



**Monitoring Results from the 2001 Ocean Recreational Selective Fisheries  
from Leadbetter Point to the U.S. Canada Border**

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## Introduction

The Pacific Fishery Management Council (PFMC) adopted selective recreational fisheries for coho in all four ocean areas from Cape Falcon, Oregon to the U.S./Canada border as well as the Buoy 10 fishery in the Columbia River estuary. This paper is a report on the three areas north of Leadbetter Point (Catch Record Card Areas 2, 3 and 4).

When the Council set the 2001 selective fisheries, assumptions were made about coho and chinook abundance, distribution of stocks, coho mark rates, compliance with the new regulations, and incidental mortality. For the third consecutive year, a monitoring plan was implemented to test some of these assumptions through dockside catch and effort sampling along with direct on-water observations of the fisheries in progress.

## Fishery Descriptions

**AREA 2:** The ocean recreational fishery from Leadbetter Point, Washington to the Queets river (Area 2) was open Sunday through Thursday, July 1 through September 6, and seven days per week September 7 through September 30, for a total of 74 fishing days. A two salmon daily bag limit, only one of which may be chinook, was in effect; all retained coho were required to have a healed adipose fin clip.

**AREA 3:** The ocean recreational fishery from the Queets River to Cape Alava (Area 3) was open seven days per week July 1 through September 23. From September 24 through October 21, salmon fishing was restricted to that portion of Area 3 defined by a line from Teawhit Head northwest to "Q" Buoy, to Cake Rock, then true east to the shoreline, seven days per week. A total of 113 fishing days were available in Area 3. A two salmon daily bag limit, only one of which may be chinook, was in effect; 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 (Area 4) was open seven days per week July 1 through September 30, for a total of 92 fishing days. A two salmon daily bag limit, only one of which may be chinook, was in effect; retained coho were required to have a healed adipose fin clip.

## Methods

**AREA 2:** WDFW stationed five dockside samplers and one on-water observer in Westport to monitor the Area 2 selective fishery. The on-water observer concentrated his efforts on the charter fleet operating from Westport. Charter operators volunteered space on their vessels to accommodate the WDFW observer, who collected information about that specific boat's encounters for the day. Data recorded included species hooked, presence or absence of the adipose fin, size (legal or sublegal), and result of the hookup (fish retained, released, or dropped off) for each hookup that occurred on that vessel.

Dockside port samplers collected catch information through interviews and catch inspections as fishing boats returned to port. Data collected per boat included catch by species, presence or

absence of adipose fins on all retained salmon, number of anglers, total number of salmon released by species, and number of adipose-clipped coho released. Landed salmon were sampled for species, fin mark, and coded-wire tag and scale collection. Due to the mass marking of hatchery chinook and coho, electronic detection equipment was used to indicate the presence or absence of coded-wire tags in those salmon species.

Total effort data was collected through counts of vessels leaving the port on their way to the fishing grounds each day. Dockside sampling data was then expanded according to the observed effort profile to estimate total effort and retained and released catch.

**AREA 3:** WDFW stationed one employee in La Push to monitor the selective recreational ocean fishery in Area 3. Because there is very little charter boat activity in La Push, and because the private sport activity is relatively low and scattered, on-water observation from La Push was not feasible.

Dockside, the port sampler collected catch information through interviews and catch inspections as described above. Total effort data was collected through a count of vessels returning to the port. Dockside sampling data was then expanded according to the observed effort profile to estimate total effort and retained and released catch.

**AREA 4:** WDFW stationed four dockside employees and two on-water observers in Neah Bay to monitor the Area 4 selective fishery. The on-water observers worked mainly from a WDFW vessel, fishing for salmon and recording species hooked, presence or absence of the adipose fin, size (legal or sublegal), and result of the hookup (fish retained, released, or dropped off). All fish hooked were released.

On-water observers also rode along on charter boats whenever possible. Charter operators in Neah Bay volunteered space on their vessels to accommodate the WDFW observers. The observers on charter boats collected information identical to that collected in Westport.

Dockside, the port samplers collected catch information through interviews and catch inspections as described above. Total effort data was collected through counts of vessels leaving the port on their way to the fishing grounds each day. Dockside sampling data was then expanded according to the observed effort profile to estimate total effort and retained and released catch.

**ALL AREAS:** Logbooks were made available to WDFW personnel to collect data from their private fishing trips. Data recorded included Catch Record Card Area fished, target species, and for each hookup, the species hooked, presence or absence of the adipose fin, size (legal or sublegal), and result of the hookup (fish retained, released, or dropped off). Logbooks were collected from trips in Areas 2 and 4, and were included with on-water observer data.

### **Catch and Effort**

In Area 2, 49,682 anglers harvested a total of 69,396 coho or 83 percent of the 83,250 coho quota and 15,745 chinook or 81 percent of the 19,450 chinook guideline. A total of 918 pink were also harvested.

In Area 3, 3,387 anglers harvested a total of 3,310 coho or 57 percent of the 5,850 coho quota and 584 chinook or 53 percent of the 1,100 chinook guideline. A total of 161 pink were also harvested.

In Area 4, 17,947 anglers harvested a total of 17,877 coho or 76 percent of the 23,400 coho quota and 1,523 chinook or 90 percent of the 1,700 chinook guideline. A total of 2,799 pink were also harvested.

Table 1 shows estimated total effort and landed chinook and coho catch by month for the catch areas north of Leadbetter Point.

### **Selective Fishery Observation**

**AREA 2.** WDFW staff observed anglers on board charter boats for each week the fishery was open in Area 2. Data collected include observations of 1,142 legal-sized coho encountered aboard chartered fishing vessels. Of these encounters, 633 coho were retained, which is 1% of the 69,396 coho retained in the ocean fishery. The mark rate (adipose fin clipped) of the legal-sized coho encountered through the season was 58%. The mark rate by month was 57% in July, 60% in August, and 51% in September (Table 2). Fourteen percent of the 1,859 salmon observed hooked in Area 2 dropped off prior to being landed.

**AREA 3.** No on-water observation data were collected from Area 3 in 2001.

**AREA 4.** WDFW staff observed catch in Area 4 for each week the fishery was open. A total of 584 legal-sized coho were observed as they were brought to the boat. The mark rate (adipose fin clipped) of the legal-sized coho encountered through the season was 39%. The mark rate by month was 44% in July, 40% in August, and 24% in September (Table 2). Seventeen percent of the 766 salmon observed hooked in Area 4 dropped off prior to being landed.

### **Comparison of Pre-season vs. Post-season Estimates of Coho Mark Rates**

Pre-season projections of 2001 coho mark rates were estimated using the coho Fishery Regulation Assessment Model (FRAM). The coho 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 0119 was the final pre-season assessment of the PFMC's adopted fishery package for the 2000 ocean fisheries. Table 3 compares the coho mark rates projected by the FRAM model with those observed through on-water monitoring in Areas 2, 3, and 4 in 2001.

Observation data showed actual coho mark rates consistently lower than pre-season projections. The total observed coho mark rate for the season in the ocean Area 2 selective fishery was 58% compared to 80% projected pre-season. In ocean Area 3, the coho mark rate calculated from dockside interviews was 32%, compared to the pre-season projection of 73%. The observed coho mark rate in the ocean Area 4 selective fishery 39%, compared to 58% projected pre-season.

## **Comparison of Dockside and Observer Data in Selective Fisheries**

Observation data on 2001 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 4 compares coho release rates in Area 2 collected through on-water observation and through dockside interviews. Area 3 on-water observation data is not available for comparison, and in Area 4, comparison of the two rates is invalid since most of the on-water data was collected through a catch-and-release program conducted by WDFW staff.

Relative to estimates of released salmon from fishery observation data, information collected at the dock in 2001 showed a very small bias towards lower numbers of salmon released. The dockside sampling of the ocean Area 2 selective fishery showed a coho release rate of 43%, compared to a rate of 45% observed on the water.

### **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 regulation in the ocean area fishery was high for both private and charter vessels. In Area 2, 34% of the total estimated coho landed were sampled dockside by the ocean sampling program. In Area 3, 70% of the total estimated coho landed were sampled, and in Area 4, 43% were sampled dockside. Dockside sampling showed compliance rates for the season of 99.1%, 98.9%, and 97.4% for Area 2, Area 3, and Area 4 respectively (Table 5). These rates are nearly identical to the compliance rates observed in 2000.

Boat patrols, dockside enforcement, and investigative work conducted by WDFW Enforcement found selective fishery compliance rates similar to those observed by the WDFW sampling program. In Area 2, the compliance rate was estimated at 98.4%; a 100.0% compliance rate was estimated in Area 3, and a compliance rate of 96.1% was estimated for Area 4 (Attachment 1).

### **Drop Off Rates**

On-water observers in all areas recorded 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 or anglers 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). Mortality rates for the season estimated from on-water observation data were 1% in both Area 2 and Area 4. Estimates of drop off mortality rates from on-water observation data collected during the ocean selective fisheries are compared with FRAM projections in Table 6.

## **Estimated Mortality**

Table 7 shows the FRAM pre-season projections of total coho mortality. Estimates of actual coho mortality in the ocean selective fisheries are shown in Table 8. This analysis uses estimates of coho mark rates from on-water sampling in Areas 2 and 4 and from dockside interviews in Area 3 to estimate total coho release. Estimates of incidental mortality are calculated using rates adopted by the Council for recreational fisheries (5% drop off mortality and 14% hooking mortality).

Incidental coho mortality in Area 2 is estimated at 13,086 which, when combined with a total coho retention of 69,396, puts the estimate of total coho mortality in the Area 2 selective fishery at 82,482. This compares to a pre-season projected total mortality of 91,753 coho.

In Area 3, incidental mortality is estimated at 1,460 which, when combined with a total coho retention of 3,310, puts the estimate of total coho mortality in the ocean selective fishery at 4,770. This compares to a pre-season projected total mortality of 6,665 coho.

Incidental coho mortality in Area 4 is estimated at 5,875 which, when combined with a total coho retention of 17,877, puts the estimate of total coho mortality in the ocean selective fishery at 23,752. This compares to a pre-season projected total mortality of 28,581 coho.

## **Conclusion**

The observed coho mark rate in Areas 2, 3, and 4 was consistently lower in all months than pre-season projections. One possible explanation for this discrepancy is that wild fish may have survived at a higher rate or been more prevalent in these areas than expected.

The release data collected through dockside interviews was just slightly lower than what was observed during on-water observations where comparison was possible. Previous years' data as well as many other studies conducted by WDFW have shown that anglers tend to over-estimate rather than under-estimate the number of released fish.

The selective fishing compliance rate ranged between 97% and 99% on the coast. Enforcement activities suggested similar compliance rates to what was observed by samplers on the dock. The pre-season model projected a rate of 5% retention of all unmarked handled coho; in-season data showed a retention rate of 1% of handled unmarked coho in all three areas.

Total estimated mortality in all three areas was lower than projected by the FRAM model pre-season. Incidental mortality was higher in than predicted in all areas due to the lower than predicted mark rates, but total mortality was tempered by the fact that coho quotas were not met in 2001.

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**TABLE 1:** Salmon catch and effort by area and month in the 2000 ocean recreational fisheries.

MONTH	Area 2			Area 3			Area 4/4B		
	Angler trips	Coho	Chinook	Angler trips	Coho	Chinook	Angler trips	Coho	Chinook
July	12,343	18,554	4,153	1,233	965	106	4,980	3,603	313
August	7,491	10,240	2,183	742	961	70	4,727	5,960	105
Sept	0	0	0	0	0	0	1,646	2,067	0
<b>TOTAL</b>	<b>19,834</b>	<b>28,794</b>	<b>6,336</b>	<b>1,975</b>	<b>1,926</b>	<b>176</b>	<b>11,353</b>	<b>11,630</b>	<b>418</b>

**TABLE 2:** 2000 mark rate of legal-sized coho encountered during on-board observation in the ocean recreational fisheries.

		Total	Marked	Unmarked	Unknown	Coho Mark
		Encountered	Encountered	Encountered	Encountered	Rate
<b>AREA 2</b>	July	816	577	235	4	71%
	August	388	266	122	0	69%
	<b>Total</b>	<b>1,204</b>	<b>843</b>	<b>357</b>	<b>4</b>	<b>70%</b>
<b>AREA 3</b>	July	103	52	50	1	51%
	August	0	0	0	0	N/A
	<b>Total</b>	<b>103</b>	<b>52</b>	<b>50</b>	<b>1</b>	<b>51%</b>
<b>AREA 4/4B</b>	July	83	33	49	1	40%
	August	62	22	40	0	35%
	Sept	125	37	88	0	30%
	<b>Total</b>	<b>270</b>	<b>92</b>	<b>177</b>	<b>1</b>	<b>34%</b>



**TABLE 3:** 2000 mark rate of legal-sized coho encountered during on-board observation in the ocean recreational fisheries compared with the FRAM preseason projected mark rates.

		Total Legal Sized Coho Encountered	Observed Coho Mark Rate	Projected Coho Mark Rate
<b>AREA 2</b>	July	816	71%	79%
	August	388	69%	75%
	<b>Total</b>	<b>1,204</b>	<b>70%</b>	<b>77%</b>
<b>AREA 3</b>	July	103	51%	76%
	August	0	N/A	59%
	<b>Total</b>	<b>103</b>	<b>51%</b>	<b>75%</b>
<b>AREA 4/4B</b>	July	83	40%	56%
	August	62	35%	45%
	Sept	125	30%	45%
	<b>Total</b>	<b>270</b>	<b>34%</b>	<b>48%</b>

**TABLE 4:** Comparison of coho release rates observed on-water and reported through dockside interviews in the 2000 ocean recreational fisheries.

		<b>ON-WATER OBSERVATIONS</b>			<b>DOCKSIDE REPORTS</b>		
		Coho Retained	Coho Released	Release Rate	Coho Retained	Coho Released	Release Rate
<b>AREA 2</b>	July	568	248	30%	7,900	5,499	41%
	August	263	125	32%	4,986	4,406	47%
	<b>Total</b>	<b>831</b>	<b>373</b>	<b>31%</b>	<b>12,886</b>	<b>9,905</b>	<b>43%</b>
<b>AREA 3</b>	July	49	53	52%	911	1,201	57%
	August	N/A	N/A	N/A	890	1,264	59%
	<b>Total</b>	<b>49</b>	<b>53</b>	<b>52%</b>	<b>1,801</b>	<b>2,465</b>	<b>58%</b>
<b>AREA 4/4B</b>	July	28	55	66%	1,420	2,658	65%
	August	18	44	71%	2,376	5,100	68%
	Sept	1	124	99%	1,112	4,028	78%
	<b>Total</b>	<b>47</b>	<b>223</b>	<b>83%</b>	<b>4,908</b>	<b>11,786</b>	<b>71%</b>

**TABLE 5:** Compliance with selective fishery regulations observed through dockside port sampling.

		Total	Marked	Unmarked	% Sampled
		Coho Sampled	Coho Sampled	Coho Sampled	Coho Marked
<b>AREA 2</b>	July	8,227	8,195	32	99.6%
	August	4,659	4,638	21	99.5%
	<b>Total</b>	<b>12,886</b>	<b>12,833</b>	<b>53</b>	<b>99.6%</b>
<b>AREA 3</b>	July	916	902	14	98.5%
	August	885	879	6	99.3%
	<b>Total</b>	<b>1,801</b>	<b>1,781</b>	<b>20</b>	<b>98.9%</b>
<b>AREA 4/4B</b>	July	1,446	1,418	28	98.1%
	August	2,494	2,449	45	98.2%
	Sept	968	952	16	98.3%
	<b>Total</b>	<b>4,908</b>	<b>4,819</b>	<b>89</b>	<b>98.2%</b>

**TABLE 6:** Estimated drop off mortality in the 2000 ocean recreational fisheries using on-water observation data.

		Total	Observed	Estimated	FRAM total	Observed Drop
		Salmon Handled	Drop Offs	Observed Drop Off Mortality a/	Drop Off Mortality b/	Off Mortality Rate c/
<b>AREA 2</b>	July	1,190	57	5	60	0.4%
	August	547	16	1	27	0.2%
	<b>Total</b>	<b>1,737</b>	<b>73</b>	<b>6</b>	<b>87</b>	<b>0.3%</b>
<b>AREA 3</b>	July	143	14	1	7	0.8%
	August	N/A	N/A	N/A	N/A	N/A
	<b>Total</b>	<b>143</b>	<b>14</b>	<b>1</b>	<b>7</b>	<b>0.8%</b>
<b>AREA 4/4B</b>	July	139	45	4	7	2.6%
	August	101	13	1	5	1.0%
	Sept	138	13	1	7	0.8%
	<b>Total</b>	<b>378</b>	<b>71</b>	<b>6</b>	<b>19</b>	<b>1.5%</b>

*a/ Assumes 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 7:** Preseason FRAM (model run 0024) projected coho mortality in the 2000 ocean recreational fisheries.

		Total Retention	Marked Retention	Unmarked Retention	Unmarked Released	Total Handled a/	Predicted Mark Rate	Drop Off Mortality b/	Release Mortality c/	Incidental Mortality d/	Total Mortality e/
<b>AREA 2</b>	July	12,000	11,931	69	3,393	16,154	79%	808	475	1,283	13,283
	August/Sept f/	16,900	16,781	119	5,817	23,788	75%	1,189	814	2,004	18,904
	<b>Total</b>	<b>28,900</b>	<b>28,712</b>	<b>188</b>	<b>9,210</b>	<b>39,942</b>	<b>77%</b>	<b>1,997</b>	<b>1,289</b>	<b>3,287</b>	<b>32,187</b>
<b>AREA 3</b>	July	1,600	1,589	11	529	2,231	76%	112	74	186	1,786
	August/Sept	100	99	1	71	171	59%	9	10	18	118
	<b>Total</b>	<b>1,700</b>	<b>1,688</b>	<b>12</b>	<b>600</b>	<b>2,402</b>	<b>75%</b>	<b>120</b>	<b>84</b>	<b>204</b>	<b>1,904</b>
<b>AREA 4/4B</b>	July	4,800	4,721	79	3,877	8,978	56%	449	543	992	5,792
	August/Sept	8,100	7,893	207	10,127	18,731	45%	937	1,418	2,354	10,454
	<b>Total</b>	<b>12,900</b>	<b>12,614</b>	<b>286</b>	<b>14,004</b>	<b>27,709</b>	<b>48%</b>	<b>1,385</b>	<b>1,961</b>	<b>3,346</b>	<b>16,246</b>

a/ Marked handled + Unmarked handled.

b/ 5% of total handled.

c/ 14% of unmarked released.

d/ Drop off + Release mortality.

e/ Total retention + Incidental mortality.

f/ August and September are modeled as one unit.

**TABLE 8:** Estimated actual coho mortality in the 2000 ocean recreational fisheries.

		Total Retention	Marked Retention	Unmarked Retention	Unmarked Released	Total Handled a/	Observed Mark Rate	Drop Off Mortality b/	Release Mortality c/	Incidental Mortality d/	Total Mortality e/
<b>AREA 2</b>	July	18,554	18,473	81	7,443	25,997	71%	1,300	1,042	2,342	20,896
	August/Sept	10,240	10,183	57	4,613	14,853	69%	743	646	1,389	11,629
	<b>Total</b>	<b>28,794</b>	<b>28,656</b>	<b>138</b>	<b>12,056</b>	<b>40,850</b>	<b>70%</b>	<b>2,043</b>	<b>1,688</b>	<b>3,730</b>	<b>32,524</b>
<b>AREA 3</b>	July	965	946	19	891	1,856	51%	93	125	217	1,182
	August/Sept	961	954	7	910	1,871	51%	94	127	221	1,182
	<b>Total</b>	<b>1,926</b>	<b>1,900</b>	<b>26</b>	<b>1,800</b>	<b>3,726</b>	<b>51%</b>	<b>186</b>	<b>252</b>	<b>438</b>	<b>2,364</b>
<b>AREA 4/4B</b>	July	3,603	3,540	63	5,193	8,796	40%	440	727	1,167	4,770
	August/Sept	8,027	7,895	132	16,996	25,023	32%	1,251	2,379	3,631	11,658
	<b>Total</b>	<b>11,630</b>	<b>11,435</b>	<b>195</b>	<b>22,189</b>	<b>33,819</b>	<b>34%</b>	<b>1,691</b>	<b>3,107</b>	<b>4,798</b>	<b>16,428</b>

*a/ Marked retention/Observed mark rate.*

*b/ 5% of total handled.*

*c/ 14% of unmarked released.*

*d/ Drop off + Release mortality.*

*e/ Total retention + Incidental mortality.*