

Progress Report for 2007 Chinook Encounter Study

SUBMITTED TO:

US CHINOOK TECHNICAL COMMITTEE
FOR FUNDING UNDER THE BUDGET INCREMENT ASSOCIATED
WITH THE U. S. CHINOOK LETTER OF AGREEMENT AND ABUNDANCE-
BASED MANAGEMENT

SUBMITTED BY:

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
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May 1, 2007 through September 30, 2007

PREFACE

The chinook annex of the 1999 PSC Agreement mandates that the Chinook Technical Committee (CTC) use estimates of total mortality to assess the impacts of fishery regulations in PSC fisheries. The current methodology uses landed catch for establishing quota values and harvest sharing between the parties. This project is focused on development of information necessary to create a new model for fishery regulation analysis. The objectives of the study reflect the requirement for the CTC to produce new estimates of stock impacts which include all sources of mortality. The goals of this project are to estimate the number of chinook salmon released and stock composition of all encountered chinook salmon in the Washington ocean and Puget Sound troll and sport fisheries.

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1. INTRODUCTION

The Pacific Fishery Management Council (PFMC) adopted 2007 recreational and commercial troll fisheries for all salmon species in the area between Cape Falcon, Oregon and the U.S./Canada border. Mark-selective fisheries for coho were included in all four Catch Record Card areas (Areas 1, 2, 3, and 4) for both recreational and commercial fisheries.

Council-area fisheries were adopted based on assumptions regarding coho and chinook abundance, distribution of stocks, chinook age class distributions, coho mark rates, compliance with selective fishery regulations, and incidental mortality. The Washington Department of Fish and Wildlife (WDFW) implemented a monitoring plan to test some of these assumptions through dockside catch and effort sampling along with on-water observations of the fisheries in progress. Both dockside and on-water sampling included collection of DNA tissue samples from chinook.

2. OBJECTIVES

The objectives of the CTC-sponsored portion of this project are: first, to estimate the number of legal and sublegal sized chinook salmon encountered during the Washington non-treaty ocean troll and recreational fisheries such that all estimates will fall within $\pm 30\%$ of the true value 90% of the time and, second, to collect genetic material (DNA tissue samples) from sublegal and legal sized chinook to estimate the stock composition by age. In 2007, WDFW was funded only for DNA data collection from the non-Treaty troll fishery during May and June. However, as time allowed, DNA data were collected during the summer sport fishery as well.

The objectives of the mark-selective coho fishery monitoring portion of this project are to test some of the assumptions used during the process of modeling ocean fisheries, specifically to determine coho mark rates by area and month, to determine compliance with selective fishery regulations, to estimate incidental mortality, and to compare release information collected dockside with observed release data.

3. SEASON DESCRIPTION

3.1 Ocean Recreational Fisheries

Area 1: The ocean recreational fishery from Cape Falcon, Oregon to Leadbetter Point, Washington and west of the Buoy 10 line at the Columbia River mouth was open for all salmon species seven days per week from July 1 through August 25 and from September 2 through September 30, for a total of 85 fishing days. A daily bag limit of two salmon, only one of which could be a chinook in effect. All retained coho were required to have a healed adipose fin clip. The Columbia Control Zone was closed.

Area 2: The ocean recreational fishery from Leadbetter Point to the Queets River was open for all salmon species Sunday through Thursday from July 1 to August 16, and seven days per week from August 17 to September 16, for a total of 66 fishing days. A daily bag limit of two salmon, only one of which could be a chinook in effect. All retained coho were required to have a healed adipose fin clip. The Grays Harbor Control Zone was closed beginning August 1.

Area 3: The ocean recreational fishery from the Queets River to Cape Alava was open for all salmon species Tuesday through Saturday from July 3 through August 16, and seven days per week from August 17 through September 15. From September 22 to October 7, salmon fishing was restricted to the part of Area 3 north of 47°50'00" north latitude and south of 48°00'00" north latitude, seven days per week. A total of 79 fishing days were available in Area 3. A daily bag limit of two salmon, only one of which could be a chinook in effect. All retained coho were required to have a healed adipose fin clip.

Area 4: The ocean recreational fishery from Cape Alava to the U.S./Canada border was open for all salmon species Tuesday through Saturday from July 3 through August 16, and seven days per week from August 17 through September 15, for a total of 63 fishing days. A daily bag limit of two salmon, only one of which could be a chinook in effect. No chum retention was allowed from August 1 through September 15. All retained coho were required to have a healed adipose fin clip. Chinook retention east of the Bonilla-Tatoosh line was allowed from July 3 through July 31 only.

3.2 Non-Treaty Commercial Troll Fisheries

The non-treaty troll fishery was open from Cape Falcon, Oregon to the U.S./Canada border May 1-2, May 5-8, May 12-15, May 19-22, May 26-29, June 2-5, June 9-12, June 16-19, and June 23-26 for all salmon except coho (a total of 34 days). The fishery reopened from Cape Falcon to the U.S./Canada border July 1-3, July 7-10, July 14-17, July 21-24, July 28-31, August 4-7, August 11-14, August 18-21, August 25-28, September 1-4, September 8-11, and September 15-16 for all salmon species except no chum retention north of Cape Alava, WA in August and September. A total of 45 fishing days were available during the summer fishery.

4. METHODS

Direct on-water observation of salmon encounters was the primary method used to estimate the encounter ratios of legal to sublegal sized chinook, marked to unmarked coho, and drop-offs, and to collect DNA samples from sublegal chinook. Observers from WDFW rode along on charter boats to collect encounter rate data from the recreational fisheries. These observers recorded all hook-ups aboard the vessel; for each hook-up, the following information was recorded: result of the hook-up (fish kept, released, or dropped off), species, mark status, and size class (legal or sublegal). Recreational anglers were also solicited to use voluntary trip reports while fishing to record the above information.

An observer from WDFW also rode aboard commercial vessels participating in the non-treaty troll fishery from Area 2. As funding to pay commercial vessels to carry an observer was unavailable in 2007, just one vessel from Westport was willing to participate. Three on-board trips were taken, all in May. This observer recorded the same information as recreational fishery observers described above.

A sampling protocol was established for both the charter and troll observers so that the most important information relative to this study was collected first. The first priority for the observers was to record the species, mark status, and result of each hook-up aboard the vessel. This allows estimation of legal to sublegal chinook encounter ratios, marked to unmarked coho encounter ratios, and drop-off numbers. The second priority was to collect DNA samples (a small non-lethal clipping from the tip of the dorsal fin), lengths, and scale samples from sublegal sized chinook. DNA from sublegal sized chinook was prioritized above that from legal sized chinook since legal sized fish were available on the dock as well as at sea. The third priority was to collect DNA, lengths, and scale samples from legal sized chinook.

Dockside samplers were placed in the four major landing ports for the ocean fisheries: Neah Bay, La Push, Westport, and Ilwaco (including the port of Chinook). Each port was sampled a minimum of 4 to 5 days per week, with weekend and weekday days stratified. On each sample day, a total recreational boat count was obtained either by counting boats exiting the port or entering the port. A minimum of 20% of the boats returning to the port within each boat type (charter and private) was sampled, which should provide weekly estimates of catch by species and mark status with CVs no higher than 5%. Information collected during each sample included number of anglers, target species, area fished, landed catch by species, mark status of landed salmon, identification and recovery of coded wire tags, and angler estimates of released salmon by species and mark status and of released groundfish by species. Additionally, dockside samplers collected DNA samples, lengths, and scale samples from landed chinook as time allowed.

5. RESULTS

5.1 Recreational Catch and Effort

In Catch Record Card Area 1, a total of 42,518 anglers harvested 65,818 coho (92 percent of the 71,450 coho quota) and 2,222 chinook. In Area 2, a total of 25,916 anglers harvested 22,992 coho (81 percent of the 28,510 coho quota) and 5,247 chinook. In Area 3, a total of 3,268 anglers harvested 2,769 coho (90 percent of the 3,060 coho quota) and 596 chinook. In Area 4, a total of 13,367 anglers harvested 10,609 coho (87 percent of the 12,230 coho quota) and 1,470 chinook. Table 1 shows estimated total recreational landed coho and chinook catch by month for the catch areas north of Cape Falcon.

5.2 Non-Treaty Troll Catch Landed in Washington

A total of 2,865 coho and 500 chinook harvested in Area 1 during the non-treaty troll fishery were landed in Washington State ports. From Area 2, catches landed in Washington totaled 1,783 coho and 8,111 chinook. A total of 1,091 coho and 5,103

chinook were harvested in Area 3 and landed in Washington, while Area 4 catches totaled 147 coho and 554 chinook. Total catches north of Cape Falcon (landed in both Washington and Oregon) were 17,441 coho (78 percent of the 22,400 coho quota) and 15,704 chinook (97 percent of the 16,250 chinook quota). Table 2 shows estimated total non-treaty commercial troll landed coho and chinook catch by month for the catch areas north of Cape Falcon.

5.3 Legal and Sublegal Sized Chinook Encountered

The numbers of legal and sublegal sized chinook salmon encountered by observers in the ocean fisheries are shown in Table 3.

During the recreational fisheries, in Area 1, ride-along samplers on charter boats observed 50 chinook encountered; of those, 37 were legal sized and 13 were sublegal sized, resulting in a sublegal sized rate of 26%, compared with 60% in 2006. In Area 2, ride-along samplers on charter boats observed 194 chinook encountered; of those, 85 were legal sized and 109 were sublegal sized, resulting in a sublegal sized rate of 56%, compared with 8% in 2006. In Areas 3 and 4 (combined for chinook in this report since the FRAM chinook model combines those areas), observers on charter boats encountered 35 chinook, of which 11 were legal sized and 24 were sublegal sized, for a sublegal sized rate of 69% compared with 67% in 2006.

During the non-treaty troll fisheries, one on-board observer was present in Area 2 only. That sampler observed 256 chinook; of those, 113 were legal sized and 143 were sublegal sized, resulting in a sublegal sized rate of 56%, compared with 32% in 2006 (table 3).

5.4 Mark Rates in Selective Fisheries

Tables 4 and 5 show the mark rates of legal sized coho and chinook, respectively, encountered in the ocean recreational fisheries.

In Area 1, a total of 968 coho encounters were observed aboard chartered fishing vessels; of these encounters, 588 coho were adipose fin clipped. The overall coho mark rate through the season was 63%, while the mark rates by month were 69% in July, 63% in August, and 53% in September (Table 4). For chinook, a total of 50 encounters were observed; 10 of these were adipose fin clipped. The overall observed chinook mark rate was 23% through the season (Table 5). Dockside landings indicated a chinook mark rate of 52% through the season.

In Area 2, a total of 892 coho encounters were observed aboard chartered fishing vessels; 406 of these were adipose fin clipped. The overall coho mark rate through the season was 48%, while the mark rates by month were 56% in July, 40% in August, and 56% in September (Table 4). For chinook, a total of 200 encounters were observed; 49 of these were adipose fin clipped. The overall observed chinook mark rate was 30% through the season (Table 5). Dockside landings indicated a chinook mark rate of 36% through the season.

No onboard observer data were collected from the recreational fishery in Area 3. Dockside interviews indicated a coho mark rate of 30%; dockside examination of landed chinook indicate a chinook mark rate of 38%.

In Area 4, a total of 401 coho were encountered; 155 of these were adipose fin clipped. The overall coho mark rate through the season was 39%, while the mark rates by month were 34% in July and 42% in August; no observer trips were conducted in September in Area 4 (Table 4). For chinook, a total of 34 encounters were observed; 10 were adipose fin clipped (Table 5). Chinook mark rates through the season were 32% based on observer data and 52% based on dockside interview data.

5.5 Chinook to Coho Ratios

Table 6 shows observed ratios of encountered chinook to coho by month in the ocean recreational fisheries. Based on the on-board observation data, 0.05 chinook were encountered per coho in Area 1, 0.22 chinook were encountered per coho in Area 2, and 0.09 chinook per coho were encountered in Area 4.

Table 7 shows observed ratios of encountered chinook to coho in the non-treaty troll fishery. During the May-June chinook-directed fishery, the chinook to coho ratio was estimated at 1.54 chinook per coho in Area 2.

5.6 Comparison of Pre-season and Post-season Estimates of Mark Rates

Pre-season projections of 2007 coho mark rates were estimated using the Fishery Regulation Assessment Model (FRAM). The FRAM uses inputs of pre-season run size projections and historic coded wire tag recovery data to predict the resulting impacts from a proposed fishery. FRAM model run 0714 was the final pre-season assessment of the PFMC's adopted fishery package for the 2007 ocean fisheries.

Table 8 compares the coho mark rates projected by the FRAM model with those observed through on-water monitoring by month and area for the recreational fisheries. In all areas, the observed coho mark rate was lower than the projected mark rate. The observed coho mark rate for the season in the Area 1 recreational selective fishery was 63% compared to 72% projected pre-season. The observed coho mark rate for the season in the Area 2 recreational selective fishery was 48% compared to 65% projected pre-season, and the observed coho mark rate in the Area 4 selective fishery was 39% compared to 53% projected pre-season.

5.7 Comparison of Dockside and Observer Data in Recreational Selective Fisheries

Observation data during recreational selective coho fisheries were collected in part to investigate potential bias in estimates of coho mark rates based on angler recollection of released coho. Table 9 compares coho release rates based on dockside interview data with those release rates computed through on-board observation data.

Relative to estimates of released salmon from observation data, information collected at the dock showed a bias towards higher numbers of salmon released where comparisons are possible. This is consistent with results from previous years. Dockside sampling data from Area 1 showed an overall coho release rate of 47% compared to a rate of 39% observed on the water. In Area 2, the release rate reported dockside was 59%, compared with a release rate of 53% observed on the water. Dockside sampling data from Area 3 showed an overall coho release rate of 71%; there was no onboard observation data collected in Area 3. In Area 4, the release rate reported dockside was 73%, compared to a rate of 63% observed on the water.

5.8 Compliance

Information on compliance with selective regulations was collected through both dockside sampling by the WDFW sampling program and enforcement activities conducted by WDFW Enforcement staff.

Compliance with the selective fishery regulations in the recreational fisheries was high for both private and charter vessels. In Area 1, 49% of the total estimated coho landed in Washington by the recreational fishery were sampled dockside by the Ocean Sampling Program; the observed compliance rate in this area was 99.8%. In Area 2, 43% of the total estimated coho landed by the recreational fishery were sampled dockside; a compliance rate of 99.6% was observed during the selective coho fishery. In Area 3, 65% of the total estimated coho landed by the recreational fishery were sampled; the observed compliance rate was 99.0%. In Area 4, 35% were sampled dockside; a compliance rate of 98.7% was observed. Table 10 reports compliance rates observed by dockside samplers for the recreational fisheries by area and month. These rates are similar to the compliance rates observed in the last four seasons.

The WDFW Enforcement Program monitored compliance with selective fishery regulations in the recreational fisheries coastwide. Enforcement staff estimated compliance regarding the possession of unmarked coho at 99.6% in Area 1, 99.3% in Area 2, 99.5% in Area 3, and 99.6% in Area 4.

During the non-treaty troll fisheries, a total of 2,448 coho (42% of the total coho landed in Washington) were examined dockside by WDFW sampling staff. These samplers encountered 12 unmarked coho in the landed catch, for a compliance rate of 99.1%.

5.9 Drop Off Rates

On-water observers were asked to record information on fish that were hooked but lost before being brought to the boat, commonly referred to as drop offs. For this study, the definition of drop off was that the fish was actually hooked but became free before it could be landed. This definition calls for some judgment on the part of the observers recording the data, resulting in potential bias.

Current Council methodology for estimating mortality due to drop off uses a rate of 5% of the total number of fish handled (retention plus release). Drop-off mortality rates for the recreational fisheries throughout the season estimated from on-water observation data were less than 1% in all areas. Estimates of drop off mortality rates from on-water observation data collected during the recreational fisheries are compared with FRAM projections in Table 11.

5.10 Estimated Mortality

Table 12 shows the FRAM pre-season projections of total coho mortality in the ocean recreational fisheries. Estimates of actual coho mortality in these fisheries are shown in Table 13. This analysis uses estimates of coho mark rates from on-water sampling where available to estimate total coho released. Estimates of incidental mortality are calculated using rates adopted by the Council for recreational fisheries (5% drop off mortality and 14% hooking mortality).

In Area 1, incidental mortality is estimated at 10,611 which, when combined with a total coho retention of 65,817, puts the estimate of total coho mortality in the Area 1 selective fishery at 76,428. This compares to a pre-season projected total mortality of 67,795 coho.

Incidental coho mortality in Area 2 is estimated at 6,462 which, when combined with a total coho retention of 22,992, puts the estimate of total coho mortality in the Area 2 fishery at 29,454. This compares to a pre-season projected total mortality of 51,614 coho.

In Area 3, incidental mortality is estimated at 1,438 which, when combined with a total coho retention of 2,769, puts the estimate of total coho mortality in the Area 3 selective fishery at 4,207. This compares to a pre-season projected total mortality of 3,912 coho.

Incidental coho mortality in Area 4 is estimated at 4,055 which, when combined with a total coho retention of 10,609, puts the estimate of total coho mortality in the Area 4 selective fishery at 14,664. This compares to a pre-season projected total mortality of 15,282 coho.

5.11 DNA Samples

Table 14 shows the number of chinook DNA samples collected by month, area, size class, and sampling type (on-board or dockside) from the ocean recreational fisheries. A total of 27 sublegal and 141 legal sized chinook were DNA sampled in Area 1. In Area 2, 67 DNA samples were collected from sublegal sized chinook, and 140 samples were collected from legal sized chinook. From Area 3, no DNA samples were collected from sublegal sized chinook, and 101 samples were collected from legal sized chinook. In Area 4, total of 14 sublegal and 92 legal sized chinook were DNA sampled.

The number of chinook DNA samples collected by month, area, size class, and sampling

type from the non-treaty troll fisheries is shown in Table 15. In Area 1, DNA was collected from 131 legal sized chinook. In Area 2, DNA from was collected from 91 sublegal sized chinook and 802 legal sized chinook. From Area 3, 864 legal sized chinook were DNA sampled. In Area 4, DNA samples were collected from 181 legal sized chinook.

Baseline data for stock composition estimates are currently being analyzed. The DNA samples collected in this project will be archived and held for future analysis when the baseline database is complete.

Table 1. Chinook and coho catch by month from the 2007 recreational fishery between Cape Falcon, Oregon and the U.S.-Canada border.

	CHINOOK					COHO				
	July	August	September	October	TOTAL	July	August	September	October	TOTAL
Area 1	292	1,225	114	-	1,631	12,170	32,559	2,689	-	47,418
Area 2	2,494	2,545	208	-	5,247	7,289	14,055	1,648	-	22,992
Area 3	132	348	116	0	596	758	1,869	142	0	2,769
Area 4	1,179	244	47	-	1,470	4,981	4,997	631	-	10,609
TOTAL WA	4,097	4,362	485	0	8,944	25,198	53,480	5,110	0	83,788
OREGON (Area 1)	81	454	56	-	591	3,812	13,809	778	-	18,399
TOTAL NOF	4,178	4,816	541	0	9,535	29,010	67,289	5,888	0	102,187

Table 2. Chinook and coho catch by month from the 2007 non-treaty troll fishery between Cape Falcon, Oregon and the U.S.-Canada border.

	CHINOOK						COHO			
	May	June	July	August	September	TOTAL	July	August	September	TOTAL
Area 1	173	226	43	50	8	500	338	2,401	126	2,865
Area 2	5,326	814	1,700	264	7	8,111	998	757	28	1,783
Area 3	144	2,932	1,588	437	2	5,103	803	286	2	1,091
Area 4	223	122	171	20	18	554	143	0	4	147
TOTAL WA	5,866	4,094	3,502	771	35	14,268	2,282	3,444	160	5,886
OREGON (Area 1)	773	371	115	163	14	1,436	1,062	10,336	157	11,555
TOTAL NOF	6,639	4,465	3,617	934	49	15,704	3,344	13,780	317	17,441

Table 3: On-board chinook encounters by size class in the 2007 ocean recreational and non-treaty troll fisheries.

Statistical Month	RECREATIONAL FISHERY						NON-TREATY TROLL FISHERY	
	Area 1		Area 2		Area 3/4		Area 2	
	Legal	Sublegal	Legal	Sublegal	Legal	Sublegal	Legal	Sublegal
May	-	-	-	-	-	-	113	143
June	-	-	-	-	-	-	-	-
July	7	18	53	46	1	10	-	-
August	3	17	31	58	10	14	-	-
September	3	2	1	5	0	0	-	-
TOTALS	13	37	85	109	11	24	113	143

Table 4. Mark rates of legal-sized coho encountered by on-board observers in the 2007 ocean recreational fisheries.

		Total Coho				
		Encountered	Marked	Unmarked	Unknown	Mark Rate
Area 1	July	393	257	117	19	69%
	August	395	240	144	11	63%
	September	180	91	81	8	53%
	TOTAL	968	588	342	38	63%
Area 2	July	376	197	153	26	56%
	August	427	165	245	17	40%
	September	89	44	35	10	56%
	TOTAL	892	406	433	53	48%
Area 4	July	153	51	101	1	34%
	August	248	104	142	2	42%
	September	-	-	-	-	N/A
	TOTAL	401	155	243	3	39%

Table 5. Mark rates of legal-sized chinook encountered by on-board observers in the 2007 ocean recreational fisheries.

		Total Chinook				
		Encountered	Marked	Unmarked	Unknown	Mark Rate
Area 1	July	25	6	17	2	26%
	August	20	4	12	4	25%
	September	5	0	4	1	N/A
	TOTAL	50	10	33	7	23%
Area 2	July	104	27	60	17	31%
	August	90	21	49	20	30%
	September	6	1	4	1	N/A
	TOTAL	200	49	113	38	30%
Area 4	July	10	5	4	1	56%
	August	24	5	17	2	23%
	September	-	-	-	-	N/A
	TOTAL	34	10	21	3	32%

Table 6. Numbers of chinook and coho encountered by on-board observers in the 2007 ocean recreational fisheries.

		Total Chinook Encountered	Total Coho Encountered	Chinook per Coho Ratio
Area 1	July	25	394	0.06
	August	20	396	0.05
	September	5	180	0.03
	TOTAL	50	970	0.05
Area 2	July	104	377	0.28
	August	90	427	0.21
	September	6	89	0.07
	TOTAL	200	893	0.22
Area 4	July	11	153	0.07
	August	25	248	0.10
	September	-	-	-
	TOTAL	36	401	0.09

Table 7. Numbers of chinook and coho encountered by on-board observers in the 2007 ocean non-treaty troll fisheries.

		Total Chinook Encountered	Total Coho Encountered	Chinook per Coho Ratio
Area 2	May	256	166	1.54

Table 8. Mark rates of legal sized coho encountered during on-board observation in the 2007 ocean recreational fisheries compared with the FRAM preseason projected mark rates.

		Total Coho Encountered	Observed Mark Rate	Projected Mark Rate
Area 1	July	393	69%	72%
	Aug.	395	63%	72%
	Sept.	180	53%	74%
	Total	968	63%	72%
Area 2	July	376	56%	64%
	Aug.	427	40%	65%
	Sept.	89	56%	68%
	Total	892	48%	65%
Area 4	July	153	34%	55%
	Aug.	248	42%	51%
	Sept.	-	N/A	56%
	Total	401	39%	53%

Table 9. Comparison of coho release rates observed on-water and reported through dockside interviews in the 2007 ocean recreation fisheries.

		On-Board Observation			Dockside Interview		
		Coho Retained	Coho Released	Release Rate	Coho Retained	Coho Released	Release Rate
Area 1	July	248	129	34%	8,175	6,042	42%
	August	234	151	39%	13,116	12,142	48%
	September	90	80	47%	2,108	2,340	53%
	Total	572	360	39%	23,399	20,524	47%
Area 2	July	194	154	44%	3,895	3,634	48%
	August	165	246	60%	4,731	8,570	64%
	September	39	40	51%	1,210	2118	64%
	Total	398	440	53%	9,836	14,322	59%
Area 3	July	-	-	-	554	1,313	70%
	August	-	-	-	1021	2,543	71%
	September	-	-	-	213	558	72%
	Total	-	-	-	1,788	4,414	71%
Area 4	July	49	103	68%	1,511	4,361	74%
	August	91	154	63%	1,711	4,500	72%
	September	-	-	N/A	490	1,403	74%
	Total	140	257	63%	3,712	10,264	73%

Table 10. Compliance with coho selective fishery regulations observed through dockside port sampling interviews in the 2007 ocean recreation fisheries.

		Total Coho Sampled	Marked Coho Sampled	Unmarked Coho Sampled	% Sampled Coho Marked
Area 1	July	8,175	8,166	9	99.9%
	August	13,116	13,092	24	99.8%
	September	2,108	2,101	7	99.7%
	Total	23,399	23,359	40	99.8%
Area 2	July	3,895	3,890	5	99.9%
	August	4,731	4,710	21	99.6%
	September	1,210	1,201	9	99.3%
	Total	9,836	9,801	35	99.6%
Area 3	July	554	552	2	99.6%
	August	1021	1014	7	99.3%
	September	213	204	9	95.8%
	Total	1,788	1,770	18	99.0%
Area 4	July	1511	1,485	26	98.3%
	August	1711	1,690	21	98.8%
	September	490	488	2	99.6%
	Total	3,712	3,663	49	98.7%

Table 11. Estimated drop off mortality in the 2007 ocean recreational fisheries using on-water observation data.

		Total Salmon Handled	Observed Drop Offs	Estimated Observed Drop Off Mortality a/	FRAM Total Drop Off Mortality b/	Observed Drop Off Mortality Rate c/
Area 1	July	419	19	2	21	0.4%
	August	416	19	2	21	0.4%
	Sept.	185	11	1	9	0.5%
	Total	1,020	49	4	51	0.4%
Area 2	July	481	45	4	24	0.7%
	August	517	27	2	26	0.4%
	Sept.	95	11	1	5	0.9%
	Total	1,093	83	7	55	0.6%
Area 4	July	164	3	0	8	0.1%
	August	273	6	0	14	0.2%
	Sept.		-	-	-	N/A
	Total	437	9	1	22	0.2%

a/ Assume 8% hooking mortality rate on observed drop offs.

b/ Total drop off mortality calculated using FRAM methodology (5% of handled fish).

c/ Estimated drop off mortality/Total salmon handled; 5% used by FRAM pre-season.

Table 12. Preseason FRAM (model run 0714) projected coho mortality in the 2007 ocean recreational fisheries.

		Total Retention	Marked Retention	Marked Release Mortality	Unmarked Retention	Unmarked Release Mortality	Total handled a/	Predicted Mark Rate	Drop Off Mortality b/	Release Mortality c/	Incidental Mortality d/	Total Mortality e/
Area 1	July	13,839	13,721	123	118	807	20,476	72%	1,024	930	1,954	15,793
	August	35,569	35,218	315	351	2,409	55,027	72%	2,751	2,724	5,475	41,044
	Sept.	9,392	9,286	83	106	725	15,162	74%	758	808	1,566	10,958
	Total	58,800	58,225	521	575	3,941	90,665	72%	4,533	4,462	8,995	67,795
Area 2	July	12,998	12,840	115	158	1,083	21,554	64%	1,078	1,198	2,276	15,274
	August	20,161	19,889	178	272	1,868	34,771	65%	1,739	2,046	3,785	23,946
	Sept.	10,352	10,201	91	151	1,033	18,384	68%	919	1,124	2,043	12,395
	Total	43,511	42,930	384	581	3,984	74,709	65%	3,735	4,368	8,103	51,614
Area 3	July	364	357	3	7	45	705	55%	35	48	83	447
	August	1,854	1,829	16	25	172	3,202	64%	160	188	348	2,202
	Sept./Oct.	841	801	7	40	273	2,842	33%	142	280	422	1,263
	Total	3,059	2,987	26	72	490	6,749	59%	337	516	853	3,912
Area 4	July	7,033	6,906	62	127	871	13,693	55%	685	933	1,618	8,651
	August	3,949	3,856	34	93	641	8,773	51%	439	675	1,114	5,063
	Sept.	1,248	1,222	11	26	179	2,607	56%	130	190	320	1,568
	Total	12,230	11,984	107	246	1,691	25,073	53%	1,254	1,798	3,052	15,282

a/ Marked handled + Unmarked handled.

b/ 5% of total handled.

c/ Marked release mortality + unmarked release mortality.

d/ Drop off + Release mortality.

e/ Total retention + Incidental mortality.

Table 13. Estimated Actual Coho Mortality in the 2007 Ocean Recreational Fisheries.

		Total Retention	Marked Retention	Marked Released	Unmarked Retention	Unmarked Released	Total Handled a/	Observed Mark Rate b/	Drop Off Mortality c/	Release Mortality d/	Incidental Mortality e/	Total Mortality f/
Area 1	July	15,982	15,964	319	18	7,276	23,577	69%	1,179	1,019	2,197	18,179
	August	46,368	46,283	926	85	27,821	75,114	63%	3,756	3,895	7,651	54,019
	Sept.	3,467	3,455	69	12	3,086	6,622	53%	331	432	763	4,230
	Total	65,817	65,703	1,314	114	38,183	105,314	63%	5,266	5,346	10,611	76,428
Area 2	July	7,289	7,278	146	11	5,661	13,096	56%	655	793	1,447	8,736
	August	14,055	13,995	280	60	20,870	35,204	40%	1,760	2,922	4,682	18,737
	Sept.	1,648	1,643	33	5	1,311	2,992	56%	150	184	333	1,981
	Total	22,992	22,916	458	76	27,841	51,292	48%	2,565	3,898	6,462	29,454
Area 3	July	758	755	15	3	1,796	2,570	30%	128	252	380	1,138
	August	1,869	1,847	37	22	4,655	6,561	29%	328	652	980	2,849
	Sept./Oct.	142	136	3	6	372	517	28%	26	52	78	220
	Total	2,769	2,738	55	31	6,824	9,647	30%	482	955	1,438	4,207
Area 4	July	4,981	4,879	98	102	9,864	14,943	34%	747	1,381	2,128	7,109
	August	4,997	4,938	99	59	6,823	11,919	42%	596	955	1,551	6,548
	Sept.	631	627	13	4	1,807	2,450	26%	123	253	375	1,006
	Total	10,609	10,445	209	164	18,494	29,312	39%	1,466	2,589	4,055	14,664

a/ Marked handled + Unmarked handled.

b/ Observed mark rates in Area 3 and in Area 4 September assumed from dockside sampling data.

c/ 5% of total handled.

d/ 14% of unmarked released.

e/ Drop off + Release mortality.

f/ Total retention + Incidental mortality.

Table 14. Number of chinook DNA samples collected from the ocean recreational fishery by size class and sample type.

		On-Board Sampling		Dockside Sampling	Total Number of DNA Samples
		Sublegal Sized	Legal Sized	Legal Sized	
Area 1	July	16	6	42	64
	August	10	3	81	94
	September	1	2	7	10
	Total	27	11	130	168
Area 2	July	29	47	49	125
	August	36	29	14	79
	September	2	1	0	3
	Total	67	77	63	207
Area 3	July	-	-	49	49
	August	-	-	50	50
	September	-	-	2	2
	Total	-	-	101	101
Area 4	July	9	0	74	83
	August	5	1	16	22
	September	-	-	1	1
	Total	14	1	91	106

Table 15. Number of chinook DNA samples collected from the non-treaty troll fishery by size class and sample type.

		On-Board Sampling		Dockside Sampling	Total Number of
		Sublegal Sized	Legal Sized	Legal Sized	DNA Samples
Area 1	May	-	-	20	20
	June	-	-	80	80
	July	-	-	16	16
	August	-	-	9	9
	September	-	-	6	6
	Total	0	0	131	131
Area 2	May	91	88	550	729
	June	-	-	164	164
	July	-	-	-	-
	August	-	-	-	-
	September	-	-	-	-
	Total	91	88	714	893
Area 3	May	-	-	50	50
	June	-	-	814	814
	July	-	-	-	-
	August	-	-	-	-
	September	-	-	-	-
	Total	0	0	864	864
Area 4	May	-	-	171	171
	June	-	-	10	10
	July	-	-	-	-
	August	-	-	-	-
	September	-	-	-	-
	Total	0	0	181	181