

**2005 MANAGEMENT FRAMEWORK PLAN
AND
SALMON RUNS' STATUS
FOR THE
STRAIT OF JUAN DE FUCA REGION**

Joint Report

Prepared by:

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(for the Port Gamble and Jamestown S'Klallam Tribes)
Washington Department of Fish and Wildlife

with assistance from:

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1. Introduction

1.1 General

This report has been prepared by the Point No Point Treaty Council (for the Port Gamble, and Jamestown S'Klallams), was reviewed and agreed to, by the Washington Department of Fish and Wildlife, the Lower Elwha Klallam and the Makah Tribe and is intended to fulfill the parties' reporting requirements under the provisions of Section 5.2 of the Puget Sound Salmon Management Plan. This report is intended to facilitate the management of the 2005 runs of Strait of Juan de Fuca-origin salmon in that region, as well as document the methodologies used. This report covers all species of salmon (except steelhead) for the Strait of Juan de Fuca Tributaries. The regional "Management Framework" (Section 4.0) documents the parties' pre-season management framework (2005-06 State / Tribal Agreed to Fisheries Document, NWIFC, April, 2005) understandings.

This report outlines the forecasted total abundance, by management unit, for each species, except fall chum salmon. For fall chum salmon forecasts include only fish taken in net fisheries and escapement, and exclude non-landed mortalities, troll, recreational, ceremonial and subsistence harvests not taken in net fisheries. Agreed-upon escapement goals, expected escapements (those that would result under the parties' management framework) for each management unit (natural and hatchery, primary and secondary), expected harvests, test and evaluation fishery requirements, and pre-season and inseason run assessment methods are included. Detailed information concerning the methods used to forecast the abundance of each run are presented in Appendix A.

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

1.2 Summary of the 2005 Runs and Fisheries

All of the runs returning to the Strait of Juan de Fuca rivers and streams (except for coho salmon in the Elwha River and the Dungeness Bay and River, and chinook salmon returning to the Elwha River) will be managed on the basis of natural production. Of the various runs of salmon, only the coho returning to the Elwha River and the Dungeness River are expected to be of sufficient abundance to support directed fisheries in the terminal areas. However, all runs may be harvested incidentally in fisheries for other runs and/or species in preterminal and terminal areas. In 2005, management measures were taken in fisheries to reduce impacts to Puget Sound chinook salmon and Hood Canal-Strait of Juan de Fuca summer chum salmon, currently listed as threatened, under provisions of the Endangered Species Act.

Pre-season forecasts of abundance are provided as a guide for fisheries and conservation planning (Tables 3.1 - 3.5). The actual run sizes entering Puget Sound may deviate from the forecasts because of statistical variability, unusual rates of survival (high or low), or unanticipated changes in exploitation rates in prior fisheries. Methods used to derive the pre-season forecasts, for 2005, are detailed in Appendix A of this report. In most cases, the escapement goals indicate the currently accepted estimate of escapement abundance necessary to provide for future maximum sustainable harvest (MSH), under average progeny survival conditions. Expected escapements are those that would result from the stated forecasts after fisheries consistent with the parties' pre-season planned management framework.

With the exception of Elwha River and Dungeness River-origin coho, no runs returning to the Strait of

Juan de Fuca tributaries in 2005 are expected to have a significant harvestable surplus available for harvest in directed fisheries. Therefore, the parties' management framework has focused on the need to provide opportunity to limited fisheries while striving to maintain protective and rehabilitative measures for Strait of Juan de Fuca salmon returning to natural spawning areas (See Section 4.0 of this report).

2. 2005 Fishery Management Periods

Area	Chinook	Pink	Summer Chum	Coho	E. Fall Chum	L. Fall Chum	Winter Steelhead
6D & Dungen. I	07/25-09/17	08/07-09/24	---	09/18-10/29	10/30-12/03	---	12/04-3/31
Dungeness II	08/08-09/24	08/07-10/08	---	09/25-10/22	10/23-12/10	---	12/11-04/15
Elwha	07/17-09/10		---	09/11-11/05	11/06-12/10	---	12/11-04/15
Discovery-Sequim Tributaries	---		09/18-10/22	10/23-12/29	---	---	12/04-04/30
Hoko-Sekiu	09/11-11/10		---	09/28-11/12	11/13-12/10	---	12/11-03/31
Misc. SJF Tributaries	09/11-11/10		---	09/28-11/12	11/13-12/15	11/30-12/31	12/04-04/15

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

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

For 2005, the above management periods have been derived by the following steps: first the central 80% of the average entry pattern for each species, for each area where that species is found, was used as the "base" management period. The source of this information comes from a 1995 analysis of entry pattern information based on historical harvest and spawner entry, which was reviewed by the affected parties. Next, "overlaps" and "gaps" between the periods were eliminated, generally by halving. The resulting "start" and "end" dates for each period were adjusted to begin on the nearest Sunday and end on Saturday, in order to facilitate weekly fisheries management actions.

Finally, management periods should not be viewed as inflexible and may be adjusted in-season by agreement of the parties, on the basis of in-season information indicating a shift in run timing for a particular stock.

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

3.1 Summer/Fall Chinook Salmon

Strait of Juan de Fuca Chinook Salmon Management / Production Units

Fishery	Elwha R.	Dungeness R.	Hoko R.	Total
	Aggregate	Supplemented	Natural	
Recruits	3,372	889	1,244	5,505
Canada	600	158	221	979
Alaska	53	14	19	86
S.Falcon Tr/Rec	0	0	0	0
N.Falcon Tr/Rec	18	5	7	29
P.S. Troll	9	2	3	15
No. Snd + Strait Recreational	43	15	29	87
Cntl. + So. Sound Recreational	42	11	14	67
Puget Sound Net	23	6	9	38
6D Net	0	3	0	3
FW Recreational	1	0	0	1
FW Net	6	0	0	6
Mgmt Unit Harvest	795	214	302	1,311
Extreme Terminal Natural Mortality	55	0	0	55
Mgmt Unit Escap.	2,522	675	942	4,139
Min. Escap. Goal	2,332	628	879	3,840

The abundance of runs returning to rivers other than the Dungeness, Elwha, and Hoko, is quite uncertain. Estimates of pre-terminal harvests terminal run size are based on FRAM run #2705. The initial Dungeness River forecast was for chinook salmon expected to return to the terminal area. The Elwha run has been forecast as a single unit because a portion of the progeny of natural spawners is taken for hatchery brood stock, and conversely, a portion of the hatchery return spawns in the river. Methods used to forecast the Dungeness, Elwha and Hoko River runs are further detailed in Appendix A-1 of this report.

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

Escapement goals are those outlined in the Puget Sound Comprehensive Chinook Management Plan-Harvest Management Component. Methods used to estimate the expected escapement, and the escapement distribution, after anticipated pre-spawning mortalities and broodstock removals in the Elwha

River, are detailed in Appendix A-1. The expected escapement in the Hoko River includes any brood take by the Makah Tribe for in-river run augmentation. In all cases, little or no harvestable surplus is indicated under the current exploitation rate based management approach, therefore no commercial or recreational fisheries directed at chinook salmon are anticipated in the extreme terminal areas.

3.2 Pink Salmon

The pink salmon runs to the tributaries of the Strait of Juan De Fuca consist primarily of a natural run to the Dungeness River. The optimum level of escapement, for these primary management units of pink salmon, is currently unresolved. The parties agree that these units are forecast to return at levels well below their escapement needs and no harvestable surplus has been forecast for 2005. Details of the 2005 forecasting methods can be found in Appendix A-2 of this report. The estimated pre-terminal harvest rate has been forecast using the 1991 to 2003 average proportion of these runs intercepted in Canadian and Washington net fisheries directed at Fraser River runs (odd years).

Production Unit	Total Recruits	CDN Harvest	WA PreTerminal Harvest	Expected Escapement	Escapement Goal
Dungeness R.	8,270	538	620	7,112	N/A

3.3 Summer Chum Salmon

Production Unit	Total Recruits	CDN Harvest	WA Preterminal Harvest	Expected Escapement	Escapement Goal
Chimacum Creek	870	55	22	793	91.2 % of recruits
Discovery Bay	5,329	336	133	4,860	91.2 % of recruits
Sequim Bay	605	38	15	552	91.2 % of recruits
Totals	6,803	429	170	6,205	

The methods used to develop the 2005 forecasts of summer chum salmon returning to the streams of Discovery Bay and Sequim Bay are detailed in Appendix A-3 of this report. The escapement targets of the Base Conservation Regime (BCR), of the Summer Chum Salmon Conservation Initiative, are those which would result on the average given application of the exploitation rate based regime. The 2005 summer chum run was forecast as total recruits to all fisheries and escapement. In addition to the Discovery Bay and Sequim Bay production units, Chimacum Creek is also expected to receive returns from a reintroduction program. The 2005 forecast of these returns is based on only a few years' data, therefore it should be considered conservatively.

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

3.4 Coho Salmon

The coho salmon runs returning to the Strait of Juan de Fuca tributaries consist of several small component natural runs in all river systems, as well as hatchery-supported returns to the Elwha and Dungeness Rivers. The Dungeness and Elwha origin runs are the only ones which were predicted to have significant harvestable numbers of coho salmon, sufficient to support directed fisheries in the terminal and extreme terminal areas in 2005. Other runs, while indicating a harvestable surplus in the aggregate, are composed of numerous small components.

Methods used to develop the forecasts for the 2005 season are summarized in Appendix A-4 of this report. Expected harvest numbers refer to the total anticipated harvests from both incidental and targeted fisheries which were modeled pre-season in FRAM run #0519. In 2005, given the expected returns of coho to the Strait primary units, the tribal and state co-managers considered the significantly lower expected interceptions in Canadian fisheries and structured the pre-season management framework to achieve a total exploitation rate of less than 40% for Strait of Juan de Fuca “primary” production units, which are managed for wild coho salmon. The escapement goals for aggregated management units are those necessary to meet the parties' agreed-upon enhanced production.

Strait of Juan de Fuca Coho Salmon Management / Production Units

Fishery	Miscellaneous Natural		Elwha R.	Dungeness R.	Subtotals		Total
	Eastern Natural	Western Natural	Aggregate ⁽¹⁾	Aggregate ⁽¹⁾	Natural	Hatchery & Secondary Natural	
Recruits	4,194	16,403	9,865	16,730	20,597	26,595	47,192
Canada	62	242	128	398	304	526	830
Alaska	1	3	1	3	4	4	8
S.Falcon Tr/Rec	9	40	30	121	49	151	200
N.Falcon Tr/Rec	156	604	366	1,095	760	1,461	2,221
P.S. Troll	2	9	1	10	11	11	22
Strait Rec.	139	546	408	2,503	685	2,911	3,596
SJI Rec.	0	0	0	0	0	0	0
Admiralty	5	17	9	20	22	29	51
N. Sound Rec.	0	0	0	0	0	0	0
S. Sound Rec.	4	18	10	18	22	28	50
Hood Canal Rec.	0	0	0	0	0	0	0
Strait Net	89	350	183	326	439	509	948
San Juans Net	4	20	9	34	24	43	67
Admiralty Net	0	0	0	0	0	0	0
No. Sound Net	1	6	3	5	7	8	15
So. Sound Net	6	25	13	33	31	46	77
Hood Canal Net	5	16	10	21	21	31	52
SJF Rivers Rec.	0	0	628	2,462	0	3,090	3,090
6D Net	0	0	0	3,671	0	3,671	3,671
Elwha/Dungen. Net	0	0	3,298	0	0	3,298	3,298
Miscell. Net	0	0	0	0	0	0	0
Mgmt Unit Harvest	483	1,896	5,097	10,720	2,379	15,817	18,196
Mgmt Unit Exp. Escapement	3,711	14,507	4,768	6,010	18,218	10,778	28,996
Min. Escap. Goal	2,516	9,842	1,272	906	8,239	2,178	10,417

Notes: (1) The Elwha R. "Aggregate" is composed of 9.5% secondary wild, and 90.5% hatchery coho salmon. The Dungeness R. "Aggregate" is composed of 6.5% secondary wild and 93.5% hatchery coho salmon.

3.5 Fall Chum Salmon

Production Unit	"4B" Run	Pre-Terminal Harvest	Terminal Run	Extr. Terminal Harvest	Expected Escapement	Escapement Goal
Dungeness R.	478	25	453	0	453	500
Deep Crk.	478	25	453	0	453	500
Pysht R.	1,579	82	1,497	11	1,485	1,650
Miscellaneous	909	47	862	21	840	900
Totals	3,444	179	3,265	33	3,233	3,550

Methods used to develop the forecasts of fall-timed chum salmon returning to the Strait of Juan de Fuca streams in 2005 are detailed in Appendix A-5 of this report. The final forecast for 2005 is the average of the forecast results, for each individual unit, obtained by PNPTC and WDFW, using different forecasting methods, shown in Appendix A-5 of this report. The expected harvests refer to the total incidental catch from these runs during preterminal and terminal area fisheries directed at other species and stocks. For 2005, no directed fishery is anticipated in the terminal or extreme terminal areas. The escapement goals are based on the overall escapement goal of 3,550 fall chum salmon for the region, as re-apportioned in 1987 on the basis of relative stock strength. These escapement goals are treated as interim, pending the development of more accurate escapement targets.

4. Pre-Season Management Framework

4.1 2005 Harvest Management Measures and Expected Fisheries

In 2005, the condition of the salmon runs returning to the Strait of Juan de Fuca terminal areas requires that harvest management plans be conservative in all respects. The expected return of most runs in 2005 is very low and the co-managers have agreed to limit directed harvests to coho salmon returning to the Elwha and Dungeness areas, which will be sufficiently abundant to warrant directed fisheries, within the constraints of low status exploitation rate limits. In particular, the planned restrictions on Canadian fisheries (designed to protect British Columbia coho salmon) combined with improved escapements of wild coho to Strait streams, have afforded us the opportunity to implement exploitation rate based management for wild coho, by adopting conservative management practices.

4.1.1 Commercial Fisheries

In the Strait of Juan de Fuca, treaty Indian troll fisheries are anticipated, from 6/16 through 9/30, in Areas 5, 6 (west of Green Pt.), and Area 6C. During that period, chum salmon will be released and the following areas shall be closed to trolling: 1,000 ft. radius around stream mouths, Freshwater Bay, Port Angeles Harbor and Hoko Bay from Kydaka Pt. to Shipwreck Pt. From 10/1 through 10/31, treaty Indian troll fisheries will be closed. From 11/1 through 2/28/2006 fisheries are anticipated in Areas 5, 6, 6C, as well as Area 4B, with the following restrictions: 1,000 ft. radius closure around stream mouths. During this period, fisheries will be adjusted to stay within harvest guidelines, as assessed by FRAM #2705.

In preterminal (mixed stock) areas, a treaty Indian drift gillnet fishery, directed at Fraser River sockeye salmon, in Areas 4B, 5 and 6C is planned (est. start 7/20) to end no later than 9/10. In Area 6, Treaty Indian gillnet fisheries for Fraser River sockeye salmon are also anticipated in the month of August. Fisheries directed at Fraser River pink salmon are anticipated in the first two weeks of September. Drift gillnet fisheries for coho salmon will operate in Areas 4B, 5 and 6C, from the end of the Fraser Panel control, through October 8, with the chum salmon fishery following at 5 days per week, from October 10 through November 12. The coho fishery shall be managed to ensure that the pre-season estimated incidental and directed coho catch is not greatly exceeded. In order to accomplish this, openings may vary from 1 to 5 days per week.

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

During the 2005 season, treaty Indian set net fisheries for chinook salmon, in Areas 4B, 5 and 6C, will operate from June 16 through August 13 (August 20 in Area 6C). A 6.5" minimum mesh size restriction shall be used in order to avoid the capture of Lake Washington sockeye. In these areas, Hoko Bay will be closed from Kydaka Pt. to Shipwreck Pt., and Freshwater Bay, south of a line between Angeles Pt. and Observatory Pt., will be closed, in addition to a closure of 1,000 ft. around all stream mouths.

In Area 6D, no commercial fisheries will take place during the chinook and fall chum salmon management periods in order to maximize the protection necessary to these weak runs. Treaty Indian fisheries for coho salmon are planned for Area 6D from 9/21 through 10/29, with daytime only gillnet fishing and a requirement of chinook and chum salmon release through 10/10. A non-treaty skiff gill net fishery is

planned from 9/21 through 10/29 with non-retention of chinook and chum salmon. These measures are intended to provide additional protection to ESA listed chinook and summer chum salmon. During fisheries for coho salmon, an area closure within 1,500 feet seaward from each mouth of the Dungeness River, will be used to further limit the harvest of non target species as well as concentrated schools of coho salmon milling at the river mouth. If surveys indicate a high likelihood of fishing impact to chinook and or summer chum salmon, additional measures may be employed including time-area restrictions, gear restrictions etc., as necessary. During this fishery, fishers will be required to attend to their gear at all times, when release of non target species is in effect. Inseason, the extent and duration of the coho fishery will be determined by the fishing effort and the inseason estimate of the coho run abundance entering the terminal area.

Of the various extreme terminal areas (rivers) along the Strait of Juan de Fuca, treaty Indian commercial fisheries are anticipated only in the Elwha River and, if necessary, in the Dungeness River. All other rivers shall remain closed to commercial salmon fishing at all times prior to the 2005-2006 winter steelhead salmon season.

In the Dungeness River (Area 76A), downstream of the Dungeness Hatchery intake (R.M. 11.3), if a harvestable surplus of coho is available, fisheries of up to 3 days per week may be authorized using selective gear only (any gear that is capable of releasing salmon alive), starting no earlier than October 16. This restriction will be necessary because of low water conditions and the potential impact on non-target species in need of protection. The extent and duration of such fisheries will depend on the findings of in-season stream surveys.

The treaty net fishery for coho in Area 76B (Elwha River) has been planned to occur from 9/11 through 10/22. Drift gillnets may be authorized only if river flow conditions require their use. The start of the coho fishery may also be "shaped", to the extent necessary, to avoid unnecessary impacts to chinook escapement and broodstock collection. In order to ensure that coho escapement needs are met, the fishery will be restricted to areas upstream of the Elwha Hatchery during the last half of October (if the hatchery escapement goal has not already been achieved). Hatchery area closures will include the area from 150 ft. upstream, to 150 ft. downstream of the Elwha Hatchery and the Elwha Rearing Channel outfalls.

4.1.2 Test Fisheries

No test fisheries, directed at salmon, are anticipated in any Strait of Juan de Fuca terminal areas, during the 2005 season.

4.1.3 Recreational Fisheries

Marine area recreational fisheries in mixed-stock areas of the Strait of Juan de Fuca are detailed in 2005/2006 Sport Fishing Rules Pamphlet (WDFW 2005). Area 6D will be closed to angling from May 1 through September 30 and will then open with a two fish bag limit on coho only through October 31. It shall then be closed to salmon fishing from November 1 through April 30, 2006.

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

taking of salmon and gamefish gear shall be restricted to fly fishing during the months of September and October.

4.2 Other Recommended Measures

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

Intensive spawner surveys in summer chum drainages (Discovery Bay, Sequim Bay, Chimacum Creek, Dungeness River) should be continued in 2005 to determine the number, age, sex ratio, and distribution of spawners. In the Dungeness system, sufficient information concerning summer chum salmon is lacking. Therefore surveys of similar intensity and scope should be conducted. Mixed stock fisheries directed at other species should also be monitored and sampled for otolith marked chum salmon, from the various supplementation programs, to gain information on the incidence and origin of summer chum interceptions. The in-stream supplementation program, utilizing native spawners, in Salmon Creek and JimmyComeLately Creek, should be continued.

Federal, State, and Tribal fisheries agencies, and private organizations have developed and implemented a captive brood stock program designed to rehabilitate chinook salmon runs to the Dungeness River. The primary goal of this recovery program is to increase the number of fish spawning naturally in the river while maintaining the genetic characteristics of the existing Dungeness stock. The long term success of this program will depend on the continuing efforts to monitor and assess stock status, determining and correcting the factors that currently limit production (including habitat degradation), and designing and implementing long term monitoring and evaluation plans designed to determine the effectiveness of the recovery effort, as well as assist in improving management of the resource. The 2005 run will be the fourth return of 5 year olds returning from the broodstock program. There is a need to measure these returns as accurately as possible to evaluate initial success of the program. These efforts should be continued in accordance with the Dungeness River Chinook Rebuilding Plan. Specifically, in 2005, releases of smolts from this program should be tagged, using CWT's. Their downstream emigration should be monitored using smolt traps. Finally, studies to determine critical freshwater habitat for this species should be implemented.

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

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

Although none have been proposed for 2005, limited test or evaluation fisheries, or instream surveys, are recommended to assess the Pysht and Lyre rivers' fall chum runs, to document run timing and age composition, and to evaluate assumptions concerning the relation of the Pysht River as an escapement index area to other tributaries in the Strait of Juan de Fuca region.

4.3 Inseason Run Size Updates

During the 2005 season, no inseason updates of run abundance will be provided for chinook, summer chum, and fall chum salmon returning to the miscellaneous Strait of Juan de Fuca streams. Since no directed fisheries are planned or anticipated for any of these runs, and no inseason management action is contemplated, the pre-season forecasted returns to the terminal areas will be sufficient.

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

For coho salmon returning to the Dungeness River system, an inseason update of terminal run abundance will be performed given that satisfactory cumulative catch per cumulative landing information from the gillnet fishery in area 6D is available. Methods that will be used to derive the inseason estimate, for 2005, are detailed in Appendix B. If sufficient fishing effort data are not available, the fishery will be managed in-season on the basis of subjective estimates of abundance, escapement progress, and fishing effort.

APPENDIX

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

A. Pre-Season Forecasting Methods

A-1. Chinook Salmon

A-1.1 Dungeness River Natural

The forecast of the Dungeness River natural-origin chinook salmon terminal area run for 2005, was estimated using the mean of the post season estimates of the 2001-04 terminal (Area 6D) runs. The run sizes for the return years 2001-04 best represent current survival conditions. The races were aggregated because of the lack of adequate information to separately quantify the returns of any spring and summer chinook salmon. The 2005 terminal area forecast return is 685 natural chinook salmon (Table A-1-a).

In the Dungeness River, recent returns were influenced by releases of supplementation chinook. It is not known whether the predicted returns may have been unduly influenced by the past returns of supplemented fish, therefore caution is urged when using this forecast. This forecast was used to estimate recruitment inputs for pre-season simulation modeling.

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

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

2005 Forecast (Average Return 2001-04)		685
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A-1.2 Elwha River

The 2005 forecast return of Elwha River chinook salmon, to the terminal area, was estimated as the 2001-04 average terminal area run. The resulting 2005 terminal area forecast is 2,603 (Table A-1-b).

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

Return Year	Extreme Terminal Run	Natural Spawning Escapement	Hatchery Broodstock	Prespawning Mortality	Terminal Harvest
1986	3,159	855	1,414	858	32
1987	6,220	1,642	1,989	2,262	327
1988	8,667	5,228	2,167	478	794
1989	5,704	3,035	1,892	560	217
1990	3,606	1,644	1,312	224	426
1991	3,761	1,642	1,719	108	292
1992	4,002	479	743	2,637	143
1993	1,669	633	929	7	100
1994	1,580	163	1,053	330	34
1995	1,814	524	626	662	2
1996	1,877	364	1,244	267	2
1997	2,534	1,578	939	10	7
1998	2,411	720	1,638	51	2
1999	1,642	903	699	23	17
2000	1,913	715	1,136	62	0
2001	2,246	655	1,553	38	0
2002	2,416	863	1,513	40	0
2003*	2,305	1,045	1,182	78	0
2004	3,443	2,075	1,329	39	0
2001-04	2,603				
2005 Forecast	2,603				

Harvest does not include Recreational Catch

(*) The 2003-04 estimates are preliminary and subject to revision

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

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

In order to estimate the potential escapements in 2005, the forecasted return to the Elwha River was further apportioned, using the 2001-2004 mean proportions (Table A-1-c), as follows: Of the 2,603, **14.21%** (370) are expected to voluntarily return to the Elwha Rearing Channel, and **85.79%** (2,233) to the river. The voluntary hatchery return was reduced by **15.09%** (56), to account for average on-station pre-spawning mortality, leaving 314 hatchery spawners. The in-river escapement was not reduced for in-river pre-spawning mortality, based on recent years' survival. However, the 2,233 in-river escapement was reduced by **50.07%** (1,118) to account for broodstock removals (gaff & seine), leaving an anticipated in-river spawning escapement of 1,115 chinook salmon and an anticipated hatchery broodstock total of 1,432.

A-1.3 Hoko River

The forecast of Hoko River chinook salmon for 2005 was estimated as the 2001-04 average return to the terminal area. The 2005 forecast estimate is 955 chinook salmon (Table A-1-d).

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

Return Year	Hoko River Escapement	Commercial Catch	Recreational Catch
1986	801	38	0
1987	581	25	0
1988	776	37	7
1989	842	17	3
1990	493	5	0
1991	1,006	16	10
1992	740	9	6
1993	894	14	0
1994	428	11	8
1995	905	20	0
1996	1,265	5	4
1997	891	20	8
1998	1,722		0
1999	1,688		0
2000	731		0
2001	946		0
2002	686		0
2003	1,100		0
2004	1,088		
Average 2001-04	955		

A-2. Pink Salmon

A-2.1 Natural Runs

Naturally produced Puget Sound pink salmon were forecast in 2005 using cycle year return per spawner rates. The biennial nature of pink salmon returns result in three distinct groupings of brood year returns (Table A-2-a). The 2005 return of pink salmon to the Dungeness River was forecast by applying the mean Cycle 2 return rate (0.55) to the 2003 parent brood escapement (15,148). This results in an estimated return of 8,401 natural Dungeness pink salmon. The return-per-spawner rate from the 1961 (Cycle 2) was excluded from the calculation of mean return rates, as outlier (Table A-2-b).

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

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

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

Cycle 1 BY	Cycle 1 R/S	Cycle 2 BY	Cycle 2 R/S	Cycle 3 BY	Cycle 3 R/S
1959	2.27	1961	13.63	1963	0.26
1965	2.85	1967	0.22	1969	4.42
1971	1.66	1973	0.84	1975	2.52
1977	3.67	1979	0.11	1981	1.95
1983	1.32	1985	0.49	1987	9.36
1989	1.38	1991	0.19	1993	6.22
1995	1.04	1997	1.47	1999	11.47
2001	0.20	2003		2005	
Average:	1.80		0.55		4.89
Std.Dev.	1.09		0.52		3.01
2005 PNPTC Forecast (CY 2) Recruits					8,401
2005 WDFW Forecast					8,138

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

A-3. Summer Chum Salmon

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

Year	Discovery	Sequim	Chimacum	Eastern Strait Total
1974	1,494	492		1,986
1975	1,374	373		1,747
1976	1,264	409		1,673
1977	1,364	446		1,810
1978	2,413	828		3,241
1979	699	201		900
1980	4,127	1,447		5,574
1981	879	261		1,140
1982	2,771	771		3,542
1983	946	272		1,218
1984	1,311	397		1,708
1985	304	108		412
1986	890	327		1,217
1987	1,673	508		2,181
1988	2,952	1,177		4,129
1989	441	355		796
1990	432	98		530
1991	253	172		425
1992	592	802		1,394
1993	520	124		644
1994	196	18		214
1995	647	234		881
1996	1,075	31		1,106
1997	923	62		985
1998	1,206	101		1,307
1999	532	7	38	577
2000	879	55	52	986
2001	2,811	262	909	3,982
2002	6,072	42	867	6,981
2003	6,002	450	562	7,014
2004*	6,430	1,665	1,141	9,236
2005 Forecast:	5,329	605	870	6,803

*The 2004 estimate is preliminary and subject to revision

The 2005 return of summer-timed chum to the Discovery, Chimacum and Sequim Management Units was forecasted as a 4 year mean (2001-2004) of the total recruitment, of each unit, to all fisheries and escapement (Table A-3-a). The forecasts are 5,329 fish to the Discovery MU, 605 fish to Sequim MU and 870 to the Chimacum MU. Recruits to the Dungeness / Graywolf system are unquantifiable at this time.

A-4. Coho Salmon

A-4.1 Natural Runs

The method used to develop the 2005 forecasted return of naturally reared coho salmon, for primary units, relied on an estimate of emigrating smolts (2004 emigration), multiplied by an estimate of marine survival.

A-4.1.1 Naturally reared smolts

For primary units in the Western Strait of Juan de Fuca (SJF) the number of smolts from five production units, comprising 19.03% of the total, was measured and expanded to 182,356 smolts for the sub-region (Table A-4-a). For primary units in the Eastern SJF the number of smolts from two production units, comprising 16.31% of the total, excluding Snow Creek, was measured and expanded to 33,409 wild smolts for the sub-region (Table A-4-a). To those, we added 13,232 smolts from the Snow Creek supplemented natural emigration, bringing the sub-region total to 46,641 smolts (Table A-4-c). The total number of estimated smolts, produced from all primary units, is estimated at 228,996.

This is the second year that the Snow Creek supplemented smolts have been included in the forecast, so the estimate of recruit contribution from this supplementation activity may be somewhat optimistic. It is currently unknown whether smolts originating from this supplementation program are experiencing survival rates comparable to those generally estimated for naturally reared smolts, or may be intermediate between naturally and hatchery reared smolts.

The number of emigrating smolts from secondary units (Elwha River and Dungeness River) was estimated by extrapolation, using the ratio of the natural escapement of the secondary units to that of the primary units in the parent brood year (2002) (Table A-4-b). This resulted in an estimate of 22,402 smolts, from secondary natural units.

A-4.1.2 Marine Survival

The forecasted survival value of 12.04% was obtained by estimating an average recruits/smolt relationship, using escapement in parent years 1998-2000 and smolt emigration in years 2000-2002 with associated DA2 recruitment in return years 2001-2003. Applying this marine survival value to the estimates of 2004 emigrating smolts, resulted in an estimate of 27,559 primary December-Age 2 (DA2) coho recruits (5,613 Eastern and 21,946 Western) (Table A-4-c) and an estimate of 2,696 DA2 coho recruits from secondary units (1,251 Elwha and 1,445 Dungeness) (Table A-4-d).

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

2004 Smolt Trapping	Enumerated Smolts	Enumerated Proportion of Total Potential	Estimated Total Smolts
Snow Crk. (Suppl. Nat.)	13,232		13,232
Jimmycomelately Crk	2,482		
Siebert Crk	2,966		
East Total w/o Snow	5,448	0.16307	33,409
Salt Crk	11,423		
E. Twin R.	8,950		
W. Twin R.	2,329		
Deep Crk	8,254		
Johnson Crk	3,754		
West Total	34,710	0.19034	182,356
E+W+Snow Total	40,158		228,996

Table A-4-b. Estimation of Marine Survival

	RY 2001	RY 2002	RY 2003
Primary, Parent Escapement (RY-3)	16,517	9,328	18,980
Secondary, Parent Escapement (RY-3)	1,272	1,339	5,107
Primary Proportion	0.92850	0.87447	0.78798
Primary Smolts (RY-1)	383,322	285,427	264,724
Primary Recruits (RY)	59,249	31,876	25,096
Marine Survival	0.15457	0.11168	0.09480
Primary Escapement (RY)	36,963	23,133	15,242
Secondary Escapement (RY)	6,227	2,263	3,948
Mean Smolt to Recruit Survival			0.12035

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

Primary Management Units	Measured Wild Smolts	Proportion of Total Potential Measured	Estimated Total Smolts w Snow	DA2's Using Mean Marine Survival
East Strait	5,448	0.16307	46,641	5,613
West Strait	34,710	0.19034	182,356	21,946
SJF Summary	40,158		228,996	27,559

Table A-4-d. Secondary Management Units Summary

Secondary Management Units	2002 Natural Escapement	2002 Brood Escapement Proportion	Estimated DA2's
Elwha	1,050	0.464	1,251
Dungeness	1,213	0.536	1,445
Total Secondary	2,263	1.000	2,696

A-4.2 Hatchery Runs

The 2005 returns of Strait of Juan de Fuca hatchery coho were predicted using the estimated 2001-03 (3 years - 1 brood cycle) average smolt survival to DA2 recruits, applied to the 2004 smolt releases (Table A-4-e). More specifically, the following sources of information were selected:

Dungeness Hatchery: 2001-2003 average recruits per smolt (0.04074) (Table A-4-e). Given a release of 509,300 smolts, the 2005 forecast is 20,751 DA2 recruits.

Elwha Hatchery: 2001-2003 average recruits per smolt (0.01808) (Table A-4-e). Given a release of 661,700 smolts, the 2005 forecast is 11,961 DA2 recruits.

The total hatchery-origin pre-season forecast value of 32,712 DA2 recruits (30,226 Age 3 ocean) were used for simulation modeling and pre-season planning.

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

Run Year	Dungeness Hatchery			Elwha Hatchery			
	Smolts Released	DA 2 Recruits	R/Sm	Smolts Released	DA 2 Recruits	R/Sm	
1979	796,100			1,387,900			
1980	399,200			837,900			
1981	679,700			1,168,700			
1982	929,400			2,845,100			
1983	106,590			2,756,200			
1984				567,800			
1985	188,000			751,000			
1986	298,000			645,400			
1987	320,000			836,000			
1988	748,600	20,948	0.02798	728,500	5,260	0.00722	
1989	301,700	25,401	0.08419	240,700	15,017	0.06239	
1990	359,050	20,811	0.05796	413,500	12,320	0.02979	
1991	342,700	12,102	0.03531	768,600	3,522	0.00458	
1992	296,400	14,058	0.04743	688,600	9,848	0.01430	
1993	433,700	9,789	0.02257	755,600	4,913	0.00650	
1994	340,000	8,923	0.02624	580,000	2,504	0.00432	
1995	680,000	26,830	0.03946	707,700	10,250	0.01448	
1996	808,700	29,804	0.03685	801,000	13,705	0.01711	
1997	871,600	16,596	0.01904	722,200	11,988	0.01660	
1998	774,600	8,287	0.01070	643,037	6,272	0.00975	
1999	877,300	6,155	0.00702	867,379	9,451	0.01090	
2000	788,600	35,645	0.04520	645,856	4,999	0.00774	
2001	865,700	43,538	0.05029	684,856	15,347	0.02241	
2002	550,700	13,913	0.02526	494,610	12,757	0.02579	
2003	565,300	26,387	0.04668	662,231	3,993	0.00603	
2004	505,750			724,594			
2005	509,300			661,700			
Average(2001-03):			0.04074	Average (2001-03):			0.01808
2005 Forecast DA2's			20,751				11,961

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

Year	E. Strait	W. Strait	Total
1986			9,883
1987			4,860
1988			4,332
1989			7,222
1990			4,030
1991			3,752
1992			6,126
1993			3,329
1994			2,503
1995			6,386
1996			5,035
1997			5,788
1998	1,389	15,128	16,517
1999	1,360	7,968	9,328
2000	2,110	16,870	18,980
2001	2,626	34,337	36,963
2002	2,548	20,585	23,133
2003	2,853	12,389	15,242

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

A-5. Fall Chum Salmon

A-5.1 Natural Fall Chum Salmon Forecast (PNPTC)

The 2005 return of fall-timed chum salmon to the Strait of Juan de Fuca tributaries was forecasted by PNPTC, in the aggregate, as the average of the natural and off-station runs observed in the years 1999 through 2003 (Table A-5-a). The resulting forecast of **2,024**, was apportioned on the basis of historical escapement survey data which resulted in the following proportions: Pysht River (46%), Dungeness River (14%), Deep Creek (14%), and miscellaneous, including Elwha R. and Lyre R. (26%) (Table A-4-e).

A-5.2 Natural Fall Chum Salmon Forecast (WDFW)

The 2005 return of wild fall-timed chum salmon to Strait of Juan de Fuca streams was forecast as a portion of the total return of all Puget Sound natural fall-timed chum. The Puget Sound return was initially forecast using parent brood escapements, long-term odd/even-year specific average R/S values, and long-term odd/even-year specific mean proportions returning at age for 3, 4, and 5-year old returns. For example, the three-year old forecast was derived by multiplying the 2002 wild escapement by the mean even-brood R/S value to get a total return of 2002 brood offspring. That number was then multiplied by the mean return at age 3 for even-year broods, yielding the 2005 age 3 return forecast. This was repeated for 4 and 5-year old components, and all three were summed to obtain a total Puget Sound forecast of 1,545,330 (Table A-5-b).

The return of each age group to Puget Sound was apportioned to individual regions (including the Strait of Juan de Fuca), using proportions of the parent escapement of each brood into each unit. The resulting forecast for Strait of Juan de Fuca natural fall chum salmon is 4,864 (Table A-5-d). The forecasts for individual production units are shown in Table A-5-e.

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

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

Return Year	Fall Chum Run Size	Return Year	Fall Chum Run Size
1980	5,862	1992	5,654
1981	6,518	1993	5,775
1982	6,744	1994	2,564
1983	1,765	1995	610
1984	8,280	1996	2,162
1985	8,330	1997	3,927
1986	1,922	1998	1,535
1987	7,269	1999	1,313
1988	13,962	2000	269
1989	4,331	2001	1,737
1990	1,220	2002	5,198
1991	1,941	2003	1,605
Average (All Yrs.):			3,762
PNPTC Average 1999-03:			2,024
Std. Dev. (99-03):			1,668

Table A-5-b. 2005 Puget Sound Natural Fall Chum R/S Based WDFW Forecast

Parent Brood	Age	Parent Escapement	Mean R/S¹	Estimated R/S (all ages)	Mean Age Composition¹	Natural Forecast
2000	5	193,762	2.58518	500,910	0.04874	24,414
2001	4	572,576	3.11245	1,782,114	0.56455	1,006,093
2002	3	1,082,187	2.58518	2,797,648	0.18402	514,823
					Total	1,545,330

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

Table A-5-d. 2005 WDFW Puget Sound Natural Chum R/S, Sibling and Average of Forecasts

	R/S	SJF Parent Escapement Proportion	SJF Forecast by Age
Age 3 (2002 Brood) Forecast	514,823	0.00423	2,175
Age 4 (2001 Brood) Forecast	1,006,093	0.00265	2,661
Age 5 (2000 Brood) Forecast	24,414	0.00113	28
Total Forecast (4B)	1,545,330		4,864

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

Area	Proportion	PNPTC Forecast	WDFW Forecast	Joint Forecast
Pysht R	0.458	928	2,229	1,579
Dungeness R	0.139	281	676	478
Deep Creek	0.139	281	676	478
Miscellaneous	0.264	534	1,284	909
Total		2,024	4,864	3,444

B. Inseason Run Assessment Methods

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

B-1. Dungeness Coho Salmon

Prior to October 10, the pre-season terminal run size forecast will serve as the estimate of the run entering Dungeness Bay (Area 6D). For the Dungeness River coho salmon, run size updates will be estimated on October 6, if there has been sufficient fishing effort from September 16 through October 5, using catch and landing data through October 5. Fishing effort and harvest will be considered sufficient if more than eight fishers are participating in this fishery, for the period under consideration. The update will be based on a linear regression model relating total terminal run size (including all terminal and extreme terminal commercial and recreational catches and escapements) to cumulative catch per cumulative landings (treaty and nontreaty) in Area 6D. The regression is based on run sizes and catches from the 1985 - 2004 period with certain years excluded because of low effort. The excluded years are 1993 - 1995, 1997 and 1999. The update model for October 6 is as follows:

$$6D \text{ Run Size} = -866.9436 + (482.2577 * CC/CL \text{ through } 10/5)$$

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

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

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

Using Data through Oct - 6	
R^2	0.79787
R^2 Adjusted	0.78440
Std Error	4392.53
N	17
β_0	-866.9436
β_1	482.2577
$P(\beta_0 = 0)$	0.655

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

Year	Dungeness Bay Run Size			Catch	Landings	CC/CL
	Hatchery	Natural	Total			
1979	5,035	1,387	6,422			
1980	13,513	3,721	17,234			
1981	16,534	4,553	21,087			
1982	21,815	6,007	27,822			
1983	10,279	2,830	13,109			
1984	1,199	330	1,529			
1985	3,708	1,021	4,729	747	70	10.67
1986	4,725	1,301	6,026	2,228	106	21.02
1987	5,938	1,635	7,573	1,789	100	17.89
1988	5,006	1,378	6,384	2,507	162	15.48
1989	5,474	1,507	6,981	1,887	113	16.70
1990	4,477	1,233	5,710	737	95	7.76
1991	4,496	1,238	5,734	1,898	142	13.37
1992	2,835	781	3,616	660	60	11.00
1993	3,321	914	4,235	73	13	5.62
1994	2,496	687	3,183	844	32	26.38
1995	11,636	3,204	14,840	537	23	23.35
1996	7,912	2,179	10,091	528	23	22.96
1997	12,806	3,526	16,332	172	9	19.11
1998	7,527	2,073	9,600	2,264	72	31.44
1999	4,289	1,181	5,470	497	18	27.61
2000	25,554	7,036	32,590	6,542	84	77.88
2001	27,232	7,498	34,730	4,438	86	51.60
2002	10,235	2,818	13,053	1,055	52	20.29
2003	15,548	4,281	19,829	1,902	47	40.47
2004	5,174	1,425	6,599	1,210	64	18.91