

2020 OCEAN SELECTIVE FISHERY SAMPLING REPORT

SUBMITTED BY:

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1. INTRODUCTION

The onset of the COVID-19 pandemic coincided with the final stages of the Pacific Fishery Management Council (PFMC) salmon season setting process, and measures taken to limit the spread of COVID-19 were initiated prior to the planned openings of the 2020 recreational and commercial troll salmon fisheries.

The PFMC adopted 2020 recreational and commercial troll fisheries for all salmon species in the area between Cape Falcon, Oregon and the U.S./Canada border. Recreational and commercial mark-selective fisheries (MSFs) for coho were included in all four Catch Record Card (CRC) areas of coastal Washington (Areas 1, 2, 3, and 4; **Fig 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-second 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 2020.

The Ocean Sampling Program (OSP) continued its intensive monitoring program in all accessible ocean ports and collaborated with the Puget Sound Sampling Unit (PSSU) in monitoring the port of Sekiu during the season to collect data to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. All salmon fishery openings were monitored in 2020. Sampling activities included 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.

2. SEASON DESCRIPTION

The Makah and Quileute Indian reservations, which include the ocean access ports of Neah Bay and La Push, were closed to public access for the entirety of the 2020 ocean salmon seasons as a result of COVID-19 mitigation measures. Limited local commercial troll landings continued in the port of La Push, but no commercial landings were allowed into the port of Neah Bay, and no recreational fishing occurred from either port. Recreational access to ocean areas on the northern coast mainly originated from the port of Sekiu. The ports of Westport and Ilwaco remained open to public access throughout the salmon fisheries. To provide landing access to the commercial fleet on the northern coast, early in-season management action opened the area between the Sekiu River and Port Angeles to troll landing and delivery; this area includes the ports of Sekiu and Port Angeles.

2.1 Ocean Recreational All-Species-Except-Coho Fisheries

CRC Area 1: The ocean recreational fishery in CRC Area 1 was open for all salmon species except coho seven days per week from June 20 through June 28. A daily bag limit of one salmon was in effect. The Columbia Control Zone was closed. This opening, 9 fishing days were available in the area.

CRC Area 2: The ocean recreational fishery in CRC Area 2 was open for all salmon species except coho seven days per week from June 20 through June 28. A daily bag limit of one salmon was in effect. This opening, 9 fishing days were available in the area.

CRC Area 3: The ocean recreational fishery in CRC Area 3 was open for all salmon species except coho seven days per week from June 20 through June 28. A daily bag limit of one salmon was in effect. This opening, 9 fishing days were available in the area.

CRC Area 4: The ocean recreational fishery in CRC Area 4 was open for all salmon species except coho seven days per week from June 20 through June 28. A daily bag limit of one salmon was in effect. This opening, 9 fishing days were available in the area.

2.2 Ocean Recreational All-Species Fisheries (Coho Mark-Selective)

CRC Area 1: The ocean recreational fishery in CRC Area 1 was open for all salmon species seven days per week from June 29 through July 26. A daily bag limit of two salmon, one of which could be a Chinook, was in effect. All retained coho were required to have a healed adipose fin clip. The Columbia Control Zone was closed. This opening, 28 fishing days were available in the area.

CRC Area 2: The ocean recreational fishery in CRC Area 2 was open for all salmon species five days per week (Sunday through Thursday) from June 29 through September 3; the fishing week was modified in-season to seven days per week from September 4 through September 30. A daily bag limit of two salmon, one of which could be a Chinook, was in effect June 29 through September 3; the bag limit was modified in-season to two salmon from September 4 through September 30. All retained coho were required to have a healed adipose fin clip. The Grays Harbor Control Zone was closed beginning August 10. This opening, 76 fishing days were available in the area.

CRC Area 3: The ocean recreational fishery in CRC Area 3 was open for all salmon species seven days per week from June 29 through September 30. A daily bag limit of two salmon was in effect. All retained coho were required to have a healed adipose fin clip. This opening, 94 fishing days were available in the area.

CRC Area 4: The ocean recreational fishery in CRC Area 4 was open for all salmon species seven days per week from June 29 through August 7. A daily bag limit of two salmon was in effect. All retained coho were required to have a healed adipose fin clip. This opening, 40 fishing days were available in the area.

The recreational salmon fishery operated under preseason quotas of 26,360 landed Chinook and 26,500 landed marked coho.

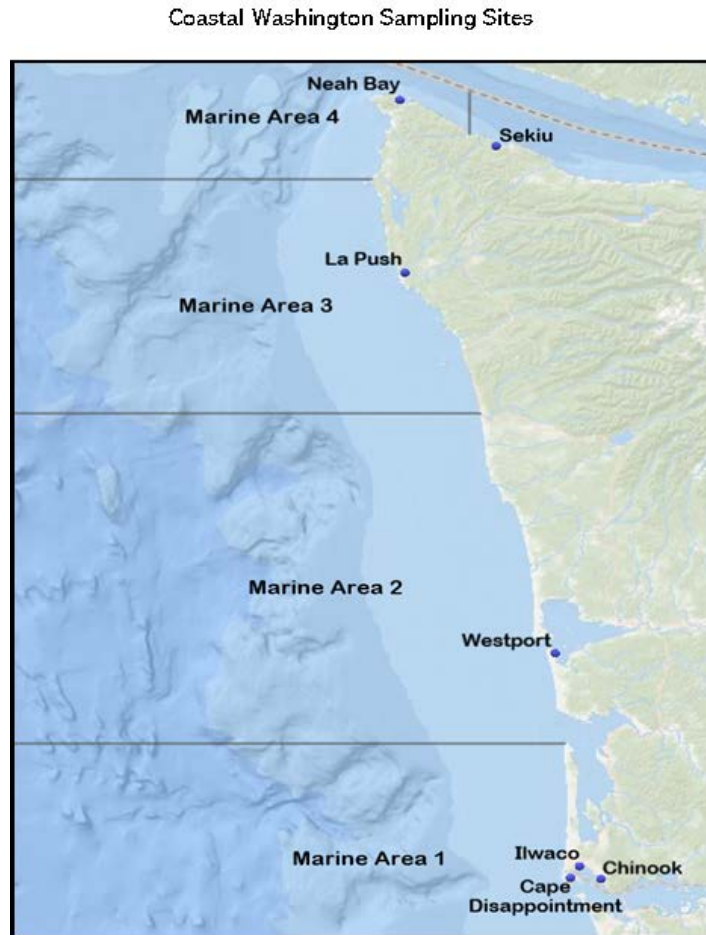


Figure 1. Map of coastal Washington showing the ocean catch record card areas (Areas 1 through 4) and major sampling sites.

2.3 Non-Tribal Commercial Troll Fisheries (Coho Mark-Selective)

The non-Tribal troll fishery was open May 6 through June 28 for all salmon except coho from Cape Falcon, Oregon to the U.S.-Canada border. Ocean Areas 1 through 4 were open during this time for 54 days. The fishery reopened for all salmon species (except no chum retention north of Cape Alava, WA in August) on July 1 in all areas between Cape Falcon, Oregon and the U.S.-Canada border. The fishery closed as scheduled on September 30 allowing a total of 92 available fishing days. All retained coho were required to have a healed adipose fin clip. Specific open dates and regulations are available in the [PFMC Review of 2020 Ocean Salmon Fisheries](https://www.pcouncil.org/documents/2021/02/review-of-2020-ocean-salmon-fisheries.pdf/) (https://www.pcouncil.org/documents/2021/02/review-of-2020-ocean-salmon-fisheries.pdf/).

3. METHODS

In compliance with COVID-19 guidance from the Washington State Governor's Office, the Washington Department of Fish and Wildlife (WDFW) enacted standard operating procedures designed to limit the spread of COVID-19. WDFW's COVID-19 operating procedures were adopted and followed by the Ocean Sampling Program (OSP) but had minimal impact on fishery sampling. However, in 2020 on-water observation was unable to be conducted and biodata collection was reduced.

WDFW's OSP implemented a comprehensive monitoring program in all accessible ocean ports during the coho MSF seasons in Washington ocean CRC 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 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

Due to COVID-19, and WDFW's standard operating procedures enacted to limit the spread, direct on-water observation of salmon encounters aboard charter vessels was not conducted in 2020.

3.2 Voluntary Trip Reports

Selective fishery encounter statistics were acquired through VTRs that WDFW samplers distributed to and collected from both charter boat skippers and the angling public in all ocean CRC Areas. The VTR form is designed to capture information identical to that collected by on-board 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 prior to the season and provided blank VTRs and binders.

3.3 Dockside Sampling

Dockside samplers were stationed in the major landing ports for the ocean fisheries that were accessible in 2020: Ilwaco (including the port of Chinook and the Cape Disappointment launch ramp), Westport, and Sekiu. The recreational fisheries in each accessible port were sampled a minimum of 4 to 5 days per week, with weekend (Saturday, Sunday, and holidays) and weekday days (non-holiday Monday through Friday) stratified. Typically, all weekend days and 3 randomly selected weekdays per week were sampled. Total fishery catch and effort estimates

were generated by the OSP using three types of 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 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. An exit count (a count of boats leaving the port) typically began at 4:30AM 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 8:00AM 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 estimates of released salmon by species and mark status and of released groundfish by species.

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_{tai} = 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):

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

where

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

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

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

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 j th boat from trip type i fishing in area a on day t ,

y_{taij} = number of species-specific fish caught on the j th 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):

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

The estimated total boat-trips is then obtained by:

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

with estimated variance:

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

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:

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

with variance:

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

Thus the estimated total number of angler-trips is:

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

with variance:

$$\hat{V}(\hat{a}_{tai}) = M_t^2 \cdot \hat{V}(\hat{a}_{tai})$$

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:

$$\hat{V}(\hat{Y}_{tai}) = \frac{\sum_j (y_{taij} - \hat{y}_{tai})^2}{m_t(m_t - 1)} M_t (M_t - m_t)$$

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 RECREATIONAL FISHERY

4.1 Dockside Sampling Results

An estimated 37,335 angler trips (33,885 from Washington, 3,450 from Oregon) were completed by private and charter anglers during the 2020 coastwide recreational salmon fishery. These anglers harvested a total of 7,659 Chinook coastwide (7,508 WA, 151 OR) and 23,974 coho (20,250 WA, 3,724 OR). **Table 1** shows effort and catch by month and area during the 2020 recreational fishery.

WDFW dockside samplers interviewed an estimated 42% of all anglers fishing from WA coastwide during the recreational salmon fishery. A total of 38% of all Chinook and 45% of all coho harvested in WA were sampled; 377 CWTs were collected from sampled Chinook and 1,230 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 65 charter boat trips documenting a total of 229 legal sized Chinook, 148 sublegal sized Chinook, 1,254 legal sized coho, and 111 sublegal sized coho during the recreational fishery. Dockside samplers also collected 66 completed and useable VTRs from private vessels containing 56 legal sized Chinook encounters, 56 sublegal sized Chinook encounters, 262 legal sized coho encounters, and 32 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.

Due to the lack of access to Neah Bay and La Push, only 74 VTRs were handed out to anglers on the northern coast by the OSP. Zero usable VTRs were received from area 3 and 4.

4.3 Overall Fishery Impacts

Estimated Total Coho Encounters and Mortalities

FRAM pre-season projections of coho encounters (Washington and Oregon) in the 2020 ocean recreational fishery 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 (Washington and Oregon) with estimated coho mortality based on Washington and Oregon sample data.

The overall impacts of the 2020 recreational fishery in ocean CRC Areas 1-4 are characterized in terms of grand-total estimates of coho encounters and mortalities and 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 CRC 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 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 lower than projected preseason in all CRC areas; except Area 2, where unmarked encounters were well above and total encounters were slightly above projections. Total mortality estimates were in-line with or lower than projected preseason in all CRC Areas, and estimated unmarked mortality was higher than projected preseason in all areas except Area 2. Estimated marked landed catch was lower than projected preseason in all CRC areas except Area 4; estimated unmarked landed catch was lower than projected in all CRC areas except Area 3. Observed coho mark rates were higher than anticipated preseason in all areas except Area 2.

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

Compliance

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

4.4 DNA Data Collection

No DNA samples were collected in 2020 due to COVID-19 related safety concerns. DNA collection will resume as soon as possible.

Table 1. Estimates of total fishing effort and number of Chinook and coho retained during the 2020 recreational fishery between Cape Falcon, Oregon and the U.S.-Canada border.

	TOTAL ANGLER TRIPS					CHINOOK RETAINED					COHO RETAINED				
	June	July	Aug	Sept	TOTAL	June	July	Aug	Sept	TOTAL	June	July	Aug	Sept	TOTAL
Area 4	1,322	4,700	768	-	6,790	551	1,400	49	-	2,000	50	2,381	624	-	3,055
Area 3	-	17	146	63	225	-	13	4	0	17	-	5	166	23	194
Area 2	676	7,937	6,205	3,278	18,097	51	2,750	1,538	479	4,818	-	2,484	3,105	2,304	7,893
Area 1	610	8,163	-	-	8,773	208	465	-	-	673	-	9,108	-	-	9,108
TOTAL WA	2,609	20,816	7,119	3,341	33,885	810	4,627	1,592	479	7,508	50	13,978	3,895	2,327	20,250
OREGON (Area 1)	83	3,367	-	-	3,450	11	140	-	-	151	0	3,724	-	-	3,724
TOTAL NOF	2,692	24,183	7,119	3,341	37,335	821	4,767	1,592	479	7,659	50	17,702	3,895	2,327	23,974
WA Variance: 2/					381,863					60,413					344,750
WA Standard Error:					618					246					587
WA CV (%):					2%					3%					3%
WA 95% CI:					32,674-35,096					7,026-7,990					19,099-21,401

1/ Closed timesteps are denoted by (-).

2/ Variance estimates are unavailable for Oregon statistics.

Table 2. WA dockside sampling statistics during the 2020 recreational fishery between Cape Falcon, Oregon and the U.S.-Canada border.

	Anglers	Sample	Landed	Sample	Landed	Sample	Chinook	Coho
	Sampled	Rate	Chinook	Rate	Coho	Rate	CWTs	CWTs
			Sampled		Sampled		collected	collected
Area 4 ^{1/}	2,180	32%	639	32%	1,009	33%	46	35
Area 3 ^{1/}	47	21%	5	29%	44	23%	1	2
Area 2	7,317	40%	1,815	38%	2,997	38%	250	380
Area 1	4,589	52%	380	56%	5,004	55%	80	813
TOTAL WA	14,133	42%	2,839	38%	9,054	45%	377	1,230

1/ Data for areas 3 and 4 determined by area fished not port of landing. Landings and sampling primarily occurred in Sekiu.

Table 3. VTR Chinook encounters by boat type, size class and mark status in the 2020 recreational fishery between Cape Falcon, Oregon and the U.S.-Canada border.

		Charter Boats (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	0	0	0	0	0	0	0
	July	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Area 3	June	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	July	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Area 2	June	0	0	0	0	0	0	0	3	1	0	0	0	0	0
	July	20	66	61	0	36	11	0	14	11	13	0	9	6	0
	Aug	14	31	28	0	26	13	0	10	4	6	0	8	5	0
	Sept	0	0	0	0	0	0	0	3	0	0	0	0	0	0
	TOTAL	34	97	89	0	62	24	0	30	16	19	0	17	11	0
Area 1	June	2	7	2	0	4	0	0	7	3	4	0	3	4	0
	July	29	20	14	0	36	22	0	29	10	4	0	12	9	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	31	27	16	0	40	22	0	36	13	8	0	15	13	0

Table 4. VTR coho encounters by boat type, size class and mark status in the 2020 recreational fishery between Cape Falcon, Oregon and the U.S.-Canada border.

		Charter Boats (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	0	0	0	0	0	0	0
	July	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Area 3	June	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	July	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Area 2	June	0	0	0	0	0	0	0	3	0	0	0	1	0	0
	July	20	113	162	0	15	6	0	14	18	26	0	3	2	0
	Aug	14	167	223	0	19	14	0	10	18	12	0	1	3	0
	Sept	0	0	0	0	0	0	0	3	11	26	0	0	0	0
	TOTAL	34	280	385	0	34	20	0	30	47	64	0	5	5	0
Area 1	June	2	13	7	0	3	0	0	7	4	4	0	0	0	0
	July	29	374	195	12	41	13	0	29	102	41	0	14	8	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	31	387	202	12	44	13	0	36	106	45	0	14	8	0

Table 5. Estimated Chinook and coho mark rates during the 2020 recreational fishery between Cape Falcon, Oregon and the U.S.-Canada border by size class using VTR encounters.

		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	-	-	-	-	-	-	-	-	-	54%
	July	-	-	-	-	-	-	-	-	-	
	August	-	-	-	-	-	-	-	-	-	
	September	-	-	-	-	-	-	-	-	-	
	TOTAL	-	-	-	-	-	-	-	-	-	
Area 3	June	-	-	-	-	-	-	-	-	-	55%
	July	-	-	-	-	-	-	-	-	-	
	August	-	-	-	-	-	-	-	-	-	
	September	-	-	-	-	-	-	-	-	-	
	TOTAL	-	-	-	-	-	-	-	-	-	
Area 2	June	-	100%	100%	-	-	-	-	-	-	53%
	July	52%	46%	51%	77%	60%	73%	41%	41%	41%	
	August	53%	40%	51%	67%	62%	65%	43%	60%	44%	
	September	-	-	-	-	-	-	-	30%	30%	
	TOTAL	52%	46%	51%	72%	61%	69%	42%	42%	42%	
Area 1	June	78%	43%	63%	100%	43%	64%	65%	50%	61%	56%
	July	59%	71%	63%	62%	57%	61%	66%	71%	67%	
	August	-	-	-	-	-	-	-	-	-	
	September	-	-	-	-	-	-	-	-	-	
	TOTAL	63%	62%	63%	65%	54%	61%	66%	70%	67%	

Table 6. Comparison of modeled (FRAM model run #2032) and estimated total coho encounters in the 2020 ocean recreational fishery.

Data Source	Area	Marked	Unmarked	Total Encounters	Landed Catch
FRAM	Area 4	2,870	2,458	5,328	2,760
	Area 3	717	597	1,314	690
	Area 2	10,200	8,872	19,072	9,800
	Area 1	13,801	10,973	24,774	13,250
	TOTAL	27,588	22,900	50,488	26,500
Estimated Actual Encounters	Area 4	3,247	1,218	4,465	3,055
	Area 3	150	40	190	194
	Area 2	8,274	11,316	19,589	7,893
	Area 1	13,373	5,984	19,357	12,832
	TOTAL	25,044	18,557	43,601	23,974
Variance^{1/}:		1,066,239	1,034,265	3,939,702	344,750
Standard Error:		1,033	1,017	1,985	587
CV (%):		4%	5%	5%	2%
95% CI:		23,020-27,068	16,564-20,550	39,711-47,491	22,823-25,125

1/ Variance estimates are unavailable for Oregon statistics.

Table 7. Comparison of modeled (FRAM model run #2032) and estimated total coho mortalities in the 2020 ocean recreational fishery.

Data Source	Area	Release Mortality		Drop Off Mortality ^{1/}		Landed Catch		Total Mortality
		Marked	Unmarked	Marked	Unmarked	Marked	Unmarked	
FRAM	Area 4	24	348	145	127	2,709	51	3,404
	Area 3	6	85	36	30	678	12	847
	Area 2	87	1,267	511	462	9,615	185	12,127
	Area 1	116	1,589	692	579	13,019	231	16,226
	TOTAL	233	3,289	1,384	1,198	26,021	479	32,604
Estimated Actual Mortality	Area 4	32	164	162	61	3,020	35	3,474
	Area 3	0	6	8	2	150	44	209
	Area 2	58	1,584	414	566	7,859	34	10,514
	Area 1	80	838	669	299	12,801	31	14,718
	TOTAL	170	2,591	1,252	928	23,830	143	28,915
Variance^{2/}:		1,707	31,772	2,666	2,586	340,932	386	-
Standard Error:		41	178	52	51	584	20	-
CV (%):		24%	7%	4%	5%	2%	14%	-
95% CI:		89-251	2,242-2,941	1,151-1,353	828-1,028	22,686-24,975	105-182	-

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

2/ Variance estimates are unavailable for Oregon statistics.

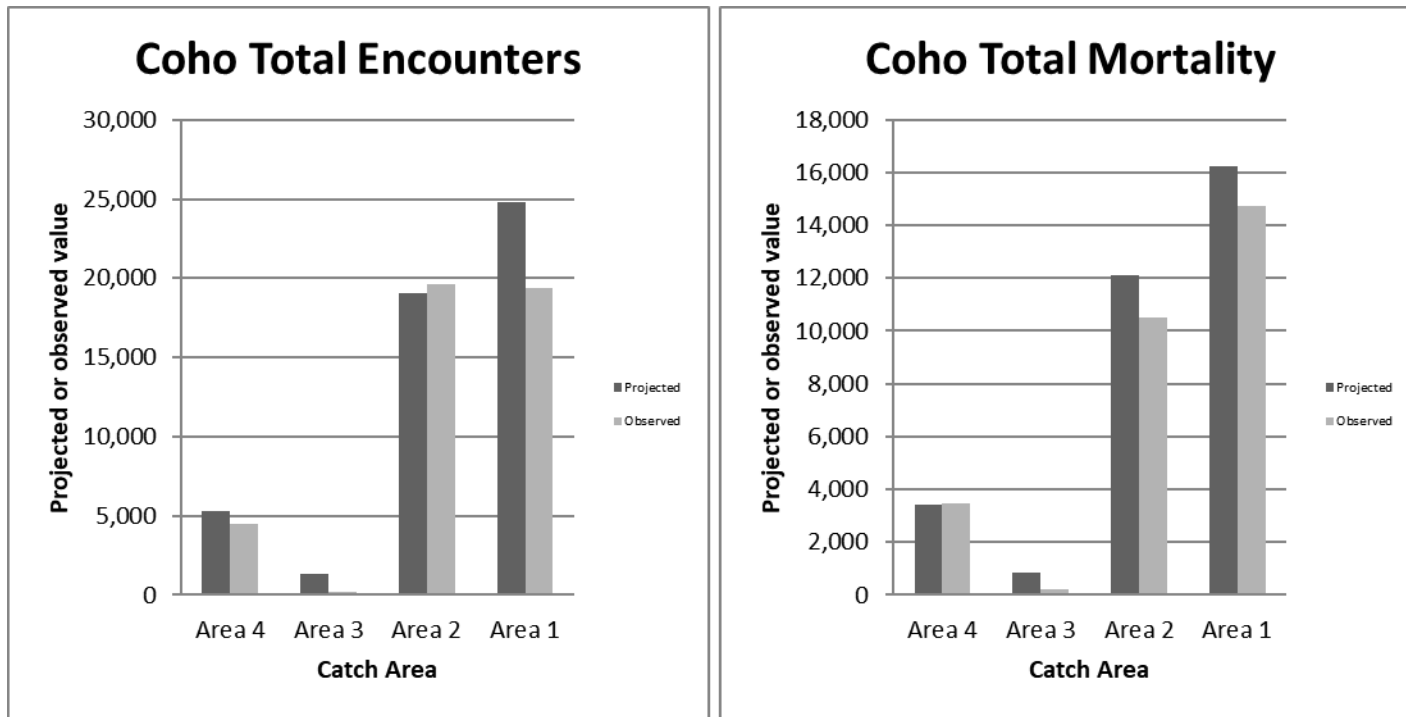


Figure 2. Comparison of modeled (FRAM model run #2032) and estimated total coho encounters and mortality in the 2020 recreational fishery.

Table 8. Compliance with coho selective fishery regulations observed during dockside sampling interviews in the 2020 all-species recreational fishery (coho mark-selective) between Cape Falcon, Oregon and the U.S.-Canada border.

	Total Coho Sampled	Marked Coho Sampled	Unmarked Coho Sampled	% Sampled Coho Marked
Area 4^{1/} June	72	70	2	97.2%
July	602	593	9	98.5%
August	335	333	2	99.4%
September	-	-	-	-
Total	1,009	996	13	98.7%
Area 3^{1/} June	-	-	-	-
July	-	-	-	-
August	39	39	0	100.0%
September	3	3	0	100.0%
Total	42	42	0	100.0%
Area 2 June	-	-	-	-
July	1,119	1,116	3	99.7%
August	1,048	1,044	4	99.6%
September	830	825	5	99.4%
Total	2,997	2,985	12	99.6%
Area 1 June	-	-	-	-
July	5,004	4,995	9	99.8%
August	-	-	-	-
September	-	-	-	-
Total	5,004	4,995	9	99.8%

1/ Data for areas 3 and 4 determined by area fished not port of landing. Landings and sampling primarily occurred in Sekiu.

5. RESULTS IN THE ALL-SPECIES COHO MARK SELECTIVE NON-TRIBAL COMMERCIAL TROLL FISHERY

The non-Tribal commercial troll fishery harvested a total of 10,448 Chinook (10,378 WA, 70 OR) and 766 coho (637 WA, 129 OR) during the 2020 coastwide all-species coho MSF operating July 1 through September 30. Estimates of coho catch in the commercial troll fishery were below preseason projections. **Table 9** shows commercial troll catch by month and area.

WDFW dockside samplers examined a total of 48% of all Chinook and 36% of all coho harvested and landed in WA during the all-species coho MSF. CWT collections totaled 465 from Chinook and 38 from coho in Washington ports (**Table 10**).

Table 9. Total Chinook and coho retained during the 2020 all-species non-Tribal commercial troll fishery (coho mark-selective) between Cape Falcon, Oregon and the U.S.-Canada border.

	Chinook				Coho			
	July	August	September	TOTAL	July	August	September	TOTAL
Area 4	692	202	0	894	29	16	0	45
Area 3	2,386	1,402	117	3,905	29	126	49	204
Area 2	4,191	1,257	32	5,480	164	172	37	373
Area 1	0	88	11	99	0	0	15	15
TOTAL WA	7,269	2,949	160	10,378	222	314	101	637
OREGON (Area 1)	57	13	0	70	63	64	2	129
TOTAL NOF	7,326	2,962	160	10,448	285	378	103	766

Table 10. Chinook and coho sampled in WA during the 2020 all-species non-Tribal commercial troll fishery (coho mark-selective) 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	520	58%	23	18	40%	3
Area 3	1,916	49%	121	83	41%	15
Area 2	2,527	46%	321	128	34%	20
Area 1	4	4%	0	0	0%	0
TOTAL WA	4,967	48%	465	229	36%	38

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