

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



September 2008

**2008 MANAGEMENT FRAMEWORK PLAN
AND
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FOR THE
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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

Table of Contents

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

1. Introduction

1.1 General

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

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

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

1.2 Summary of the 2008 Runs and Fisheries

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

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

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

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

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

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

2. 2008 Fishery Management Periods

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

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

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

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

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

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

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

3.1 Summer/Fall Chinook Salmon

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

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

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

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

3.2 Summer Chum Salmon

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

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

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

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

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

3.3 Coho Salmon

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

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

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

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

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

3.3 Coho Salmon

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

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

3.4 Fall Chum Salmon

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

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

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

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

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

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

3.4 Fall Chum Salmon

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

4. Pre-Season Management Framework

4.1 2008 Harvest Management Measures and Expected Fisheries

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

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

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

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

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

4.1.1 Preseason Framework Plan for Commercial Fisheries

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

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

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

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

Area 12D Closed

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

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

Port Gamble (Area 9A)

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

Quilcene / Dabob (Area 12A)

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

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

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

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

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

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

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

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

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

All Closed to commercial harvest

4.1.2 Preseason Framework for Recreational Fisheries

Hood Canal Marine Area (Area 12) Recreational

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

Quilcene/Dabob Bay Recreational

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

Hoodsport Hatchery Zone Recreational

Same as Area 12 except:

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

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

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

Dosewallips River Recreational (mouth to Hwy. 101 Bridge)

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

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

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

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

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

Skokomish River Recreational (mouth to Hwy. 101 Bridge)

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

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

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

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

4.1.3 Test and Evaluation Fisheries

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

4.2 Other Recommended Measures

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

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

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

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

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

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

4.3 Inseason Run Size Updates

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

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

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

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

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

APPENDIX

A. Pre-season Forecasting Methods

A. Pre-season Forecasting Methods

A-1. Summer/Fall Chinook Salmon

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

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

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

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

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

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

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

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

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

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

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

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

A-2. Summer Chum Salmon

A-2.1 Natural Runs (PNPTC)

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

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

A-2.2 Natural Runs (WDFW / Skokomish Tribe)

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

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

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

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

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

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

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

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

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

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

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

A-2.3 Natural Runs (Joint Approach)

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

A-3. Coho Salmon

A-3.1 Natural Runs

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A-3.2 Hatchery Runs

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

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

A-4. Fall Chum Salmon

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

A-4.1 Natural Runs

A-4.1.1 Natural Run Forecasts (Tribal)

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

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

A-4.1.2 Natural Run Forecasts (WDFW)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A-4.2 Hatchery Runs.

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

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

A-4.2.1 Forecasts of Instream Augmentation

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

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

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

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

| Area | 3's | 4's | 5's | Total |
|--------------|----------|-----------|-----------|-----------|
| 9A | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 |
| 12B | 0 | 0 | 0 | 0 |
| 12A | 0 | 0 | 0 | 0 |
| 12C | 0 | 0 | 0 | 0 |
| 82G | 0 | 0 | 0 | 0 |
| 12D | 0 | 31 | 17 | 48 |
| Total | 0 | 31 | 17 | 48 |

A-4.2.2 Hatchery On-Station Forecasts (Tribal)

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

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

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

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

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

A-4.2.3 Hatchery Forecasts (WDFW)

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

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

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

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

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

Continued ...

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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