



**Monitoring Results from the 2000 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 2000 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 second 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 3 through August 10, and on August 13 in that portion of Area 2 inside a line from the lighthouse 1 mile south of the south jetty to Buoy 2 to Buoy 3 to the Grays Harbor north jetty and through Buoy 13, for a total of 30 fishing days. That portion of Area 2 defined above was closed through August 10. A two salmon daily bag limit, 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 3 through August 12, for a total of 41 fishing days. A two salmon daily bag limit, 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 3 through August 17, for a total of 46 fishing days. A two salmon daily bag limit, one of which may be chinook, was in effect; retained coho were required to have a healed adipose fin clip. The state waters Area 4B add-on fishery was open seven days per week August 18 through September 30, for a total of 44 fishing days. The daily bag limit was two salmon with no chinook retention, and retained coho were required to have a healed adipose fin clip.

Methods

AREA 2: WDFW stationed four dockside samplers and two on-water observers in Westport to monitor the Area 2 selective fishery. The on-water observers concentrated their efforts on the charter fleet operating from Westport. Charter operators volunteered space on their vessels to accommodate the WDFW observers. The observers on charter boats 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 coho, electronic detection equipment was used to indicate the presence or absence of coded-wire tags in all coho.

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 little to no 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. However, charter boats from Neah Bay fished in Area 3 on many occasions, and observers from Neah Bay were able to collect data aboard those trips.

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 people dockside 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, observing hookups by the private boat fleet. The observer vessel positioned itself each day near concentrations of private fishing boats. When a hookup occurred, the WDFW vessel moved as close as feasible, and observers recorded species hooked, presence or absence of the adipose fin, size (legal or sublegal), and result of the hookup (fish retained, released, or dropped off) as possible.

In addition, WDFW personnel fished aboard a privately owned boat whenever possible and recorded the above information about each encounter. This method was implemented when it became apparent that due to conditions such as fog, low effort, and the fact that fishers didn't tend to group in one area like in other areas along the coast, it was possible to witness more encounters this way.

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.

Catch and Effort

In Area 2, 19,834 anglers harvested a total of 28,794 coho or 98 percent of the 29,500 coho quota and 6,336 chinook or 86 percent of the 7,400 chinook guideline.

In Area 3, 1,975 anglers harvested a total of 176 chinook or 59 percent of the 300 chinook guideline, and 1,926 coho or 99 percent of the 1,950 coho quota.

In the Area 4 ocean fishery, 7,934 anglers harvested a total of 410 chinook or 82 percent of the chinook guideline of 500, and 7,220 coho or 9 percent over the 6,650 coho quota. In the Area 4B state-waters fishery, 3,419 anglers harvested a total of 4,410 coho or 74 percent of the 6,000 coho quota

Table 1 shows estimated total effort and landed salmon 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 1,204 legal-sized coho encountered aboard chartered fishing vessels. Of these encounters, 568 coho were retained, which is 2% of the 28,794 coho retained in the ocean fishery. The mark rate (adipose fin clipped) of the legal-sized coho encountered through the season was 70%. The mark rate by month was 71% and 69% in July and August respectively (Table 2). Four percent of the 1,737 salmon observed hooked in Area 2 dropped off prior to being landed.

AREA 3. WDFW staff were able to observe anglers on board charter boats for the July portion of the Area 3 fishery. Data collected include observations of 103 legal-sized coho encountered aboard chartered fishing vessels. Of these encounters, 49 coho were retained, which is 2% of the 1,926 coho retained in the fishery. The mark rate (adipose fin clipped) of the legal-sized coho encountered was 51%. Data showed that of the 143 salmon hooked, 14 salmon (10%) dropped off prior to being landed.

AREA 4. WDFW staff observed catch in the Area 4 and Area 4B fisheries from an on-water remote platform, through fishing from a privately owned boat, and from a few charter ride alongs. A total of 270 legal-sized coho were observed as they were brought to the boat. Of these encounters, 47 coho were retained, which is 0.4% of the 11,630 coho retained in the two fisheries. The mark rate (adipose fin clipped) of the legal-sized coho encountered through the season was 34%. The mark rate by month was 40%, 36%, and 30% for July, August and September respectively (Table 2). Of the 378 salmon observed hooked, 71 salmon (19%) dropped off prior to being landed.

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

Pre-season projections of 2000 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 0024 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 2000.

Observation data showed actual coho mark rates consistently lower than pre-season projections in Area 2. The total observed coho mark rate for the season in the ocean Area 2 selective fishery was 70% compared to 77% projected pre-season. The observed mark rates in Areas 3 and 4 were lower than projected pre-season. In ocean Area 3, the observed coho mark rate was 51%, compared to the pre-season projection of 75%. The observed coho mark rate in the ocean Area 4 selective fishery 34%, compared to 48% projected pre-season.

Comparison of Dockside and Observer Data in Selective Fisheries

Observation data on 2000 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 collected through on-water observation and through dockside interviews. Relative to estimates of released salmon from fishery observation data, information collected at the dock in 2000 showed a bias towards higher numbers of salmon released in Areas 2 and 3. In Area 4, dockside-reported release rates were lower than those observed on-water, but a comparison of the two rates is invalid since much of the on-water data was collected through a catch-and-release program conducted by WDFW staff.

The dockside sampling of the ocean Area 2 selective fishery showed a coho release rate of 44%, compared to a rate of 31% observed on the water. In Area 3, dockside sampling data showed a coho release rate of 58%, compared to a rate of 52% 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, 45% of the total estimated coho landed were sampled dockside by the ocean sampling program. In Area 3, 94% of the total estimated coho landed were sampled, and in Area 4, 42% were sampled dockside. Dockside sampling showed compliance rates for the season of 99.6%, 98.9%, and 98.2% for Area 2, Area 3, and Area 4 respectively (Table 5). These rates are nearly identical to the compliance rates observed in 1999.

Boat patrols, dockside enforcement, and investigative work conducted by WDFW Enforcement confirmed the selective fishery compliance rates observed by the WDFW sampling program. In Area 2, the compliance rate was estimated at 98.1%; a 99.0% compliance rate was estimated in Area 3, and a compliance rate of 98.9% 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 ranged from less than 1% in Areas 2 and 3 to 1.5% in 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 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 3,730 which, when combined with a total coho retention of 28,794, puts the estimate of total coho mortality in the Area 2 selective fishery at 32,524. This compares to a pre-season projected total mortality of 31,078 coho.

In Area 3, incidental mortality is estimated at 438 which, when combined with a total coho retention of 1,926, puts the estimate of total coho mortality in the ocean selective fishery at 2,364. This compares to a pre-season projected total mortality of 1,832 coho.

Incidental coho mortality in Area 4 is estimated at 4,798 which, when combined with a total coho retention of 11,630, puts the estimate of total coho mortality in the ocean selective fishery at 16,428. This compares to a pre-season projected total mortality of 14,560 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 generally higher than what was observed during on-water observations. Many other studies conducted by WDFW have shown that anglers tend to over-estimate rather than under-estimate the number of released fish. The on-water release rates in Area 4/4B must be ignored because of the catch-and-release method of on-water observation used in that area.

The selective fishing compliance rate ranged between 98% 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 higher than projected by the FRAM model pre-season. This was due mainly to the fact that the observed mark rate was lower in each area than predicted.

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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
TOTAL	19,834	28,794	6,336	1,975	1,926	176	11,353	11,630	418

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

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
AREA 2	July	816	71%	79%
	August	388	69%	75%
	Total	1,204	70%	77%
AREA 3	July	103	51%	76%
	August	0	N/A	59%
	Total	103	51%	75%
AREA 4/4B	July	83	40%	56%
	August	62	35%	45%
	Sept	125	30%	45%
	Total	270	34%	48%

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

		ON-WATER OBSERVATIONS			DOCKSIDE REPORTS		
		Coho Retained	Coho Released	Release Rate	Coho Retained	Coho Released	Release Rate
AREA 2	July	568	248	30%	7,900	5,499	41%
	August	263	125	32%	4,986	4,406	47%
	Total	831	373	31%	12,886	9,905	43%
AREA 3	July	49	53	52%	911	1,201	57%
	August	N/A	N/A	N/A	890	1,264	59%
	Total	49	53	52%	1,801	2,465	58%
AREA 4/4B	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%
	Total	47	223	83%	4,908	11,786	71%

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

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

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/
AREA 2	July	1,190	57	5	60	0.4%
	August	547	16	1	27	0.2%
	Total	1,737	73	6	87	0.3%
AREA 3	July	143	14	1	7	0.8%
	August	N/A	N/A	N/A	N/A	N/A
	Total	143	14	1	7	0.8%
AREA 4/4B	July	139	45	4	7	2.6%
	August	101	13	1	5	1.0%
	Sept	138	13	1	7	0.8%
	Total	378	71	6	19	1.5%

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/
AREA 2	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
	Total	28,900	28,712	188	9,210	39,942	77%	1,997	1,289	3,287	32,187
AREA 3	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
	Total	1,700	1,688	12	600	2,402	75%	120	84	204	1,904
AREA 4/4B	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
	Total	12,900	12,614	286	14,004	27,709	48%	1,385	1,961	3,346	16,246

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/
AREA 2	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
	Total	28,794	28,656	138	12,056	40,850	70%	2,043	1,688	3,730	32,524
AREA 3	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
	Total	1,926	1,900	26	1,800	3,726	51%	186	252	438	2,364
AREA 4/4B	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
	Total	11,630	11,435	195	22,189	33,819	34%	1,691	3,107	4,798	16,428

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.