

**2003 MANAGEMENT FRAMEWORK PLAN
AND
SALMON RUNS' STATUS
FOR THE
STRAIT OF JUAN DE FUCA REGION**

Joint Report
by:
Point No Point Treaty Council
(for the Port Gamble, Lower Elwha and Jamestown S'Klallam Tribes)
Washington Department of Fish and Wildlife
Makah Tribe

Table of Contents

| | |
|--|---------|
| Introduction | Page 1 |
| General | Page 1 |
| Summary of the 2003 Runs and Fisheries | Page 1 |
| 2003 Fishery Management Periods | Page 3 |
| Summary of Pre-Season Forecasts, Expected Harvests and Escapements | Page 5 |
| Summer/Fall Chinook Salmon | Page 5 |
| Pink Salmon | Page 6 |
| Summer Chum Salmon | Page 6 |
| Coho Salmon | Page 7 |
| Fall Chum Salmon | Page 8 |
| Pre-Season Management Framework | Page 9 |
| 2003 Harvest Management Measures and Expected Fisheries | Page 9 |
| Commercial Fisheries | Page 9 |
| Test Fisheries | Page 10 |
| Recreational Fisheries | Page 10 |
| Other Recommended Measures | Page 11 |
| Inseason Run Size Updates | Page 11 |
| APPENDIX | Page 13 |
| A. Pre-Season Forecasting Methods | Page 15 |
| Chinook Salmon | Page 15 |
| Dungeness River Natural | Page 15 |
| Elwha River | Page 16 |
| Hoko River | Page 18 |
| Pink Salmon | Page 19 |
| Summer Chum Salmon | Page 20 |
| Coho Salmon | Page 22 |
| Natural Runs | Page 22 |
| Hatchery Runs | Page 23 |
| Fall Chum Salmon | Page 26 |
| B. Inseason Run Assessment Methods | Page 29 |
| Dungeness Coho Salmon | Page 29 |

1. Introduction

1.1 General

This report has been prepared by the Point No Point Treaty Council (for the Lower Elwha, Port Gamble, and Jamestown S'Klallams), was reviewed and agreed to, by the Washington Department of Fish and Wildlife 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 2003 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 (2003-04 State/Tribal Agreed to Fisheries Document, NWIFC, April, 2003) understandings.

This report outlines the forecasted total abundance, by management unit, for each species, except fall chum salmon. For fall chum salmon forecasts include 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.

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 2003 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 Elwha River and the Dungeness River are expected to be of sufficient abundance to support 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 2003, 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.

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 pre-season forecasts, for 2003, 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. 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 Elwha River and Dungeness River-origin coho, no runs returning to the Strait of Juan de Fuca tributaries in 2002 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. 2003 Fishery Management Periods

| Area | Chinook | Pink | Summer Chum | Coho | E. Fall Chum | L. Fall Chum | Winter Steelhead |
|------------------------------|-------------|-------------|-------------|-------------|--------------|--------------|------------------|
| 6D & Dungen. I | 07/27-09/20 | 08/10-09/27 | --- | 09/21-10/25 | 10/26-11/29 | --- | 11/30-3/31 |
| Dungeness II | 08/10-09/20 | 08/10-10/11 | --- | 09/21-10/25 | 10/26-12/13 | --- | 12/14-04/15 |
| Elwha | 07/20-09/13 | --- | --- | 09/14-11/08 | 11/09-12/06 | --- | 12/07-04/15 |
| Discovery-Sequim Tributaries | --- | --- | 09/14-10/25 | 10/26-12/29 | --- | --- | 12/01-04/30 |
| Hoko-Sekiu | 09/07-11/10 | --- | --- | 09/28-11/15 | 11/16-12/06 | --- | 12/07-03/31 |
| Misc. SJF Tributaries | 09/07-11/10 | --- | --- | 09/28-11/08 | 11/09-12/15 | 11/30-12/31 | 12/01-04/15 |

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 2003, 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 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 | Natural | |
| Recruits | 2,785 | 452 | 1,015 | 4,252 |
| Canada | 408 | 66 | 150 | 624 |
| Alaska | 79 | 13 | 27 | 119 |
| S.Falcon Tr/Rec | 0 | 0 | 0 | 0 |
| N.Falcon Tr/Rec | 15 | 3 | 7 | 24 |
| P.S. Troll | 6 | 1 | 3 | 10 |
| No. Snd + Strait Recreational | 40 | 7 | 24 | 71 |
| Cntl. + So. Sound Recreational | 44 | 7 | 13 | 64 |
| Puget Sound Net | 20 | 3 | 7 | 30 |
| 6D Net | 0 | 1 | 0 | 1 |
| FW Recreational | 1 | 0 | 0 | 1 |
| FW Net | 2 | 0 | 0 | 2 |
| Mgmt Unit Harvest | 615 | 100 | 230 | 945 |
| Extreme Terminal Natural Mortality | 45 | 0 | 0 | 45 |
| Mgmt Unit Escap. | 2,126 | 352 | 785 | 3,262 |
| Min. Escap. Goal | 2,099 | 347 | 779 | 3,225 |

The abundance of runs returning to rivers other than the Dungeness, Elwha, and Hoko, is quite uncertain. Estimates of pre-terminal harvests terminal run size are based on FRAM run #1603AEQfix. The initial Dungeness River forecast was for chinook salmon expected to return to the terminal area. The Elwha run has 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 (2/19/2003). 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, little or 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 2003. We believe that the 2003 return may be significantly lower than predicted, because of a significant flood event during its instream residence. However we have not quantified the potential losses from that event. The WDFW used a regression relationship, between cycle year survival rates and daily mean incubation period stream flows, to adjust its forecast to a Puget Sound run of 53,541. Details of the 2003 forecasting methods can be found in Appendix A-2 of this report. The estimated pre-terminal harvest rate has been forecast using the 1991 to 2001 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. | 162,823 | 13,026 | 13,417 | 136,381 | N/A |

3.3 Summer Chum Salmon

| Production Unit | Total Recruits | CDN Harvest | WA Preterminal Harvest | Expected Escapement | Escapement Goal |
|-----------------|----------------|-------------|------------------------|---------------------|--------------------|
| Chimacum Creek | 467 | 29 | 12 | 425 | 91.2 % of recruits |
| Discovery Bay | 2,573 | 162 | 64 | 2,347 | 91.2 % of recruits |
| Sequim Bay | 92 | 6 | 2 | 83 | 91.2 % of recruits |
| Totals | 3,131 | 197 | 78 | 2,856 | |

The methods used to develop the 2003 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 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 2003 summer chum run was forecast as total recruits to 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 2003 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. Given the low number of forecasted returns and the closure of terminal area fisheries during the summer chum entry in these areas, very little incidental harvest is anticipated.

3.4 Coho Salmon

| 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 | 2,253 | 17,803 | 5,241 | 18,805 | 20,056 | 24,046 | 44,102 |
| Canada | 5 | 50 | 18 | 128 | 55 | 146 | 201 |
| Alaska | 0 | 3 | 1 | 3 | 3 | 4 | 7 |
| S.Falcon Tr/Rec | 4 | 47 | 10 | 95 | 51 | 105 | 156 |
| N.Falcon Tr/Rec | 123 | 986 | 311 | 1,640 | 1,109 | 1,951 | 3,060 |
| P.S. Troll | 0 | 3 | 0 | 3 | 3 | 3 | 6 |
| Strait Rec. | 74 | 577 | 229 | 2,298 | 651 | 2,527 | 3,178 |
| SJI Rec. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Admiralty | 2 | 19 | 5 | 23 | 21 | 28 | 49 |
| N. Sound Rec. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| S. Sound Rec. | 3 | 22 | 5 | 19 | 25 | 24 | 49 |
| Hood Canal Rec. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Strait Net | 84 | 658 | 166 | 622 | 742 | 788 | 1,530 |
| San Juans Net | 0 | 5 | 0 | 9 | 5 | 9 | 14 |
| Admiralty Net | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No. Sound Net | 0 | 2 | 0 | 2 | 2 | 2 | 4 |
| So. Sound Net | 1 | 18 | 4 | 24 | 19 | 28 | 47 |
| Hood Canal Net | 4 | 30 | 8 | 45 | 34 | 53 | 87 |
| SJF Rivers Rec. | 0 | 0 | 588 | 2,201 | 0 | 2,789 | 2,789 |
| 6D Net | 0 | 0 | 0 | 4,285 | 0 | 4,285 | 4,285 |
| Elwha/Dungen. Net | 0 | 0 | 1,791 | 0 | 0 | 1,791 | 1,791 |
| Miscell. Net | 0 | 16 | 0 | 0 | 16 | 0 | 16 |
| Mgmt Unit Harvest | 300 | 2,436 | 3,136 | 11,397 | 2,736 | 14,533 | 17,269 |
| Mgmt Unit Exp. Escapement | 1,953 | 15,367 | 2,105 | 7,408 | 17,320 | 9,513 | 26,833 |
| Min. Escap. Goal | 1,352 | 10,682 | 1,233 | 2,452 | 12,034 | 3,685 | 15,719 |

Notes: (1) The Elwha R. "Aggregate" is composed of 6.6% secondary wild, and 93.4% hatchery coho salmon. The Dungeness R. "Aggregate" is composed of 27.1% secondary wild and 72.9% hatchery 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 origin runs are the only ones which were predicted to have harvestable numbers of coho salmon, sufficient to support directed fisheries in the terminal and extreme terminal areas in 2003.

Methods used to develop the forecasts for the 2003 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 #0319. In 2003, given the low 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.

3.5 *Fall Chum Salmon*

| Production Unit | "4B" Run | Pre-Terminal Harvest | Terminal Run | Extr. Terminal Harvest | Expected Escapement | Escapement Goal |
|------------------------|-----------------|-----------------------------|---------------------|-------------------------------|----------------------------|------------------------|
| Dungeness R. | 346 | 18 | 328 | 0 | 328 | 500 |
| Deep Crk. | 346 | 18 | 328 | 0 | 328 | 500 |
| Pysht R. | 1,143 | 59 | 1,083 | 8 | 1,075 | 1,650 |
| Miscellaneous | 658 | 34 | 624 | 15 | 608 | 900 |
| Totals | 2,494 | 130 | 2,364 | 24 | 2,340 | 3,550 |

Methods used to develop the forecasts of fall-timed chum salmon returning to the Strait of Juan de Fuca streams in 2003 are detailed in Appendix A-5 of this report. The final forecast for 2003 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 2003, 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 2003 Harvest Management Measures and Expected Fisheries

In 2003, 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 2003 is very low and it appears that only hatchery coho salmon returning to the Elwha and Dungeness areas will be sufficiently abundant to warrant directed fisheries. 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.

4.1.1 Commercial Fisheries

In the Strait of Juan de Fuca, treaty Indian troll fisheries are anticipated, from 6/16 through 9/15, in Areas 5, 6 (west of Green Pt.), and 6C. During that period, chum salmon will be released and the following areas shall be closed to trolling: 1,000 ft. radius around stream mouths, Freshwater Bay, Port Angeles Harbor and Hoko Bay from Kydaka Pt. to Shipwreck Pt. From 9/16 through 4/15/2004 treaty Indian troll fisheries are anticipated in Areas 5, 6, 6C, as well as Area 4B, with the following restrictions: 1,000 ft. radius closure around stream mouths, release of coho in Area 6, through 12/31, and release of chum salmon through 9/30.

Treaty Indian commercial net fisheries generally occur in the nearshore marine areas of the Strait of Juan de Fuca from Angeles Point to Neah Bay (Areas 4B, 5, 6C), using set net gear. These fisheries harvest a mixture of passing stocks as well as concentrations of local stocks. The only terminal area in this region is Dungeness Bay (Area 6D) and fisheries in this area consist primarily of treaty set net and non-treaty skiff gillnet fisheries which target coho salmon runs returning to the Dungeness River. In extreme terminal areas (rivers), treaty Indian set net, hook-and-line, and occasionally drift net fisheries take place.

During the 2003 season, treaty Indian set net fisheries for chinook salmon, in Areas 4B and 5, will operate from June 16 through August 16. A 6.5" minimum mesh size restriction shall be used in order to avoid the capture of Lake Washington sockeye. In these areas, Hoko Bay will be closed from Kydaka Pt. to Shipwreck Pt., in addition to a closure of 1,000 ft. around all stream mouths. A treaty Indian drift gillnet fishery directed at Fraser River sockeye and pink salmon, in Areas 4B, 5, 6C is planned (est. start 7/20) to end no later than 9/13. In Area 6, Treaty Indian gillnet fisheries for Fraser River sockeye salmon are anticipated in the month of August, with fisheries targeting pink salmon in the first two weeks of September. Drift gillnet fisheries for coho salmon will operate in Areas 4B, 5 and 6C, from the end of the Fraser Panel control, through October 11, with the chum salmon fishery following at 5 days per week, from October 12 through November 8. The coho fishery shall be managed to ensure that the pre-season estimated incidental and directed coho catch is not greatly exceeded. In order to accomplish this, openings may vary from 1 to 5 days per week.

In Area 6D, no commercial fisheries will take place during the chinook and fall chum salmon management periods in order to maximize the protection necessary to these weak runs. Treaty Indian fisheries for coho salmon are planned for Area 6D from 9/21 through 11/01, with daytime only gillnet fishing and a requirement of chinook and chum salmon release through 10/10. A non-treaty skiff gill net fishery is planned from 9/29 through 10/31 with non-retention of chinook and chum salmon. These measures are intended to provide additional protection to ESA listed chinook and summer chum salmon. During fisheries for coho salmon, an area closure within 1,500 feet seaward from each mouth of the Dungeness River, will be used to further limit the harvest of non target species as well as concentrated schools of

coho salmon milling at the river mouth. If surveys indicate a high likelihood of fishing impact to chinook and or summer chum salmon, additional measures may be employed including time-area restrictions, gear restrictions etc., as necessary. During this fishery, fishers will be required to attend to their gear at all times, when release of non target species is in effect. Inseason, the extent and duration of the coho fishery will be determined by the fishing effort and the inseason estimate of the coho run abundance entering the terminal area.

Of the various extreme terminal areas (rivers) along the Strait of Juan de Fuca, treaty Indian commercial fisheries are anticipated only in the Elwha River and, if necessary, in the Dungeness River. All other rivers shall remain closed to commercial salmon fishing at all times prior to the 2003-2004 winter steelhead salmon season.

In the Dungeness River, downstream of the U.S. Hwy. 101, if a harvestable surplus of coho is available, fisheries of up to 3 days per week may be authorized using selective gear (any gear that is capable of releasing salmon alive) only, starting no earlier than October 16. This restriction will be necessary because of low water conditions and the potential impact on non-target species in need of protection. The extent and duration of such fisheries will depend on the findings of in-season stream surveys.

The treaty net fishery for coho in Area 76B (Elwha River) has been planned to occur from 9/14 through 11/8. Drift gillnets may be authorized only if river flow conditions require their use. The start of the coho fishery may also be "shaped", to the extent necessary, to avoid unnecessary impacts to chinook escapement and broodstock collection. In order to ensure that coho escapement needs are met, the fishery will be restricted to areas upstream of the Elwha Hatchery during the last half of October (if the hatchery escapement goal has not already been achieved). Hatchery area closures will include the area from 150 ft. upstream, to 150 ft. downstream of the Elwha Hatchery and the Elwha Rearing Channel outfalls.

4.1.2 Test Fisheries

No test fisheries, directed at salmon, are anticipated in any Strait of Juan de Fuca terminal areas, during the 2003 season.

4.1.3 Recreational Fisheries

Marine area recreational fisheries in mixed-stock areas of the Strait of Juan de Fuca are detailed in 2003/2004 Sport Fishing Rules Pamphlet (WDFW 2003). Area 6D will be closed to angling from May 1 through September 30 and will then open with a two fish bag limit on coho only through October 31. It shall then be closed to salmon fishing from November 1 through April 30, 2004.

In freshwater areas, all Strait of Juan de Fuca streams, except for the Elwha River and the Dungeness River, shall be closed to recreational fishing for salmon. The Elwha River, will be closed, from the river mouth to the DFW rearing channel outfall marker, from 6/1 through 9/30. This closure will provide additional protection to the ESA listed Elwha chinook salmon stock. Angling, for coho salmon only, will be permitted from October 1 through November 15, with a six fish bag limit (four adults, 12" min. size). An area closure of 150 ft. above and below each hatchery outfall will be in effect. In the Dungeness River, angling for salmon (marked coho only) will be permitted downstream of the Dungeness Hatchery intake, at RM 11.3, from October 16 through December 31, with a four fish bag limit (12" min. size). The Dungeness River will remain closed to angling for salmon (except steelhead), from January 1 through April 30, 2003. The Hoko River shall be closed to the taking of salmon and gamefish gear shall be restricted to flyfishing during the months of September and October.

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 2003 to determine the number, age, sex ratio, and distribution of spawners. In the Dungeness system, 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 (tissues for GSI analysis) for the incidence and origin of summer chum interceptions. The in-stream supplementation program, utilizing native spawners, in Salmon Creek and JimmyComeLately Creek, should be continued.

Federal, State, and Tribal fisheries agencies, and private organizations have 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 is 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 2003 run will be the second 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 2003, releases of smolts from this program should be tagged, using CWT's. 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. Additionally, given pre-season agreements between the co-managers, an assessment of the mark selective recreational fishery for coho, in the Dungeness River, should be undertaken, to determine the mark ratio, encounter rates and total fishing mortality.

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 2003, 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 2003 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 given that 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 2003, are detailed in Appendix B. If sufficient fishing effort data is 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

A-1.1 Dungeness River Natural

The forecast of the Dungeness River natural-origin chinook salmon terminal area run for 2003, was estimated using the mean of the post season estimates of the 1999-02 terminal (Area 6D) runs. The run sizes for the return years 1999-02 best represent current survival conditions. The races were aggregated because of the lack of adequate information to separately quantify the returns of any spring and summer chinook salmon. The 2003 terminal area forecast return is 356 natural chinook salmon (Table A-1-a). The WDFW forecast was 345, based on the 1999-02 mean of spawning escapements.

In the Dungeness River, releases of supplementation chinook from brood years 1997-99 are expected to contribute a currently unquantified number of terminal area returns. However, returns from past supplementation releases are included indirectly, by using recent years' returns. This forecast was used to estimate recruitment inputs for pre-season simulation modeling.

Table A-1-a. 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 | 7 | 225 |
| 2001 | 453 | 0 | 42 | 495 |
| 2002* | 633 | 0 | | 633 |
| 2003 Forecast (Average Return 1999-02) | | | | 357 |

(*) The 2002 estimate is preliminary and subject to revision

A-1.2 Elwha River

The 2003 forecast return of Elwha River chinook salmon, to the terminal area, was estimated as the 1999-02 average terminal area run. The resulting 2003 terminal area forecast is 2,050 (Table A-1-b). This forecast was used to estimate recruitment inputs for pre-season simulation modeling.

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

| Return Year | Terminal Run | Preterminal Catch | Recreational Catch | Area 4B Run | Area 4B /Terminal |
|----------------------|---------------------|--------------------------|---------------------------|--------------------|--------------------------|
| 1988 | 8,666 | 417 | 2 | 9,083 | 1.0481 |
| 1989 | 5,703 | 113 | 9 | 5,816 | 1.0198 |
| 1990 | 3,605 | 39 | 0 | 3,644 | 1.0108 |
| 1991 | 3,761 | 63 | 0 | 3,824 | 1.0168 |
| 1992 | 4,002 | 54 | 0 | 4,056 | 1.0135 |
| 1993 | 1,669 | 26 | 19 | 1,695 | 1.0156 |
| 1994 | 1,580 | 42 | 0 | 1,622 | 1.0266 |
| 1995 | 1,814 | 38 | 0 | 1,852 | 1.0209 |
| 1996 | 1,877 | 7 | 0 | 1,884 | 1.0037 |
| 1997 | 2,527 | 44 | 8 | 2,571 | 1.0174 |
| 1998 | 2,409 | 7 | 0 | 2,469 | 1.0249 |
| 1999 | 1,625 | 5 | 3 | 1,630 | 1.0031 |
| 2000 | 1,913 | 7 | 7 | 1,920 | 1.0037 |
| 2001 | 2,246 | 6 | 25 | 2,252 | 1.0027 |
| 2002* | 2,416 | | | | |
| 1999-02 | 2,050 | | | | 1.0031 |
| 2003 Forecast | 2,050 | | | | |

(* The 2002 estimate is preliminary and subject to revision)

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

| Return Year | Hatchery Voluntary Escapement | In-River Gross Escapement | Gaff-Seine Removals | In-Hatchery Prespawning Mortality | In-River Prespawning Mortality |
|--------------------|--------------------------------------|----------------------------------|----------------------------|--|---------------------------------------|
| 1986 | 1,285 | 1,842 | 505 | 376 | 482 |
| 1987 | 1,283 | 4,610 | 1,138 | 432 | 1,830 |
| 1988 | 2,089 | 5,784 | 506 | 428 | 50 |
| 1989 | 1,135 | 4,352 | 905 | 148 | 412 |
| 1990 | 586 | 2,594 | 886 | 160 | 64 |
| 1991 | 970 | 2,499 | 857 | 108 | N/A |
| 1992 | 97 | 3,762 | 672 | 26 | 2,611 |
| 1993 | 165 | 1,404 | 771 | 7 | 0 |
| 1994 | 365 | 1,181 | 749 | 61 | 269 |
| 1995 | 145 | 1,667 | 518 | 37 | 625 |
| 1996 | 214 | 1,661 | 1,177 | 147 | 120 |
| 1997 | 318 | 2,209 | 624 | 3 | 7 |
| 1998 | 138 | 2,271 | 1,551 | 51 | 0 |
| 1999 | 113 | 1,512 | 609 | 23 | 0 |
| 2000 | 177 | 1,736 | 1,021 | 62 | 0 |
| 2001 | 195 | 2,051 | 1,396 | 38 | 0 |
| 2002 | 473 | 1,943 | 1,080 | 40 | 0 |

In order to estimate potential escapements, the forecasted return to the Elwha River was further apportioned, using the 1999-2002 mean proportions (Table A-1-c), as follows: Of the 2,050, **11.1%** (228) are expected to voluntarily return to the Elwha Rearing Channel, and **88.9%** (1,822) to the river. The voluntary hatchery return was reduced by **20.3%** (46), to account for average on-station pre-spawning mortality, leaving 182 hatchery spawners. The in-river escapement was not reduced for in-river pre-spawning mortality, based on recent years' survival. The 1,822 in-river escapement was reduced by **40.3%** (734) to account for broodstock removals (gaff & seine), leaving an anticipated in-river spawning escapement of 1,088 chinook salmon and an anticipated hatchery broodstock of 915.

A-1.3 Hoko River

The forecast of Hoko River chinook salmon for 2003 was estimated as the 1999-02 average return to the terminal area. The 2003 forecast estimate is 1,013 chinook salmon (Table A-1-d). This forecast was used to estimate recruitment inputs for pre-season simulation modeling.

Table A-1-d. 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 |
| Average 1999-02 | 1,013 | | |

*The 2002 estimate is preliminary and subject to revision.

A-2. Pink Salmon

A-2.1 Natural Runs

Naturally produced Puget Sound pink salmon were forecast in 2003 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 2003 return of pink salmon to the Dungeness River was forecast by applying the mean Cycle 1 return rate (2.03) to the 2001 parent brood escapement (80,344). This results in an estimated return of 162,823 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 |

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 | 2.85 | 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 | 1.47 | 1999 | 11.47 |
| 2001 | | 2003 | | 2005 | |
| Average: | 2.03 | | 0.55 | | 4.89 |
| Std.Dev. | 0.95 | | 0.52 | | 3.01 |
| 2003 Forecast (CY 1) Recruits | | | | | 162,823 |

Note: The WDFW used an additional step in forecasting the Dungeness River pink salmon run. This was done in order to adjust for the record floods that occurred, during incubation, in January, 2002. A regression of maximum daily mean flow (during incubation) against CY 1 recruits per spawner was used to derive a prediction R/S value of 0.667. This resulted in a WDFW forecasted return to Puget Sound (4B run) of 53,541.

A-3. Summer Chum Salmon

The 2003 return of summer-timed chum to the three Strait of Juan de Fuca Management Units (Chimacum, Discovery and Sequim) was forecasted as an 4 year mean of total recruits to fisheries and escapements, separately for each of these units in the 1999 through 2002 return years (Table A-3-a). The forecasts are 2,573 fish to Discovery MU, 92 fish to Sequim MU and 467 to the Chimacum MU. Recruits to the Dungeness / Graywolf system are unquantifiable at this time.

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* | 6,071 | 42 | 867 | 6,980 |
| 2003 Forecast (99-02 Avg.): | 2,573 | 92 | 467 | 3,131 |

*The 2002 estimate is preliminary and subject to revision

A-4. Coho Salmon

A-4.1 Natural Runs

The method used to develop the 2003 forecasted return of naturally reared coho salmon, for primary units, relied on an estimate of emigrating smolts (2002 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 (SJF) the number of smolts from six production units, comprising 21.64% of the total, was measured and expanded to 234,903 smolts for the sub-region (Table A-4-a). For primary units in the Eastern SJF the number of smolts from two production units, comprising 13.98% of the total, was measured and expanded to 29,821 smolts for the sub-region (Table A-4-a). The total number of estimated smolts, produced from primary units, is 264,724.

The number of emigrating smolts from secondary units (Elwha River and Dungeness River) was estimated by extrapolation, using the ratio of the natural escapement of the secondary units to that of the primary units in the parent brood year (2000) (Table A-4-b). This resulted in estimate of 71,325 smolts.

A-4.1.2 Marine Survival

The forecasted survival value of 10.14% was obtained by estimating an average spawner/smolts relationship, using escapement in parent years 1996-1998 and smolt emigration in years 1998-2000 with associated recruitment in return years 1999-2001. Applying this marine survival value to the estimates of emigrating smolts, resulted in an estimate of primary DA2 coho recruits (3,024 Eastern and 23,821 Western) (Table A-4-c) and estimate of 7,233 DA2 coho recruits from secondary units (463 Elwha and 6,770 Dungeness) (Table A-4-d).

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

| Smolt Trapping | Enumerated Smolts | Enumerated Proportion of Total Potential | Estimated Total Smolts |
|---------------------|-------------------|--|------------------------|
| Jimmycomelately Crk | 934 | | |
| Siebert Crk | 3,235 | | |
| East Total | 4,169 | 0.13980 | 29,821 |
| Salt Crk | 16,416 | | |
| E. Twin R. | 7,651 | | |
| W. Twin R. | 3,629 | | |
| Deep Crk | 8,863 | | |
| Little Hoko R. | 5,491 | | |
| Johnson Crk | 8,790 | | |
| West Total | 50,840 | 0.21643 | 234,903 |
| E+W Total | 55,009 | | 264,724 |

Table A-4-b. Estimation of Marine Survival

| | RY 1999 | RY 2000 | RY 2001 |
|------------------------------|----------------|----------------|----------------|
| Primary, Parent Escapement | 5,035 | 5,788 | 16,517 |
| Secondary, Parent Escapement | 1,840 | 3,630 | 1,271 |
| Primary Proportion | 0.73236 | 0.61457 | 0.92855 |
| Primary Recruits | 14,805 | 23,370 | 31,736 |
| Marine Survival | 0.10599 | 0.11544 | 0.08279 |
| Mean Survival | | | 0.10141 |

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

| Primary Management Units | Measured Smolts | Proportion of Total Potential Measured | Estimated Total Smolts | DA2's Using 0.10140 Marine Survival |
|---------------------------------|------------------------|---|-------------------------------|--|
| East Strait | 4,169 | 0.13980 | 29,821 | 3,024 |
| West Strait | 50,840 | 0.21643 | 234,903 | 23,819 |
| SJF Summary | 55,009 | | 264,724 | 26,845 |

Table A-4-d. Secondary Management Units Summary

| Secondary Management Units | 2000 Brood Escapement Proportion | Estimated DA2's |
|-----------------------------------|---|------------------------|
| Elwha | 0.0640 | 463 |
| Dungeness | 0.9360 | 6,770 |
| Total Secondary | 1.0000 | 7,233 |

A-4.2 Hatchery Runs

The 2003 returns of Strait of Juan de Fuca hatchery coho were predicted using the estimated 1999-01 (3 years - 1 brood cycle) average smolt survival to December-Age 2 (DA2) recruits, applied to the 2002 smolt releases (Table A-4-d). More specifically, the following sources of information were selected:

Dungeness Hatchery: 1999-2001 average recruits per smolt (0.03224) (Table A-4-d). Given a release of 565,300 smolts, the 2003 forecast is 18,228 DA2 recruits.

**Table A-4-e. 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 | 8,287 | 0.01070 | 643,037 | 6,272 | 0.00975 |
| 1999 | 877,300 | 5,182 | 0.00591 | 867,379 | 7,759 | 0.00895 |
| 2000 | 788,600 | 36,419 | 0.04618 | 645,856 | 4,093 | 0.00634 |
| 2001 | 865,700 | 38,648 | 0.04464 | 684,856 | 9,941 | 0.01452 |
| 2002 | 550,700 | | | 494,610 | | |
| 2003 | 565,300 | | | 662,231 | | |
| Average(1999-01): | | | 0.03224 | Average (1999-01): | 0.00993 | |
| 2003 Forecast DA2's | | | 18,228 | 6,578 | | |

Elwha Hatchery: 1999-2001 average recruits per smolt (0.00993) (Table A-4-d). Given a release of 662,231 smolts, the 2003 forecast is 6,578 DA2 recruits.

The total hatchery-origin pre-season forecast value of 24,805 DA2 recruits (18,604 Age 3 ocean) was used for simulation modeling and pre-season planning.

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 | 1,389 | 15,128 | 16,517 |
| 1999 | 1,360 | 7,968 | 9,328 |
| 2000 | 2,110 | 16,870 | 18,980 |
| 2001 | 2,626 | 34,337 | 36,963 |

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

A-5. Fall Chum Salmon

A-5.1 Natural Fall Chum Salmon Forecast (PNPTC)

The 2003 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 runs observed in the years 1998 through 2002 (Table A-5-a). The resulting forecast 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%) (Table A-5-b).

A-5.2 Natural Fall Chum Salmon Forecast (WDFW)

The 2003 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 2000 wild escapement by the mean even-brood R/S value to get a total return of 2000 brood offspring. That number was then multiplied by the mean return at age 3 for even-year broods, yielding the 2003 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 795,873 (Table X).

When age and runsize data from the 2002 return became available, a sibling forecast was also prepared. This method uses long-term average age composition to predict 2003 returns of age 4 fish based on the 2002 age 3 return, and to predict the 2003 age 5 return based on 2001 age 3 and 2002 age 4 returns (Table XX). The final forecast averaged the R/S-based and sibling-based methods, yielding a forecast of 921,476 (Table XXX).

The return of each age group to Puget Sound was apportioned to individual regions (including Strait of Juan de Fuca) and regional production units using proportions of the parent escapement of each brood into these smaller areas. Forecasts for these areas can be seen in Table XXXX.

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 | 1991 | 1,941 |
| 1981 | 6,518 | 1992 | 5,654 |
| 1982 | 6,744 | 1993 | 5,775 |
| 1983 | 1,765 | 1994 | 2,564 |
| 1984 | 8,280 | 1995 | 610 |
| 1985 | 8,330 | 1996 | 2,162 |
| 1986 | 1,922 | 1997 | 3,927 |
| 1987 | 7,269 | 1998 | 1,535 |
| 1988 | 13,962 | 1999 | 1,313 |
| 1989 | 4,331 | 2000 | 269 |
| 1990 | 1,220 | 2001 | 1,737 |
| | | 2002 | 5,198 |
| Average (All Yrs.): | | | 3,860 |
| PNPTC Average 1998-02: | | | 2,010 |
| Std. Dev. (98-02): | | | 1,672 |

Table A-5-b. 2003 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 |
|---------------------|------------|--------------------------|-----------------------------|---------------------------------|---|-------------------------|
| 1998 | 5 | 888,442 | 2.57 | 2,284,126 | 0.051 | 115,759 |
| 1999 | 4 | 337,400 | 3.11 | 1,049,657 | 0.565 | 593,107 |
| 2000 | 3 | 193,763 | 2.57 | 498,153 | 0.175 | 87,006 |
| | | | | | Total | 795,872 |

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

**Table A-5-c. 2003 Puget Sound Natural Fall Chum WDFW Sibling Forecast
for Age 4 and 5 Returns**

| Age 4 (1999 Brood) Sibling Forecast | | Age 5 (1998 Brood) Sibling Forecast | |
|-------------------------------------|-----------|-------------------------------------|-----------|
| Age 3 Run from 1999 Brood | 535,963 | Age 3+4 Run from 1998 Brood | 2,444,313 |
| Age 3 Avg. Proportion of Brood | 0.365 | Age 3+4 Avg. Proportion of Brood | 0.949 |
| Est. 1999 Brood Total Return | 1,468,161 | Est. 1998 Brood Total Return | 2,574,804 |
| Age 4 Avg. Proportion of Brood | 0.565 | Age 5 Avg. Proportion of Brood | 0.051 |
| Age 4 Sibling Forecast | 829,583 | Age 5 Sibling Forecast | 130,491 |

Table A-5-d. 2003 WDFW Puget Sound Natural Chum R/S, Sibling and Average of Forecasts

| | R/S | Sibling | Average | SJF Parent Escapement Proportion | SJF Forecast by Age |
|-----------------------------|---------|---------|---------|----------------------------------|---------------------|
| Age 3 (2000 Brood) Forecast | 87,006 | n/a | 87,006 | 0.001 | 98 |
| Age 4 (1999 Brood) Forecast | 593,107 | 829,583 | 711,345 | 0.004 | 2,682 |
| Age 5 (1998 Brood) Forecast | 115,759 | 130,491 | 123,125 | 0.002 | 197 |
| Total Forecast | 795,873 | 960,073 | 921,476 | | 2,977 |

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

| Area | Proportion | PNPTC Forecast | WDFW Forecast | Joint Forecast |
|---------------|------------|----------------|---------------|----------------|
| Pysht R | 0.458 | 921 | 1,364 | 1,143 |
| Dungeness R | 0.139 | 279 | 413 | 346 |
| Deep Creek | 0.139 | 279 | 413 | 346 |
| Miscellaneous | 0.264 | 531 | 786 | 658 |
| Total | | 2,010 | 2,977 | 2,494 |

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 12, 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 10, if there has been sufficient fishing effort from September 15 through October 8, using catch and landing data through October 8. Fishing effort and harvest will be considered sufficient if the following relationship is satisfied: the catch and landings through October 8 must fall within the observed historical range of harvest data. The update will be based on a linear regression model relating terminal run size to cumulative catch and landings (treaty and nontreaty) in Area 6D based upon the years 1986-1991 and 1995-2001 (excluding 1992 and 1997 as outliers and 1993-1994 when non-treaty fisher effort was zero). The update model for October 10 is as follows:

$$6D \text{ Run Size} = -1081.765 + (405.340 * CC/CL \text{ through } 10/8)$$

The updated run abundance entering the terminal area will represent the total abundance. The hatchery/natural ratio that is being used 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 landings 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 - 8 | |
|-----------------------------------|-----------|
| R ² | 0.913 |
| R ² Adjusted | 0.905 |
| Std Error | 2739.740 |
| N | 12 |
| β ₀ | -1081.765 |
| β ₁ | 405.340 |
| P(β ₀ = 0) | 0.456 |

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

| Year | Dungeness Bay Run Size | | | Catch | Landings | CC/CL |
|------|------------------------|---------|--------|-------|----------|-------|
| | Hatchery | Natural | Total | | | |
| 1979 | 6,995 | 2,934 | 9,929 | | | |
| 1980 | 13,664 | 3,769 | 17,433 | | | |
| 1981 | 18,956 | 1,663 | 20,619 | | | |
| 1982 | 28,386 | 8,515 | 36,901 | | | |
| 1983 | 10,351 | 3,168 | 13,519 | | | |
| 1984 | 1,000 | 1,100 | 2,100 | | | |
| 1985 | 1,752 | 876 | 2,628 | 907 | 93 | 9.75 |
| 1986 | 3,149 | 4,013 | 7,162 | 2,637 | 128 | 20.60 |
| 1987 | 3,332 | 4,923 | 8,255 | 2,476 | 117 | 21.16 |
| 1988 | 4,944 | 1,268 | 6,212 | 2,631 | 184 | 14.30 |
| 1989 | 4,769 | 1,894 | 6,663 | 2,487 | 133 | 18.70 |
| 1990 | 4,330 | 1,134 | 5,464 | 1,304 | 118 | 11.05 |
| 1991 | 3,944 | 1,360 | 5,304 | 2,068 | 164 | 12.61 |
| 1992 | 2,952 | 519 | 3,471 | 770 | 68 | 11.32 |
| 1993 | 2,820 | 206 | 3,026 | 90 | 15 | 6.00 |
| 1994 | 2,554 | 534 | 3,088 | 923 | 35 | 26.37 |
| 1995 | 8,101 | 327 | 8,428 | 630 | 28 | 22.50 |
| 1996 | 7,780 | 181 | 7,961 | 695 | 32 | 21.72 |
| 1997 | 12,234 | 337 | 12,571 | 203 | 10 | 20.30 |
| 1998 | 7,966 | 434 | 8,400 | 2,677 | 83 | 32.25 |
| 1999 | 4,797 | 730 | 5,527 | 665 | 24 | 27.71 |
| 2000 | 25,487 | 4,786 | 30,273 | 7,054 | 87 | 81.08 |
| 2001 | 27,989 | 760 | 28,749 | 4,776 | 79 | 60.46 |