

**2008 MANAGEMENT FRAMEWORK PLAN  
AND  
SALMON RUNS' STATUS  
FOR THE  
HOOD CANAL REGION**



**September 2008**

**2008 MANAGEMENT FRAMEWORK PLAN  
AND  
SALMON RUNS' STATUS  
FOR THE  
HOOD CANAL REGION**

**Joint Report**

**Prepared by:**

**Point No Point Treaty Council**

**(for the Port Gamble, and Jamestown S'Klallam Tribes)**

**Washington Department of Fish and Wildlife**



## Table of Contents

Introduction .....	1
General .....	1
Summary of the 2008 Runs and Fisheries .....	1
2008 Fishery Management Periods .....	3
Summary of Pre-Season Forecasts, Expected Harvests and Escapements .....	5
Summer/Fall Chinook Salmon .....	5
Summer Chum Salmon .....	6
Coho Salmon .....	7
Fall Chum Salmon .....	9
Pre-Season Management Framework .....	11
2008 Harvest Management Measures and Expected Fisheries .....	11
Preseason Framework Plan for Commercial Fisheries .....	12
Preseason Framework for Recreational Fisheries .....	14
Test and Evaluation Fisheries .....	15
Other Recommended Measures .....	15
Inseason Run Size Updates .....	16
APPENDIX .....	19
Pre-season Forecasting Methods .....	21
Summer/Fall Chinook Salmon .....	21
Summer Chum Salmon .....	24
Natural Runs (PNPTC) .....	24
Natural Runs (WDFW / Skokomish Tribe) .....	24
Natural Runs (Joint Approach) .....	26
Coho Salmon .....	27
Natural Runs .....	27
Hatchery Runs .....	31
Fall Chum Salmon .....	32
Natural Runs .....	32
Hatchery Runs .....	37

# 1. Introduction

## *1.1 General*

This report has been prepared by the Point No Point Treaty Council (for the Port Gamble, and Jamestown S'Klallams) and was reviewed and agreed to, by the Lower Elwha Klallam Tribe, the Skokomish Tribe and the Washington Department of Fish and Wildlife (WDFW). Any differences between the parties are noted. This report is intended to fulfill the parties' reporting requirements under the provisions of Section 5.2 of the Puget Sound Salmon Management Plan, facilitate the management of the 2008 runs of Hood Canal-origin salmon in that region, as well as document the methodologies used. This report covers all species of salmon (except steelhead) for the Hood Canal Region. The regional "Management Framework" section of this report (Section 4.0) documents the parties' pre-season framework management understandings for this region.

Forecasted returns of each species, except fall chum salmon, are based on the total anticipated recruits and all intercepting fisheries. For fall chum salmon, forecasts include only salmon available for net fisheries and escapement, and exclude non-landed mortalities, troll, recreational, ceremonial and subsistence harvests not taken in net fisheries. All forecasts are outlined in this report by management unit. Agreed-upon escapement goals, expected escapements (those that would result under the parties' management framework) for each management unit (natural and hatchery, primary and secondary), expected harvests, test and evaluation fishery requirements, and pre-season as well as in-season run assessment methods are included. Detailed information, concerning the methods used to forecast the abundance of each run, is presented in Appendix A.

The parties' pre-season management framework outlines the anticipated measures to be taken in Puget Sound commercial and recreational fisheries for the harvest and protection of salmon runs returning to Hood Canal. The framework also includes any contingency measures contemplated by the parties for use in-season, should the need arise.

## *1.2 Summary of the 2008 Runs and Fisheries*

Of the runs returning to Hood Canal, the early fall chum runs and south Hood Canal chinook will be managed on the basis of hatchery production. Additionally, coho salmon of the Port Gamble and Quilcene-Dabob management units will also be managed on the basis of hatchery production. The remaining management units of all species will be managed on the basis of natural production. These include (in accordance with the Hood Canal Salmon Management Plan) all of the remaining coho management units; Mid Hood Canal chinook salmon, all summer chum salmon (managed as secondary to chinook and coho salmon), and all late fall chum salmon. Additionally, since 2000, management strategies have been adopted to reduce impact upon listed (50 CFR Parts 223 and 224) evolutionarily significant units (ESU's) of fish which include Hood Canal/Strait of Juan de Fuca (HC-SJF) summer chum salmon and Puget Sound chinook salmon.

Summer/Fall chinook returning to hatcheries and natural spawning areas in area 12C and the Skokomish River are predicted to return at harvestable levels to be managed for directed harvest inseason. Chinook salmon returning to Area 12B tributaries are expected to be of extremely low abundance and require long term protective measures. A limited Treaty Indian fishery, as well as recreational fisheries, for chinook salmon are anticipated in Areas 12C and in Area 12H where Hoodsport hatchery returns are expected to provide for additional directed harvest.

Summer chum salmon are in recovery mode throughout this region and two of the three management units are predicted to be of sufficient abundance to exceed their recovery thresholds. However, the forecasted

return of the Mainstem management unit, although predicted to be above its critical threshold, will require continued application of restrictive measures in the Hood Canal “mainstem”, in order to assist recovery. In the Quilcene-Dabob area, appropriate fishing restrictions will be in place, as described in the *Summer Chum Salmon Conservation Initiative (SCSCI)* to ensure that the escapement rates to this management unit are met.

Of the various other runs of salmon, coho returning to the Quilcene Bay Pens and the Quilcene National Fish Hatchery (QNFH), coho returning to Port Gamble pens, and fall chum returning to all Hood Canal hatchery facilities, are expected to be of sufficient abundance to support significant directed commercial and recreational fisheries. Naturally reared coho salmon, from all other management units, are expected to also be at low abundance and will require additional attention to ensure the required escapement rates after directed harvest (as well as incidental harvests) in the Hood Canal “mainstem” fishery and in the Skokomish River.

Pre-season forecasts of abundance (Tables 3.1 - 3.4) are provided as a pre-season estimate of harvest and a guide for conservation planning. The actual run sizes may deviate from the forecasts because of statistical variability, unusual rates of survival (high or low), or unanticipated changes in exploitation rates in prior fisheries. Methods, used to derive the 2008 pre-season forecasts, are detailed in Appendix A of this report. In most cases, the escapement goals indicate the currently accepted estimate of escapement abundance necessary to provide for future maximum sustainable harvest (MSH), under average progeny survival conditions. However, in the case of summer chum salmon, the goals are based on the target escapement rates established in SCSCI. In the case of chinook salmon, the targets are those established in the *Puget Sound Comprehensive Chinook Management Plan (PSCCMP)*. In the case of coho salmon returning to natural spawning areas, the escapement goal is that which would result from the rate of escapement allowance established for the forecasted abundance of 2008 recruits. The escapement rate was established at a level equal to, or higher than, the minimum escapement rate allowable for the 2008 forecasted recruitment (55%), under the stepped exploitation rate management approach, which has been implemented for Hood Canal natural (primary) coho. Expected escapements are those that would result from the stated forecasts after fisheries consistent with the parties' pre-season planned management framework.

## 2. 2008 Fishery Management Periods

Area	Spring Chinook	Summer Chinook	Summer Chum	Coho	Early Fall Chum	Late Fall Chum	Winter Steelhead
9A	---	---	---	8/24-11/1	11/2-11/29	---	11/30-3/31
12A	---	---	8/24-09/27	8/24-10/18	10/19---	---12/26	---
12	4/16-7/12	7/13-9/05	9/01-9/22	9/10-10/18	10/19-11/20	---	---
12B	4/16-7/12	7/13-9/12	9/05-10/1	9/14-10/25	10/26-11/20	---	---
12C	4/16-7/19	7/20-9/18	8/26-10/1	9/18-10/25	10/26-11/27	---	---
12D	4/16-7/19	7/20-9/18	8/29-9/22	9/18-10/25	10/26-11/27	---	---
Quilcene R	---	---	9/7-10/1	8/31-10/20	11/9---	---12/27	12/7-4/15
Dosewallips Duckabush	---	8/10-9/20	9/7-10/12	9/21-11/15	11/16---	---1/4	12/7-4/15
Skokomish R	5/01-8/2	8/3-9/20	---	9/21-11/15	11/16-12/6	12/2-1/4	12/7-4/15
Union R.	---	---	8/31-10/6	9/21-11/15	11/16-12/6		12/7-4/15
Misc. HC Tribes.	---	8/10-9/20	---	9/21-11/15	11/16---	---12/27	12/7-4/15

Note: Shaded areas represent cases where the management periods have not been adjusted to eliminate overlaps/gaps.

The management periods defined above describe, for each area, the time intervals during which regulatory actions will be directed to meet the conservation and allocation requirements for adult salmon of each species, taking into consideration the catches of that species (actual and/or expected), outside its management period. Since many runs extend over lengthy periods of time, with small portions of the runs available at the extreme ends of the annual entry pattern, it is impractical to attempt to take management actions directed at these runs throughout their entire entry while continuing to simultaneously manage fisheries on other species and runs. In managing fisheries, the parties shall attempt to apportion the harvest throughout each management period in order to achieve catch and escapement from all segments of each run.

The Hood Canal "Early-fall" chum management periods cover the central 80% of the Hoodport Hatchery run timing for all marine areas except Areas 9A and 12A, which are based on the actual Area 9A and 12A hatchery stock timing. "Late-fall" chum management periods begin after the central 80% of the Hoodport hatchery run has returned. Late-fall ending dates (generic) are based on adult tagging (or, in the case of QNFH, rack counts), but in practice are often adjusted to eliminate overlaps and gaps with winter steelhead management periods.

For 2008, the above management periods have been derived (unless otherwise noted) by the following steps: first the central 80% (average) of the entry pattern for each species, for each area where that species is found, was used as the "base" management period. The source of this information comes from a 1995 analysis of entry pattern information, based on historical harvest and spawner entry, which was reviewed by all affected parties. Next, "overlaps" and "gaps" between the periods were generally eliminated, generally by halving. Finally, the resulting "start" and "end" dates for each period were adjusted to begin on the nearest Sunday and end on Saturday, in order to facilitate weekly fisheries management. These last

procedures, were not followed in the case of summer chum salmon, because to do so, might result in inadequate protection for these diminished runs. Management periods should not be viewed as inflexible and may be adjusted in-season by agreement of the parties, on the basis of in-season information indicating a shift in run timing for a particular population.

### 3. Summary of Pre-Season Forecasts, Expected Harvests and Escapements

#### 3.1 Summer/Fall Chinook Salmon

Harvest and Escapement by Management / Production Unit (FRAM 2108)						
Fishery	Skokomish		Mid-Canal	Miscell.	Hoodsport	Total
	Natural	Hatchery	Natural	Natural	Hatchery	
Catch & Escapement Total	2,991	29,749	85	651	22,167	55,643
Canada	680	6,652	20	148	4,702	12,202
Alaska	0	0	0	0	0	0
S.Falcon Tr/Rec	2	23	0	0	25	50
N.Falcon Tr/Rec	85	881	3	19	698	1,686
P.S. Troll	14	157	0	3	152	326
SJF Rec.	9	145	0	2	198	354
Puget Sound Rec.	90	1,404	3	20	1,855	3,372
Puget Sound Net	69	735	2	15	626	1,446
Hood Canal Rec.	8	104	0	2	450	564
Hood Canal Net	67	690	0	15	535	1,307
Freshwater Rec.	325	3,176	0	0	1	3,502
Extreme Terminal Net	435	4,176	0	0	9,597	14,207
Mgmt Unit Harvest	1,784	18,143	28	223	18,839	39,016
Mgmt Unit Escapement	1,207	11,606	57	428	3,329	16,627
Minimum Escapement Target	1,200	2,000	55	n/a	1,800	5,055

In March 1999, Puget Sound chinook were listed as threatened by the NMFS (50 CFR part 223 and 224). Chinook runs in Hood Canal, included in the Puget Sound ESU, have been at fairly low levels over the last decade. Given the relatively low expected returns, of naturally reared Hood Canal chinook salmon in 2008, fisheries directed at chinook salmon will be significantly curtailed in Hood Canal areas.

The above table was prepared using the results of the final PFMC simulation model run *FRAM #2108* which incorporates the forecast information and takes into account all anticipated preterminal and terminal area harvest impacts. The harvest figures shown above include all Puget Sound harvests (commercial net, troll, marine and freshwater recreational). For further details on the methods used to estimate the above forecasts, see Appendix A-1. Escapement targets for natural spawning areas are based on the Order Re: *Hood Canal Salmon Management Plan (Proc. 83-8)* as well as pre-season interagency agreements and are listed here primarily for reference purposes, since the pre-season planning was primarily based on total exploitation rate limitations, as outlined in the Puget Sound Comprehensive Chinook Management Plan.

The escapement goals listed for the Hoodsport and George Adams/McKernan (Skokomish R.) hatcheries are those necessary to provide the required enhanced production in accordance with the parties' 2004 enhancement planning modifications to the Hood Canal Production Program.

### 3.2 Summer Chum Salmon

Management Unit	Total Recruits	Canadian Harvest	Washington Preterminal Harvest	Terminal Harvest	Extreme Terminal Harvest	Expected Escapement	Minimum Escapement Threshold
Quilcene/Dabob	8,344	527	207	175	417	7,018	1,110
	8,496	536	211	178	425	7,145	
Mainstem HC	6,878	434	171	144	0	6,128	2,660
	8,911	563	222	187	0	7,939	
SE Hood Canal	2,518	159	63	96	0	2,200	300
	2,752	174	68	105	0	2,405	
<b>Totals</b>	17,740	1,120	441	415	417	15,346	4,070
	20,159	1,273	501	470	425	17,490	

Note: The forecast include the combined return of naturally reared supplementation program summer chum to each Management Unit.

Hood Canal summer chum salmon originate from natural production in streams tributary to the mainstem Hood Canal, Quilcene/Dabob, and SE Hood Canal. The methods used to develop the 2008 forecasts of summer chum salmon are described in Appendix A-2 of this report. In 2008, forecast of recruitment were made using two different approaches. The first relied on the mean of recent years' recruitments. The second relied on the recent years recruitments of only natural origin recruits for the Quilcene-Dabob and SE Hood Canal units. Both approaches resulted in estimates above the critical thresholds and are listed above. For details on the data and methods used, see Appendix A-2.

In March 1999, the Hood Canal-Strait of Juan de Fuca ESU (Evolutionary Significant Unit) summer-run chum salmon was listed as threatened by NMFS (50 CFR part 224). Hood Canal summer chum salmon are managed as secondary management units, in accordance with the Puget Sound and Hood Canal Salmon Management plans. In 2008, anticipated interceptions may occur during marine area fisheries for chinook and coho salmon in Hood Canal. There may also be some potential for incidental catch in Washington pre-terminal area fisheries, directed at sockeye salmon. Although these units are managed as secondary, additional measures are taken to ensure that their recovery is not impeded by harvest impacts.

In 2008, the mean expected exploitation rate based interception, derived from *the Base Conservation Regime* (BCR) management, was used to assess interception of total recruits entering terminal areas. Because of additional measures taken in various fisheries, it is expected that lower rates than those predicted will result. Minimum escapement thresholds are based on the BCR.

### 3.3 Coho Salmon

The normal-timed coho salmon runs returning to Hood Canal consist of several small natural components in all river systems, in addition to hatchery components returning to the George Adams Hatchery in the Skokomish river system and the Quilcene National Fish Hatchery in the Big Quilcene river system. Other normal-timed units include delayed-release coho from the sea pen facilities at Quilcene Bay and Port Gamble Bay. The Quilcene Hatchery run is timed somewhat earlier than the other normal-timed runs. The Port Gamble Bay run, using Quilcene stock, is also somewhat earlier and recent test fisheries have been used to gather information to obtain more precise estimates of its entry pattern.

The aggregate (natural and hatchery) Hood Canal run of December Age-2 (DA-2) recruits was forecast to be 87,206, consisting of 41,307 natural (40,483 primary and 824 secondary) and 45,899 hatchery coho. These were used to provide model input values for the 2008 PFMC/North of Falcon management planning process. The methods used to develop the 2008 Hood Canal coho forecasts are further detailed in Appendix A-3 of this report.

The following table is based on the results of the pre-season *FRAM* simulation run #0824, and does not include estimated natural mortality in 2008. The expected harvest numbers refer to the total anticipated landed and nonlanded harvests from both incidental and targeted fisheries, based on estimates provided by pre-season *FRAM* simulation run #0824. Further details concerning pre-season fishing scenario are shown in Section 4 of this report.

The escapement targets for Hood Canal primary natural coho are based on a maximum allowable exploitation rate of 45% in all fisheries, based on this year's predicted abundance. The expected escapements are those which would result after the application of the pre-season established fishing regimes, to the 2008 forecasted abundance.

The escapement targets for hatchery (and secondary natural) management units are those necessary to meet the parties' agreed-upon enhanced production, as adjusted for 2008.

### 3.3 Coho Salmon

Harvest and Escapement by Management / Production Unit (FRAM 0824)								
Fishery	12/12B/12C/12D Skokomish		9A <sup>(1)</sup>	12A <sup>(1)</sup>	Hood Canal Stocks' Subtotals		Non Local	Total
	Natural	Hatchery	Aggregate	Aggregate	Hatchery & SecNat'l	Primary Natural		
Harv & Esc. Total	29,244	11,694	4,449	17,547	33,690	29,244		62,934
Canada	616	627	283	948	1,858	616		2,474
S.Falcon Tr/Rec	9	16	6	24	46	9		55
N.Falcon Tr/Rec	857	552	231	815	1,598	857		2,455
P.S. Troll	35	13	3	18	34	35		69
Strait Rec.	1,352	923	366	1,381	2,670	1,352		4,022
SJI Rec.	9	14	7	22	43	9		52
Area 9 Rec.	794	417	125	626	1,168	794		1,962
P. Sound Rec.	692	262	81	372	715	692		1,407
Strait Net	294	109	39	158	306	294		600
SJI Net	28	11	1	15	27	28		55
No. Sound Net	68	24	6	33	63	68		131
So. Sound Net	651	236	69	345	650	651		1,301
Hood Canal Rec.	1,417	516	146	755	1,417	1,417	322	3,156
HC Rivers Rec.	1,058	1,680	0	2,065	3,745	1,058		4,803
HC Mainstem Net	3,474	924	17	251	1,192	3,474	182	4,848
Area 9A Net	1,070	184	2,695	745	3,624	1,070	531	5,225
Area 12A Net	0	0	0	5,033	5,033	0		5,033
Skokomish R Net	647	1,295	0	0	1,295	647		1,942
Mgt Unit Harvest	13,071	7,803	4,075	13,606	25,484	13,071	1,035	39,590
Mgt Unit Escap.	16,173	3,891	374	3,941	8,206	16,173		24,379
Min. Escap. Goal	16,084	550	307	2,091				

Notes: (1) These management units also contain naturally reared coho, which were estimated separately and then “aggregated” for modeling and management purposes, because of their secondary classification.

### ***3.4 Fall Chum Salmon***

The Hood Canal run of fall chum salmon is generally forecast as a single fall run, composed of hatchery and natural management units. However, in accordance with the Hood Canal Salmon Management Plan, and the SaSI resource inventory, it is also separated into two timing components, which are used for management purposes. "Early fall" chum refer to the Hoodspport Hatchery and other hatchery management units, using the same brood, as well as similarly timed natural units; "Late fall" chum refer to natural units returning after the Hoodspport run, as well as similarly timed hatchery units (Enetai). In practice, during the early fall chum management period (through Nov. 20 in northern and central Hood Canal), only the Hoodspport/George Adams/McKernan units are considered primary. During the late-fall management period, natural units (Skokomish R., Area 12B, and Area 12A tributaries) become the primary units.

Methods used to estimate the 2008 forecasts of all fall chum salmon returning to Hood Canal are described in Appendix A-4 of this report. The pre-season summary, presented in Table 3.4, is the result of averaging the forecasting results obtained by PNPTC and WDFW, using alternate methods, for each production unit. This was made possible because of the similar overall abundances predicted by the various methods.

Pre-terminal catches are expected to occur primarily during Treaty Indian and non-treaty chum fisheries directed at mixtures of various Puget Sound and British Columbia runs. The portion of these catches that is expected to come from Hood Canal management units, has been estimated to be approximately 6,800 at the Strait of Juan de Fuca (SJF) and the San Juan Islands (SJI), combined. The methods used to obtain the SJF and SJI estimates utilized the 1986-1996 average of the Hood Canal contribution to management weeks' 40-46 catch in those fisheries, as shown by GSI sampling. The total anticipated volume of harvest in the above fisheries was estimated using the mean catch (+1 s.d.) during the 1999-2006 period (for SJF), and provisions of Annex IV, Ch. 6 of the PST and State-Tribal agreements (for SJI), as well as pre-season forecasts of abundance of chum salmon returning to Puget Sound and the "inside" areas of British Columbia.

The proportion of the escapement to be taken at the Hoodspport Hatchery versus the George Adams/McKernan Hatchery complex, is based on the management objectives of meeting the combined Hoodspport/Skokomish River hatchery escapement, as revised in 2004, by Co-Managers' agreement, plus providing a minimal in-river harvest in the Skokomish River. For the Quilcene National Fish Hatchery, escapement goals are based on the Co-Managers' decision to terminate production of fall chum from this facility.

The expected escapement to the Little Boston Hatchery assumes a 90% extreme terminal harvest rate in Port Gamble Bay. Other expected escapements on fall timed runs are based on the application of harvest appropriate to fully harvest the Hoodspport-George Adams-McKernan surplus. For late-fall chum, the expected escapements are those that would result after Hoodspport-timed chum have been taken from the portion of each late-fall management unit that overlaps the Hoodspport entry timing.

Escapement goals for natural fall chum salmon were developed by WDFW. They are generally the average of the three largest even-year escapements in the years 1968-1977. For secondary management units, these goals form a management guideline for secondary management unit protection.

### 3.4 Fall Chum Salmon

Management and Production Units	"4B" Run	Pre-Term Harvest	Terminal Run	Terminal Harvest	Extr. Term Harvest	Expected Escapement	Escapement Goal
<i>AREA 9A</i>							
Natural	0	0	0	0	0	0	0
Hatchery	5,273	53	5,220	4,802	376	42	0
<i>AREA 12</i>							
Natural	17,116	173	16,942	15,587	0	1,355	3,900
<i>AREA 12A</i>							
Natural	10,118	103	10,015	3,788	0	6,227	1,250
Hatchery	0	0	0	0	0	0	0
<i>AREA 12B</i>							
Natural	140,509	1,424	139,085	52,606	0	86,479	18,750
<i>AREA 12C</i>							
Natural	69,991	709	69,282	63,739	0	5,543	7,000
Hoodsport Hatchery	171,535	1,739	169,797	156,213	4,584	9,000	9,000
Enetai Hatchery	29,347	297	29,050	22,028	0	7,022	1,900
<i>AREAS 82G/J (Skokomish R.)</i>							
Natural	36,147	366	35,781	21,345	545	13,891	9,800
G.Adams-McKernan Hatchery	107,258	1,087	106,171	97,677	2,494	6,000	6,000
<i>AREA 12D</i>							
Natural-Augmented	81,114	822	80,292	73,868	0	6,424	13,550
<b>Totals</b>	<b>668,409</b>	<b>6,775</b>	<b>661,634</b>	<b>511,653</b>	<b>7,999</b>	<b>141,982</b>	<b>71,150</b>

## 4. Pre-Season Management Framework

### *4.1 2008 Harvest Management Measures and Expected Fisheries*

In 2008, the condition of the salmon runs returning to the Hood Canal terminal areas requires that harvest management plans be conservative for some species, while providing opportunities for harvest of more abundant stocks and species.

Summer/Fall chinook salmon returning to Hood Canal should be managed in order to achieve the necessary escapements to the WDFW hatcheries which contribute the majority of the harvestable return to Hood Canal. The combined escapement target of 3,800 chinook salmon, to the various WDFW hatchery facilities, initially defines the aggregate allowable harvest rate in the terminal marine areas and the Skokomish River. However, in addition to that limitation, starting in 2000, additional management measures must be taken in response to the listing of Puget Sound chinook salmon as threatened, under the ESA. The Hood Canal chinook salmon return shall be managed to meet the needs of three major units: Mid-Canal (Dosewallips, Duckabush and Hamma Hamma), Skokomish (aggregate of naturally reared and hatchery mitigation), and the Hoodport Hatchery. In order to provide necessary protection to the Mid-Canal unit, as well as provide both fishing opportunity and protection to Skokomish chinook salmon, fisheries directed at chinook salmon will be limited to Area 12C and in the Hoodport Hatchery zone (Area 12H), as well as the Skokomish River (Area 82G). Fisheries in Area 12C and the lower Skokomish River delta will be further restricted in order to provide protection for commingled summer chum salmon.

Fisheries directed at Hood Canal hatchery and naturally reared coho salmon will be scheduled in Hood Canal mainstem terminal areas. Provisions for conservative management of Hood Canal coho salmon stocks were pursued during the 2008 PFMC / North of Cape Falcon process, primarily to ensure that commingled summer-run chum and chinook salmon will be protected. The parties have agreed to implement the previously adopted summer chum salmon base conservation regime (BCR) management measures in 2008. The BCR is based on a series of management measures, which are expected to effectively reduce incidental impact to the summer chum salmon ESU. These measures include a combination of specific management actions and fishery specific exploitation rate “ceilings”. Given the limited data available for summer chum, this has been determined to be the best strategy for protection and recovery of the Hood Canal mainstem management unit.

In 2008, early-fall chum salmon runs managed at rates appropriate for the George Adams/McKernan, Hoodport, and Little Boston hatcheries are expected to comprise most of the total fall chum salmon return. Therefore, significant harvests are expected during the early-fall chum salmon management period.

The following section provides a summary of the co-managers’ preseason understandings, regarding the fishery regimes to be used in 2008. The commercial and recreational fishery regimes were used during the preseason planning process discussions and simulation modeling, in an effort to achieve the co-managers’ intent for harvest and escapements. During the season, as more information becomes available on the runs, climatic and habitat conditions, fishery impacts and requirements, the fishery schedules, closures, and other measures may be modified to provide for the necessary protection to escapements, as well as opportunity to harvest available surpluses.

4.1.1 Preseason Framework Plan for Commercial Fisheries

Hood Canal Mainstem (Areas 12, 12B, 12C, 12D)

Treaty: 1,000 feet closure around streams which are closed to net fishing. Beach seines and hook and line gear release chum through 9/30 (through 10/10 if within 500' of western shore of Areas 12B and 12C).

Nontreaty: See WAC 220-47-307 for Nontreaty exclusion zones.

Chinook	Treaty	Areas 12, 12B and 12D: Closed Area 12C: Open wb 7/20; through 8/23, no more than 5 days/wk. Gillnets restricted to 7" min mesh starting 8/1. Area 12H: Open wb 8/3 through wb 9/21; hook and line gear continuous; beach seines daylight hours Tues and Thur each week; possible in-season modifications; chum release.
	Nontreaty	Closed
Coho	Treaty:	Area 12: Open 9/25 through 10/18; for gillnets. Beach seines for coho only (release all chinook and chum through 9/30). No early start for beach seines. Both gears may fish no more than 6 days/wk when open.. Area 12B: Open 10/1 through 10/25; for gillnets; 500 foot closure along western shore through 10/10; beach seines for coho only (release all chinook and chum through 9/30). Both gears may fish no more than 6 days/wk when open.. Area 12C: Open 10/01 through 10/25; for gillnets; 500 foot beach closure from Ayock Pt. to approx. 2,000 feet south of Lilliwaup (at the large house, north of Octopus Hole) through 10/10; beach seines for coho (release all chum through 9/30) may start no earlier than 9/21. Both gears types may fish up to 5 days/wk when open. Area 12D (west of Madrona Pt. - local name): Open for beach seines and gillnets no earlier than 10/1. Weekly schedules including chum release through 9/30, identical to Area 12C.
	Nontreaty	Closed
Chum	All	WDFW and the Tribes will review recent catches and the in-season management method for the Hood Canal Chum fishery. Review to be completed by August 30, 2008. Changes may be made by agreement to the fishing schedule based on those reviews.
	Treaty	Area 12: Open 10/19 through 11/20, 7 d/wk. Area 12B: Open 10/26 through 11/20; 7 d/wk. Area 12C: Open 10/26 through 11/29; 7 d/wk. Area 12D: Closed. Area 12H: Hook and line gear open from 10/19 through 11/29; beach seines open Tuesday and Thursday of each week, then Monday and Wednesday for the week of 11/16; possible inseason adjustments. Starting 11/2, hatchery escapement control measures will go into effect.
	Nontreaty	Areas 12 – 12B: Open Wks 43 (wb 10/19) through wk 47 (wb 11/16), PS release chinook and unmarked coho, live boxes required during wks 43 and 44; PS fishing pattern: 1,2,1,2,1; GN fishing pattern: 2,2,2,2,2, daylight hours Area 12C Open Wks 46 (wb 11/9) through Wk 48 (wb 11/23), if needed to attain NT share. PS release chinook; PS fishing pattern: 1,1,1; GN fishing pattern: 2,2,2.

Area 12D Closed

Area 12H: BS (Hoodsport Hatchery zone) fishery in wks 46 - 48 pending discussions with the Co-Managers

NOTE: Chum fishing schedules may change inseason due to updates of abundance.

Port Gamble (Area 9A)

Chinook	All	Closed
Coho	Treaty	Open wb 8/24 through wb 10/26, gillnet only.
	Nontreaty	Open Wks 35 (wb 8/24) through wk 44 (wb 10/26); GN and skiff GN, both gears limited to 100 fathoms length and 60 meshes in depth; 3 days wk 35, then 7 days/wk; chinook NR; chum NR through 9/30; release fish not to be retained by cutting ensnaring meshes. The beach area of the Port Gamble Indian Reservation, between Pt. Julia and the boundary marker at the south end of the reservation shall be closed to all fishing.
Chum	Treaty	Open wb 11/2 through wb 11/30.
	Nontreaty	Closed
Steelhead	Treaty	Open wb 12/7 through 1/31/2009.

Quilcene / Dabob (Area 12A)

Coho	Treaty	Open north of Pt. Whitney, wb 8/24 through wb 10/12; chum and chinook release from hook and line and beach seine gear through 9/30; beach seines 5 days/wk, daylight hours; hook and line open continuous; gillnets closed before 9/1 and limited to 1 day/wk from 9/1 through 9/30. Gillnets will close if 12A summer chum escapement projected <1,500. Additional gillnet time may be added after 9/15, if 12A summer chum escapement projected >2,500 and coho harvest needs require it. Beach seine advance notification required prior to fishing.
	Nontreaty	Open Wks 35 (wb 8/24) through wk 40 (wb 9/28); Skiff gillnet fishing pattern 1,1,1,1,1, daylight hours; net must be attended at all times. Chinook NR and chum NR through 10/7, Release fish not to be retained by cutting ensnaring meshes. Gillnets will close if 12A summer chum escapement projected <1,500. Additional gillnet time may be added after 9/15, if 12A summer chum escapement projected >2,500, per Summer Chum Salmon Conservation Initiative (SCSCI). Fishery will be managed consistent with SCSCI.
Chum	Treaty	Open to set and drift gillnets wb 10/19 through 11/20, south of an E-W line through Pt. Whitney.
	Nontreaty	Closed

Skokomish River (Area 82G) Treaty (Nontreaty net closed)

NOTE: The Skokomish Tribe may implement a commercial fishery in Purdy Creek (Area 82J) on 9/24 and 10/8, including sampling and monitoring programs.

NOTE: Hook and line gear and beach seines release chum through 10/15.

Chinook	Open 8/3 through 9/20; no more than 3 days/wk; closed to gillnets below SR 106.
Coho	Open 9/21 through 10/4; no more than 4 days/wk; open 10/5 through 11/15, 5 days/wk.

Closed to gillnets below SR 106 through 9/30.  
Chum Open 11/16 through 12/6; 7 days/wk.

Big Quilcene River (Area 82F) Treaty (Nontreaty net closed)

Coho Openings to be determined in-season, for coho only, as necessary, from 9/1 through 9/21. Closed below Rogers St., from Rogers St. to U.S. Hwy 101, hook and line gear only, release other salmon. The hatchery area, from U.S. Hwy 101 to the Quilcene Hatchery rack, may be opened for short periods to take surplus coho. Hand held gear only (dipnets, hand lines, etc.)  
Chum Closed

Misc. Hood Canal Rivers (Dosewallips, Duckabush, Hamma Hamma, Tahuya, Dewatto, Union)

All Closed to commercial harvest

*4.1.2 Preseason Framework for Recreational Fisheries*

Hood Canal Marine Area (Area 12) Recreational

5/1-6/30 Closed  
7/1-8/31 North of Ayock Pt. – Closed to salmon angling except see Quilcene/Dabob Bay Recreational below.  
9/1-10/15 North of Ayock Pt. (including Quilcene / Dabob Bay) – 2 fish limit, coho only.  
7/1-10/15 South of Ayock Pt. - 4 fish limit, 2 chinook (chinook 22" min size) and 2 coho; release chum.  
10/16-12/31 4 fish limit, 1 chinook (chinook 22" min size).  
1/1-2/13 Closed  
2/16-4/10 1 fish limit (chinook 22" min size).  
4/11-4/30 Closed

Quilcene/Dabob Bay Recreational

5/1-8/15 Same as Area 12  
8/16-8/31 2 fish limit, coho only.  
9/1-4/30 Same as Area 12

Hoodsport Hatchery Zone Recreational

Same as Area 12 except:

7/1-12/31 4 fish limit, no minimum size, only 2 chinook greater than 24"; and only 2 coho.  
Chum release 7/1-10/15; night closure.

Dewatto River Recreational (mouth to Dewatto-Holly Rd. Bridge)

9/16 – 10/31 2 fish limit, 12" min size, coho only. Selective Gear Rules.

Dosewallips River Recreational (mouth to Hwy. 101 Bridge)

11/1 – 12/15 2 fish limit, 12” min size, chum only

Duckabush River Recreational (mouth to Mason Co. PUD #1 electrical distribution line)

11/1 – 12/15 2 fish limit, 12” min size, chum only

Quilcene River Recreational (from Rodgers St. to Hwy 101 Bridge)

8/16 – 10/31 4 fish, 12” min size, coho only. Only 1 single point barbless hook may be used. Only fish hooked inside the mouth may be retained.

Skokomish River Recreational (mouth to Hwy. 101 Bridge)

- 8/1 – 9/5 1 fish limit, 12” min size, release chum. All Species-night closure, non-buoyant lure restriction, and single point barbless hooks required through 11/30. Terminal gear (hooks, weights, lures or baits) and line must not be within 25’ or Tribal gillnets.
- 10/1 – 10/15 6 fish / 4 adult, 12” min. size. Release chinook and chum. All Species-night closure, non-buoyant lure restriction, and single point barbless hooks required through 11/30. Terminal gear (hooks, weights, lures or baits) and line must not be within 25’ or Tribal gillnets.
- 10/16 – 12/15 6 fish/4 adult, 12” min. size. Release chinook. All Species-night closure, non-buoyant lure restriction, and single point barbless hooks required through 11/30. Terminal gear (hooks, weights, lures or baits) and line must not be within 25’ or Tribal gillnets.

Tahuya River Recreational (mouth to marker 1 mile above N. Shore Rd. Bridge)

9/16 – 10/31 2 fish limit, 12” min size, coho only. Selective Gear rules.

All other HOOD CANAL REGION freshwater recreational closed to salmon angling.

*4.1.3 Test and Evaluation Fisheries*

No test fisheries, directed at salmon, are anticipated in any Hood Canal terminal areas, during the 2008 season.

**4.2 Other Recommended Measures**

It is recommended that the parties initiate communication during the season, to the extent necessary to address unforeseen circumstances which would likely require the modification on one or more elements of the pre-season management framework. Examples of these may include lower than expected run sizes that may require conservation action, higher than expected incidental interceptions of summer chum salmon, significant changes in the estimated coho run size, low water conditions that serve to delay the emigration

of coho salmon from marine areas, and significantly higher, or lower, than expected fall chum run sizes and/or escapements that would require fishery plan modifications.

Also, in addition to routine fishery planning, catch monitoring, assessment and regulation, the following specific activities are recommended:

Emphasis should be placed on the recovery of a minimum of 20% coded-wire tags (CWT) from chinook and coho salmon in Hood Canal fisheries. This rate of sampling is crucial to annual escapement assessment, survival rate estimation and run reconstruction. In addition to CWT sampling, the individual aspects in need of attention include fishing effort, catch composition, accounting of catch and biological characteristics of individual stocks. In order to meet these objectives, a coordinated effort between the WDFW the PNPTC Tribes, and the Skokomish Tribe, to develop and implement a sampling and monitoring plan, should allow for an improved assessment of commercial and recreational fisheries in Hood Canal and the Skokomish River.

Commercial fisheries in Hood Canal and the Skokomish River should be intensively sampled and monitored to assure for accurate estimates of total (including incidental) catch of chinook, coho and chum in treaty and non-treaty fisheries. This can be accomplished by estimating daily fishing effort, as catch per unit effort (CPUE) and encounter rates throughout each fishery. Additional tribal and WDFW technicians stationed in all Hood Canal areas and the Skokomish River should provide for improved mainstem coverage of sampling and monitoring.

During the time when summer chum salmon may be present in the fishing areas, and at the spawning grounds, it is recommended that age samples be obtained from summer chum salmon, in order to enable the reconstruction of contributing cohorts. It is also recommended that summer chum spawner survey frequency be maintained to once per week in all areas, to maintain the accuracy of estimates.

### ***4.3 Inseason Run Size Updates***

For summer/fall chinook salmon, in Area 12H, the frequency of fisheries for chinook salmon will be regulated on the basis of observed hatchery escapements.

In 2002, an effort was undertaken to evaluate available sources of information that may permit inseason assessment of chinook salmon abundance entering the Skokomish River. These included, hatchery escapement patterns, recreational fishery monthly catch and Treaty Indian daily catch and landings information, for the 1980-2000 period. Unfortunately no relationship was found to consequently improve on pre-season estimates. Therefore the pre-season estimated abundance will be used during the season.

In the Quilcene area, in-river escapement estimates for coho and summer chum salmon shall be used inseason to assist in decision making regarding the potential adjustment of fishery restrictions. In the case of summer chum salmon, while no inseason estimate of total abundance will be made, an inseason estimate of anticipated spawning escapement will be made and compared with threshold values of the SCSCI. Adjustments to gillnet fishing in Area 12A may be made on the basis of the results obtained, in accordance with procedures of the SCSCI.

Fall chum salmon fisheries in Hood Canal, have been adjusted in past years on the basis of inseason updates of terminal area run abundance. However, for the 2008 season, given the compounded lack of reconciled source data on harvest and stock composition, extending over the past 7 - 8 years, the managers

have been unable to construct and test a reasonably accurate inseason assessment model. Still, the co-managers will continue their efforts to devise inseason assessment procedures, to guide harvest management actions through the season. If a suitable model is developed for 2008, it will be described in a separate document.



## **APPENDIX**

### **A. Pre-season Forecasting Methods**



## A. Pre-season Forecasting Methods

### *A-1. Summer/Fall Chinook Salmon*

**Table A-1-a. Hood Canal Summer/Fall Chinook Releases at WDFW Hatcheries and Run Sizes.**

Return Year (RY)	0+ Lbs. Released in RY-3	Return/Lb	Terminal Run
1984	39,232	0.42295	16,593
1985	40,098	0.50574	20,279
1986	55,499	0.39329	21,827
1987	50,811	0.51412	26,123
1988	55,967	0.50753	28,405
1989	65,510	0.38222	25,039
1990	54,674	0.23280	12,728
1991	100,366	0.18881	18,950
1992	101,102	0.02929	2,961
1993	89,517	0.05293	4,738
1994	78,335	0.04785	3,748
1995	82,895	0.11068	9,175
1996	73,472	0.11065	8,130
1997	32,571	0.23963	7,805
1998	58,652	0.27639	16,211
1999	89,149	0.32366	28,854
2000	87,306	0.22970	20,054
2001	101,591	0.26207	26,624
2002	89,837	0.44063	39,585
2003	106,363	0.34332	36,517
2004	95,282	0.43770	41,705
2005	92,989	<b>0.73239</b>	68,104
2006	76,768	0.59616	45,766
2007*	89,952	0.36905	33,197
2008	95,366		
2009	88,632		
2010			
<b>Average 2004-2007</b>		0.38266	
<b>2008 Forecast</b>			36,493

(\*) : 2007 return data are preliminary and subject to revision, following reconciliation of records.

The 2008 forecasted terminal run size of summer-run Hood Canal chinook salmon is the product of brood 2004 fingerling lbs released from WDFW facilities in 2005, multiplied by the average of post-season estimated terminal area return rates (total terminal run / hatchery fingerling lbs released 3 yrs previous) for the last eight return years (2000-2007), excluding return year 2005 in which the return rate was a statistical outlier (Table A-1-a). A two brood cycle period was used for this forecast, in order to avoid giving undue weight to the exceptionally high return rates experienced in 2005 and 2006. The resulting terminal area run forecast is 36,519 chinook salmon. The Hood Canal forecast was apportioned to 33,935 hatchery fish and 2,584 natural fish based on the Hood Canal terminal run reconstruction-based relative contribution of the individual Hood Canal management units in the most recent brood cycle, comprised of the 2004-2007 return years (Table A-1-d). These estimates will be used as inputs to generate ocean recruit forecasts during pre-season simulation modeling.

**Table A-1-b. Hood Canal Summer/Fall Chinook Terminal Runs**

Year	12A	12B	12C	12D	Skokomish	G.A. Hatchery	Hoodport Hatchery	Total
1984	0	758	0	440	5,302	5,537	4,183	16,220
1985	0	1,908	0	1,040	8,297	5,739	3,044	20,028
1986	0	21	0	169	8,690	10,628	2,221	21,729
1987	0	112	0	64	8,064	12,743	4,311	25,294
1988	0	150	0	79	7,078	13,086	6,888	27,281
1989	0	129	0	158	6,133	13,023	5,175	24,618
1990	0	47	0	49	2,484	8,454	1,577	12,611
1991	0	88	0	73	5,461	9,746	3,514	18,882
1992	0	96	0	20	1,373	490	965	2,944
1993	29	143	0	46	1,385	883	2,242	4,728
1994	4	384	1	30	809	609	1,889	3,726
1995	7	103	2	491	1,398	5,196	1,978	9,175
1996	8	24	1	1	995	3,100	4,001	8,130
1997	27	6	15	7	452	1,887	5,411	7,805
1998	0	288	0	177	1,185	5,620	8,941	16,211
1999	0	876	86	249	1,889	9,192	16,562	28,854
2000	0	438	263	195	1,041	4,533	13,584	20,054
2001	0	322	584	196	2,314	10,664	12,544	26,624
2002	0	95	39	116	1,947	11,620	25,768	39,585
2003	0	194	94	108	1,500	13,367	21,254	36,517
2004	0	129	1,102	96	3,993	20,440	15,945	41,705
2005	0	45	666	117	3,640	28,712	34,924	68,104
2006	0	30	304	35	2,510	25,657	17,230	45,766
2007*	0	73	41	23	783	24,220	8,057	33,197

Note: The 2007 run reconstruction is preliminary and subject to revision.

**Table A-1-c. Proportional Distribution of Hood Canal Summer/Fall Chinook Returns**

<b>Year</b>	<b>12A</b>	<b>12B</b>	<b>12C</b>	<b>12D</b>	<b>Skokomish</b>	<b>G.Adams</b>	<b>Hoodsport</b>
2004	0.00000	0.00309	0.02642	0.00230	0.09574	0.49011	0.38233
2005	0.00000	0.00066	0.00978	0.00172	0.05345	0.42159	0.51280
2006	0.00000	0.00066	0.00664	0.00076	0.05484	0.56061	0.37648
2007	0.00000	0.00220	0.00124	0.00069	0.02359	0.72958	0.24270
<b>'04 - 2007 Mean</b>	0.00000	0.00165	0.01102	0.00137	0.05691	0.55047	0.37858

**Table A-1-d. Apportionment of the Hood Canal Summer/Fall Chinook Forecast**

<b>Hood Canal Production Unit</b>	<b>Terminal Run Forecast</b>	<b>Proportion</b>
12B	60	0.00165
12C	402	0.01102
12D	50	0.00137
Skokomish	2,077	0.05691
<b>Natural Subtotal</b>	2,589	0.07095
George Adams	20,088	0.55047
Hoodsport	13,815	0.37858
<b>Hatchery Subtotal</b>	33,904	0.92905
<b>Total</b>	36,493	1.00000

Note: The forecasted proportions are derived from the 2004-2007 mean distribution.

## ***A-2. Summer Chum Salmon***

### *A-2.1 Natural Runs (PNPTC)*

The 2008 forecast of the Hood Canal summer-timed chum salmon returns was forecast as total recruitment to all fisheries and escapements returning to the Mainstem Hood Canal, Quilcene, and SE Hood Canal Management Units (MUs).

Because of the exceptional variability in recent years' returns, influenced by a period of exceptionally high survival rates, all Hood Canal units were forecast as the mean of the 2000 - 2007 returns, excluding 2004 returns to Mainstem Hood Canal and Quilcene, as well as 2003 returns to SE Hood Canal, which were statistical outliers. (Table A-2-a). Insufficient age-specific information is currently available for summer chum salmon, to attempt forecasts that are based on age specific, or cohort returns.. The forecasted recruitment, to all fisheries (domestic and Canadian) and escapement, for summer chum, is 6,878 for the Mainstem, 8,344 for the Quilcene, and 2,518 for the SE Hood Canal management units, for a total of 17,740. The forecasts include summer chum salmon which are expected to return to a number of streams from supplementation and reintroduction projects.

### *A-2.2 Natural Runs (WDFW / Skokomish Tribe)*

For two management units (Quilcene / Dabob and SE Hood Canal), the returns of summer chum were forecast in terms of natural origin fish because after the termination of several supplementation projects, few supplementation-origin adults are expected to return to these MUs in 2008.

Supplementation and reintroduction projects were implemented in the Big Quilcene River from 1992 through 2003 (Quilcene / Dabob MU); in the Union River from 2000 through 2003 and in the Tahuya River from 2003 through the present (SE Hood Canal MU). In the Mainstem Hood Canal MU, supplementation and reintroduction projects were implemented in Lilliwaup Creek from 1992 through the present, in Big Beef Creek from 1996 through 2004. and in the Hamma Hamma River from 1997 through the present. Summer chum fry from each project were marked and natural-origin recruits (NORs) can be distinguished from supplementation-origin recruits (SORs) upon return as adults. Fry released from each project have contributed annually to the summer chum adult recruitment and escapements.

The supplementation project in Lilliwaup Creek, the Hamma Hamma River, and the Tahuya River, are ongoing and adults from the project (SORs) are expected to return during 2008. Since the projects in the Big Quilcene and the Union River were terminated, only age 5 SORs are expected to return, from those projects, in 2008. Estimates of the number of natural-origin recruits (NORs) and supplementation-origin recruits (SORs) returning to each MU each year from 2000 through 2007 and forecasts for 2008 are shown in Table A-2-b.

The return to the Quilcene/Dabob MU was forecast as the mean of NOR recruits from the 2003, 2005, 2006 and 2007 return years; the forecast is 8,496 summer chum. The return to the Mainstem Hood Canal MU was forecast as the mean of the total (NOR + SOR) recruits from the 2003, 2005, 2006 and 2007 return years; the forecast is 8,911 summer chum. The exceptionally high returns, in 2004, to the Quilcene / Dabob MU and the Mainstem Hood Canal MU, were not used in the forecasts. The return to the SE Hood Canal MU was forecast as the mean of the NOR recruits to Union River from 2004 through 2007 plus the mean of the total (NOR + SOR) recruits to Tahuya River in 2006 and 2007; the forecast is 2,752 summer chum. The total forecast of 2008 Hood Canal summer chum salmon recruits is 20,159 (Table A-2-b).

**Table A-2-a. Hood Canal Summer Chum Salmon Recruits.**

Year	Mainstem Hood Canal	Quilcene / Dabob	SE Hood Canal	Hood Canal Total
1974	11,810	944	1,067	13,821
1975	19,370	3,235	3,757	26,362
1976	35,613	11,206	21,869	68,688
1977	11,159	1,918	2,587	15,664
1978	18,791	5,555	716	25,062
1979	7,844	734	817	9,395
1980	8,867	1,932	2,133	12,932
1981	4,331	761	477	5,569
1982	5,522	1,494	956	7,972
1983	543	2,351	597	3,491
1984	1,279	1,486	502	3,267
1985	1,765	1,025	1,417	4,207
1986	1,284	1,483	5,001	7,768
1987	150	2,722	1,030	3,902
1988	2,191	2,540	915	5,646
1989	614	1,599	2,184	4,397
1990	259	623	577	1,459
1991	700	1,174	321	2,195
1992	1,953	1,237	183	3,373
1993	402	183	283	868
1994	1,170	896	891	2,957
1995	4,394	4,830	760	9,984
1996	10,734	9,801	511	21,046
1997	681	8,199	493	9,373
1998	758	3,201	255	4,214
1999	778	3,554	174	4,506
2000	2,035	6,704	757	9,496
2001	4,248	7,595	1,516	13,359
2002	6,220	6,050	890	13,160
2003	11,142	12,863	<b>12,019</b>	36,024
2004	<b>25,890</b>	<b>63,167</b>	5,997	95,054
2005	7,127	7,023	2,002	16,152
2006	11,425	14,291	3,630	29,346
2007*	5,949	3,884	2,831	12,664
<b>2008 PNPTC Forecast **</b>	6,878	8,344	2,518	17,740

\* 2007 Data is preliminary and subject to revision. \*\* Outliers (in bold) were not used

**Table A-2-b. Hood Canal Summer Chum Salmon Natural and Supplemetation Origin Recruits.**

Year	Mainstem Hood Canal		Quilcene / Dabob		SE Hood Canal	
	NOR	SOR	NOR	SOR	NOR	SOR
2000	2,035		6,704		757	0
2001	2,696	1,552	3,632	3,964	1,517	0
2002	2,832	3,388	4,330	1,720	890	0
2003	8,748	2,394	10,850	2,013	<b>7,974</b>	<b>4,045</b>
2004	<b>20,905</b>	<b>4,984</b>	<b>59,333</b>	<b>3,833</b>	3,611	2,386
2005	4,767	2,360	6,231	792	709	1,293
2006	8,928	2,497	13,093	1,198	1,747	1,883
2007	5,949		3,811	73	2,065	766
<b>2008 WDFW / Skokomish Tribe NOR Forecast</b>			8,496		2,752	
<b>2008 WDFW / Skokomish Tribe NOR + SOR Forecast</b>	8,911					
<b>2008 Total Hood Canal Forecast</b>					20,159	

Notes: For the Mainstem Hood Canal MU, combined NOR+SOR were used for the 2007 return and the 2008 forecasts.

For the SE Hood Canal MU, the 2008 forecast is the sum of the Union River average NORs plus the Tahuya River average NORs + SORs.

*A-2.3 Natural Runs (Joint Approach)*

The Summer Chum Salmon Conservation Initiative (SCSCI) defines Critical and Recovery abundance thresholds for each MU. The abundance thresholds are 1,260 (Critical) and 4,570 (Recovery) for the Quilcene/Dabob MU, 2,980 (Critical) and 15,560 (Recovery) for the Mainstem Hood Canal MU, and 340 (Critical) and 550 (Recovery) for the SE Hood Canal MU. The 2008 forecasted abundance for the returns of summer chum, under the Co-Managers' different forecasting approaches provide a range from 8,344 to 8,496 fish for the Quilcene/Dabob MU, a range from 6,878 to 8,911 fish for the Mainstem Hood Canal MU, and a range from 2,518 to 2,752 fish for the SE Hood Canal MU. All estimates exceed the Critical threshold for their respective MUs and exceed the Recovery threshold for the Quilcene/Dabob and SE Hood Canal MUs. The Co-Managers will conduct annual post-season abundance assessments comparing the ranges in the forecasts to actual returns for each MU, as required by the SCSCI.

### A-3. Coho Salmon

#### A-3.1 Natural Runs

The forecasted recruitment of 2008 Hood Canal natural runs was based on a linear regression model that related the return of tagged jack coho at BBC to Hood Canal December Age 2 recruits in the subsequent run year. This model used recruit data from brood years 1983-1998 and 2002-2003 (Table A-3-a). Recruit data from brood years 1999-2001 were excluded because of their unusually high recruit per tagged jack ratio, which is not expected to occur this year. The final form of the regression is shown below:

$$\text{Hood Canal Recruitment} = 25575.283 + (403.378 * (\text{BBC Tagged Jacks}))$$

Relevant statistics of the model used to derive the 2008 forecast are shown below.

<b>Using Brood Years 1983-1998 , 2002-2003</b>	
Multiple R	0.78741
R <sup>2</sup>	0.62001
Adj. R <sup>2</sup>	0.59626
Std Error of Estimate	38489.25
N	18
Intercept	25575.283
Slope	403.378
2006 Jacks (X)	39
2008 Forecast (Y)	41,307

The forecasted recruits were subsequently apportioned to primary and secondary units on the basis of the distribution of their parent brood escapement. The total forecast of 41,307 natural DA2 recruits was thus apportioned into 40,483 from primary and 824 from secondary units, on the basis of their parent brood spawner distribution (Table A-3-b).

**Table A-3-a. 2008 Hood Canal Natural Coho Forecast Data**

<b>Brood Year</b>	<b>Big Beef Creek Total Smolts</b>	<b>Big Beef Total Natural Jacks</b>	<b>Big Beef Tagged Natural Jacks</b>	<b>Hood Canal Total Dec Age-2 Recruits</b>
1975	35,025			
1976	17,619		36	
1977	45,634		452	
1978	20,715		265	
1979	41,054		398	
1980	25,225			
1981	25,333		210	
1982	36,636		554	
1983	25,720	427	346	211,127
1984	24,479	445	350	232,860
1985	11,510	201	121	40,236
1986	26,534	314	208	117,460
1987	17,594	336	234	118,316
1988	19,565	173	122	70,422
1989	23,646	167	144	61,949
1990	18,677	273	202	64,929
1991	13,071	206	149	138,845
1992	18,431	188	157	94,029
1993	16,574	224	185	71,422
1994	25,820	410	298	145,541
1995	40,828	610	510	176,029
1996	22,222	60	45	23,436
1997	20,967	96	85	54,905
1998	47,089	189	179	164,989
1999	21,803	120	111	106,147
2000	24,352	80	70	268,753
2001	36,060	339	254	298,347
2002	25,060	294	235	76,798
2003	32,949	61	33	50,433
2004	38,579	161	86	
2005	29,911	47	39	

**Table A-3-b. Apportionment of the 2008 Hood Canal Natural Coho Forecast**

Area	Escapement Capacity	Escapement BY 2005	Management Unit Type	Proportion of Brood Escapement	December Age-2 Recruits
12 / 12B	28.88%	14,854	Primary	38.82%	16,034
12C / 12D	31.66%	16,363	Primary	42.76%	17,663
Skokomish	29.01%	6,286	Primary	16.43%	6,786
9A	1.25%	200	Secondary	0.52%	216
12A	9.20%	563	Secondary	1.47%	608
<b>Primary Subtotal</b>	<b>89.55%</b>	<b>37,503</b>		<b>98.01%</b>	<b>40,483</b>
<b>Secondary Subtotal</b>	<b>10.45%</b>	<b>763</b>		<b>1.99%</b>	<b>824</b>
<b>Grand Total</b>	<b>100.00%</b>	<b>38,266</b>		<b>100.00%</b>	<b>41,307</b>

**Table A-3-c. Escapement of Coho Salmon to Primary Natural Spawning Areas of Hood Canal**

Year	North (12-12B)	South (12C-12D)	Skokomish	Total
1986	17,485	18,943	3,432	39,860
1987	6,922	7,498	3,510	17,930
1988	4,623	5,009	1,948	11,580
1989	6,924	7,502	934	15,360
1990	2,664	2,885	1,281	6,830
1991	5,433	5,886	1,541	12,860
1992	8,199	8,882	2,179	19,260
1993	10,052	10,890	1,327	22,269
1994	21,289	23,063	12,128	56,480
1995	17,049	18,470	5,560	41,079
1996	16,254	17,609	4,008	37,871
1997	37,338	40,450	17,568	95,356
1998	40,323	44,420	14,957	99,700
1999	6,854	7,550	1,847	16,251
2000	8,687	9,569	8,288	26,544
2001	35,134	38,703	20,601	94,438
2002	26,172	28,831	13,647	68,650
2003	59,552	65,601	44,757	169,910
2004	39,439	43,445	62,995	145,879
2005	14,854	16,363	6,286	37,503
2006	5,554	6,118	1,597	13,269

**Table A-3-d. Hood Canal Hatchery and Net Pen Smolt to Dec-2 Recruit Survival**

Brood Year	George Adams Hatchery			Port Gamble Net Pens			Quilcene NFH			Quilcene Bay Net Pens			
	Smolts	Recruits	R/Sm	Smolts	Recruits	R/Sm	Smolts	Recruits	R/Sm	Smolts	Recruits	R/Sm	
1976	30,171						397,562						
1977	1,816,704						490,611						
1978	1,042,520						377,098						
1979	1,406,424			682,900			502,189						
1980	322,580			454,000			498,166						
1981	351,474			400,000			352,298						
1982	364,000			394,000			271,035						
1983	310,100	106,593	<b>0.34374</b>	586,400	89,105	0.15195	223,128						
1984	312,800	52,163	0.16676	394,400	73,890	0.18735	542,480			247,221	40,095	0.16218	
1985	355,400	20,960	0.05898	351,900	9,450	0.02685	617,231			85,575	<i>4,363</i>	<i>0.05098</i>	
1986	337,700	32,908	0.09745	429,141	29,183	0.06800	574,171	<i>98,188</i>	<i>0.17101</i>	193,522	<i>16,075</i>	<i>0.08307</i>	
1987	298,000	28,068	0.09419	407,600	157,116	<b>0.38547</b>	753,390	75,121	0.09971	146,000	30,269	0.20732	
1988	310,700	14,698	0.04731	383,629	74,033	0.19298	491,303	64,066	0.13040	311,327	21,484	0.06901	
1989	300,300	7,106	0.02366	298,944	53,439	0.17876	352,556	9,874	0.02801	266,193	7,834	0.02943	
1990	307,300	7,894	0.02569	403,600	32,220	0.07983	501,254	27,662	0.05519	353,263	18,203	0.05153	
1991	304,197	20,054	0.06592	383,419	63,120	0.16462	397,701	49,061	0.12336	337,800	24,903	0.07372	
1992	301,019	15,688	0.05212	361,553	13,281	0.03673	400,700	34,709	0.08662	287,187	8,379	0.02918	
1993	303,054	31,320	0.10335	414,844	4,672	0.01126	425,334	29,577	0.06954	216,737	1,864	0.00860	
1994	396,084	17,542	0.04429	378,686	8,741	0.02308	625,700	40,118	0.06412	0			
1995	434,140	6,963	0.01604	342,828	8,450	0.02465	425,971	17,650	0.04143	220,000	5,756	0.02616	
1996	527,317	11,878	0.02253	441,656	17,564	0.03977	452,203	9,322	0.02061	225,269	3,421	0.01234	
1997	534,554	22,621	0.04232	420,482	3,830	0.00911	437,222	22,091	0.05053	189,951	10,872	0.05724	
1998	502,266	38,971	0.07759	391,765	7,196	0.01837	368,399	23,966	0.06505	208,000	9,780	0.04702	
1999	493,992	46,008	0.09314	432,847	4,931	0.01139	428,995	33,187	0.07736	0			
2000	587,937	36,351	0.06183	432,161	6,521	0.01509	411,674	27,053	0.06571	210,627	12,982	0.06164	
2001	336,886	44,572	0.13231	409,221	4,803	0.01174	388,212	42,242	0.10881	90,000	2,272	0.02524	
2002	501,031	55,380	0.11053	423,746	16,270	0.03840	404,582	51,373	0.12698	200,835	15,035	0.07486	
2003	309,179	20,438	0.06610	437,316	14,444	0.03303	361,891	22,931	0.06336	179,711	2,865	<i>0.01594</i>	
2004	290,570			540,000			488,080			215,731			
2005	245,608			247,500			273,099			124,813			
<b>Average (1995-03)</b>			0.06915				0.02239			0.06887			0.03656
<b>2008 Forecast:</b>		16,985				5,542			18,809			4,563	

Note: DEC Age-2 Recruits have been recalculated for BY95 - BY2001 and are therefore NOT comparable to those from earlier years. Earlier broods are in the process of being recalculated as well.

Note: Values in italics indicate untagged production units. Values in boldface were excluded from the analysis

### *A-3.2 Hatchery Runs*

For 2008, given the lower than average marine survival experienced by BY 2002 and BY 2003 natural and, in the case of BY 2003, hatchery smolts, we have decided to use a longer term mean of the estimated survival rates for each hatchery facility. The 2008 forecast utilized survival rates the latest available three brood cycles, or 9 broods (Table A-3-d). Historic marine survival rates were estimated from CWT-based cohort reconstruction of December Age-2 recruits, as were those of natural coho. Because there are several enhancement facilities in Hood Canal, and tag data were not available for all facilities for all years, marine survival rates were estimated from reconstructed cohorts, using the assumption that untagged releases contributed to preterminal fisheries in a way that maintained the same ratio to tagged releases, as estimated by RRTERM to have entered the Hood Canal terminal area (Table A-3-d).

The 2008 forecast of 45,899 hatchery reared December Age-2 coho recruits (Table A-3-d) was predicted from the brood year 2005 smolt releases multiplied by the average estimated marine survival rate for each facility's smolts from the nine latest available brood years. (Table A-3-d).

#### *A-4. Fall Chum Salmon*

The 2008 forecast of the Hood Canal fall chum salmon run was estimated separately for natural production units, off-station augmented production in natural rearing areas, and individual hatchery production units. The following descriptions of methods and source data are intended to provide documentation of the methods and approaches used. Because of delays in catch reconciliation records from 2000 through 2007 terminal area fisheries, combined with the unavailability of age specific data from the 2005,2006 and 2007 return years, the forecasts are extremely preliminary and possibly biased. For instance, substantial catches in Area 12H (Hoodsport hatchery zone) were reconstructed as being in Area 12C. This resulted in a possibly significant positive bias to the historical estimates for natural and Skokomish R. hatchery returns, with a corresponding negative bias to Hoodsport hatchery returns. This may have also affected the recruits at age estimates, for numerous Hood Canal units. In effect, the preliminary forecast, shown below, suffers from the lack of up to date data, from as far back as ten years. It is our intent to correct this information in the near future. Until then, forecasts should be treated with caution and management actions should be conservative.

##### *A-4.1 Natural Runs*

###### A-4.1.1 Natural Run Forecasts (Tribal)

The 2008 return of Hood Canal natural fall-timed chum salmon of each returning age group (3, 4, and 5 year olds) was forecast using the available mean return-per-spawner-at-age rates for all available broods, from 1968 to the present, excluding estimates from the 1983 brood (ages 3 and 4) and the 1989 brood (age 5) return. The mean recruit-per-spawner return rates were 1.34424, 3.53834, and 0.33767, for 3, 4, and 5 year-olds respectively (Table A-4-a). These age specific rates were used because they would diminish the effect of possibly inaccurate recent years' survival estimates. However, given the reconstruction and recruit assessment problems identified above for recent years, the very high return rate of 4 year olds in 2004 and the lack of age information from 2005, 2006, and 2007, even these average return rates were considered to be unrealistically high, and given the high levels of parent brood escapement and the lower than expected returns of 2005, along with the higher than expected return of 2006, all rates were adjusted to 50% of the estimated mean. These adjusted rates of return were multiplied with the 2005, 2004, and 2003 brood escapements (47,720, 168,126, and 148,513, respectively) to estimate the total 2008 forecast of **386,665** Hood Canal natural fall chum returning to Puget Sound, before the addition of anticipated returns from instream supplementation projects. The Hood Canal natural run forecast was further apportioned to individual production units (Tables A-4-d and A-4-e), on the basis of relative proportion attributable to each production unit's spawners (brood year escapements), for each returning age group.

The grand total return to each natural production unit was estimated by adding the estimated return from in stream enhancement and supplementation efforts. The forecast of this latter component is described under "Hatchery runs" (Section A-4.2).

###### A-4.1.2 Natural Run Forecasts (WDFW)

The 2008 return of natural fall-timed chum salmon to Hood Canal was preliminarily derived as a portion of the forecasted return of all Puget Sound natural fall-timed chum. Natural fall chum forecasts were calculated using the Puget Sound-wide recruit/spawner (R/S) method, with the regional (Hood Canal) forecast, and terminal forecasts within Hood Canal, allocated according to parent escapement.

The Puget Sound forecast was initially estimated using parent brood escapements, long-term odd/even-year specific average R/S values, and long-term odd/even-year specific mean proportions returning at age for 3, 4, and 5-year old returns. For example, the three-year old forecast was derived by multiplying the

2005 natural escapement by the mean odd-year brood R/S value to get a total return of 2005 brood offspring. That number was then multiplied by the mean proportion of the return at age 3 for odd-year broods, yielding the 2008 age 3 return forecast. This was repeated for the 4 and 5-year old components, and all three were summed to obtain a total Puget Sound forecast.

The Puget Sound natural fall chum parent escapements were large in 2003, 2004, and 2005. The 2003 parent escapement was the largest odd-year escapement on record, the 2004 parent escapement was the third largest escapement for all years, and the 2005 parent escapement was strong. Without some adjustment to the traditional R/S method, the 2008 forecasts would likely be over-estimates. For example, the actual return of natural-origin chum in Hood Canal (and South Sound) in 2005, 2006, and 2007 were about one-half, three-fourths, and three-fourths, respectively, of the predicted runsize using the traditional R/S method. To address this, we used 75% of the long-term R/S averages for the 2008 forecasts. This keeps the prediction inside the bounds of the existing data and compensates for the uncertainty resulting from record escapements and apparent decreases in survival. This method forecast returns of 1,696,988 natural fall chum to Puget Sound (Table A-4-b).

The forecasted return of each age group to Puget Sound was apportioned to Hood Canal using the proportions of the parent escapement of each brood. The forecast for Hood Canal is **323,229** natural fall chum salmon (Table A-4-c). The forecasts for individual production units are shown in Table A-4-f.

#### A-4.1.3 Joint 2007 Hood Canal Natural Fall Chum Salmon Forecast

While the resulting estimates prepared by Tribal and WDFW are substantially different, it should be noted that differences between methods have been further confounded by the potential data bias, discussed above, which would affect each approach to a different degree. For preliminary preseason planning, we agreed to use a forecast of **354,947** natural fall chum, the average of the Tribal and WDFW results. The total forecast was then apportioned to individual production units on the basis of the age specific brood escapement distribution (Table A-4-g).

**Table A-4-a. Hood Canal Natural Fall Chum Returns-at-Age per Spawner**

<b>Brood Year</b>	<b>Brood Escapement</b>	<b>3's</b>	<b>4's</b>	<b>5's</b>	<b>Total</b>
1968	47,802	0.58849	1.63839	0.09531	2.32219
1969	30,070	0.55346	1.14771	0.09264	1.79381
1970	41,698	0.55975	1.58101	0.01314	2.15390
1971	41,139	0.58683	0.41252	0.33535	1.33470
1972	41,602	0.26600	1.27781	0.00000	1.54381
1973	27,870	1.77432	2.60438	0.07441	4.45311
1974	52,224	0.81057	4.42759	0.07083	5.30899
1975	16,266	7.39080	0.05030	0.00000	7.44110
1976	48,078	0.53107	0.20951	0.03284	0.77342
1977	26,074	2.63782	2.75187	0.13638	5.52607
1978	79,156	0.00000	0.60521	0.05628	0.66149
1979	14,323	1.90574	2.12510	0.00000	4.03084
1980	21,672	0.51985	2.14281	0.23020	2.89286
1981	14,311	3.49591	12.57517	0.62961	16.70069
1982	12,134	2.88354	7.08386	0.94399	10.91139
1983	7,121	<b>9.05912</b>	<b>24.36310</b>	1.13297	<b>34.55519</b>
1984	22,751	1.29322	5.88289	0.37653	7.55264
1985	50,910	0.47585	2.67119	0.33941	3.48645
1986	29,549	0.00000	3.15515	0.44356	3.59871
1987	24,481	0.00000	3.54568	1.04655	4.59223
1988	30,704	1.51411	8.58958	1.42974	11.53343
1989	24,873	0.11184	6.46342	<b>5.71902</b>	12.29428
1990	20,811	1.48264	8.26697	0.69326	10.44287
1991	44,745	0.59753	1.58643	0.12973	2.31369
1992	96,382	2.21238	4.21549	0.20013	6.62800
1993	67,770	1.07479	1.38931	0.10130	2.56540
1994	151,821	0.30984	0.88726	0.03062	1.22772
1995	119,344	0.58343	0.37619	0.01256	0.97218
1996	251,803	0.01674	0.19286	0.00000	0.20960
1997	53,492	0.59665	2.02701	0.40313	3.02679
1998	101,631	1.52336	2.19554	0.01921	3.73811
1999*	33,924	2.88933	8.81777	1.39799	13.10509
2000*	37,131	3.18516	12.33085		
2001*	101,713	1.98902			
2002*	173,037				
2003*	148,513				
2004*	168,126				
2005	47,720				
2006					
<b>Mean: Brood Years 1968-01 (exclusive of outliers, in bold)</b>					
<b>All Odd Years</b>	47,087	1.66646	3.23627	0.38880	5.57576
<b>All Even Years</b>	75,164	1.04098	3.80487	0.28973	4.46870
<b>All Years</b>	61,126	1.34424	3.53834	0.33767	5.00437
<b>2008 Tribal Forecast (@ 0.5)</b>		64,147	297,443	25,074	386,665

**Table A-4-b. 2008 WDFW Puget Sound Natural Fall Chum Salmon Forecast**

Parent Brood	Age	Parent Escapement	Mean R/S <sup>1</sup>	Adjusted R/S (.75)	Estimated R/S (all ages)	Mean Age Composition <sup>1</sup>	Natural Forecast
2003	5	695,721	3.46847	2.60135	1,809,816	0.07212	130,524
2004	4	870,416	2.58891	1.94168	1,690,072	0.76774	1,297,536
2005	3	286,841	3.46847	2.60135	746,175	0.36041	268,929
						Total	1,696,988

Note: Uses odd or even brood year average, depending on brood year

**Table A-4-c. 2008 WDFW Hood Canal Natural Fall Chum Salmon Forecasts**

	Puget Sound Forecast	HC Parent Escapement Proportion	HC Forecast by Age
Age 3 (2005 Brood) Forecast	268,929	0.16636	44,740
Age 4 (2004 Brood) Forecast	1,297,536	0.19316	250,627
Age 5 (2003 Brood) Forecast	130,524	0.21347	27,862
<b>Total WDFW Forecast</b>	<b>1,696,988</b>		<b>323,229</b>

**Table A-4-d. 2008 Hood Canal Natural Fall Chum Salmon Parent Brood Escapement Distribution**

Area	2005	2004	2003
9A	0.00%	0.00%	0.00%
12	1.87%	5.49%	3.92%
12A	8.56%	1.62%	3.84%
12B	22.95%	42.61%	42.46%
12C	23.64%	18.47%	24.62%
82G	18.36%	8.90%	6.64%
12D	24.61%	22.90%	18.52%

**Table A-4-e. Apportionment of the 2008 Tribal Hood Canal Natural Fall Chum Salmon Forecast**

Area	3's	4's	5's	Total
9A	0	0	0	0
12	1,202	16,344	984	18,529
12A	5,494	4,819	962	11,275
12B	14,721	126,752	10,646	152,119
12C	15,167	54,926	6,172	76,265
82G	11,776	26,479	1,665	39,920
12D	15,788	68,124	4,645	88,557
<b>Total</b>	<b>64,147</b>	<b>297,443</b>	<b>25,074</b>	<b>386,665</b>

**Table A-4-f. Apportionment of the 2008 WDFW Hood Canal Natural Fall Chum Salmon Forecast**

Area	3's	4's	5's	Total
9A	0	0	0	0
12	838	13,771	1,093	15,703
12A	3,832	4,061	1,069	8,961
12B	10,267	106,802	11,830	128,899
12C	10,578	46,280	6,859	63,718
82G	8,213	22,311	1,850	32,374
12D	11,012	57,401	5,161	73,574
<b>Total</b>	<b>44,740</b>	<b>250,627</b>	<b>27,862</b>	<b>323,229</b>

**Table A-4-g. Apportionment of the 2008 Joint Hood Canal Natural Fall Chum Salmon Forecast**

<b>Area</b>	<b>Tribal Forecast</b>	<b>WDFW Forecast</b>	<b>Joint Forecast</b>
9A	0	0	0
12	18,529	15,703	17,116
12A	11,275	8,961	10,118
12B	152,119	128,899	140,509
12C	76,265	63,718	69,991
82G (Skokomish)	39,920	32,374	36,147
12D	88,557	73,574	81,065
<b>Total</b>	<b>386,664</b>	<b>323,229</b>	<b>354,947</b>

*A-4.2 Hatchery Runs.*

The 2008 hatchery-origin returns (including in-stream augmentation) of fall-timed chum salmon were generally forecasted using average returns-at-age-per-pound of fingerlings released, to Puget Sound net fisheries and escapements, using historical run sizes from the fall chum database, historical releases from each facility, and applying them to releases from brood years 2003, 2004, and 2005. In estimating the returns, the following information was used for each facility. Off-station production, resulting from instream augmentation programs was estimated separately and was then added to the forecasted return to natural spawning areas. The lack of reconciled recent years' data, as well as problems with recent years' terminal area run reconstruction, may have introduced significant positive bias to the estimates of Skokomish River hatchery runs, while introducing a negative bias to Hoodsport hatchery runs. These problems should be corrected in the near future. The following forecasts should be treated conservatively.

The effects of changes to the Hood Canal hatchery chum programs will continue to be seen in 2008, including the return of Area 12A production unit to natural production, since the last release from the Quilcene National Fish Hatchery occurred with the 2002 brood. Also, the 2004 brood was the first year of reduced production at the Hoodsport and George Adams / McKernan facilities, which will affect age-4 returns in 2008.

A-4.2.1 Forecasts of Instream Augmentation

Egg box and fry-augmented runs to streams of areas 12, 12B, 12C, 12D, 82G: The Tribal forecast applied one half of the mean return rates of age 3, age 4, and age 5 fish per pound planted at Hoodsport Hatchery (1965-1971 broods) (Tables A-4-h and A-4-i). The resulting forecast for 2008 is 48 fish. WDFW applied return rates that were based on rates for corresponding hatcheries, reduced by a factor of 2 to 4, to compensate for the smaller size at release, resulting in a forecast of 25 fish (Table A-4-m). This forecast was apportioned to each area, according to the volume released from each brood year and the resulting estimates were added to the corresponding natural run components.

**Table A-4-h. Hood Canal Fall Chum, Off-Station Lbs. Planted**

Area	BY 2005		BY 2004		BY 2003	
	Lbs	%	Lbs	%	Lbs	%
9A	0	0.0%	0	0.0%	0	0.0%
12	0	0.0%	0	0.0%	0	0.0%
12B	0	0.0%	0	0.0%	1	0.5%
12A	0	0.0%	0	0.0%	0	0.0%
12C	0	0.0%	0	0.0%	0	0.0%
Skokomish	0	0.0%	0	0.0%	0	0.0%
12D	0	100.0%	22	100.0%	191	99.5%
<b>Total</b>	<b>0</b>	<b>100.0%</b>	<b>22</b>	<b>100.0%</b>	<b>192</b>	<b>100.0%</b>

**Table A-4-i. Apportionment of the 2008 Tribal Hood Canal Fall Chum Off-Station Forecast**

Area	3's	4's	5's	Total
9A	0	0	0	0
12	0	0	0	0
12B	0	0	0	0
12A	0	0	0	0
12C	0	0	0	0
82G	0	0	0	0
12D	0	31	17	48
<b>Total</b>	<b>0</b>	<b>31</b>	<b>17</b>	<b>48</b>

A-4.2.2 Hatchery On-Station Forecasts (Tribal)

Hoodsport Hatchery: Mean return rate of age 3, 4, and 5 fish per pound planted at Finch Creek (1972-2001 broods) (Table A-4-j). The resulting forecast for 2008 is **162,587**. Run reconstruction problems may have biased this run low.

George Adams/McKernan Hatcheries: Mean return rate of age 3, age 4, and age 5 fish per pound released (1978-2001 broods), excluding BY 1999 (ages 4 and 5) and BY 2000 (age 4) (Table A-4-k). The resulting forecast for 2007 is **110,004**. All available years were used in order to attempt to counteract a probable high bias, caused by run reconstruction and age at return data problems.

Little Boston Hatchery and Port Gamble Pens: Mean return rate of age 3, age 4 and age 5 fish per pound planted at Hoodspout Hatchery (1965-1971 broods) (Table A-5-j). The resulting forecast for 2008 is based on the fingerling releases of 809 lbs (BY 2005), 1,797 lbs (BY 2004), and 1,699 lbs (BY 2003), which were used to estimate the return of 3, 4, and 5-year olds respectively, for a total return of **5,247**. (Table A-4-n).

Enetai Hatchery: Mean return rates of age 3, age 4 and age 5 fish per pound planted (1976-1999 broods). (Table A-4-l). The resulting forecast for 2008 is based on the fingerling releases of 6,603 lbs. (BY 2005), 6,613 (BY 2004), and 3,264 lbs (BY 2003), which were used to estimate the return of 3, 4, and 5-year olds respectively, for a total return of **28,742**. In this instance, all available brood data were used, for the same reasons as those for George Adams / McKernan.

The Tribal forecasts of hatchery returns are summarized in Table A-4-n and indicate a total forecast of on-station hatchery-origin fall chum, for 2008, of **306,598**.

#### A-4.2.3 Hatchery Forecasts (WDFW)

The 2008 return of hatchery-origin fall chum was forecast by multiplying pounds released from each facility by long-term, even/odd brood year specific average return rates for that facility. For example, 3-year old returns were forecast by multiplying pounds released of 2005 brood year chum by the long-term, odd-year brood age 3 return rate for that hatchery. Age 4 and age 5 returns were forecast by the same method. For off-station releases (volunteer/cooperative projects), return rates were based on rates for a corresponding hatchery, reduced by a factor of 2 or 4 to compensate for smaller size at release. Individual station forecasts are shown in the tables below. A summary of the WDFW forecasts by age are shown for Hood Canal hatcheries in Table A-4-m. The WDFW total Hood Canal hatchery on-station forecast is **320,230**.

#### A-4.2.4 Joint 2008 Hood Canal Hatchery Fall Chum Salmon Forecast

For preliminary preseason planning, we agreed to use a forecast of **313,414** hatchery fall chum, the average of the Tribal and WDFW forecasting methods' results, apportioned to individual hatchery facilities (Table A-4-o).

**Table A-4-j. Fall Chum Returns-per-Pound,  
by Age at Return from Hoodspport Hatchery Releases**

<b>Brood Year</b>	<b>Release Lbs.</b>	<b>3's</b>	<b>4's</b>	<b>5's</b>	<b>Total</b>
1965	888	0.80208	2.35750	0.01558	3.17516
1966	1,771	0.92010	2.66721	0.02299	3.61030
1967	2,301	0.93776	1.15006	0.11132	2.19914
1968	4,373	0.54928	1.56195	0.19686	2.30809
1969	2,424	0.59879	2.69040	0.26275	3.55194
1970	3,036	1.45276	4.96486	0.00000	6.41762
1971	3,794	1.45488	1.48756	0.02969	2.97213
1972	4,126	0.55870	7.49948	<b>0.82970</b>	8.88788
1973	9,202	0.70599	3.60727	0.16357	4.47683
1974	27,368	0.89570	5.68814	0.03343	6.61727
1975	22,776	2.54895	2.78624	0.05244	5.38763
1976	24,490	0.76752	1.80998	0.04155	2.61905
1977	21,883	3.98451	2.02120	0.02757	6.03328
1978	33,256	1.00278	2.34466	0.24428	3.59172
1979	24,238	2.98678	2.89652	0.21504	6.09834
1980	44,336	0.48636	2.23768	0.04039	2.76443
1981	23,589	3.18480	4.51989	0.36118	8.06587
1982	32,058	1.69592	4.43338	0.15862	6.28792
1983	34,748	1.23151	4.91046	0.44689	6.58886
1984	60,763	1.76204	2.85909	0.09411	4.71524

Continued ...

**Table A-4-j (cont'd). Fall Chum Returns-per-Pound,  
by Age at Return from Hoodport Hatchery Releases**

1985	39,279	2.92389	5.00571	0.20595	8.13555
1986	33,036	0.53259	2.21872	0.20579	2.95710
1987	40,323	0.42814	3.70929	0.14736	4.28479
1988	36,877	3.13411	7.17034	0.29712	10.60157
1989	35,149	0.71847	1.79583	0.50845	3.02275
1990	38,422	4.27142	7.01940	0.37401	11.66483
1991	39,379	3.01183	1.98098	0.07460	5.06741
1992	33,678	2.33155	3.93700	0.12497	6.39352
1993	33,920	1.77835	4.03487	0.17676	5.98998
1994	37,075	0.73558	1.96470	0.03943	2.73971
1995	37,583	1.29662	0.93342	0.01997	2.25001
1996	25,374	0.35824	1.78350	0.05543	2.19717
1997	30,276	0.24440	2.52591	0.08956	2.85987
1998*	37,534	2.61358	3.17189	0.04088	5.82635
1999*	33,196	3.75717	3.05376	0.30281	7.11374
2000*	34,067	0.19623	1.19368		
2001*	35,033	1.16076			
2002*	35,574				
2003*	33,231				
2004	31,410				
2005	29,031				
2006					
All Odd Years	25,345	1.77661	2.85927	0.17842	4.84852
All Even Years	28,931	1.34803	3.58476	0.12312	5.30587
All Years	27,094	1.56811	3.22201	0.15239	5.07066
All Years 65-71	2,655	0.95938	2.41136	0.09131	3.46205
All Years 72-00*	32,101	1.71015	3.41769	0.16823	5.47281
All Years 96-00*	32,580	1.38840	2.34575	0.12217	4.49928
<b>2008 Tribal Forecast</b>		49,647	107,350	5,590	162,587
<b>2008 WDFW Forecast</b>		57,990	115,864	6,629	180,483

Note: Because of incomplete reconstruction, 2003 and 2004 return rates were not available.

**Table A-4-k. Fall Chum Returns-per-Pound, by Age at Return  
from George Adams / McKernan Hatchery Releases**

<b>Brood Year</b>	<b>Release Lbs.</b>	<b>3's</b>	<b>4's</b>	<b>5's</b>	<b>Total</b>
1978	18,717	0.11901	0.85327	0.15188	1.12416
1979	40,273	0.36752	0.61002	0.06715	1.04469
1980	24,418	0.30902	2.10810	0.05751	2.47463
1981	12,028	3.24075	4.43634	0.36758	8.04467
1982	26,780	1.03328	3.20556	0.20036	4.43920
1983	25,917	1.25574	8.01500	0.44456	9.71530
1984	28,601	1.49188	1.18815	0.05936	2.73939
1985	24,500	0.78202	1.85405	0.20669	2.84276
1986	36,329	0.12036	1.56008	0.24038	1.92082
1987	30,566	0.10195	1.44458	0.20499	1.75152
1988	31,083	1.45527	4.69637	0.54805	6.69969
1989	32,315	0.52929	2.25103	0.20309	2.98341
1990	17,032	0.47710	5.81499	0.43246	6.72455
1991	30,024	1.45064	1.33176	0.05341	2.83581
1992	25,235	1.59492	2.86789	0.09179	4.55460
1993	27,016	1.21873	2.78823	0.32053	4.32749
1994	27,723	0.54142	3.79484	0.03621	4.37247
1995	22,624	3.11094	1.06483	0.00880	4.18457
1996	23,138	0.26978	0.51881	0.11447	0.90306
1997	27,884	0.07039	5.16473	0.21978	5.45490
1998	33,440	5.52435	4.11516	0.30166	9.94117
1999	27,365	4.92693	<b>24.35584</b>	<b>2.42864</b>	<b>31.71141</b>
2000	8,486	5.17945	<b>17.68449</b>		
2001	31,946	4.40683			
2002	30,996				
2003	32,631				
2004	23,127				
2005	22,768				
2006					
<b>Average Return Brood Years (1978-01) excluding outliers in bold.</b>					
Odd Years	27,704	1.78848	2.89606	0.20966	4.31851
Even Years	25,365	1.50965	2.79302	0.20310	4.17216
<b>All Years</b>	26,534	1.64907	2.84209	0.20622	4.24185
<b>2008 Tribal Forecast</b>					
		37,546	65,729	6,729	110,004
<b>2008 WDFW Forecast</b>					
		37,715	59,955	6,842	104,512

Note: Because of incomplete reconstruction, 2003 & 2003 return rates were not available

**Table A-4-l. Fall Chum Returns-per-Pound, by Age at Return for Enetai Hatchery Releases**

<b>Brood Year</b>	<b>Release Lbs.</b>	<b>3's</b>	<b>4's</b>	<b>5's</b>	<b>Total</b>
1976	3,696	0.18155	0.75214	0.00000	0.93369
1977	5,785	1.53198	3.31116		
1978	6,514	1.40297		0.01172	
1979	2,666		0.62223	0.09213	
1980	3,053	0.43328	1.81825	0.10249	2.35402
1981	4,985	2.12202	2.89871	0.10103	5.12176
1982	6,130	2.23198	2.83908	0.05719	5.12825
1983	2,727	3.66295	4.00346	0.12399	7.79040
1984	5,855	2.34790	1.46902	0.02738	3.84430
1985	5,485	2.22696	2.49188	0.03179	4.75063
1986	5,495	1.13061	1.07304	0.09600	2.29965
1987	4,455	1.07889	1.44217		
1988	4,493	1.46308		0.08704	
1989	4,191		1.67962	0.06531	
1990	3,294	3.14615	6.08997		
1991	2,936	6.39302		0.06815	
1992	2,095		3.07692	0.10468	
1993	4,297	1.77956	2.41267	0.08406	4.27629
1994	6,809	1.37618	3.03970	0.00283	4.41871
1995	3,456	4.32699	0.34679	0.00000	4.67378
1996	2,302	0.40142	0.65064	0.11105	1.16311
1997	4,068	0.20989	1.78593	0.13968	2.13550
1998	3,270	1.81444	3.78351		5.59795
1999	1,542	3.49463			
2000	194				
2001	5,321				
2002	7,081				
2003	3,264				
2004	6,613				
2005	6,603				
2006					
<b>Average (Brood Years 1976-99). Outliers (in bold) excluded.</b>					
Odd Years	4,119	2.68269	2.09946	0.07846	4.79139
Even Years	4,460	1.44814	2.45923	0.06004	3.21746
<b>All Years</b>	4,289	2.03602	2.27934	0.06876	3.89200
<b>2008 Tribal Forecast</b>		13,444	15,073	224	28,742
<b>2008 WDFW Forecast</b>		14,992	14,673	288	29,953

Note: Because of incomplete reconstruction, and lack of rack sampling, return rates after 2002 were not available

**Table A-4-m. Summary of 2008 WDFW Hood Canal Hatchery Fall Chum Forecasts**

<b>Facility</b>	<b>Age 3</b>	<b>Age 4</b>	<b>Age 5</b>	<b>Total</b>
Little Boston Hatchery	768	4,356	158	5,282
Hoodsport Hatchery	57,990	115,864	6,629	180,483
G. Adams / McKernan Hatchery	37,715	59,955	6,842	104,512
Enetai Hatchery	14,992	14,673	288	29,953
12D Streams - Augmentation	0	15	10	25
<b>Total</b>	<b>111,465</b>	<b>194,863</b>	<b>13,927</b>	<b>320,255</b>

**Table A-4-n. Summary of 2008 Tribal Hood Canal Hatchery Fall Chum Forecasts**

<b>Facility</b>	<b>Age 3</b>	<b>Age 4</b>	<b>Age 5</b>	<b>Total</b>
Little Boston Hatchery	776	4,333	155	5,264
Hoodsport Hatchery	49,647	107,350	5,590	162,587
G. Adams / McKernan Hatchery	37,546	65,729	6,729	110,004
Enetai Hatchery	13,444	15,073	224	28,742
<b>Total</b>	<b>101,413</b>	<b>192,485</b>	<b>12,699</b>	<b>306,598</b>

**Table A-4-o. Apportionment of the 2008 Joint Hood Canal Hatchery Fall Chum Salmon Forecasts**

<b>Facility</b>	<b>Tribal Forecast</b>	<b>WDFW Forecast</b>	<b>Joint Forecast</b>
Little Boston Hatchery	5,264	5,282	5,273
Hoodsport Hatchery	162,587	180,483	171,535
G. Adams / McKernan Hatchery	110,004	104,512	107,258
Enetai Hatchery	28,742	29,953	29,347
<b>Total</b>	<b>306,598</b>	<b>320,230</b>	<b>313,414</b>