2022 Ocean Selective Fishery Sampling Report

SUBMITTED BY:

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1. INTRODUCTION

The Pacific Fishery Management Council (PFMC) adopted 2022 recreational and commercial troll fisheries for all salmon species between Cape Falcon, Oregon, and the U.S./Canada border. Recreational and commercial mark-selective fisheries (MSFs) for coho were included in all four marine areas of coastal Washington (Marine Areas 1, 2, 3, and 4; **Figure 1**). 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 PFMC adopted ocean coho MSFs in Marine Areas 1 through 4 for the twenty-fourth consecutive year, following state-tribal agreement during the North of Falcon process. No Chinook MSFs were recommended by the Council's Salmon Advisory Subpanel nor adopted by the PFMC in 2022.

The Washington Department of Fish and Wildlife's (WDFW) Ocean Sampling Program (OSP) continued its intensive monitoring program in all ocean ports during the salmon fishing season to collect data to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. All salmon fishery openings were monitored in 2022. Sampling activities included on-water observation, a Voluntary Trip Report (VTR) system, and dockside creel sampling. Among other parameters, sampling activities emphasized data collection needs for the estimation of *i*) the mark rate of the targeted coho population, *ii*) the total number of coho harvested by mark-status, including an estimate of angler compliance rate with coho MSF regulations, *iii*) the total number of coho released (by mark-status), *iv*) the coded-wire tag (CWT) stock composition of landed coho, and *v*) the total mortality of marked and unmarked coho.

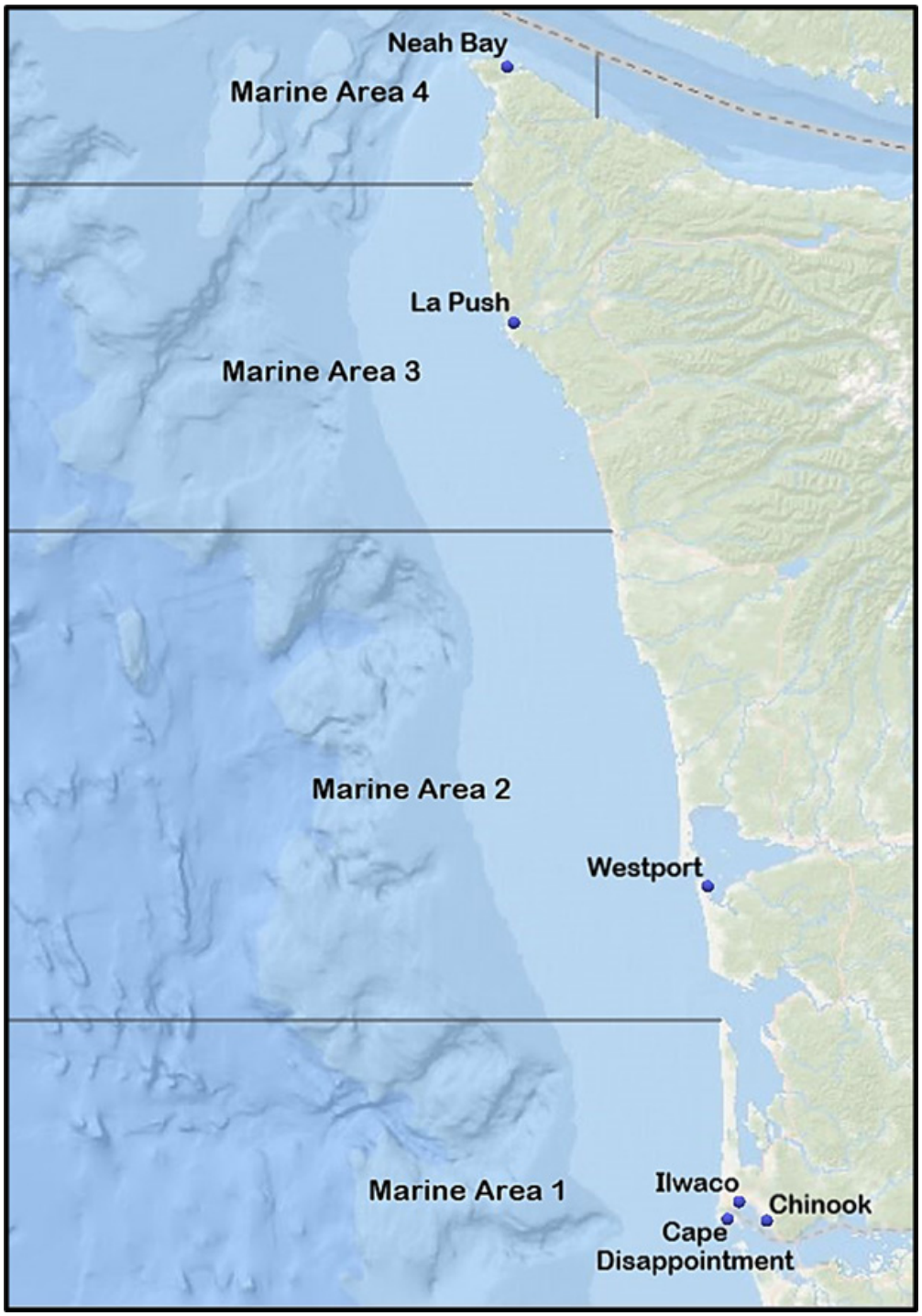

Figure 1. Map of coastal Washington showing the marine areas (Marine Areas 1 through 4) and major sampling sites**.**

2. SEASON DESCRIPTION

2.1 Ocean Recreational All-Species Fishery (Coho Mark-Selective)

Marine Area 1: The ocean recreational fishery was open in Marine Area 1 for all salmon species seven days per week from June 25 through August 22. A daily bag limit of two salmon, one of which could be a Chinook, was in effect. August 23 through September 30, the bag limit was modified in-season so that Chinook retention was not allowed. All retained coho were required to have a healed adipose fin clip. The Columbia Control Zone was closed. This opening, 98 fishing days were available in the area.

Marine Area 2: The ocean recreational fishery was open in Marine Area 2 for all salmon species seven days per week from July 2 through July 21. A daily bag limit of two salmon, one of which could be a Chinook, was in effect. July 22 through August 22, the bag limit was modified in-season so that Chinook retention was not allowed on Fridays and Saturdays. August 23 through September 30, the bag limit was modified so that Chinook retention was not allowed. From July 2 through August 26, all retained coho were required to have a healed adipose fin clip. The fishery was modified in-season to allow retention of unmarked coho beginning August 27 with a bag limit of two. The Grays Harbor Control Zone was closed beginning August 9. This opening, 91 fishing days were available in the area (56 days coho MSF, 35 days coho non-selective).

Marine Area 3: The ocean recreational fishery was open in Marine Area 3 for all salmon species, except no chum retention north of Cape Alava, WA, in August, seven days per week from June 18 through September 30. A daily bag limit of two salmon was in effect June 18 through July 3; the bag limit was modified in-season to a daily bag limit of two salmon, one of which could be a Chinook, beginning July 4. July 16 through July 24, the bag limit was modified in-season so that Chinook retention was not allowed. All retained coho were required to have a healed adipose fin clip. From October 5 through October 8, salmon fishing was open, but restricted to the portion of Area 3 north of 47°50’00” north latitude and south of 48°00’00” north latitude, seven days per week. A daily bag limit of two Chinook was in effect. This opening, 109 fishing days were available in the area.

Marine Area 4: The ocean recreational fishery was open in Marine Area 4 for all salmon species, except no chum retention north of Cape Alava, WA, in August, seven days per week from June 18 through July 4 and July 25 through September 30. A daily bag limit of two salmon was in effect June 18 through June 23; the bag limit was modified in-season to two salmon, only one of which could be a Chinook, from June 24 through July 4. On July 5, in-season action was taken to close the fishery to prevent exceedance of the Chinook guideline and extend the season. On July 25, in-season action was taken to reopen the subarea west of the Bonilla-Tatoosh line within Marine Area 4 for all salmon species seven days per week. On August 1, in-season action was taken to reopen the subarea east of the Bonilla-Tatoosh line within Marine Area 4 for all salmon species. A daily bag limit of two salmon, only one of which could be a Chinook, was in effect. All retained coho were required to have a healed adipose fin clip. This opening, 85 fishing days were available in the area.

The recreational salmon fishery operated under preseason quotas of 27,000 landed Chinook and 168,000 landed marked coho.

2.2 Non-Tribal Commercial Troll Fishery

The non-Tribal commercial troll fishery was open May 1 through June 29 for all salmon except coho from Cape Falcon, Oregon, to the U.S.-Canada border. Marine Areas 1 through 4 were open during this time for 60 days. The fishery reopened for all salmon species, except no chum retention north of Cape Alava, WA, beginning August 1, on July 1 in all areas between Cape Falcon, Oregon, and the U.S.-Canada border. From July 1 through August 25, all retained coho were required to have a healed adipose fin clip. The fishery was modified in-season to allow retention of unmarked coho August 26 through September 30. The fishery closed as scheduled on September 30, allowing a total of 92 available fishing days (56 days coho MSF, 36 days coho non-selective). Specific open dates and regulations are available in the PFMC Review of 2022 Ocean Salmon Fisheries (https://www.pcouncil.org/documents/2023/02/review-of-2022-ocean-salmon-fisheries.pdf/).

3. METHODS

WDFW's OSP implemented a comprehensive monitoring program in all major ocean ports during the coho MSF seasons in Washington Marine Areas 1-4. The OSP collected data to estimate key fishery parameters characterizing the ocean MSFs and associated impacts on unmarked salmon. Sampling activities included direct on-the-water observations of salmon encounters during charter ride-along trips, VTRs of completed trips provided by charter boat skippers and the angling public, dockside angler interviews (with catch sampling), and total boat counts via exit or entrance counts at each major coastal port.

3.1 On-Board Observation

OSP samplers conducted direct on-water observation of salmon encounters aboard charter vessels during the ocean recreational all-species coho MSF. For each hook up, data collected included result of the hook up (fish kept, released, or dropped off), species, mark status (marked or unmarked), and size class (legal or sublegal). These data were used to estimate the encounter rates of Chinook and coho by size class and mark group (legal-size and marked [LM], legal-size and unmarked [LU], sublegal-size and marked [SM], and sublegal-size and unmarked [SU]), as well as drop-offs.

Direct on-water observation of salmon encounters was primarily used in Marine Areas 1 and 2 where charter vessel salmon fishing trips are numerous, and vessels have the capacity to accommodate OSP staff. The VTR program (see Section 3.2 below) was also used to collect encounter data in these two areas.

In Marine Areas 3 and 4, where few charter vessels take salmon fishing trips, and those who do have limited capacity, the VTR system was the primary method used to collect on-water encounter data; charter on-board observation was minimal in these areas.

3.2 Voluntary Trip Reports

Selective fishery encounter statistics were acquired through VTRs that WDFW samplers distributed to and collected from charter boat skippers and the angling public in all four marine areas. The VTR form is designed to capture information identical to that collected by onboard observers. Anglers complete the information on the form as they fish, minimizing recall error.

Samplers distributed VTRs to private vessels on every sampled day in all sampled ports. Charter vessels agreeing to participate were given a binder with several forms to complete throughout the season. For private vessels, samplers approached anglers preparing to depart for fishing or after returning from fishing, explained the purpose of the VTR and how to complete it, and encouraged anglers to record all encounters while fishing and to return the form to a dockside sampler at the end of the fishing day. Anglers could also mail these forms to the WDFW Region 6 Office postage paid. Additionally, office staff contacted anglers by phone or mail who regularly complete VTRs before the season and provided blank VTRs and binders.

3.3 Dockside Sampling

Dockside samplers were stationed in the four major landing ports for ocean salmon fisheries: Neah Bay, La Push, Westport, and Ilwaco (including the port of Chinook and the Cape Disappointment boat launch). The recreational salmon fisheries in each accessible port were sampled a minimum of four to five days per week, with weekend (Saturday, Sunday, and holidays) and weekday days (non-holiday Monday through Friday) stratified separately. Typically, all weekend days and three randomly selected weekdays per week were sampled. Total fisheries catch and effort estimates were generated by the OSP using data obtained during dockside sampling: effort counts, interview data, and examination of catch. Each is described below.

Effort Counts

On each sample day, a total recreational boat count was obtained by counting boats exiting or entering the port. A minimum of 20% of the boats returning to the port within each boat type (charter and private) were sampled. An exit count (a count of boats leaving the port) typically began at 4:00 AM and continued through the end of the sampling day (exact time was port-specific). An entrance count (a count of boats entering the port) usually began near 8:00 AM and continued through dusk. Whether OSP samplers conducted exit or entrance counts varied based on specific considerations for each port. Regardless of the method used, this effort count, taken on every sampled day, provided the total counts of charter and private boats to which sample data were expanded.

Angler Interviews and Catch Sampling

WDFW samplers stationed in coastal ports collected catch and effort information during dockside angler interviews from boats returning from fishing. 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 CWTs, and angler reports 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 opportunistically.

3.4 Estimating Catch and Effort

3.4.i Estimated Stratum Totals (Primary Stage)

Combined (total) catch estimates are typically stratified by weekend/holiday and weekday. In some strata, every day is sampled. In those strata the combined estimates are simply sums of the daily catches. In other strata, where some days are not sampled, the average catch per day over all sampled days is multiplied by the number of days in the stratum to estimate the total catch.

Let:

a = the marine catch area,

i = trip type,

t = Weekend/holiday or Weekday stratum,

N_t = the number of days in stratum t,

T_t = collection of all days in stratum t,

n_t = the number of days sampled in stratum t,

S_t = collection of sampled days in stratum t (when S=T, n=N),

Y_{taik} = estimated catch (or effort) on day k for stratum t in area a from trip type i,

C_{tai} = catch for stratum t in area a from trip type i,

Then

$$\hat{C}_{tai} = N_t \frac{\sum_{k \in S_t} \hat{Y}_{taik}}{n_t}$$

with estimated variance (see Thompson 1992, p. 129):

$$\hat{V}\left(\hat{C}_{tai}\right) = \frac{N_t(N_t - n_t)}{n_t} \frac{\sum_{k \in S_t} \left(\hat{Y}_{taik} - \bar{\hat{Y}}_{tai}\right)^2}{n_t - 1} + \frac{N_t}{n_t} \sum_{k \in S_t} \hat{V}\left(\hat{Y}_{taik}\right)$$

where

$$\bar{\hat{Y}}_{tai} = \frac{\sum_{k \in S_t} \hat{Y}_{taik}}{n_t}.$$

For strata with all days sampled, $n_t = N_t$, and the catch and variance estimators reduce to:

$$\hat{C}_{tai} = \sum_{k \in T_t} \hat{Y}_{taik}$$

and

$$\hat{V}\left(\hat{C}_{tai}\right) = \sum_{k \in T_t} \hat{V}\left(\hat{Y}_{taik}\right).$$

3.4.ii Daily Catch and Effort Estimation (Secondary Stage)

Both catch and effort are post-stratified by trip type and area fished. Effort in terms of boat trips is simply the sampled number of boats for each trip type and area expanded by the appropriate boat type (charter or private) exit/entrance count. Effort in terms of angler trips is calculated as the mean number of anglers per boat (indexed by trip type and area) expanded by the counted total population of boats.

The total catch for a given species on a sampled day is the product of the population of boats and the estimated catch per boat, again post-stratified by trip type and area fished. Key assumptions in the current estimation procedures are that:

1) All boats exiting/entering a port are included in the exit/entrance count
2) Exit/entrance counts are made without error
3) The approximate systematic sample of boats can be treated as a simple random sample
4) Anglers answer questions accurately and do not conceal fish

In the following discussion, subscripts referring to port and boat type are suppressed. Let:

M_t = total exit or entrance count for a given port on day t (assumed known without error),

m_t = total boats sampled on day t,

m_{tai} = number of boats sampled of trip type i fishing in area a on day t,

a_{taij} = number of anglers on the jth boat from trip type i fishing in area a on day t,

y_{taij} = number of species-specific fish caught on the jth boat from trip type i in area a on day t, and

Y_{tai} = total catch of specific species caught from trip type i in area a on day t.

The estimate of the number of boat trips of trip-type i and area a follows the procedure outlined in Lai et al. (1991), where the proportion of boats in each category is estimated by:

$$\hat{p}_{tai} = \frac{m_{tai}}{m_t}$$

with estimated variance (see Cochran 1977, p. 52):

$$V(\hat{p}_{tai}) = \frac{\hat{p}_{tai} \cdot (1 - \hat{p}_{tai})}{(m_t - 1)} \cdot (\frac{M_t - m_t}{M_t})$$

The estimated total boat-trips are then obtained by:

$$\hat{M}_{tai} = M_t \cdot \hat{p}_{tai}$$

with estimated variance:

$$\hat{V}(\hat{M}_{tai}) = M^2{}_t \cdot \hat{V}(\hat{p}_{tai})$$

Effort expressed in terms of angler trips is the product of the average anglers per boat trip times the total number of boat trips. The mean number of anglers per boat trip (for trip type *i* and fishing area *a*) is estimated as:

$$\hat{\bar{a}}_{tai} = \frac{\sum_j a_{taij}}{m_t}$$

with variance:

$$\hat{V}(\hat{\bar{a}}_{tai}) = \frac{\sum_j (a_{taij} - \hat{\bar{a}}_{tai})^2}{m_t (m_t - 1)} \cdot (\frac{M_t - m_t}{M_t})$$

Thus, the estimated total number of angler trips is:

$$\hat{a}_{tai} = M_t \cdot \hat{\bar{a}}_{tai}$$

with variance:

$$\hat{V}(\hat{a}_{tai}) = M^2{}_t \cdot \hat{V}(\hat{\bar{a}}_{tai})$$

The catch (or number released) for a specific species on sampled day *t* in area *a* from trip type *i* is similarly estimated by:

$$\hat{Y}_{tai} = \frac{\sum_j y_{taij}}{m_t} M_t$$

with estimated variance:

$$\hat{V}\left(\hat{Y}_{tai}\right) = \frac{\sum_{j}\left(y_{taij} - \hat{\bar{y}}_{tai}\right)^2}{m_t\left(m_t - 1\right)} M_t\left(M_t - m_t\right)$$

This estimate and its variance differ somewhat from that described in Lai et al. (1991) since the total count, M_t (assumed to be a known quantity), is used to expand the estimated CPUE (calculated over all sampled boats) rather than the estimated boat-trips by trip-type and area fished.

4. RESULTS IN THE OCEAN RECREATIONAL ALL-SPECIES COHO MSF

4.1 Dockside Sampling Results

Private and charter anglers completed an estimated 76,352 angler trips coastwide (59,445 from Washington, 16,907 from Oregon) during the 2022 ocean recreational all-species coho MSF. These anglers harvested 24,681 Chinook (21,312 WA, 3,369 OR) and 72,085 coho (51,540 WA, 20,545 OR). Table 1 shows effort and catch by month and area during the 2022 ocean recreational all-species coho MSF.

WDFW dockside samplers interviewed an estimated 36% of all anglers fishing from WA coastwide during the ocean recreational all-species coho MSF. 32% of all Chinook and 42% of all coho harvested in WA were sampled; 749 CWTs were collected from sampled Chinook, and 2,695 were collected from sampled coho in WA ports (Table 2).

4.2 On-water Observation and VTR Results

Tables 3 and 4 detail on-water data collected from VTRs submitted by charter and private fishing vessels. Charter boat VTRs provided on-water catch and encounter data from a total of 100 charter boat trips documenting 431 legal-sized Chinook, 72 sub-legal sized Chinook, 2,905 legal sized coho, and 15 sublegal sized coho during the ocean recreational all-species coho MSF. Dockside samplers also collected 66 completed and useable VTRs from private vessels containing 134 legal sized Chinook encounters, 31 sublegal sized Chinook encounters, 284 legal sized coho encounters, and 31 sublegal sized coho encounters. Mark rates calculated from VTR data, where available, are shown in Table 5 and compared to pre-season FRAM coho mark rate projections.

4.3 Overall Fishery Impacts

Estimated Total Coho Encounters and Mortalities

Please note FRAM pre-season projections are based on ocean salmon fishery seasons as adopted by PFMC and, in some cases, may not be directly comparable with the ocean salmon fishery seasons that were conducted.

FRAM pre-season projections of coho encounters north of Cape Falcon, OR (Washington and Oregon) in the 2022 ocean recreational all-species coho MSF are compared with estimated

encounters based on Washington and Oregon sample data in Table 6. Table 7 compares total coho mortality projected pre-season by FRAM north of Cape Falcon, OR (Washington and Oregon) with estimated coho mortality based on Washington and Oregon sample data.

The overall impacts of the 2022 ocean recreational all-species coho MSF in Marine Areas 1-4 are characterized in terms of grand-total estimates of coho encounters and mortalities by using estimates specific to mark group (i.e., marked and unmarked). The method described in section 3.4 was used to generate total estimates of retained catch by mark group. To estimate coho salmon encounters and releases by mark group, we applied Conrad's (2012) alternative method for estimating coho encounters and release mortalities in ocean MSFs, which independently calculates charter and private vessel totals based on observer and VTR data. This method differs from that used prior to 2012.

Estimated marked and unmarked coho retention is calculated from dockside sampling data as described in Section 3.4; note that since catch estimates are stratified by week, monthly total proportions of marked and unmarked estimated retained catch may vary slightly from monthly total proportions of marked and unmarked sampled coho. Encounters are calculated by boat type and marine area based on landed catch of legal sized marked coho, the proportion of observed encounters that were legal sized marked coho, and the proportion of observed encounters that were legal sized marked coho that were retained. Mortality was estimated for each mark group based on calculated encounters and the proportion of the legal sized coho of that mark status that were released multiplied by the PFMC ocean selective fishery mortality *(sfm)* rate of 14% (Conrad, 2012).

Observed estimates of total coho encounters and unmarked coho encounters were higher than projected preseason in all marine areas. Total mortality estimates were below preseason projections in all marine areas. Estimated unmarked mortality was lower than projected preseason in all areas. Estimated marked and unmarked landed catch was lower than projected preseason in all areas. Estimated unmarked landed catch was higher than projected in all marine areas except Area 4. Observed coho mark rates were lower than anticipated preseason in Marine Areas 1 and 2, but higher than anticipated in Marine Areas 3 and 4.

Figure 2 compares the FRAM projected coho encounters and mortality by area with those estimated using Washington and Oregon sample data in the ocean recreational all-species coho MSF.

Compliance

Table 8 reports rates of compliance with coho MSF regulations observed by dockside samplers for the ocean recreational fishery by area and month. Coastwide, compliance with coho MSF regulations averaged 99%, similar to previous seasons.

Table 1. Estimates of total fishing effort and number of Chinook and coho retained during the 2022 ocean recreational all-species coho MSF between Cape Falcon, Oregon and the U.S.-Canada border.[1/]

	TOTAL ANGLER TRIPS					CHINOOK RETAINED					COHO RETAINED				
	June	July	Aug	Sept	TOTAL	June	July	Aug	Sept	TOTAL	June	July	Aug	Sept	TOTAL
Area 4	3,693	2,398	2,255	1,091	9,437	2,773	1,297	733	74	4,877	239	432	1,373	588	2,633
Area 3	92	967	844	575	2,478	21	423	242	83	769	44	701	828	588	2,161
Area 2	-	12,497	11,265	-	23,763	-	6,491	4,746	-	11,237	-	9,378	13,865	-	23,243
Area 1	573	8,280	11,264	3,650	23,768	311	1,843	2,259	15	4,429	233	10,731	10,276	2,263	23,503
TOTAL WA	**4,358**	**24,143**	**25,628**	**5,316**	**59,445**	**3,105**	**10,054**	**7,980**	**172**	**21,312**	**515**	**21,242**	**26,343**	**3,440**	**51,540**
OREGON (Area 1)	757	4,378	9,428	2,344	16,907	96	700	2,573	0	3,369	1,006	6,375	10,400	2,764	20,545
TOTAL NOF	**5,115**	**28,521**	**35,056**	**7,660**	**76,352**	**3,201**	**10,754**	**10,553**	**172**	**24,681**	**1,521**	**27,617**	**36,743**	**6,204**	**72,085**
WA Variance[2/]:					1,250,017					498,418					1,203,391
WA Standard Error:					1,118					706					1,097
WA CV (%):					2%					3%					2%
WA 95% CI:					57,254-61,636					19,928-22,696					49,390-53,690

1/ Closed months and months non-mark-selective for coho are denoted by (-).

2/ Variance estimates are unavailable for Oregon.

Table 2. WA dockside sampling statistics during the 2022 ocean recreational all-species coho MSF between Cape Falcon, Oregon and the U.S.-Canada border.

	Anglers Sampled	Sample Rate	Landed Chinook Sampled	Sample Rate	Landed Coho Sampled	Sample Rate	Chinook CWTs collected	Coho CWTs collected
Area 4	2,404	25%	1,098	23%	821	31%	112	83
Area 3	1,335	54%	364	47%	1,193	55%	32	155
Area 2	8,669	36%	3,772	34%	8,704	37%	416	1,052
Area 1	9,124	38%	1,617	37%	11,079	47%	189	1,405
TOTAL WA	**21,532**	**36%**	**6,851**	**32%**	**21,797**	**42%**	**749**	**2,695**

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Table 3. VTR Chinook encounters by boat type, size class and mark status in the 2022 ocean recreational all-species coho MSF between Cape Falcon, Oregon and the U.S.-Canada border.[1/]

		Charter Boats (On-board observation/VTRs)							Private boats (VTRs)						
		Total	LEGAL-SIZED			SUBLEGAL-SIZED			Total VTRs	LEGAL-SIZED			SUBLEGAL-SIZED		
		Observer	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown	Collected	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown
Area 4	June	0	0	0	0	0	0	0	11	22	6	0	4	0	0
	July	1	0	0	0	0	2	0	1	1	0	0	0	0	0
	Aug	2	1	9	0	0	2	0	0	0	0	0	0	0	0
	Sept	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	**3**	**1**	**9**	**0**	**0**	**4**	**0**	**12**	**23**	**6**	**0**	**4**	**0**	**0**
Area 3	June	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	July	6	9	10	0	12	2	0	3	0	0	0	0	0	0
	Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sept	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	**6**	**9**	**10**	**0**	**12**	**2**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**
Area 2	June	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July	35	110	103	0	26	10	0	18	29	37	0	3	0	0
	Aug	45	90	79	0	11	1	0	3	2	6	0	0	1	0
	Sept	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL	**80**	**200**	**182**	**0**	**37**	**11**	**0**	**21**	**31**	**43**	**0**	**3**	**1**	**0**
Area 1	June	0	0	0	0	0	0	0	2	4	0	0	1	0	0
	July	3	0	0	0	0	0	0	17	9	9	0	13	3	0
	Aug	6	8	12	0	5	1	0	8	6	2	0	0	6	0
	Sept	2	0	0	0	0	0	0	3	1	0	0	0	0	0
	TOTAL	**11**	**8**	**12**	**0**	**5**	**1**	**0**	**30**	**20**	**11**	**0**	**14**	**9**	**0**

1/ Closed months and months non-mark-selective for coho are denoted by (-).

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Table 4. VTR coho encounters by boat type, size class and mark status in the 2022 ocean recreational all-species coho MSF between Cape Falcon, Oregon and the U.S.-Canada border.[1/]

		Charter Boats (On-board observation/VTRs)							Private boats (VTRs)						
		Total	LEGAL-SIZED			SUBLEGAL-SIZED			Total VTRs	LEGAL-SIZED			SUBLEGAL-SIZED		
		Observer	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown	Collected	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown
Area 4	June	0	0	0	0	0	0	0	11	2	1	0	0	0	0
	July	1	2	1	0	0	0	0	1	0	0	0	0	0	0
	Aug	2	13	9	0	0	0	0	0	0	0	0	0	0	0
	Sept	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	**3**	**15**	**10**	**0**	**0**	**0**	**0**	**12**	**2**	**1**	**0**	**0**	**0**	**0**
Area 3	June	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	July	6	15	7	0	0	0	0	3	8	4	0	0	0	0
	Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sept	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	**6**	**15**	**7**	**0**	**0**	**0**	**0**	**3**	**8**	**4**	**0**	**0**	**0**	**0**
Area 2	June	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July	35	409	467	0	2	2	0	18	57	23	0	0	1	0
	Aug	45	833	896	0	4	4	0	3	10	11	0	0	0	0
	Sept	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL	**80**	**1242**	**1363**	**0**	**6**	**6**	**0**	**21**	**67**	**34**	**0**	**0**	**1**	**0**
Area 1	June	0	0	0	0	0	0	0	2	0	0	0	0	0	0
	July	3	0	0	0	0	0	0	17	59	31	0	0	2	0
	Aug	6	92	120	0	1	1	0	8	27	29	0	9	9	0
	Sept	2	20	21	0	0	1	0	3	15	7	0	7	3	0
	TOTAL	**11**	**112**	**141**	**0**	**1**	**2**	**0**	**30**	**101**	**67**	**0**	**16**	**14**	**0**

1/ Closed months and months non-mark-selective for coho are denoted by (-).

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Table 5. Estimated Chinook and coho mark rates during the 2022 ocean recreational all-species coho MSF between Cape Falcon, Oregon and the U.S.-Canada border by size class using VTR encounters.[1/]

		LEGAL-SIZED CHINOOK			SUBLEGAL-SIZED CHINOOK			LEGAL-SIZED COHO			FRAM Projected Coho
		Charter	Private	Combined	Charter	Private	Combined	Charter	Private	Combined	Mark Rate
Area 4	June	NA	79%	79%	NA	100%	100%	NA	67%	67%	
	July	NA	100%	100%	0%	NA	0%	67%	NA	67%	
	August	10%	NA	10%	0%	NA	0%	59%	NA	59%	
	September	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	TOTAL	**10%**	**79%**	**62%**	**0%**	**100%**	**50%**	**60%**	**67%**	**61%**	**51%**
Area 3	June	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	July	47%	NA	47%	86%	NA	86%	68%	67%	68%	
	August	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	September	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	TOTAL	**47%**	**NA**	**47%**	**86%**	**NA**	**86%**	**68%**	**67%**	**68%**	**58%**
Area 2	June	-	-	-	-	-	-	-	-	-	
	July	52%	44%	50%	72%	100%	74%	47%	71%	49%	
	August	53%	25%	52%	92%	0%	85%	48%	48%	48%	
	September	-	-	-	-	-	-	-	-	-	
	TOTAL	**52%**	**42%**	**51%**	**77%**	**75%**	**77%**	**48%**	**66%**	**48%**	**62%**
Area 1	June	NA	100%	100%	NA	100%	100%	NA	NA	NA	
	July	NA	50%	50%	NA	81%	81%	NA	66%	66%	
	August	40%	75%	50%	83%	0%	42%	43%	48%	44%	
	September	NA	100%	100%	NA	NA	NA	49%	68%	56%	
	TOTAL	**40%**	**65%**	**55%**	**83%**	**61%**	**66%**	**44%**	**60%**	**51%**	**67%**

1/ Closed months and months non-mark-selective for coho are denoted by (-).

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Table 6. Comparison of modeled (FRAM model run Coho2225) and estimated total coho encounters in the 2022 ocean recreational all-species coho MSF.

Data Source	Area	Marked	Unmarked	Total Encounters	Landed Catch
FRAM	Area 4	18,144	17,173	35,317	17,471
	Area 3	4,554	3,231	7,785	4,370
	Area 2	64,952	39,972	104,924	62,160
	Area 1	87,999	42,681	130,679	84,000
	TOTAL	**175,648**	**103,057**	**278,705**	**168,001**
Estimated Actual Encounters	Area 4	2,842	3,047	5,889	2,633
	Area 3	2,390	2,930	5,320	2,161
	Area 2	24,715	18,611	43,326	23,243
	Area 1	45,869	33,900	79,769	44,048
	TOTAL	**75,816**	**58,489**	**134,304**	**72,085**
	Variance[1/]:	9,706,705	4,332,503	26,779,521	1,203,391
	Standard Error:	3,116	2,081	5,175	1,097
	CV (%):	4%	4%	4%	2%
	95% CI:	69,709-81,922	54,409-62,568	124,161-144,447	69,935-74,235

1/ Variance estimates are unavailable for Oregon statistics.

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Table 7. Comparison of modeled (FRAM model run Coho2225) and estimated total coho mortalities in the 2022 ocean recreational all-species coho MSF.

		Release Mortality		Drop Off Mortality [1/]		Landed Catch		Total
Data Source	Area	Marked	Unmarked	Marked	Unmarked	Marked	Unmarked	Mortality
FRAM	Area 4	153	2,435	910	888	17,116	355	21,857
	Area 3	38	466	229	170	4,302	68	5,273
	Area 2	548	5,797	3,261	2,113	61,315	845	73,879
	Area 1	742	6,262	4,420	2,282	83,087	913	97,706
	TOTAL	**1,482**	**14,961**	**8,820**	**5,452**	**165,820**	**2,181**	**198,716**
Estimated Actual Mortality	Area 4	36	420	142	152	2,586	47	3,383
	Area 3	33	408	119	147	2,156	5	2,867
	Area 2	216	2,606	1,236	931	23,175	68	28,230
	Area 1	268	4,739	2,293	1,695	43,958	90	53,043
	TOTAL	**552**	**8,173**	**3,791**	**2,924**	**71,875**	**210**	**87,524**
Variance[2/]:		20,488	225,153	24,267	10,831	1,197,721	546	-
Standard Error:		143	475	156	104	1,094	23	-
CV (%):		26%	6%	4%	4%	2%	11%	-
95% CI:		271-832	7,243-9,103	3,485-4,096	2,720-3,128	69,730-74,020	164-256	-

1/ Observed drop off mortality calculated as 5% of observed encounters.

2/ Variance estimates are unavailable for Oregon statistics.

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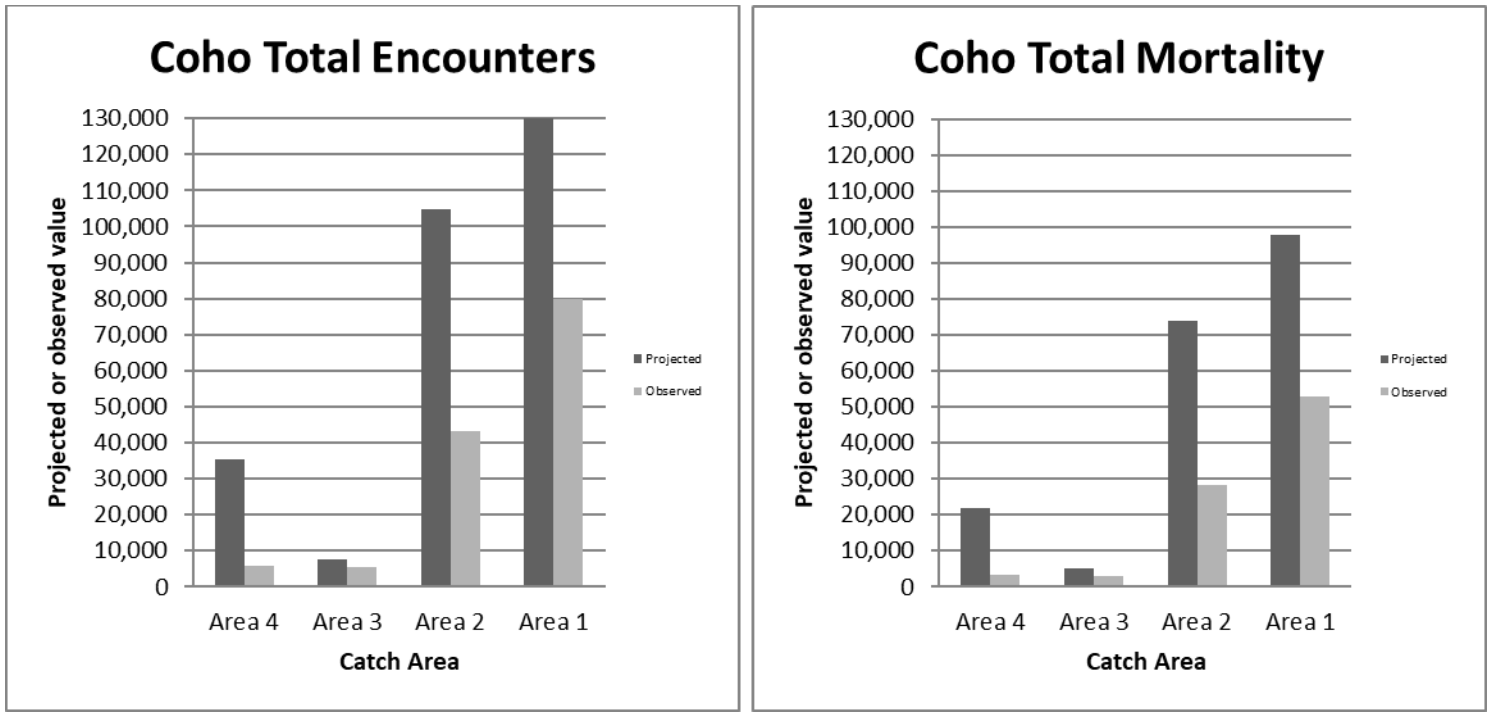

Figure 2. Comparison of modeled (FRAM model run Coho2225) and estimated total coho encounters and mortality in the 2022 ocean recreational all-species coho MSF.

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Table 8. Compliance with coho MSF regulations observed during dockside sampling interviews in the 2022 ocean recreational all-species coho MSF between Cape Falcon, Oregon and the U.S.-Canada border.[1/]

		Total Coho Sampled	Marked Coho Sampled	Unmarked Coho Sampled	% Sampled Coho Marked
Area 4	June	69	66	3	95.7%
	July	138	136	2	98.6%
	August	395	391	4	99.0%
	September	189	185	4	97.9%
	Total	**791**	**778**	**13**	**98.4%**
Area 3	June	29	29	0	100.0%
	July	421	418	3	99.3%
	August	517	516	1	99.8%
	September	256	256	0	100.0%
	Total	**1,223**	**1,219**	**4**	**99.7%**
Area 2	June	-	-	-	NA
	July	4,187	4,177	10	99.8%
	August	4,514	4,505	9	99.8%
	September	-	-	-	NA
	Total	**8,701**	**8,682**	**19**	**99.8%**
Area 1	June	336	335	1	99.7%
	July	5,825	5,812	13	99.8%
	August	3,853	3,842	11	99.7%
	September	1,068	1,063	5	99.5%
	Total	**11,082**	**11,052**	**30**	**99.7%**

1/ Closed months and months non-mark-selective for coho are denoted by (-).

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5. RESULTS IN THE NON-TRIBAL COMMERCIAL TROLL ALL-SPECIES COHO MSF

The non-Tribal commercial troll fishery harvested a total of 7,282 Chinook (7,164 WA, 118 OR) and 4,985 coho (3,349 WA, 1,636 OR) during the 2022 coastwide all-species coho MSF operating July 1 through August 25. Estimates of coho catch in the commercial troll all-species coho MSF were below preseason projections. **Table 9** shows commercial troll catch in the all-species coho MSF by month and area.

WDFW dockside samplers examined a total of 46% of all Chinook and 34% of all coho harvested and landed in WA during the non-Tribal commercial troll all-species coho MSF. CWT collections totaled 292 from Chinook and 142 from coho in WA ports (**Table 10**).

Table 9. Total Chinook and coho retained during the 2022 non-Tribal commercial troll all-species coho MSF between Cape Falcon, Oregon and the U.S.-Canada border.

	Chinook				**Coho**			
	July	August	September	TOTAL	July	August	September	TOTAL
Area 4	137	40	-	177	20	4	-	24
Area 3	1,583	559	-	2,142	528	625	-	1,153
Area 2	3,105	1,341	-	4,446	486	1,246	-	1,732
Area 1	399	0	-	399	440	0	-	440
TOTAL WA	**5,224**	**1,940**	**-**	**7,164**	**1,474**	**1,875**	**-**	**3,349**
OREGON (Area 1)	96	22	-	118	1,449	187	-	1,636
TOTAL NOF	**5,320**	**1,962**	**-**	**7,282**	**2,923**	**2,062**	**-**	**4,985**

1/ Months non-mark-selective for coho are denoted by (-).

Table 10. Chinook and coho sampled in WA during the 2022 non-Tribal commercial troll all-species coho MSF between Cape Falcon, Oregon and the U.S.-Canada border.

	Chinook			**Coho**		
	Total Sampled	Sample Rate	CWTs Collected	Total Sampled	Sample Rate	CWTs Collected
Area 4	0	0%	0	0	0%	0
Area 3	929	43%	85	265	23%	28
Area 2	2,183	49%	188	706	41%	93
Area 1	177	44%	19	169	38%	21
TOTAL WA	**3,289**	**46%**	**292**	**1,140**	**34%**	**142**

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