

**2010 MANAGEMENT FRAMEWORK PLAN  
AND  
SALMON RUNS' STATUS  
FOR THE  
HOOD CANAL REGION**



Skokomish Tribe



*Washington  
Department of*  
**FISH and  
WILDLIFE**

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# 1. Introduction

## *1.1 General*

This report has been prepared by the Skokomish Tribe and the Washington Department of Fish and Wildlife (WDFW) and was reviewed and agreed to, by the Lower Elwha Klallam Tribe, the Point No Point Treaty Council (representing the Jamestown S’Klallam and Port Gamble S’Klallam Tribes). 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 2010 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 2010 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 all three management units are predicted to be of sufficient abundance to exceed the critical threshold for each management unit and only exceeds the recovery threshold for the SE Hood Canal MU. 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 (QBNP), the Quilcene National Fish Hatchery (QNFH), the Port Gamble Pens (PGNP) and the George Adams Hatchery (GAH); 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.

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 2010 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 2010 recruits. The escapement rate was established at a level equal to, or higher than, the minimum escapement rate allowable for the 2010 forecasted recruitment (45%), 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. 2010 Fishery Management Periods

Area	Spring Chinook	Summer Chinook	Summer Chum	Coho		Early Fall Chum	Late Fall Chum	Winter Steelhead
9A	---	---	---	8/22-10/30		10/31-11/27	---	11/28-3/31
12A	---	---	8/22-09/27	8/22-10/16		10/17---	---12/25	---
12	4/16-7/10	7/11	9/05	9/01-9/22	9/10	10/16	10/17-11/20	---
12B	4/16-7/10	7/11	9/12	9/05-10/1	9/14	10/23	10/24-11/20	---
12C	4/16-7/17	7/18	9/18	8/26-10/1	9/18	10/23	10/24-11/27	---
12D	4/16-7/17	7/18	9/18	8/29-9/22	9/18	10/23	10/24-11/27	---
Quilcene R	---		---	9/7-10/1	8/31	10/20	11/9---	---12/27
Dosewallips Duckabush	---	8/8-9/18		9/7-10/12	9/21	11/13	11/14---	---1/4
Skokomish R	5/01-7/31	8/1-9/18	---		9/19-11/13		11/14-12/4	12/5-1/4
Union R.	---	---	8/31-10/6	9/21	11/13	11/16-12/6		12/5-4/15
Misc. HC Tribs.	---	8/8-9/18	---		9/19-11/13		11/14---	---12/27

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 Hoodspout 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 Hoodspout 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 2010, 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 #1010)							
Fishery	Skokomish (*F)		Mid-Canal (*F)	Misc. (*F)	Hoodsport (*F)	Hood Canal (*Y)	Total
	Natural	Hatchery	Natural	Natural	Hatchery	Hatchery	
Catch & Escapement Total	3,171	43,017	197	173	18,463	820	65,841
Canada	527	6,537	31	31	2,748	2	9,876
Alaska	0	0	0	0	0	0	0
S.Falcon Tr/Rec	2	39	0	0	18	5	64
N.Falcon Tr/Rec	104	1,699	7	6	755	76	2,647
P.S. Troll	23	312	1	1	134	12	483
SJF Rec.	55	1,190	5	2	552	9	1,815
Puget Sound Rec.	103	2,283	9	6	1,064	214	3,678
Puget Sound Net	77	996	5	4	423	23	1,528
Hood Canal Rec.	13	178	0	1	499	9	700
Hood Canal Net	99	1,361	1	5	559	27	2,052
Freshwater Rec.	115	6,114	0	0	1	73	6,303
Extreme Terminal Net	461	5,984	0	0	9,542	173	16,160
Mgmt Unit Harvest	1,579	26,692	60	55	16,295	623	45,304
Mgmt Unit Escapement	1,592	16,325	138	118	2,169	197	20,539
Minimum Escapement Target	1,200	2,250	141	n/a	1,850	n/a	5,441

\*F=Fingerling

\*Y=Yearling

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 2010, 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 #1010* 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	Critical Escapement Threshold
Quilcene/Dabob	1,343	85	33	28	67	1,129	1,110
Mainstem HC	4,005	253	100	84	0	3,568	2,660
SE Hood Canal	651	41	16	13	0	581	300
<b>Totals</b>	<b>5,999</b>	<b>379</b>	<b>149</b>	<b>125</b>	<b>67</b>	<b>5,279</b>	<b>4,070</b>

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. In 2010, forecast of recruitment was made as total recruitment to all fisheries and escapements to each management unit (Mainstem Hood Canal, Quilcene and SE Hood Canal). For details on the data and methods used to derive the 2010 forecast please refer to Appendix A-2.

In March 1999, the Hood Canal-Strait of Juan de Fuca ESU (Evolutionarily 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 2010, 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 2010, 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. Critical 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 112,490, consisting of 44,731 natural (41,257 primary and 474 secondary) and 67,759 hatchery coho. These were used to provide model input values for the 2010 PFMC/North of Falcon management planning process. The methods used to develop the 2010 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 #1016, and does not include estimated natural mortality in 2010. 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 #1016. 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 2010 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 2010.

### 3.3 Coho Salmon

Harvest and Escapement by Management / Production Unit (FRAM #1016)								
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	33,311	19,791	4,035	27,924	51,750	33,311		85,061
Canada	226	504	124	743	1,371	226		1,597
S.Falcon Tr/Rec	32	53	7	76	136	32		168
N.Falcon Tr/Rec	1,641	1,451	319	2,055	3,825	1,641		5,466
P.S. Troll	35	19	3	26	48	35		83
Strait Rec.	1,208	1,768	407	2,558	4,733	1,208		5,941
SJI Rec.	5	8	2	11	21	5		26
Area 9 Rec.	1,270	696	111	926	1,733	1,270		3,003
P. Sound Rec.	564	319	53	403	775	564		1,339
Strait Net	378	210	39	274	523	378		901
SJI Net	12	6	0	6	12	12		24
No. Sound Net	75	41	5	50	96	75		171
So. Sound Net	735	399	62	510	971	735		1,706
Hood Canal Rec.	1,080	584	90	739	1,413	1,080	186	2,679
HC Rivers Rec.	1,008	2,181	0	2,054	4,235	1,008		5,243
HC Mainstem Net	4,264	1,737	46	546	2,329	4,264	341	6,934
Area 9A Net	1,153	290	2,374	1,066	3,730	1,153	495	5,378
Area 12A Net	0	0	0	10,959	10,959	0		10,959
Skokomish R Net	640	2,185	0	0	2,185	640		2,825
Mgt Unit Harvest	14,326	12,451	3,642	23,002	39,095	14,326	1,022	54,443
Mgt Unit Escap.	18,985	7,340	393	4,922	12,655	18,985		31,640
Min. Escap. Goal	18,321	550	277	1,924				

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 Hoodsport 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 Hoodsport run. In practice, during the early fall chum management period (through Nov. 20 in northern and central Hood Canal), only the Hoodsport/George Adams/McKernan units are considered primary. During the late-fall management period, natural units become the primary units.

The parent escapement of these stocks are summed and then divided into the Hood Canal chum forecast for the return year, to yield a predicted percentage of late fall chum returning. For example, for return year 2010, the parent escapement of late fall chum were summed for 2005, 2006, and 2007 (89,849), and divided into the Hood Canal 2010 chum forecast (477,309), to yield 18.8%.

Methods used to estimate the 2010 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 the Skokomish Tribe and WDFW, using alternate methods, for each production unit.

The proportion of the escapement to be taken at the Hoodsport Hatchery versus the George Adams/McKernan Hatchery complex, is based on the management objectives of meeting the combined Hoodsport/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 in 2004, with the last fall spawning in 2002 and release in 2003.

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 Hoodsport-George Adams-McKernan surplus. For late-fall chum, the expected escapements are those that would result after Hoodsport-timed chum have been taken from the portion of each late-fall management unit that overlaps the Hoodsport entry timing. The methodology used to derive expected escapements, harvest rates, harvest available and treaty and non-treaty shares is currently under review by the co-managers.

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. Hatchery escapement goals have been developed by the agency operating the hatchery facility and have been agreed to by the co-managers.

3.4 Fall Chum Salmon

Management and Production Units	Terminal Run	“Late Run”	Harvest Rate*	Harvest Available	T/NT Share*	Escapement Goal
<i>AREA 9A</i>						
Natural	0	0				0
Hatchery	3,369	0				1,000
<i>AREA 12</i>						
Natural	4,255	0				3,900
<i>AREA 12A</i>						
Natural	7,249	5,691				1,250
Hatchery	0	0				0
<i>AREA 12B</i>						
Natural	64,454	62,462				18,750
<i>AREA 12C</i>						
Natural	49,927	0				7,000
Hoodsport Hatchery	147,173	0				7,200
Enetai Hatchery	25,989	0				3,000
<i>AREAS 82G/J (Skokomish R.)</i>						
Natural	23,479	21,696				9,800
G.Adams-McKernan Hatchery	119,778	0				17,000
<i>AREA 12D</i>						
Natural-Augmented	31,636	0				13,550
<b>Tribal **</b>	<b>477,309</b>	<b>89,849</b>	<b>90.71%</b>	<b>351,484</b>	<b>175,742</b>	<b>82,450</b>
<b>WDFW **</b>	<b>477,309</b>	<b>89,849</b>	<b>90.93%</b>	<b>352,335</b>	<b>176,168</b>	<b>82,450</b>

\*Based on pre-season forecast and current escapement goals.

\*\*No agreement reached between co-manager’s for derivation of Harvest rate, Harvest available and T/NT Share.



## 4. Pre-Season Management Framework

### 4.1 2010 Harvest Management Measures and Expected Fisheries

In 2010, 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 are 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 Hoodsport 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 Hoodsport 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 2010 PFMC / North of Cape Falcon process, to ensure that commingled summer-run chum and chinook salmon would also be protected. The parties have agreed to implement the previously adopted summer chum salmon base conservation regime (BCR) management measures in 2010. 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 ESU.

In 2010, early-fall chum salmon runs managed at rates appropriate for the George Adams/McKernan, Hoodsport, and Little Boston hatcheries are expected to comprise most of the total fall chum salmon return. Therefore, harvest is 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 2010. 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 7/18; through 8/31, no more than 5 days/wk. Gillnets restricted to 7" min mesh starting 8/1. Area 12H: Open wb 7/18 through 9/25; 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 10/16; for gillnets. Beach seines only may start 9/16 -10/23 (release all chinook and chum through 9/30). Both gears may fish 7 days/wk when open.. Area 12B: Open 10/1 through 10/23; for gillnets; 500 foot closure along western shore through 10/10; beach seines only may start 9/21 (release all chinook and chum through 9/30). Both gears may fish 7 days/wk when open. Area 12C: Open 10/1 through wb 10/23 for gillnets; with 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; GN fishing pattern: 2-4-4-5; beach seines for Coho (release all Chum through 9/30) may start no earlier than 9/21 – 10/23. BS fishing pattern: 4-5-4-4-5. 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	Treaty	Area 12: Open 10/17 through 11/20, 7 d/wk. Area 12B: Open 10/24 through 11/20; 7 d/wk. Area 12C: Open 10/24 through 11/27; 7 d/wk. Area 12D: Closed. Area 12H: Hook and line gear open from 10/18 through 12/5; beach seines open Tuesday and Thursday of each week, then Monday and Wednesday for the week of 11/14; possible inseason adjustments. Starting 11/1, hatchery escapement control measures will go into effect.
	Nontreaty	Area 12: (Management period 10/17 - 11/20). Fisheries scheduled for Wks 43 (wb 10/17) through wk 47 (wb 11/14): PS Chinook, unmarked coho NR fishing pattern: 1,2,1,2,1; GN fishing pattern: 2,2,2,2,2, daylight hours. Area 12B: (Management period 10/24 - 11/20). Fisheries scheduled for Wks 43 (wb 10/17, last week of coho mgmt) through wk 47 (wb 11/14): PS Chinook, unmarked coho NR fishing pattern: 1,2,1,2,1; GN fishing pattern: 2,2,2,2,2, daylight hours. Area 12C: (Management period 10/24 - 11/27). Fisheries scheduled for Wks 46 (wb 11/7) through wk 48 (wb 11/21), if needed to attain NT share. PS Chinook and unmarked coho NR; PS fishing pattern: 2,1,1; 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 8/22 through wb 10/30, gillnet only.
	Nontreaty	Open Wks 35 (wb 8/22) - 44 (wb 10/24) GN and skiff GN, both gears limited to 100 fathoms length and 60 meshes in depth; 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 - closed to all fishing.
Chum	Treaty	Open 10/31 through 12/4.
	Nontreaty	Closed
Steelhead	Treaty	Open wb 12/5 through 1/31/2011.

Quilcene / Dabob (Area 12A)

Coho	Treaty	Open wb 8/22 through wb 10/16; 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 fisheries for Coho only start 8/21, open continuously. Gillnets closed until Summer chum escapement exceeds 1500. Beach seine advance notification required prior to fishing.
	Nontreaty	Beach seine open wks 35 (wb 8/22) - 40 (wb 9/26); Limited participation (4 permits/day); CK and CH NR; fishing pattern 4,4,4,4,4,4; Fishery will be managed consistent with SCSCI. GN closed unless Treaty GN opening.
Chum	Treaty	Open to set and drift gillnets wb 10/17 through 11/20.
	Nontreaty	Closed

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

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

Chinook	Open 8/2 through 9/18; no more than 4 days/wk; closed to gillnets below SR 106.
Coho	Open 9/19 through 11/13; 7 days/wk; Closed to gillnets below SR 106 through 9/30.
Chum	Open 11/14 through 12/4; 7 days/wk.

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

Coho Openings to be determined in-season, for Coho only, from 9/1 through 10/16. Closed below Rogers St. From Rogers St. to U.S. Hwy 101, hook and line gear only, release all 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) – 4 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).
- 1/1-1/31 Closed
- 2/1-4/30 2 fish limit (chinook 22" min size), release unmarked Chinook.

Quilcene/Dabob Bay Recreational

- 5/1-8/15 Same as Area 12
- 8/16-8/31 4 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)

- 10/1 – 10/31 2 fish limit, 12" min size, coho only. Selective Gear Rules; Night closure.

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 – 9/30 2 fish limit, 12" min size, release chum and unmarked Chinook. All Species-night closure, anti-snagging rule, and single point barbless hooks required through 11/30. Terminal gear (hooks, weights, lures or baits) and line must not be within 25' of Tribal gillnets. Closed upstream of Highway 106 bridge Mondays through September 16, except September 6.
- 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)

- 10/1 – 10/31 2 fish limit, 12" min size, coho only. Selective Gear rules; Night closure.

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 2010 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 all Treaty and Non-Treaty 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 is needed between all parties, to develop and implement a sampling and monitoring plan, that should allow for an improved assessment of commercial and recreational fisheries in Hood Canal.

The Skokomish Tribe has proposed a modification to the Base Conservation Regime (BCR) as defined in the Summer Chum Salmon Conservation Initiative (SCSCI) at NOF 2010. This proposed modification is for the elimination of the annual closure of the Skokomish River for gillnets downstream of Highway 106 bridge from August 1 through September 30. These discussions are currently on-going with NOAA Fisheries and the co-managers.

The Skokomish Tribe has begun to develop a Chinook salmon mark and recapture project for Purdy Creek, after discussions at NOF 2010. This project will be designed to determine stray rate and spawning distribution of natural origin Chinook salmon in Purdy Creek and the mainstem of the Skokomish River and will be peer reviewed by NOF 2011.

The co-managers will work on items identified in the 2010 North of Falcon WorkPlan, including, but not limited to the following: (1) developing a regional Hatchery Action Implementation Plan (HAIP) with the intention of reaching agreement on changes that will improve hatchery effectiveness and that will ensure compatibility between hatchery production, salmon recovery plans, rebuilding programs and harvest management strategies; (2) developing FRAM and TAMM improvements that will provide new or improved outputs and enhance analytical capabilities, including a new Puget Sound Chinook run reconstruction, revised terminal area stock composition, standardizing pre-season forecasts, mark-selective fishery bias correction, brood-year based output reports for Chinook and stratification of timesteps; (3) development and funding for future Chinook Models; (4) maintain current and expand when possible State-Tribal enforcement efforts according to tasks and priorities; (5) encounter rates and induced mortality (non-landed); (6) selective fishery reporting; (7) regional coho management reviews.

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 In-season 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 in-season 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 2010 fishing season.

In the Quilcene area, in-river escapement estimates for coho and summer chum salmon shall be used in-season to assist in decision making regarding the potential adjustment of fishery restrictions. In the case of summer chum salmon, while no in-season estimate of total abundance will be made, an in-season 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 2010 season, the co-managers will continue efforts to develop in-season assessment procedures, that will guide harvest management actions through the season. If a suitable model is developed for 2010, it will be described in a separate document. In lieu of an agreed to methodology for in-season approaches, the fishery will be managed as per the Pre-Season Forecast.

## APPENDIX

### **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.**

<b>Return Year (RY)</b>	<b>0+ Lbs. Released in RY-3</b>	<b>Return/Lb</b>	<b>Terminal Run</b>
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	0.27658	16,222
1999	89,149	0.33894	30,216
2000	87,306	0.23917	20,881
2001	101,591	0.29912	30,388
2002	89,837	0.37659	33,832
2003	106,363	0.39140	41,630
2004	95,282	0.39327	37,472
2005	92,989	0.50734	47,177
2006	76,769	0.61204	46,986
2007	89,952	0.43716	39,323
2008	95,368	0.42953	40,963
2009*	88,634	0.51223	45,401
2010	90,491		
2011	89,269		
2012	89,877		
<b>Average 2006-2009</b>		0.49774	
<b>2010 Forecast</b>			45,041

(\*) : 2009 return data are preliminary and subject to revision, following reconciliation of records.

The 2010 forecasted terminal run size of summer-run Hood Canal chinook salmon is the product of brood 2006 fingerling lbs released from WDFW facilities in 2007, 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 four return years (2006-2009), (Table A-1-a). The data series used this year was intended to estimate a terminal return to net fisheries, freshwater sport and escapements. It does not include other run components or contributions. The historical data series was recently reconciled from the 2006 through 2009 return years, to include this information for 2010 forecasting purposes (Tables A-1-a and A-1-b). The resulting terminal area run forecast is 45,041 chinook salmon. The forecast was apportioned to 42,614 chinook expected to return to hatcheries and 2,446 fish expected to return to natural spawning areas, based on the Hood Canal terminal runs' relative contribution of the individual Hood Canal management units in the most recent brood cycle, comprised of the 2006-2009 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	12/12B	12C	12D	Skokomish	G.A. Hatchery	Hoodspout 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	1,187	5,630	8,940	16,222
1999	0	876	86	249	2,123	10,332	16,550	30,216
2000	0	439	262	194	1,203	5,238	13,545	20,881
2001	0	326	605	203	3,247	14,965	11,042	30,388
2002	0	95	38	114	2,312	13,801	17,472	33,832
2003	0	194	93	106	2,059	18,346	20,832	41,630
2004	0	129	1,091	95	3,706	18,973	13,478	37,472
2005	0	45	619	108	3,044	24,009	19,352	47,177
2006	0	30	292	34	2,537	25,930	18,163	46,986
2007	0	73	40	22	959	29,664	8,565	39,323
2008	0	275	10	26	2,568	29,094	8,990	40,963
2009*	0	130	20	31	2,304	28,574	14,342	45,401

Note: Values for years prior to 1998 DO NOT include freshwater recreational catch

Note: The 2006-2009 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>
2006	0.00000	0.00064	0.00621	0.00072	0.05399	0.55187	0.38656
2007	0.00000	0.00186	0.00102	0.00056	0.02439	0.75437	0.21781
2008	0.00000	0.00671	0.00024	0.00063	0.06269	0.71025	0.21947
2009	0.00000	0.00286	0.00044	0.00068	0.05075	0.62937	0.31590
<b>'06 - 2009 Mean</b>	0.00000	0.00302	0.00198	0.00065	0.04796	0.66146	0.28493

**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	136	0.00302
12C	89	0.00198
12D	29	0.00065
Skokomish	2,160	0.04796
<b>Natural Subtotal</b>	2,414	0.05360
George Adams	29,793	0.66146
Hoodsport	12,834	0.28493
<b>Hatchery Subtotal</b>	42,627	0.94640
<b>Total</b>	45,041	1.00000

Note: The forecasted proportions are derived from the 2006-2009 mean distribution.

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

### *A-2.1 Natural Runs*

The 2010 forecast of the Hood Canal summer chum salmon returns was forecast as total recruitment to all fisheries and escapements for the Mainstem Hood Canal, Quilcene, and SE Hood Canal Management Units (MUs). Also factored into the 2010 forecast were (1) the performance of recent summer chum forecasts when compared to actual returns and (2) the potential impact of high flows during brood years expected to contribute to returns in 2010 (i.e., BY 2007 as age 3 and BY 2006 as age 4).

Abundance for each MU was forecast as the mean of the 2007 through 2009 returns and the mean was then adjusted by the ratio of actual abundance to forecast abundance during 2009. The actual to forecast ratios were 0.578, 0.334, and 0.461 for the Mainstem, Quilcene/Dabob, and SE Hood Canal MUs, respectively.

There were extremely high flows (due to rain on snow events) during the summer chum egg incubation period in fall/winter 2007 that likely had detrimental impacts on natural summer chum spawners in Hood Canal streams. The impacts were likely the highest in the SE Hood Canal MU streams (Union and Tahuya rivers). In addition, the numbers of BY 2007 summer chum fry released from the Tahuya River supplementation program were substantially reduced as a result of egg and fry mortality due to damage to the water intake structure at the remote hatchery facility during the floods. Consequently, fewer than normal numbers of age 3 natural and/or supplementation-origin recruits are expected in 2010 and the 2010 forecast for the SE Hood Canal MU was reduced by an additional 25%.

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 2008. 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 substantially to the summer chum adult recruitment and escapements.

The supplementation projects in Lilliwaup Creek, the Hamma Hamma River, and the Tahuya River are each expected to contribute supplementation-origin recruits (SORs) during 2010. The projects in the Quilcene River, Big Beef Creek, and the Union River were terminated and no SORs are expected to return from those projects in 2010.

For the Mainstem Hood Canal MU, the returns of summer chum were forecast based on total (NORs + SORs) returns. For the Quilcene / Dabob MU, the returns of summer chum were forecast based NORs. The return to the SE Hood Canal MU was forecast as the mean of the NORs to Union River from 2007 through 2009 plus the mean of the total (NORs + SORs) recruits to Tahuya River from 2008 through 2009.

Estimates of the number of natural-origin recruits and supplementation-origin recruits returning to each MU each year from 2000 through 2009 and forecasts for 2010 are shown in Table A-2-a. The 2010 forecasted returns are 4,005 summer chum to the Mainstem Hood Canal MU, 1,343 summer chum to the Quilcene / Dabob Bays MU, and 651 summer chum to the SE Hood Canal MU. The total forecasted return is 5,998 summer chum to Hood Canal in 2010 (Table A-2-a).

**Table A-2-a. Hood Canal Summer Chum Salmon Natural and Supplementation 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	5,964		3,887	75	2,070	768
2008	9,857		5,701	0	1,174	798
2009	4,971		2,490	0	623	387
Mean 2007-09	6,931		4,026		1,882	
<b>2010 Forecast a/b/</b>	4,005		1,343		651	
<b>2010 Total Hood Canal Forecast</b>					5,998	

a/ 2007-09 mean adjusted by ratio of actual abundance to forecast abundance during 2009; see text.

b/ SE Hood Canal forecast adjusted by an additional 25% to account for detrimental impact of high flows during fall/winter 2007 on natural spawners and supplementation releases: see text.

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 2010 forecasted abundance for the returns of summer chum,, a estimate of 4,005 recruits for the Mainstem Hood Canal MU, provide 1,343 recruits for the Quilcene/Dabob MU and a estimate of 651 recruits for the SE Hood Canal MU. The 2010 forecasted abundance for the returns of summer chum exceed the Critical threshold for each Management Unit and exceeds the Recovery threshold for the SE Hood Canal MU.

The Co-managers have agreed to monitor the incidental harvest of summer chum in all scheduled fisheries and to monitor the in-season abundance of summer chum in the Quilcene / Dabob Bays MU. The Co-Managers will conduct annual post-season abundance assessments comparing 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 2010 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 2002-2005 (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:

$$\text{Hood Canal Recruitment} = 35393.657 + (359.130 * (\text{BBC Tagged Jacks}))$$

Relevant statistics of the model used to derive the 2010 forecast are shown below.

<b>Using Brood Years 1983-1998 , 2002-2005</b>	
Multiple R	0.75968
R <sup>2</sup>	0.57711
Adj. R <sup>2</sup>	0.55224
Std Error of Estimate	36987.5796
N	20
Intercept	35393.657
Slope	359.130
2009 Jacks (X)	26
2010 Forecast (Y)	44,731

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 natural DA2 recruits was thus apportioned into 44,257 from primary and 474 from secondary units, on the basis of their parent brood spawner distribution (Table A-3-b).

**Table A-3-a. 2010 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	<i>19,565</i>	173	122	<i>81,147</i>
1989	<i>23,646</i>	167	144	<i>66,306</i>
1990	<i>18,677</i>	273	202	<i>67,729</i>
1991	<i>13,071</i>	206	149	<i>140,612</i>
1992	<i>18,431</i>	188	157	<i>95,144</i>
1993	<i>16,574</i>	224	185	<i>73,734</i>
1994	<i>25,820</i>	410	298	<i>149,823</i>
1995	<i>40,828</i>	610	510	<i>180,517</i>
1996	<i>22,222</i>	60	45	<i>23,437</i>
1997	<i>20,967</i>	96	85	<i>55,909</i>
1998	<i>47,089</i>	189	179	<i>165,500</i>
1999	<i>21,803</i>	120	111	<i>107,024</i>
2000	<i>24,352</i>	80	70	<i>269,219</i>
2001	<i>36,060</i>	339	254	<i>299,727</i>
2002	28,827	294	235	<i>77,628</i>
2003	31,771	61	33	<i>57,642</i>
2004	36,163	161	86	<i>111,959</i>
2005	28,416	47	39	<i>31,098</i>
2006	26,097	111	95	
2007	43,266	32	26	

\*Data Italicized Denotes Methodology Currently Under Review and agreed to for forecasting purposes only

**Table A-3-b. Apportionment of the 2010 Hood Canal Natural Coho Forecast**

<b>Area</b>	<b>Escapement Capacity</b>	<b>Escapement BY 2007</b>	<b>Management Unit Type</b>	<b>Proportion of Brood Escapement</b>	<b>December Age-2 Recruits</b>
12 / 12B	28.88%	19,017	Primary	40.60%	18,160
12C / 12D	31.66%	20,949	Primary	44.72%	20,004
Skokomish	29.01%	6,381	Primary	13.62%	6,093
9A	1.25%	256	Secondary	0.55%	244
12A	9.20%	240	Secondary	0.51%	229
<b>Primary Subtotal</b>	89.55%	46,347		98.94%	44,257
<b>Secondary Subtotal</b>	10.45%	496		1.06%	474
<b>Grand Total</b>	100.00%	46,843		100.00%	44,731



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

<b>Year</b>	<b>North (12-12B)</b>	<b>South (12C-12D)</b>	<b>Skokomish</b>	<b>Total</b>
1986	17,865	19,679	3,432	40,976
1987	7,286	8,026	3,510	18,822
1988	4,523	4,983	1,948	11,454
1989	6,488	7,148	934	14,570
1990	2,518	2,774	1,281	6,573
1991	5,118	5,638	1,541	12,297
1992	8,026	8,842	2,179	19,047
1993	9,800	10,795	1,327	21,922
1994	20,847	22,965	12,128	55,940
1995	16,340	18,000	5,560	39,900
1996	18,428	20,300	4,008	42,736
1997	37,016	40,777	17,568	95,361
1998	40,323	44,420	14,957	99,700
1999	6,854	7,550	1,847	16,251
2000	8,724	9,610	8,288	26,622
2001	35,134	38,703	20,601	94,438
2002	26,170	28,829	13,647	68,646
2003	60,546	66,697	44,757	172,000
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
2007	19,017	20,949	6,381	46,347
2008	5,285	5,822	408	11,515

**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	4,363	0.05098	
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	16,075	0.08307	
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	28,359	0.09172	437,306	14,502	0.03316	361,891	<i>25,250</i>	<i>0.06977</i>	179,711	8,165	0.04543	
2004	290,570	<i>20,739</i>	<i>0.07137</i>	540,000	<i>13,871</i>	<i>0.02569</i>	488,080	<i>41,686</i>	<i>0.08541</i>	215,731	2,815	0.01305	
2005	245,608	<i>28,337</i>	<i>0.11537</i>	247,500	<i>5,105</i>	<i>0.02063</i>	273,099	<i>23,679</i>	<i>0.08670</i>	124,813	7,205	0.05773	
2006	294,151			415,000			358,131			193,808			
2007	296,198			247,500			357,967			164,725			
<b>Average (1997-05)</b>			0.08846				0.02040				0.08181	0.04384	
<b>2010 Forecast:</b>		26,203				5,048				29,287	7,221		

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 values agreed to for preseason forecasting only. Values in boldface were excluded from the analysis

### *A-3.2 Hatchery Runs*

For 2010, 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 2010 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 2010 forecast of 67,759 hatchery reared December Age-2 coho recruits (Table A-3-d) was predicted from the brood year 2007 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 2010 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.

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

The 2010 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 1.25732, 2.72237, and 0.31945, for 3, 4, and 5 year-olds respectively (Table A-4-a). However, coupled with a very high return rate of 4 year olds in 2004 and the recent reconciliation of catch data, 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 2008, all rates were adjusted to 50% of the estimated mean. These adjusted rates of return were multiplied with the 2007, 2006, and 2005 brood escapements (78,218, 97,104, and 47,598; respectively) to estimate the total 2010 forecast of 188,951 Hood Canal natural fall chum returning to Puget Sound, before the addition of anticipated returns from in-stream 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)

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 2007 natural escapement by the mean even-year brood R/S value to get a total return of 2007 brood offspring. That number was then multiplied by the mean proportion of the return at age 3 for even-year broods, yielding the 2010 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 2006, there were potential detrimental impacts due to floods in 2006 and 2007, and fall chum survival rates have been relatively low recently. Without some adjustment to the traditional R/S method, the 2010 forecasts would likely be over-estimates. To address this, we (1) applied no R/S rate adjustments for age 5 as 2008 run reconstruction showed the 3-year old return at approximately the long-term average R/S return rate for age 3, (2) applied the average R/S rate for parental escapement >500K (n=6) for age 4 returns, and (3) applied 50% of the long-term R/S average for age 3 to account for the effects of floods in 2007. 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 1,320,359 natural fall chum to Puget Sound (Table A-4-b).

The forecast for Hood Canal is 173,050 natural fall chum salmon (Table A-4-c). 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 (Table A-4-f).

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

For preliminary preseason planning, we agreed to use a forecast of 181,001 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**

Brood Year	Brood Escapement	3's	4's	5's	Total
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	<b>12.57517</b>	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	0.40133	0.01270	0.99746
1996	251,803	0.01977	0.20395	0.00000	0.22372
1997	53,492	0.52960	2.05414	0.40225	2.98599
1998	101,631	1.54720	2.17750	0.01927	3.74398
1999	33,924	2.88881	8.36176	1.46228	12.71284
2000	37,131	2.95919	<b>12.40288</b>	0.25103	15.61310
2001	103,713	1.92253	0.71772	0.08583	2.72608
2002	173,037	0.36398	1.62283	0.09993	2.08674
2003	148,512	0.21273	1.32788	0.21269	1.75329
2004	168,126	0.15014	0.98188		
2005	47,598	1.76695			
2006	97,104				
2007	78,218				
2008	38,425				
<b>Mean: Brood Years 1968-03 (exclusive of outliers, in bold)</b>					
<b>All Odd Years</b>	48,738	1.58383	2.35067	0.36436	5.15930
<b>All Even Years</b>	74,459	0.94799	3.05276	0.27704	4.95661
<b>All Years</b>	61,912	1.25732	2.72237	0.31945	4.40709
		<b>3's</b>	<b>4's</b>	<b>5's</b>	

<b>2010 Tribal Forecast (@0.5)</b>	49,172	132,176	7,603	188,951
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**Table A-4-b. 2010 WDFW Puget Sound Natural Fall Chum Salmon Forecast**

Parent Brood	Age	Parent Escapement	Mean R/S <sup>1</sup>	Adjusted R/S	Estimated R/S (all ages)	Mean Age Composition <sup>1</sup>	Natural Forecast
2005	5	287,596	3.08	3.08	885,867	0.0680000	60,596
2006	4	806,999	2.51	1.58	1,275,059	0.7730000	985,582
2007	3	482,700	3.08	1.54	743,418	0.3690000	274,181
						Total	1,320,359

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

**Table A-4-c. 2010 WDFW Hood Canal Natural Fall Chum Salmon Forecasts**

	Puget Sound Forecast	HC Parent Escapement Proportion	HC Forecast by Age
Age 3 (2007 Brood) Forecast	274,181	0.1620428	44,429
Age 4 (2006 Brood) Forecast	985,582	0.1203269	118,592
Age 5 (2005 Brood) Forecast	60,596	0.1655030	10,029
<b>Total WDFW Forecast</b>	1,320,359		173,050

**Table A-4-d. 2010 Hood Canal Natural Fall Chum Salmon Parent Brood Escapement Distribution**

Area	2005	2006	2007
9A	0.00%	0.00%	0.00%
12	1.88%	2.45%	2.39%
12A	8.59%	3.53%	1.09%
12B	22.75%	37.03%	43.40%
12C	23.70%	30.25%	19.15%
82G	18.40%	12.34%	9.82%
12D	24.68%	14.39%	24.15%

**Table A-4-e. Apportionment of the 2010 Tribal Hood Canal Natural Fall Chum Salmon Forecast**

Area	3's	4's	5's	Total
9A	0	0	0	0
12	924	3,244	182	4,349
12A	4,222	4,665	83	8,970
12B	11,187	48,945	3,299	63,432
12C	11,656	39,982	1,456	53,094
82G	9,050	16,314	747	26,110
12D	12,133	19,027	1,836	32,996
<b>Total</b>	<b>49,172</b>	<b>132,176</b>	<b>7,603</b>	<b>188,951</b>

**Table A-4-f. Apportionment of the 2010 WDFW Hood Canal Natural Fall Chum Salmon Forecast**

Area	3's	4's	5's	Total
9A	0	0	0	0
12	1,062	2,910	188	4,160
12A	483	4,185	861	5,529
12B	19,280	43,915	2,282	65,477
12C	8,510	35,873	2,377	46,760
82G	4,364	14,637	1,846	20,847
12D	10,730	17,071	2,475	30,276
<b>Total</b>	<b>44,429</b>	<b>118,591</b>	<b>10,029</b>	<b>173,049</b>

**Table A-4-g. Apportionment of the 2010 Joint Hood Canal Natural Fall Chum Salmon Forecast**

Area	Tribal Forecast	WDFW Forecast	Joint Forecast
9A	0	0	0
12	4,349	4,160	4,255
12A	8,970	5,529	7,249
12B	63,432	65,477	64,454
12C	53,094	46,760	49,927
82G (Skokomish)	26,110	20,847	23,479
12D	32,996	30,276	31,636



<b>Total</b>	188,951	173,049	181,000
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A-4.2 Hatchery Runs (Tribal)

The 2010 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 2005, 2006, and 2007. In estimating the returns, the following information was used for each facility. The problems with recent years' terminal area run reconstruction, may have introduced significant positive bias to the estimates of Skokomish River hatchery runs, introducing a negative bias to Hoodsport hatchery runs. These problems should be corrected in the near future. Off-station production, resulting from instream augmentation programs was estimated separately and was then added to the forecasted return to natural spawning areas.

The effects of changes to the Hood Canal hatchery chum programs will continue to be seen in 2010, 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 first affected age-5 returns in 2009 and subsequent years.

A-4.2.1 Forecasts of Instream Augmentation (Tribal)

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 2010 is 83 fish. 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. Tribal Hood Canal Fall Chum 2010, Off-Station Lbs. Planted**

Area	BY 2007		BY 2006		BY 2005	
	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	100.0%
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	148	100.0%	10	100.0%	0	0.0%
<b>Total</b>	148	100.0%	10	100.0%	1	100.0%

**Table A-4-i. Apportionment of the 2010 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	71	12	0	83
<b>Total</b>	71	12	0	83

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 2010 is 141,331. 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 2010 is 120,068. 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: Mean return rate of age 3, age 4 and age 5 fish per pound planted at Hoodsport Hatchery (1965-1971 broods) (Table A-4-j). The resulting forecast for 2010 is based on the fingerling releases of 1,018 lbs (BY 2007), 847 lbs (BY 2006), and 809 lbs (BY 2005), which were used to estimate the return of 3, 4, and 5-year olds respectively, for a total return of 3,093 (Table A-4-n).

Enetai Hatchery: Mean return rates of age 3, age 4 and age 5 fish per pound planted (1976-2003 broods). (Table A-4-l). The resulting forecast for 2010 is based on the fingerling releases of 6,469 lbs. (BY 2007), 6,895 (BY 2006), and 6,603 lbs (BY 2005), which were used to estimate the return of 3, 4, and 5-year olds respectively, for a total return of . 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 of 297,066.

A-4.2.3 Hatchery Forecasts (WDFW)

The 2010 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 2007 brood year chum by the long-term, even-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. A summary of the WDFW forecasts by age are shown for Hood Canal hatcheries in Table A-4-m. The WDFW Hood Canal hatchery fall chum forecast is 295,553 on-station and 199 off-station for a total forecast of 295,752.

#### A-4.2.4 Joint 2010 Hood Canal Hatchery Fall Chum Salmon Forecast

For preliminary preseason planning, we agreed to use a forecast of 296,409 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 Hoodspout 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	0.35104	1.66305	0.05572	2.06981
1997	30,276	0.34889	2.52394	0.09089	2.96372
1998	37,534	2.62754	3.21934	0.03818	5.88506
1999	33,196	3.81337	2.85193	0.30443	6.96973
2000	34,067	0.18327	1.12001	0.06995	1.37323
2001	35,033	1.16696	0.88571	0.04609	2.09876
2002	35,574	0.48600	0.98579	0.00808	1.47987
2003	33,231	0.83763	0.63987	0.04794	1.52544
2004	31,410	0.33036	0.56328		
2005	29,031				
2006	29,958				
2007	25,523				
All Odd Years	25,353	1.73801	2.63943	0.16542	4.54287
All Even Years	28,980	1.25373	3.29640	0.11364	4.89391
All Years	27,124	1.49587	2.96792	0.14089	4.71389
All Years 65-71	2,655	0.95938	2.41136	0.09131	3.46205
All Years 72-03	32,245	1.64965	3.16481	0.15209	4.98772
All Years 96-03	33,036	1.22684	1.73620	0.08266	3.04570
<b>2010 Tribal Forecast</b>		42,104	94,811	4,415	141,331

**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	0.27842	0.47256	0.11599	0.86697
1997	27,884	0.06412	5.23332	0.21356	5.51100
1998	33,440	5.59772	3.99864	0.27753	9.87389
1999	27,365	4.78742	<b>22.40721</b>	<b>2.17993</b>	<b>29.37456</b>
2000	8,486	4.76506	<b>15.87349</b>	0.72806	21.36661
2001	31,946	3.95554	2.51829	0.00000	6.47383
2002	30,996	1.44617	4.05078	0.09009	5.58704
2003	32,631	5.01811	6.81432	0.32729	12.15972
2004	23,127	5.35825	3.32306		
2005	22,768				
2006	24,833				
2007	21,035				
<b>Average Return Brood Years (1978-04) excluding outliers in bold.</b>					
Odd Years	27,259	1.99098	3.19681	0.20147	5.15623
Even Years	25,329	1.48196	2.91802	0.19180	4.28145
<b>All Years</b>	26,294	1.86928	3.05184	0.21789	5.38475
<b>2010 Tribal Forecast</b>		39,320	75,786	4,961	120,068

Note: Because of incomplete reconstruction, 2004-2006 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	0.00296	4.41884
1995	3,456	4.32699	0.34679	0.00621	4.67999
1996	2,302	0.41883	0.65893	0.07013	1.14789
1997	4,068	0.20813	1.79254	0.13066	2.13133
1998	3,270	1.82332	3.93045		5.75377
1999	1,542	3.21144		0.36481	3.57625
2000	195		1.77961	1.69690	3.47651
2001	4,326	4.12338	2.11684	0.19163	6.43185
2002	7,081	1.58006	6.80996	0.05611	8.44613
2003	3,264	3.10357	2.25885	1.07494	6.43736
2004	6,613	5.50110	1.07494		
2005	6,603	2.70151			
2006	6,895				
2007	6,469				
<b>Average (Brood Years 1976-07). Outliers (in bold) excluded.</b>					
Odd Years	4,203	2.80542	2.11474	0.19456	5.02176
Even Years	4,612	1.77208	2.64708	0.19272	3.78031
<b>All Years</b>	4,408	2.28875	2.39156	0.19364	4.36836
<b>2010 Tribal Forecast</b>		14,806	16,490	1,279	32,574

Note: Because of incomplete reconstruction, and lack of rack sampling, return rates after 2004 were not available

**Table A-4-m. Summary of 2010 WDFW Hood Canal Hatchery Fall Chum Forecasts**

Facility	Age 3	Age 4	Age 5	Total
Little Boston Hatchery	965	2,595	85	3,645
Hoodsport Hatchery	47,657	100,119	5,239	153,015
G. Adams / McKernan Hatchery	46,930	67,973	4,586	119,489
Enetai Hatchery	0	18,528	876	19,404
12D Streams - Augmentation	192	7	0	199
<b>Total</b>	<b>95,744</b>	<b>189,222</b>	<b>10,786</b>	<b>295,752</b>

**Table A-4-n. Summary of 2010 Tribal Hood Canal Hatchery Fall Chum Forecasts**

Facility	Age 3	Age 4	Age 5	Total
Little Boston Hatchery	977	2,042	74	3,093
Hoodsport Hatchery	42,104	94,811	4,415	141,331
G. Adams / McKernan Hatchery	39,320	75,786	4,961	120,068
Enetai Hatchery	14,806	16,490	1,279	32,574
<b>Total</b>	<b>97,207</b>	<b>189,130</b>	<b>10,729</b>	<b>297,066</b>

**Table A-4-o. Apportionment of the 2010 Joint Hood Canal Hatchery Fall Chum Salmon Forecasts**

Facility	Tribal Forecast	WDFW Forecast	Joint Forecast
Little Boston Hatchery	3,093	3,645	3,369
Hoodsport Hatchery	141,331	153,015	147,173
G. Adams / McKernan Hatchery	120,068	119,489	119,778
Enetai Hatchery	32,574	19,404	25,989
12D Streams - Augmentation		199	
<b>Total</b>	<b>297,066</b>	<b>295,752</b>	<b>296,409</b>