion of the cohort that was not vulnerable to the fishing gear.

STK (stock). This file contains base period exploitation rates on the total cohort in mixed maturity fisheries, exploitation rates on mature fish, maturation schedules, and adult equivalent factors (Appendix C). This file is updated as new stocks are added, or new CWT tag codes are used to represent distribution patterns of existing model stocks.

A calibration run is initiated with an .OP6 file that specifies input files, calibration methods, and the desired output reports. A detailed description of the .OP6 file can be found in the user's manual for the model (Analytic Work Group 1994).

Calibration Procedures

Using fishery catches, terminal runs (or escapements), and the other data discussed above, the calibration uses an iterative algorithm to estimate the stock productivity scalars for each brood year and model stock. The stock productivity scalars account for the annual variability in natural mortality in the initial year of ocean residence. They are multiplied by the initial recruitment resulting from the brood year escapements and the base period spawner-recruit function. The stock productivity scalars also adjust for biases resulting from errors in the data or assumptions used to estimate the base period parameters for the spawner-recruit function.

The stock productivity scalars are estimated through the following steps:

- (1) Predicted terminal runs are computed for each year using the input files discussed above and with values of all stock productivity scalars set equal to 1.
- (2) The ratio (S_{by}) of the estimated terminal run and model predicted terminal run is computed for each brood year. For example, if the estimated and model predicted terminal runs for the 1979 brood were 900 and 1,500 age 3 fish in 1982, 4,000 and 4,500 age 4 fish in 1983, and 1,000 and 1,500 age 5 fish in 1983, the ratio would be computed as:

$$S_{by} = \frac{\sum_{Age} (\text{Estimated Terminal Run})_{Age}}{\sum_{Age} (\text{Model Predicted Terminal Run})_{Age}}$$

$$S_{by} = \frac{900 + 4000 + 1000}{1500 + 4500 + 1500}$$

In the absence of age-specific estimates of the terminal run, the components are computed by multiplying the total terminal run by the model predictions of age composition.

- (3) The stock productivity scalar (EV) for iteration n and brood year by is computed as:

$$EV_{n, by} = EV_{n-1, by} \times S_{by}$$

- (4) Steps 1-3 are repeated until the absolute change in the stock productivity scalars for all stocks is less than a predetermined tolerance level.

Several options for the calibration are provided in the .OP6 file. The options include the brood years for which the stock productivity scalars are estimated in each iteration and the type of the convergence test. For the 1997 calibration, stock productivity scalars were estimated for each brood year in each iteration. Convergence was defined to occur when the absolute value of the difference in stock productivity scalars between successive iterations did not exceed 0.05. Additional discussion of the calibration options can be found in the user's manual (Analytic Work Group 1994).

Stock-specific calibration options are specified in the .FCS file and discussed below:

Minimum Number of Age Classes. Data for all age classes will not be available when the stock productivity scalars are estimated for recent broods. In the 1997 calibration, for example, estimates of the age 4 and 5 terminal run for the 1994 brood were not available. Since considerable uncertainty may exist in a single data point,

application of the calibration algorithm can be restricted to cases in which a specific minimum number of age classes are present.

Minimum Age. Considerable uncertainty often exists in the estimates of terminal runs or escapements for younger age classes, particularly age 2. The minimum age class to include in the calibration algorithm is included in the .FCS file.

Estimation of Age Composition. Age-specific estimates of the terminal run or escapement may not be available. An option is provided to estimate the age composition using base period maturation and exploitation rates.

As discussed previously, the objective of the calibration is to estimate the abundance of each stock prior to the initiation of fishing. However, the forecasts provided by the management agencies for 1997 were typically for terminal runs or escapements. Since the forecasts implicitly include exploitation in preterminal fisheries, the expansion of the forecasts to total cohort size should be made using the average exploitation rate for the period of years in the forecast database.

The 1997 calibration was completed in two stages to facilitate computation of the average exploitation rates and incorporation of the agency forecasts. The Stage 1 calibration provided initial estimates of exploitation rates and cohort abundance for fishing years 1982 through 1996 using updated catch and escapement data for 1996. Average exploitation rates were then computed and used as input values for 1997 fisheries in the Stage 2 calibration.

The average exploitation rate scale factors (FP^*) for each model fishery were obtained from the Stage 1 calibration using the following formula:

$$FP^* = \frac{\sum_{y=s}^e RT_y \times FP_y}{(e - s)}$$

where

s : start year for average;

e : end year for average;

RT_y : ratio of the catch quota in the current year to the catch that would be predicted given current abundance, current size limits, and base period exploitation rates.

The range of years used to compute the average varied between fisheries, and depended upon the predominant stocks contributing to the fishery (Appendix N).

The input files used in the Stage 2 calibration were identical to those used in Stage 1 with two exceptions: (1) the average exploitation rate scale factors for each fishery were inserted into the .FP file for 1997; and (2) the stock productivity scalars estimated in the Stage 1 calibration were used as starting values for the Stage 2 calibration.

MODEL AND DATA CHANGES

The types and values of data used in the 1997 calibration were similar to those used in 1996 with the following exceptions:

- (1) the 1996 calibration had an erroneous value for the Cowlitz Fall Hatchery stock for the age 3 terminal run in 1987;
- (2) FPs were computed relative to the model base period (1979 through 1981) rather than the base period for the exploitation rate analysis (1979 through 1982).

The effects of these changes on model estimates are discussed in the Calibration Results section of this report.

Discrepancies between age composition estimates in the SEAK troll fishery based on the PSC Chinook Model and estimates based on aging fish scales were identified by the CTC. While no improvements were made to the May 1997 calibration to adjust for the discrepancies, work was done by the Model Improvement Subgroup to explore possible explanations for the discrepancies. A description of the progress to date is in Appendix L.

Relative to the 1996 calibration, no changes were made to the model code that affected calibration results.

MODEL CALIBRATION EVALUATION

To examine the appropriateness of a calibration, several results are examined:

- (1) accuracy of the reconstructed catches in the fisheries (these values may consistently differ from the actual catches if the calibration is not able to recreate the actual catches in the years 1979 through 1984, the model years prior to implementation of the ceiling algorithm);
- (2) accuracy of terminal runs or escapements compared to the data used for calibration of each stock;
- (3) comparison of age structure in terminal runs or escapements with data used for calibration (consistent biases in age structure are addressed by changing maturation rates);
- (4) patterns in the stock productivity scalars compared with marine survival patterns generated by the annual exploitation rate analysis based on CWT data;
- (5) comparison of CWT and model estimates of fishery harvest rate indices; and
- (6) comparison of model estimates with mortality distributions for individual stocks generated from the annual CWT-based exploitation rate analysis.

Calibration usually involves an iterative process until a judgment is made that an acceptable fit to all the data has been achieved. This decision is not based on any quantitative assessment of model fit, but more usually involves a trial-and-error process. The determination of whether or not further iterations are necessary is based principally on the significance of deviations from observed or estimated values for stocks and fisheries most relevant to the issues to be evaluated and on the time constraints established for completion of the calibration.

The ability of the present calibration 9702 to estimate the observed catches and escapements can be summarized by calculating the average deviations of the model estimates from the observed values (Table 3 for the fisheries that are modeled as operating under catch ceilings or quotas for past years, and Table 4 for terminal run size/escapements by model stocks.).

The model does not estimate catches with equal accuracy in every fishery. This may reflect inadequate representation of the stocks by base period tag data or may reflect errors in the estimation of initial stock abundances used to initiate the model. This has been a consistent problem for certain fisheries, notably: CBC troll, NCBC sport, NBC nets, and South PS sport fisheries. The effect of these deviations depends on the direction of the error (over or under estimation), magnitude of the catches, and the stocks involved in each fishery.

Table 3. Average proportion of observed catch accounted for by model calibration 9702 during 1979 through 1996.

Model Fishery	Model Catch as Proportion of Observed Catch
Southeast Alaska Troll	0.99
Northern BC Troll	1.02
Central BC Troll	1.51
West Coast Vancouver Island Troll	0.99
Washington/Oregon Ocean Troll	1.26
Strait of Georgia Troll	0.85
Southeast Alaska Net	0.87
Northern BC Net	0.70
Central BC Net	1.09
Puget Sound North Net	0.77
Southeast Alaska Sport	1.02
North/Central BC Sport	1.57
West Coast Vancouver Island Sport	0.95
Washington/Oregon Ocean Sport	0.90
Puget Sound North Sport	0.84
Puget Sound South Sport	0.64
Strait of Georgia Sport	1.18

The ability of the model to estimate escapements and terminal run sizes varies between stocks. The last four columns of Table 4 present summary statistics on the fit achieved by calibration 9702. The column entitled “Avg Fit” represents the 1979-1996 average ratio between the model-generated estimate and reported values. On average, the model is able to accurately estimate the observed terminal run or escapements used in the calibration process. The column entitled “SD” is the standard deviation of the ratios between model estimates and reported values. The variability in these annual estimates differs between stocks. These problems tend to be greatest in stocks without age-specific data or in stocks with highly variable marine survivals. Since these concerns are not consistently related to specific stocks, the most likely impacts are annual variations in age-specific survival rates, maturation rates, and fishing patterns.

The columns entitled “Min” and “Max” present the extreme ranges of annual fits from 1979 through 1996. The minimum column (Min) represents the smallest proportion of the reported value estimated by the model. The maximum column (Max) represents the largest ratio between the estimated value and the model estimate. The significance of these deviations depends upon the questions being evaluated. For example, a large deviation for a stock during the first few years of the calibration or a stock that has a minor impact on a fishery of concern may not necessitate further calibration iterations.

During the calibration process, model results are also evaluated against independent information. For example, total mortality fishery indices generated by calibration 9702 and the CWT-based exploitation rate analysis were compared. Examples of comparisons of SEAK troll, NCBC troll, WCVI troll, and the combined GS sport and troll fisheries are presented in figs. 5 through 8, respectively. The primary focus of evaluation with respect to fishery indices is the pattern, especially in recent years, rather than the magnitude.

- (1) For the SEAK troll fishery, the model and CWT-based fishery indices exhibit similar patterns. Model-based fishery indices are consistently lower than the CWT-based fishery index. This suggests a scaling problem with initial cohort sizes used to initialize the model being too small for some stocks contributing to this fishery.
- (2) For the NCBC troll fishery, model and CWT-based fishery indices exhibit similar patterns since 1986.
- (3) CWT and model-based fishery indices for the WCVI troll fishery begin to differ substantially in 1992. This deviation is related to the 1992 and 1993 FP factors employed for this fishery to reflect late-season targeting on WCVI chinook stocks. Future calibrations will involve an effort to improve the consistency of CWT and model-based estimates of WCVI fishery indices (see Appendix M).
- (4) Model and CWT-based estimates of the fishery index for the GS combined sport and troll differ substantially since 1993. The cause is unclear at this time, but two primary factors are suspected. The small number of tags recovered in these

fisheries in recent years severely affects the basis and variability of the index produced through CWT analysis. The CWT index is dominated by three stock groups, Big Qualicum, Puntledge, and Samish. Exploitation patterns of these stocks may not be representative of impacts throughout the GS. The Big Qualicum and Puntledge stocks are known to be primarily harvested by fisheries in the northern Strait of Georgia. The Samish stock is likely impacted by fisheries in the Strait of Juan de Fuca/Victoria area; further, data for age 3 and 4 fish from this stock during the 1979-1982 base period is available for only a single year. Secondly, there is no CWT indicator stock for the Fraser Late stock, a major contributor to fisheries in GS.

Table 4. Comparison of model calibration results with estimated terminal run sizes or escapements during 1979 through 1996 (Avg Fit is the average ratio of the model estimate to the estimated value; SD is the standard deviation of the ratios between model estimates and reported values; Min and Max are the smallest and largest proportions of the reported value estimated by the model).

Model Stock	Calibration Type	Avg Fit	SD	Min	Max
Alaska South SE	Escapement	1.03	0.17	0.73	1.29
Northern/Central BC	Term. Run	1.01	0.09	0.92	1.28
Fraser Early	Term. Run	1.01	0.10	0.88	1.15
Fraser Late	Escapement	1.01	0.13	0.84	1.30
WCVI Hatchery & Natural	Term. Run	1.04	0.22	0.66	1.46
Upper Strait of Georgia	Escapement	1.11	0.37	0.74	2.26
Lower Strait of Georgia Natural	Escapement	1.05	0.24	0.70	1.48
Lower Strait of Georgia Hatchery	Term. Run	1.01	0.15	0.76	1.48
Nooksack Fall	Term. Run	1.04	0.15	0.78	1.27
Puget Sound Fall Fingerling & Yearling	Term. Run	1.02	0.12	0.80	1.21
Puget Sound Natural Fall	Term. Run	1.03	0.16	0.80	1.30
Nooksack Spring	Escapement	1.06	0.22	0.86	1.56
Skagit Summer/ Fall Wild	Term. Run	1.01	0.12	0.82	1.18
Stillaguamish Summer/Fall Wild	Escapement	1.06	0.24	0.73	1.70
Snohomish Summer/Fall Wild	Term. Run	1.01	0.12	0.81	1.19
Washington Coastal Fall Hatchery	Term. Run	1.03	0.14	0.81	1.32
Columbia Upriver Bright	Term. Run	1.01	0.15	0.72	1.23
Spring Creek Hatchery	Term. Run	1.00	0.08	0.81	1.18
Lower Bonneville Hatchery & Fall Cowlitz Hatchery	Term. Run	1.00	0.24	0.55	1.45
Lewis River Wild	Term. Run	1.02	0.14	0.76	1.23
Willamette Spring Hatchery	Term. Run	1.00	0.11	0.84	1.24
Spring Cowlitz Hatchery	Term. Run	1.02	0.16	0.71	1.29
Columbia River Summer	Escapement	1.01	0.09	0.88	1.24
Oregon Coastal Fall North Migrating	Escapement	1.01	0.24	0.72	1.78
Washington Coastal Fall Wild	Term. Run	1.03	0.15	0.84	1.40
Snake River Wild Fall	Escapement	1.11	0.55	0.58	2.90
Mid-Columbia River Bright Hatchery	Term. Run	1.04	0.17	0.87	1.49

**Model and CWT-Based Total Mortality
Fishery Index for SEAK Troll**

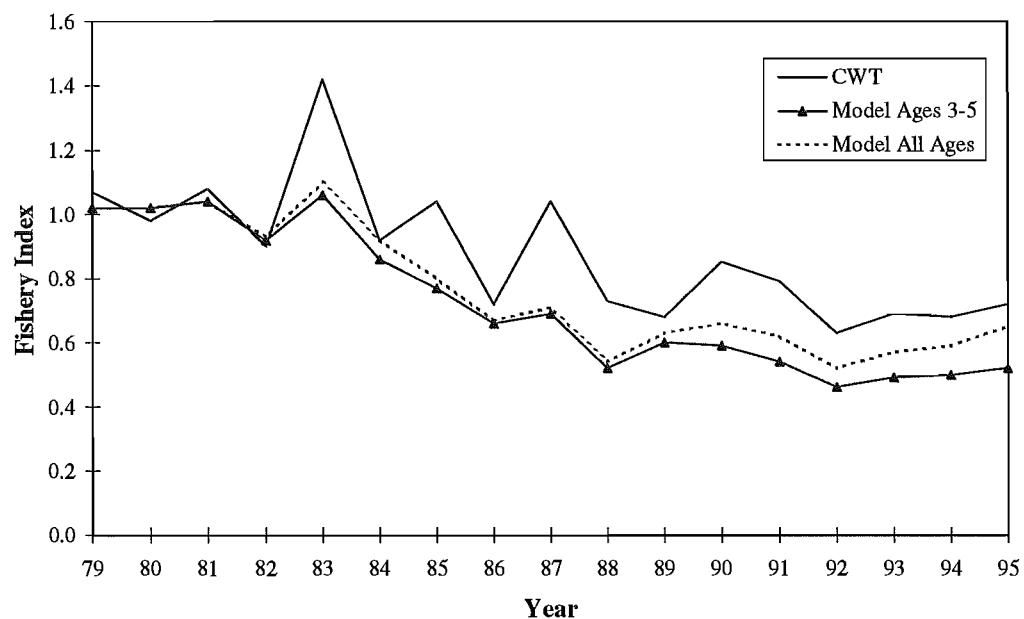


Figure 1. Comparison of model-generated and CWT-based total mortality fishery indices for the SEAK troll fishery.

**Model and CWT-Based Total Mortality
Fishery Index for North/Central BC Troll**

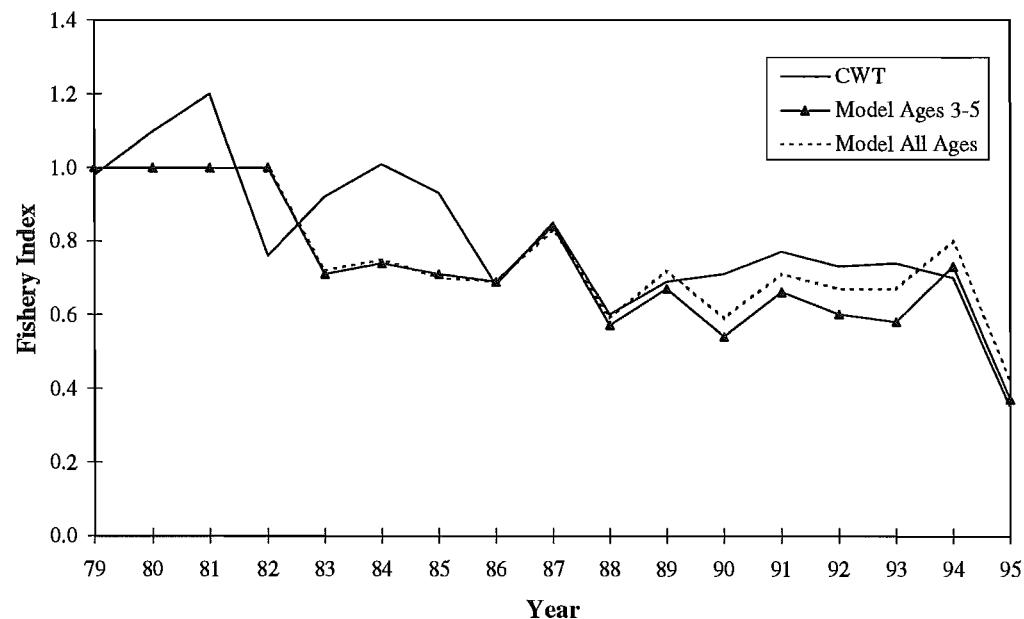


Figure 2. Comparison of model-generated and CWT-based total mortality fishery indices for the NCBC troll fishery.

Model and CWT-Based Total Mortality Fishery Index for WCVI Troll

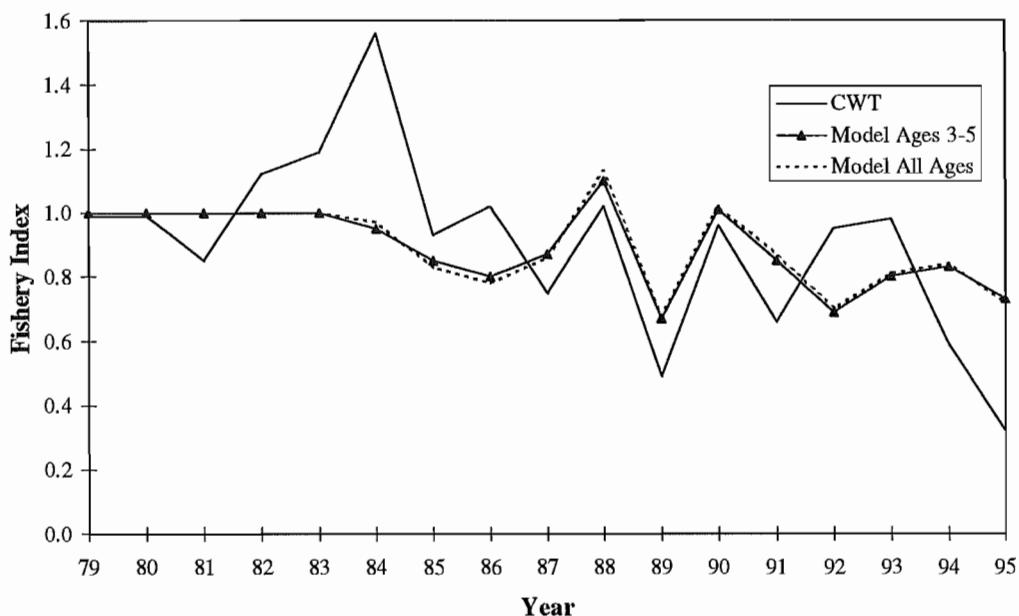


Figure 3. Comparison of model-generated and CWT-based total mortality fishery indices for the WCVI troll fishery.

Model and CWT-Based Total Mortality Fishery Index for Strait of Georgia Sport and Troll

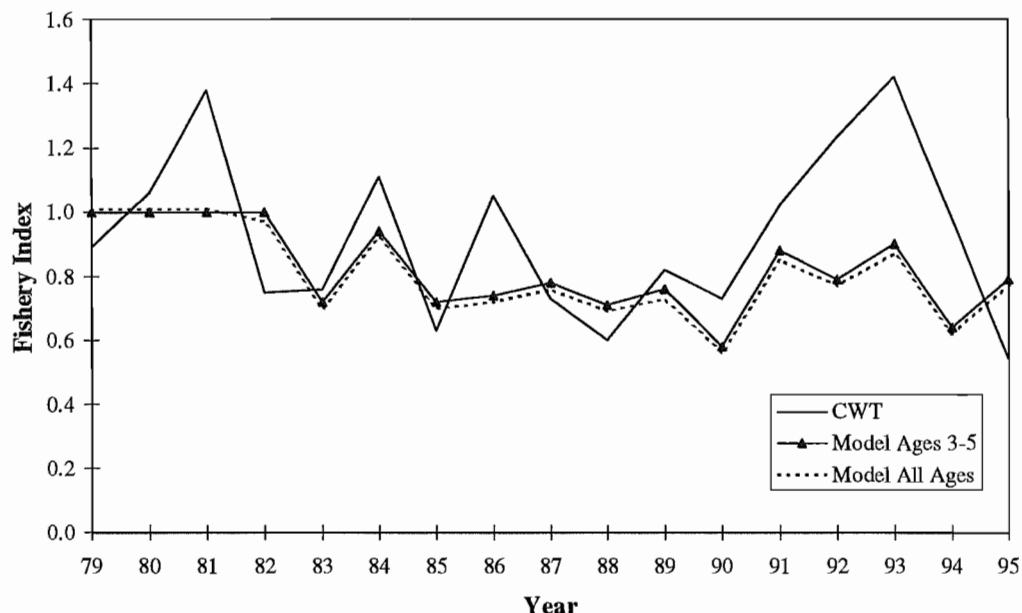


Figure 4. Comparison of model-generated and CWT-based total mortality fishery indices for the GS combined sport and troll fisheries.

CALIBRATION RESULTS

Abundance Indices

An abundance index (A) provides a measure of the number of fish larger than the size limit available to a fishery assuming a geographic distribution for each model stock identical to that in the model base period (Analytic Work Group 1989). It is expressed relative to the years 1979 through 1982, and computed as follows:

$$A_{f,y} = \frac{\sum_s \sum_a C_{s,a,y} \times U_{s,a,f} \times (1 - PNV_{a,f})}{\sum_s \sum_a C_{s,a,b} \times U_{s,a,f} \times (1 - PNV_{a,f})}$$

where

$C_{s,a,y}$: cohort size for stock s , age a , in year y ;

$C_{s,a,b}$: average cohort size for stock s , age a , during 1979-1982 base period;

$U_{s,a,f}$: model base period exploitation rate for stock s , age a , in fishery f ;

$PNV_{a,f}$: proportion of age a fish that are not vulnerable in fishery f .

Abundance indices for the SEAK troll, NCBC troll, NBC troll, CBC troll, WCVI troll, GS troll and sport, WA/OR Ocean troll and sport, and NPS sport fisheries, and the stock composition of the abundance indices, are provided in Figs. 5-12. To simplify presentation of the results, the model stocks were grouped in the following way:

- AK South SE Group. Includes Alaska South Southeast model stock.
- NCBC group. Includes North/Central BC model stock.
- WCVI group. Includes WCVI Hatchery and WCVI Wild model stocks.
- Fraser Early group. Includes Fraser Early model stock.
- Fraser Late group. Includes Fraser Late model stock.
- Puget Sound group. Includes Nooksack Fall, Puget Sound Fall Fingerling, Puget Sound Natural Fall, Puget Sound Fall Yearling, Nooksack Spring, Skagit Summer/Fall Wild, Stillaguamish Summer/Fall Wild, Snohomish Summer/Fall Wild model stocks.
- WA Coastal group. Includes Washington Coastal Fall Hatchery and Washington Coastal Fall Wild model stocks.
- Columbia River Bright group (CR Brights). Includes Columbia Upriver Bright, Mid-Columbia River Bright Hatchery, Columbia River Summer, Lewis River Wild, and Snake River Fall model stocks.
- OR Coastal group. Includes Oregon Coastal Fall North Migrating model stock.
- Upper GS group. Includes Upper Georgia Strait model stock.
- Lower GS group. Includes Lower GS Hatchery and Lower GS Natural model stocks.

The indices for 1997 are projected to be greater than 1996 in all of the fisheries, and the indices are greater than the base period in two fisheries (SEAK and NCBC troll).

In general, the abundance indices obtained from the 1996 and 1997 calibrations were similar (Table 5). However, several differences were evident across multiple fisheries:

- modification of the method for computing the exploitation rate scale factors resulted in slight reductions in the abundance indices for 1983 and 1984 for all fisheries except the WA/OR Ocean troll and sport fishery in 1983. This may also have caused small reductions in the abundance indices for subsequent years since the fishery catches are set relative to the model catches in the years 1979 through 1984.
- correction of the error in the Cowlitz Fall Hatchery data for return year 1987 resulted in increased abundance indices in that year for the WCVI troll, WA/OR Ocean troll and sport, and NPS sport fishery.
- replacement of 1996 preseason forecasts with postseason estimates of terminal runs resulted in increased abundance indices in 1995 and 1996 for the SEAK troll and NCBC troll fisheries.

Table 5. PSC Chinook Model abundance indices for select fisheries. Indices are from the May 1997 calibration (number 9702) and the March 196 calibration (number 9617).

Year	SEAK troll		NCBC troll		WCVI troll		GS troll and sport		WA/OR Ocean troll and sport		NPS sport	
	9702	9617	9702	9617	9702	9617	9702	9617	9702	9617	9702	9617
1979	0.85	0.85	0.97	0.96	1.08	1.07	1.13	1.12	1.15	1.15	1.05	1.04
1980	1.03	1.03	0.96	0.96	0.97	0.97	1.02	1.02	0.95	0.95	1.03	1.03
1981	0.91	0.91	0.99	0.99	0.95	0.95	0.95	0.95	0.96	0.96	0.99	0.99
1982	1.21	1.22	1.08	1.10	1.00	1.01	0.90	0.91	0.94	0.94	0.93	0.94
1983	1.29	1.32	1.03	1.07	0.77	0.79	0.71	0.76	0.54	0.54	0.86	0.87
1984	1.30	1.34	1.03	1.07	0.78	0.80	0.80	0.86	0.57	0.58	0.89	0.90
1985	1.17	1.18	1.05	1.06	0.86	0.87	0.94	0.94	0.64	0.64	0.88	0.88
1986	1.30	1.31	1.07	1.07	0.90	0.91	0.83	0.83	0.70	0.70	0.93	0.93
1987	1.51	1.53	1.20	1.21	1.19	1.10	0.48	0.48	1.24	1.07	1.20	1.13
1988	1.78	1.78	1.31	1.30	0.95	0.92	0.44	0.44	0.68	0.67	1.01	0.99
1989	1.73	1.74	1.39	1.39	0.88	0.89	0.64	0.64	0.60	0.60	0.89	0.89
1990	1.81	1.81	1.40	1.41	0.86	0.86	0.81	0.80	0.45	0.45	0.75	0.76
1991	1.90	1.91	1.37	1.37	0.73	0.73	0.51	0.52	0.51	0.51	0.64	0.64
1992	1.75	1.76	1.33	1.34	0.73	0.73	0.61	0.61	0.44	0.43	0.54	0.54
1993	1.87	1.92	1.35	1.37	0.71	0.70	0.57	0.55	0.36	0.35	0.48	0.47
1994	1.60	1.61	0.98	0.98	0.51	0.52	0.46	0.46	0.23	0.24	0.43	0.45
1995	0.95	0.91	0.65	0.63	0.37	0.36	0.29	0.30	0.25	0.25	0.48	0.50
1996	0.90	0.71	0.77	0.68	0.46	0.46	0.39	0.47	0.31	0.37	0.55	0.57
1997 (pred.)	1.33		1.03		0.66		0.68		0.47		0.61	

SEAK Troll Abundance Index and its Stock Composition

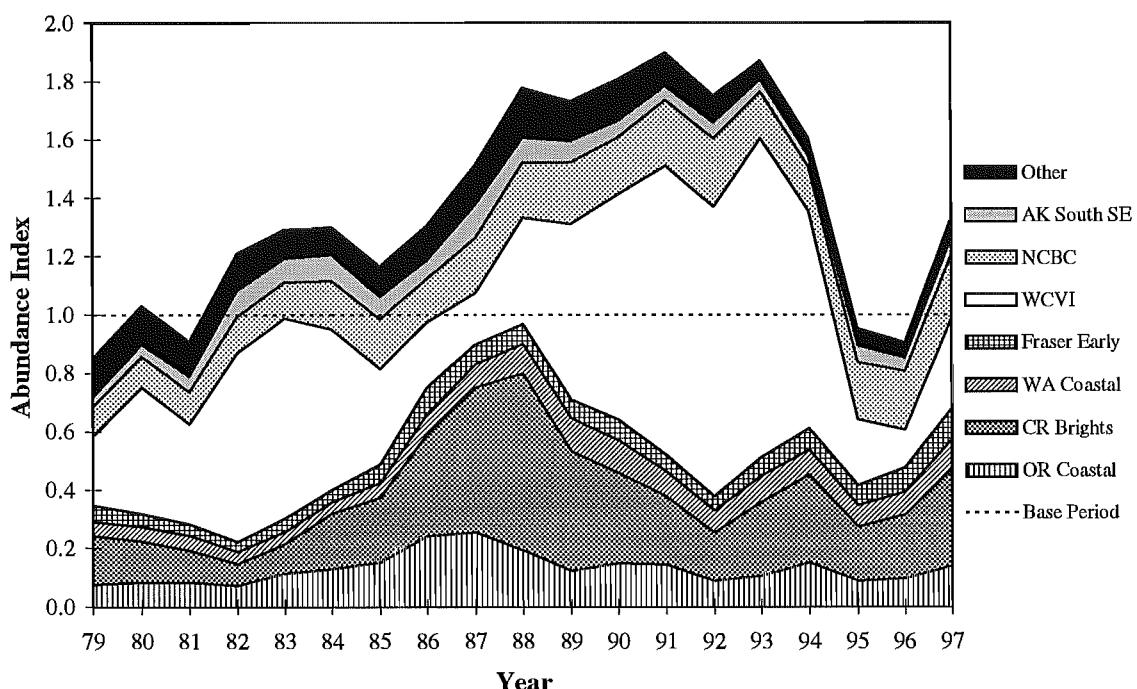


Figure 5. Abundance indices for the SEAK troll fishery obtained from the May 1997 calibration of the PSC Chinook Model.

- The 1997 abundance index for the SEAK troll fishery is 1.33, an increase of 48% from the post-season 1996 abundance index of 0.90.
- The increase in the abundance index for 1997 is primarily due to the increased abundance of Columbia Bright and WCVI stock groups.
- Since the conclusion of the base period, the SEAK abundance index has been above the base period level in all years except in 1995 and 1996.
- Beginning in the mid-1980's, the Columbia Bright stock group increased in abundance over the base period and accounted for the majority of the increase in the overall SEAK abundance index between 1986 and 1988.
- Beginning in the early 1990's, the WCVI stock increased beyond base period levels and accounted for the highest years of abundance in the SEAK fishery.

NCBC Troll Abundance Index and its Stock Composition

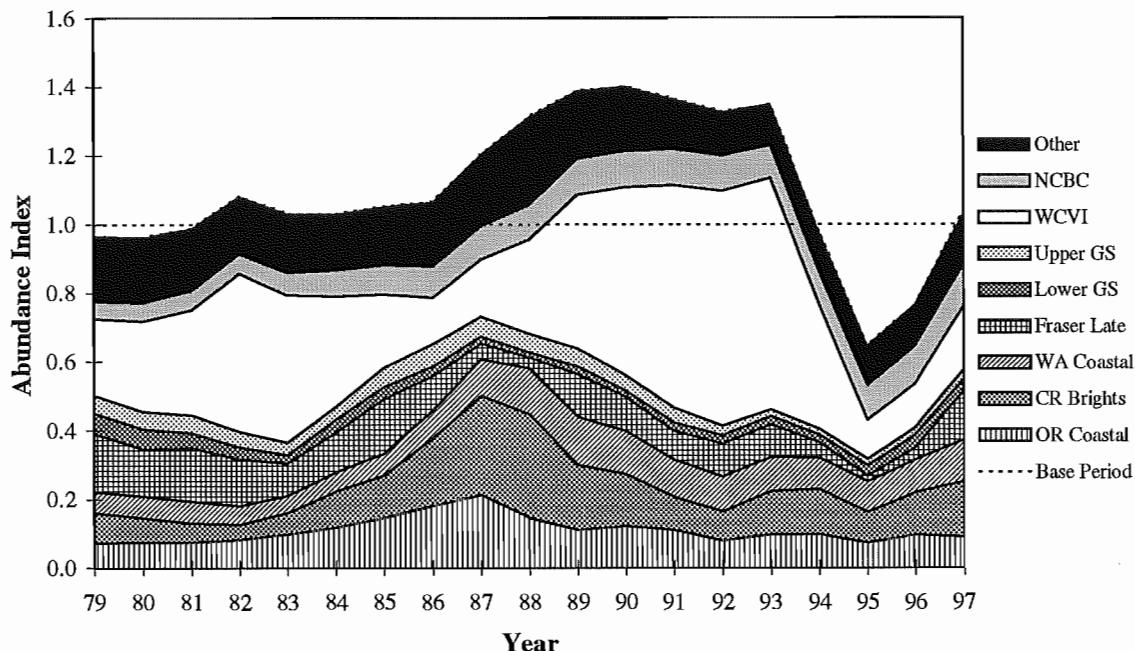


Figure 6. Abundance indices for the NCBC troll fishery obtained from the May 1997 calibration of the PSC Chinook Model.

- The projected 1997 abundance index for the NCBC troll fishery is 1.03, an increase of 34% from the post-season 1996 abundance index of 0.77.
- The increase in abundance in 1997 is primarily due to the increased abundance in the Fraser Late stock group with minor increases in the Columbia Bright and Washington Coastal stock groups.
- Since the conclusion of the base period, the NCBC abundance index has been above the base period level in all years except 1994, 1995, and 1996.
- Beginning in the mid-1980's, the Columbia Bright stock group increased in abundance over the base period; however, the overall abundance increased only slightly due to declines in the abundance indices for the Fraser Late and WCVI stock groups.
- Beginning in the early 1990's, the WCVI stock group increased beyond base period levels and accounted for the highest years of abundance in the NCBC fishery.

Northern BC Troll Abundance Index and its Stock Composition

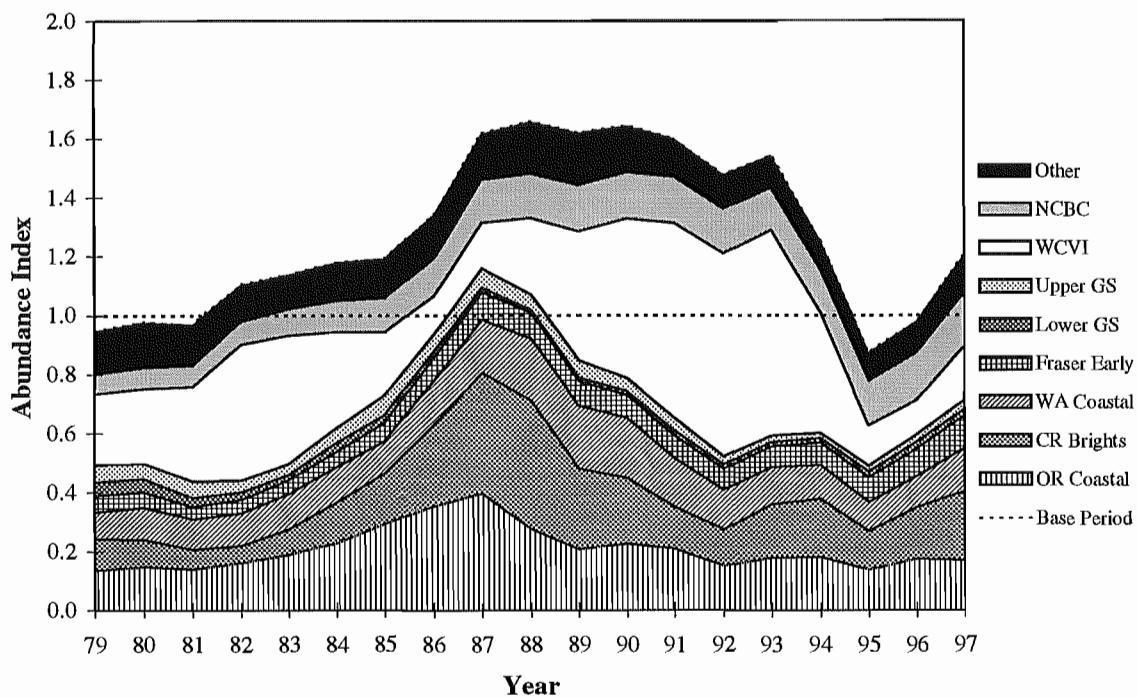


Figure 7. Abundance indices for the NBC troll fishery obtained from the May 1997 calibration of the PSC Chinook Model.

Central BC Troll Abundance Index and its Stock Composition

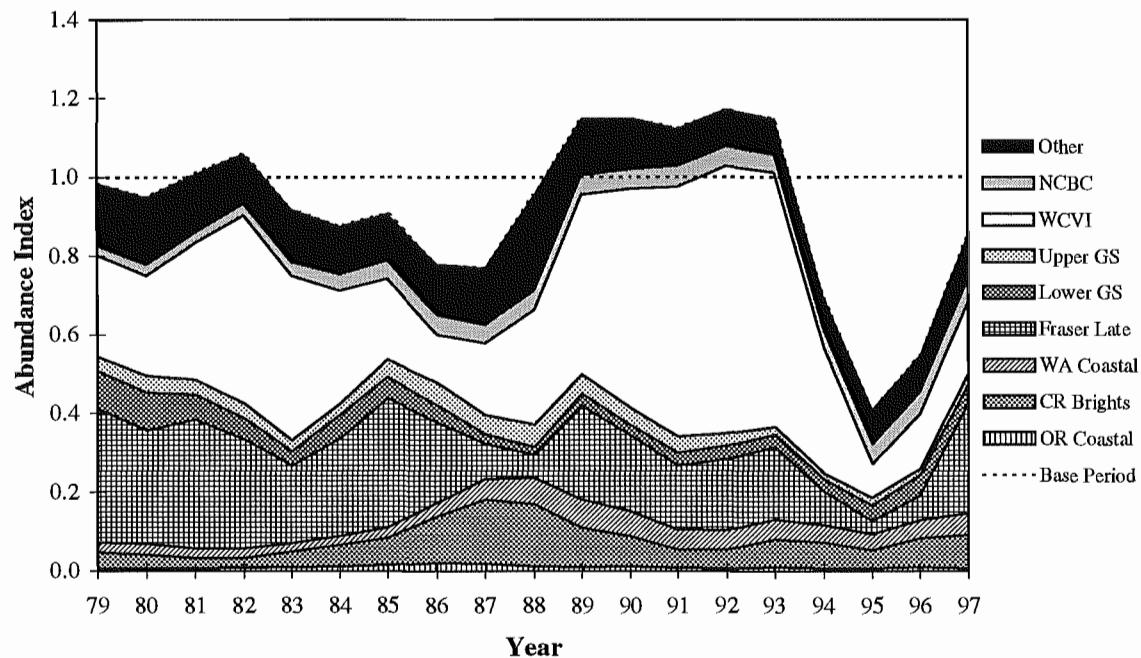


Figure 8. Abundance indices for the CBC troll fishery obtained from the May 1997 calibration of the PSC Chinook Model.

- The projected 1997 abundance index for the NBC fishery is above the base period; the projected 1997 abundance index for the CBC fishery is below the base period but greater than in 1996. The projected increase in 1997 for the CBC fishery is primarily due to increased abundance for the Fraser Late stock group.
- Since the conclusion of the base period, the NBC abundance index has been above the base period level in all years except 1995 and 1996; the CBC abundance index has been above the base period level only during the five year period from 1989 through 1993. The increased abundance index in the CBC fishery in 1989 through 1993 was primarily due to the WCVI stock group.
- The NBC abundance indices have been greater than the indices for CBC since the model base period.
- The increase in the abundance index for the NBC fishery in the years 1987 through 1993 was primarily due to the increased abundance of the Columbia River Bright and Oregon Coastal stock groups in 1987 and 1988, and of the WCVI stock group in 1989 through 1993.

WCVI Troll Abundance Index and its Stock Composition

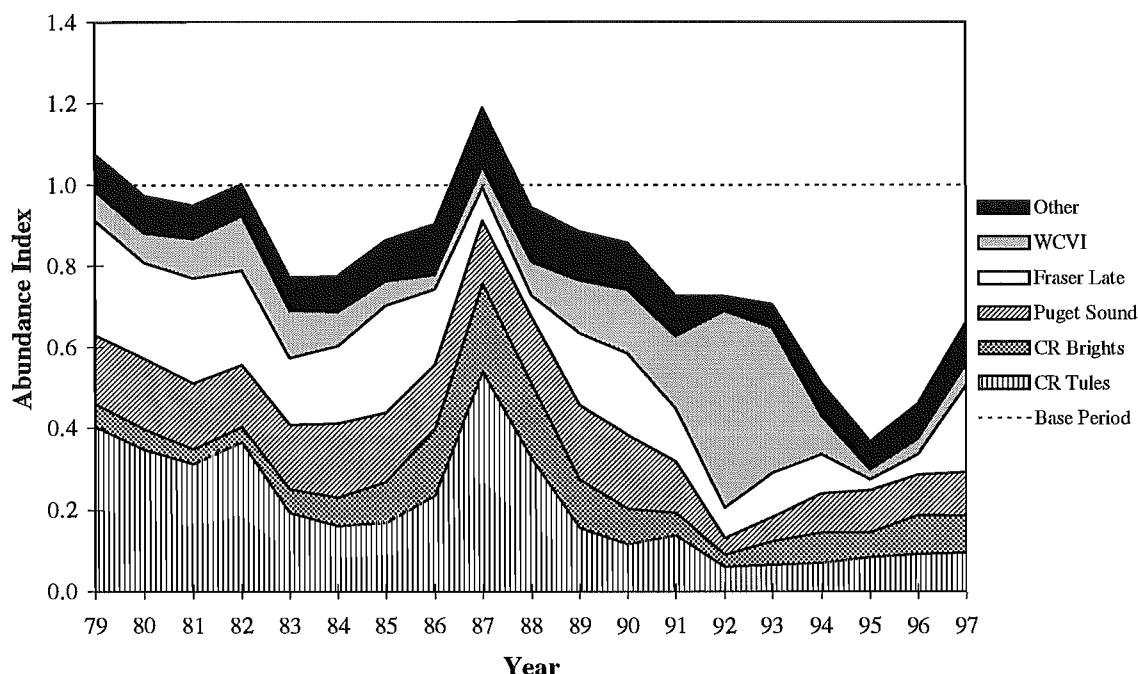


Figure 9. Abundance indices for the WCVI troll fishery obtained from the May 1997 calibration of the PSC Chinook Model.

- The projected 1997 abundance index for the WCVI troll fishery is 0.66, an increase of 43% from the post-season 1996 abundance index of 0.46.
- The projected increase in the abundance index for 1997 increase is primarily due to an increase in the abundance index for the Fraser Late stock group.
- Since the conclusion of the base period, the WCVI abundance index has been above the base period level only once (1987).
- The long term decline in the abundance index has been primarily due to a decline in the abundance of the Columbia River Tule stock group.
- In the early 1990s, the abundance index for the WCVI stock group increased, slowing the decline in the abundance index for the WCVI fishery. However, the abundance index for the WCVI stock group also declined by the mid-1990's and reached the lowest point in 1995.

GS Sport & Troll Abundance Index and its Stock Composition

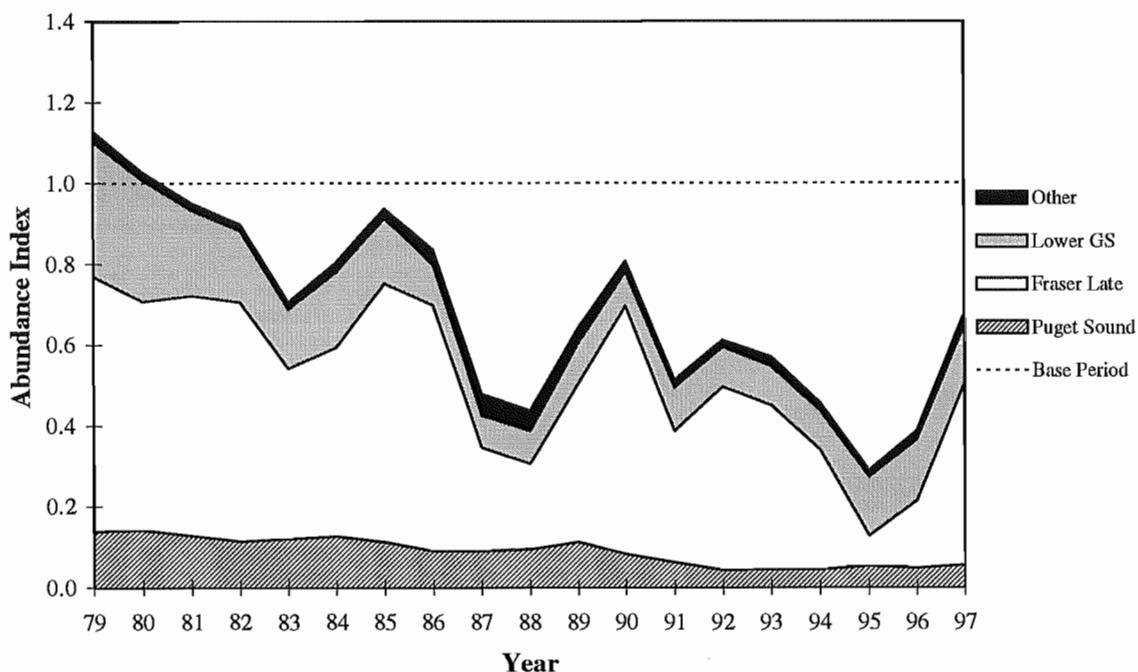


Figure 10. Abundance indices for the GS sport and troll fisheries obtained from the May 1997 calibration of the PSC Chinook Model.

- The projected 1997 abundance index for the GS sport and troll fisheries is 0.68, an increase of 74% from the post-season 1996 abundance index of 0.39.
- The projected increase in the abundance index for 1997 is due to an increase in the abundance index for the Fraser Late stock group.
- Since the conclusion of the base period, the GS sport and troll abundance index has never been above the base period level.
- The primary reason for the decline in the abundance index for the GS sport and troll fishery has been the decline in the abundance index for the Fraser Late stock group.

WA/OR Sport & Troll Abundance Index and its Stock Composition

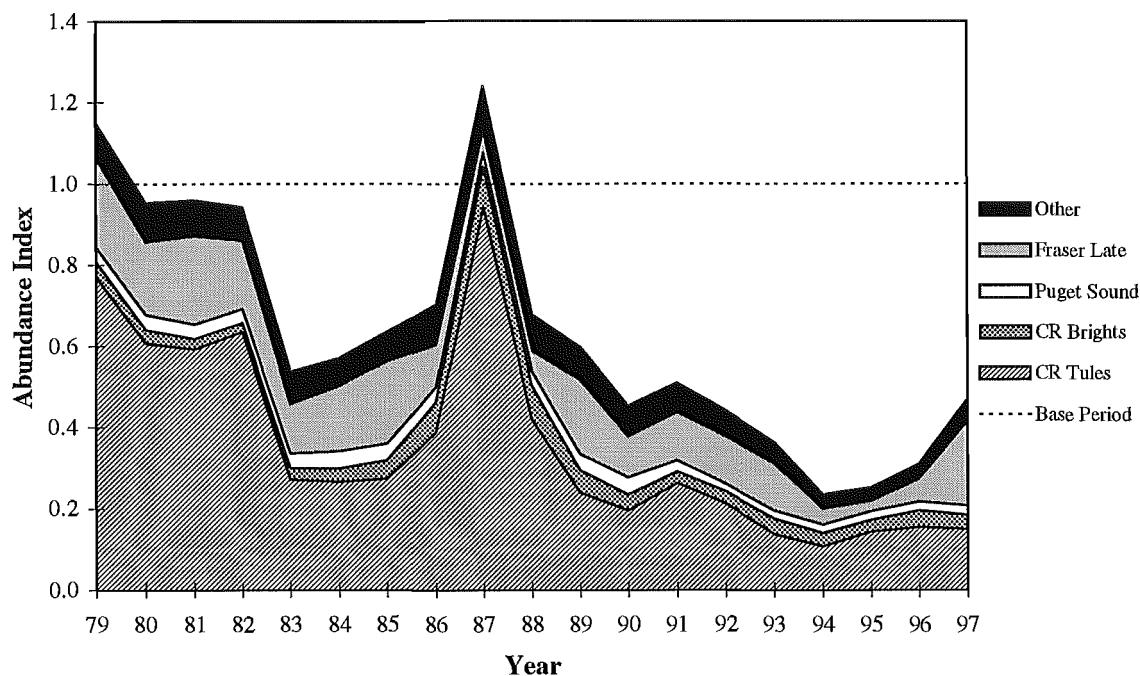


Figure 11. Abundance indices for the WA/OR sport and troll fisheries obtained from the May 1997 calibration of the PSC Chinook Model.

- The projected 1997 abundance index for the WA/OR sport and troll fisheries is 0.47, an increase of 52% from the post-season 1996 abundance index of 0.31.
- The projected increase in the abundance index in 1997 is due to an increase in the abundance index for the Fraser Late stock group.
- Since the conclusion of the base period, the WA/OR sport and troll abundance index has been the base period level only once (1987).
- The decline in the abundance index for the WA/OR sport and troll fishery was due primarily to decreases in the abundance indices for the Columbia River Tule and Fraser Late stock groups.

North PS Sport Abundance Index and its Stock Composition

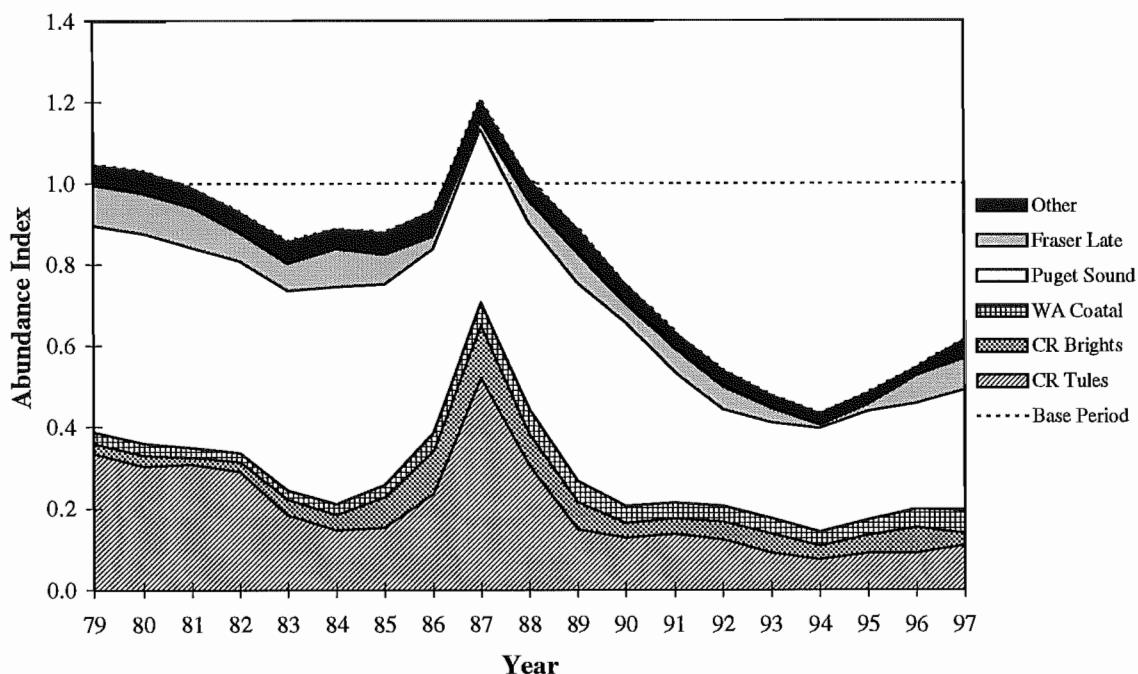


Figure 12. Abundance indices for the NPS sport fishery obtained from the May 1997 calibration of the PSC Chinook Model.

- The projected 1997 abundance index for the North PS sport fishery is 0.61, an increase of 11% from the post-season 1996 abundance index of 0.55.
- The projected increase in the abundance index for 1997 is due to increases in the abundance indices for the Fraser Late and Puget Sound stock groups.
- The North PS Sport abundance index was above the base period only in 1987.
- The decline in the abundance index has been primarily due to decreases in the abundance indices for the Columbia River Tule and Puget Sound stock groups.

Stock Composition of Catch

Estimates of stock composition (for the model stocks) of the annual total catch since 1979 in SEAK troll, Northern BC troll, Central BC troll, NCBC troll, WCVI troll, Georgia Strait sport and troll, WA/OR sport and troll, and the North PS sport fisheries are presented in Figs. 13-20. The stock composition for the SEAK troll fishery does not include the contribution of fish originating from SEAK hatcheries.

Average Composition of Total Fishing Mortality

Estimates of the stock composition of the total fishing mortality in the SEAK all gear, NCBC all gear, WCVI troll, and GS sport and troll fisheries (1997 and 1985-1996 average), the distribution of mortality among the fisheries, and the associated indicator stocks are provided in Tables 6-9.

Stock Composition of the SEAK Troll Fishery

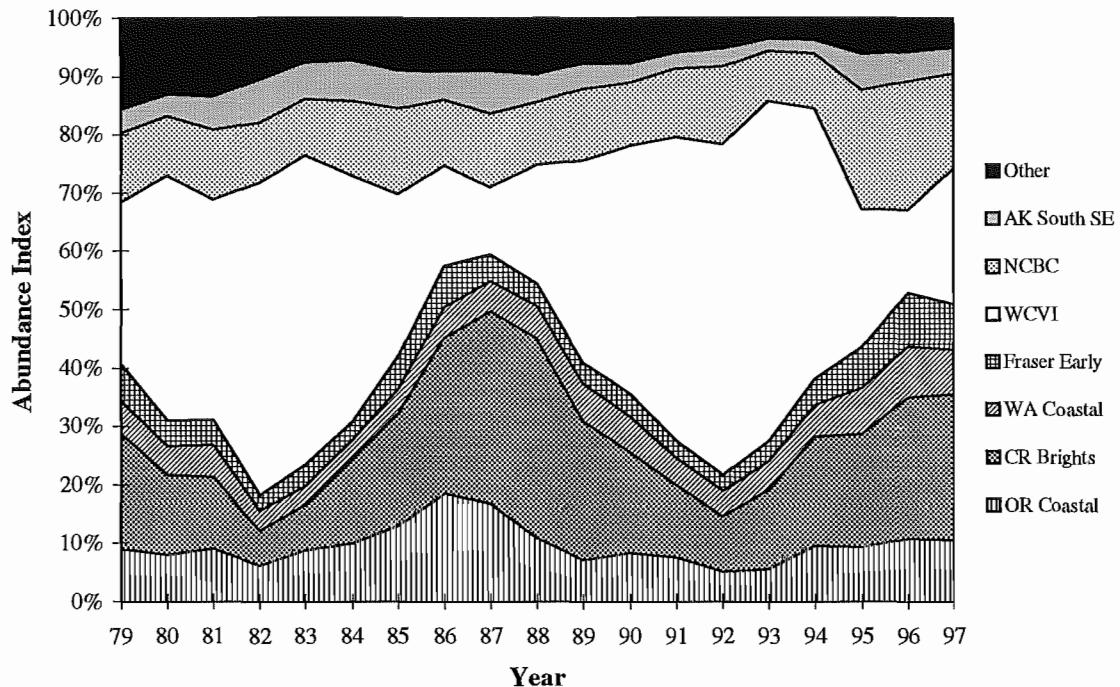


Figure 13. Stock composition of the SEAK troll fishery obtained from the May 1997 calibration of the PSC Chinook Model.

- From 1985 through 1996, the seven identified stock groups comprised an average of 93.1% of the SEAK troll catch.
- Between 1982-1983 and 1991-1993 the WCVI stock group comprised more than 50% of the catch.

Stock Composition of the NCBC Troll Fishery

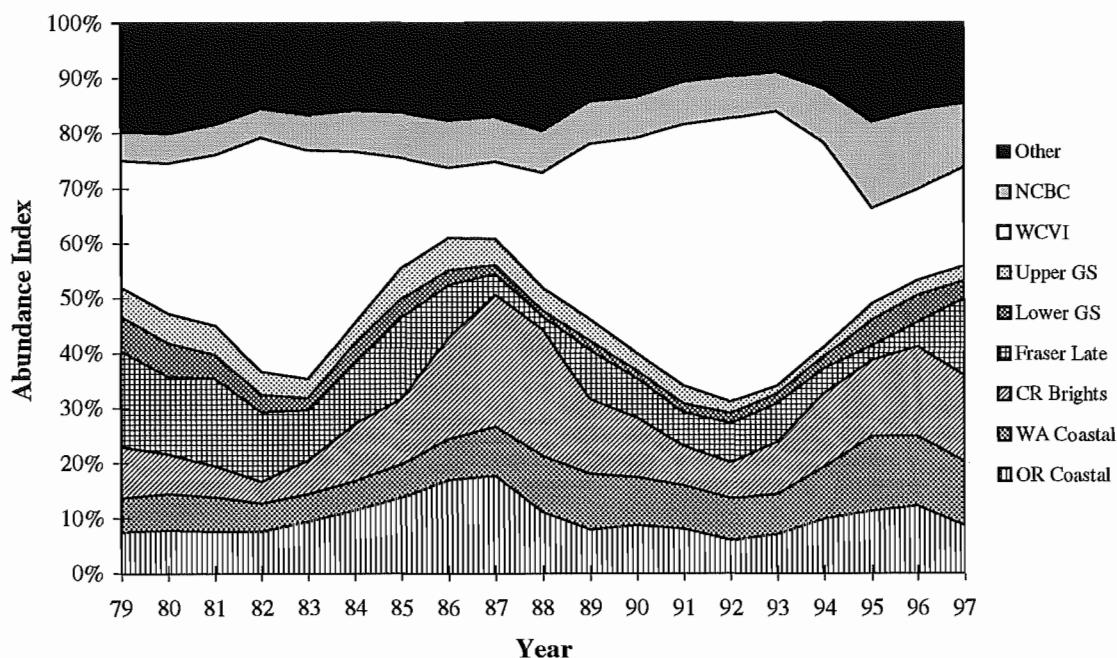


Figure 14. Stock composition of the NCBC troll fishery obtained from the May 1997 calibration of the PSC Chinook Model.

- From 1985 through 1996, the eight identified stock groups comprised an average of 85.5% of the NCBC troll catch.

Stock Composition of the Northern BC Troll Fishery

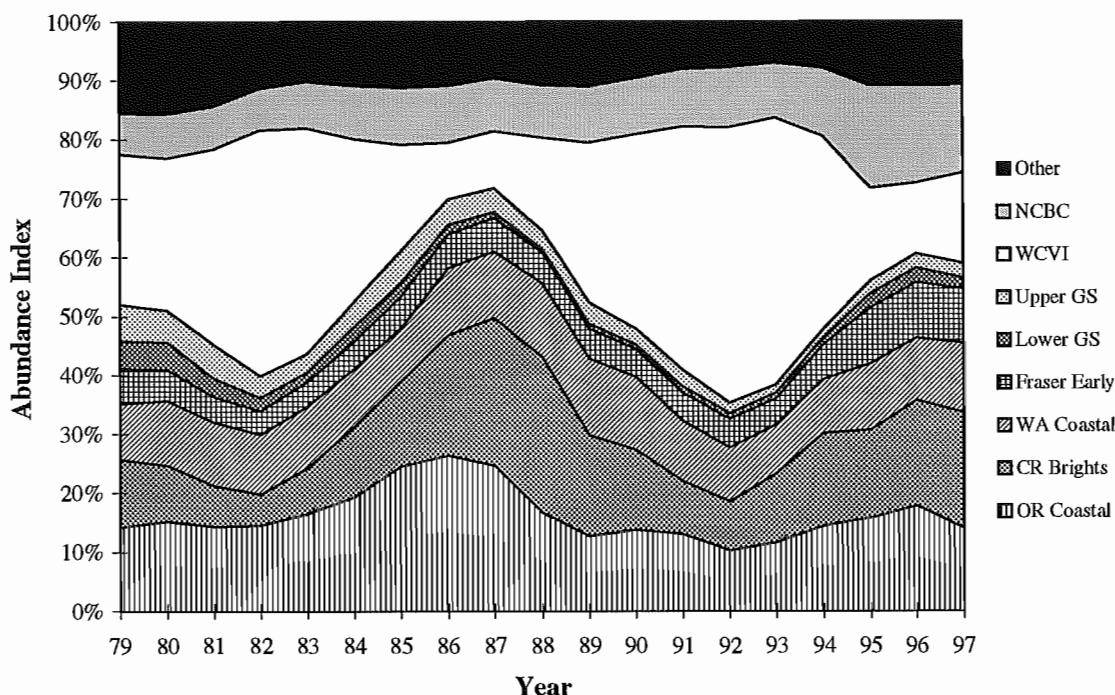


Figure 15. Stock composition of the NBC troll fishery obtained from the May 1997 calibration of the PSC Chinook Model.

Stock Composition of the Central BC Troll Fishery

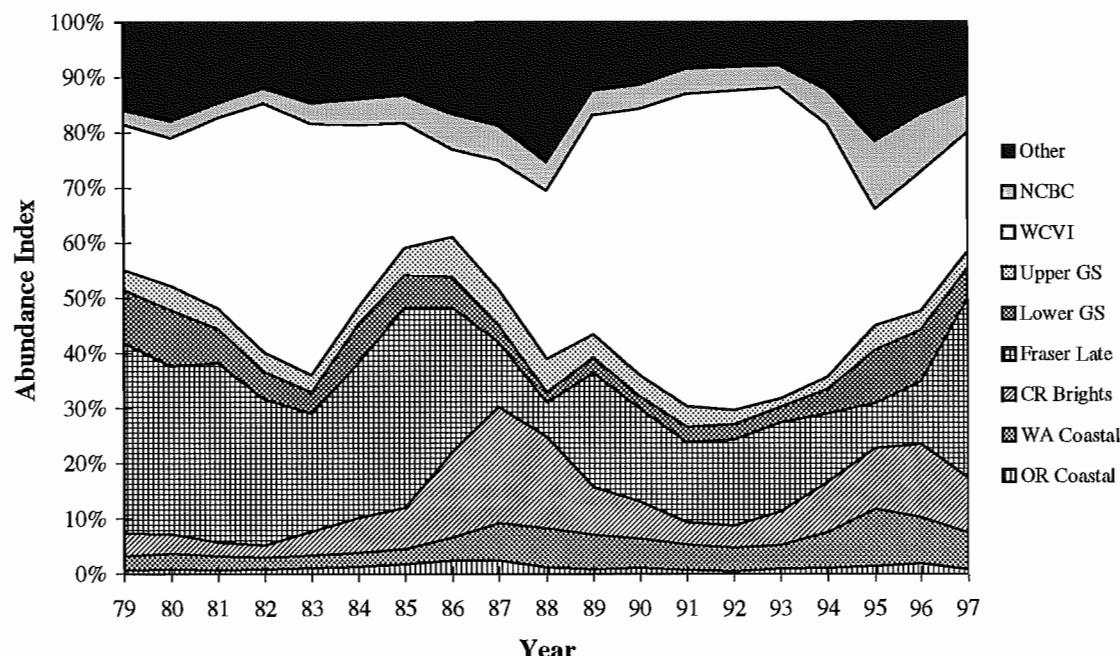


Figure 16. Stock composition of the CBC troll fishery obtained from the May 1997 calibration of the PSC Chinook Model.

- The stock composition of the NBC and CBC fisheries differs. Oregon Coastal, Columbia River Bright, and WCVI are the primary stock groups in the NBC fishery; Columbia River Bright, Fraser Late, and WCVI are the primary stock groups in the CBC fishery.
- Variability in the stock composition of the NBC and CBC fisheries is primarily due to variation in the contributions of the WCVI, Columbia River Bright, and Fraser Late (in CBC) stock groups.

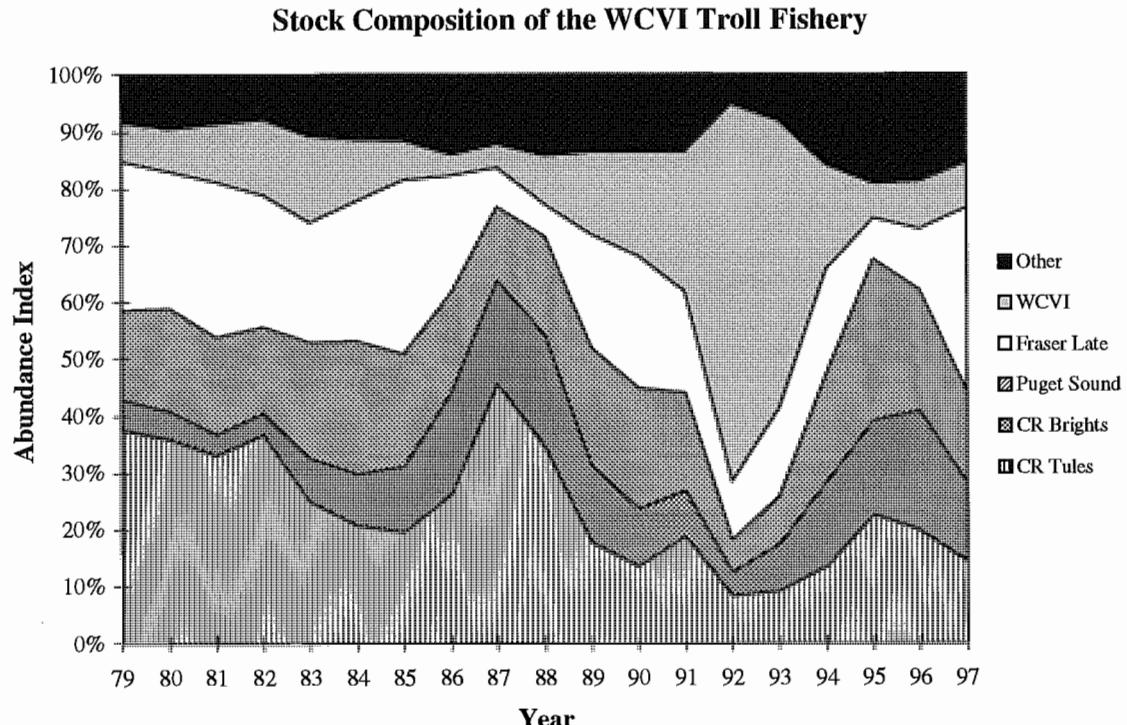


Figure 17. Stock composition of the WCVI troll fishery obtained from the May 1997 calibration of the PSC Chinook Model.

- From 1985 through 1996, the five identified stock groups comprised an average of 86.6% of the WCVI troll catch.
- The dominant stock in the WCVI fishery has varied throughout the years. Predominant stock groups have included WCVI, Puget Sound, and Columbia River Tule.

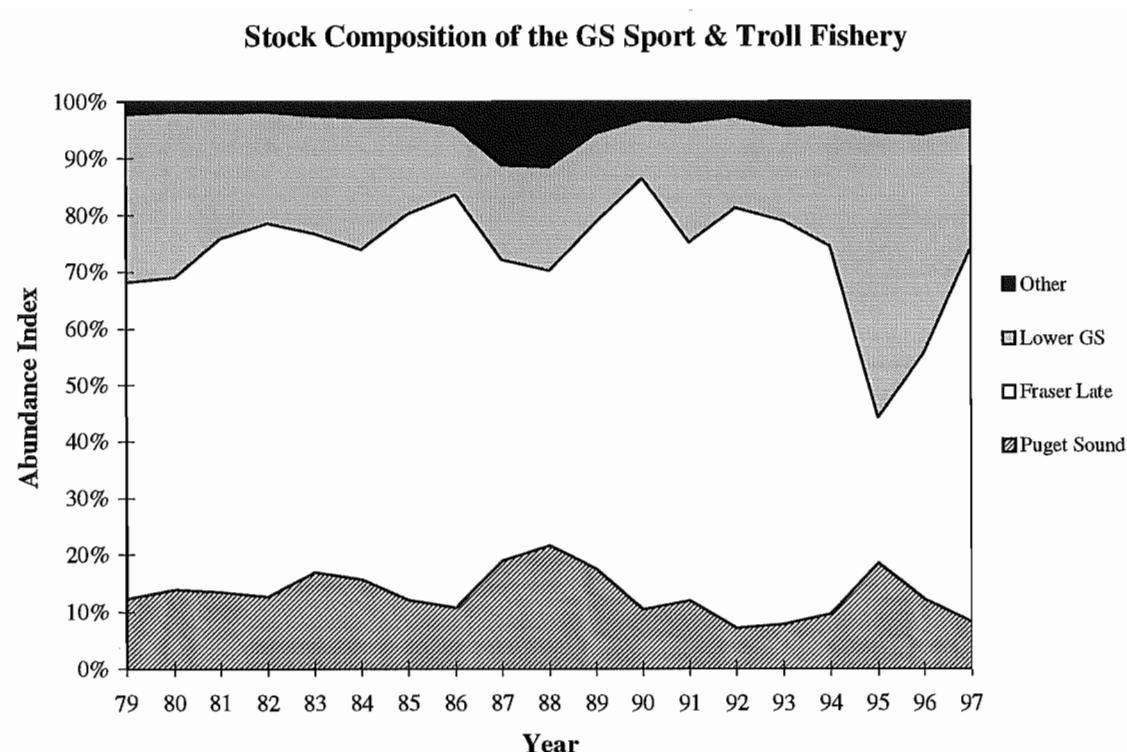


Figure 18. Stock composition of the GS sport and troll fisheries obtained from the May 1997 calibration of the PSC Chinook Model.

- From 1985 through 1996, the three identified stock groups comprised an average of 94.6% of the catch in the GS sport and troll fishery.
- The Fraser Late stock group comprised the majority of the catch in all years except 1995.

Stock Composition of the WA/OR Sport & Troll Fishery

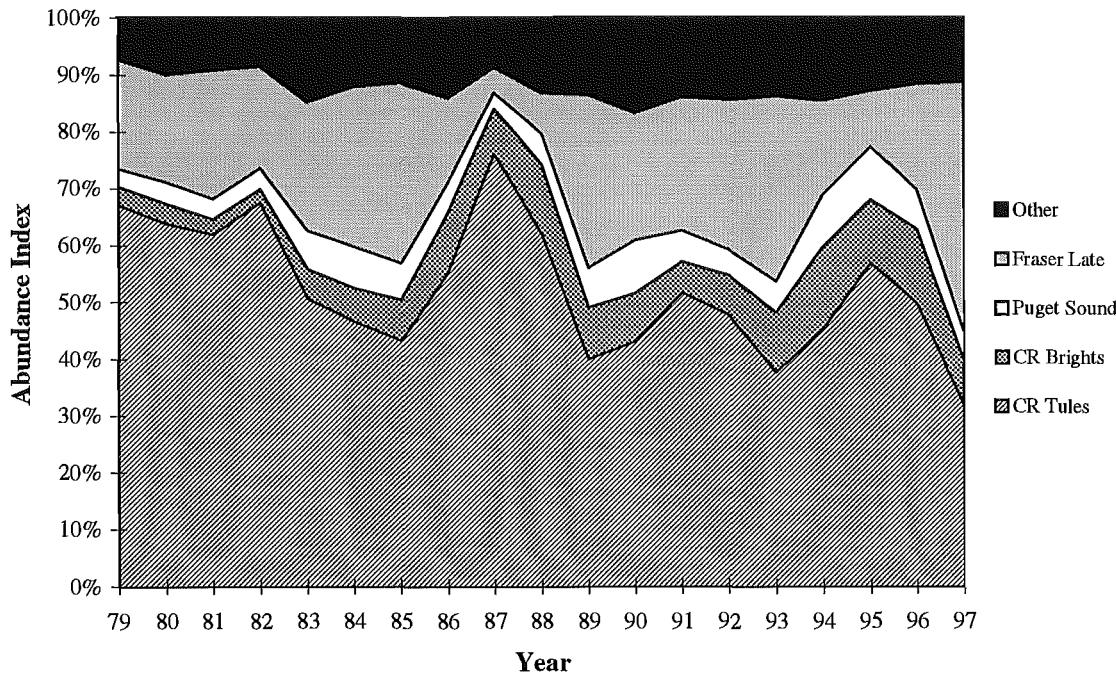


Figure 19. Stock composition of the WA/OR sport and troll fisheries obtained from the May 1997 calibration of the PSC Chinook Model.

- From 1985 through 1996, the four identified stock groups comprised an average of 86.6% of the WA/OR sport and troll catch.
- In all but eight years since 1979, the Columbia River Tule stock group has comprised more than 50% of the catch.
- The Fraser Late stock group was typically the second largest contributor to the fishery, and in 1997 is projected to comprise over 40% of the catch in the WA/OR sport and troll fishery.

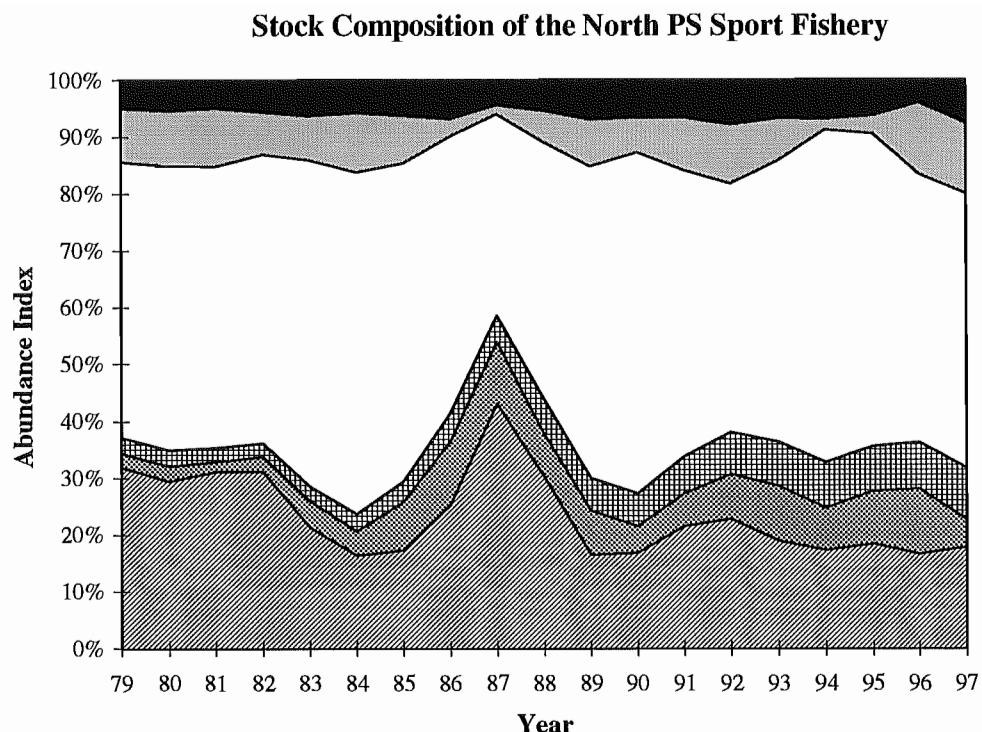


Figure 20. Stock composition of the NPS sport fishery obtained from the May 1997 calibration of the PSC Chinook Model.

- From 1985 through 1996, the five identified stock groups comprised an average of 93.7% of the catch in the NPS sport fishery.
- The Puget Sound stock group was the largest component of the fishery in most years.
- The Columbia River Tule stock group was typically the second largest component of the fishery, and contributed over 40% of the catch in 1987.

Table 6. PSC Chinook Model estimates of stock composition of total fishing mortality in the SEAK fisheries (troll, net, and sport), percent of total stock mortality occurring in the fishery, and the associated escapement indicator stocks.

Model Stock	1997	<u>Average(1985 - 1996)</u>		
	Percent Fishery	Percent Fishery	Percent Stock	Escapement Indicator Stocks
WCVI Hatchery	18.45%	28.96%	42.12%	NA
Columbia Upriver Bright	15.86%	17.60%	31.79%	Columbia Upriver Bright
North/Central BC	21.75%	15.75%	41.77%	Yukon Nass Skeena Area 6 Index Area 8 Index Rivers Inlet Smith Inlet
Oregon Coastal North Migr.	7.78%	7.80%	31.46%	Oregon Coastal
WCVI Wild	5.14%	7.57%	40.13%	WCVI
Fraser	6.17%	4.14%	23.54%	Upper Fraser Middle Fraser Thompson
Alaska South SE	4.93%	4.04%	96.38%	King Salmon Andrew Creek Blossom Keta Unuk Chickamin
Washington Coastal Wild	3.26%	2.84%	15.60%	Grays Harbor Fall Quillayute Fall Hoh Fall Queets Fall
Mid-Columbia Brights	6.98%	2.50%	23.50%	Not Represented
Upper Georgia Strait	2.14%	2.36%	34.75%	Upper Georgia Strait
WA Coastal Hatchery	4.23%	2.36%	15.21%	NA
Willamette River Hatchery	0.66%	1.44%	9.14%	NA
Columbia Upriver Summer	1.00%	0.88%	29.13%	Columbia Upriver Summer
Lewis River Wild	0.21%	0.58%	9.78%	Lewis River

Table 6 (cont.) PSC Chinook Model estimates of stock composition of total fishing mortality in the SEAK fisheries (troll, net, and sport), percent of total stock mortality occurring in the fishery, and the associated escapement indicator stocks.

Model Stock	1997	<u>Average(1985 - 1996)</u>		
	Percent Fishery	Percent Fishery	Percent Stock	Escapement Indicator Stocks
Lower Georgia Strait	0.59%	0.22%	1.87%	Lower Georgia Strait
Lower GS Hatchery	0.19%	0.20%	2.27%	NA
Fraser Late	0.17%	0.18%	0.25%	Harrison
Fall Cowlitz Hatchery	0.09%	0.17%	5.25%	NA
PS Hatchery Fingerling	0.14%	0.09%	0.41%	NA
Skagit Summer/Fall	0.05%	0.07%	3.09%	Skagit Summer/Fall
Spring Cowlitz Hatchery	0.01%	0.06%	1.13%	NA
Puget Sound Natural	0.03%	0.05%	0.37%	Green
Nooksack Fall	0.03%	0.04%	0.16%	NA
Stillaguamish Summer/Fall	0.04%	0.03%	9.18%	Stillaguamish
Snake River Fall	0.05%	0.03%	7.18%	Not Represented
Snohomish Summer/Fall	0.03%	0.02%	1.57%	Snohomish
PS Yearling	0.02%	0.02%	0.42%	NA
Nooksack Spring	0.00%	0.00%	0.00%	Not Represented
Spring Creek Hatchery	0.00%	0.00%	0.00%	NA
Lower Bonneville Hatchery	0.00%	0.00%	0.00%	NA

Table 7. PSC Chinook Model estimates of stock composition of total fishing mortality in the NCBC fisheries (troll, net, and sport), percent of total stock mortality occurring in the fishery, and the associated escapement indicator stocks.

Model Stock	1997	<u>Average(1985 - 1996)</u>		
	Percent Fishery	Percent Fishery	Percent Stock	Escapement Indicator Stocks
North/Central BC	27.34%	25.67%	52.51%	Yakoun Nass Skeena Area 6 Index Area 8 Index Rivers Inlet Smith Inlet
WCVI Hatchery	11.78%	19.68%	22.96%	NA
Columbia Upriver Bright	10.44%	11.84%	18.10%	Columbia Upriver Bright
Oregon Coastal North Migr.	6.83%	8.60%	30.73%	Oregon Coastal
WCVI Wild	2.70%	5.33%	22.52%	WCVI
Fraser Early	6.40%	3.95%	20.12%	Upper Fraser Middle Fraser Thompson
Fraser Late	11.97%	3.69%	4.60%	Harrison
Upper Georgia Strait	2.16%	3.65%	43.52%	Upper Georgia Strait
Washington Coastal Wild	3.63%	3.33%	15.96%	Grays Harbor Fall Quillayute Fall Hoh Fall Queets Fall
Willamette River Hatchery	1.65%	2.79%	14.34%	NA
WA Coastal Hatchery	4.85%	2.69%	16.34%	NA
Mid-Columbia Brights	4.74%	1.96%	16.37%	Not Represented
Lower Georgia Strait	1.47%	1.12%	9.05%	Lower Georgia Strait
Lower GS Hatchery	0.71%	1.00%	9.52%	NA
Columbia Upriver Summer	0.91%	0.99%	26.69%	Columbia Upriver Summer
Lower Bonneville Hatchery	0.62%	0.74%	1.46%	NA
Nooksack Fall	0.38%	0.63%	2.05%	NA

Table 7 (cont.) PSC Chinook Model estimates of stock composition of total fishing mortality in the NCBC fisheries (troll, net, and sport), percent of total stock mortality occurring in the fishery, and the associated escapement indicator stocks.

Model Stock	1997 Percent Fishery	<u>Average(1985 - 1996)</u>		
	Percent Fishery	Percent Stock	Escapement Indicator Stocks	
Skagit Summer/Fall	0.23%	0.43%	17.29%	Skagit Summer/Fall
Lewis River Wild	0.09%	0.37%	5.21%	Lewis River
PS Hatchery Fingerling	0.39%	0.33%	1.30%	NA
Snohomish Summer/Fall	0.15%	0.23%	12.56%	Snohomish
PS Yearling	0.10%	0.20%	3.33%	NA
Spring Cowlitz Hatchery	0.06%	0.19%	2.84%	NA
Fall Cowlitz Hatchery	0.06%	0.18%	4.47%	NA
Puget Sound Natural	0.09%	0.17%	1.17%	Green
Alaska South SE	0.13%	0.13%	2.80%	King Salmon Andrew Creek Blossom Keta Unuk Chickamin
Stillaguamish Summer/Fall	0.03%	0.05%	13.22%	Stillaguamish
Snake River Fall	0.04%	0.03%	7.96%	Not Represented
Spring Creek Hatchery	0.04%	0.03%	0.31%	NA
Nooksack Spring	0.01%	0.01%	2.70%	Not Represented

Table 8. PSC Chinook Model estimates of stock composition of total fishing mortality in the WCVI troll fishery, percent of total stock mortality occurring in the fishery, and the associated escapement indicator stocks.

Model Stock	1997 Percent Fishery	<u>Average(1985 - 1996)</u>		
	Percent Fishery	Percent Stock	Escapement Indicator Stocks	
Fraser Late	40.18%	18.12%	21.43%	Harrison
WCVI Hatchery	6.14%	16.81%	16.91%	NA
Lower Bonneville Hatchery	9.18%	15.82%	37.52%	NA
Columbia Upriver Bright	9.22%	11.97%	18.55%	Columbia Upriver Bright
PS Hatchery Fingerling	7.17%	5.77%	20.93%	NA
Nooksack Fall	2.85%	4.40%	15.68%	NA
WCVI Wild	1.61%	4.34%	15.96%	WCVI
Oregon Coastal North Migr.	2.90%	3.39%	12.06%	Oregon Coastal
Puget Sound Natural	1.82%	2.86%	19.22%	Green
Spring Creek Hatchery	2.48%	2.46%	20.17%	NA
Mid-Columbia Brights	4.06%	2.01%	15.80%	Not Represented
Washington Coastal Wild	1.89%	1.77%	8.18%	Grays Harbor Fall Quillayute Fall Hoh Fall Queets Fall
WA Coastal Hatchery	2.65%	1.57%	8.48%	NA
Willamette River Hatchery	1.08%	1.41%	7.59%	NA
Fraser Early	1.65%	1.14%	5.14%	Upper Fraser Middle Fraser Thompson
Columbia Upriver Summer	1.27%	1.13%	30.71%	Columbia Upriver Summer
Fall Cowlitz Hatchery	0.48%	1.10%	32.03%	NA
PS Yearling	0.60%	0.77%	13.38%	NA
Lewis River Wild	0.18%	0.64%	9.90%	Lewis River
Skagit Summer/Fall	0.47%	0.57%	23.94%	Skagit Summer/Fall

Table 8 (cont.) PSC Chinook Model estimates of stock composition of total fishing mortality in the WCVI troll fishery, percent of total stock mortality occurring in the fishery, and the associated escapement indicator stocks.

Model Stock	1997	<u>Average(1985 - 1996)</u>		
	Percent Fishery	Percent Fishery	Percent Stock	Escapement Indicator Stocks
Spring Cowlitz Hatchery	0.36%	0.47%	7.79%	NA
North/Central BC	0.49%	0.43%	0.84%	Yakoun Nass Skeena Area 6 Index Area 8 Index Rivers Inlet Smith Inlet
Snohomish Summer/Fall	0.30%	0.30%	16.90%	Snohomish
Lower Georgia Strait	0.43%	0.27%	1.82%	Lower Georgia Strait
Lower GS Hatchery	0.22%	0.20%	1.96%	NA
Snake River Fall	0.22%	0.14%	31.57%	Not Represented
Stillaguamish Summer/Fall	0.06%	0.06%	16.04%	Stillaguamish
Upper Georgia Strait	0.04%	0.06%	0.76%	Upper Georgia Strait
Nooksack Spring	0.03%	0.03%	10.79%	Not Represented
Alaska South SE	0.00%	0.00%	0.00%	King Salmon Andrew Creek Blossom Keta Unuk Chickamin

Table 9. PSC Chinook Model estimates of stock composition of total fishing mortality in the GS sport and troll fishery, percent of total stock mortality occurring in the fishery, and the associated escapement indicator stocks.

Model Stock	1997 Percent Fishery	Average(1985 - 1996)			Escapement Indicator Stocks
		Percent Fishery	Percent Stock		
Fraser Late	68.68%	53.14%	47.83%	Harrison	
Nooksack Fall	4.16%	9.93%	26.05%	NA	
Lower Georgia Strait	9.12%	7.41%	38.85%	Lower Georgia Strait	
Lower GS Hatchery	4.61%	5.51%	38.63%	NA	
PS Hatchery Fingerling	2.86%	3.91%	10.40%	NA	
Fraser Early	2.61%	3.90%	14.13%	Upper Fraser Middle Fraser Thompson	
WCVI Hatchery	0.35%	2.24%	2.12%	NA	.
Lower Bonneville Hatchery	0.75%	2.04%	4.07%	NA	
PS Yearling	1.06%	1.96%	23.29%	NA	
Puget Sound Natural	0.66%	1.81%	8.39%	Green	
Columbia Upriver Bright	1.14%	1.73%	1.99%	Columbia Upriver Bright	
Upper Georgia Strait	0.75%	1.48%	14.88%	Upper Georgia Strait	
Washington Coastal Wild	0.53%	1.20%	4.09%	Grays Harbor Fall Quillayute Fall Hoh Fall Queets Fall	
WA Coastal Hatchery	0.86%	1.06%	4.20%	NA	
Skagit Summer/Fall	0.34%	0.69%	19.24%	Skagit Summer/Fall	
WCVI Wild	0.08%	0.48%	1.71%	WCVI	
Snohomish Summer/Fall	0.21%	0.36%	13.90%	Snohomish	
Mid-Columbia Brights	0.54%	0.29%	1.66%	Not Represented	
Spring Creek Hatchery	0.15%	0.23%	1.49%	NA	
Nooksack Spring	0.24%	0.20%	55.55%	Not Represented	

Table 9 (cont.) PSC Chinook Model estimates of stock composition of total fishing mortality in the GS sport and troll fishery, percent of total stock mortality occurring in the fishery, and the associated escapement indicator stocks.

Model Stock	1997 Percent Fishery	<u>Average(1985 - 1996)</u>		
	Percent Fishery	Percent Stock	Escapement Indicator Stocks	
Columbia Upriver Summer	0.20%	0.15%	2.92%	Columbia Upriver Summer
Stillaguamish Summer/Fall	0.06%	0.10%	20.26%	Stillaguamish
Willamette River Hatchery	0.01%	0.05%	0.21%	NA
North/Central BC	0.00%	0.05%	0.10%	Yakoun Nass Skeena Area 6 Index Area 8 Index Rivers Inlet Smith Inlet
Lewis River Wild	0.01%	0.03%	0.21%	Lewis River
Spring Cowlitz Hatchery	0.00%	0.02%	0.17%	NA
Fall Cowlitz Hatchery	0.00%	0.01%	0.06%	NA
Snake River Fall	0.00%	0.00%	0.11%	Not Represented
Oregon Coastal North Migr.	0.00%	0.00%	0.00%	Oregon Coastal
Alaska South SE	0.00%	0.00%	0.00%	King Salmon Andrew Creek Blossom Keta Unuk Chickamin

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Appendix A

Fishery names and identification numbers, and stock names, abbreviations, and identification numbers included in the PSC Chinook Model.

FISHERIES		STOCKS		
Number	Name	Number	Abv.	Name
1	SEAK troll	1	AKS	Alaska South SE
2	Northern BC troll	2	NTH	North/Central BC
3	Central BC troll	3	FRE	Fraser Early
4	WCVI troll	4	FRL	Fraser Late
5	WA/OR troll	5	RBH	WCVI Hatchery
6	Strait of Georgia troll	6	RBT	WCVI Natural
7	Alaska net	7	GSQ	Upper Strait of Georgia
8	Northern BC net	8	GST	Lower Strait of Georgia Natural
9	Central BC net	9	GSH	Lower Strait of Georgia Hatchery
10	WCVI net	10	NKF	Nooksack Fall
11	Juan de Fuca net	11	PSF	Puget Sound Fall Fingerling
12	North Puget Sound net	12	PSN	Puget Sound Natural Fall
13	South Puget Sound net	13	PSY	Puget Sound Fall Yearling
14	Washington Coastal net	14	NKS	Nooksack Spring
15	Columbia River net	15	SKG	Skagit Summer/Fall Wild
16	Johnstone Strait net	16	STL	Stillaguamish Summer/Fall Wild
17	Fraser net	17	SNO	Snohomish Summer/Fall Wild
18	SEAK sport	18	WCH	Washington Coastal Fall Hatchery
19	North/Central BC sport	19	URB	Columbia Upriver Bright
20	WCVI sport	20	SPR	Spring Creek Hatchery
21	WA/OR Ocean sport	21	BON	Lower Bonneville Hatchery
22	North Puget Sound sport	22	CWF	Fall Cowlitz Hatchery
23	South Puget Sound sport	23	LRW	Lewis River Wild
24	Strait of Georgia sport	24	WSH	Willamette River Hatchery
25	Freshwater sport	25	CWS	Spring Cowlitz Hatchery
		26	SUM	Columbia River Summer
		27	ORC	Oregon Coastal Fall North Migrating
		28	WCN	Washington Coastal Fall Wild
		29	LYF	Snake River Wild Fall
		30	MCB	Mid-Columbia River Bright Hatchery

Appendix B

Names, dates, and times of input files to the May 1997 calibration (9702)
of the PSC Chinook Model

Calibration Stage	File Type	File Name	Date	Time
1 st Stage	FCS	Trial97.fcs	4/20/97	11:32 AM
	EVO	9702a.evo	4/20/97	11:55 AM
	OP6	9702a.op6	4/20/97	11:29 AM
	BSE	Clb9621.bse	3/10/96	8:24 AM
	STK	Clb9621.stk	3/6/96	4:27 PM
	FP	Oldspf97.fp	4/19/97	4:28 PM
	MAT	Mat97.mat	4/7/97	10:14 PM
	CEI	9702cal.cei	4/20/97	11:18 AM
	IDL	Trial97.idl	3/17/97	5:21 PM
	CNR	Clb97pre.cnr	3/24/97	2:19 PM
2 nd Stage	ENH	Clb9602.enh	2/22/96	6:06 PM
	FCS	Trial97.fcs	4/20/97	1:11 PM
	EVO	9702b.evo	4/20/97	1:30 PM
	OP6	9702b.op6	4/20/97	1:23 PM
	BSE	Clb9621.bse	3/10/96	8:24 AM
	STK	Clb9621.stk	3/6/96	4:27 PM
	FP	Oldspf9b.fp	4/20/97	1:19 PM
	MAT	Mat97.mat	4/7/97	10:14 PM
	CEI	9702cal.cei	4/20/97	11:18 AM
	IDL	Trial97.idl	3/17/97	5:21 PM
Projection	CNR	Clb97pre.cnr	3/24/97	2:19 PM
	ENH	Clb9602.enh	2/22/96	6:06 PM
	EVO	9702b.evo	4/20/97	1:30 PM
	OP6	9702p.op6	5/20/97	1:09 PM
	BSE	Clb9621.bse	3/10/96	8:24 AM
	STK	Clb9621.stk	3/6/96	4:27 PM
	FP	Oldspf97.fp	4/19/97	4:28 PM
	MAT	Mat97.mat	4/7/97	10:14 PM
	CEI	9702proj.cei	4/20/97	11:18 AM
	IDL	Trial97.idl	3/17/97	5:21 PM

Appendix C

Base period cohort sizes, maturity rates, adult equivalencies, and fishery specific legal catch
exploitation rates for stocks in the PSC Chinook model.

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Table C-1. Alaska South SE base period data. Shading represents exploitation rates on mature fish.

Stock Name	Alaska South SE (AKS)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	77,296	42,857	22,275	3,879
Maturity rate	0.0548	0.1213	0.6491	1.0000
Adult Equivalence	0.5839	0.7996	0.9649	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0001	0.3339	0.3212	0.3126
NBC troll	0.0000	0.0107	0.0109	0.0008
CBC troll	0.0000	0.0000	0.0003	0.0000
WCVI troll	0.0000	0.0000	0.0000	0.0000
Southern US troll	0.0000	0.0025	0.0027	0.0000
GS troll	0.0000	0.0000	0.0000	0.0000
SEAK net	0.0044	0.0108	0.0456	0.0238
NBC net	0.0006	0.0004	0.0034	0.0079
CBC net	0.0001	0.0000	0.0000	0.0000
WCVI net	0.0000	0.0000	0.0000	0.0000
Juan de Fuca net	0.0000	0.0000	0.0000	0.0000
North PS net	0.0000	0.0000	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0003
Johnstone Strait net	0.0000	0.0000	0.0000	0.0000
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0525	0.0538	0.0592
NCBC sport	0.0000	0.0000	0.0001	0.0000
WCVI sport	0.0000	0.0000	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0000	0.0000	0.0000
North PS sport	0.0000	0.0000	0.0000	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0000	0.0000	0.0000	0.0000
Freshwater sport	0.0000	0.0000	0.0000	0.0000

Table C-2. Northern/Central BC base period data. Shading represents exploitation rates on mature fish.

Stock Name	Northern/Central B.C. (NTH)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	315,185	149,103	66,432	13,708
Maturity rate	0.0499	0.1447	0.6910	1.0000
Adult Equivalence	0.5872	0.8078	0.9691	1.0000
Fishery	1979-1982 Legal Catch	Exploitation Rate		
SEAK troll	0.0263	0.2668	0.0892	0.2561
NBC troll	0.0259	0.0382	0.0419	0.0911
CBC troll	0.0026	0.0312	0.0091	0.0162
WCVI troll	0.0015	0.0027	0.0020	0.0000
Southern US troll	0.0000	0.0000	0.0000	0.0000
GS troll	0.0000	0.0000	0.0000	0.0000
SEAK net	0.0046	0.0021	0.0062	0.0081
NBC net	0.0139	0.0196	0.0463	0.0726
CBC net	0.0056	0.0115	0.0206	0.0063
WCVI net	0.0000	0.0000	0.0089	0.0000
Juan de Fuca net	0.0013	0.0000	0.0000	0.0000
North PS net	0.0000	0.0000	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0001	0.0004	0.0000	0.0000
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.2436	0.0288	0.0043	0.0039
NCBC sport	0.6093	0.0068	0.0115	0.0225
WCVI sport	0.0000	0.0000	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0000	0.0000	0.0000
North PS sport	0.0000	0.0000	0.0000	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0032	0.0000	0.0000	0.0000
Freshwater sport	0.0000	0.0171	0.0004	0.0081

Table C-3. Fraser Early base period data. Shading represents exploitation rates on mature fish.

Stock Name	Fraser Early (FRE)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	372,533	209,042	118,314	23,479
Maturity rate	0.0261	0.1450	0.6871	1.0000
Adult Equivalence	0.5767	0.8076	0.9687	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0108	0.1010	0.0953
NBC troll	0.0099	0.0000	0.0479	0.1266
CBC troll	0.0000	0.0013	0.0193	0.0174
WCVI troll	0.0000	0.0000	0.0230	0.0180
Southern US troll	0.0000	0.0000	0.0000	0.0000
GS troll	0.0000	0.0013	0.0019	0.0000
SEAK net	0.0000	0.0000	0.0141	0.0000
NBC net	0.0017	0.0013	0.0282	0.0201
CBC net	0.0036	0.0034	0.0000	0.0000
WCVI net	0.0000	0.0000	0.0000	0.0000
Juan de Fuca net	0.0000	0.0000	0.0000	0.0527
North PS net	0.0000	0.0036	0.0595	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0019	0.0068	0.0458	0.0163
Fraser net	0.0000	0.0000	0.5553	0.3744
SEAK sport	0.0000	0.0000	0.0013	0.0000
NCBC sport	0.0000	0.0000	0.0000	0.0000
WCVI sport	0.0000	0.0000	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0000	0.0039	0.0000
North PS sport	0.0000	0.0000	0.0000	0.0000
South PS sport	0.0056	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0054	0.0141	0.0109	0.0343
Freshwater sport	0.0000	0.0000	0.0000	0.0000

Table C-4. Fraser Late base period data. Shading represents exploitation rates on mature fish.

Stock Name	Fraser Late (FRL)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	2,367,197	1,219,934	416,344	37,831
Maturity rate	0.0761	0.0907	0.8500	1.0000
Adult Equivalence	0.5869	0.7898	0.9708	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0003	0.0027	0.0000
NBC troll	0.0007	0.0049	0.0021	0.0022
CBC troll	0.0007	0.0858	0.0501	0.0112
WCVI troll	0.0000	0.1726	0.1895	0.0046
Southern US troll	0.0020	0.0787	0.0351	0.0000
GS troll	0.0090	0.0903	0.1786	0.0022
SEAK net	0.0000	0.0000	0.0000	0.0000
NBC net	0.0000	0.0000	0.0025	0.0000
CBC net	0.0085	0.0013	0.0000	0.0000
WCVI net	0.0008	0.0014	0.0000	0.0000
Juan de Fuca net	0.0007	0.0028	0.0016	0.0000
North PS net	0.0124	0.0031	0.0092	0.0000
Other PS net	0.0069	0.0011	0.0000	0.0000
Wash Coast net	0.0039	0.0029	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0073	0.0101	0.0074	0.0023
Fraser net	0.4656	0.3424	0.0197	0.0046
SEAK sport	0.0000	0.0000	0.0005	0.0000
NCBC sport	0.0059	0.0000	0.0009	0.0000
WCVI sport	0.0000	0.0002	0.0022	0.0000
Southern US Ocn sport	0.0049	0.0172	0.0056	0.0089
North PS sport	0.0104	0.0042	0.0000	0.0000
South PS sport	0.0286	0.0069	0.0011	0.0000
Strait of Georgia sport	0.0452	0.1355	0.1693	0.0044
Freshwater sport	0.0000	0.0000	0.0000	0.0000

Table C-5. WCVI Hatchery data base period data. Shading represents exploitation rates on mature fish.

Stock Name	WCVI Hatchery (RBH)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	322,354	165,062	64,612	8,768
Maturity rate	0.0542	0.1763	0.6119	1.0000
Adult Equivalence	0.5903	0.8097	0.9612	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0001	0.1576	0.3251	0.4051
NBC troll	0.0004	0.0830	0.0869	0.1053
CBC troll	0.0042	0.0920	0.0754	0.0426
WCVI troll	0.0011	0.0718	0.0742	0.0328
Southern US troll	0.0000	0.0003	0.0000	0.0000
GS troll	0.0000	0.0005	0.0000	0.0000
SEAK net	0.0005	0.0135	0.0652	0.0707
NBC net	0.0002	0.0131	0.0713	0.0825
CBC net	0.0036	0.0048	0.0344	0.0135
WCVI net	0.0386	0.1474	0.2087	0.2882
Juan de Fuca net	0.0006	0.0025	0.0023	0.0000
North PS net	0.0002	0.0006	0.0112	0.0000
Other PS net	0.0004	0.0000	0.0035	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0015	0.0022	0.0191	0.0800
Fraser net	0.0000	0.0000	0.0011	0.0000
SEAK sport	0.0000	0.0074	0.0141	0.0128
NCBC sport	0.0000	0.0010	0.0010	0.0000
WCVI sport	0.5609	0.1629	0.1667	0.2013
Southern US Ocn sport	0.0000	0.0000	0.0000	0.0000
North PS sport	0.0000	0.0000	0.0007	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0009	0.0034	0.0022	0.0100
Freshwater sport	0.0000	0.0000	0.0000	0.0000

Table C-6. WCVI Natural base period data. Shading represents exploitation rates on mature fish.

Stock Name	WCVI Natural (RBT)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	374,307	209,560	91,557	13,094
Maturity rate	0.0542	0.1763	0.6119	1.0000
Adult Equivalence	0.5903	0.8097	0.9612	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0001	0.1576	0.3251	0.4051
NBC troll	0.0004	0.0830	0.0869	0.1053
CBC troll	0.0042	0.0920	0.0754	0.0426
WCVI troll	0.0011	0.0718	0.0742	0.0328
Southern US troll	0.0000	0.0003	0.0000	0.0000
GS troll	0.0000	0.0005	0.0000	0.0000
SEAK net	0.0005	0.0135	0.0652	0.0707
NBC net	0.0002	0.0131	0.0713	0.0825
CBC net	0.0036	0.0048	0.0344	0.0135
WCVI net	0.0386	0.1474	0.2087	0.2882
Juan de Fuca net	0.0006	0.0025	0.0023	0.0000
North PS net	0.0002	0.0006	0.0112	0.0000
Other PS net	0.0004	0.0000	0.0035	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0015	0.0022	0.0191	0.0800
Fraser net	0.0000	0.0000	0.0011	0.0000
SEAK sport	0.0000	0.0074	0.0141	0.0128
NCBC sport	0.0000	0.0010	0.0010	0.0000
WCVI sport	0.5609	0.1629	0.1667	0.2013
Southern US Ocn sport	0.0000	0.0000	0.0000	0.0000
North PS sport	0.0000	0.0000	0.0007	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0009	0.0034	0.0022	0.0100
Freshwater sport	0.0000	0.0000	0.0000	0.0000

Table C-7. Upper Strait of Georgia base period data. Shading represents exploitation rates on mature fish.

Stock Name	Upper Strait of Georgia (GSQ)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	179,936	101,006	54,467	24,462
Maturity rate	0.0004	0.0096	0.2477	1.0000
Adult Equivalence	0.5198	0.7423	0.9248	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0119	0.1271	0.1744
NBC troll	0.0000	0.1007	0.0612	0.0841
CBC troll	0.0009	0.0210	0.0791	0.0893
WCVI troll	0.0000	0.0000	0.0022	0.0093
Southern US troll	0.0000	0.0000	0.0000	0.0000
GS troll	0.0030	0.0078	0.0020	0.0000
SEAK net	0.0000	0.0177	0.0886	0.0174
NBC net	0.0061	0.0354	0.0641	0.0719
CBC net	0.0471	0.0409	0.1255	0.0985
WCVI net	0.0000	0.0000	0.0000	0.0110
Juan de Fuca net	0.0000	0.0006	0.0000	0.0000
North PS net	0.0000	0.0000	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0086	0.0091	0.1984	0.1804
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0049	0.0251	0.0270
NCBC sport	0.0585	0.0078	0.0071	0.0424
WCVI sport	0.0000	0.0000	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0000	0.0000	0.0000
North PS sport	0.0000	0.0000	0.0000	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0055	0.0095	0.0340	0.0647
Freshwater sport	0.0000	0.0000	0.0000	0.0000

Table C-8. Lower Strait of Georgia Natural base period data. Shading represents exploitation rates on mature fish.

Stock Name	Lower Strait of Georgia Natural (GST)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	412,191	181,171	27,565	929
Maturity rate	0.0376	0.2269	0.9214	1.0000
Adult Equivalence	0.6038	0.8405	0.9921	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0085	0.0299	0.0710
NBC troll	0.0006	0.0428	0.0277	0.1697
CBC troll	0.0003	0.0901	0.0561	0.0428
WCVI troll	0.0009	0.0299	0.0240	0.0000
Southern US troll	0.0000	0.0000	0.0000	0.0000
GS troll	0.0576	0.1872	0.0937	0.0995
SEAK net	0.0000	0.0017	0.0411	0.0476
NBC net	0.0020	0.0033	0.0173	0.0000
CBC net	0.0412	0.0115	0.0314	0.1675
WCVI net	0.0004	0.0006	0.0000	0.0000
Juan de Fuca net	0.0000	0.0000	0.0054	0.0000
North PS net	0.0013	0.0025	0.0186	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0001	0.0008	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0325	0.0317	0.1611	0.1202
Fraser net	0.0013	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0012	0.0054	0.0000
NCBC sport	0.0217	0.0043	0.0111	0.0000
WCVI sport	0.0011	0.0003	0.0000	0.0000
Southern US Ocn sport	0.0013	0.0000	0.0032	0.0000
North PS sport	0.0056	0.0015	0.0079	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.1111	0.2568	0.2179	0.0281
Freshwater sport	0.1367	0.1621	0.0605	0.1428

Table C-9. Lower Strait of Georgia Hatchery base period data. Shading represents exploitation rates on mature fish.

Stock Name	Lower Strait of Georgia Hatchery (GSH)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	196,675	73,179	9,196	271
Maturity rate	0.0376	0.2269	0.9214	1.0000
Adult Equivalence	0.6038	0.8405	0.9921	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0085	0.0299	0.0710
NBC troll	0.0006	0.0428	0.0277	0.1697
CBC troll	0.0003	0.0901	0.0561	0.0428
WCVI troll	0.0009	0.0299	0.0240	0.0000
Southern US troll	0.0000	0.0000	0.0000	0.0000
GS troll	0.0576	0.1872	0.0937	0.0995
SEAK net	0.0000	0.0017	0.0411	0.0476
NBC net	0.0020	0.0033	0.0173	0.0000
CBC net	0.0412	0.0115	0.0314	0.1675
WCVI net	0.0004	0.0006	0.0000	0.0000
Juan de Fuca net	0.0000	0.0000	0.0054	0.0000
North PS net	0.0013	0.0025	0.0186	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0001	0.0008	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0325	0.0317	0.1611	0.1202
Fraser net	0.0013	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0012	0.0054	0.0000
NCBC sport	0.0217	0.0043	0.0111	0.0000
WCVI sport	0.0011	0.0003	0.0000	0.0000
Southern US Ocn sport	0.0013	0.0000	0.0032	0.0000
North PS sport	0.0056	0.0015	0.0079	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.1111	0.2568	0.2179	0.0281
Freshwater sport	0.1367	0.1621	0.0605	0.1428

Table C-10. Nooksack Fall base period data. Shading represents exploitation rates on mature fish.

Stock Name	Nooksack Fall (NKF)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	571,852	391,331	202,397	12,219
Maturity rate	0.0090	0.1498	0.8712	1.0000
Adult Equivalence	0.5787	0.8212	0.9871	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0007	0.0012	0.0000
NBC troll	0.0000	0.0046	0.0023	0.0000
CBC troll	0.0000	0.0050	0.0199	0.0191
WCVI troll	0.0000	0.0788	0.1791	0.1161
Southern US troll	0.0000	0.0077	0.0315	0.0083
GS troll	0.0031	0.0331	0.0188	0.0000
SEAK net	0.0000	0.0004	0.0000	0.0000
NBC net	0.0000	0.0016	0.0025	0.0000
CBC net	0.0045	0.0050	0.0027	0.0000
WCVI net	0.0017	0.0073	0.0047	0.0000
Juan de Fuca net	0.0065	0.0031	0.0000	0.0000
North PS net	0.5843	0.4332	0.0989	0.0942
Other PS net	0.3321	0.4785	0.7042	0.8759
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0018	0.0063	0.0090	0.0000
Fraser net	0.0002	0.0004	0.0018	0.0047
SEAK sport	0.0000	0.0002	0.0002	0.0000
NCBC sport	0.0153	0.0014	0.0000	0.0000
WCVI sport	0.0003	0.0021	0.0018	0.0000
Southern US Ocn sport	0.0000	0.0011	0.0027	0.0000
North PS sport	0.0289	0.0185	0.0532	0.0739
South PS sport	0.0458	0.0119	0.0101	0.0090
Strait of Georgia sport	0.0141	0.0852	0.1269	0.0577
Freshwater sport	0.0130	0.0000	0.0000	0.0000

Table C-11. Puget Sound Fall Fingerling base period data. Shading represents exploitation rates on mature fish.

Stock Name	Puget Sound Fingerling (PSF)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	315,685	164,164	72,760	6,804
Maturity rate	0.0197	0.1422	0.8122	1.0000
Adult Equivalence	0.5794	0.8156	0.9812	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0000	0.0046	0.0000
NBC troll	0.0000	0.0003	0.0049	0.0000
CBC troll	0.0000	0.0022	0.0140	0.0000
WCVI troll	0.0049	0.1000	0.1804	0.1985
Southern US troll	0.0000	0.0106	0.0351	0.0242
GS troll	0.0002	0.0058	0.0195	0.0000
SEAK net	0.0000	0.0001	0.0000	0.0000
NBC net	0.0000	0.0016	0.0000	0.0000
CBC net	0.0015	0.0016	0.0003	0.0000
WCVI net	0.0017	0.0092	0.0010	0.0000
Juan de Fuca net	0.0040	0.0024	0.0030	0.0075
North PS net	0.0965	0.2218	0.0455	0.0201
Other PS net	0.9326	0.3601	0.3570	0.4537
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0012	0.0032	0.0030	0.0000
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0000	0.0007	0.0000
NCBC sport	0.0000	0.0003	0.0012	0.0000
WCVI sport	0.0000	0.0012	0.0015	0.0000
Southern US Ocn sport	0.0000	0.0013	0.0009	0.0000
North PS sport	0.0081	0.0202	0.0492	0.0639
South PS sport	0.1827	0.0862	0.0617	0.0671
Strait of Georgia sport	0.0086	0.0461	0.0205	0.0065
Freshwater sport	0.0000	0.0000	0.0010	0.0000

Table C-12. Puget Sound Natural Fall base period data. Shading represents exploitation rates on mature fish.

Stock Name	Puget Sound Natural Fall (PSN)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	209,427	113,554	50,491	4,747
Maturity rate	0.0218	0.1493	0.8113	1.0000
Adult Equivalence	0.5813	0.8170	0.9811	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0000	0.0042	0.0000
NBC troll	0.0000	0.0004	0.0045	0.0000
CBC troll	0.0000	0.0025	0.0141	0.0000
WCVI troll	0.0044	0.0992	0.1864	0.2056
Southern US troll	0.0000	0.0116	0.0338	0.0207
GS troll	0.0001	0.0058	0.0179	0.0000
SEAK net	0.0000	0.0001	0.0000	0.0000
NBC net	0.0000	0.0017	0.0000	0.0000
CBC net	0.0014	0.0015	0.0005	0.0000
WCVI net	0.0017	0.0096	0.0010	0.0000
Juan de Fuca net	0.0043	0.0022	0.0031	0.0075
North PS net	0.0862	0.2289	0.0536	0.0186
Other PS net	1.0085	0.3701	0.3299	0.4473
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0012	0.0029	0.0025	0.0000
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0000	0.0008	0.0000
NCBC sport	0.0000	0.0003	0.0010	0.0000
WCVI sport	0.0000	0.0012	0.0013	0.0000
Southern US Ocn sport	0.0000	0.0018	0.0013	0.0000
North PS sport	0.0119	0.0210	0.0492	0.0613
South PS sport	0.1980	0.0882	0.0613	0.0613
Strait of Georgia sport	0.0092	0.0438	0.0205	0.0073
Freshwater sport	0.0000	0.0000	0.0010	0.0000

Table C-13. Puget Sound Fall Yearling base period data. Shading represents exploitation rates on mature fish.

Stock Name	Puget Sound Yearling (PSY)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	264,624	139,924	46,945	5,704
Maturity rate	0.0338	0.1393	0.6587	1.0000
Adult Equivalence	0.5778	0.8044	0.9659	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0000	0.0037	0.0060
NBC troll	0.0000	0.0022	0.0112	0.0060
CBC troll	0.0000	0.0030	0.0239	0.0222
WCVI troll	0.0009	0.0474	0.2027	0.0585
Southern US troll	0.0000	0.0052	0.0070	0.0128
GS troll	0.0003	0.0402	0.0694	0.0282
SEAK net	0.0000	0.0000	0.0000	0.0000
NBC net	0.0000	0.0027	0.0047	0.0000
CBC net	0.0002	0.0247	0.0131	0.0105
WCVI net	0.0002	0.0209	0.0252	0.0175
Juan de Fuca net	0.0008	0.0182	0.0000	0.0000
North PS net	0.0625	0.2885	0.0472	0.0210
Other PS net	0.2856	0.4276	0.3898	0.3912
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0000	0.0126	0.0186	0.0176
Fraser net	0.0005	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0000	0.0011	0.0020
NCBC sport	0.0000	0.0024	0.0011	0.0000
WCVI sport	0.0000	0.0008	0.0011	0.0000
Southern US Ocn sport	0.0000	0.0023	0.0000	0.0000
North PS sport	0.0098	0.0200	0.0504	0.0967
South PS sport	0.1581	0.1606	0.1010	0.0927
Strait of Georgia sport	0.0206	0.0963	0.1007	0.1057
Freshwater sport	0.0000	0.0054	0.0000	0.0139

Table C-14. Nooksack Spring base period data. Shading represents exploitation rates on mature fish.

Stock Name	Nooksack Spring (NKS)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	24,565	11,645	1,235	71
Maturity rate	0.0304	0.3743	0.9108	0.0000
Adult Equivalence	0.5939	0.8302	0.9108	0.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0000	0.0000	0.0000
NBC troll	0.0000	0.0000	0.0218	0.0000
CBC troll	0.0000	0.0228	0.0000	0.0000
WCVI troll	0.0000	0.1417	0.0000	0.0000
Southern US troll	0.0000	0.0000	0.0000	0.0000
GS troll	0.0000	0.4271	0.0000	0.0000
SEAK net	0.0000	0.0000	0.0000	0.0000
NBC net	0.0046	0.0000	0.0000	0.0000
CBC net	0.0030	0.0049	0.0000	0.0000
WCVI net	0.0191	0.0698	0.0000	0.0000
Juan de Fuca net	0.0161	0.0000	0.0000	0.0000
North PS net	1.4781	0.0614	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0043	0.0000	0.0000	0.0000
Fraser net	0.0119	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0000	0.0000	0.0000
NCBC sport	0.0000	0.0000	0.0000	0.0000
WCVI sport	0.0000	0.0000	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0000	0.0000	0.0000
North PS sport	0.0000	0.0241	0.0211	0.0000
South PS sport	0.0000	0.0096	0.0000	0.0000
Strait of Georgia sport	0.1381	0.1336	0.1686	0.9985
Freshwater sport	0.0000	0.0000	0.0000	0.0000

Table C-15. Skagit Summer/Fall Wild base period data. Shading represents exploitation rates on mature fish.

Stock Name	Skagit Wild (SKG)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	110,352	58,543	22,251	2,646
Maturity rate	0.0135	0.1946	0.8106	1.0000
Adult Equivalence	0.5844	0.8267	0.9811	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0173	0.0165	0.0086
NBC troll	0.0069	0.0254	0.0268	0.0000
CBC troll	0.0093	0.0509	0.0370	0.0058
WCVI troll	0.0185	0.1218	0.0765	0.1462
Southern US troll	0.0000	0.0000	0.0000	0.0000
GS troll	0.0066	0.0254	0.0141	0.0000
SEAK net	0.0000	0.0014	0.0000	0.0000
NBC net	0.0000	0.0073	0.0000	0.0000
CBC net	0.0175	0.0331	0.0012	0.0000
WCVI net	0.0013	0.0132	0.0012	0.0147
Juan de Fuca net	0.0047	0.0046	0.0000	0.0000
North PS net	0.1953	0.0357	0.0262	0.0000
Other PS net	0.0000	0.1153	0.2032	0.4743
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0073	0.0103	0.0036	0.0296
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0016	0.0016	0.0000
NCBC sport	0.0071	0.0039	0.0080	0.0000
WCVI sport	0.0000	0.0013	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0004	0.0000	0.0000
North PS sport	0.0285	0.0119	0.0011	0.0432
South PS sport	0.0092	0.0123	0.0198	0.0230
Strait of Georgia sport	0.0441	0.0689	0.0221	0.0000
Freshwater sport	0.0000	0.0000	0.0000	0.0146

Table C-16. Stillaguamish Summer/Fall Wild base period data. Shading represents exploitation rates on mature fish.

Stock Name	Stillaguamish Wild (STL)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	7,374	3,891	1,286	78
Maturity rate	0.0138	0.2239	0.8925	1.0000
Adult Equivalence	0.5924	0.8381	0.9893	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0000	0.0662	0.0000
NBC troll	0.0000	0.0355	0.0000	0.0000
CBC troll	0.0000	0.1042	0.0000	0.0000
WCVI troll	0.0000	0.1532	0.0778	0.0000
Southern US troll	0.0000	0.0000	0.0000	0.0000
GS troll	0.0000	0.0000	0.0000	0.0000
SEAK net	0.0028	0.0000	0.0000	0.0000
NBC net	0.0144	0.0321	0.0000	0.0000
CBC net	0.0144	0.0028	0.0000	0.0000
WCVI net	0.0157	0.0234	0.0000	0.0000
Juan de Fuca net	0.0028	0.0000	0.0000	0.0000
North PS net	0.2919	0.0570	0.0610	0.0000
Other PS net	0.1459	0.1937	0.1768	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0064	0.0111	0.0000	0.0000
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0000	0.0312	0.0000
NCBC sport	0.0000	0.0111	0.0000	0.0000
WCVI sport	0.0000	0.0109	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0000	0.0000	0.0000
North PS sport	0.0000	0.0055	0.0000	0.0000
South PS sport	0.2333	0.0578	0.0264	0.2240
Strait of Georgia sport	0.0187	0.0586	0.1019	0.0000
Freshwater sport	0.0000	0.0000	0.0000	0.0000

Table C-17. Snohomish Summer/Fall Wild base period data. Shading represents exploitation rates on mature fish.

Stock Name	Snohomish Wild (SNO)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	76,698	41,360	16,770	2,781
Maturity rate	0.0093	0.1533	0.7413	1.0000
Adult Equivalence	0.5732	0.8131	0.9741	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0171	0.0154	0.0058
NBC troll	0.0069	0.0250	0.0249	0.0000
CBC troll	0.0093	0.0502	0.0345	0.0039
WCVI troll	0.0184	0.1200	0.0712	0.0977
Southern US troll	0.0000	0.0000	0.0000	0.0000
GS troll	0.0065	0.0250	0.0131	0.0000
SEAK net	0.0000	0.0013	0.0000	0.0000
NBC net	0.0000	0.0072	0.0000	0.0000
CBC net	0.0174	0.0326	0.0012	0.0000
WCVI net	0.0013	0.0131	0.0012	0.0090
Juan de Fuca net	0.0047	0.0045	0.0000	0.0000
North PS net	0.2799	0.0443	0.0261	0.0000
Other PS net	0.0000	0.4040	0.5727	0.8178
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0072	0.0101	0.0036	0.0181
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0016	0.0015	0.0000
NCBC sport	0.0070	0.0039	0.0074	0.0000
WCVI sport	0.0000	0.0013	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0003	0.0000	0.0000
North PS sport	0.0283	0.0118	0.0011	0.0289
South PS sport	0.0091	0.0121	0.0184	0.0154
Strait of Georgia sport	0.0438	0.0679	0.0206	0.0000
Freshwater sport	0.0000	0.0000	0.0000	0.0089

Table C-18. Washington Coastal Fall Hatchery base period data. Shading represents exploitation rates on mature fish.

Stock Name	Washington Coastal Hatchery (WCH)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	126,901	67,291	30,532	7,120
Maturity rate	0.0976	0.1992	0.5926	1.0000
Adult Equivalence	0.6116	0.8137	0.9593	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0512	0.1076	0.2082
NBC troll	0.0000	0.0943	0.0812	0.1310
CBC troll	0.0000	0.0046	0.0553	0.0066
WCVI troll	0.0000	0.0692	0.0445	0.0136
Southern US troll	0.0000	0.0219	0.0000	0.0000
GS troll	0.0000	0.0000	0.0000	0.0000
SEAK net	0.0067	0.0000	0.0162	0.0000
NBC net	0.0000	0.0029	0.0121	0.0204
CBC net	0.0026	0.0021	0.0000	0.0000
WCVI net	0.0006	0.0064	0.0000	0.0000
Juan de Fuca net	0.0002	0.0000	0.0000	0.0000
North PS net	0.0000	0.0006	0.0218	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.1273	0.5223	0.7860	0.5747
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0008	0.0000	0.0000	0.0138
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.1303	0.0047	0.0035	0.0044
NCBC sport	0.0000	0.0000	0.0000	0.0000
WCVI sport	0.0024	0.0012	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0000	0.0035	0.0000
North PS sport	0.0027	0.0110	0.0000	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0000	0.0262	0.0000	0.0000
Freshwater sport	0.0000	0.0000	0.0000	0.0000

Table C-19. Columbia Upriver Bright base period data. Shading represents exploitation rates on mature fish.

Stock Name	Columbia Upriver Brights (URB)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	337,179	203,681	111,797	27,524
Maturity rate	0.0257	0.1116	0.5438	1.0000
Adult Equivalence	0.5644	0.7899	0.9544	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0499	0.1652	0.2386
NBC troll	0.0000	0.0286	0.0635	0.0640
CBC troll	0.0000	0.0142	0.0234	0.0099
WCVI troll	0.0003	0.0729	0.0728	0.0420
Southern US troll	0.0000	0.0057	0.0101	0.0033
GS troll	0.0000	0.0013	0.0055	0.0000
SEAK net	0.0000	0.0037	0.0009	0.0010
NBC net	0.0013	0.0057	0.0470	0.0030
CBC net	0.0076	0.0104	0.0075	0.0000
WCVI net	0.0004	0.0000	0.0000	0.0000
Juan de Fuca net	0.0036	0.0011	0.0000	0.0000
North PS net	0.0001	0.0001	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0011	0.0000
Wash Coast net	0.0000	0.0000	0.0005	0.0000
Columbia River net	0.0644	0.3372	0.2600	0.0739
Johnstone Strait net	0.0007	0.0011	0.0091	0.0007
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0033	0.0078	0.0046
NCBC sport	0.0000	0.0000	0.0024	0.0000
WCVI sport	0.0003	0.0000	0.0015	0.0000
Southern US Ocn sport	0.0000	0.0063	0.0068	0.0054
North PS sport	0.0003	0.0051	0.0009	0.0058
South PS sport	0.0011	0.0009	0.0000	0.0000
Strait of Georgia sport	0.0002	0.0034	0.0026	0.0000
Freshwater sport	0.0433	0.0081	0.0020	0.0039

Table C-20. Spring Creek Hatchery base period data. Shading represents exploitation rates on mature fish.

Stock Name	Spring Creek Hatchery (SPR)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	761,919	393,383	49,351	1,089
Maturity rate	0.0306	0.6102	0.9533	1.0000
Adult Equivalence	0.6553	0.9206	0.9953	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0000	0.0000	0.0000
NBC troll	0.0000	0.0003	0.0028	0.0000
CBC troll	0.0000	0.0048	0.0129	0.0000
WCVI troll	0.0056	0.3106	0.2694	0.2544
Southern US troll	0.0032	0.4129	0.1061	0.0216
GS troll	0.0003	0.0009	0.0000	0.0000
SEAK net	0.0000	0.0000	0.0000	0.0000
NBC net	0.0000	0.0000	0.0000	0.0000
CBC net	0.0004	0.0014	0.0000	0.0000
WCVI net	0.0080	0.0029	0.0000	0.0000
Juan de Fuca net	0.0047	0.0011	0.0018	0.0000
North PS net	0.0053	0.0052	0.0014	0.0000
Other PS net	0.0017	0.0007	0.0014	0.0000
Wash Coast net	0.0004	0.0056	0.0259	0.0000
Columbia River net	0.5077	0.6464	0.5775	0.3897
Johnstone Strait net	0.0001	0.0005	0.0000	0.0000
Fraser net	0.0000	0.0001	0.0000	0.0000
SEAK sport	0.0000	0.0000	0.0000	0.0000
NCBC sport	0.0000	0.0000	0.0000	0.0000
WCVI sport	0.0034	0.0003	0.0000	0.0000
Southern US Ocn sport	0.0446	0.0633	0.0187	0.0000
North PS sport	0.0435	0.0166	0.0137	0.0000
South PS sport	0.0207	0.0037	0.0000	0.0000
Strait of Georgia sport	0.0060	0.0080	0.0172	0.0000
Freshwater sport	0.0000	0.0005	0.0000	0.0000

Table C-21. Lower Bonneville Hatchery base period data. Shading represents exploitation rates on mature fish.

Stock Name	Lower Bonneville Hatchery (BON)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	402,991	205,100	38,140	178
Maturity rate	0.0101	0.3972	0.9877	1.0000
Adult Equivalence	0.6191	0.8788	0.9988	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0000	0.0000	0.0000
NBC troll	0.0000	0.0000	0.0000	0.0000
CBC troll	0.0000	0.0019	0.0980	0.0000
WCVI troll	0.0000	0.3803	0.3027	0.0000
Southern US troll	0.0000	0.3192	0.0737	0.0000
GS troll	0.0000	0.0000	0.0000	0.0000
SEAK net	0.0000	0.0000	0.0000	0.0000
NBC net	0.0000	0.0000	0.0000	0.0000
CBC net	0.0015	0.0000	0.0000	0.0000
WCVI net	0.0012	0.0107	0.0000	0.0000
Juan de Fuca net	0.0009	0.0012	0.0000	0.0000
North PS net	0.0000	0.0013	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0010	0.0000	0.0000	0.0000
Columbia River net	0.2397	0.4010	0.3567	0.0000
Johnstone Strait net	0.0011	0.0004	0.0000	0.0000
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0000	0.0000	0.0000
NCBC sport	0.0000	0.0000	0.0000	0.0000
WCVI sport	0.0034	0.0063	0.0000	0.0000
Southern US Ocn sport	0.0146	0.0367	0.0000	0.0000
North PS sport	0.0077	0.0233	0.0421	0.0000
South PS sport	0.0373	0.0055	0.0000	0.0000
Strait of Georgia sport	0.0017	0.0074	0.0316	0.0000
Freshwater sport	0.0000	0.0128	0.0000	0.0000

Table C-22. Fall Cowlitz Hatchery base period data. Shading represents exploitation rates on mature fish.

Stock Name	Fall Cowlitz Hatchery (CWF)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	198,271	114,628	52,503	3,721
Maturity rate	0.0168	0.1287	0.8169	1.0000
Adult Equivalence	0.5764	0.8130	0.9817	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0000	0.0725	0.0804
NBC troll	0.0000	0.0086	0.0238	0.0000
CBC troll	0.0000	0.0025	0.0000	0.0000
WCVI troll	0.0000	0.1077	0.2095	0.3893
Southern US troll	0.0000	0.1721	0.1432	0.0425
GS troll	0.0000	0.0022	0.0000	0.0000
SEAK net	0.0000	0.0000	0.0000	0.0000
NBC net	0.0000	0.0065	0.0107	0.0000
CBC net	0.0013	0.0027	0.0000	0.0000
WCVI net	0.0000	0.0000	0.0000	0.0000
Juan de Fuca net	0.0049	0.0037	0.0000	0.0000
North PS net	0.0000	0.0052	0.0163	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0012	0.0000	0.0000
Columbia River net	0.3151	0.3708	0.2257	0.0000
Johnstone Strait net	0.0000	0.0011	0.0107	0.0531
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0000	0.0054	0.0000
NCBC sport	0.0000	0.0000	0.0052	0.0000
WCVI sport	0.0000	0.0000	0.0063	0.0000
Southern US Ocn sport	0.0000	0.0595	0.0904	0.0000
North PS sport	0.0000	0.0016	0.0000	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0000	0.0000	0.0000	0.0000
Freshwater sport	0.0244	0.0624	0.0107	0.0000

Table C-23. Lewis River Wild base period data. Shading represents exploitation rates on mature fish.

Stock Name	Lewis River Wild (LRW)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	118,822	66,057	37,630	7,673
Maturity rate	0.0472	0.1092	0.6600	1.0000
Adult Equivalence	0.5792	0.7976	0.9660	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0033	0.0780	0.1520
NBC troll	0.0000	0.0107	0.0340	0.0095
CBC troll	0.0000	0.0011	0.0089	0.0334
WCVI troll	0.0106	0.0452	0.0831	0.0000
Southern US troll	0.0021	0.0338	0.0290	0.0000
GS troll	0.0000	0.0035	0.0000	0.0095
SEAK net	0.0000	0.0000	0.0208	0.0000
NBC net	0.0000	0.0018	0.0109	0.0000
CBC net	0.0051	0.0011	0.0000	0.0000
WCVI net	0.0000	0.0000	0.0000	0.0000
Juan de Fuca net	0.0010	0.0035	0.0066	0.0000
North PS net	0.0051	0.0019	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0000	0.0166	0.0000
Columbia River net	0.1143	0.1073	0.0388	0.0555
Johnstone Strait net	0.0015	0.0000	0.0000	0.0000
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0000	0.0033	0.0048
NCBC sport	0.0000	0.0000	0.0027	0.0000
WCVI sport	0.0000	0.0000	0.0000	0.0000
Southern US Ocn sport	0.0139	0.0143	0.0262	0.0237
North PS sport	0.0046	0.0035	0.0000	0.0000
South PS sport	0.0114	0.0017	0.0000	0.0000
Strait of Georgia sport	0.0000	0.0000	0.0000	0.0000
Freshwater sport	0.6150	0.2289	0.0994	0.1656

Table C-24. Willamette Spring Hatchery base period data. Shading represents exploitation rates on mature fish.

Stock Name	Willamette River Hatchery (WSH)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	67,455	37,595	9,986	496
Maturity rate	0.0022	0.5109	0.9348	1.0000
Adult Equivalence	0.6305	0.8996	0.9935	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0016	0.2377	0.0092	0.0000
NBC troll	0.0558	0.1633	0.0127	0.0000
CBC troll	0.0032	0.0020	0.0000	0.0000
WCVI troll	0.0402	0.0520	0.0090	0.0000
Southern US troll	0.0029	0.0128	0.0214	0.0000
GS troll	0.0000	0.0000	0.0000	0.0000
SEAK net	0.0016	0.0000	0.0000	0.0000
NBC net	0.0043	0.0020	0.0000	0.0000
CBC net	0.0028	0.0000	0.0000	0.0000
WCVI net	0.0000	0.0000	0.0000	0.0000
Juan de Fuca net	0.0005	0.0000	0.0000	0.0000
North PS net	0.0000	0.0000	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0121	0.1815	0.0324
Johnstone Strait net	0.0009	0.0000	0.0000	0.0000
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0103	0.0002	0.0000
NCBC sport	0.0000	0.0003	0.0000	0.0000
WCVI sport	0.0000	0.0000	0.0000	0.0000
Southern US Ocn sport	0.0136	0.0009	0.0036	0.0000
North PS sport	0.0362	0.0018	0.0000	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0015	0.0003	0.0013	0.0000
Freshwater sport	0.5400	0.4556	0.3549	0.7497

Table C-25. Spring Cowlitz Hatchery base period data. Shading represents exploitation rates on mature fish.

Stock Name	Spring Cowlitz Hatchery (CWS)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	152,299	72,301	12,461	92
Maturity rate	0.0770	0.6559	0.9901	1.0000
Adult Equivalence	0.6785	0.9309	0.9990	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0670	0.0085	0.0000
NBC troll	0.0024	0.0469	0.0169	0.0000
CBC troll	0.0000	0.0171	0.0000	0.0000
WCVI troll	0.0568	0.0983	0.0355	0.0000
Southern US troll	0.0613	0.2398	0.0215	0.0000
GS troll	0.0000	0.0000	0.0000	0.0000
SEAK net	0.0000	0.0000	0.0000	0.0000
NBC net	0.0000	0.0024	0.0000	0.0000
CBC net	0.0027	0.0016	0.0000	0.0000
WCVI net	0.0002	0.0000	0.0000	0.0000
Juan de Fuca net	0.0000	0.0000	0.0000	0.0000
North PS net	0.0000	0.0000	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0047	0.0274	0.0000
Johnstone Strait net	0.0016	0.0000	0.0000	0.0000
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0025	0.0000	0.0000
NCBC sport	0.0145	0.0016	0.0000	0.0000
WCVI sport	0.0000	0.0000	0.0000	0.0000
Southern US Ocn sport	0.1681	0.0359	0.0000	0.0000
North PS sport	0.0292	0.0000	0.0000	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0028	0.0015	0.0000	0.0000
Freshwater sport	0.4826	0.4525	0.4008	0.0000

Table C-26. Columbia River Summer base period data. Shading represents exploitation rates on mature fish.

Stock Name	Columbia River Summers (SUM)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	172,004	94,876	57,334	12,802
Maturity rate	0.0263	0.0240	0.4968	1.0000
Adult Equivalence	0.5481	0.7655	0.9497	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0000	0.1715	0.1035
NBC troll	0.0162	0.0418	0.0146	0.0703
CBC troll	0.0000	0.0320	0.0524	0.0379
WCVI troll	0.0000	0.0438	0.1637	0.0000
Southern US troll	0.0000	0.0000	0.0110	0.0000
GS troll	0.0000	0.0049	0.0141	0.0000
SEAK net	0.0000	0.0000	0.0000	0.0000
NBC net	0.0000	0.0000	0.0000	0.0000
CBC net	0.0193	0.0050	0.0171	0.0000
WCVI net	0.0036	0.0032	0.0000	0.0179
Juan de Fuca net	0.0000	0.0000	0.0000	0.0000
North PS net	0.0000	0.0000	0.0000	0.0059
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.2091	0.1672	0.0130	0.0000
Johnstone Strait net	0.0012	0.0000	0.0000	0.0179
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0000	0.0073	0.0000
NCBC sport	0.0000	0.0000	0.0177	0.0000
WCVI sport	0.0000	0.0000	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0044	0.0108	0.0000
North PS sport	0.0000	0.0000	0.0000	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0041	0.0064	0.0000	0.0000
Freshwater sport	0.0000	0.0768	0.0085	0.0000

Table C-27. Oregon Coastal Fall North Migrating base period data. Shading represents exploitation rates on mature fish.

Stock Name	Oregon Coastal (ORC)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	616,030	289,028	142,508	39,136
Maturity rate	0.2357	0.1688	0.4800	1.0000
Adult Equivalence	0.6633	0.7992	0.9480	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0897	0.1763	0.2926
NBC troll	0.0026	0.1530	0.1163	0.1379
CBC troll	0.0000	0.0094	0.0052	0.0024
WCVI troll	0.0021	0.0499	0.0576	0.0239
Southern US troll	0.0000	0.0111	0.0017	0.0013
GS troll	0.0000	0.0000	0.0000	0.0000
SEAK net	0.0000	0.0006	0.0165	0.0000
NBC net	0.0000	0.0000	0.0141	0.0310
CBC net	0.0029	0.0004	0.0035	0.0000
WCVI net	0.0000	0.0000	0.0000	0.0000
Juan de Fuca net	0.0000	0.0000	0.0000	0.0000
North PS net	0.0000	0.0000	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0003	0.0000	0.0000	0.0000
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0000	0.0060	0.0012
NCBC sport	0.0000	0.0000	0.0000	0.0000
WCVI sport	0.0000	0.0000	0.0022	0.0000
Southern US Ocn sport	0.0044	0.0031	0.0070	0.0000
North PS sport	0.0082	0.0000	0.0000	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0000	0.0000	0.0000	0.0000
Freshwater sport	0.2242	0.2005	0.1937	0.1947

Table C-28. Washington Coastal Fall Wild base period data. Shading represents exploitation rates on mature fish.

Stock Name	Washington Coastal Wild (WCN)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	269,136	139,448	61,221	15,554
Maturity rate	0.1216	0.2185	0.5410	1.0000
Adult Equivalence	0.6227	0.8150	0.9541	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0543	0.1188	0.2130
NBC troll	0.0000	0.0999	0.0896	0.1340
CBC troll	0.0000	0.0049	0.0611	0.0068
WCVI troll	0.0000	0.0734	0.0491	0.0140
Southern US troll	0.0000	0.0232	0.0000	0.0000
GS troll	0.0000	0.0000	0.0000	0.0000
SEAK net	0.0069	0.0000	0.0204	0.0000
NBC net	0.0000	0.0031	0.0153	0.0212
CBC net	0.0026	0.0022	0.0000	0.0000
WCVI net	0.0006	0.0068	0.0000	0.0000
Juan de Fuca net	0.0002	0.0000	0.0000	0.0000
North PS net	0.0000	0.0007	0.0276	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0692	0.3329	0.6409	0.3899
Columbia River net	0.0000	0.0000	0.0000	0.0000
Johnstone Strait net	0.0008	0.0000	0.0000	0.0143
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.1342	0.0049	0.0039	0.0045
NCBC sport	0.0000	0.0000	0.0000	0.0000
WCVI sport	0.0025	0.0012	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0000	0.0038	0.0000
North PS sport	0.0028	0.0117	0.0000	0.0000
South PS sport	0.0000	0.0000	0.0000	0.0000
Strait of Georgia sport	0.0000	0.0277	0.0000	0.0000
Freshwater sport	0.0000	0.0000	0.0000	0.0000

Table C-29. Snake River Wild Fall base period data. Shading represents exploitation rates on mature fish.

Stock Name	Snake River Wild Fall (LYF)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	11,513	10,205	7,098	1,452
Maturity rate	0.0669	0.2076	0.6522	1.0000
Adult Equivalence	0.6021	0.8195	0.9652	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0055	0.0681	0.1001
NBC troll	0.0000	0.0194	0.0422	0.1041
CBC troll	0.0000	0.0282	0.0123	0.0000
WCVI troll	0.0000	0.1260	0.2677	0.1400
Southern US troll	0.0000	0.0969	0.1067	0.0391
GS troll	0.0000	0.0000	0.0000	0.0000
SEAK net	0.0003	0.0000	0.0000	0.0000
NBC net	0.0025	0.0005	0.0031	0.0076
CBC net	0.0037	0.0009	0.0000	0.0000
WCVI net	0.0000	0.0000	0.0000	0.0000
Juan de Fuca net	0.0034	0.0021	0.0021	0.0000
North PS net	0.0000	0.0006	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0000	0.0000
Wash Coast net	0.0000	0.0000	0.0000	0.0000
Columbia River net	0.0651	0.1368	0.3532	0.2700
Johnstone Strait net	0.0023	0.0005	0.0000	0.0000
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0039	0.0000	0.0109
NCBC sport	0.0000	0.0000	0.0000	0.0000
WCVI sport	0.0000	0.0048	0.0000	0.0000
Southern US Ocn sport	0.0000	0.0280	0.0219	0.0065
North PS sport	0.0000	0.0005	0.0000	0.0370
South PS sport	0.0000	0.0000	0.0003	0.0000
Strait of Georgia sport	0.0000	0.0007	0.0000	0.0000
Freshwater sport	0.0000	0.0075	0.0135	0.0000

Table C-30. Mid-Columbia River Bright Hatchery base period data. Shading represents exploitation rates on mature fish.

Stock Name	Mid-Columbia River Bright Hatchery (MCB)			
	Age 2	Age 3	Age 4	Age 5
1979-1982 Cohort Size	37,012	20,341	10,517	2,494
Maturity rate	0.0257	0.1116	0.5438	1.0000
Adult Equivalence	0.5644	0.7899	0.9544	1.0000
Fishery	1979-1982 Legal Catch Exploitation Rates by age			
SEAK troll	0.0000	0.0499	0.1652	0.2386
NBC troll	0.0000	0.0286	0.0635	0.0640
CBC troll	0.0000	0.0142	0.0234	0.0099
WCVI troll	0.0003	0.0729	0.0728	0.0420
Southern US troll	0.0000	0.0057	0.0101	0.0033
GS troll	0.0000	0.0013	0.0055	0.0000
SEAK net	0.0000	0.0037	0.0009	0.0010
NBC net	0.0013	0.0057	0.0470	0.0030
CBC net	0.0076	0.0104	0.0075	0.0000
WCVI net	0.0004	0.0000	0.0000	0.0000
Juan de Fuca net	0.0036	0.0011	0.0000	0.0000
North PS net	0.0001	0.0001	0.0000	0.0000
Other PS net	0.0000	0.0000	0.0011	0.0000
Wash Coast net	0.0000	0.0000	0.0005	0.0000
Columbia River net	0.0644	0.3372	0.2600	0.0739
Johnstone Strait net	0.0007	0.0011	0.0091	0.0007
Fraser net	0.0000	0.0000	0.0000	0.0000
SEAK sport	0.0000	0.0033	0.0078	0.0046
NCBC sport	0.0000	0.0000	0.0024	0.0000
WCVI sport	0.0003	0.0000	0.0015	0.0000
Southern US Ocn sport	0.0000	0.0063	0.0068	0.0054
North PS sport	0.0003	0.0051	0.0009	0.0058
South PS sport	0.0011	0.0009	0.0000	0.0000
Strait of Georgia sport	0.0002	0.0034	0.0026	0.0000
Freshwater sport	0.0433	0.0081	0.0020	0.0039

Appendix D

Catches in fisheries modeled with the ceiling algorithm in the May 1997 calibration (9702) of the PSC Chinook Model

Table D-1. Catches in SEAK fisheries in May 1997 calibration (9702) of the PSC Chinook Model (shading represents base period for ceiling algorithm).	2
Table D-2. Catches in NCBC fisheries in May 1997 calibration (9702) of the PSC Chinook Model (shading represents base period for ceiling algorithm).	3
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Table D-5. Catches in Washington and Oregon fisheries in May 1997 calibration (9702) of the PSC Chinook Model (shading represents base period for ceiling algorithm).	6
Table D-6. Catches in Puget Sound fisheries in May 1997 calibration (9702) of the PSC Chinook Model (shading represents base period for ceiling algorithm).	7

Table D-1. Catches in SEAK fisheries in May 1997 calibration (9702) of the PSC Chinook Model (shading represents base period for ceiling algorithm).
 Catches do not include catch of SEAK hatchery fish.

SEAK Fisheries			
Year	Troll	Net	Sport
1979	334,300	28,500	16,600
1980	303,900	20,100	20,200
1981	248,800	19,000	21,300
1982	242,300	49,000	25,800
1983	269,800	19,700	22,300
1984	235,600	32,400	22,000
1985	212,200	34,200	23,000
1986	231,600	20,500	19,200
1987	231,000	14,000	20,500
1988	217,100	17,400	22,200
1989	224,200	18,500	26,800
1990	263,600	16,100	41,400
1991	231,600	20,000	45,100
1992	162,500	24,000	35,300
1993	211,300	16,500	42,700
1994	177,100	23,300	35,500
1995	115,200	28,600	34,900
1996	108,100	9,200	29,100

Table D-2. Catches in NCBC fisheries in May 1997 calibration (9702) of the PSC Chinook Model (shading represents base period for ceiling algorithm).

NCBC Fisheries					
Year	NBC Troll	CBC Troll	NBC Net	CBC Net	NCBC Sport
1979	148,726	109,034	55,472	76,120	15,302
1980	163,563	97,889	35,882	49,142	19,669
1981	151,731	79,670	53,337	29,458	11,425
1982	174,147	74,731	77,462	47,082	17,274
1983	163,055	105,569	25,318	32,575	12,353
1984	179,665	83,303	47,293	9,644	10,525
1985	186,723	28,818	63,177	27,141	9,867
1986	152,999	52,556	38,061	55,391	12,619
1987	177,457	64,016	38,579	21,395	13,827
1988	152,369	31,104	27,550	21,224	19,307
1989	207,679	19,093	42,005	6,275	35,650
1990	154,116	27,312	32,132	28,489	31,967
1991	194,015	27,853	49,303	15,024	32,496
1992	142,268	42,308	35,004	17,030	37,881
1993	161,719	24,484	35,883	7,791	38,232
1994	164,795	20,136	18,910	9,310	38,947
1995	56,425	4,589	24,300	3,992	30,000
1996	15	1	19,340	3,090	11,000

Troll: Areas 1-11 and 30 (North 1-5, Central 6-11 and 30)

Net and Sport: Areas 1-10 (North 1-5, Central 6-30). All net catches include small chinook.

Terminal exclusions not reported included in this table are: (1) Area 4 net does not include catches in River Gap Slough fishery recorded on Records of Management Strategies; and (2) Area 8 net does not include large mesh gillnet fishery.

Table D-3. Catches in West Coast Vancouver Island fisheries in May 1997 calibration (9702) of the PSC Chinook Model (shading represents base period for ceiling algorithm). Troll catch includes Outside sport catch.

WCVI Fisheries		
Year	Troll	Inside Sport
1979	480,768	22,000
1980	488,709	21,400
1981	398,135	23,100
1982	543,991	30,000
1983	385,571	56,000
1984	473,101	59,022
1985	367,112	13,177
1986	353,180	10,881
1987	426,273	19,679
1988	443,821	36,444
1989	263,601	29,500
1990	366,396	56,861
1991	261,363	78,144
1992	387,325	42,828
1993	342,286	49,904
1994	178,028	39,000
1995	102,992	9,500
1996	3,622	1,873

Troll: Areas 21, 23-27, and 121-127

Net: Areas 21, and 23-27

Sport: Areas 22 and 23 catch inside surfline beginning on August 1; Nootka Sound (Area 24) catch after July 15 obtained from fishery officers or unpublished reports..

Table D-4. Catches in Strait of Georgia fisheries in May 1997 calibration (9702) of the PSC Chinook Model (shading represents base period for ceiling algorithm).

Strait of Georgia Fisheries		
Year	Troll	Sport
1979	257,278	350,000
1980	273,122	371,000
1981	238,876	253,300
1982	178,498	163,793
1983	105,061	198,433
1984	88,158	369,445
1985	55,686	234,838
1986	43,899	181,896
1987	38,695	121,081
1988	19,611	119,117
1989	28,474	132,846
1990	34,384	111,914
1991	32,230	115,523
1992	37,249	116,579
1993	33,237	129,200
1994	12,988	74,570
1995	3	66,810
1996	2	101,680

Troll: Areas 13-18, and 29
 Net: Areas 14-19, 28, and 29
 Sport: Areas 13-19, 19b, 28, and 29

Table D-5. Catches in Washington and Oregon fisheries in May 1997 calibration (9702) of the PSC Chinook Model (shading represents base period for ceiling algorithm).

WA/OR Fisheries North of Cape Falcon		
Year	Troll	Sport
1979	140,389	84,400
1980	136,391	59,100
1981	125,157	95,900
1982	173,744	114,900
1983	82,073	51,700
1984	31,042	6,900
1985	67,216	31,700
1986	82,000	23,000
1987	126,000	44,500
1988	157,000	19,400
1989	140,000	20,800
1990	112,383	32,900
1991	88,423	13,300
1992	100,318	19,000
1993	64,934	13,700
1994	8,400	0
1995	18,500	600
1996	23,200	200

Troll: WA Areas 1-4, 5, 6, 6A, 6C, 7, 7A, and OR Area 1-2
 Sport: WA Areas 1-4, and OR Areas 1-2

Table D-6. Catches in Puget Sound fisheries in May 1997 calibration (9702) of the PSC Chinook Model (shading represents base period for ceiling algorithm).

Puget Sound Fisheries			
Year	North Sport	South Sport	North Net
1979	84,461	156,402	64,689
1980	68,646	142,799	75,658
1981	61,079	106,048	69,236
1982	36,795	85,703	61,310
1983	73,226	123,752	44,638
1984	73,762	102,740	45,552
1985	56,877	92,603	46,363
1986	84,000	88,000	38,000
1987	67,000	59,000	40,000
1988	48,000	63,000	42,000
1989	61,000	75,000	26,000
1990	58,273	71,000	13,902
1991	44,782	48,859	15,143
1992	45,226	51,656	14,938
1993	39,350	41,034	15,484
1994	7,500	40,800	19,400
1995	14,200	53,500	10,100
1996			4,400

North Sport: Areas 5-7
 South Sport: Areas 8-13
 North Net: Areas 5, 6, 6A, 6C, 7, 7A

Appendix E

Forecast file (.fcs) used in the May 1997 calibration (9702)

79 , First year in EV file(used for checking year input)

MAT97.MAT , Maturation Schedule

AKS, Alaska Spring

2, read in maturity schedule

1, Escapement

3, First age of data

1, Minimum number of ages per brood

79,0,1, 10377

80,0,1, 13157

81,0,1, 12843

82,0,1, 24939

83,0,1, 21873

84,0,1, 29103

85,0,1, 23409

86,0,1, 39370

87,0,1, 33245

88,0,1, 25232

89,0,1, 25315

90,0,1, 16434

91,0,1, 13428

92,0,1, 13594

93,0,1, 20051

94,0,1, 15856

95,0,1, 13683

96,0,1, 18888

97,0,1,0

98,0,1,0

99,0,1,0

NTH, North/Central BC

1, Adjustment to maturation rate

2, terminal run adults

3, First age of data

1, Minimum number of ages per brood

79,0,1, 65589

80,0,1, 73819

81,0,1, 77497

82,0,1, 81130

83,0,1, 79798

84,0,1, 104271

85,0,1, 137688

86,0,1, 160810

87,0,1, 146249

88,0,1, 170827

89,0,1, 182280

90,0,1, 171153

91,0,1, 156892

92,0,1, 189062

93,0,1, 186829

94,0,1, 139368
95,0,1, 113728
96,0,1, 209390
97,0,1,0
98,0,1,0
99,0,1,0

FRE, Fraser Early

1, Adjustment to maturation rate
2, Escapement + commercial gill net
3, First age of data
1, Minimum number of ages per brood
79,0,1, 104568
80,0,1, 68973
81,0,1, 64315
82,0,1, 81206
83,0,1, 72672
84,0,1, 93287
85,0,1, 122149
86,0,1, 144836
87,0,1, 128095
88,0,1, 129394
89,0,1, 101605
90,0,1, 129910
91,0,1, 110503
92,0,1, 93570
93,0,1, 89587
94,0,1, 126656
95,0,1, 110200
96,0,1, 169330
97,0,1,0
98,0,1,0
99,0,1,0

FRL, Lower Fraser Late (Harrison)

1, Adjustment to maturation rate
1, Escapement
3, First age
1, Minimum number of ages per brood
79,0,1, 126879
80,0,1, 126457
81,1, 36419, 61059, 9186
82,1, 30246, 80578, 5605
83,1, 16238, 73682, 10859
84,1, 48792, 62732, 7507
85,1, 60075, 103228, 11590
86,1, 5528, 146557, 7204
87,1, 11644, 50352, 16796
88,1, 2233, 29410, 3331
89,1, 47542, 18859, 7233

90,1, 5175, 167020, 3908
91,1, 30172, 40729, 19737
92,1, 30783, 96329, 3300
93,1, 45224, 65387, 8144
94,1, 2476, 86104, 2476
95,1, 9377, 12415, 7841
96,1, 12824, 23108, 1136
97,1, 44750, 32850, 2440
98,0,1,0
99,0,1,0

RBH, WCVI Hatchery

2, read in maturity schedule

5, Term Run + native - jacks excluded - MORE THAN ONE STOCK

2, Number of stocks to use same EV factors

RBT, Stock For same EV's

3, First age

1, Minimum number of ages

79,1, 84035, 16674, 6378
80,1, 27016, 61355, 2281
81,1, 63980, 23452, 10101
82,1, 67485, 72390, 10826
83,1, 35858, 83290, 32597
84,1, 28993, 100402, 26151
85,1, 61958, 55389, 13683
86,1, 9454, 56664, 10989
87,1, 80390, 13264, 6386
88,1, 64701, 100693, 1280
89,1, 95644, 93697, 33249
90,1, 98047, 122677, 33480
91,1, 94872, 175226, 90558
92,1, 97067, 137524, 59026
93,1, 120935, 161510, 55930
94,1, 7361, 127986, 51502
95,1, 859, 16998, 44533
96,1, 63785, 12542, 8992
97,1, 17382, 93028, 8926
98,0,1,0
99,0,1,0

GSQ, Upper Georgia Strait

1, Automatic mat rate adjustment

1, Escapement - age structure based on Quinsam index

3, First age

1, Minimum number of ages to fit

79,0,1, 13916
80,1, 60, 4270, 3146
81,1, 110, 1425, 9430
82,1, 397, 5734, 7720
83,1, 1155, 4030, 8499

84,1, 973, 4285, 3751
85,1, 294, 5497, 4637
86,1, 1681, 8739, 15358
87,1, 5755, 7006, 15039
88,1, 387, 11911, 3842
89,1, 4027, 3745, 13878
90,1, 619, 11757, 5304
91,1, 1184, 6040, 6067
92,1, 457, 10218, 6242
93,1, 1885, 762, 1523
94,0,1, 3770
95,0,1, 9400
96,0,1, 7500
97,0,1,0
98,0,1,0
99,0,1,0

GST, Lower Georgia Strait

- 1, Automatic mat rate adjustment
- 1, Escapement age structure based on BQR
- 3, First age

- 1, Minimum number of ages to fit

79,1, 8742, 3777, 116
80,1, 5148, 6612, 189
81,1, 1688, 8807, 270
82,1, 2575, 7107, 485
83,1, 4160, 5060, 391
84,1, 7432, 3826, 453
85,1, 3409, 2170, 0
86,1, 1203, 2167, 436
87,1, 428, 2992, 590
88,1, 2240, 5584, 711
89,1, 5338, 2587, 212
90,1, 1999, 6160, 271
91,1, 8412, 5350, 811
92,1, 7354, 5815, 171
93,0,1, 11018
94,0,1, 10202
95,0,1, 20282
96,0,1, 24670
97,0,1, 0
98,0,1, 0
99,0,1,0

GSH, L. Georgia Str Hatchery

- 2, Read in maturity schedule
- 2, Terminal run facilities and natural spawning
- 3, First Age

- 1, Minimum number of ages

79,1, 7768, 3356, 103

80,1,	4167,	5352,	153
81,1,	949,	4956,	152
82,1,	1486,	4100,	280
83,1,	3303,	4018,	310
84,1,	6797,	3498,	414
85,1,	9733,	6198,	0
86,1,	4258,	7672,	1545
87,1,	1044,	7304,	1440
88,1,	1553,	3872,	493
89,1,	7414,	3593,	294
90,1,	2598,	8008,	352
91,1,	6483,	4123,	625
92,1,	5689,	4498,	132
93,0,1,	11093		
94,0,1,	10783		
95,0,1,	5615		
96,0,1,	8455		
97,0,1,0			
98,0,1,0			
99,0,1,0			

NKF, Nooksack Fall (Nooksack/Samish)

0, No Adjustment

2, Terminal Run

3, First Age

1, Minimum number of ages to fit

79,0,1, 82790

80,0,1,113292

81,0,1, 90282

82,0,1,111772

83,0,1, 83361

84,0,1,133521

85,0,1,136902

86,0,1,111231

87,0,1, 67749

88,0,1, 50918

89,0,1, 75652

90,0,1,105152

91,0,1, 41085

92,0,1, 27703

93,0,1, 36504

94,0,1, 29115

95,0,1, 22468

96,0,1, 28700

97,0,1, 34000

98,0,1, 0

99,0,1, 0

PSF, Puget Sound Fingerling (Included with PSY)

0, No Adjustment

5, Terminal Run MORE than 1 stock

2, Number of stocks

PSY, Stock ID for using same EVs

3, First Age

1, Minimum number of years

79,0,1, 53050

80,0,1, 67691

81,0,1, 75073

82,0,1, 50039

83,0,1, 56512

84,0,1, 77796

85,0,1, 62493

86,0,1, 60276

87,0,1, 71909

88,0,1, 79297

89,0,1, 98384

90,0,1, 84122

91,0,1, 54981

92,0,1, 39660

93,0,1, 44559

94,0,1, 60211
95,0,1, 94686
96,0,1, 62832
97,0,1, 78735
98,0,1, 0
99,0,1, 0

PSN, Puget Sound Natural

0, No Adjustment
2, Terminal Run
3, First Age
1, Minimum number of ages
79,0,1, 28435
80,0,1, 23341
81,0,1, 12131
82,0,1, 13438
83,0,1, 29377
84,0,1, 23234
85,0,1, 27595
86,0,1, 23951
87,0,1, 42059
88,0,1, 47124
89,0,1, 51605
90,0,1, 61372
91,0,1, 37257
92,0,1, 26453
93,0,1, 21252
94,0,1, 31428
95,0,1, 36581
96,0,1, 19065
97,0,1, 19041
98,0,1, 0
99,0,1, 0

NKS, Nooksack Spring

0, No adjustment
1, Escapement
3, First age
1, Minimum number of ages
79,0,1, 0
80,0,1, 1821
81,0,1, 1549
82,0,1, 479
83,0,1, 510
84,0,1, 689
85,0,1, 946
86,0,1, 679
87,0,1, 638
88,0,1, 0
89,0,1, 0

90,0,1, 0
91,0,1, 0
92,0,1, 0
93,0,1, 0
94,0,1, 0
95,0,1, 0
96,0,1, 0
97,0,1, 0
98,0,1, 0
99,0,1, 0

SKG, Skagit Summer/Fall Natural

1, Automatic Maturity Rate Adjustment

2, Terminal Run

3, First Age

2, Minimum number of ages needed for EV calculation

79,0,1,24124

80,1, 4760, 24924, 1203

81,1, 4456, 14280, 2694

82,1, 4159, 16862, 3032

83,1, 2918, 9197, 3155

84,1, 6306, 7746, 1712

85,1, 4658, 20062, 1171

86,1, 969, 13525, 8047

87,1, 3892, 6330, 3122

88,1, 1746, 10936, 2302

89,1, 3856, 6390, 3145

90,1, 2019, 12113, 5249

91,1, 506, 4409, 3649

92,1, 424, 6358, 2332

93,1, 385, 4617, 1924

94,1, 1183, 3732, 1274

95,1, 957, 6030, 2465

96,1, 1211, 8659, 2382

97,1, 643, 3722, 1992

98,0,1, 0

99,0,1, 0

STL, Stillaguamish Summer/Fall Natural

0, No Adjustment

1, Escapement

3, First Age

1, Minimum number of ages for EV calculations

79,0,1, 1042

80,0,1, 821

81,0,1, 630

82,0,1, 773

83,0,1, 387

84,0,1, 374

85,0,1, 1409

86,0,1, 1277

87,0,1, 1321

88,0,1, 717

89,0,1, 811

90,0,1, 842

91,0,1, 1632

92,0,1, 780

93,0,1, 928

94,0,1, 954

95,0,1, 822

96,0,1, 1384

97,0,1, 928

98,0,1, 0

99,0,1, 0

SNO, Snohomish Summer/Fall Natural

0, No Adjustment

2, Terminal Run

3, First Age

1, Minimum number of ages

79,0,1, 13583

80,0,1, 17616

81,0,1, 9776

82,0,1, 9112

83,0,1, 11052

84,0,1, 8819

85,0,1, 9352

86,0,1, 8664

87,0,1, 6967

88,0,1, 7744

89,0,1, 6263

90,0,1, 8437

91,0,1, 5046

92,0,1, 4355

93,0,1, 5498

94,0,1, 5037

95,0,1, 5851

96,0,1, 7822

97,0,1, 5200

98,0,1, 0

99,0,1, 0

WCH, Washington Coastal Fall Hatchery

1, Automatic mat rate adjustment

2, Terminal Run without jacks

3, First Age

1, Minimum number of years

79,0,1, 24200

80,0,1, 31255

81,0,1, 23191

82,0,1, 19401

83,0,1, 15551

84,0,1, 21877

85,0,1, 21193

86,0,1, 23452

87,0,1, 44661

88,0,1, 78721

89,0,1, 77163

90,0,1, 47766

91,0,1, 51599

92,0,1, 68550
93,0,1, 60355
94,0,1, 47047
95,0,1, 53251
96,0,1, 60105
97,0,1, 0
98,0,1, 0
99,0,1, 0

URB, Columbia River UpRiver Brights only NO MCBs

2, read in maturity schedule-do not adjust

2, Terminal Run Adults

3, First Age

1, Minimum number of ages

79,1, 9400, 64500, 15300
80,1, 11900, 29200, 35700
81,1, 7700, 45600, 13000
82,1, 35200, 29100, 14600
83,1, 28400, 47800, 9800
84,1, 35900, 76800, 17100
85,1, 64900, 80400, 51000
86,1, 91100, 149200, 39600
87,1, 102300, 217500, 98200
88,1, 34100, 192500, 109300
89,1, 30700, 66100, 161200
90,1, 8800, 70100, 67800
91,1, 9800, 26200, 61600
92,1, 17600, 37700, 24300
93,1, 13400, 62300, 26700
94,1, 13000, 63100, 56400
95,1, 18400, 19800, 66200
96,1, 50300, 72300, 18700
97,1, 10100, 107000, 49300
98,0,1, 0
99,0,1, 0

SPR, Spring Creek Tules

2, read in maturity schedule-do not adjust

2, Terminal Run Adults

3, First age

1, Minimum number of ages

79,1, 66500, 28000, 700
80,1, 57300, 40300, 200
81,1, 59700, 25300, 1300
82,1, 94400, 26200, 200
83,1, 14400, 14100, 300
84,1, 39200, 8100, 200
85,1, 24300, 8100, 800
86,1, 9800, 6600, 200
87,1, 5500, 3500, 100

88,1,	7200,	4700,	100
89,1,	15100,	11100,	600
90,1,	10300,	8200,	500
91,1,	42500,	8800,	1100
92,1,	19200,	9800,	500
93,1,	8300,	7900,	600
94,1,	13400,	4000,	1100
95,1,	26700,	6300,	800
96,1,	28300,	4700,	100
97,1,	14100,	7600,	200
98,0,1,	0		
99,0,1,	0		

BON, Bonneville Tules

2, read in maturity schedule-do not adjust

5, Terminal Run - more than one stock

2, Number of stocks with same EV factors

CWF, Stock using same EV's (BON plus CWF equal in-river LRH)

3, First Age

1, Minimum number of ages for brood year

79,1,	50900,	57400,	10400
80,1,	35900,	63100,	6500
81,1,	46600,	43100,	5100
82,1,	86200,	48400,	4800
83,1,	44900,	40600,	2500
84,1,	52900,	47900,	1600
85,1,	62000,	42700,	6300
86,1,	96800,	49300,	8500
87,1,	237300	,98700,	7900
88,1,	27300,	270800,	11700
89,1,	25500,	57300,	48100
90,1,	16000,	33500,	8600
91,1,	39400,	19700,	3500
92,1,	29600,	30400,	2600
93,1,	20500,	28000,	3800
94,1,	24500,	24300,	4800
95,1,	24100,	17000,	5200
96,1,	37200,	36300,	1900
97,1,	25300,	26200,	2700
98,0,1,	0		
99,0,1,	0		

LRW, Lewis River Wild - Columbia River

2, read in maturity schedule-do not adjust

2, Terminal Run Adults

3, First Age

1, Minimum number of ages for brood year

79,1,	11800,	16500,	4400
80,1,	7400,	23700,	7700
81,1,	3500,	18200,	3300

82,1,	4500,	5300,	3200
83,1,	2200,	11100,	3500
84,1,	2300,	6900,	4000
85,1,	4400,	5100,	3700
86,1,	8400,	12600,	3200
87,1,	13400,	18400,	6000
88,1,	3700,	25700,	11800
89,1,	4500,	12400,	21000
90,1,	1200,	8400,	9100
91,1,	5600,	7000,	6600
92,1,	1200,	7700,	2900
93,1,	4700,	3700,	4700
94,1,	1800,	9000,	900
95,1,	1800,	4800,	9300
96,1,	1300,	7900,	4700
97,1,	100,	3100,	4300
98,0,1,	0		
99,0,1,	0		

WSH, Willamette Spring Hatchery - includes Sandy river

2, read in maturity schedule-do not adjust

2, Terminal Run

3, First Age

1, Minimum number of ages for brood year

79,1,	18263,	29996,	367
80,1,	21453,	20491,	1123
81,1,	26089,	30507,	631
82,1,	44496,	31870,	713
83,1,	35145,	25560,	515
84,1,	44823,	39682,	1131
85,1,	36367,	30953,	1022
86,1,	46943,	23930,	713
87,1,	59373,	34967,	513
88,1,	65609,	52385,	1025
89,1,	42818,	68508,	1223
90,1,	65156,	64436,	1747
91,1,	38765,	67787,	2902
92,1,	22079,	58114,	2631
93,1,	25210,	41798,	1310
94,1,	25923,	26018,	663
95,1,	16964,	25552,	848
96,0,1,	37400		
97,0,1,	30000		
98,0,1,	0		
99,0,1,	0		

CWS, Cowlitz-Kalama-Lewis Springs (trib rtrns adjusted for mnstem catch)

0, No adjustment

2, Terminal Run

3, First Age (3 4 5+)

1, minimum number of ages

79,0,1, 19810

80,1, 18837,	9506,	148
81,1, 24031,	9871,	248
82,1, 17722,	13746,	178
83,1, 23357,	6438,	81
84,1, 23846,	5645,	24
85,1, 11313,	3041,	11
86,1, 13279,	3316,	66
87,1, 28791,	8122,	38
88,1, 13749,	11060,	83
89,1, 9961,	12032,	336
90,1, 10162,	8073,	606
91,1, 12060,	7171,	661
92,1, 13979,	4209,	151
93,1, 10757,	8054,	97
94,1, 3201,	4007,	207
95,1, 1774,	4147,	198
96,0,1, 4500		
97,1, 2400,	2100,	100
98,0,1, 0		
99,0,1, 0		

SUM, Columbia River Upriver summers upper columbia only computed from data in BA

0, No adjustment

1, Escapement

3, First age

1, minimum number of ages

79,0,1, 25567
80,0,1, 23529
81,0,1, 17130
82,0,1, 13627
83,0,1, 11964
84,0,1, 16361
85,0,1, 19292
86,0,1, 18302
87,0,1, 22495
88,0,1, 20198
89,0,1, 24499
90,0,1, 18363
91,0,1, 14343
92,0,1, 10258
93,0,1, 15299
94,0,1, 16556
95,0,1, 15000
96,0,1, 16100
97,0,1, 16700
98,0,1, 0
99,0,1, 0

ORC, Oregon Coastal Far North Falls - new estimates from R. Williams

2, read in maturity schedule includes far north ONLY

1, Escapement

3, First Age

1, minimum number of ages per brood

79,0,1, 33875

80,0,1, 48590

81,0,1, 40768

82,0,1, 50117

83,0,1, 33718

84,0,1, 54073

85,0,1, 70231

86,0,1, 85091

87,1, 15745, 25861, 28156

88,1, 2888, 57608, 46694

89,1, 9748, 10341, 48292

90,1, 11758, 25844, 15393

91,1, 3847, 25459, 28928

92,1, 14205, 17876, 39642

93,1, 19451, 8778, 5857

94,1, 2054, 44806, 15405

95,1, 17217, 3432, 30662

96,1, 29807, 24241, 6662

97,1, 3035, 41093, 19283

98,0,1, 0

99,0,1, 0

WCN, Washington Coastal Natural

1, Automatic adjustment

2, Terminal Run

3, First Age

1, Minimum number of ages

79,0,1, 25800

80,0,1, 39900

81,0,1, 32600

82,0,1, 36300

83,0,1, 22500

84,0,1, 42000

85,0,1, 33100

86,0,1, 48500

87,0,1, 71400

88,0,1, 79700

89,0,1, 93000

90,0,1, 75900

91,0,1, 49700

92,0,1, 52500

93,0,1, 47800

94,0,1, 46900

95,0,1, 45900

96,0,1, 51400

97,0,1, 0

98,0,1, 0

99,0,1, 0

LYF, Lyons Ferry Fall Chinook ESA

0, No adjustment

1, Escapement (Lower Granite PFMC Table B16) 97 esc est by Simmons

3, First age assumes term run to esc in first stage

1, Minimum number of ages to fit output equals 1788 (preseason) to esc (504)

79, 0,1, 500

80, 0,1, 450

81, 0,1, 340

82, 0,1, 720

83, 0,1, 428

84, 0,1, 324

85, 0,1, 438

86, 0,1, 449

87, 0,1, 253

88, 0,1, 368

89, 0,1, 295

90, 0,1, 78

91, 0,1, 318

92, 0,1, 533

93, 0,1, 742

94, 0,1, 406

95, 0,1, 350

96, 0,1, 749

97, 0,1, 506

98, 0,1, 0

99,0,1,0

MCB, Mid Columbia Brights BUBs and PUBs CORRECTED 2/14/95

0, No adjustment

2, Terminal run

3, First age

1, Minimum number of ages to fit

79, 0,1, 0

80, 0,1, 0

81, 1, 300, 4100, 100

82, 1, 2700, 4200, 1900

83, 1, 2700, 10100, 1700

84, 1, 900, 6200, 4600

85, 1, 1000, 2400, 2300

86, 1, 7200, 9300, 800

87, 1, 13600, 37500, 5900

88, 1, 7400, 58500, 12000

89, 1, 9500, 33300, 50500

90, 1, 4600, 26800, 27800

91, 1, 6200, 12800, 16900

92, 1, 6400, 17500, 7300

93, 1, 4900, 15500, 7100

94, 1, 3100, 18100, 10700

95, 1, 8300, 10500, 11700

96, 1, 23100, 26500, 10000

97, 1, 4000, 53200, 14900

98, 0,1, 0

99, 0,1, 0

Appendix F

Hatchery production data used in the May 1997 calibration (9702) of the
PSC Chinook Model

Table F-1. Hatchery production data and parameters used in calibration 9702 of the PSC Chinook Model. Changes in production are relative to the 1979-1981 average. A negative value indicates a decrease in production of that stock.

Stock	North/Central BC	Fraser Early	WCVI Hatchery	Upper Strait of Georgia	Lower Strait of Georgia Natural	Lower Strait of Georgia Hatchery	Nooksack Fall
Ricker A	4.976	2.197	4.544	4.929	4.616	2.866	4.02
Survival to Age 1	0.0565	0.0054	0.0715	0.064	0.0659	0.0115	0.0624
Maximum % of Escapement ¹	10%	30%	100%	30%	30%	100%	100%
Brood Year	Change in Production from 1979-1981 average						
1982	380,485	1,510,398	3,277,114	83,391	571,537	1,402,425	6,918,715
1983	1,277,632	1,625,614	4,597,102	474,010	626,087	2,706,834	3,719,931
1984	2,211,949	4,056,898	3,971,073	2,244,491	555,507	2,274,896	-1,429,162
1985	2,214,031	5,481,988	5,404,619	2,631,964	513,514	7,062,021	-1,785,632
1986	4,396,666	9,615,164	8,087,345	2,796,751	914,552	9,631,567	1,977,133
1987	5,638,063	11,210,313	9,373,750	2,656,502	2,813,857	14,247,391	-169,873
1988	5,745,745	11,027,829	9,642,939	2,798,903	2,901,906	13,273,967	-3,363,201
1989	5,265,697	7,313,257	12,778,691	3,533,725	2,156,982	14,438,914	1,587,052
1990	5,503,942	7,758,271	12,351,616	3,336,705	1,999,463	18,065,761	-909,508
1991	5,378,592	6,870,601	12,597,599	3,403,061	4,832,179	11,915,933	1,701,524
1992	5,501,898	4,211,245	15,410,962	3,075,514	6,860,450	10,070,557	1,701,524
1993	4,537,622	3,273,046	12,770,834	1,256,070	5,699,755	8,078,430	1,701,524
1994	5,237,550	5,296,084	10,000,000	2,921,015	4,800,000	13,227,720	1,701,524
1995	5,237,550	5,296,084	10,000,000	2,921,015	4,800,000	13,227,720	1,701,524
1996	5,237,550	5,296,084	10,000,000	2,921,015	4,800,000	13,227,720	1,701,524
1997	5,237,550	5,296,084	10,000,000	2,921,015	4,800,000	13,227,720	1,701,524

¹While the capability exists to model supplementation for any stock, the Lower Strait of George Natural is currently the only stock for which this option is enabled.

Table F-1 (cont.). Hatchery production data and parameters used in calibration 9702 of the PSC Chinook Model. Changes in production are relative to the 1979-1981 average. A negative value indicates a decrease in production of that stock.

Stock	Puget Sound Fall Fingerling	Puget Sound Fall Yearling	WA Coastal Hatchery	Spring Creek Hatchery	Lower Bonneville Hatchery	Fall Cowlitz Hatchery	Mid-Columbia Bright Hatchery
Ricker A	4.02	4.15	3.664	5.101	4.647	3.627	4.53
Survival to Age 1	0.0624	0.0161	0.05614	0.0792	0.0167	0.0159	0.072
Maximum % of Escapement ¹	100%	100%	100%	100%	100%	100%	100%
Brood Year	Change in Production from 1979-1981 average						
1982	8,899,716	-236,381	655,014	-233,389	-1,068,839	-16,220,747	1,253,496
1983	12,989,544	-866,189	-1,137,280	-3,506,339	2,366,472	-11,496,857	2,268,694
1984	16,770,611	-218,928	4,557,646	-3,125,485	-9,080,978	-13,217,455	6,058,615
1985	16,154,708	-1,061,911	2,574,015	-3,952,426	-1,734,305	-7,208,985	5,274,848
1986	26,787,952	-222,237	1,111,658	-3,906,913	2,994,965	-2,417,303	5,270,085
1987	25,614,897	234,926	9,628,625	-5,696,562	5,444,923	1,333,395	18,121,393
1988	21,817,850	-196,331	11,027,609	760,254	7,907,837	4,635,966	12,057,542
1989	25,585,459	-1,412	11,107,222	-4,313,832	1,472,957	-1,809,183	10,620,475
1990	35,638,336	-254,318	6,435,623	-198,715	2,761,807	533,335	12,214,237
1991	16,681,207	-254,318	8,201,829	4,385,536	-44,575	-5,574,108	9,115,514
1992	16,681,207	-254,318	12,093,834	-237,299	-1,183,541	-7,593,637	9,115,514
1993	16,681,207	-254,318	12,093,834	1,060,537	-3,476,315	-16,600,686	9,115,514
1994	16,681,207	-254,318	12,093,834	1,442,695	-3,617,018	-16,667,401	9,115,514
1995	16,681,207	-254,318	12,093,834	552,681	3,832,982	-7,967,401	9,115,514
1996	16,681,207	-254,318	12,093,834	1,452,681	3,832,982	-7,967,401	9,115,514
1997	16,681,207	-254,318	12,093,834	1,452,681	3,832,982	-7,967,401	9,115,514

¹While the capability exists to model supplementation for any stock, the Lower Strait of George Natural is currently the only stock for which this option is enabled.

Appendix G

Chinook non-retention data used in the May 1997 calibration (9702) of the PSC Chinook Model

Table G-1. CNR data used for the SEAK troll and SEAK net fisheries.....	2
Table G-2. CNR data used in the NBC and CBC troll fisheries.....	3
Table G-3. CNR data used in the WCVI troll fishery.....	4
Table G-4. CNR data used in the GS troll fishery.....	5

Table G-1. CNR data used for the SEAK troll and SEAK net fisheries.

Year	SEAK Net			SEAK Troll		
	Legal Size Encounters	Sublegal Size Encounters	Total Catch	Legal Size Encounters	Sublegal Size Encounters	Total Catch
1979						
1980						
1981				18,225	18,578	248,800
1982				89,100	90,827	242,300
1983				74,925	76,378	269,800
1984				87,075	88,763	235,600
1985	12,352	60,506	34,715	118,191	131,011	216,100
1986	13,773	26,850	22,099	78,763	104,820	237,700
1987	4,497	13,923	15,532	191,956	171,156	242,600
1988	8,574	28,357	21,787	60,930	91,200	231,400
1989	8,557	28,301	24,242	150,600	162,900	235,700
1990	6,833	22,601	27,712	98,919	106,121	287,900
1991	7,443	24,615	32,832	109,062	117,003	264,100
1992	12,783	42,277	32,128	121,625	130,480	183,600
1993	4,696	15,532	27,991	117,774	126,349	226,900
1994	8,094	26,770	35,654	119,656	128,368	186,200
1995	283	935	47,964	80,406	86,260	138,100
1996	283	935	37,400	77,928	83,601	141,400

Table G-2. CNR data used in the NBC and CBC troll fisheries.

Year	NBC Troll		CBC Troll	
	Regular Season Boat Days	CNR Boat Days	Regular Season Boat Days	CNR Boat Days
1979				
1980				
1981				
1982				
1983				
1984				
1985				
1986				
1987	60	9	60	9
1988	43	17	43	17
1989	66	9	66	9
1990	18,964	6,431	6,032	1,591
1991	26,754	3,042	4,891	641
1992	15,798	5,778	5,739	1,070
1993	16,427	3,496	2,867	1,153
1994	22,159	2,490	7,156	409
1995	9,682	9,518	1,218	1,327
Year	Encounters		Encounters	
	Legal	Sublegal	Catch	Legal
1996	11,888	13,540	15	446
				531
				1

Table G-3. CNR data used in the WCVI troll fishery.

WCVI Troll		
Year	Regular Season Days ¹	CNR Days ¹
1979		
1980		
1981		
1982		
1983		
1984		
1985	105	5
1986		
1987	47	7
1988	55	15
1989		
1990		
1991		
1992		
1993		
1994		
1995	12,081	9,273

Year	Legal Size Encounters	Sublegal Size Encounters	Total Catch
1996	54,091	156,642	3,622

¹ 1995 values are boat days.

Table G-4. CNR data used in the GS troll fishery.

Year	GS Troll	
	Regular Season Boat Days	CNR Boat Days
1979		
1980		
1981		
1982		
1983		
1984		
1985	12,412	12,184
1986	5,151	17,834
1987		
1988		
1989		
1990		
1991	4,589	1,867
1992	3,744	2,414
1993	4,184	2,990
1994	6,340	626
1995		
1996		

Appendix H

Stock, Age, and Fishery specific FP values used in the May 1997 calibration (9702) of the PSC Chinook Model

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Table H-1. Stock and age specific FP values used for the SEAK Troll fishery.
FP values of 1.00 are not shown.

Fishery:		SEAK Troll			
Stock:		AKS			
		Age 2	Age 3	Age 4	Age 5
1982		0.755	0.986	0.993	1.048
1983		1.160	0.964	0.939	0.918
1984		0.486	0.920	0.861	0.852
1985		0.847	0.833	0.768	0.701
1986		1.166	0.692	0.593	0.503
1987		0.951	0.735	0.687	0.625
1988		0.953	0.569	0.657	0.762
1989		0.653	0.597	0.608	0.723
1990		1.384	1.047	0.944	0.909
1991		0.797	0.868	0.932	1.208
1992		0.444	0.538	0.609	0.862
1993		0.784	0.472	0.479	0.560
1994		0.681	0.373	0.394	0.454
1995		1.157	0.876	0.788	0.749
1996		0.874	0.574	0.554	0.588
1997-Stage 1		0.874	0.574	0.554	0.588
1997-Stage 2		0.706	0.582	0.567	0.594
Stock:		NTH			
		Age 2	Age 3	Age 4	Age 5
1982		0.662	0.857	0.954	0.873
1983		1.070	0.965	0.912	0.769
1984		0.671	0.795	0.869	0.975
1985		0.827	0.768	0.720	0.676
1986		1.084	0.728	0.560	0.277
1987		0.615	0.601	0.540	0.286
1988		0.584	0.604	0.618	0.284
1989		0.529	0.553	0.619	0.286
1990		1.036	0.888	0.809	0.278
1991		0.700	0.828	1.021	0.519
1992		0.386	0.519	0.702	0.304
1993		0.717	0.548	0.528	0.206
1994		0.605	0.462	0.432	0.203
1995		0.808	0.713	0.647	0.187
1996		0.710	0.574	0.536	0.198
1997-Stage 1		0.710	0.574	0.536	0.198
1997-Stage 2		0.597	0.552	0.547	0.330

Table H-1 (cont.) Stock and age specific FP values used for the SEAK Troll fishery.
FP values of 1.00 are not shown.

Fishery:		SEAK Troll			
Stock:	FRE	Age 2	Age 3	Age 4	Age 5
1982	0.000	0.544	0.669	0.651	
1983	0.000	1.176	1.046	1.058	
1984	0.000	0.526	0.645	0.623	
1985	0.000	0.851	0.776	0.778	
1986	0.000	1.384	1.008	1.042	
1987	0.000	0.664	0.554	0.560	
1988	0.000	0.705	0.633	0.647	
1989	0.000	0.621	0.549	0.552	
1990	0.000	1.247	0.947	0.966	
1991	0.000	0.802	0.781	0.778	
1992	0.000	0.454	0.469	0.464	
1993	0.000	0.948	0.733	0.755	
1994	0.000	0.794	0.625	0.645	
1995	0.000	0.964	0.727	0.741	
1996	0.000	0.902	0.695	0.714	
1997-Stage 1	0.000	0.902	0.695	0.714	
1997-Stage 2	0.000	0.688	0.586	0.593	
Stock:	FRL	Age 2	Age 3	Age 4	Age 5
1982	0.000	1.350	0.750	0.000	
1983	0.000	0.893	1.129	0.000	
1984	0.000	1.533	0.652	0.000	
1985	0.000	0.984	0.868	0.000	
1986	0.000	0.546	1.171	0.000	
1987	0.000	0.752	0.800	0.000	
1988	0.000	0.175	0.736	0.000	
1989	0.000	0.837	0.666	0.000	
1990	0.000	1.312	1.315	0.000	
1991	0.000	1.366	0.880	0.000	
1992	0.000	0.946	0.520	0.000	
1993	0.000	0.382	0.797	0.000	
1994	0.000	0.155	0.654	0.000	
1995	0.000	1.112	1.068	0.000	
1996	0.000	0.550	0.840	0.000	
1997-Stage 1	0.000	0.550	0.840	0.000	
1997-Stage 2	0.000	0.665	0.692	0.000	

Table H-1 (cont.) Stock and age specific FP values used for the SEAK Troll fishery.
FP values of 1.00 are not shown.

Fishery:		SEAK Troll			
Stocks:	RBH, RBT	Age 2	Age 3	Age 4	Age 5
1982	0.000	0.679	0.795	0.768	
1983	0.000	1.045	0.942	0.962	
1984	0.000	0.695	0.749	0.728	
1985	0.000	0.811	0.725	0.737	
1986	0.000	1.017	0.689	0.751	
1987	0.000	0.580	0.505	0.516	
1988	0.000	0.563	0.587	0.591	
1989	0.000	0.516	0.492	0.495	
1990	0.000	0.970	0.735	0.774	
1991	0.000	0.703	0.754	0.743	
1992	0.000	0.395	0.469	0.455	
1993	0.000	0.684	0.537	0.568	
1994	0.000	0.578	0.470	0.496	
1995	0.000	0.752	0.570	0.599	
1996	0.000	0.672	0.526	0.554	
1997-Stage 1	0.000	0.672	0.526	0.554	
1997-Stage 2	0.000	0.577	0.508	0.520	
Stock:	GSQ	Age 2	Age 3	Age 4	Age 5
1982	0.000	0.544	0.982	0.934	
1983	0.000	1.176	1.005	0.999	
1984	0.000	0.526	0.692	0.732	
1985	0.000	0.851	0.758	0.752	
1986	0.000	1.384	0.694	0.737	
1987	0.000	0.664	0.831	0.719	
1988	0.000	0.705	0.894	0.805	
1989	0.000	0.621	0.678	0.688	
1990	0.000	1.247	1.110	1.055	
1991	0.000	0.802	0.995	1.051	
1992	0.000	0.454	0.653	0.705	
1993	0.000	0.948	0.581	0.636	
1994	0.000	0.794	0.498	0.530	
1995	0.000	0.964	0.944	0.871	
1996	0.000	0.902	0.674	0.679	
1997-Stage 1	0.000	0.902	0.674	0.679	
1997-Stage 2	0.000	0.688	0.630	0.626	

Table H-1 (cont.) Stock and age specific FP values used for the SEAK Troll fishery.
FP values of 1.00 are not shown.

Fishery:	SEAK Troll			
Stocks:	GST, GSH			
	Age 2	Age 3	Age 4	Age 5
1982	0.000	0.822	0.987	1.110
1983	0.000	0.956	0.968	0.802
1984	0.000	0.818	0.873	1.338
1985	0.000	0.759	0.794	0.856
1986	0.000	0.743	0.682	0.375
1987	0.000	0.518	0.709	0.481
1988	0.000	0.541	0.654	0.090
1989	0.000	0.547	0.655	0.487
1990	0.000	0.829	1.041	0.725
1991	0.000	0.846	0.999	0.816
1992	0.000	0.540	0.657	0.517
1993	0.000	0.574	0.541	0.205
1994	0.000	0.477	0.432	0.100
1995	0.000	0.645	0.864	0.589
1996	0.000	0.565	0.612	0.298
1997-Stage 1	0.000	0.565	0.612	0.298
1997-Stage 2	0.000	0.541	0.603	0.455
Stock:	NKF			
	Age 2	Age 3	Age 4	Age 5
1982	0.000	1.099	0.939	0.000
1983	0.000	1.072	1.044	0.000
1984	0.000	0.399	0.415	0.000
1985	0.000	0.730	0.661	0.000
1986	0.000	0.641	0.699	0.000
1987	0.000	1.236	0.896	0.000
1988	0.000	1.403	1.242	0.000
1989	0.000	0.738	0.736	0.000
1990	0.000	1.375	1.119	0.000
1991	0.000	0.967	1.086	0.000
1992	0.000	0.613	0.741	0.000
1993	0.000	0.551	0.700	0.000
1994	0.000	0.534	0.645	0.000
1995	0.000	1.251	0.961	0.000
1996	0.000	0.779	0.768	0.000
1997-Stage 1	0.000	0.779	0.768	0.000
1997-Stage 2	0.000	0.701	0.664	0.000

Table H-1 (cont.) Stock and age specific FP values used for the SEAK Troll fishery.
FP values of 1.00 are not shown.

Fishery:	SEAK Troll			
Stock:	PSF, PSN			
	Age 2	Age 3	Age 4	Age 5
1982	0.000	0.000	0.919	0.000
1983	0.000	0.000	1.038	0.000
1984	0.000	0.000	0.668	0.000
1985	0.000	0.000	0.801	0.000
1986	0.000	0.000	0.812	0.000
1987	0.000	0.000	0.869	0.000
1988	0.000	0.000	0.850	0.000
1989	0.000	0.000	0.624	0.000
1990	0.000	0.000	1.166	0.000
1991	0.000	0.000	0.847	0.000
1992	0.000	0.000	0.512	0.000
1993	0.000	0.000	0.581	0.000
1994	0.000	0.000	0.503	0.000
1995	0.000	0.000	0.990	0.000
1996	0.000	0.000	0.691	0.000
1997-Stage 1	0.000	0.000	0.691	0.000
1997-Stage 2	0.000	0.000	0.630	0.000
Stock:	PSY			
	Age 2	Age 3	Age 4	Age 5
1982	0.000	0.000	1.203	1.350
1983	0.000	0.000	1.038	0.893
1984	0.000	0.000	0.865	1.533
1985	0.000	0.000	0.898	0.984
1986	0.000	0.000	0.700	0.546
1987	0.000	0.000	1.159	0.752
1988	0.000	0.000	0.890	0.175
1989	0.000	0.000	0.758	0.837
1990	0.000	0.000	1.493	1.312
1991	0.000	0.000	1.020	1.366
1992	0.000	0.000	0.635	0.946
1993	0.000	0.000	0.459	0.382
1994	0.000	0.000	0.358	0.155
1995	0.000	0.000	1.331	1.112
1996	0.000	0.000	0.716	0.550
1997-Stage 1	0.000	0.000	0.716	0.550
1997-Stage 2	0.000	0.000	0.707	0.665

Table H-1 (cont.) Stock and age specific FP values used for the SEAK troll fishery.
FP values of 1.00 are not shown.

Fishery:		SEAK Troll				
Stock:		NKS	Age 2	Age 3	Age 4	Age 5
1979		1.040	1.040	1.040	1.040	
1980		1.158	1.158	1.158	1.158	
1981		1.036	1.036	1.036	1.036	
1982		0.766	0.766	0.766	0.766	
1983		0.966	0.966	0.966	0.966	
1984		0.690	0.690	0.690	0.690	
1985		0.728	0.728	0.728	0.728	
1986		0.544	0.544	0.544	0.544	
1987		0.517	0.517	0.517	0.517	
1988		0.647	0.647	0.647	0.647	
1989		0.543	0.543	0.543	0.543	
1990		0.823	0.823	0.823	0.823	
1991		0.692	0.692	0.692	0.692	
1992		0.513	0.513	0.513	0.513	
1993		0.592	0.592	0.592	0.592	
1994		0.549	0.549	0.549	0.549	
1995		0.646	0.646	0.646	0.646	
1996		0.596	0.596	0.596	0.596	
1997-Stage 1		0.596	0.596	0.596	0.596	
1997-Stage 2		0.523	0.523	0.523	0.523	
Stock:		SKG	Age 2	Age 3	Age 4	Age 5
1982		0.000	0.826	0.887	0.880	
1983		0.000	1.085	0.942	0.767	
1984		0.000	0.580	0.629	0.952	
1985		0.000	0.827	0.655	0.659	
1986		0.000	0.958	0.567	0.257	
1987		0.000	0.907	0.607	0.286	
1988		0.000	0.866	0.862	0.326	
1989		0.000	0.579	0.588	0.302	
1990		0.000	1.221	0.779	0.270	
1991		0.000	0.711	0.933	0.553	
1992		0.000	0.385	0.632	0.337	
1993		0.000	0.622	0.564	0.218	
1994		0.000	0.551	0.514	0.216	
1995		0.000	1.033	0.634	0.181	
1996		0.000	0.735	0.571	0.205	
1997-Stage 1		0.000	0.735	0.571	0.205	
1997-Stage 2		0.000	0.637	0.544	0.334	

Table H-1 (cont.) Stock and age specific FP values used for the SEAK troll fishery.
FP values of 1.00 are not shown.

Fishery:		SEAK Troll			
Stocks:	STL, SNO				
		Age 2	Age 3	Age 4	Age 5
1982	0.000	0.000	0.909	0.000	
1983	0.000	0.000	0.931	0.000	
1984	0.000	0.000	0.379	0.000	
1985	0.000	0.000	0.455	0.000	
1986	0.000	0.000	0.419	0.000	
1987	0.000	0.000	0.512	0.000	
1988	0.000	0.000	1.288	0.000	
1989	0.000	0.000	0.793	0.000	
1990	0.000	0.000	0.667	0.000	
1991	0.000	0.000	1.417	0.000	
1992	0.000	0.000	1.087	0.000	
1993	0.000	0.000	0.789	0.000	
1994	0.000	0.000	0.732	0.000	
1995	0.000	0.000	0.524	0.000	
1996	0.000	0.000	0.682	0.000	
1997-Stage 1	0.000	0.000	0.682	0.000	
1997-Stage 2	0.000	0.000	0.597	0.000	
Stocks:		WCH, WCN			
Stocks:	WCH, WCN	Age 2	Age 3	Age 4	Age 5
		Age 2	Age 3	Age 4	Age 5
1982	0.000	0.560	0.810	0.631	
1983	0.000	1.153	0.907	1.090	
1984	0.000	0.555	0.834	0.576	
1985	0.000	0.845	0.741	0.783	
1986	0.000	1.327	0.625	1.118	
1987	0.000	0.642	0.466	0.592	
1988	0.000	0.671	0.465	0.704	
1989	0.000	0.598	0.429	0.589	
1990	0.000	1.193	0.657	1.041	
1991	0.000	0.776	0.658	0.824	
1992	0.000	0.436	0.389	0.498	
1993	0.000	0.903	0.445	0.821	
1994	0.000	0.757	0.390	0.699	
1995	0.000	0.921	0.505	0.802	
1996	0.000	0.861	0.447	0.774	
1997-Stage 1	0.000	0.861	0.447	0.774	
1997-Stage 2	0.000	0.666	0.467	0.625	

Table H-1 (cont.) Stock and age specific FP values used for the SEAK troll fishery.
FP values of 1.00 are not shown.

Fishery:		SEAK Troll			
Stock:	URB	Age 2	Age 3	Age 4	Age 5
1982	0.000	0.704	0.744	0.797	
1983	0.000	1.097	0.973	0.954	
1984	0.000	0.655	0.755	0.669	
1985	0.000	0.845	0.764	0.679	
1986	0.000	1.120	0.811	0.686	
1987	0.000	0.708	0.510	0.501	
1988	0.000	0.665	0.529	0.721	
1989	0.000	0.590	0.482	0.565	
1990	0.000	1.166	0.800	0.750	
1991	0.000	0.777	0.706	0.903	
1992	0.000	0.443	0.417	0.604	
1993	0.000	0.750	0.576	0.623	
1994	0.000	0.627	0.494	0.548	
1995	0.000	0.931	0.615	0.578	
1996	0.000	0.769	0.562	0.583	
1997-Stage 1	0.000	0.769	0.562	0.583	
1997-Stage 2	0.000	0.640	0.522	0.538	
Stocks:		SPR, BON			
		Age 2	Age 3	Age 4	Age 5
1979	1.040	1.040	1.040	1.040	
1980	1.158	1.158	1.158	1.158	
1981	1.036	1.036	1.036	1.036	
1982	0.766	0.766	0.766	0.766	
1983	0.966	0.966	0.966	0.966	
1984	0.690	0.690	0.690	0.690	
1985	0.728	0.728	0.728	0.728	
1986	0.544	0.544	0.544	0.544	
1987	0.517	0.517	0.517	0.517	
1988	0.647	0.647	0.647	0.647	
1989	0.543	0.543	0.543	0.543	
1990	0.823	0.823	0.823	0.823	
1991	0.692	0.692	0.692	0.692	
1992	0.513	0.513	0.513	0.513	
1993	0.592	0.592	0.592	0.592	
1994	0.549	0.549	0.549	0.549	
1995	0.646	0.646	0.646	0.646	
1996	0.596	0.596	0.596	0.596	
1997-Stage 1	0.596	0.596	0.596	0.596	
1997-Stage 2	0.523	0.523	0.523	0.523	

Table H-1 (cont.) Stock and age specific FP values used for the SEAK troll fishery.
FP values of 1.00 are not shown.

Fishery:		SEAK Troll			
Stock:	CWF	Age 2	Age 3	Age 4	Age 5
	1982	0.000	0.000	0.840	0.870
1983	0.000	0.000	0.912	0.712	
1984	0.000	0.000	0.836	1.143	
1985	0.000	0.000	0.750	0.727	
1986	0.000	0.000	0.616	0.204	
1987	0.000	0.000	0.516	0.211	
1988	0.000	0.000	0.494	0.006	
1989	0.000	0.000	0.443	0.138	
1990	0.000	0.000	0.704	0.138	
1991	0.000	0.000	0.667	0.265	
1992	0.000	0.000	0.393	0.087	
1993	0.000	0.000	0.432	0.028	
1994	0.000	0.000	0.378	0.045	
1995	0.000	0.000	0.555	0.067	
1996	0.000	0.000	0.455	0.046	
1997-Stage 1	0.000	0.000	0.455	0.046	
1997-Stage 2	0.000	0.000	0.478	0.246	
Stock:		LRW			
Stock:	LRW	Age 2	Age 3	Age 4	Age 5
	1982	0.000	0.544	0.845	0.761
1983	0.000	1.176	0.870	1.013	
1984	0.000	0.526	0.850	0.673	
1985	0.000	0.851	0.712	0.740	
1986	0.000	1.384	0.507	0.871	
1987	0.000	0.664	0.441	0.560	
1988	0.000	0.705	0.466	0.700	
1989	0.000	0.621	0.405	0.608	
1990	0.000	1.247	0.565	0.924	
1991	0.000	0.802	0.645	0.926	
1992	0.000	0.454	0.389	0.603	
1993	0.000	0.948	0.381	0.711	
1994	0.000	0.794	0.344	0.603	
1995	0.000	0.964	0.433	0.719	
1996	0.000	0.902	0.386	0.677	
1997-Stage 1	0.000	0.902	0.386	0.677	
1997-Stage 2	0.000	0.688	0.436	0.592	

Table H-1 (cont.) Stock and age specific FP values used for the SEAK troll fishery.
 FP values of 1.00 are not shown.

Fishery:		SEAK Troll				
Stock:		WSH	Age 2	Age 3	Age 4	Age 5
1982		0.544	0.784	0.744	0.000	
1983		1.176	0.950	0.984	0.000	
1984		0.526	0.784	0.805	0.000	
1985		0.851	0.751	0.796	0.000	
1986		1.384	0.736	0.863	0.000	
1987		0.664	0.502	0.514	0.000	
1988		0.705	0.529	0.469	0.000	
1989		0.621	0.487	0.494	0.000	
1990		1.247	0.766	0.853	0.000	
1991		0.802	0.735	0.716	0.000	
1992		0.454	0.447	0.418	0.000	
1993		0.948	0.541	0.588	0.000	
1994		0.794	0.465	0.490	0.000	
1995		0.964	0.591	0.656	0.000	
1996		0.902	0.532	0.578	0.000	
1997-Stage 1		0.902	0.532	0.578	0.000	
1997-Stage 2		0.688	0.512	0.536	0.000	
Stock:		CWS	Age 2	Age 3	Age 4	Age 5
1982		0.000	0.896	0.866	0.000	
1983		0.000	0.818	1.062	0.000	
1984		0.000	0.940	0.929	0.000	
1985		0.000	0.707	0.904	0.000	
1986		0.000	0.376	1.049	0.000	
1987		0.000	0.400	0.699	0.000	
1988		0.000	0.378	0.493	0.000	
1989		0.000	0.362	0.708	0.000	
1990		0.000	0.462	1.273	0.000	
1991		0.000	0.602	1.027	0.000	
1992		0.000	0.361	0.651	0.000	
1993		0.000	0.276	0.721	0.000	
1994		0.000	0.252	0.538	0.000	
1995		0.000	0.352	1.023	0.000	
1996		0.000	0.294	0.761	0.000	
1997-Stage 1		0.000	0.294	0.761	0.000	
1997-Stage 2		0.000	0.392	0.678	0.000	

Table H-1 (cont.) Stock and age specific FP values used for the SEAK troll fishery.
 FP values of 1.00 are not shown.

Fishery:	SEAK Troll			
Stock:	SUM			
	Age 2	Age 3	Age 4	Age 5
1982	0.000	0.000	0.753	0.903
1983	0.000	0.000	0.978	0.900
1984	0.000	0.000	0.796	0.488
1985	0.000	0.000	0.789	0.494
1986	0.000	0.000	0.836	0.388
1987	0.000	0.000	0.523	0.469
1988	0.000	0.000	0.485	1.105
1989	0.000	0.000	0.485	0.699
1990	0.000	0.000	0.839	0.591
1991	0.000	0.000	0.702	1.253
1992	0.000	0.000	0.408	0.944
1993	0.000	0.000	0.570	0.681
1994	0.000	0.000	0.480	0.634
1995	0.000	0.000	0.648	0.458
1996	0.000	0.000	0.566	0.591
1997-Stage 1	0.000	0.000	0.566	0.591
1997-Stage 2	0.000	0.000	0.529	0.547
Stock:	ORC			
	Age 2	Age 3	Age 4	Age 5
1982	0.000	0.583	0.712	0.710
1983	0.000	1.121	1.007	0.973
1984	0.000	0.599	0.722	0.740
1985	0.000	0.836	0.789	0.757
1986	0.000	1.244	0.907	0.826
1987	0.000	0.610	0.552	0.476
1988	0.000	0.622	0.545	0.512
1989	0.000	0.564	0.486	0.460
1990	0.000	1.115	0.879	0.762
1991	0.000	0.738	0.677	0.673
1992	0.000	0.410	0.383	0.391
1993	0.000	0.838	0.615	0.584
1994	0.000	0.705	0.527	0.505
1995	0.000	0.858	0.681	0.575
1996	0.000	0.800	0.608	0.555
1997-Stage 1	0.000	0.800	0.608	0.555
1997-Stage 2	0.000	0.635	0.544	0.511

Table H-1 (cont.) Stock and age specific FP values used for the SEAK troll fishery.
 FP values of 1.00 are not shown.

Fishery:		SEAK Troll			
Stock:	LYF				
		Age 2	Age 3	Age 4	Age 5
1982	0.000	1.175	0.716	0.765	
1983	0.000	1.129	1.034	1.053	
1984	0.000	0.407	0.707	0.446	
1985	0.000	0.840	0.809	0.657	
1986	0.000	0.730	0.968	0.868	
1987	0.000	1.526	0.607	0.647	
1988	0.000	1.449	0.581	1.040	
1989	0.000	0.717	0.520	0.712	
1990	0.000	1.659	0.973	0.991	
1991	0.000	0.787	0.709	1.102	
1992	0.000	0.424	0.401	0.761	
1993	0.000	0.456	0.651	0.838	
1994	0.000	0.455	0.552	0.741	
1995	0.000	1.542	0.765	0.787	
1996	0.000	0.818	0.656	0.789	
1997-Stage 1	0.000	0.818	0.656	0.789	
1997-Stage 2	0.000	0.741	0.575	0.647	
Stock:		MCB			
Stock:	MCB	Age 2	Age 3	Age 4	Age 5
		Age 2	Age 3	Age 4	Age 5
1982	0.000	0.704	0.744	0.797	
1983	0.000	1.097	0.973	0.954	
1984	0.000	0.655	0.755	0.669	
1985	0.000	0.845	0.764	0.679	
1986	0.000	1.120	0.811	0.686	
1987	0.000	0.708	0.510	0.501	
1988	0.000	0.665	0.529	0.721	
1989	0.000	0.590	0.482	0.565	
1990	0.000	1.166	0.800	0.750	
1991	0.000	0.777	0.706	0.903	
1992	0.000	0.443	0.417	0.604	
1993	0.000	0.750	0.576	0.623	
1994	0.000	0.627	0.494	0.548	
1995	0.000	0.931	0.615	0.578	
1996	0.000	0.769	0.562	0.583	
1997-Stage 1	0.000	0.769	0.562	0.583	
1997-Stage 2	0.000	0.640	0.522	0.538	

Table H-2. Stock and age specific FP values used for the NBC troll fishery. FP values of 1.00 are not shown.

Fishery:		NBC Troll			
Stock:	All Stocks	Age 2	Age 3	Age 4	Age 5
1983	0.731	0.731	0.731	0.731	
1984	0.929	0.929	0.929	0.929	
1997-Stage 2	0.771	0.771	0.771	0.771	

Table H-3. Stock and age specific FP values used for the CBC troll fishery. FP values of 1.00 are not shown.

Fishery:		CBC Troll			
Stock:	All Stocks	Age 2	Age 3	Age 4	Age 5
1983	0.683	0.683	0.683	0.683	
1984	0.379	0.379	0.379	0.379	
1997-Stage 2	0.386	0.386	0.386	0.386	

Table H-4. Stock and age specific FP values used for the WCVI troll fishery. FP values of 1.00 are not shown.

Fishery:		WCVI Troll			
Stocks:	RBH, RBT	Age 2	Age 3	Age 4	Age 5
1992	4.193	4.193	4.193	4.193	
1993	2.550	2.550	2.550	2.550	
1997-Stage 2	1.294	1.294	1.294	1.294	
Stock:	All Other Stocks	Age 2	Age 3	Age 4	Age 5
1992	0.764	0.764	0.764	0.764	
1993	0.906	0.906	0.906	0.906	
1997-Stage 2	0.865	0.865	0.865	0.865	

Table H-5. Stock and age specific FP values used for the WA/OR troll fishery.
FP values of 1.00 are not shown.

Fishery:		WA/OR Troll			
Stocks:		NKF, PSF, PSN, PSY, NKS, SKG, STL, SNO			
		Age 2	Age 3	Age 4	Age 5
1983		1.316	1.316	1.316	1.316
1984		0.871	0.871	0.871	0.871
1997-Stage 2		1.016	1.016	1.016	1.016
Stocks:		WCH, WCN			
		Age 2	Age 3	Age 4	Age 5
1983		0.687	0.687	0.687	0.687
1984		0.380	0.380	0.380	0.380
1997-Stage 2		0.954	0.954	0.954	0.954
Stock:		URB			
		Age 2	Age 3	Age 4	Age 5
1983		0.629	0.629	0.629	0.629
1984		0.830	0.830	0.830	0.830
1997-Stage 2		0.976	0.976	0.976	0.976
Stocks:		SPR, BON, CWF, LRW, WSH, CWS, SUM, ORC, LYF, MCB			
		Age 2	Age 3	Age 4	Age 5
1983		0.629	0.629	0.629	0.629
1984		0.347	0.347	0.347	0.347
1997-Stage 2		0.949	0.949	0.949	0.949
Stock:		All Other Stocks			
		Age 2	Age 3	Age 4	Age 5
1983		0.687	0.687	0.687	0.687
1984		0.380	0.380	0.380	0.380
1997-Stage 2		0.954	0.954	0.954	0.954

Table H-6. Stock and age specific FP values used for the GS troll fishery.
FP values of 1.00 are not shown.

Fishery:		GS Troll			
Stock:	All Stocks	Age 2	Age 3	Age 4	Age 5
1983	0.770	0.770	0.770	0.770	
1984	0.600	0.600	0.600	0.600	
1997-Stage 2	0.380	0.380	0.380	0.380	

Table H-7. Stock and age specific FP values used for the SEAK net fishery.
FP values of 1.00 are not shown.

Fishery:		SEAK Net			
Stock:	All Stocks	Age 2	Age 3	Age 4	Age 5
1983	0.915	0.915	0.915	0.915	
1984	1.016	1.016	1.016	1.016	
1997-Stage 2	0.827	0.827	0.827	0.827	

Table H-8. Stock and age specific FP values used for the NBC net fishery.
 FP values of 1.00 are not shown.

Stock:	All Stocks			
	Age 2	Age 3	Age 4	Age 5
1983	0.434	0.434	0.434	0.434
1984	0.498	0.498	0.498	0.498
1985	1.230	1.230	1.230	1.230
1986	0.340	0.340	0.340	0.340
1987	0.516	0.516	0.516	0.516
1988	0.644	0.644	0.644	0.644
1989	0.303	0.303	0.303	0.303
1990	0.689	0.689	0.689	0.689
1991	0.217	0.217	0.217	0.217
1992	0.289	0.289	0.289	0.289
1993	0.297	0.297	0.297	0.297
1994	0.393	0.393	0.393	0.393
1995	0.165	0.165	0.165	0.165
1996	0.165	0.165	0.165	0.165
1997-Stage 1	0.165	0.165	0.165	0.165
1997-Stage 2	0.424	0.424	0.424	0.424

Table H-9. Stock and age specific FP values used for the CBC net fishery.
 FP values of 1.00 are not shown.

Fishery:	CBC Net			
Stock:	All Stocks			
	Age 2	Age 3	Age 4	Age 5
1983	0.139	0.139	0.139	0.139
1984	0.043	0.043	0.043	0.043
1985	0.594	0.594	0.594	0.594
1986	0.829	0.829	0.829	0.829
1987	0.189	0.189	0.189	0.189
1988	0.241	0.241	0.241	0.241
1989	0.046	0.046	0.046	0.046
1990	0.522	0.522	0.522	0.522
1991	0.236	0.236	0.236	0.236
1992	1.222	1.222	1.222	1.222
1993	0.162	0.162	0.162	0.162
1994	0.200	0.200	0.200	0.200
1995	0.066	0.066	0.066	0.066
1996	0.066	0.066	0.066	0.066
1997-Stage 1	0.066	0.066	0.066	0.066
1997-Stage 2	0.299	0.299	0.299	0.299

Table H-10. Stock and age specific FP values used for the WCVI net fishery.
 FP values of 1.00 are not shown.

Fishery:		WCVI Net			
Stocks:	RBH, RBT	Age 2	Age 3	Age 4	Age 5
1983	1.783	1.783	1.783	1.783	
1984	1.190	1.190	1.190	1.190	
1985	0.418	0.418	0.418	0.418	
1986	0.817	0.817	0.817	0.817	
1987	0.665	0.665	0.665	0.665	
1988	0.652	0.652	0.652	0.652	
1989	1.087	1.087	1.087	1.087	
1990	0.706	0.706	0.706	0.706	
1991	1.142	1.142	1.142	1.142	
1992	0.497	0.497	0.497	0.497	
1993	0.864	0.864	0.864	0.864	
1994	0.758	0.758	0.758	0.758	
1995	0.546	0.546	0.546	0.546	
1996	0.000	0.000	0.000	0.000	
1997-Stage 1	0.546	0.546	0.546	0.546	
1997-Stage 2	0.802	0.802	0.802	0.802	
Stock:	All Other Stocks	Age 2	Age 3	Age 4	Age 5
1988		0.750	0.750	0.750	0.750
1989		0.750	0.750	0.750	0.750
1990		0.750	0.750	0.750	0.750
1991		0.750	0.750	0.750	0.750
1992		0.750	0.750	0.750	0.750
1993		0.750	0.750	0.750	0.750
1994		0.750	0.750	0.750	0.750
1995		0.750	0.750	0.750	0.750
1996		0.000	0.000	0.000	0.000
1997-Stage 1		0.750	0.750	0.750	0.750
1997-Stage 2		0.750	0.750	0.750	0.750

Table H-11. Stock and age specific FP values used for the Juan de Fuca net fishery.
 FP values of 1.00 are not shown.

Fishery:	JdeF Net			
Stock:	All Stocks			
	Age 2	Age 3	Age 4	Age 5
1983	1.337	1.337	1.337	1.337
1984	0.580	0.580	0.580	0.580
1985	0.805	0.805	0.805	0.805
1986	0.717	0.717	0.717	0.717
1987	0.437	0.437	0.437	0.437
1988	0.238	0.238	0.238	0.238
1989	0.746	0.746	0.746	0.746
1990	0.429	0.429	0.429	0.429
1991	0.461	0.461	0.461	0.461
1992	0.241	0.241	0.241	0.241
1993	0.234	0.234	0.234	0.234
1994	0.122	0.122	0.122	0.122
1995	0.022	0.022	0.022	0.022
1996	0.234	0.234	0.234	0.234
1997-Stage 1	0.234	0.234	0.234	0.234
1997-Stage 2	0.122	0.122	0.122	0.122

Table H-12. Stock and age specific FP values used for the NPS net fishery.
FP values of 1.00 are not shown.

Fishery:		North PS Net			
Stock:	NKF	Age 2	Age 3	Age 4	Age 5
	1982	1.053	1.053	1.053	1.053
1983	0.919	0.919	0.919	0.919	
1984	0.583	0.583	0.583	0.583	
1985	0.565	0.565	0.565	0.565	
1986	0.699	0.699	0.699	0.699	
1987	0.648	0.648	0.648	0.648	
1988	0.700	0.700	0.700	0.700	
1989	0.296	0.296	0.296	0.296	
1990	0.164	0.164	0.164	0.164	
1991	0.248	0.248	0.248	0.248	
1992	0.204	0.204	0.204	0.204	
1993	0.241	0.241	0.241	0.241	
1994	0.395	0.395	0.395	0.395	
1995	0.311	0.311	0.311	0.311	
1996	0.459	0.459	0.459	0.459	
1997-Stage 1	0.459	0.459	0.459	0.459	
1997-Stage 2	0.459	0.459	0.459	0.459	
Stocks:		PSF, PSY			
Stocks:	PSF, PSY	Age 2	Age 3	Age 4	Age 5
	1982	1.089	1.089	1.089	1.089
1983	0.905	0.905	0.905	0.905	
1984	0.584	0.584	0.584	0.584	
1985	0.554	0.554	0.554	0.554	
1986	0.684	0.684	0.684	0.684	
1987	0.636	0.636	0.636	0.636	
1988	0.686	0.686	0.686	0.686	
1989	0.291	0.291	0.291	0.291	
1990	0.161	0.161	0.161	0.161	
1991	0.244	0.244	0.244	0.244	
1992	0.200	0.200	0.200	0.200	
1993	0.237	0.237	0.237	0.237	
1994	0.387	0.387	0.387	0.387	
1995	0.305	0.305	0.305	0.305	
1996	0.452	0.452	0.452	0.452	
1997-Stage 1	0.452	0.452	0.452	0.452	
1997-Stage 2	0.452	0.452	0.452	0.452	

Table H-12 (Cont). Stock and age specific FP values used for the NPS net fishery. FP values of 1.00 are not shown.

Fishery:		North PS Net			
Stock:	PSN	Age 2	Age 3	Age 4	Age 5
1982	1.061	1.061	1.061	1.061	
1983	0.906	0.906	0.906	0.906	
1984	0.576	0.576	0.576	0.576	
1985	0.557	0.557	0.557	0.557	
1986	0.688	0.688	0.688	0.688	
1987	0.639	0.639	0.639	0.639	
1988	0.691	0.691	0.691	0.691	
1989	0.292	0.292	0.292	0.292	
1990	0.162	0.162	0.162	0.162	
1991	0.245	0.245	0.245	0.245	
1992	0.200	0.200	0.200	0.200	
1993	0.237	0.237	0.237	0.237	
1994	0.390	0.390	0.390	0.390	
1995	0.306	0.306	0.306	0.306	
1996	0.453	0.453	0.453	0.453	
1997-Stage 1	0.453	0.453	0.453	0.453	
1997-Stage 2	0.453	0.453	0.453	0.453	
Stock:	SKG	Age 2	Age 3	Age 4	Age 5
1982	1.371	1.371	1.371	1.371	
1983	0.751	0.751	0.751	0.751	
1984	0.669	0.669	0.669	0.669	
1985	0.392	0.392	0.392	0.392	
1986	0.485	0.485	0.485	0.485	
1987	0.449	0.449	0.449	0.449	
1988	0.487	0.487	0.487	0.487	
1989	0.205	0.205	0.205	0.205	
1990	0.114	0.114	0.114	0.114	
1991	0.172	0.172	0.172	0.172	
1992	0.142	0.142	0.142	0.142	
1993	0.168	0.168	0.168	0.168	
1994	0.274	0.274	0.274	0.274	
1995	0.216	0.216	0.216	0.216	
1996	0.348	0.348	0.348	0.348	
1997-Stage 1	0.348	0.348	0.348	0.348	
1997-Stage 2	0.348	0.348	0.348	0.348	

Table H-12 (Cont). Stock and age specific FP values used for the NPS net fishery. FP values of 1.00 are not shown.

Fishery:		North PS Net				
Stock:		STL	Age 2	Age 3	Age 4	Age 5
1982		1.078	1.078	1.078	1.078	
1983		0.917	0.917	0.917	0.917	
1984		0.583	0.583	0.583	0.583	
1985		0.569	0.569	0.569	0.569	
1986		0.701	0.701	0.701	0.701	
1987		0.645	0.645	0.645	0.645	
1988		0.695	0.695	0.695	0.695	
1989		0.301	0.301	0.301	0.301	
1990		0.157	0.157	0.157	0.157	
1991		0.253	0.253	0.253	0.253	
1992		0.206	0.206	0.206	0.206	
1993		0.243	0.243	0.243	0.243	
1994		0.392	0.392	0.392	0.392	
1995		0.316	0.316	0.316	0.316	
1996		0.460	0.460	0.460	0.460	
1997-Stage 1		0.460	0.460	0.460	0.460	
1997-Stage 2		0.460	0.460	0.460	0.460	
Stock:		SNO	Age 2	Age 3	Age 4	Age 5
1982		1.060	1.060	1.060	1.060	
1983		0.918	0.918	0.918	0.918	
1984		0.583	0.583	0.583	0.583	
1985		0.565	0.565	0.565	0.565	
1986		0.699	0.699	0.699	0.699	
1987		0.648	0.648	0.648	0.648	
1988		0.700	0.700	0.700	0.700	
1989		0.295	0.295	0.295	0.295	
1990		0.165	0.165	0.165	0.165	
1991		0.245	0.245	0.245	0.245	
1992		0.203	0.203	0.203	0.203	
1993		0.242	0.242	0.242	0.242	
1994		0.397	0.397	0.397	0.397	
1995		0.313	0.313	0.313	0.313	
1996		0.459	0.459	0.459	0.459	
1997-Stage 1		0.459	0.459	0.459	0.459	
1997-Stage 2		0.459	0.459	0.459	0.459	

Table H-13. Stock and age specific FP values used for the South PS net fishery.
FP values of 1.00 are not shown.

Fishery:		South PS Net			
Stock:	NKF	Age 2	Age 3	Age 4	Age 5
	1982	0.921	0.921	0.921	0.921
1983	0.749	0.749	0.749	0.749	
1984	0.913	0.913	0.913	0.913	
1985	0.967	0.967	0.967	0.967	
1986	0.982	0.982	0.982	0.982	
1987	0.950	0.950	0.950	0.950	
1988	0.897	0.897	0.897	0.897	
1989	0.840	0.840	0.840	0.840	
1990	0.952	0.952	0.952	0.952	
1991	0.895	0.895	0.895	0.895	
1992	0.769	0.769	0.769	0.769	
1993	0.661	0.661	0.661	0.661	
1994	0.864	0.864	0.864	0.864	
1995	0.725	0.725	0.725	0.725	
1996	0.859	0.859	0.859	0.859	
1997-Stage 1	0.859	0.859	0.859	0.859	
1997-Stage 2	0.859	0.859	0.859	0.859	
Stocks:		PSF, PSY			
Stocks:	PSF, PSY	Age 2	Age 3	Age 4	Age 5
	1982	0.933	0.933	0.933	0.933
1983	1.175	1.175	1.175	1.175	
1984	1.227	1.227	1.227	1.227	
1985	1.255	1.255	1.255	1.255	
1986	1.100	1.100	1.100	1.100	
1987	1.048	1.048	1.048	1.048	
1988	1.102	1.102	1.102	1.102	
1989	1.014	1.014	1.014	1.014	
1990	1.144	1.144	1.144	1.144	
1991	1.135	1.135	1.135	1.135	
1992	1.071	1.071	1.071	1.071	
1993	1.024	1.024	1.024	1.024	
1994	0.890	0.890	0.890	0.890	
1995	0.739	0.739	0.739	0.739	
1996	1.071	1.071	1.071	1.071	
1997-Stage 1	1.071	1.071	1.071	1.071	
1997-Stage 2	1.071	1.071	1.071	1.071	

Table H-13 (Cont). Stock and age specific FP values used for the South Puget Sound net fishery. FP values of 1.00 are not shown.

Fishery:	South PS Net			
Stock:	PSN			
	Age 2	Age 3	Age 4	Age 5
1982	1.498	1.498	1.498	1.498
1983	1.681	1.681	1.681	1.681
1984	1.518	1.518	1.518	1.518
1985	1.458	1.458	1.458	1.458
1986	1.331	1.331	1.331	1.331
1987	1.440	1.440	1.440	1.440
1988	1.537	1.537	1.537	1.537
1989	1.431	1.431	1.431	1.431
1990	1.424	1.424	1.424	1.424
1991	1.271	1.271	1.271	1.271
1992	1.282	1.282	1.282	1.282
1993	1.339	1.339	1.339	1.339
1994	1.358	1.358	1.358	1.358
1995	1.021	1.021	1.021	1.021
1996	1.392	1.392	1.392	1.392
1997-Stage 1	1.392	1.392	1.392	1.392
1997-Stage 2	1.392	1.392	1.392	1.392
Stock:	SKG			
	Age 2	Age 3	Age 4	Age 5
1982	1.196	1.196	1.196	1.196
1983	0.966	0.966	0.966	0.966
1984	0.301	0.301	0.301	0.301
1985	0.920	0.920	0.920	0.920
1986	0.417	0.417	0.417	0.417
1987	0.680	0.680	0.680	0.680
1988	0.479	0.479	0.479	0.479
1989	1.258	1.258	1.258	1.258
1990	0.277	0.277	0.277	0.277
1991	0.768	0.768	0.768	0.768
1992	0.448	0.448	0.448	0.448
1993	0.376	0.376	0.376	0.376
1994	0.101	0.101	0.101	0.101
1995	0.634	0.634	0.634	0.634
1996	0.587	0.587	0.587	0.587
1997-Stage 1	0.587	0.587	0.587	0.587
1997-Stage 2	0.587	0.587	0.587	0.587

Table H-13 (Cont). Stock and age specific FP values used for the South Puget Sound net fishery. FP values of 1.00 are not shown.

Fishery:	South PS Net			
Stock:	STL			
	Age 2	Age 3	Age 4	Age 5
1982	1.102	1.102	1.102	1.102
1983	0.868	0.868	0.868	0.868
1984	0.880	0.880	0.880	0.880
1985	0.713	0.713	0.713	0.713
1986	0.714	0.714	0.714	0.714
1987	0.467	0.467	0.467	0.467
1988	0.591	0.591	0.591	0.591
1989	0.787	0.787	0.787	0.787
1990	0.810	0.810	0.810	0.810
1991	0.686	0.686	0.686	0.686
1992	0.586	0.586	0.586	0.586
1993	0.446	0.446	0.446	0.446
1994	0.404	0.404	0.404	0.404
1995	0.624	0.624	0.624	0.624
1996	0.660	0.660	0.660	0.660
1997-Stage 1	0.660	0.660	0.660	0.660
1997-Stage 2	0.660	0.660	0.660	0.660
Stock:	SNO			
	Age 2	Age 3	Age 4	Age 5
1982	0.814	0.814	0.814	0.814
1983	0.956	0.956	0.956	0.956
1984	0.969	0.969	0.969	0.969
1985	0.800	0.800	0.800	0.800
1986	0.780	0.780	0.780	0.780
1987	0.515	0.515	0.515	0.515
1988	0.672	0.672	0.672	0.672
1989	0.868	0.868	0.868	0.868
1990	0.887	0.887	0.887	0.887
1991	0.783	0.783	0.783	0.783
1992	0.660	0.660	0.660	0.660
1993	0.509	0.509	0.509	0.509
1994	0.460	0.460	0.460	0.460
1995	0.626	0.626	0.626	0.626
1996	0.730	0.730	0.730	0.730
1997-Stage 1	0.730	0.730	0.730	0.730
1997-Stage 2	0.730	0.730	0.730	0.730

Table H-14. Stock and age specific FP values used for the WA Coast net fishery.
 FP values of 1.00 are not shown.

Fishery:		Wa Coastal Net				
Stock:		WCH	Age 2	Age 3	Age 4	Age 5
1982		0.861	0.861	0.861	0.861	
1983		0.455	0.455	0.455	0.455	
1984		0.429	0.429	0.429	0.429	
1985		0.757	0.757	0.757	0.757	
1986		0.633	0.633	0.633	0.633	
1987		0.436	0.436	0.436	0.436	
1988		0.732	0.732	0.732	0.732	
1989		0.555	0.555	0.555	0.555	
1990		0.671	0.671	0.671	0.671	
1991		0.836	0.836	0.836	0.836	
1992		0.905	0.905	0.905	0.905	
1993		0.890	0.890	0.890	0.890	
1994		0.840	0.840	0.840	0.840	
1995		0.803	0.803	0.803	0.803	
1996		1.025	1.025	1.025	1.025	
1997-Stage 1		0.712	0.712	0.712	0.712	
1997-Stage 2		0.712	0.712	0.712	0.712	
Stock:		WCN	Age 2	Age 3	Age 4	Age 5
1982		1.334	1.334	1.334	1.334	
1983		1.146	1.146	1.146	1.146	
1984		0.403	0.403	0.403	0.403	
1985		1.037	1.037	1.037	1.037	
1986		0.876	0.876	0.876	0.876	
1987		1.238	1.238	1.238	1.238	
1988		0.848	0.848	0.848	0.848	
1989		1.421	1.421	1.421	1.421	
1990		1.194	1.194	1.194	1.194	
1991		1.213	1.213	1.213	1.213	
1992		1.072	1.072	1.072	1.072	
1993		1.353	1.353	1.353	1.353	
1994		1.099	1.099	1.099	1.099	
1995		1.163	1.163	1.163	1.163	
1996		0.771	0.771	0.771	0.771	
1997-Stage 1		1.060	1.060	1.060	1.060	
1997-Stage 2		1.060	1.060	1.060	1.060	

Table H-15. Stock and age specific FP values used for the Columbia River net fishery.
 FP values of 1.00 are not shown.

Fishery:		Columbia River Net			
Stock:	URB	Age 2	Age 3	Age 4	Age 5
	1982	0.282	0.282	0.282	0.282
1983	0.584	0.584	0.584	0.584	
1984	1.223	1.223	1.223	1.223	
1985	1.385	1.385	1.385	1.385	
1986	1.614	1.614	1.614	1.614	
1987	1.627	1.627	1.627	1.627	
1988	1.788	1.788	1.788	1.788	
1989	1.599	1.599	1.599	1.599	
1990	1.541	1.541	1.541	1.541	
1991	1.114	1.114	1.114	1.114	
1992	0.715	0.715	0.715	0.715	
1993	0.711	0.711	0.711	0.711	
1994	0.553	0.553	0.553	0.553	
1995	0.536	0.536	0.536	0.536	
1996	0.714	0.714	0.714	0.714	
1997	1.561	1.561	1.561	1.561	
1997-Stage 1	1.561	1.561	1.561	1.561	
1997-Stage 2	1.561	1.561	1.561	1.561	
Stock:		SPR			
Stock:	SPR	Age 2	Age 3	Age 4	Age 5
	1982	1.380	1.380	1.380	1.380
1983	0.783	0.783	0.783	0.783	
1984	1.040	1.040	1.040	1.040	
1985	0.842	0.842	0.842	0.842	
1986	1.162	1.162	1.162	1.162	
1987	0.714	0.714	0.714	0.714	
1988	1.001	1.001	1.001	1.001	
1989	1.271	1.271	1.271	1.271	
1990	0.885	0.885	0.885	0.885	
1991	0.950	0.950	0.950	0.950	
1992	0.714	0.714	0.714	0.714	
1993	0.703	0.703	0.703	0.703	
1994	0.532	0.532	0.532	0.532	
1995	0.932	0.932	0.932	0.932	
1996	1.309	1.309	1.309	1.309	
1997-Stage 1	0.857	0.857	0.857	0.857	
1997-Stage 2	0.857	0.857	0.857	0.857	

Table H-15 (Cont). Stock and age specific FP values used for the Columbia River net fishery. FP values of 1.00 are not shown.

Fishery:	Columbia River Net			
Stock:	BON			
	Age 2	Age 3	Age 4	Age 5
1982	0.905	0.905	0.905	0.905
1983	0.466	0.466	0.466	0.466
1984	0.717	0.717	0.717	0.717
1985	0.417	0.417	0.417	0.417
1986	1.283	1.283	1.283	1.283
1987	1.370	1.370	1.370	1.370
1988	1.520	1.520	1.520	1.520
1989	0.619	0.619	0.619	0.619
1990	0.200	0.200	0.200	0.200
1991	0.309	0.309	0.309	0.309
1992	0.121	0.121	0.121	0.121
1993	0.210	0.210	0.210	0.210
1994	0.000	0.000	0.000	0.000
1995	0.023	0.023	0.023	0.023
1996	0.047	0.047	0.047	0.047
1997-Stage 1	0.118	0.118	0.118	0.118
1997-Stage 2	0.118	0.118	0.118	0.118
Stock:	CWF			
	Age 2	Age 3	Age 4	Age 5
1982	0.905	0.905	0.905	0.905
1983	0.466	0.466	0.466	0.466
1984	0.717	0.717	0.717	0.717
1985	0.417	0.417	0.417	0.417
1986	1.283	1.283	1.283	1.283
1987	1.370	1.370	1.370	1.370
1988	1.520	1.520	1.520	1.520
1989	0.619	0.619	0.619	0.619
1990	0.200	0.200	0.200	0.200
1991	0.309	0.309	0.309	0.309
1992	0.121	0.121	0.121	0.121
1993	0.210	0.210	0.210	0.210
1994	0.000	0.000	0.000	0.000
1995	0.023	0.023	0.023	0.023
1996	0.047	0.047	0.047	0.047
1997-Stage 1	0.118	0.118	0.118	0.118
1997-Stage 2	0.118	0.118	0.118	0.118

Table H-15 (Cont). Stock and age specific FP values used for the Columbia River net fishery. FP values of 1.00 are not shown.

Fishery:	Columbia River Net				
Stock:	LRW	Age 2	Age 3	Age 4	Age 5
1982	0.302	0.302	0.302	0.302	
1983	0.117	0.117	0.117	0.117	
1984	0.713	0.713	0.713	0.713	
1985	0.886	0.886	0.886	0.886	
1986	1.349	1.349	1.349	1.349	
1987	1.433	1.433	1.433	1.433	
1988	1.522	1.522	1.522	1.522	
1989	0.568	0.568	0.568	0.568	
1990	0.145	0.145	0.145	0.145	
1991	1.052	1.052	1.052	1.052	
1992	0.602	0.602	0.602	0.602	
1993	0.391	0.391	0.391	0.391	
1994	0.080	0.080	0.080	0.080	
1995	0.000	0.000	0.000	0.000	
1996	0.109	0.109	0.109	0.109	
1997-Stage 1	0.372	0.372	0.372	0.372	
1997-Stage 2	0.372	0.372	0.372	0.372	
Stock:	WSH	Age 2	Age 3	Age 4	Age 5
1982	0.738	0.738	0.738	0.738	
1983	1.391	1.391	1.391	1.391	
1984	1.548	1.548	1.548	1.548	
1985	2.362	2.362	2.362	2.362	
1986	1.766	1.766	1.766	1.766	
1987	1.509	1.509	1.509	1.509	
1988	1.517	1.517	1.517	1.517	
1989	1.536	1.536	1.536	1.536	
1990	1.888	1.888	1.888	1.888	
1991	1.653	1.653	1.653	1.653	
1992	0.842	0.842	0.842	0.842	
1993	0.199	0.199	0.199	0.199	
1994	0.320	0.320	0.320	0.320	
1995	0.000	0.000	0.000	0.000	
1996	0.045	0.045	0.045	0.045	
1997-Stage 1	0.510	0.510	0.510	0.510	
1997-Stage 2	0.510	0.510	0.510	0.510	

Table H-15 (Cont). Stock and age specific FP values used for the Columbia River net fishery. FP values of 1.00 are not shown.

Fishery:	Columbia River Net			
Stock:	CWS			
	Age 2	Age 3	Age 4	Age 5
1982	0.800	0.800	0.800	0.800
1983	1.385	1.385	1.385	1.385
1984	0.771	0.771	0.771	0.771
1985	2.482	2.482	2.482	2.482
1986	0.849	0.849	0.849	0.849
1987	1.208	1.208	1.208	1.208
1988	1.851	1.851	1.851	1.851
1989	1.624	1.624	1.624	1.624
1990	0.921	0.921	0.921	0.921
1991	0.629	0.629	0.629	0.629
1992	1.652	1.652	1.652	1.652
1993	1.644	1.644	1.644	1.644
1994	1.879	1.879	1.879	1.879
1995	0.774	0.774	0.774	0.774
1996	0.000	0.000	0.000	0.000
1997-Stage 1	1.097	1.097	1.097	1.097
1997-Stage 2	1.097	1.097	1.097	1.097
Stock:	SUM			
	Age 2	Age 3	Age 4	Age 5
1982	1.496	1.496	1.496	1.496
1983	0.538	0.538	0.538	0.538
1984	0.441	0.441	0.441	0.441
1985	1.211	1.211	1.211	1.211
1986	1.027	1.027	1.027	1.027
1987	1.219	1.219	1.219	1.219
1988	1.083	1.083	1.083	1.083
1989	0.108	0.108	0.108	0.108
1990	0.128	0.128	0.128	0.128
1991	0.218	0.218	0.218	0.218
1992	0.203	0.203	0.203	0.203
1993	0.514	0.514	0.514	0.514
1994	0.304	0.304	0.304	0.304
1995	0.582	0.582	0.582	0.582
1996	0.698	0.698	0.698	0.698
1997-Stage 1	0.420	0.420	0.420	0.420
1997-Stage 2	0.420	0.420	0.420	0.420

Table H-15 (Cont.). Stock and age specific FP values used for the Columbia River net fishery. FP values of 1.00 are not shown.

Fishery:	Columbia River Net			
Stock:	LYF			
	Age 2	Age 3	Age 4	Age 5
1982	0.282	0.282	0.282	0.282
1983	0.584	0.584	0.584	0.584
1984	1.223	1.223	1.223	1.223
1985	1.385	1.385	1.385	1.385
1986	1.614	1.614	1.614	1.614
1987	1.627	1.627	1.627	1.627
1988	1.788	1.788	1.788	1.788
1989	1.599	1.599	1.599	1.599
1990	1.541	1.541	1.541	1.541
1991	1.114	1.114	1.114	1.114
1992	0.715	0.715	0.715	0.715
1993	0.711	0.711	0.711	0.711
1994	0.553	0.553	0.553	0.553
1995	0.536	0.536	0.536	0.536
1996	0.714	0.714	0.714	0.714
1997-Stage 1	1.561	1.561	1.561	1.561
1997-Stage 2	1.561	1.561	1.561	1.561
Stock:	MCB			
	Age 2	Age 3	Age 4	Age 5
1982	0.930	0.930	0.930	0.930
1983	0.799	0.799	0.799	0.799
1984	1.232	1.232	1.232	1.232
1985	1.440	1.440	1.440	1.440
1986	2.159	2.159	2.159	2.159
1987	2.147	2.147	2.147	2.147
1988	2.322	2.322	2.322	2.322
1989	2.211	2.211	2.211	2.211
1990	1.696	1.696	1.696	1.696
1991	1.274	1.274	1.274	1.274
1992	1.032	1.032	1.032	1.032
1993	1.282	1.282	1.282	1.282
1994	0.503	0.503	0.503	0.503
1995	0.630	0.630	0.630	0.630
1996	0.873	0.873	0.873	0.873
1997-Stage 1	0.932	0.932	0.932	0.932
1997-Stage 2	0.932	0.932	0.932	0.932

Table H-16. Stock and age specific FP values used for the Johnstone Strait net fishery.
 FP values of 1.00 are not shown.

Fishery:	Johnstone St Net			
Stock:	All Stocks			
	Age 2	Age 3	Age 4	Age 5
1983	1.337	1.337	1.337	1.337
1984	0.580	0.580	0.580	0.580
1985	0.805	0.805	0.805	0.805
1986	0.717	0.717	0.717	0.717
1987	0.437	0.437	0.437	0.437
1988	0.238	0.238	0.238	0.238
1989	0.746	0.746	0.746	0.746
1990	0.429	0.429	0.429	0.429
1991	0.461	0.461	0.461	0.461
1992	0.241	0.241	0.241	0.241
1993	0.234	0.234	0.234	0.234
1994	0.122	0.122	0.122	0.122
1995	0.022	0.022	0.022	0.022
1996	0.234	0.234	0.234	0.234
1997-Stage 1	0.234	0.234	0.234	0.234
1997-Stage 2	0.122	0.122	0.122	0.122

Table H-17. Stock and age specific FP values used for the Fraser River net fishery.
 FP values of 1.00 are not shown.

Stock:	Fraser Net			
	FRE	Age 2	Age 3	Age 4
1983	0.318	0.318	0.318	0.318
1984	0.544	0.544	0.544	0.544
1985	0.622	0.622	0.622	0.622
1986	0.423	0.423	0.423	0.423
1987	0.268	0.268	0.268	0.268
1988	0.192	0.192	0.192	0.192
1989	0.722	0.722	0.722	0.722
1990	0.370	0.370	0.370	0.370
1991	0.436	0.436	0.436	0.436
1992	0.184	0.184	0.184	0.184
1993	0.472	0.472	0.472	0.472
1994	0.320	0.320	0.320	0.320
1995	0.161	0.161	0.161	0.161
1996	0.156	0.156	0.156	0.156
1997-Stage 1	0.472	0.472	0.472	0.472
1997-Stage 2	0.371	0.371	0.371	0.371

Table H-17 (Cont). Stock and age specific FP values used for the Fraser River net fishery. FP values of 1.00 are not shown.

Fishery:		Fraser Net			
Stock:	FRL	Age 2	Age 3	Age 4	Age 5
1985	0.678	0.678	0.678	0.678	
1986	1.731	1.731	1.731	1.731	
1987	0.698	0.698	0.698	0.698	
1988	1.055	1.055	1.055	1.055	
1989	0.426	0.426	0.426	0.426	
1990	0.217	0.217	0.217	0.217	
1991	0.418	0.418	0.418	0.418	
1992	0.318	0.318	0.318	0.318	
1993	0.276	0.276	0.276	0.276	
1994	0.324	0.324	0.324	0.324	
1995	0.689	0.689	0.689	0.689	
1996	0.973	0.973	0.973	0.973	
1997-Stage 1	0.276	0.276	0.276	0.276	
1997-Stage 2	0.650	0.650	0.650	0.650	
Stock:	All Other Stocks	Age 2	Age 3	Age 4	Age 5
1982	0.910	0.910	0.910	0.910	
1983	1.337	1.337	1.337	1.337	
1984	0.580	0.580	0.580	0.580	
1985	0.805	0.805	0.805	0.805	
1986	0.717	0.717	0.717	0.717	
1987	0.437	0.437	0.437	0.437	
1988	0.238	0.238	0.238	0.238	
1989	0.746	0.746	0.746	0.746	
1990	0.429	0.429	0.429	0.429	
1991	0.461	0.461	0.461	0.461	
1992	0.241	0.241	0.241	0.241	
1993	0.234	0.234	0.234	0.234	
1994	0.122	0.122	0.122	0.122	
1995	0.022	0.022	0.022	0.022	
1996	0.234	0.234	0.234	0.234	
1997-Stage 1	0.234	0.234	0.234	0.234	
1997-Stage 2	0.750	0.750	0.750	0.750	

Table H-18. Stock and age specific FP values used for the SEAK sport fishery.
FP values of 1.00 are not shown.

Fishery:	SEAK Sport			
Stock:	All Stocks			
	Age 2	Age 3	Age 4	Age 5
1983	1.689	1.689	1.689	1.689
1984	1.881	1.881	1.881	1.881
1997-Stage 2	1.589	1.589	1.589	1.589

Table H-19. Stock and age specific FP values used for the NCBC sport fishery.
FP values of 1.00 are not shown.

Fishery:	NCBC Sport			
Stock:	All Stocks			
	Age 2	Age 3	Age 4	Age 5
1997-Stage 2	1.399	1.399	1.399	1.399

Table H-20. Stock and age specific FP values used for the WCVI sport fishery.
FP values of 1.00 are not shown.

Fishery:	WCVI Sport			
Stock:	All Stocks			
	Age 2	Age 3	Age 4	Age 5
1997-Stage 2	0.682	0.682	0.682	0.682

Table H-21. Stock and age specific FP values used for the WA/OR Ocean sport fishery.
FP values of 1.00 are not shown.

Fishery:	WA/OR Ocean Sport			
Stock:	All Stocks			
	Age 2	Age 3	Age 4	Age 5
1983	0.833	0.833	0.833	0.833
1984	0.203	0.203	0.203	0.203
1997-Stage 2	0.361	0.361	0.361	0.361

Table H-22. Stock and age specific FP values used for the NPS sport fishery.

Fishery:	NPS Sport			
Stock:	All Stocks			
	Age 2	Age 3	Age 4	Age 5
1997-Stage 2	0.922	0.922	0.922	0.922

Table H-23. Stock and age specific FP values used for the South PS sport fishery.

Fishery:	South PS Sport			
Stock:	All Stocks			
	Age 2	Age 3	Age 4	Age 5
1997-Stage 2	0.740	0.740	0.740	0.740

Table H-24. Stock and age specific FP values used for the GS sport fishery.
FP values of 1.00 are not shown.

Fishery:	GS Sport			
Stock:	All Stocks			
	Age 2	Age 3	Age 4	Age 5
1983	0.690	0.690	0.690	0.690
1984	1.180	1.180	1.180	1.180
1997-Stage 2	1.243	1.243	1.243	1.243

Table H-25. Stock and age specific FP values used for freshwater sport fisheries.
FP values of 1.00 are not shown.

Fishery:	Freshwater Sport				
Stock:	URB	Age 2	Age 3	Age 4	Age 5
1982	0.274	0.274	0.274	0.274	
1983	0.875	0.875	0.875	0.875	
1984	3.604	3.604	3.604	3.604	
1985	5.023	5.023	5.023	5.023	
1986	4.139	4.139	4.139	4.139	
1987	4.832	4.832	4.832	4.832	
1988	5.262	5.262	5.262	5.262	
1989	5.499	5.499	5.499	5.499	
1990	3.977	3.977	3.977	3.977	
1991	7.056	7.056	7.056	7.056	
1992	5.666	5.666	5.666	5.666	
1993	6.056	6.056	6.056	6.056	
1994	4.654	4.654	4.654	4.654	
1995	6.466	6.466	6.466	6.466	
1996	4.306	4.306	4.306	4.306	
1997-Stage 1	3.553	3.553	3.553	3.553	
1997-Stage 2	3.553	3.553	3.553	3.553	
Stock:	BON	Age 2	Age 3	Age 4	Age 5
1982	0.914	0.914	0.914	0.914	
1983	0.557	0.557	0.557	0.557	
1984	2.811	2.811	2.811	2.811	
1985	1.562	1.562	1.562	1.562	
1986	2.282	2.282	2.282	2.282	
1987	3.099	3.099	3.099	3.099	
1988	2.322	2.322	2.322	2.322	
1989	3.823	3.823	3.823	3.823	
1990	3.489	3.489	3.489	3.489	
1991	4.337	4.337	4.337	4.337	
1992	4.494	4.494	4.494	4.494	
1993	3.752	3.752	3.752	3.752	
1994	0.122	0.122	0.122	0.122	
1995	1.272	1.272	1.272	1.272	
1996	2.011	2.011	2.011	2.011	
1997-Stage 1	2.665	2.665	2.665	2.665	
1997-Stage 2	2.665	2.665	2.665	2.665	

Table H-25 (Cont). Stock and age specific FP values used for the freshwater sport fisheries. FP values of 1.00 are not shown.

Fishery:		Freshwater Sport			
Stock:	CWF	Age 2	Age 3	Age 4	Age 5
	1982	0.914	0.914	0.914	0.914
1983	0.557	0.557	0.557	0.557	
1984	2.811	2.811	2.811	2.811	
1985	1.562	1.562	1.562	1.562	
1986	2.282	2.282	2.282	2.282	
1987	3.099	3.099	3.099	3.099	
1988	2.322	2.322	2.322	2.322	
1989	3.823	3.823	3.823	3.823	
1990	3.489	3.489	3.489	3.489	
1991	4.337	4.337	4.337	4.337	
1992	4.494	4.494	4.494	4.494	
1993	3.752	3.752	3.752	3.752	
1994	0.122	0.122	0.122	0.122	
1995	1.272	1.272	1.272	1.272	
1996	2.011	2.011	2.011	2.011	
1997-Stage 1	2.665	2.665	2.665	2.665	
1997-Stage 2	2.665	2.665	2.665	2.665	
Stock:		LRW	Age 2	Age 3	Age 4
Stock:	LRW	Age 2	Age 3	Age 4	Age 5
	1982	1.666	1.666	1.666	1.666
1983	1.934	1.934	1.934	1.934	
1984	2.769	2.769	2.769	2.769	
1985	2.118	2.118	2.118	2.118	
1986	1.768	1.768	1.768	1.768	
1987	2.058	2.058	2.058	2.058	
1988	1.766	1.766	1.766	1.766	
1989	2.750	2.750	2.750	2.750	
1990	2.561	2.561	2.561	2.561	
1991	2.304	2.304	2.304	2.304	
1992	3.986	3.986	3.986	3.986	
1993	4.527	4.527	4.527	4.527	
1994	1.598	1.598	1.598	1.598	
1995	5.416	5.416	5.416	5.416	
1996	1.781	1.781	1.781	1.781	
1997-Stage 1	3.269	3.269	3.269	3.269	
1997-Stage 2	3.269	3.269	3.269	3.269	

Table H-25 (Cont). Stock and age specific FP values used for the freshwater sport. FP values of 1.00 are not shown.

Fishery:	Freshwater Sport				
Stock:	WSH	Age 2	Age 3	Age 4	Age 5
1982	0.993	0.993	0.993	0.993	
1983	1.106	1.106	1.106	1.106	
1984	1.011	1.011	1.011	1.011	
1985	0.945	0.945	0.945	0.945	
1986	1.007	1.007	1.007	1.007	
1987	0.867	0.867	0.867	0.867	
1988	0.863	0.863	0.863	0.863	
1989	0.861	0.861	0.861	0.861	
1990	0.946	0.946	0.946	0.946	
1991	1.191	1.191	1.191	1.191	
1992	0.892	0.892	0.892	0.892	
1993	1.285	1.285	1.285	1.285	
1994	0.978	0.978	0.978	0.978	
1995	1.180	1.180	1.180	1.180	
1996	0.589	0.589	0.589	0.589	
1997-Stage 1	1.019	1.019	1.019	1.019	
1997-Stage 2	1.019	1.019	1.019	1.019	
Stock:	CWS	Age 2	Age 3	Age 4	Age 5
1982	1.346	1.346	1.346	1.346	
1983	1.568	1.568	1.568	1.568	
1984	1.601	1.601	1.601	1.601	
1985	1.510	1.510	1.510	1.510	
1986	1.957	1.957	1.957	1.957	
1987	1.445	1.445	1.445	1.445	
1988	1.237	1.237	1.237	1.237	
1989	1.698	1.698	1.698	1.698	
1990	2.064	2.064	2.064	2.064	
1991	2.083	2.083	2.083	2.083	
1992	1.486	1.486	1.486	1.486	
1993	1.984	1.984	1.984	1.984	
1994	1.608	1.608	1.608	1.608	
1995	1.379	1.379	1.379	1.379	
1996	0.750	0.750	0.750	0.750	
1997-Stage 1	1.549	1.549	1.549	1.549	
1997-Stage 2	1.549	1.549	1.549	1.549	

Table H-25 (Cont). Stock and age specific FP values used for the freshwater sport. FP values of 1.00 are not shown.

Fishery:	Freshwater Sport			
Stock:	LYF			
	Age 2	Age 3	Age 4	Age 5
1982	0.273	0.273	0.273	0.273
1983	0.501	0.501	0.501	0.501
1984	3.445	3.445	3.445	3.445
1985	1.277	1.277	1.277	1.277
1986	2.729	2.729	2.729	2.729
1987	3.161	3.161	3.161	3.161
1988	3.468	3.468	3.468	3.468
1989	3.200	3.200	3.200	3.200
1990	0.925	0.925	0.925	0.925
1991	2.920	2.920	2.920	2.920
1992	2.129	2.129	2.129	2.129
1993	3.038	3.038	3.038	3.038
1994	0.000	0.000	0.000	0.000
1995	0.000	0.000	0.000	0.000
1996	0.315	0.315	0.315	0.315
1997-Stage 1	0.300	0.300	0.300	0.300
1997-Stage 2	0.300	0.300	0.300	0.300
Stock:	MCB			
	Age 2	Age 3	Age 4	Age 5
1982	0.273	0.273	0.273	0.273
1983	0.748	0.748	0.748	0.748
1984	1.827	1.827	1.827	1.827
1985	1.767	1.767	1.767	1.767
1986	2.478	2.478	2.478	2.478
1987	2.647	2.647	2.647	2.647
1988	3.869	3.869	3.869	3.869
1989	4.274	4.274	4.274	4.274
1990	5.653	5.653	5.653	5.653
1991	3.302	3.302	3.302	3.302
1992	6.238	6.238	6.238	6.238
1993	5.507	5.507	5.507	5.507
1994	2.878	2.878	2.878	2.878
1995	9.960	9.960	9.960	9.960
1996	3.683	3.683	3.683	3.683
1997-Stage 1	5.261	5.261	5.261	5.261
1997-Stage 2	5.261	5.261	5.261	5.261

Appendix I
 Conversion factors used in the May 1997 calibration
 (9702) of the PSC Chinook Model

Year	Columbia Upriver Bright	Spring Creek Hatchery	Snake River Fall Wild
1979	0.9226	0.4705	0.6253
1980	0.5529	0.8593	0.3314
1981	0.4842	0.6263	0.2265
1982	0.5372	1.0000	0.3097
1983	0.8897	0.6659	0.4400
1984	0.9649	0.5446	1.0000
1985	0.9955	0.3547	0.5398
1986	0.9925	1.0000	0.3241
1987	0.8873	1.0000	0.3399
1988	0.9769	1.0000	0.2931
1989	0.9166	0.9848	0.3653
1990	0.8391	0.9835	0.3645
1991	0.8097	0.6460	0.2349
1992	0.9007	0.6553	0.4804
1993	0.8304	0.9866	0.6424
1994	0.8352	0.8741	0.5078
1995	0.8440	0.6708	0.2437
1996	0.7155	0.9910	0.4701

Appendix J

Proportion Vulnerable by age for Fisheries With Changes in the Minimum Size Limit
Since the 1979-1981 Model Base Period

Fishery	Years	Age 2	Age 3	Age 4	Age 5
SEAK Net	1986-97	0.1989	0.6911	0.0326	0.0086
NBC Troll	1987-97	0.5938	0.6561	0.1036	0.0159
CBC Troll	1987-97	0.5981	0.6188	0.1154	0.0222
GS Troll	1984-97	0.5979	0.5881	0.0755	0.0306
GS Sport	1982-88	0.8101	0.0098	0.0014	0.0102
GS Sport	1989-97	1.0000	0.5881	0.0755	0.0306
WCVI Troll	1987-97	0.5974	0.6072	0.2139	0.0807

Appendix K

Stock Productivity Scalars (EV's) used in the May 1997 calibration (9702)
of the PSC Chinook Model

Brood Year	Stock														
	AKS	NTH	FRE	FRL	RBH	RBT	GSQ	GST	GSH	NKF	PSF	PSN	PSY	NKS	SKG
74	0.86	1.46	1.33	0.44	1.08	1.08	1.18	0.46	1.41	0.66	1.04	0.89	1.04	0.01	1.36
75	0.91	1.47	1.28	0.88	0.60	0.60	0.80	0.56	1.45	0.71	0.90	0.87	0.90	0.01	1.23
76	1.02	1.50	0.98	0.96	2.50	2.50	1.36	1.26	2.11	0.97	0.98	0.74	0.98	1.33	1.89
77	1.26	1.51	0.86	0.83	1.07	1.07	0.89	1.38	1.79	1.17	1.02	0.48	1.02	1.23	1.20
78	1.83	1.52	0.92	1.26	3.22	3.22	1.32	0.97	1.26	1.24	0.83	0.45	0.83	0.74	1.33
79	1.28	1.01	0.82	1.27	1.84	1.84	0.74	0.74	0.48	1.85	0.47	0.78	0.47	0.47	0.73
80	1.98	1.02	1.03	0.93	1.38	1.38	0.82	0.37	0.29	2.33	0.51	0.83	0.51	0.37	0.50
81	1.66	1.22	1.45	1.40	0.83	0.83	1.63	0.52	1.04	2.51	0.46	0.98	0.46	0.26	1.40
82	1.58	1.32	1.58	1.74	0.66	0.66	2.05	0.30	1.12	1.38	0.44	1.21	0.44	0.24	0.84
83	1.73	1.23	1.05	0.57	0.17	0.17	0.83	0.24	0.62	1.04	0.52	1.41	0.52	0.29	0.44
84	1.14	1.20	0.92	0.42	0.91	0.91	1.95	0.26	0.19	1.21	0.51	1.47	0.51	0.37	0.69
85	0.99	1.14	0.80	0.15	0.99	0.99	0.48	0.22	0.14	1.50	0.60	1.52	0.60		0.50
86	0.80	1.05	0.75	1.29	1.60	1.60	0.97	0.54	0.35	1.39	0.53	1.64	0.53		0.70
87	0.59	1.01	0.67	0.57	1.69	1.69	0.57	0.35	0.20	1.10	0.32	1.15	0.32		0.36
88	0.59	1.07	0.57	2.22	1.80	1.80	0.56	0.68	0.38	0.82	0.21	0.75	0.21		0.32
89	0.68	1.02	0.69	1.27	1.84	1.84	0.13	0.48	0.34	0.52	0.17	0.60	0.17		0.25
90	0.64	0.84	0.73	0.77	1.50	1.50	0.38	0.31	0.32	0.52	0.25	0.68	0.25		0.23
91	0.71	0.78	0.80	0.13	0.14	0.14	0.29	0.41	0.23	0.33	0.45	0.75	0.45		0.44
92	0.86	1.15	0.97	0.18	0.07	0.07	0.33	0.58	0.21	0.35	0.48	0.54	0.48		0.54
93	1.15	1.28	1.24	0.33	0.62	0.62	0.75	0.91	0.26	0.46	0.52	0.53	0.52		0.30
94				2.03	0.19	0.19				0.65	0.40	0.54	0.40		
79-94 Ave.	1.09	1.09	0.94	0.96	1.02	1.02	0.83	0.46	0.41	1.12	0.43	0.96	0.43	0.33	0.55

Appendix K (cont.). Stock Productivity Scalars (EV's) used in the May 1997 calibration (9702)
of the PSC Chinook Model

Brood Year	Stock														
	STL	SNO	WCH	URB	SPR	BON	CWF	LRW	WSH	CWS	SUM	ORC	WCN	LYF	MCB
74	1.25	1.06	1.14	0.99	0.98	5.89	5.89	0.83	0.82	0.60	1.17	0.51	0.60	0.18	0.01
75	1.22	1.11	1.25	2.32	1.30	1.98	1.98	1.26	4.14	0.61	1.12	0.60	0.73	0.27	0.01
76	1.07	1.19	1.28	1.09	1.27	1.95	1.95	1.64	2.13	0.73	0.95	0.68	0.78	0.48	0.07
77	0.85	0.89	1.17	1.22	0.83	1.53	1.53	1.23	2.97	0.89	0.72	0.76	0.85	1.14	1.29
78	0.86	0.75	0.93	0.78	0.90	1.42	1.42	0.51	3.38	1.17	0.54	0.65	0.77	1.64	0.99
79	0.53	0.77	0.76	1.07	1.30	0.70	0.70	0.33	1.13	0.64	0.47	0.89	0.77	4.52	22.49
80	0.45	0.61	0.80	2.42	0.25	0.40	0.40	0.20	10.77	1.66	0.56	0.78	0.75	3.37	0.93
81	1.10	0.60	0.90	2.54	0.38	0.35	0.35	0.17	10.27	1.41	0.64	1.07	0.92	3.96	0.12
82	1.42	0.53	0.92	4.41	0.27	0.42	0.42	0.34	7.85	0.75	0.83	1.56	1.28	5.05	0.25
83	1.58	0.51	2.30	5.74	0.15	0.71	0.71	0.60	10.64	1.13	0.93	1.95	1.57	6.76	0.62
84	0.94	0.48	1.26	5.98	0.12	2.23	2.23	0.94	14.05	2.01	0.82	1.29	1.51	4.58	1.52
85	0.51	0.42	1.75	2.51	0.37	0.62	0.62	0.44	16.93	1.54	0.68	0.37	1.71	6.54	1.28
86	0.49	0.43	1.75	2.56	0.40	0.34	0.34	0.31	14.42	1.10	0.55	0.73	1.46	5.49	0.73
87	0.82	0.32	0.64	0.89	0.50	0.21	0.21	0.19	17.80	1.07	0.37	0.76	1.12	4.33	0.21
88	0.79	0.28	0.66	0.94	0.62	0.31	0.31	0.28	12.51	0.94	0.33	0.26	0.92	8.26	0.25
89	0.67	0.32	0.64	1.84	0.43	0.27	0.27	0.12	8.05	1.25	0.43	0.39	0.90	7.30	0.26
90	0.58	0.34	0.81	1.88	0.13	0.20	0.20	0.37	6.28	0.82	0.46	0.94	0.86	8.02	0.28
91	0.53	0.38	0.65	0.68	0.10	0.14	0.14	0.19	6.34	0.53	0.52	0.11	0.81	8.78	0.18
92	0.74	0.43	0.57	1.71	0.22	0.18	0.18	0.20	3.78	0.24	0.54	0.53	0.85	3.77	0.36
93	0.71	0.35	0.68	2.73	0.22	0.19	0.19	0.10	3.77	0.23	0.62	1.03	1.12	4.37	0.86
94	0.65	0.32		0.64	0.15	0.18	0.18	0.01	3.43	0.19	0.69	0.12		4.71	0.17
79-94 Ave.	0.78	0.44	1.01	2.41	0.35	0.47	0.47	0.30	9.25	0.97	0.59	0.80	1.10	5.61	1.91

Appendix L

Summary of Model Improvement Group progress to date

Discrepancies between age composition estimates in the SEAK troll fishery based on the PSC Chinook Model and estimates based on aging fish scales were identified by the CTC. The scale estimates and model estimates (from calibration 9702) are provided below.

Year	Scale Estimate	Model Estimate
1982	44%	21%
1983	28%	20%
1984	38%	23%
1985	46%	26%
1986	35%	23%
1987	33%	25%
1988	30%	20%
1989	20%	20%
1990	30%	19%
1991	28%	17%
1992	34%	18%
1993	28%	14%
1994	29%	16%

Estimates of age composition of SEAK troll catches of treaty fish were made by apportioning annual total troll catches by 14 strata (i.e., fall in/out, winter 1 (Oct. 1 - Dec. 31) in/out, winter 2 (Jan. 1 - April 15) in/out, spring in/out, June traditional in/out, June experimental in/out, and July in/out) and applying year/strata specific estimates of freshwater age composition based on scale samples taken from the specific year/strata. Average proportion of age 1. taken over years of available data for the strata applied to strata/years where scale samples were not available. Since samples were taken from catches that included SEAK hatchery stocks, the hatchery add-on was subtracted from the estimated age 1. catches to estimate catch of age 1. treaty fish.

Estimates of freshwater age composition of modeled catches were made assuming the following stock specific age 1. proportions: Alaska Spring - 1.0 , North/Central BC - 0.75, Fraser Early - 1.0, Nooksack Spring - 1.0, Willamette Spring Hatchery - 1.0, Cowlitz Spring Hatchery - 1.0, all other stocks 0.0.

The CTC explored the two possible explanations to the above discrepancies: (1) the scale estimates of yearling fish are too high, or (2) the model estimates of yearling fish are too low. The CTC began by making the assumption that yearling origin fish are predominately spring type fish.

With respect to errors in aging scales, blind tests of scale aging errors using hatchery fish of known age from CWT are very consistent among studies, and errors in aging age 0. tend to be lower than errors in aging age 1. chinook (Van Alen 1986, Yole 1989, Bilton 1985). It is also believed that errors in aging wild spring stocks (age 1.) is low, based on routine testing of ADF&G scale readers using samples taken from SE Alaska chinook escapements which are 100% age 1. In these tests, errors in reading freshwater ages were nil (Scott McPherson, ADF&G, Douglas, AK personal communication).

Of more concern are potential errors in aging wild fall chinook stocks that extensively rear the coastal estuaries. These stocks migrate from riparian areas where growth may be very low to coastal estuaries, where growth may be very high and occurs prior to the time of scale annulus formation. This transition in growth may be reflected on the scale as a false annulus, consequently these fish would be erroneously aged as age 1. Scale samples have been acquired from several fall stocks (three years for each of three coastal Oregon river systems, Columbia Upriver Brights, and three coastal Washington river systems). These samples were taken in river fisheries or from spawning ground sampling, are of known freshwater age, and have been aged by agency readers. The samples will be used to construct blind tests of ADF&G scale readers to evaluate potential errors in aging wild fall chinook salmon stocks. It is anticipated that these tests will be completed by fall 1997.

With respect to the potential errors in model estimates of yearling fish, two hypotheses were examined for explaining discrepancies in model and scale freshwater age composition of the SEAK troll fishery. The first hypothesis examined was that terminal run sizes of spring stocks vulnerable to the SEAK troll fishery used in PSC Chinook Model calibrations were erroneously low. The second hypothesis examined was that differences in the size and age of recruitment to the fishery existed among freshwater age classes and these result in greater vulnerability of yearling chinook to the SEAK fishery . The third hypothesis examined was that the base period SEAK troll fishery exploitation rates estimated for spring stocks were too low. Presumably the errors in spring stock base period exploitation were due to low numbers of CWT recoveries from spring stocks during the base period.

The first hypothesis was examined by a simple analysis of how sensitive the PSC Chinook Model catches of spring stocks were to terminal run sizes of key spring stocks. Here, four model calibrations were conducted using the four possible combinations of halving and doubling the NCBC and WCVI terminal runs. The model calibrations that doubled the NCBC terminal runs had spring stock catches similar to those based on scale ages. These results suggest that large underestimates of SE Alaska, NCBC and/or early Fraser terminal runs could lead to errors in model estimates of spring stock catches.

The second hypothesis was examined by directly estimating age specific PNV's. Yearling PNV's were estimated from empirical length distributions based on age 3 yearling CWT recoveries in the SEAK and BC net fisheries. The model was modified to admit freshwater age specific PNV's. Calibration runs with the new age 1. PNV's showed that

freshwater age proportions in the modeled stock catches were not sensitive to differential PNV's.

The third hypothesis was examined by comparing stock catch distributions among SPFI strata based on the modeled catches and those based on the cohort analysis. The model catch distributions are based only on the base period CWT recoveries, while catch distributions based on the cohort analyses are based on annual CWT recoveries from the base period to 1995. These comparisons revealed that the major fall stocks (WCVI, Upriver Brights and Oregon Coastal) tended to be much higher contributors, on average, to the July strata in the CWT data than in the base period model catch distribution. The major spring stocks (Alaska Spring, NCBC, Quinsam, and Willamette) tended to be higher contributors, on average, in the winter/spring strata in the CWT data than in the base period model catch distributions. These discrepancies suggested that stock vulnerabilities to the SEAK fishery have changed since the base period, or that CWT recoveries in the base period are not representative of the SEAK fishery catches.

These discrepancies led to a closer examination of a number of issues, including: (1) an analysis of the timing of the CWT recoveries in the base period winter/spring fishery relative to the present winter/spring fishery, and (2) an analysis of scale age composition as an indicator of stock composition for alternative stratification of the SEAK fishery (fall in/out, winter 1 (Oct 1- Dec. 31) in/out, winter2 (Jan 1 - April 15) in/out, spring in/out, June in/out, and July in/out).

Most of the base period CWT recoveries from the winter/spring fishery came from the late May time period and from outside areas. In recent years, the fishery has been closed from mid-April to July 1, and the base period recoveries were believed to be not representative of the present Winter/Spring fishery since the mid 1980's.

There were consistent differences in freshwater age composition between inside and outside areas, with yearling fish present in high numbers in inside areas throughout the year. Further, differences in age composition tended to be greater between areas than between time periods within areas. This suggested that the SPFI stratification in the 1996 PSC Chinook Model, where winter/spring and fall strata included both inside and outside areas in the inside age composition, was inappropriate. It was decided to explore a different stratification, winter/spring in, winter/spring out, June in, June out, and July/fall in, and July/fall out.

Winter inside catches in the base period, however, are very small. The small catches, combined with limited sampling, produced very few CWT recoveries in the strata. Two modifications were made to the calibration data to try to capture the presence of spring stocks in the inside winter strata:

1. CWT winter recoveries were simulated for the SEAK troll fishery in the years 1976-1982. Sampling was limited during this time period, and it was thought that by creating recoveries the spring stocks would be better represented. A

Visual Basic program (STRATAPROG.BAS) was written to read in the most current c-files and simulate winter recoveries. Each of the eight winter strata was assigned a “matched” strata (or group of strata) which most closely matched the stock composition in the winter strata. SEAK catches in the winter strata and catches and CWT recoveries in the matched strata were used to calculate the new recoveries. The recoveries in the matched strata were scaled by the ratio of the SEAK troll catch in the winter strata over the SEAK troll catch in the matched strata.

2. The SEAK troll fishery was re-stratified into the following six fisheries: Winter/Spring Inside, Winter/Spring Outside, June Inside, June outside, Summer/Fall Inside, Summer/Fall Outside.

Two new calibrations were performed; one with the simulated recoveries, and one with both the simulated recoveries and the new strata. Unfortunately, in both instances the proportion of spring stocks in the Alaska troll fishery decreased, by 5% and 4% respectively. Part of the decrease (2%) was explained by a change in the North/Central BC stock base period data. Weights assigned to the base period tagcodes were changed from the most recent calibration to better represent the stock composition.

Other discrepancies between the data for calibration 9702 and the two new calibrations were recognized, however time was limited to explore them in detail to determine the cause of the remaining drop in percent springs. Even if the discrepancies were reconciled, it is very unlikely that the new calibrations would show the desired increase in the percent springs.

The under-representation of spring stocks will be explored more extensively this summer. The above changes have not been incorporated into the model.

Appendix M

Potential Model Improvements

Solutions to concerns previously identified by the CTC should be implemented:

- (1) Age data from scale samples indicate that the model underestimates the abundance of spring type stocks in the SEAK troll fishery (see Appendix L).
- (2) The FP values for the WCVI troll fishery in 1992 and 1993 are used to reflect targeting on WCVI stocks. The method produces a model fishery index considerably different than the CWT based fishery index.
- (3) The age composition of the model prediction for the terminal run of the Fraser Late stock should be evaluated for consistency with estimates obtained from biological sampling data.
- (4) The NTH stock is comprised of three substocks, Skeena/Nass, Kitimat, and Atnarko with different catch distributions. Since the relative production of each substock has changed since the model base period, errors are introduced into the model predictions for the catch distribution.
- (5) Most forecasts provided by the management agencies assume average ocean harvest rates during the time series of return data used in the forecast. Current calibration methods account for the assumption of average ocean harvest for the coming year. Accounting for the annual variation in ocean harvest rates for all years might improve preseason forecasts. Another option might be to predict, and calibrate to, ocean cohort sizes rather than terminal returns.
- (6) Parameters used for the incidental mortality computations should be reviewed and updated. In particular, release mortality rates recommended by the CTC should be incorporated in the model, methods used to compute the PNV parameters should be reviewed, and model estimates of encounter rates should be compared for consistency with recent studies.
- (7) Methods used to estimate exploitation rates for stocks with no base period CWT groups should be evaluated.

In addition, the following broad topics should be addressed by the CTC.

Model Code. The computer language used for the model (QuickBasic 4.2) precludes the incorporation of additional fisheries and/or stocks (e.g., improved representation of the

SEAK, transboundary, NCBC, and WCVI stocks). To remove this limitation, the CTC should evaluate using an alternative programming language.

Model Validation. The model should be validated by comparing model predictions for key statistics with independently derived estimates. Key statistics compared should include brood exploitation rates by stock, fishery indices, sublegal encounter rates, maturation rates, and the stock composition of fishery catches.

Model Structure. A comprehensive review of the model's structure is needed. Key elements include the incidental mortality and the parameter estimation algorithms. The model primarily uses terminal runs, escapements, and fishery catches to estimate the stock productivity scalars. The CTC should evaluate the potential for incorporating additional sources of information in the parameter estimation algorithm.

Model Documentation. The model documentation should be updated, reviewed by the CTC, and published as a PSC report.

Model Output Reports. Output routines of the model should be revised to provide stock group and age specific abundance indices.

Appendix N

Fisheries and Years included in Computing Average Exploitation Rates
for 2nd Stage Calibration

Fishery	Flag ¹	Years in Average		Years Average Applied	
		First	Last	First	Last
SEAK troll	0	1983	1996	1997	2005
NBC troll	0	1983	1996	1997	2005
CBC troll	0	1983	1996	1997	2005
WCVI troll	0	1986	1996	1997	2005
WA/OR troll	0	1979	1996	1997	2005
GS troll	0	1983	1996	1997	2005
SEAK net	0	1979	1996	1997	2005
NBC net	0	1983	1996	1997	2005
CBC net	0	1983	1996	1997	2005
WCVI net	5	1983	1996	1997	2005
WCVI net	6	1983	1996	1997	2005
SEAK sport	0	1983	1996	1997	2005
NCBC sport	0	1983	1996	1997	2005
WCVI sport	0	1983	1996	1997	2005
WA/OR Ocean sport	0	1983	1996	1997	2005
NPS sport	0	1983	1996	1997	2005
South PS sport	0	1983	1996	1997	2005
GS sport	0	1983	1996	1997	2005

¹A flag of 0 indicates that the average is used for all stocks in the fishery.
A non-zero flag indicates the stock number(s) to apply the average .

Appendix O

Maturation Rates and Adult Equivalent Rates for 11 Stocks used in the May 1997
calibration (9702) of the PSC Chinook Model

Year	Stock	Maturation Rates			Adult Equivalent Rates		
		Age 2	Age 3	Age 4	Age 2	Age 3	Age 4
1979	AKS	0.0548	0.1213	0.6491	0.5839	0.7996	0.9649
	BON	0.0000	0.2399	0.9877	0.5626	0.8417	0.9988
	CWF	0.0011	0.1287	0.8169	0.5665	0.8130	0.9817
	GSH	0.0344	0.3599	0.9497	0.6043	0.8697	0.9950
	LRW	0.0554	0.1092	0.6600	0.5820	0.7976	0.9660
	ORC	0.2606	0.1688	0.4800	0.6803	0.7992	0.9480
	RBH	0.0915	0.1472	0.5840	0.6001	0.8087	0.9584
	RBT	0.0915	0.1472	0.5840	0.6001	0.8087	0.9584
	SPR	0.0303	0.4474	0.9638	0.6615	0.8869	0.9964
	URB	0.0000	0.0499	0.4867	0.0000	0.7633	0.9466
1980	WSH	0.0099	0.6693	0.9348	0.6420	0.9272	0.9935
	AKS	0.0548	0.1213	0.6491	0.5839	0.7996	0.9649
	BON	0.0110	0.0508	0.8963	0.6165	0.8037	0.9896
	CWF	0.0343	0.1262	0.8169	0.5804	0.8086	0.9817
	GSH	0.0231	0.2419	0.9558	0.5810	0.8431	0.9956
	LRW	0.0331	0.0878	0.6600	0.5725	0.7964	0.9660
	ORC	0.1121	0.1989	0.4800	0.6063	0.8108	0.9480
	RBH	0.0346	0.1948	0.6963	0.5658	0.7998	0.9696
	RBT	0.0346	0.1948	0.6963	0.5658	0.7998	0.9696
	SPR	0.0186	0.6558	0.9407	0.6430	0.9299	0.9941
1981	URB	0.0000	0.1857	0.4225	0.0000	0.8183	0.9386
	WSH	0.0076	0.5622	0.7461	0.6305	0.9121	0.9746
	AKS	0.0045	0.1213	0.6491	0.5439	0.7996	0.9649
	BON	0.0087	0.3723	0.9140	0.6204	0.8735	0.9914
	CWF	0.0152	0.0959	0.7621	0.5791	0.8079	0.9762
	GSH	0.0182	0.1191	0.9130	0.5835	0.8158	0.9913
	LRW	0.0788	0.1317	0.7094	0.5957	0.7969	0.9709
	ORC	0.0379	0.1517	0.5479	0.5503	0.7952	0.9548
	RBH	0.0180	0.1130	0.3915	0.5589	0.7860	0.9392
	RBT	0.0180	0.1130	0.3915	0.5589	0.7860	0.9392
1982	SPR	0.0634	0.5530	0.9534	0.6993	0.9089	0.9953
	URB	0.0000	0.1582	0.7112	0.0000	0.8217	0.9711
	WSH	0.0000	0.4957	0.9904	0.6563	0.8980	0.9990
	AKS	0.1225	0.0579	0.6491	0.6220	0.7741	0.9649
	BON	0.0184	0.4077	0.9812	0.6541	0.8815	0.9981
	CWF	0.0191	0.1505	0.8438	0.5741	0.8180	0.9844
	GSH	0.0482	0.1323	0.8867	0.6085	0.8225	0.9887
	LRW	0.0472	0.1301	0.5762	0.5792	0.8016	0.9576
	ORC	0.0589	0.0900	0.4827	0.5679	0.7610	0.9483
	RBH	0.0176	0.1276	0.4850	0.5638	0.7868	0.9485
	RBT	0.0176	0.1276	0.4850	0.5638	0.7868	0.9485

Year	Stock	Maturation Rates			Adult Equivalent Rates		
		Age 2	Age 3	Age 4	Age 2	Age 3	Age 4
1983	AKS	0.0425	0.1722	0.5028	0.5893	0.8132	0.9503
	BON	0.0074	0.6255	1.0000	0.6511	0.9251	1.0000
	CWF	0.0135	0.1288	0.8218	0.5636	0.8082	0.9822
	GSH	0.0523	0.2301	0.9430	0.5989	0.8409	0.9943
	LRW	0.0472	0.1092	0.6493	0.5792	0.7976	0.9649
	ORC	0.2357	0.0816	0.2172	0.6633	0.7724	0.9217
	RBH	0.0239	0.0686	0.4451	0.5732	0.7943	0.9445
	RBT	0.0239	0.0686	0.4451	0.5732	0.7943	0.9445
	SPR	0.0381	0.5234	1.0000	0.6724	0.9021	1.0000
	URB	0.0000	0.0951	0.5947	0.0000	0.7757	0.9589
	WSH	0.0079	0.4134	0.9693	0.6373	0.8809	0.9969
1984	AKS	0.0325	0.1449	0.6793	0.5769	0.8159	0.9679
	BON	0.0316	0.6562	1.0000	0.6629	0.9265	1.0000
	CWF	0.0351	0.0826	0.7484	0.5790	0.7967	0.9748
	GSH	0.0284	0.1615	0.9173	0.5886	0.8239	0.9917
	LRW	0.0347	0.1092	0.6600	0.5682	0.7976	0.9660
	ORC	0.0800	0.1688	0.4026	0.5589	0.7992	0.9403
	RBH	0.0094	0.1287	0.7391	0.5837	0.8039	0.9739
	RBT	0.0094	0.1287	0.7391	0.5837	0.8039	0.9739
	SPR	0.0405	0.7110	0.9334	0.6798	0.9420	0.9933
	URB	0.0000	0.1666	0.4466	0.0000	0.8086	0.9402
	WSH	0.0062	0.5348	0.9617	0.6461	0.9063	0.9962
1985	AKS	0.0142	0.1314	0.8082	0.5564	0.8038	0.9808
	BON	0.0353	0.6565	0.8263	0.6676	0.9313	0.9826
	CWF	0.0455	0.1374	0.7296	0.6276	0.8052	0.9730
	GSH	0.0242	0.1962	0.8753	0.5922	0.8237	0.9875
	LRW	0.0586	0.1297	0.6600	0.5720	0.7895	0.9660
	ORC	0.1632	0.0230	0.4800	0.6194	0.7437	0.9480
	RBH	0.0363	0.2196	0.6869	0.5651	0.8282	0.9687
	RBT	0.0363	0.2196	0.6869	0.5651	0.8282	0.9687
	SPR	0.0860	0.7603	0.9896	0.7165	0.9519	0.9990
	URB	0.0000	0.1611	0.6520	0.0000	0.8060	0.9630
	WSH	0.0000	0.6092	0.9814	0.6221	0.9198	0.9981
1986	AKS	0.0257	0.0931	0.6762	0.5661	0.7857	0.9676
	BON	0.0505	0.7213	1.0000	0.6654	0.9363	1.0000
	CWF	0.0217	0.4036	0.6775	0.5856	0.8713	0.9678
	GSH	0.0251	0.1779	0.7591	0.5891	0.8315	0.9759
	LRW	0.0582	0.0951	0.4762	0.5716	0.7791	0.9476
	ORC	0.0538	0.1054	0.2201	0.5744	0.7787	0.9220
	RBH	0.0229	0.0345	0.7478	0.5926	0.7839	0.9748
	RBT	0.0229	0.0345	0.7478	0.5926	0.7839	0.9748
	SPR	0.0567	0.9276	0.9895	0.6661	0.9855	0.9989
	URB	0.0000	0.1563	0.6223	0.0000	0.7995	0.9609
	WSH	0.0209	0.4587	0.9342	0.6422	0.8887	0.9934

Year	Stock	Maturation Rates			Adult Equivalent Rates		
		Age 2	Age 3	Age 4	Age 2	Age 3	Age 4
1987	AKS	0.0261	0.0862	0.5470	0.5638	0.7924	0.9547
	BON	0.0101	0.6280	0.6412	0.6191	0.9246	0.9641
	CWF	0.0792	0.1934	0.8018	0.5965	0.8234	0.9802
	GSH	0.0199	0.1762	0.9386	0.5905	0.8265	0.9939
	LRW	0.1100	0.1483	0.4485	0.5918	0.7793	0.9448
	ORC	0.0335	0.1096	0.4080	0.5457	0.7859	0.9408
	RBH	0.0221	0.2994	0.7022	0.5641	0.8329	0.9702
	RBT	0.0221	0.2994	0.7022	0.5641	0.8329	0.9702
	SPR	0.0107	0.6144	1.0000	0.6166	0.9229	1.0000
	URB	0.0000	0.1686	0.5397	0.0000	0.8040	0.9529
1988	WSH	0.0078	0.5345	0.9307	0.6296	0.9065	0.9931
	AKS	0.0564	0.0885	0.6607	0.5834	0.7887	0.9661
	BON	0.0101	0.3972	0.9665	0.6191	0.8788	0.9966
	CWF	0.0369	0.1340	0.7629	0.5963	0.8025	0.9763
	GSH	0.0326	0.2035	0.8680	0.6051	0.8316	0.9868
	LRW	0.0728	0.0980	0.2617	0.5853	0.7733	0.9262
	ORC	0.0419	0.0720	0.4940	0.5483	0.7570	0.9494
	RBH	0.0145	0.0920	0.5191	0.5648	0.7918	0.9519
	RBT	0.0145	0.0920	0.5191	0.5648	0.7918	0.9519
	SPR	0.0288	0.4322	1.0000	0.6543	0.8749	1.0000
1989	URB	0.0000	0.1137	0.5985	0.0000	0.7780	0.9553
	WSH	0.0097	0.4893	0.9898	0.6179	0.8952	0.9990
	AKS	0.0075	0.1174	0.6023	0.5606	0.7978	0.9602
	BON	0.0101	0.3972	0.9877	0.6191	0.8788	0.9988
	CWF	0.0555	0.2187	0.6492	0.5908	0.8298	0.9649
	GSH	0.0325	0.2637	0.8579	0.6127	0.8454	0.9858
	LRW	0.1066	0.1613	0.3588	0.5987	0.7896	0.9359
	ORC	0.0667	0.0568	0.2276	0.5694	0.7550	0.9228
	RBH	0.0285	0.1886	0.6334	0.5697	0.7978	0.9633
	RBT	0.0285	0.1886	0.6334	0.5697	0.7978	0.9633
1990	SPR	0.0342	0.6051	0.7467	0.6379	0.9201	0.9747
	URB	0.0000	0.0567	0.3994	0.0000	0.7574	0.9369
	WSH	0.0039	0.4030	0.9349	0.6058	0.8774	0.9935
	AKS	0.0222	0.0992	0.6357	0.5597	0.7961	0.9636
	BON	0.0101	0.3972	0.9877	0.6191	0.8788	0.9988
	CWF	0.0233	0.1976	0.7772	0.5699	0.8097	0.9777
	GSH	0.0515	0.2986	0.8752	0.6288	0.8567	0.9875
	LRW	0.0644	0.1228	0.3639	0.5700	0.7869	0.9364
	ORC	0.0493	0.0904	0.2535	0.5635	0.7694	0.9253
	RBH	0.0256	0.1402	0.3847	0.5665	0.7958	0.9385
	RBT	0.0256	0.1402	0.3847	0.5665	0.7958	0.9385
	SPR	0.0687	0.4663	0.9719	0.6904	0.8930	0.9972
	URB	0.0000	0.0127	0.3110	0.0000	0.7421	0.9286
	WSH	0.0168	0.3266	0.9329	0.6302	0.8633	0.9933

Year	Stock	Maturation Rates			Adult Equivalent Rates		
		Age 2	Age 3	Age 4	Age 2	Age 3	Age 4
1991	AKS	0.0122	0.0994	0.6709	0.5531	0.7853	0.9671
	BON	0.0101	0.3972	0.9877	0.6191	0.8788	0.9988
	CWF	0.0334	0.1288	0.5352	0.5800	0.7995	0.9535
	GSH	0.0343	0.3856	0.9455	0.6204	0.8696	0.9946
	LRW	0.2459	0.1015	0.4637	0.6540	0.7720	0.9464
	ORC	0.0324	0.0678	0.3307	0.5523	0.7727	0.9331
	RBH	0.0129	0.1683	0.5313	0.5521	0.7930	0.9531
	RBT	0.0129	0.1683	0.5313	0.5521	0.7930	0.9531
	SPR	0.0280	0.7685	0.9950	0.6564	0.9537	0.9995
	URB	0.0000	0.0648	0.3222	0.0000	0.7648	0.9235
	WSH	0.0220	0.4656	0.9622	0.6246	0.8913	0.9962
1992	AKS	0.0135	0.0556	0.5202	0.5580	0.7822	0.9520
	BON	0.0101	0.3972	0.9877	0.6191	0.8788	0.9988
	CWF	0.0209	0.1347	0.6235	0.6082	0.8079	0.9624
	GSH	0.0282	0.3559	0.8458	0.5977	0.8670	0.9846
	LRW	0.1170	0.1142	0.3278	0.5907	0.7732	0.9328
	ORC	0.0407	0.1178	0.4518	0.5656	0.7676	0.9452
	RBH	0.0020	0.0732	0.3893	0.5579	0.7803	0.9389
	RBT	0.0020	0.0732	0.3893	0.5579	0.7803	0.9389
	SPR	0.0720	0.6201	1.0000	0.6696	0.9237	1.0000
	URB	0.0491	0.0102	0.3715	0.5490	0.7415	0.9356
	WSH	0.0091	0.4061	0.9573	0.6276	0.8802	0.9957
1993	AKS	0.0318	0.0889	0.6175	0.5695	0.7885	0.9617
	BON	0.0101	0.3972	0.9877	0.6191	0.8788	0.9988
	CWF	0.0312	0.3507	0.7249	0.5857	0.8570	0.9725
	GSH	0.0301	0.2642	0.9194	0.5989	0.8372	0.9919
	LRW	0.0878	0.0705	0.2990	0.5887	0.7664	0.9299
	ORC	0.0808	0.1106	0.2075	0.5778	0.7816	0.9208
	RBH	0.0249	0.1384	0.5367	0.5689	0.7957	0.9537
	RBT	0.0249	0.1384	0.5367	0.5689	0.7957	0.9537
	SPR	0.0366	0.6054	0.9883	0.6573	0.9200	0.9988
	URB	0.0491	0.0361	0.2664	0.5490	0.7515	0.9236
	WSH	0.0101	0.4663	0.9797	0.6330	0.8916	0.9980
1994	AKS	0.0318	0.1029	0.5984	0.5695	0.7936	0.9598
	BON	0.0195	0.3972	0.9877	0.6327	0.8788	0.9988
	CWF	0.0312	0.1777	0.7466	0.5857	0.8176	0.9747
	GSH	0.0301	0.2244	0.7344	0.5989	0.8379	0.9734
	LRW	0.0878	0.1175	0.3588	0.5887	0.7841	0.9359
	ORC	0.0808	0.0988	0.4307	0.5778	0.7733	0.9431
	RBH	0.0249	0.1375	0.5359	0.5689	0.7970	0.9536
	RBT	0.0249	0.1375	0.5359	0.5689	0.7970	0.9536
	SPR	0.0366	0.6123	0.9670	0.6573	0.9209	0.9967
	URB	0.0491	0.0361	0.3178	0.5490	0.7515	0.9278
	WSH	0.0101	0.5037	0.9612	0.6330	0.8988	0.9961

Year	Stock	Maturation Rates			Adult Equivalent Rates		
		Age 2	Age 3	Age 4	Age 2	Age 3	Age 4
1995	AKS	0.0318	0.1029	0.6266	0.5695	0.7936	0.9627
	BON	0.0195	0.4850	0.9877	0.6327	0.8940	0.9988
	CWF	0.0312	0.1777	0.7289	0.5857	0.8176	0.9729
	GSH	0.0301	0.2244	0.8880	0.5989	0.8379	0.9888
	LRW	0.0878	0.1175	0.4412	0.5887	0.7841	0.9441
	ORC	0.0808	0.0988	0.3596	0.5778	0.7733	0.9360
	RBH	0.0249	0.1375	0.5571	0.5689	0.7970	0.9557
	RBT	0.0249	0.1375	0.5571	0.5689	0.7970	0.9557
	SPR	0.0366	0.6123	0.9599	0.6573	0.9209	0.9960
	URB	0.0491	0.0361	0.3178	0.5490	0.7515	0.9278
1996	WSH	0.0101	0.5037	0.9468	0.6330	0.8988	0.9947
	AKS	0.0548	0.1213	0.6491	0.5839	0.7996	0.9649
	BON	0.0101	0.3972	0.9877	0.6191	0.8788	0.9988
	CWF	0.0168	0.1287	0.8169	0.5764	0.8130	0.9817
	GSH	0.0376	0.2269	0.9214	0.6038	0.8405	0.9921
	LRW	0.0472	0.1092	0.6600	0.5792	0.7976	0.9660
	ORC	0.2357	0.1688	0.4800	0.6633	0.7992	0.9480
	RBH	0.0542	0.1763	0.6119	0.5903	0.8097	0.9612
	RBT	0.0542	0.1763	0.6119	0.5903	0.8097	0.9612
	SPR	0.0306	0.6102	0.9533	0.6553	0.9206	0.9953
1997	URB	0.0257	0.1116	0.5438	0.5644	0.7899	0.9544
	WSH	0.0022	0.5109	0.9348	0.6305	0.8996	0.9935
	AKS	0.0548	0.1213	0.6491	0.5839	0.7996	0.9649
	BON	0.0101	0.3972	0.9877	0.6191	0.8788	0.9988
	CWF	0.0168	0.1287	0.8169	0.5764	0.8130	0.9817
	GSH	0.0376	0.2269	0.9214	0.6038	0.8405	0.9921
	LRW	0.0472	0.1092	0.6600	0.5792	0.7976	0.9660
	ORC	0.2357	0.1688	0.4800	0.6633	0.7992	0.9480
	RBH	0.0542	0.1763	0.6119	0.5903	0.8097	0.9612
	RBT	0.0542	0.1763	0.6119	0.5903	0.8097	0.9612
1998-2005	SPR	0.0306	0.6102	0.9533	0.6553	0.9206	0.9953
	URB	0.0257	0.1116	0.5438	0.5644	0.7899	0.9544
	WSH	0.0022	0.5109	0.9348	0.6305	0.8996	0.9935