

**2007 MANAGEMENT FRAMEWORK PLAN
AND
SALMON RUNS' STATUS
FOR THE
STRAIT OF JUAN DE FUCA REGION**



August 2007

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Joint Report

Prepared by:

Point No Point Treaty Council
(for the Port Gamble and Jamestown S'Klallam Tribes)
Washington Department of Fish and Wildlife

with assistance from:

Lower Elwha Klallam Tribe; Makah Tribe

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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), was reviewed and agreed to, by the Washington Department of Fish and Wildlife, the Lower Elwha Klallam and the Makah Tribe and is intended to fulfill the parties' reporting requirements under the provisions of Section 5.2 of the Puget Sound Salmon Management Plan. This report is intended to facilitate the management of the 2007 runs of Strait of Juan de Fuca-origin salmon in that region, as well as document the methodologies used. This report covers all species of salmon (except steelhead) for the Strait of Juan de Fuca Tributaries. The regional "Management Framework" (Section 4.0) documents the parties' pre-season management framework (2007-08 State / Tribal Agreed to Fisheries Document, NWIFC, April, 2007) understandings.

This report outlines the forecasted total abundance, by management unit, for each species, except fall chum salmon. For fall chum salmon forecasts include only fish taken in net fisheries and escapement, and exclude non-landed mortalities, troll, recreational, ceremonial and subsistence harvests not taken in net fisheries. 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 and inseason run assessment methods are included. Detailed information concerning the methods used to forecast the abundance of each run are presented in Appendix A. Information concerning methods used to obtain inseason estimates of abundance is presented in Appendix B.

The parties' pre-season management framework outlines the anticipated measures to be taken in Strait of Juan de Fuca near-terminal, terminal, and extreme terminal commercial and recreational fisheries for the harvest and protection of salmon runs returning to this region. The framework also includes contingency measures contemplated by the parties for use inseason, should the need arise.

1.2 Summary of the 2007 Runs and Fisheries

All of the runs returning to the Strait of Juan de Fuca rivers and streams (except for coho salmon in the Elwha River and the Dungeness Bay and River, and chinook salmon returning to the Elwha River) will be managed on the basis of natural production. Of the various runs of salmon, only the coho returning to the Dungeness River and the Elwha River are expected to be of sufficient abundance to support significant directed fisheries in the terminal areas. However, all runs may be harvested incidentally in fisheries for other runs and/or species in preterminal and terminal areas. In 2007, management measures were taken in fisheries to reduce impacts to Puget Sound chinook salmon and Hood Canal - Strait of Juan de Fuca summer chum salmon, currently listed as threatened, under provisions of the Endangered Species Act.

Pre-season forecasts of abundance are provided as a guide for fisheries and conservation planning (Tables 3.1 - 3.5). The actual run sizes entering Puget Sound 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 2007 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 target is that which would result from the rate of escapement allowance established for the 2007 recruits. The escapement rate was established at a level equal to, or higher than, the minimum escapement rate (60%) allowable for the 2007 forecasted recruitment, under the stepped exploitation rate management approach, which has been implemented for Strait of Juan de Fuca 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.

With the exception of Dungeness River and the Elwha River - origin coho, no runs returning to the Strait of Juan de Fuca tributaries in 2007 are expected to have a significant harvestable surplus available for harvest in directed fisheries. Therefore, the parties' management framework has focused on the need to provide opportunity to limited fisheries while striving to maintain protective and rehabilitative measures for Strait of Juan de Fuca salmon returning to natural spawning areas (See Section 4.0 of this report).

2. 2007 Fishery Management Periods

Area	Chinook	Pink	Summer Chum	Coho	E. Fall Chum	L. Fall Chum	Winter Steelhead
6D & Dungen. I	07/22-09/15	08/5-09/22	---	09/16-10/27	10/28-12/1	---	12/2-3/31
Dungeness II	08/05-09/22	08/5-10/6	---	09/23-10/27	10/28-12/8	---	12/9-04/15
Elwha	07/22-09/15	---	---	09/16-11/3	11/4-12/8	---	12/9-04/15
Discovery-Sequim Tributaries	---	---	09/16-10/20	10/21-12/29	---	---	12/2-04/30
Hoko-Sekiu	09/9-11/10	---	---	09/30-11/10	11/11-12/8	---	12/9-03/31
Misc. SJF Tributaries	09/9-11/10	---	---	09/30-11/10	11/11-12/15	12/2-12/31	12/2-04/15

Notes: Region I of the Dungeness River (Dung. I), extends from the Schoolhouse Bridge, downstream to the river mouth. It is located in the area of tidal influence, and therefore it is managed concurrent with the rest of Dungeness Bay (Area 6D). Shaded portions in the above table indicate no adjustment to eliminate overlaps/gaps was applied.

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 (actual and/or expected) of that species, 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 stocks throughout their entire entry while continuing to simultaneously manage fisheries on other species and stocks. 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.

For 2007, the above management periods have been derived by the following steps: first the central 80% of the average 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 the affected parties. Next, "overlaps" and "gaps" between the periods were eliminated, generally by halving. The resulting "start" and "end" dates for each period were often adjusted to begin on the nearest Sunday and end on Saturday, in order to facilitate weekly fisheries management actions.

Finally, 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 stock.

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

3.1 Summer/Fall Chinook Salmon

Strait of Juan de Fuca Chinook Salmon Management / Production Units

Fishery	Elwha R.	Dungeness R.	Hoko R.	Total
	Aggregate	Supplemented	Supplemented	
Recruits	3,371	1,518	1,173	6,062
Canada	707	318	245	1,270
Alaska	150	67	52	269
S.Falcon Tr/Rec	0	0	0	0
N.Falcon Tr/Rec	10	4	3	17
P.S. Troll	6	2	2	10
No. Snd + Strait Recreational	17	9	12	38
Cntl. + So. Sound Recreational	11	5	5	21
Puget Sound Net	20	9	7	35
6D Net	0	0	0	0
FW Recreational	0	2	0	2
FW Net	8	0	0	8
Mgmt Unit Harvest	928	417	325	1,670
Extreme Terminal Natural Mortality	34	0	0	34
Mgmt Unit Escap.	2,409	1,101	848	4,358
Min. Escap. Goal	2,147	981	759	3,886

The abundance of any runs returning to rivers other than the Dungeness, Elwha, and Hoko, is quite uncertain. Estimates of pre-terminal harvests and terminal run size are based on FRAM run #3907. The initial Dungeness River forecast was for chinook salmon expected to return to the terminal area. The Elwha run was been forecast as a single unit because a portion of the progeny of natural spawners is taken for hatchery brood stock, and conversely, a portion of the hatchery return spawns in the river. Methods used to forecast the Dungeness, Elwha and Hoko River runs are further detailed in Appendix A-1 of this report.

In 1999, Puget Sound chinook salmon were listed as threatened as defined by NMFS (50 CFR part 424) and ESA Section 4(d). The Dungeness and Elwha Rivers are included in this ESU and are essential to recovery. Protective measures include no terminal area fisheries directed at chinook salmon in these systems.

Escapement goals are those outlined in the Puget Sound Comprehensive Chinook Management Plan-Harvest Management Component and given the forecasted 2007 abundance, require that the total

southern U.S. exploitation rate be limited to less than 10%. Methods used to estimate the expected escapement, and the escapement distribution, after anticipated pre-spawning mortalities and broodstock removals in the Elwha River, are detailed in Appendix A-1. The expected escapement in the Hoko River includes any brood take by the Makah Tribe for in-river run augmentation. In all cases, no harvestable surplus is indicated under the current exploitation rate based management approach, therefore no commercial or recreational fisheries directed at chinook salmon are anticipated in the extreme terminal areas.

3.2 Pink Salmon

The pink salmon runs to the tributaries of the Strait of Juan De Fuca consist primarily of a natural run to the Dungeness River. The optimum level of escapement, for these primary management units of pink salmon, is currently unresolved. The parties agree that these units are forecast to return at levels well below their escapement needs and no harvestable surplus has been forecast for 2007. Details of the 2007 forecasting methods can be found in Appendix A-2 of this report. The estimated pre-terminal harvest rate has been forecast using the 1997 to 2005 average proportion of these runs intercepted in Canadian and Washington net fisheries directed at Fraser River runs (odd years).

Production Unit	Total Recruits	CDN Harvest	WA PreTerminal Harvest	Expected Escapement	Escapement Goal
Dungeness R.	41,032	657	533	39,842	N/A

3.2 Summer Chum Salmon

Production Unit	Total Recruits	CDN Harvest	WA Preterminal Harvest	Expected Escapement	Escapement Target
Chimacum Creek	1,286	81	32	1,173	91.2 % of recruits
Discovery Bay	6,240	393	156	5,691	91.2 % of recruits
Sequim Bay	1,040	66	26	949	91.2 % of recruits
Totals	8,566	540	214	7,812	

The methods used to develop the 2007 forecasts of summer chum salmon returning to the streams of Discovery Bay and Sequim Bay are detailed in Appendix A-3 of this report. The escapement rate targets of the Base Conservation Regime (BCR), of the Summer Chum Salmon Conservation Initiative, are those which would result on the average given application of the exploitation rate based regime. The 2007 summer chum run was forecast as total recruits to all fisheries and escapement. In addition to the Discovery Bay and Sequim Bay production units, Chimacum Creek is also expected to receive returns from a reintroduction program. The 2007 forecast of these returns is based on only a few years' data, therefore it should be considered conservatively.

In 1999, the Hood Canal-Strait of Juan de Fuca ESU summer-run chum salmon was listed as threatened by NMFS (50 CFR part 223) and the ESA Section 4(d). The Hood Canal-Strait of Juan De Fuca ESU includes tributaries of Sequim Bay, Discovery Bay, and the Dungeness River. While the volume of anticipated recruits exceeds the currently established recovery thresholds for these populations, in accordance with the co-managers' recovery plan, no additional harvest will be planned or anticipated.

3.3 Coho Salmon

The coho salmon runs returning to the Strait of Juan de Fuca tributaries consist of several small component natural runs in all river systems, as well as hatchery-supported returns to the Elwha and Dungeness Rivers. The Dungeness and Elwha River origin runs are the only ones which were predicted to have significant harvestable numbers of coho salmon, sufficient to support directed fisheries in the terminal and extreme terminal areas in 2007. Other runs, while indicating a harvestable surplus in the aggregate, are composed of numerous small components.

Strait of Juan de Fuca Coho Salmon Management / Production Units							
Fishery	Miscellaneous Natural		Elwha R.	Dungeness R.	Subtotals		Total
	Eastern Natural	Western Natural	Aggregate ⁽¹⁾	Aggregate ⁽¹⁾	Natural	Hatchery & Secondary Natural	
Recruits	3,367	26,480	5,135	13,252	29,847	18,387	48,234
Canada	36	296	45	180	332	225	557
Alaska	1	5	1	3	6	4	10
S.Falcon Tr/Rec	15	122	29	100	137	129	266
N.Falcon Tr/Rec	106	850	198	670	956	868	1,824
P.S. Troll	1	10	0	5	11	5	16
Strait Rec.	176	1,378	285	1,139	1,554	1,424	2,978
SJI Rec.	0	0	0	0	0	0	0
Admiralty Rec.	5	42	10	24	47	34	81
N. Sound Rec.	0	0	0	0	0	0	0
S. Sound Rec.	5	36	7	18	41	25	66
Hood Canal Rec.	0	0	0	0	0	0	0
Strait Net	32	253	41	121	285	162	447
San Juans Net	4	27	3	23	31	26	57
Admiralty Net	0	0	0	0	0	0	0
No. Sound Net	1	7	1	3	8	4	12
So. Sound Net	4	36	5	23	40	28	68
Hood Canal Net	5	41	8	29	46	37	83
SJF Rivers Rec.	0	0	656	2,007	0	2,663	2,663
6D Net	0	0	0	4,249	0	4,249	4,249
Elwha/Dungen. Net	0	0	1,322	0	0	1,322	1,322
Miscell. Net	0	12	0	0	12	0	12
Mgmt Unit Harvest	391	3,115	2,611	8,594	3,506	11,205	14,711
Mgmt Unit Exp. Escapement	2,976	23,365	2,524	4,658	26,341	7,182	33,523
Min. Escap. Goal	2,020	15,888	1,309	883	17,908	2,192	20,100

Notes: (1) The Elwha R. "Aggregate" is composed of 21.3% secondary wild, and 78.7% hatchery coho salmon. The Dungeness R. "Aggregate" is composed of 30.7% secondary wild and 69.3% hatchery coho salmon.

Methods used to develop the forecasts for the 2007 season are summarized in Appendix A-4 of this report. Expected harvest numbers refer to the total anticipated harvests from both incidental and targeted fisheries which were modeled pre-season in FRAM run #0714. In 2007, given the expected returns of coho to the Strait primary units, the tribal and state co-managers considered the significantly lower expected interceptions in Canadian fisheries and structured the pre-season management framework to achieve a total exploitation rate of less than 40% for Strait of Juan de Fuca “primary” production units, which are managed for wild coho salmon. The escapement goals for aggregated management units are those necessary to meet the parties' agreed-upon enhanced production.

3.4 Fall Chum Salmon

Production Unit	"4B" Run	Pre-Terminal Harvest	Terminal Run	Extr. Terminal Harvest	Expected Escapement	Escapement Goal
Dungeness R.	295	39	256	0	256	500
Deep Crk.	295	39	256	0	256	500
Pysht R.	973	127	845	7	839	1,650
Miscellaneous	560	29	531	12	519	900
Totals	2,122	233	1,889	19	1,870	3,550

Methods used to develop the forecasts of fall-timed chum salmon returning to the Strait of Juan de Fuca streams in 2007 are detailed in Appendix A-5 of this report. The final forecast for 2007 is the average of the forecast results, for each individual unit, obtained by PNPTC and WDFW, using different forecasting methods, shown in Appendix A-5 of this report. The expected harvests refer to the total incidental catch from these runs during preterminal and terminal area fisheries directed at other species and stocks. For 2006, no directed fishery is anticipated in the terminal or extreme terminal areas. The escapement goals are based on the overall escapement goal of 3,550 fall chum salmon for the region, as re-apportioned in 1987 on the basis of relative stock strength. These escapement goals are treated as interim, pending the development of more accurate escapement targets.

4. Pre-Season Management Framework

4.1 2007 Harvest Management Measures and Expected Fisheries

In 2007, the condition of the salmon runs returning to the Strait of Juan de Fuca terminal areas requires that harvest management plans be conservative in all respects. The expected return of most runs in 2007 is very low and only coho salmon returning to the Dungeness area will be sufficiently abundant to warrant directed fisheries, within the constraints of low status exploitation rate limits. In particular, the planned restrictions on Canadian fisheries (designed to protect British Columbia coho salmon) combined with improved escapements of wild coho to Strait streams, have afforded us the opportunity to implement exploitation rate based management for wild coho, by adopting conservative management practices.

The following section provides a summary of the co-managers' preseason understandings, regarding the fishery regimes to be used in 2007. These 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, it will be used as a management guidance and may be adjusted in response to information that modifies one or more of the preseason assumptions.

4.1.1 Preseason Framework for Commercial Fisheries

Areas 5, 6, 6C Treaty Troll (Ntrty net closed)

NOTE: For Area 4B: 5/1-10/31 see Ocean Troll. For 11/1-12/31 and 1/1-4/15 see below

- 5/1-6/17 Closed
- 6/18-9/30 Open for salmon, chum release; Freshwater Bay, south of Angeles Pt./ Observatory Pt. line closed; Pt. Angeles Hbr. W. of line from tip of Ediz Hook to ITT Rayonier Dock closed; Hoko Bay closed, inside the area bounded by a line from Kydaka Point to Shipwreck Point; 1,000 foot closure around stream mouths; Area 6 closed east of line true north from Green Point.
- 10/1-10/31 Closed
- 11/1-4/15 Areas 4B, 5, 6, 6C: Open through April 15, 2008, or when chinook catch reaches the harvest guideline of 8,500 chinook, whichever comes first. 1,000-foot closures around stream mouths.
- 4/16-4/30 Closed

Areas 4B, 5, & 6C Treaty Net (Ntrty net closed)

- Chinook Open for setnet gear only, 6/18 through 8/11 in Areas 4B and 5 and through 8/18 in Area 6C; 7 days a week; Hoko Bay closed, inside the area bounded by a line from Kydaka Point to Shipwreck Point, and Freshwater Bay, south of Angeles Pt. / Observatory Pt. line closed. 1,000-ft. closure around stream mouths
- Sockeye/Pink Start to be determined (7/22 est.). End no later than 9/8.
- Coho Open for gillnets starting at 5 days per week (in-season adjustments based on cumulative catch) from the end of Fraser Panel control, through wb 9/30; 1,000 ft. closure around stream mouths. The gillnet catch number listed in FRAM #0714 will be used as management target and will not be greatly exceeded.
- Chum Open for gillnets, starting at 5 days per week (days may be added if effort is low), wb 10/07 through wb 11/04; 1,000-foot closure around stream mouths.

Area 6D (Dungeness Bay) Net

Chinook	All	Closed
Pink	All	Closed
Coho	Treaty	Open 9/23 through wb 10/28; additional openings possible based on in-season information; chinook and chum release and gillnets may fish daytime only, through 10/10; 1,500 ft closure around each river mouth.
	Nontreaty	Open Wk 39 (wb 9/23) through Wk 43 (wb 10/21) for skiff gillnet gear; 7AM – 7PM, 5 days each week (M-F); Chinook and chum release by cutting ensnaring meshes; 1,500 ft. (1/4 nautical mile) closure around each river mouth. Additional openings possible, beginning in wb 10/28, based on inseason information.
Chum	All	Closed

Dungeness River Treaty (Ntrty net closed)

Chinook	Treaty	Closed
Pink	Treaty	Closed
Coho	Treaty	Fishing up to 3 days/wk, to be determined in-season, for coho only, may occur no earlier than 10/16 and will be restricted to areas below the Dungeness hatchery intake using species selective (non-gillnet) gear.
Chum	Treaty	Closed
Steelhead	Treaty	Open starting wb 12/9, through wb 2/24.

Elwha River Treaty (Ntrty net closed)

Chinook	Treaty	Closed except Ceremonial Harvest of 5 fish in July.
Coho	Treaty	Open wb 9/16 through wb 10/28; days per week to be determined in-season.
Chum	Treaty	Closed
Steelhead	Treaty	Open starting wb 12/09, through wb 2/24.

Eastern SJF Misc. Treaty (Ntrty net closed)

Steelhead	Treaty	Open starting wb 12/9, schedule TBD.
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Western SJF Misc. Treaty (Ntrty net closed)

Steelhead	Treaty	Open starting wb 12/2, through wb 2/24; Lyre R. closed below Susie Creek through 12/31.
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4.1.2 Preseason Framework for Recreational Fisheries

Area 5 Recreational

5/1-6/30	Closed
7/1-8/31	2 fish limit plus 2 additional pink salmon, (Chinook 22" min size); unmarked chinook, unmarked coho, and chum release; Areas 5 & 6 season quota of 4,000

- landed chinook, afterwards, release all chinook. South of the Kydaka Pt. / Shipwreck Pt. line – closed to salmon angling. Single point barbless hooks only.
- 9/1-9/15 2 fish limit, plus 2 additional pink salmon; chinook, unmarked coho, and chum release. South of the Kydaka Pt. / Shipwreck Pt. line – closed to salmon angling. Single point barbless hooks only.
- 9/16-9/30 2 fish limit, plus 2 additional pink salmon; chinook and chum release. South of the Kydaka Pt. / Shipwreck Pt. line – closed to salmon angling. Single point barbless hooks only.
- 10/1-10/31 Closed
- 11/1-11/30 2 fish limit, 1 Chinook (Chinook 22" min size).
- 12/1-2/15 Closed
- 2/16-4/10 1 fish limit (Chinook 22" min size).
- 4/11-4/30 Closed

Area 6 Recreational

- 5/1-6/30 Closed
- 7/1-8/31 2 fish limit, plus 2 additional pink salmon, (chinook 22" min size); unmarked coho, chum, and chinook release, except W. of true N/S line through "2" buoy near tip of Ediz Hook retention of marked chinook allowed; Areas 5 & 6 season quota of 4,000 landed Chinook, afterwards, release all chinook. South of Angeles Pt. / Observatory Pt. line – closed to angling. Pt. Angeles Hbr. W. of line from tip of Ediz Hook to ITT Rayonier Dock – closed to salmon angling. Dungeness Bay closed to salmon angling. Single point barbless hooks only.
- 9/1-9/30 2 fish limit, plus 2 additional pink (Chinook 22" min size); Chinook, unmarked coho, and chum release. South of Angeles Pt./Observatory Point line - closed to angling through 8/31. Pt. Angeles Hbr. W. of a line from the tip of Ediz Hook to ITT Rayonier Dock – closed to salmon angling through 8/31. Dungeness Bay closed to salmon angling.
- 10/1-10/31 2 fish limit, 1 chinook (chinook 22" min size). South of Angeles Pt. / Observatory Point line – closed to angling. Pt. Angeles Hbr. W. of a line from the tip of Ediz Hook to ITT Rayonier Dock – closed to salmon angling. Sequim Bay south of a line from the south end of Gibson Spit to the west end of Travis Spit - closed to salmon angling. Discovery Bay south of a line from the Gardiner Boat Ramp to Beckett Point - closed to salmon angling. (see: Dungeness Bay Recreational below.) Single-point barbless hooks only.
- 11/1-2/15 Closed.
- 2/16- 4/10 1 fish limit (chinook 22" min size). Dungeness Bay closed to salmon angling.
- 4/11-4/30 Closed

Dungeness Bay Recreational

- 5/1-9/30 Closed to salmon angling.
- 10/1-10/31 2 fish limit, coho only.
- 11/1-4/30 Closed to salmon angling.

Dungeness River Recreational (mouth to hatchery intake pipe at RM 11.3)

- 10/16 – 12/31 4 fish limit, coho only; 12" min size.

Elwha River Recreational (mouth to Aldwell Lake Dam)

3/1 – 9/30 Closed to all fishing
10/1-11/15 6 fish limit, coho only; no more than 4 adults; 12 inch min. size.
10/1 – 2/29 Trout and other game fish open.

Hoko River Recreational (mouth to cement bridge (mile 7.0) on Hoko/Ozette Hwy)

All year Closed to angling for salmon
6/1 – 3/15 Open for trout and other game fish
9/1 - 10/31 Fly fishing gear only.

All other STRAIT OF JUAN DE FUCA REGION freshwater recreational closed to salmon angling.

4.1.3 Test Fisheries

No test fisheries, directed at salmon, are anticipated in any Strait of Juan de Fuca terminal areas, during the 2007 season.

4.2 Other Recommended Measures

In addition to routine fishery planning, monitoring, stock and harvest assessment and fishery regulation, the parties recommend that additional tasks should be undertaken in order to ensure the health of the resource, facilitate future resource management decisions and action, as well as attempt to address a number of serious resource-related problems in this region. Therefore, the following are recommended:

Intensive spawner surveys in summer chum drainages (Discovery Bay, Sequim Bay, Chimacum Creek, Dungeness River) should be continued in 2007 to determine the number, age, sex ratio, and distribution of spawners. In the Dungeness system, sufficient information concerning summer chum salmon is lacking. Therefore surveys of similar intensity and scope should be conducted. Mixed stock fisheries directed at other species should also be monitored and sampled for otolith marked chum salmon, from the various supplementation programs, to gain information on the incidence and origin of summer chum interceptions. The in-stream supplementation program, utilizing native spawners, in JimmyComeLately Creek, should be continued.

Federal, State, and Tribal fisheries agencies, and private organizations developed and implemented a captive brood stock program designed to rehabilitate chinook salmon runs to the Dungeness River. The primary goal of this recovery program has been to increase the number of fish spawning naturally in the river while maintaining the genetic characteristics of the existing Dungeness stock. The long term success of this program will depend on the continuing efforts to monitor and assess stock status, determining and correcting the factors that currently limit production (including habitat degradation), and designing and implementing long term monitoring and evaluation plans designed to determine the effectiveness of the recovery effort, as well as assist in improving management of the resource. The 2007 run will be the sixth return of 5 year olds returning from the broodstock program. There is a need to measure these returns as accurately as possible to evaluate initial success of the program. These efforts should be continued in accordance with the Dungeness River Chinook Rebuilding Plan. Specifically, in 2007, releases of smolts should be tagged, using CWT's. Consideration should be given to removing the adipose fin from a portion of the release, in order to ensure that these fish are sampled, if taken in Alaska and / or British Columbia fisheries. Their downstream emigration should be monitored using smolt traps. Finally, studies

to determine critical freshwater habitat for this species should be implemented.

In the Dungeness River, stream surveys should be used to verify clearance of chinook salmon from any anticipated fishing areas.

In the Elwha River, a tribal project designed cooperatively with the USNPS, the USFWS, and the WDFW, is aimed at the restoration of native fall chum salmon and will collect up to 75,000 fall chum salmon eggs (depending on availability). Eyed eggs from the captured brood will be distributed to instream incubators, in Bosco Slough and Boston Charlie creeks.

Although none have been proposed for 2007, limited test or evaluation fisheries, or instream surveys, are recommended to assess the Pysht and Lyre rivers' fall chum runs, to document run timing and age composition, and to evaluate assumptions concerning the relation of the Pysht River as an escapement index area to other tributaries in the Strait of Juan de Fuca region.

4.3 Inseason Run Size Updates

During the 2007 season, no inseason updates of run abundance will be provided for chinook, summer chum, and fall chum salmon returning to the miscellaneous Strait of Juan de Fuca streams. Since no directed fisheries are planned or anticipated for any of these runs, and no inseason management action is contemplated, the pre-season forecasted returns to the terminal areas will be sufficient.

For coho salmon returning to the Elwha River, no method has been found to provide inseason updates of the estimate of abundance with sufficient accuracy. Therefore, inseason harvest management actions will be controlled by time and area closures designed to provide closed periods in the area between the Elwha Hatchery and the river mouth when the major escapement influx is most likely to occur, based on historical information.

For coho salmon returning to the Dungeness River system, an inseason update of terminal run abundance will be performed if satisfactory cumulative catch per cumulative landing information from the gillnet fishery in area 6D is available. Methods that will be used to derive the inseason estimate, for 2007, are detailed in Appendix B. If sufficient fishing effort data are not available, the fishery will be managed in-season on the basis of subjective estimates of abundance, escapement progress, and fishing effort.

APPENDIX

- A. Pre-season Forecasting Methods**
- B. Inseason Run Assessment Methods**

A. Pre-Season Forecasting Methods

A-1. Chinook Salmon

Given the fact that the forecasted returns of the Strait of Juan de Fuca chinook salmon are being entered into the FRAM simulation model as a single population, the 2007 forecasted return to the terminal areas was forecasted as a single quantity, which was then apportioned to individual populations, given their recent years' performance. This approach is believed to lessen the errors caused by summing individual stock forecasts. The forecast was made using the mean terminal area return in the last four years (2003 - 2006) and was also apportioned using the relative distribution in the same period, which may better reflect recent survival rates and the increasing proportional contribution from the Dungeness stock. The resulting TRS forecast for 2007, is 4,357 for the region (Table A-1-a), apportioned to Hoko (819), Elwha (2,444), and Dungeness (1,095) (Table A-1-b).

Table A-1-a. Strait of Juan de Fuca Chinook Salmon TRS

Year	Hoko	Elwha	Dungeness	Strait ETRS
1986	839	3,159	254	4,252
1987	606	6,220	133	6,959
1988	820	8,667	372	9,859
1989	862	5,704	95	6,661
1990	498	3,606	361	4,465
1991	1,032	3,761	199	4,992
1992	755	4,002	154	4,911
1993	908	1,669	54	2,631
1994	447	1,580	65	2,092
1995	925	1,814	163	2,902
1996	1,274	1,877	183	3,334
1997	919	2,534	52	3,505
1998	1,722	2,411	110	4,243
1999	1,688	1,642	75	3,405
2000	731	1,913	218	2,862
2001	946	2,246	453	3,645
2002	686	2,416	633	3,735
2003	1,100	2,305	640	4,045
2004	1,088	3,443	1,014	5,545
2005	283	2,130	1,079	3,492
2006	880	1,924	1,543	4,347
2007 Forecast (2003-06 Avg.)				4,357

Table A-1-b. Proportional Distribution of Strait of Juan de Fuca Chinook TRS

Year	Hoko	Elwha	Dungeness
1986	0.197	0.743	0.060
1987	0.087	0.894	0.019
1988	0.083	0.879	0.038
1989	0.129	0.856	0.014
1990	0.112	0.808	0.081
1991	0.207	0.753	0.040
1992	0.154	0.815	0.031
1993	0.345	0.634	0.021
1994	0.214	0.755	0.031
1995	0.319	0.625	0.056
1996	0.382	0.563	0.055
1997	0.262	0.723	0.015
1998	0.406	0.568	0.026
1999	0.496	0.482	0.022
2000	0.255	0.668	0.076
2001	0.260	0.616	0.124
2002	0.184	0.647	0.169
2003	0.272	0.570	0.158
2004	0.196	0.621	0.183
2005	0.081	0.610	0.309
2006	0.202	0.443	0.355
2003 - 06 Avg.	0.188	0.561	0.251
2007 Forecast Distribution	819	2,444	1,095

Table A-1-c. Dungeness River Chinook Salmon Forecast Data

Return Year	Escapement	Area 6D Harvest	Recreational Catch	Terminal Run
1986	238	9	7	254
1987	100	4	29	133
1988	335	5	32	372
1989	88	1	6	95
1990	310	0	51	361
1991	163	19	17	199
1992	153	1	0	154
1993	43	1	10	54
1994	65	0	0	65
1995	163	0	0	163
1996	183	0	0	183
1997	50	0	2	52
1998	110	0	0	110
1999	75	0	0	75
2000	218	0	0	218
2001	453	0	0	453
2002	633	0	0	633
2003	640	0	0	640
2004	1,014	0	0	1,014
2005	1,077	2	0	1,079
2006	1,543	0	0	1,543

Table A-1-d. Elwha River Chinook Salmon Forecast Data.

Return Year	Extreme Terminal Run	Natural Spawning Escapement	Hatchery Broodstock	Prespawning Mortality	Terminal Harvest
1986	3,159	855	1,414	858	32
1987	6,220	1,642	1,989	2,262	327
1988	8,667	5,228	2,167	478	794
1989	5,704	3,035	1,892	560	217
1990	3,606	1,644	1,312	224	426
1991	3,761	1,642	1,719	108	292
1992	4,002	479	743	2,637	143
1993	1,669	633	929	7	100
1994	1,580	163	1,053	330	34
1995	1,814	524	626	662	2
1996	1,877	364	1,244	267	2
1997	2,534	1,578	939	10	7
1998	2,411	720	1,638	51	2
1999	1,642	903	699	23	17
2000	1,913	715	1,136	62	0
2001	2,246	655	1,553	38	0
2002	2,416	863	1,513	40	0
2003	2,305	1,045	1,182	78	0
2004	3,443	2,075	1,329	39	0
2005	2,130	723	1,396	7	4
2006*	1,924	693	1,220	7	4

Harvest does not include Recreational Catch

(*) The 2006 estimates are preliminary and subject to revision

Table A-1-e. Elwha River Chinook Natural and WDFW Rearing Channel Prespawning Mortalities

Return Year	Hatchery Voluntary Escapement	Natural Spawners	In-River Gross Escapement	Gaff-Seine Removals	In-Hatchery Prespawning Mortality	In-River Prespawning Mortality
1986	1,285	855	1,842	505	376	482
1987	1,283	1,642	4,610	1,138	432	1,830
1988	2,089	5,228	5,784	506	428	50
1989	1,135	3,035	4,352	905	148	412
1990	586	1,644	2,594	886	160	64
1991	970	1,642	2,499	857	108	n/a
1992	97	479	3,762	672	26	2,611
1993	165	633	1,404	771	7	0
1994	365	163	1,181	749	61	269
1995	145	524	1,667	518	37	625
1996	214	364	1,661	1,177	147	120
1997	318	1,578	2,209	624	3	7
1998	138	720	2,271	1,551	51	0
1999	113	903	1,512	609	23	0
2000	177	715	1,736	1,021	62	0
2001	195	655	2,051	1,396	38	0
2002	473	863	1,943	1,080	40	0
2003	314	1,045	1,991	946	78	n/a
2004	515	2,075	2,928	853	39	0
2005	211	723	1,915	1,192	7	0
2006	366	693	1,554	861	7	0

In order to estimate the potential escapements in 2007, the forecasted return to the Elwha River was further apportioned, using the 2003-2006 mean proportions (Table A-1-e), as follows: Of the forecasted 2,444, **0.2%** (4) are expected to be harvested; **14.40%** (352) are expected to voluntarily return to the Elwha Rearing Channel, and **85.58%** (2,088) to the river. The voluntary hatchery return is expected to be reduced by **9.66%** (34), to account for average on-station pre-spawning mortality, leaving 318 hatchery spawners. The in-river escapement was not reduced for in-river pre-spawning mortality, based on recent years' survival. However, the 2,088 in-river escapement was reduced by **46.12%** (963) to account for broodstock removals (gaff & seine), leaving an anticipated in-river spawning escapement of 1,125 chinook salmon and an anticipated effective hatchery broodstock total of 1,281.

A-1.3 Hoko River

Table A-1-f. Hoko River Chinook Salmon Forecast Data.

Return Year	Hoko River Escapement	Commercial Catch	Recreational Catch
1986	801	38	0
1987	581	25	0
1988	776	37	7
1989	842	17	3
1990	493	5	0
1991	1,006	16	10
1992	740	9	6
1993	894	14	0
1994	428	11	8
1995	905	20	0
1996	1,265	5	4
1997	891	20	8
1998	1,722		0
1999	1,688		0
2000	731		0
2001	946		0
2002	686		0
2003	1,100		0
2004	1,088		
2005	283		
2006	880		

A-2. Pink Salmon

Naturally produced Puget Sound pink salmon were forecast for 2007 using cycle year return per spawner rates. The biennial nature of pink salmon returns result in three distinct groupings of brood year returns (Table A-2-a). The 2007 return of pink salmon to the Dungeness River was forecast by applying the mean Cycle 3 return rate (4.89) to the 2005 parent brood escapement (8,714). This resulted in an estimated return of 42,622 natural Dungeness pink salmon. The return-per-spawner rate from the 1961 (Cycle 2) and the 1963 and 1999 broods (Cycle 3) were excluded from the calculation of mean return rates, as outliers (Table A-2-b).

Table A-2-a. Corrected Pink Salmon Run Reconstruction for the Dungeness River

Run Year	Escapement	Terminal Run	Total Recruits
1959	40,000	40,000	64,603
1961	70,000	70,000	90,964
1963	400,000	400,000	954,051
1965	70,000	75,000	105,640
1967	95,000	117,400	213,494
1969	14,400	14,400	20,425
1971	46,000	46,000	63,576
1973	47,000	47,000	76,423
1975	24,500	24,900	39,618
1977	35,500	35,600	61,687
1979	50,000	57,800	130,182
1981	2,900	2,900	5,532
1983	4,900	4,900	5,642
1985	4,700	4,700	6,447
1987	1,900	1,900	2,298
1989	10,900	10,900	17,778
1991	9,900	9,900	15,021
1993	1,695	1,695	1,903
1995	8,352	8,352	10,546
1997	4,953	4,953	8,697
1999	7,306	7,306	7,393
2001	80,344	80,344	83,832
2003	15,148	15,277	15,893
2005	8,714	8,714	8,946

Table A-2-b. Dungeness River Pink Salmon Returns per Spawner

Cycle 1 BY	Cycle 1 R/S	Cycle 2 BY	Cycle 2 R/S	Cycle 3 BY	Cycle 3 R/S
1959	2.27	1961	13.63	1963	0.26
1965	3.05	1967	0.22	1969	4.42
1971	1.66	1973	0.84	1975	2.52
1977	3.67	1979	0.11	1981	1.95
1983	1.32	1985	0.49	1987	9.36
1989	1.38	1991	0.19	1993	6.22
1995	1.04	1997	1.49	1999	11.47
2001	0.20	2003	0.59	2005	
Average:	1.82		0.56		4.89
Std.Dev.	1.12		0.49		3.01
2007 PNPTC Forecast (CY 3) Recruits					42,624
2007 WDFW Forecast					39,441

Note: The WDFW used the same forecasting method. Therefore differences in results are likely due to differences in source reconstruction results.

A-3. Summer Chum Salmon

Table A-3-a. Summer Chum Salmon Recruits to Fisheries and Escapement

Year	Discovery	Sequim	Chimacum	Eastern Strait Total
1974	1,494	492		1,986
1975	1,374	373		1,747
1976	1,264	409		1,673
1977	1,364	446		1,810
1978	2,413	828		3,241
1979	699	201		900
1980	4,127	1,447		5,574
1981	879	261		1,140
1982	2,771	771		3,542
1983	946	272		1,218
1984	1,311	397		1,708
1985	304	108		412
1986	890	327		1,217
1987	1,673	508		2,181
1988	2,952	1,177		4,129
1989	441	355		796
1990	432	98		530
1991	253	172		425
1992	592	802		1,394
1993	520	124		644
1994	196	18		214
1995	647	234		881
1996	1,075	31		1,106
1997	923	62		985
1998	1,206	101		1,307
1999	532	7	38	577
2000	879	55	52	986
2001	2,811	262	909	3,982
2002	6,072	42	867	6,981
2003	6,003	450	563	7,016
2004	6,431	1,666	1,142	9,239
2005	7,010	1,317	1,403	9,730
2006*	5,517	728	2,035	8,280
2007 Forecast:	6,240	1,040	1,286	8,566

*The 2006 estimate is preliminary and subject to revision

The 2007 return of summer-timed chum to the Discovery, Chimacum and Sequim Management Units was forecasted as a 4 year mean (2003-2006) of the total recruitment, of each unit, to all fisheries and escapement (Table A-3-a). The forecasts are 6,240 fish to the Discovery MU, 1,040 fish to Sequim MU and 1,286 to the Chimacum MU. Recruits to the Dungeness / Graywolf system are few and unquantifiable at this time.

A-4. Coho Salmon

A-3.1 Natural Runs

The method used to develop the 2007 forecasted return of naturally reared coho salmon, for primary units, relied on an estimate of emigrating smolts (2006 emigration), multiplied by an estimate of marine survival.

A-4.1.1 Naturally reared smolts

For primary units in the western Strait of Juan de Fuca, 67,879 smolts, representing production from five streams, that comprise 19.03% of the subregion, were expanded to 356,620 to represent the entire subregion (Table A-4-a). For primary units in the Eastern SJF the number of smolts from three production units, comprising 25.83% of the total, excluding Snow Creek, was measured and expanded to 26,462 wild smolts for the sub-region (Table A-4-a). To those, we added 18,924 smolts from the Snow Creek supplemented natural emigration, bringing the sub-region total to 45,486 smolts (Table A-4-a). The total number of estimated smolts, produced from all primary units, is estimated at 402,005 (Table A-4-a).

The number of emigrating smolts from secondary units (Elwha River and Dungeness River) was estimated, for Elwha by extrapolation, using the ratio of the natural escapement of the Elwha River to that of all primary units in the parent brood year (2004) (Table A-4-e). For the Dungeness, the newly acquired estimate of emigrating wild smolts (estimated by WDFW at its trapping operation) was used. This resulted in an estimate of 52,231 smolts, from all secondary natural units (Table A-4-e).

A-4.1.2 Marine Survival

The forecasted survival value of 10.91%, to DA2 recruitment, which was obtained by estimating an average recruits/smolt relationship, using escapement in parent years 2000-2002 and smolt emigration in years 2002-2004 with associated DA2 recruitment in return years 2003-2005 (Table A-4-b), is a “moving average” method that may not accurately represent the most recent changes in survival. In the case of the Strait of Juan de Fuca wild coho, we believe that this method might be overly optimistic, given the lower marine survival of brood year 2002 smolts and the suspected very low survival (data are not yet available) of brood year 2003 smolts (the 2006 return). Therefore, we opted for an alternative method which relies on a regression of observed marine survival, versus the PDO (Pacific Decadal Oscillation) index. The source data and results of this approach are shown in Table A-4-c. Applying the resulting marine survival value to the estimates of 2006 emigrating smolts, resulted in an estimate of 39,903 primary December-Age 2 (DA2) coho recruits (4,505 Eastern and 35,398 Western) (Table A-4-d) and an estimate of 5,184 DA2 coho recruits from secondary units (828 Elwha and 4,356 Dungeness) (Table A-4-e).

Table A-4-a. SJF Coho Smolt Production in Small Streams

2006 Smolt Trapping	Enumerated Smolts	Enumerated Proportion of Total Potential	Estimated Total Smolts
Snow Crk. (Suppl. Nat.)	18,924		18,924
Jimmycomelately Crk.	2,188		
Siebert Crk.	828		
McDonald Crk.	3,818		
East Total w/o Snow	6,834	0.25826	26,462
Salt Crk	24,038		
E. Twin R.	11,288		
W. Twin R.	8,103		
Deep Crk	18,796		
Johnson Crk.	5,654		
West Total	67,879	0.19034	356,620
E+W+Snow Total	74,713		402,005

Table A-4-b. Estimation of Marine Survival

	RY 2003	RY 2004	RY 2005
Primary, Parent Escapement (RY-3)	17,547	29,048	20,117
Secondary, Parent Escapement (RY-3)	5,107	6,226	2,263
Primary Proportion	0.77457	0.82350	0.89888
Primary Smolts (RY-1)	264,724	287,687	228,996
Primary Recruits (RY)	28,745	38,943	19,094
Marine Survival	0.10858	0.13537	0.08338
Primary Escapement (RY)	17,042	19,755	10,202
Secondary Escapement (RY)	3,949	1,169	951
Mean Smolt to Recruit Survival			0.10911

Table A-4-c. Estimation of Marine Survival Using the PDO Index

Run Year	Marine Survival	PDO Index
1999	0.10599	0.552
2000	0.20607	-0.985
2001	0.15457	-0.242
2002	0.09708	-0.384
2003	0.10858	-0.492
2004	0.13537	0.790
2005	0.08338	0.470
2006	n/a	1.520
2007		0.760
<i>Marine Survival = 0.12584 - (0.3498 * PDO)</i>		
2007 Forecast Marine Survival:		0.09926

Table A-4-d. Primary Natural Management Units Summary

Primary Management Units	Measured Wild Smolts	Proportion of Total Potential Measured	Estimated Total Smolts w Snow	DA2's Using PDO based Marine Survival
East Strait	6,834	0.25826	45,386	4,505
West Strait	67,879	0.19034	356,620	35,398
SJF Summary	74,713		402,005	39,903

Table A-4-e. Secondary Management Units Summary

Secondary Management Units	2004 Natural Escapement	2004 Brood Escapement Proportion	Estimated Smolts*	Estimated DA2's
Elwha	410	0.351	8,343	828
Dungeness*	759	0.649	43,888	4,356
Total Secondary	1,169	1.000	52,231	5,184

(*): Dungeness River smolts were estimated directly, using the WDFW screw trap operation

**Table A-4-f. Coho Salmon Spawning Escapements to
Primary Natural Spawning Areas of the Strait of Juan de Fuca**

Year	E. Strait	W. Strait	Total
1986			9,883
1987			4,860
1988			4,332
1989			7,222
1990			4,030
1991			3,752
1992			6,126
1993			3,329
1994			2,503
1995			6,386
1996			5,035
1997			5,788
1998	1,313	14,237	15,550
1999	1,314	5,831	7,145
2000	2,180	15,367	17,547
2001	2,539	26,509	29,048
2002	3,002	17,115	20,117
2003	3,249	13,793	17,042
2004	7,752	12,003	19,755
2005	3,426	6,776	10,202

Note: Escapement estimation methods changed in 1998. Therefore prior estimates are not directly comparable

A-4.2 Hatchery Runs

The 2007 returns of Strait of Juan de Fuca hatchery coho were predicted using the estimated 2003-05 (3 years - 1 brood cycle) average smolt survival to DA2 recruits, applied to the 2006 smolt releases (Table A-3-g). More specifically, the following sources of information were selected:

Dungeness Hatchery: 2003-2005 average recruits per smolt (0.02663) (Table A-4-g). Given a release of 500,000 smolts, the 2007 forecast is 13,314 DA2 recruits.

Elwha Hatchery: 2003-2005 average recruits per smolt (0.00942) (Table A-4-g). Given a release of 643,122 smolts, the 2007 forecast is 6,060 DA2 recruits.

The total hatchery-origin pre-season forecast value of 19,374 DA2 recruits (17,901 Age 3 ocean) will be used for simulation modeling and pre-season planning.

**Table A-4-g. Strait of Juan de Fuca Hatchery Coho Contribution
to Puget Sound Net Fisheries and Escapements**

Run Year	Dungeness Hatchery			Elwha Hatchery			
	Smolts Released	DA 2 Recruits	R/Sm	Smolts Released	DA 2 Recruits	R/Sm	
1979	796,100			1,387,900			
1980	399,200			837,900			
1981	679,700			1,168,700			
1982	929,400			2,845,100			
1983	106,590			2,756,200			
1984				567,800			
1985	188,000			751,000			
1986	298,000			645,400			
1987	320,000			836,000			
1988	748,600	20,948	0.02798	728,500	5,260	0.00722	
1989	301,700	25,401	0.08419	240,700	15,017	0.06239	
1990	359,050	20,811	0.05796	413,500	12,320	0.02979	
1991	342,700	12,102	0.03531	768,600	3,522	0.00458	
1992	296,400	14,058	0.04743	688,600	9,848	0.01430	
1993	433,700	9,789	0.02257	755,600	4,913	0.00650	
1994	340,000	8,923	0.02624	580,000	2,504	0.00432	
1995	680,000	26,830	0.03946	707,700	10,250	0.01448	
1996	808,700	29,804	0.03685	801,000	13,705	0.01711	
1997	871,600	16,596	0.01904	722,200	11,988	0.01660	
1998	774,600	12,301	0.01588	643,037	6569	0.01022	
1999	877,300	6,073	0.00692	867,379	9,438	0.01088	
2000	788,600	42,393	0.05376	645,856	4,962	0.00768	
2001	865,700	52,851	0.06105	684,856	15,237	0.02225	
2002	550,700	17,588	0.03194	494,610	12,419	0.02511	
2003	565,300	26,894	0.04757	662,231	3,461	0.00523	
2004	505,750	9,486	0.01876	724,594	8,598	0.01187	
2005	509,300	6,902	0.01355	661,700	7,395	0.01118	
2006	512,450			175,380			
2007	500,000			643,122			
Average(2003-05):			0.02663	Average (2003-05):			0.00942
2007 Forecast DA2's			13,314				6,060

A-5. Fall Chum Salmon

A-5.1 Natural Fall Chum Salmon Forecast (PNPTC)

The 2007 return of fall-timed chum salmon to the Strait of Juan de Fuca tributaries was forecasted by PNPTC, in the aggregate, as the average of the natural and off-station runs observed in the years 2000 through 2004 (Table A-5-a). The resulting forecast of **2,323**, was apportioned on the basis of historical escapement survey data which resulted in the following proportions: Pysht River (46%), Dungeness River (14%), Deep Creek (14%), and miscellaneous, including Elwha R. and Lyre R. (26%). At the time the forecast was prepared, more recent run size estimates, including 2005 and 2006, were not available. (Table A-5-e).

A-5.2 Natural Fall Chum Salmon Forecast (WDFW)

The 2007 return of wild fall-timed chum salmon to Strait of Juan de Fuca streams was forecast as a portion of the total return of all Puget Sound natural fall-timed chum. The Puget Sound return was initially forecast 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 2004 wild escapement by the mean even-year brood R/S value to get a total return of 2004 brood offspring. That number was then multiplied by the mean return at age 3 for even-year broods, yielding the 2007 age 3 return forecast. This was repeated for 4 and 5-year old components, and all three were summed to obtain a total Puget Sound forecast of 1,923,751 (Table A-5-b). However, given the lack of age information for 2005 and 2006, and the lower return in 2005, from relatively high escapements, the forecast was reduced by 50% to 961,875.

The return of each age group to Puget Sound was apportioned to individual regions (including the Strait of Juan de Fuca), using proportions of the parent escapement of each brood into each unit. The resulting forecast for Strait of Juan de Fuca natural fall chum salmon is 1,922 (Table A-5-c). The forecasts for individual production units are shown in Table A-5-d.

Final forecasts, given the small difference in the results obtained by the two methods, were made using the mean of the results obtained by the PNPTC and WDFW, for each production unit. (Table A-5-d)

Table A-5-a. Strait of Juan de Fuca Historical Fall Chum Salmon "4B" Runs

Return Year	Fall Chum Run Size	Return Year	Fall Chum Run Size
1980	5,862	1993	5,775
1981	6,518	1994	2,564
1982	6,744	1995	610
1983	1,765	1996	2,162
1984	8,280	1997	3,927
1985	8,330	1998	1,535
1986	1,922	1999	1,313
1987	7,269	2000	269
1988	13,962	2001	1,737
1989	4,331	2002	5,198
1990	1,220	2003	1,177
1991	1,941	2004	3,233
1992	5,654	2005	
Average (All Yrs.):			3,722
PNPTC Average 2000-04:			2,323
Std. Dev. (00-04):			1,730

Table A-5-b. 2007 Puget Sound Natural Fall Chum R/S Based WDFW Forecast

Parent Brood	Age	Parent Escapement	Mean R/S¹	Estimated R/S (all ages)	Mean Age Composition¹	Natural Forecast
2002	5	1,082,188	2.58891	2,801,687	0.04870	136,442
2003	4	697,463	3.46847	2,419,129	0.56747	1,372,783
2004	3	872,280	2.58891	2,258,254	0.18356	414,525
					Total	1,923,751
Adjusted to 50% Prior to Use						961,875

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

Table A-5-c. 2007 WDFW Puget Sound Natural Chum R/S, Sibling and Average of Forecasts

	R/S	SJF Parent Escapement Proportion	SJF Forecast by Age
Age 3 (2004 Brood) Forecast	207,263	0.00311	645
Age 4 (2003 Brood) Forecast	686,392	0.00144	989
Age 5 (2002 Brood) Forecast	68,221	0.00422	288
Total Forecast (4B)	961,875		1,922

Table A-5-d. Apportionment of the Strait of Juan de Fuca Fall Chum Salmon Forecast

Area	Proportion	PNPTC Forecast	WDFW Forecast	Joint Forecast
Pysht R	0.458	1,065	881	973
Dungeness R	0.139	323	267	295
Deep Creek	0.139	323	267	295
Miscellaneous	0.264	613	507	560
Total		2,323	1,922	2,122

B. Inseason Run Assessment Methods

The Dungeness River coho salmon is the only run among those returning to the Strait of Juan de Fuca tributaries for which an acceptable model for estimating abundance during the season has been found. For all other runs the pre-season forecast will serve as the in-season estimate of abundance.

B-1. Dungeness Coho Salmon

Prior to October 7, the pre-season terminal run size forecast will serve as the estimate of the run entering Dungeness Bay (Area 6D). For the Dungeness River coho salmon, run size updates will be estimated on October 4, if there has been sufficient fishing effort through October 3, using catch and landing data through October 3. Fishing effort and harvest will be considered sufficient if more than twenty, but less than 40 fisher days have occurred, for the period under consideration. The update will be based on a linear regression model relating total terminal run size (including all terminal and extreme terminal commercial and recreational catches and escapements) to cumulative catch per cumulative effort (treaty and nontreaty) in Area 6D. The regression is based on run sizes and catches from the 1985 - 2006 period. However, from that period, only years in which cumulative effort through 10/3 was between 20 and 39 units, were used. This was done to better approximate the current level of fishing effort. The selected data appear in Table B-1-b in boldface. The update model for October 4 is as follows:

$$6D \text{ Run Size} = 2632.716 + (171.313 * CC/CE \text{ through } 10/3)$$

The updated run abundance entering the terminal area will represent the total abundance. The hatchery to natural ratio shall be assumed to be as forecast pre-season.

Table B-1-a shows the regression statistics for the update model. Table B-1-b shows the data series used to develop this model. The database used to develop this model includes catches and effort (fisher-days) by gillnets (treaty and nontreaty) from the observed years.

Table B-1-a. Summary Statistics of the Area 6D Inseason Abundance Estimation Model

Using Data through Oct. 3	
R^2	0.837480
R^2 Adjusted	0.819422
Std Error	3861.0978
N	11
β_0	2632.716
β_1	171.313
$P(\beta_0 = 0)$	0.1358

Table B-1-b. Inseason Coho Abundance Estimation Data for Area 6D.

Year	Dungeness Bay Run Size			Cum. Catch	Cum. Effort	CC/CE
	Hatchery	Natural	Total			
1979	5,035	1,387	6,422			
1980	13,513	3,721	17,234			
1981	16,534	4,553	21,087			
1982	21,815	6,007	27,822			
1983	10,279	2,830	13,109			
1984	1,199	330	1,529			
1985	3,708	1,021	4,729	628	34	18.47
1986	4,725	1,301	6,026	1,894	41	46.20
1987	5,938	1,635	7,573	1,285	34	37.79
1988	5,006	1,378	6,384	2,101	58	36.22
1989	5,474	1,507	6,981	1,629	42	38.79
1990	4,477	1,233	5,710	552	36	15.33
1991	4,496	1,238	5,734	1,707	53	32.21
1992	2,835	781	3,616	477	34	14.03
1993	3,321	914	4,235	32	8	4.00
1994	2,496	687	3,183	700	14	50.00
1995	7,940	2,186	10,126	473	14	33.79
1996	7,912	2,179	10,091	400	13	30.77
1997	12,806	3,526	16,332	172	6	28.67
1998	7,599	2,092	9,691	2,041	36	56.69
1999	4,289	1,181	5,470	332	9	36.89
2000	25,444	7,006	32,450	5,669	31	182.87
2001	31,777	8,750	40,527	3,591	40	89.78
2002	10,474	2,884	13,358	796	25	31.84
2003	16,284	4,484	20,768	1,694	29	58.41
2004	5,696	1,568	7,264	868	33	26.30
2005	4,111	1,132	5,243	562	28	20.07
2006*	1,204	331	1,535	631	28	22.54

2007 Dungeness Coho ISU

