2021-2022 Winter Mark-Selective Recreational Chinook Fisheries In Marine Areas 5, 10, 11, and 13

Post-season Report

DRAFT

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INTRODUCTION

In the marine environments of the Strait of Juan de Fuca and Puget Sound, abundant runs of hatchery Chinook salmon (*Oncorhynchus tshawytscha*) have been mixed with depressed stocks of natural-origin Chinook salmon for many years. Providing recreational anglers with opportunities to harvest abundant hatchery stocks while simultaneously protecting weaker, natural-origin stocks has proven to be a significant conservation and management challenge. The combination of large-scale hatchery marking (i.e., adipose fin clipping) programs and mark-selective harvest regulations makes it possible for anglers to pursue and harvest hatchery Chinook salmon while minimally impacting natural-origin salmon populations. In such "mark-selective fisheries" (MSFs), recreational anglers are generally allowed to retain adipose-fin clipped ("marked") hatchery fish and are required to release unharmed any unclipped ("unmarked", predominantly natural-origin) salmon that are encountered[1].

Since the Washington Department of Fish and Wildlife (WDFW) implemented the first marine mark-selective Chinook salmon fisheries in Marine Areas 5 and 6 (Strait of Juan de Fuca) in 2003 based on state-tribal agreements (Thiesfeld and Hagen-Breaux 2005a, WDFW 2008a), mark-selective Chinook salmon fishing regulations have been implemented in multiple Marine Areas in Puget Sound during both the summer and winter seasons. Including the 2021-2022 management season, mark-selective fisheries for Chinook salmon have been conducted in Puget Sound for the last 19 summer (May through September) seasons and the last 17 winter (October through April) seasons though not all fisheries have been same in these Areas all of these years.

During the 2021-2022 winter season, October through April, WDFW implemented four mark-selective Chinook salmon fisheries in Marine Areas 5, 10, 11, and 13. The Chinook MSF seasons in each area were scheduled as follows:

- Marine Area 5 from March 1 through April 30, 2022;
- Marine Area 10 from January 1 through March 31, 2022;
- Marine Area 11 from November 1 through December 31, 2021;
- Marine Area 13 from October 1, 2021 through April 30, 2022.

[1]The regulations specific to summer mark-selective fisheries in Puget Sound Marine Catch Areas allowed for the retention of up to two legal-sized (>22 inches [56 cm]) marked Chinook salmon per day and required the immediate release of all unmarked or sublegal Chinook salmon. Additionally, anglers were: i) required to use single-point, barbless hooks while fishing for salmon, ii) held to a combined (all salmon species) two-fish daily limit, and iii) held to a handling rule that prevented them from bringing unmarked and/or sublegal Chinook aboard their vessels.

RESULTS

1) Marine Area 5 Winter Mark-Selective Chinook Fishery

WDFW implemented a winter Chinook MSF in Marine Area 5 from March 1, 2022 through April 8, 2022. Due to the likelihood of exceeding FRAM's pre-season projected catch, Marina Area 5 was closed to salmon fishing 22 days earlier than originally scheduled. Data collection methods used to monitor the Marine Area 5 Chinook MSF included dockside angler interviews with catch sampling.

WDFW dockside samplers conducted "Baseline Sampling" at selected access sites during the 2021-2022 winter Chinook salmon MSF in Marine Area 5. Complete details of these methods are presented in a separate Methods Report (WDFW 2012a). Baseline sampling is opportunistic in nature, with overall sampling effort allocated across space and time in a manner that maximizes the number of angler interviews obtained per sample effort. The Marine Area 5 baseline sample frame included two access sites, Olson's Resort and Van Riper's Resort in Sekiu, WA (**Table 1.3**), and a total of 60 site visits during the nine-week season. Site visits ranged from short (e.g., "no effort" samples) to full-day (8+ hours) sampling events. When present, samplers interviewed all anglers exiting the Marine Area 5 fishery at the selected access site. The interview and catch-sampling procedures employed were identical to those used in other MSFs in Puget Sound. Marine Area 5 samplers acquired information about: 1) angling effort (boat and angler trips, trip length), 2) encounter composition (retained and/or released) by species and mark status (marked vs. unmarked, Chinook salmon only), and 3) landed Chinook salmon size (fork length) and age (scales) composition. Samplers also inspected landed Chinook salmon for coded-wire tags (CWTs or tags) using wand detectors and acquired snouts when tags were present. Resulting tag data were used to estimate the unexpanded CWT-based composition of landed catch.

In contrast to the intensive "Murthy" survey design employed in some other areas in Puget Sound MSFs, Marine Area 5 sampling results could not be used to produce fishery-total estimates of effort, encounters (retained catch + releases), and unmarked-DIT Chinook salmon impacts. However, Marine Area 5 baseline sampling observations will ultimately be combined with Catch Record Card (CRC) data, once they become available, to estimate catch and effort at the fishery-wide level (see WDFW and NWIFC 2013). While these descriptors of MSF impacts are not presented in this document, they will be available at a later date. In the following section, we present results from our monitoring activities during the Marine Area 5 winter 2021-2022 Chinook salmon MSF.

Table 1.1 Observations of fishing effort, Chinook salmon retained, and reported Chinook salmon releases, by week, for the winter Chinook salmon MSF in Marine Area 5. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status, UD = undetermined mark-status.

Stat Week	Start	End	Effort		Retained Fish			Released Fish		
			Boats	Anglers	Chinook AD	Chinook UM	Chinook UK	Chinook AD	Chinook UM	Chinook UK
10	1-Mar	6-Mar	131	310	361	1	7	86	131	55
11	7-Mar	13-Mar	105	276	118	0	0	24	31	7
12	16-Mar	20-Mar	85	223	193	0	1	37	96	20
13	22-Mar	27-Mar	138	342	315	4	4	89	159	34
14	30-Mar	3-Apr	66	168	136	1	0	17	53	4
15	6-Apr	8-Apr	20	56	45	0	0	2	15	0
Season Total			**545**	**1375**	**1168**	**6**	**12**	**255**	**485**	**120**

Table 1.2 Observations of fishing effort, salmon retained (other than Chinook), and reported salmon releases (other than Chinook), by week, for the winter Chinook salmon MSF in Marine Area 5. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status, UD = undetermined mark-status.

Stat Week	Start	End	Effort		Released Fish					
			Boats	Anglers	Coho AD	Coho UM	Coho UK	Pink	Sockeye	Unknown Salmon
10	1-Mar	6-Mar	131	310	0	0	1	0	0	0
11	7-Mar	13-Mar	105	276	0	0	0	0	0	0
12	16-Mar	20-Mar	85	223	0	0	0	0	0	0
13	22-Mar	27-Mar	138	342	0	0	0	0	0	0
14	30-Mar	3-Apr	66	168	0	0	0	0	0	0
15	6-Apr	8-Apr	20	56	0	0	0	0	0	0
Season Total			**545**	**1375**	**0**	**0**	**1**	**0**	**0**	**0**

Table 1.3 List of sites sampled with the number of sampling events (site-days) during the winter Chinook salmon MSF in Marine Area 5.

Location Name	Number of Site Days Sampled Per Month		Total Site-Days	% of Total
	March	April		
Olson's Resort	45	12	57	95.00%
Van Riper's Resort	3	0	3	5.00%
Grand Total	**48**	**12**	**60**	**100.00%**

Table 1.4 Summary of CWTs recovered from Chinook salmon harvested during the 2021-2022 winter Chinook salmon MSF in Marine Area 5. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	N Washington (7.3%)	Kendall Cr 01.0406	Kendall Cr Hatchery	1 (0.9%)	0
		Nooksack -Sf 01.0246	Skookum Cr Hatchery	1 (0.9%)	0
		East Sound Bay (San)	Glenwood Springs	1 (0.9%)	0
		Friday Cr 03.0017	Samish Hatchery	2 (1.8%)	0
		Skookum Cr 01.0273	Skookum Cr Hatchery	3 (2.7%)	0
	Hood Canal (16.4%)	Finch Cr 16.0222	Hoodsport Hatchery	8 (7.3%)	0
		Purdy Cr 16.0005	George Adams Hatchery	10 (9.1%)	4
	Northern Puget Sound (16.4%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	4 (3.6%)	1
		Wallace R 07.0940	Wallace R Hatchery	11 (10%)	1
		Whitehorse Springs	Whitehorse Pond	1 (0.9%)	0
		Whitehorse Springs	Fortson Pond Net Pen	1 (0.9%)	0
		Stillaguamish R -Sf	Brenner Hatchery	1 (0.9%)	0
	Skagit River (6.4%)	Cascade R 03.1411	Marblemount Hatchery	5 (4.5%)	0
		Clark Cr 03.1421	Marblemount Hatchery	2 (1.8%)	0
	Mid Puget Sound (15.5%)	Big Soos Cr 09.0072	Soos Creek Hatchery	5 (4.5%)	2
		Gorst Cr 15.0216	Gorst Cr Rearing Pnd	1 (0.9%)	0
		Grovers Cr Hatchery	Grovers Cr Hatchery	9 (8.2%)	9
		Icy Cr 09.0125	Icy Cr Hatchery	2 (1.8%)	0
	S Puget Sound (10.9%)	Minter Cr 15.0048	Minter Cr Hatchery	5 (4.5%)	0
		Narrows Marina Pens	Narrows Marina Pens	2 (1.8%)	0
		Clear Cr 11.0013C	Clear Creek Hatchery	3 (2.7%)	3
		Chambers Cr 12.0007	Garrison Hatchery	1 (0.9%)	0
		Deschutes R 13.0028	Minter Cr Hatchery	1 (0.9%)	0
Col. Riv.	Columbia R General (0.9%)	Columbia R - General	Wells Hatchery	1 (0.9%)	0
	Upper Columbia R (3.6%)	Omak Pond	Chief Joseph Hatchery	1 (0.9%)	0
		Entiat R 46.0042	Entiat Nfh	2 (1.8%)	0
		Similkameen R 490325	Similkameen Hatchery	1 (0.9%)	0
	Central Columbia River (7.3%)	Spring Cr 29.0159	Spring Cr Nfh	8 (7.3%)	8
	Lower Columbia River (14.5%)	Big Cr (Lwr Col R)	Big Cr Hatchery	2 (1.8%)	0
		Klaskanine R N Fk	Klaskanine Hatchery	1 (0.9%)	0
		Bull Run R	Sandy Hatchery	1 (0.9%)	0
		Willamette R Cst Fk	Dexter Ponds (Willam	2 (1.8%)	0
		Tanner Cr (Bnville)	Bonneville Hatchery	3 (2.7%)	0
		Willamette R Cst Fk	Willamette Hatchery	1 (0.9%)	0
		Santiam R S Fk	South Santiam Hatch	1 (0.9%)	0
		Cowlitz R 26.0002	Cowlitz Salmon Hatchery	1 (0.9%)	0
		Blind Sl (Lwr Col R)	Cedc Net Pens	1 (0.9%)	0
		Willamette R M Fk-1	Dexter Ponds (Willam	1 (0.9%)	0
		Tongue Pt (Astoria)	Cedc Net Pens	2 (1.8%)	0
	Snake River (0.9%)	Lyons Ferry Rel.Site	Lyons Ferry Hatchery	1 (0.9%)	0
			Total	**110**	**28**

Table 1.5 Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the winter Chinook salmon MSF in Marine Area 5.

Mark Type	Legal	Sublegal	Total
Marked	683	22	705
Unmarked	4	0	4
Total	687	22	709

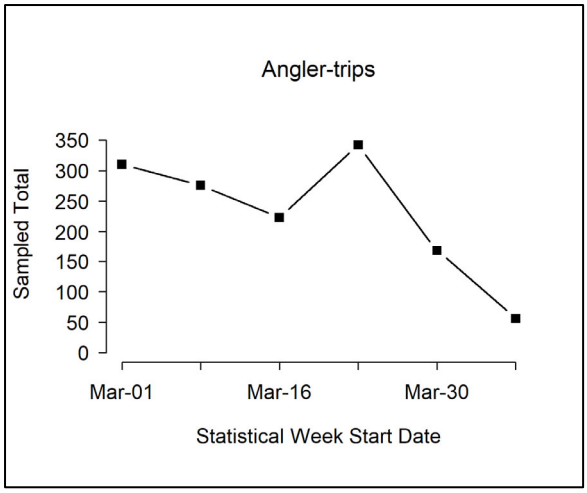

Figure 1.1 Temporal patterns in fishing effort during the 2021-2022 winter Chinook salmon MSF in Marine Area 5. Note: displayed values are sample observations (summed across sampled sites)

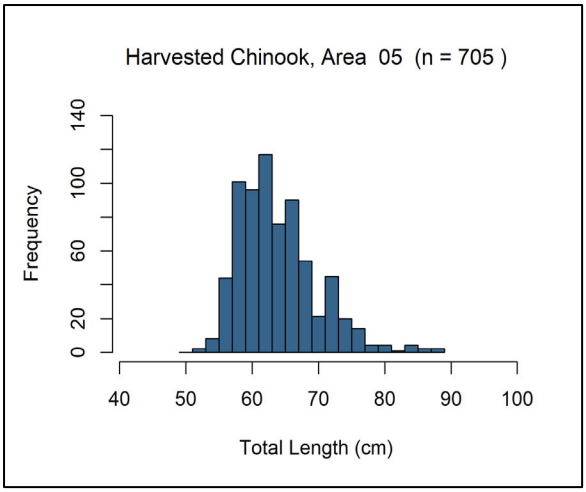

Figure 1.3 Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2021-2022 winter Chinook salmon MSF in Marine Area 5. Note: displayed values are observations where lengths were taken.

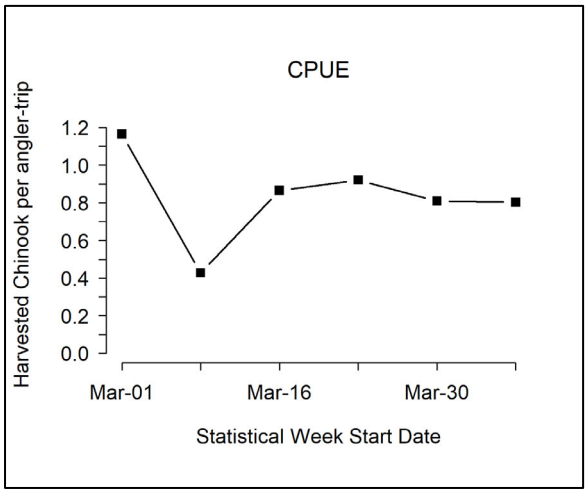

Figure 1.2 Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2021-2022 winter Chinook salmon MSF in Marine Area 5.

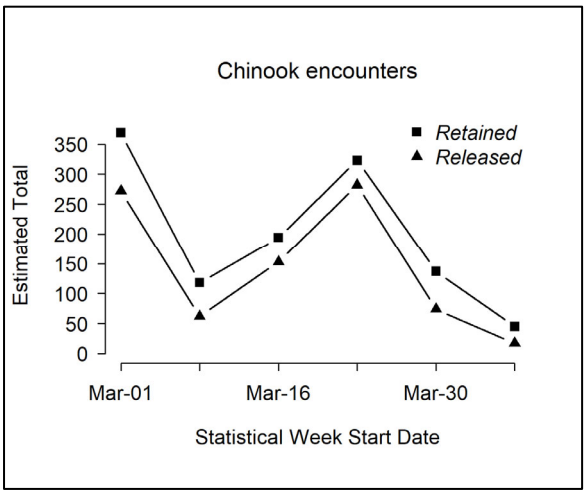

Figure 1.4 Temporal patterns in Chinook salmon encounters (number retained and released) during the 2021-2022 winter Chinook salmon MSF in Marine Area 5. Note: displayed values are sample observations (summed across sampled sites)

Table 1.6 Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on STRs during the 2021-2022 winter Chinook salmon MSF in Marine Area 5, with estimates of legal-size and overall (legal and sublegal) mark rates. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
		AD	UM	AD	UM		Overall	Legal
Private STR	0 1-trip STRs	0	0	0	0	0	NA	NA
Size/mark-status composition:		0.00	0.00	0.00	0.00			
Variance:		NA	NA	NA	NA			

Table 1.7 Dockside encounters (retained and released) by size-mark category during the 2021-2022 winter Chinook salmon MSF in Marine Area 5. Retained fish were sampled for mark-status and length, released fish by size-mark status were reported by the angler.

Dockside Encounters				
Status	Legal		Sublegal	
	LM	LU	SM	SU
Encounters	700	353	260	136
Size/mark-status composition	0.48	0.24	0.18	0.09
Bias Corrected[a]	0.43	0.13	0.32	0.15
Variance	0.0004	0.0003	0.0003	0.0002

[a] This correction to the dockside encounter composition estimate follows the recommendation made in Conrad, Garber, and Rose (2020).

2) Marine Area 10 Winter Mark-Selective Chinook Fishery

WDFW implemented a winter Chinook salmon MSF in Marine Area 10 from January 1 through March 31, 2022. Chinook retention in the winter Chinook MSF fishery was not uniform through then entire season, **Table 2.1** summarizes the dates when this fishery was open and closed to Chinook retention. The Puget Sound Sampling Unit (PSSU) implemented an intensive monitoring program in Marine Area 10 throughout the season to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, on-the-water effort surveys, test fishing and collection of Salmon Trip Reports (STRs) from the angling public. **Table 2.2** summarizes the parameters estimated and the sampling activities associated with each parameter. Specific procedures used for collecting these data and estimating critical data parameters are presented in detail in our separate Methods Report (WDFW 2012a). In the following section we present results from our monitoring activities during the Marine Area 10 winter Chinook salmon MSF which occurred from January 1 through March 31, 2022, the last day of the fishery.

Table 2.1 Fishery dates and fishery retention status of Chinook salmon in the 2021-2022 winter Chinook salmon MSF in Marine Area 10.

Start Date	End Date	Fishery Status	Days
1-Jan	3-Jan	Open	3
4-Jan	7-Jan	Closed	4
8-Jan	10-Jan	Open	3
11-Jan	23-Feb	Closed	44
24-Feb	26-Feb	Open	3
27-Feb	2-Mar	Closed	4
3-Mar	5-Mar	Open	3
6-Mar	9-Mar	Closed	4
10-Mar	12-Mar	Open	3
13-Mar	15-Mar	Closed	3
16-Mar	31-Mar	Open	16

Table 2.2 Sampling/estimation details on target parameters associated with the overall Marine Area 10 winter Chinook salmon MSF monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Creel Sampling	Fishing effort (boat & angler trips); kept and released fish	Catch rates (CPUE); length, age, and CWT composition of harvest[1]; collection of angler fishing methods.	Angler trip; kept fish; reported fish release.	Two weeks	Within days, estimates were produced by day-type strata (weekday/weekend). Each week we sampled every Friday, Saturday, and Sunday, and we randomly selected n=2 out of N=4 weekdays (Monday-Thursday) for sampling.
		Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook salmon	Boat trip	Season	With a LM% CV of < .2 from test fishing, bias-corrected encounter proportions from the Dockside data (**Table 2.14)** were not used to produce encounter and mortality estimates.
On-the-water Surveys	Proportion of total angler effort that uses sample-frame sites (i.e., site "size measures") versus out-of-frame sites.	Total on-water boat and angler counts at assumed peak effort time interval (instantaneous count); spatial distribution of recreational fishing boats in the area.	Boats and anglers	Month	A total of 12 boat surveys, (WE = 6, WD = 6) were conducted during the 12 -week fishery. The results of these surveys were incorporated into multi-year site-weight averages.
Test Fishing	Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook salmon	Chinook salmon length, age, and DNA-based[2] stock composition; species composition of non-Chinook salmon encounters	Fish encounter	Season	Test fishing data collected when the fishery was open to Chinook salmon retention were used to calculate legal-mark proportions for an estimate of encounters and mortalities. (See **Table 2.5**, **Table 2.6**).
Voluntary Salmon Trip Reports (STRs)	Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook salmon	Encounter data for non-Chinook salmon species (e.g., Coho) that the angler may record on the STR form	Fish encounter	Season	Due to adequate sample size and assumed higher quality test fishing data, STR data (**Table 2.13**) were not used to estimate total Chinook impacts.
Overall Fishery Impacts Estimation	Total Chinook salmon encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook salmon	N/A	Season	Estimated on a monthly time step but considered at the season-total level.
Coded-wire tag (CWT) Impacts Estimation	Marked/unmarked double-index tag (DIT) encounters and mortalities	N/A	N/A	Season	The temporal resolution of DIT impacts is constrained by the total number of tags recovered.

[1] The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

[2] Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery

Table 2.3 Sampling/estimation details on target parameters associated with the overall Marine Area 10 winter Chinook salmon MSF monitoring program. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked.

Month	Stat Week	Start Date	End Date	Est. Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
Jan	1	1-Jan	2-Jan	0	0	0	0	0	0	0
	2	3-Jan	9-Jan	382	816	203	0	497	268	968
	3	10-Jan	10-Jan	20	34	20	0	49	27	96
Feb	9	24-Feb	26-Feb	543	1231	132	0	322	174	627
Mar	10	3-Mar	5-Mar	301	641	70	0	170	92	332
	11	10-Mar	12-Mar	237	473	111	0	271	146	527
	12	16-Mar	20-Mar	201	450	112	13	274	135	533
	13	21-Mar	27-Mar	380	783	211	0	515	278	1003
	14	28-Mar	31-Mar	394	593	177	0	434	234	845
Season Total				**2459**	**5,020**	**1035**	**13**	**2532**	**1352**	**4,932**
Variance:				29,997	120,851	11,781	133	411,987	107,569	1,041,225
SE:				173	348	109	12	642	328	1020
CV (%):				7	7	10	88	25	24	21
95% CI:				2,119 - 2,798	4,338 - 5,701	822 - 1,248	0 - 36	1,274 - 3,790	709 - 1,995	2,932 - 6,932

Table 2.4 Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the 2021-2022 winter Chinook salmon MSF in Marine Area 10.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	161	13	174
Unmarked	0	1	1
Total	**161**	**14**	**175**

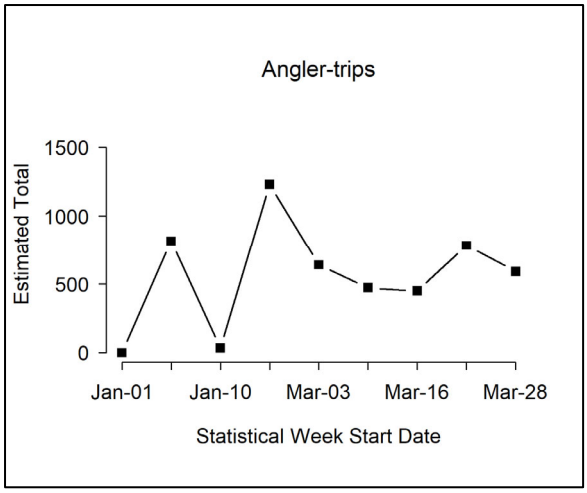

Figure 2.1 Temporal patterns in fishing effort during the 2021-2022 winter Chinook salmon MSF in Marine Area 10.

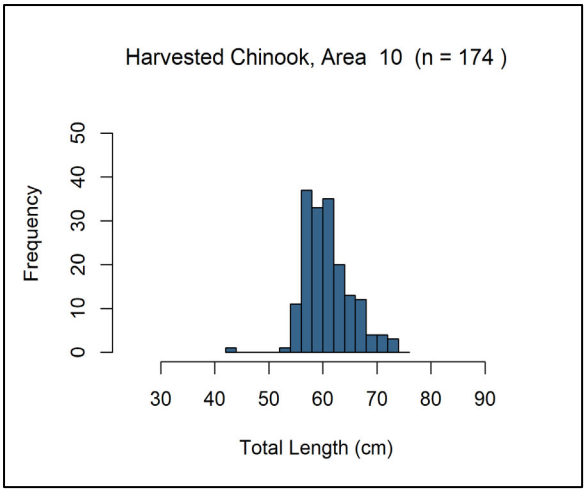

Figure 2.3 Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2021-2022 winter Chinook salmon MSF in Marine Area 10. Note: displayed values are observations where lengths were taken.

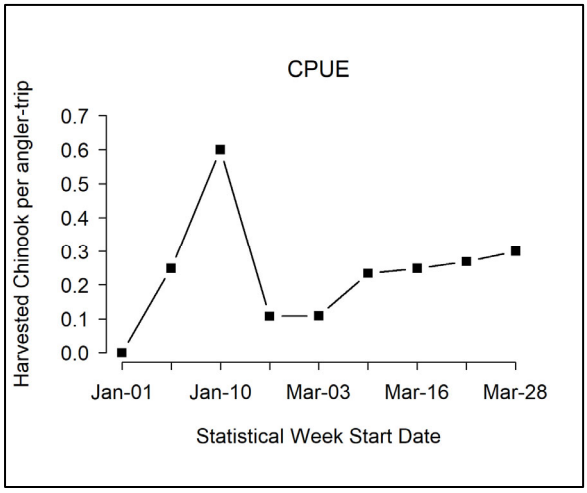

Figure 2.2 Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2021-2022 winter Chinook salmon MSF in Marine Area 10.

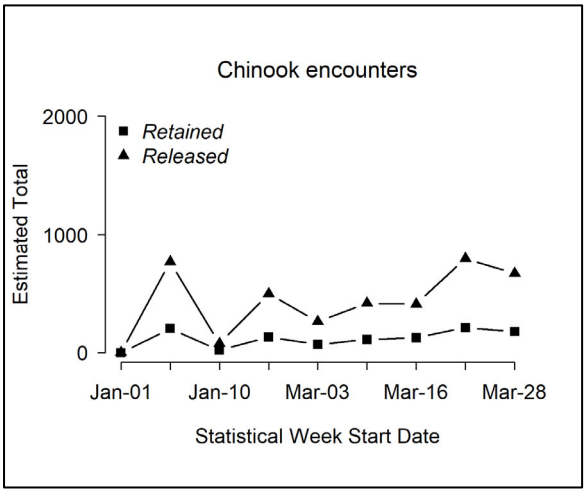

Figure 2.4 Temporal patterns in Chinook salmon encounters (number retained and released) during the 2021-2022 winter Chinook salmon MSF in Marine Area 10.

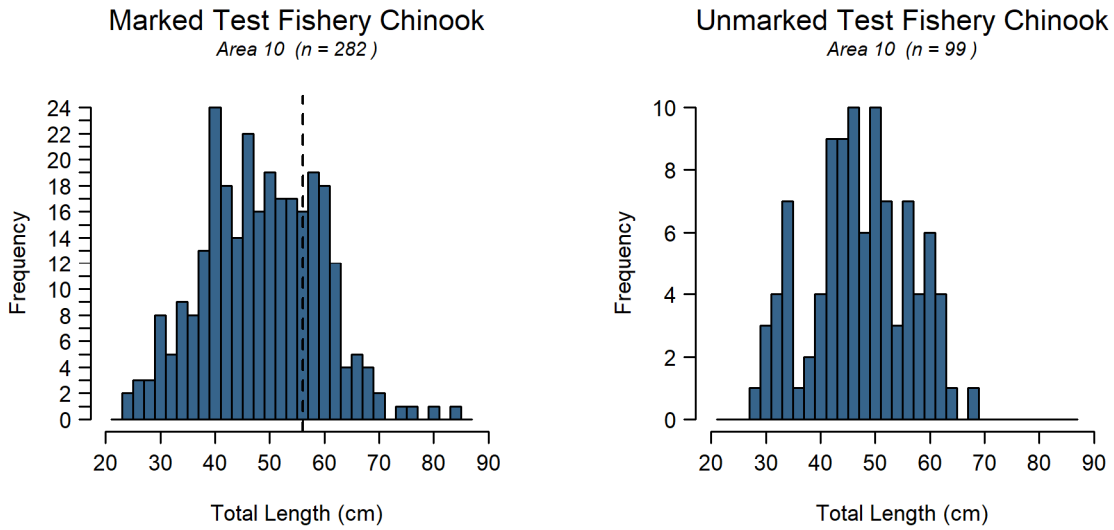

Figure 2.5 Length-frequency distributions of marked (*left panel*) and unmarked (*right panel*) Chinook salmon encountered by test fishers during the 2021-2022 winter Chinook salmon MSF in Marine Area 10 for the complete time-period the fishery was scheduled. The vertical dashed line in the left panel corresponds to the legal-size limit (22 in or 56 cm).

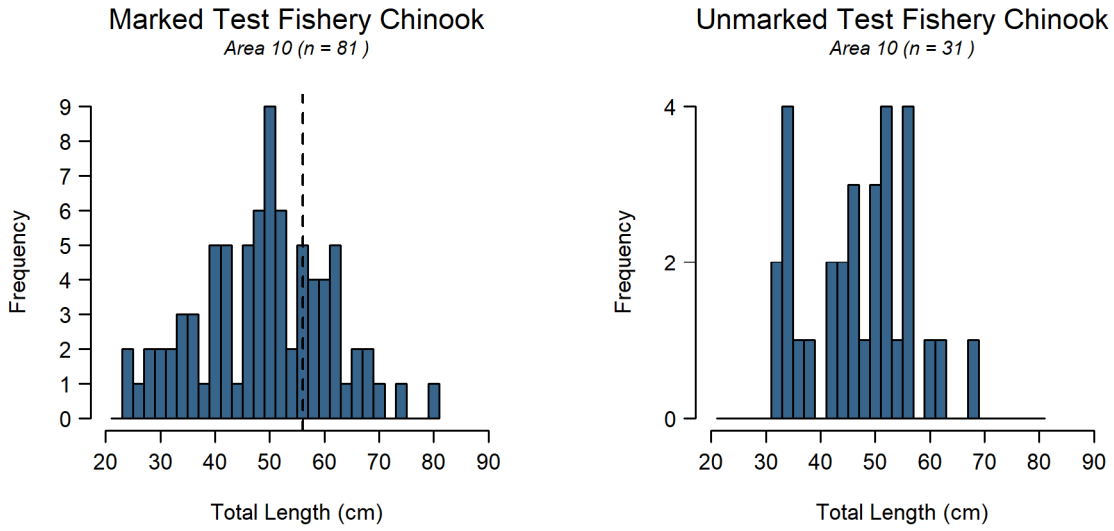

Figure 2.6 Length-frequency distributions of marked (*left panel*) and unmarked (*right panel*) Chinook salmon encountered by test fishers during the 2021-2022 winter Chinook salmon MSF in Marine Area 10 when the fishery was open to Chinook salmon retention (see **Table 2.1**). The vertical dashed line in the left panel corresponds to the legal-size limit (22 in or 56 cm).

Table 2.5 Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the 2021-2022 winter Chinook salmon MSF in Marine Area 10 for the complete time-period the fishery was scheduled. AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hrs Fished	AD	UM	AD	UM	
2	4	17.04	1	1	17	6	25
3	8	41.22	4	2	13	8	27
4	10	50.75	1	1	19	6	27
5	10	58.46	12	2	24	12	50
6	16	82.68	15	5	27	13	60
7	7	37.60	13	2	12	1	28
8	11	65.51	4	1	19	6	30
9	7	37.64	6	1	26	7	40
10	8	41.42	4	2	15	5	26
11	6	30.61	1	1	8	4	14
12	6	35.45	7	0	10	2	19
13	4	18.22	5	0	7	3	15
14	7	36.67	6	1	6	7	20
Total	**104**	**553.28**	**79**	**19**	**203**	**80**	**381**
Size/mark-status composition:			0.21	0.05	0.53	0.21	
Variance:			(0.0004)	(0.0001)	(0.0007)	(0.0004)	
Legal size mark rate:			0.81				
Overall mark rate:			0.74				

Table 2.6 Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the 2021-2022 winter Chinook salmon MSF in Marine Area 10 when the fishery was open to Chinook salmon retention (see **Table 2.1**). AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hrs Fished	AD	UM	AD	UM	
2	2	6.42	0	0	4	2	6
3	1	4.48	0	0	5	3	8
9	4	21.96	2	0	13	3	18
10	4	20.92	4	2	10	5	21
11	2	9.86	1	1	1	2	5
12	6	35.45	7	0	10	2	19
13	4	18.22	5	0	7	3	15
14	7	36.67	6	1	6	7	20
Total	**30**	**153.99**	**25**	**4**	**56**	**27**	**112**
Size/mark-status composition:			0.22	0.04	0.50	0.24	
Variance:			(0.0016)	(0.0003)	(0.0023)	(0.0016)	
Legal size mark rate:			0.86				
Overall mark rate:			0.72				

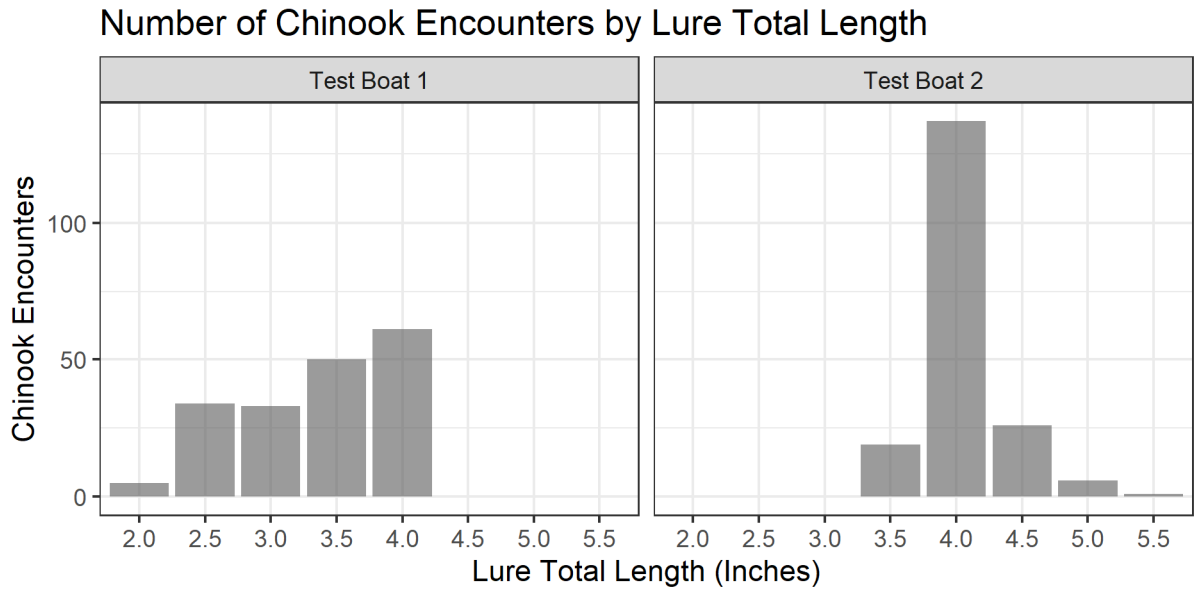

Figure 2.7 Comparison of number of Chinook salmon encounters and gear preference between test boats in the 2021-2022 winter Chinook salmon MSF in Marine Area 10 for the complete time-period the fishery was scheduled.

Table 2.7 Comparison of Chinook encountered by legal-mark status between test boats in the 2021-2022 winter Chinook salmon MSF in Marine Area 10

	Legal		Sublegal		Total
	AD	UM	AD	UM	
Test Boat 1	26	9	104	47	186
Size/mark-status composition:	0.14	0.05	0.56	0.25	1.00
Test Boat 2	53	10	99	33	195
Size/mark-status composition:	0.27	0.05	0.51	0.17	1.00

Table 2.8 Comparison of Chinook encounter rates and lengths between test boats in the 2021-2022 winter Chinook salmon MSF in Marine Area 10.

Test Boat	Trips	Mean Trip Duration (Hours)	Total Hours	Chinook Encounters	Total Length Mean (CM)	Chinook Encounters per Hour
Test Boat 1	43	4.43	190.37	186	45.67	0.98
Test Boat 2	61	5.95	362.91	195	50.08	0.54

During the Marine Area 10 Winter 2021-2022 Mark-Selective Chinook Fishery two test fishing boats were in operation concurrently. Both boats, targeting Chinook salmon, operated in the same general locations and time periods. Test Boat 1 showed a preference for smaller lure sizes, and Test Boat 2 showed a preference for larger lure sizes (**Figure 2.7**). Test Boat 1's results yielded both a lower mean total length of Chinook encountered and a higher encounter rate than Test Boat 2 (**Table 2.8**). A chi-square test of independence comparing counts of legal-mark encounters showed a significant difference between Test Boat 1 and Test Boat 2, p-value < .05 (**Table 2.7**).

Given the apparent effect on size of Chinook encountered between Test Boat 1 and Test Boat 2, preferences in lure size between test boats, and a lack of information on lure size used by the greater sport fishing fleet it was decided that both datasets will be combined in this report for estimates of total encounters. It is unclear if Test Boat 1 or Test Boat 2 had better representations of the sport fishing fleet and the combination of both datasets might not be any more accurate than either individually.

Starting on June 1, 2022, WDFW implemented random sampling of lure type and size, fishing method (down rigger, mooching, jigging), and sport fishing locations through its expansive fishery monitoring program. This information is summarized and given to the test boat program in weekly coordination meetings to ensure that all test boats have the best and most recent information available to represent the fleet. WDFW is currently conducting a more extensive analysis of gear used in the recreational fishery to better understand these trends.

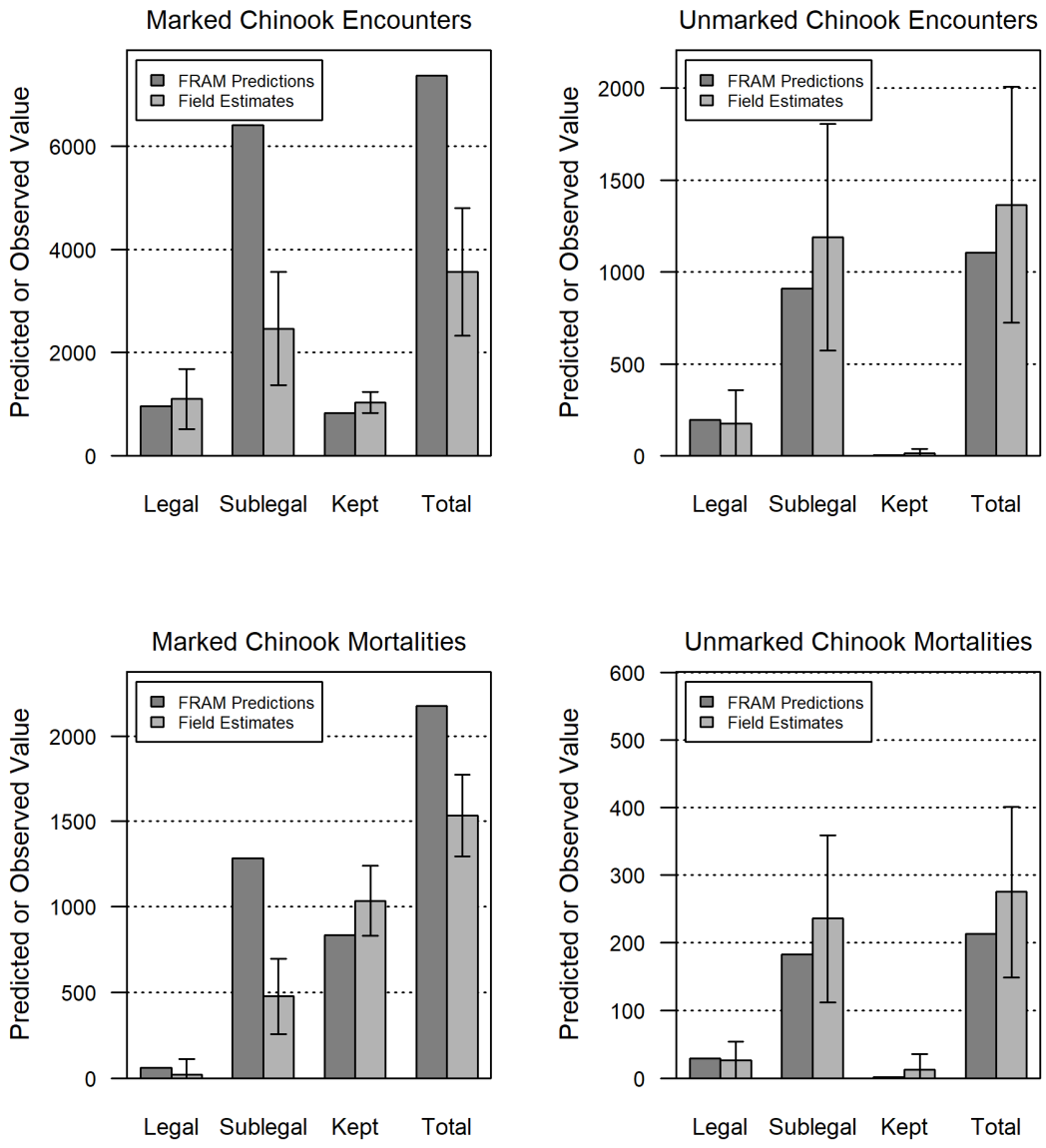

Figure 2.8 Comparison of modeled (FRAM model run 3721) and estimated total Chinook salmon encounters and mortalities for the 2021-2022 winter Chinook salmon MSFs in Marine Area 10. Error bars represent approximate 95% confidence intervals for field estimates.

Table 2.9 Comparison of modeled (FRAM model run 3721) and estimated total Chinook salmon encounters for the 2021-2022 winter Chinook salmon MSF in Marine Area 10. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	1105	197	908	2
	AD	7,370	959	6,411	834
	Total	8,475	1156	7,319	836
	% Marked	87	83	88	100
Estimated (Creel) Encounters	UM	1365	176	1189	13
	AD	3,567	1101	2,466	1035
	Total	4,932	1277	3,655	1048
	% Marked	72	86	67	99

Table 2.10 Summary of season-wide fishery impact estimates for the 2021-2022 winter Chinook salmon MSF in Marine Area 10. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
Legal AD	1101	958	143	21	979	12732	113	758 - 1,200	12
Legal UM	176	0	176	26	26	192	14	0 - 54	53
Sublegal AD	2,466	77	2,389	478	555	13,018	114	331 - 779	21
Sublegal UM	1189	13	1176	235	248	4093	64	123 - 374	26
Total	**4,932**	**1048**	**3,884**	**761**	**1809**	**30,036**	**173**	**1,469 - 2,149**	**10**

Table 2.11 Comparison of modeled (FRAM model run 3721) and estimated total Chinook salmon mortalities for the 2021-2022 winter Chinook salmon MSF in Marine Area 10. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked.

Mortality Category	FRAM Chinook Mortalities			Estimated Chinook Mortalities		
	UM	AD	Total	UM	AD	Total
Total (Landed + Released)	213	2177	2,390	275	1534	1809
Released Legal	29	61	90	26	21	48
Released Sublegal	182	1282	1464	235	478	713
Landed Only	2	834	836	13	1035	1048

Table 2.12 Monthly sample rates (Total retained Chinook salmon sampled/Estimated retained Chinook salmon) in the 2021-2022 winter Chinook salmon MSF in Marine Area 10.

Time period			Estimated Retained Chinook			Number of Chinook sampled			Sample Rate
Month	Stat Weeks	Dates	AD	UM	Total	AD	UM	Total	
January	1-3	1 Jan - 10 Jan	223	0	223	45	0	45	20.10%
February	9	24 Feb - 26 Feb	132	0	132	26	0	26	19.80%
March	10-14	3 Mar - 31 Mar	680	13	693	106	1	107	15.40%
Season Total			**1035**	**13**	**1048**	**177**	**1**	**178**	**17.00%**

Table 2.13 Total Chinook salmon encountered (retained and released) by private-boat and charter boat anglers logging their trips on STRs, with estimates of legal-size and overall (legal and sublegal) mark rates during the 2021-2022 winter Chinook salmon MSF in Marine Area 10. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses

Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
		AD	UM	AD	UM		Overall	Legal
Private VTR	10 1-trip VTRs	12	3	42	3	60	0.90	0.80
Size/mark-status composition:		0.20	0.05	0.70	0.05			
Variance:		(0.0027)	(0.0008)	(0.0036)	(0.0008)			
Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
		AD	UM	AD	UM		Overall	Legal
Charter VTR	5 1-trip VTRs	12	2	31	5	50	0.86	0.86
Size/mark-status composition:		0.24	0.04	0.62	0.10			
Variance:		(0.0037)	(0.0008)	(0.0048)	(0.0018)			
Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
		AD	UM	AD	UM		Overall	Legal
Pooled VTR	15 1-trip VTRs	24	5	73	8	110	0.88	0.83
Size/mark-status composition:		0.22	0.05	0.66	0.07			
Variance:		(0.0016)	(0.0004)	(0.0020)	(0.0006)			

Table 2.14 Dockside encounters (retained and released) by size-mark category during the 2021-2022 winter Chinook salmon MSF in Marine Area 10. Retained fish were sampled for mark-status and length, released fish by size-mark status were reported by the angler.

Dockside Encounters				
Status	Legal		Sublegal	
	LM	LU	SM	SU
Encounters	171	36	252	41
Size/mark-status composition	0.34	0.07	0.50	0.08
Bias Corrected[a]	0.30	0.07	0.50	0.12
Variance	0.0006	0.0002	0.0007	0.0002

[a] This correction to the dockside encounter composition estimate follows the recommendation made in Conrad, Garber, and Rose (2020).

Table 2.15 Summary of CWTs recovered from Chinook salmon retained during the 2021-2022 winter Chinook salmon MSF in Marine Area 10. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	Hood Canal (15%)	Finch Cr 16.0222	Hoodsport Hatchery	3 (15%)	0
	N Puget Sound (30%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	3 (15%)	2
		Wallace R 07.0940	Wallace R Hatchery	2 (10%)	0
		Whitehorse Springs	Whitehorse Pond	1 (5%)	0
	Skagit River (15%)	Cascade R 03.1411	Marblemount Hatchery	2 (10%)	0
		Co Line Slu 03.1853A	Marblemount Hatchery	1 (5%)	0
	Mid Puget Sound (25%)	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	1 (5%)	0
		Grovers Cr Hatchery	Grovers Cr Hatchery	1 (5%)	1
		Icy Cr 09.0125	Icy Cr Hatchery	3 (15%)	0
	S Puget Sound (15%)	Clear Cr 11.0013C	Clear Creek Hatchery	1 (5%)	1
		Minter Cr 15.0048	Minter Cr Hatchery	2 (10%)	0
			Total	**20**	**4**

Table 2.16 Summary of double-index tagged (DIT) Chinook salmon kept by anglers and estimated total mortality of unmarked DIT Chinook salmon due to hook-and-release impacts resulting from the 2021-2022 winter Chinook salmon MSF in Marine Area 10. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs	Est.AD	var(Est.AD)	UM DIT Enc	Est.UM	var(Est.UM)	SE(Est.UM)
Bernie Gobin Hatch	2019	2	12	59.76	11.6	1.2	0.556	1.05
Clear Creek Hatchery	2019	1	6	29.88	5.8	0.6	0.285	0.53
Grovers Cr Hatchery	2019	1	6	29.88	6.1	0.6	0.313	0.56
Total		4	24	119.53	23.5	2.4	1.154	2.15

Table 2.17 Fishery-total estimates of retained and released salmon (*other than Chinook salmon*) during the 2021-2022 winter Chinook salmon MSF in Marine Area 10. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status

Week	Start Date	End Date	Retained Salmon		Released Salmon			
			Coho AD	Coho UM	Coho AD	Coho UM	Coho UK	Unknown Salmon
1	1-Jan	2-Jan	0	0	0	0	0	0
2	3-Jan	9-Jan	0	0	0	0	0	47
3	10-Jan	10-Jan	0	0	0	0	0	27
9	24-Feb	26-Feb	0	7	0	0	0	40
10	3-Mar	5-Mar	0	0	4	7	0	0
11	10-Mar	12-Mar	0	0	0	0	0	9
12	16-Mar	20-Mar	0	0	0	0	0	15
13	21-Mar	27-Mar	0	0	0	0	0	38
14	28-Mar	31-Mar	0	0	0	0	0	0
Season Total:			0	7	**4**	**7**	**0**	**176**
Variance:			**NA**	**32**	**7**	**27**	**NA**	**1,776**
Standard Error:			**NA**	**6**	**3**	**5**	**NA**	**42**
CV (%):			**NA**	**78%**	**59%**	**76%**	**NA**	**24%**
95% CI:			**NA**	**0 - 18**	**0 - 10**	**0 - 17**	**NA**	**94 - 259**

Table 2.18 Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2021-2022 winter Chinook salmon MSFs in Marine Area 10. Bold sites indicate those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
Armeni Public Ramp	**12**	**0.0363**	**38**	**0.0626**
Bayside Marina/Drystack	4	0.0121	6	0.0099
Bremerton Yacht Club	1	0.0030	0	0.0000
Brownsville Marina	**12**	**0.0363**	**22**	**0.0362**
Burton Ramp, Vashon Is	0	0.0000	1	0.0016
Commencement Bay Marina Services	0	0.0000	1	0.0016
Cornet Bay Public Ramp	0	0.0000	1	0.0016
Coupeville Public Ramp	0	0.0000	1	0.0016
Dagmar's Landing	4	0.0121	15	0.0247
Des Moines Marina	5	0.0151	13	0.0214
Driftwood Key Marina	1	0.0030	1	0.0016
Duwamish Is Marina	0	0.0000	1	0.0016
Eagle Harbor Waterfront Park	3	0.0091	2	0.0033
Edmonds Boat Basin	8	0.0242	21	0.0346
Edmonds Dry Storage	29	0.0876	35	0.0577
Edmonds Marina	73	0.2205	88	0.1450
Edmonds Marine Beach	0	0.0000	1	0.0016
Elliott Bay Marina	3	0.0091	18	0.0297
Everett Marina	10	0.0302	18	0.0297
Everett Ramp	21	0.0634	63	0.1038
Evergreen Park Ramp	2	0.0060	1	0.0016
Fort Casey Public Ramp	0	0.0000	1	0.0016
Foss Tug Dock	1	0.0030	1	0.0016
Gig Harbor Marina	2	0.0060	0	0.0000
Harbor Isl Marina	0	0.0000	2	0.0033
Keyport Ramp	1	0.0030	0	0.0000
Kingston Marina	10	0.0302	10	0.0165
Kingston Public Ramp	**29**	**0.0876**	**53**	**0.0873**
Langley Marina/Ramp	0	0.0000	1	0.0016
Manchester Public Ramp	**10**	**0.0302**	**24**	**0.0395**
Mukilteo Lighthouse Park	1	0.0030	5	0.0082
Narrows Marina	3	0.0091	9	0.0148
Point Defiance Boathouse	1	0.0030	1	0.0016
Point Defiance Public Ramp	1	0.0030	12	0.0198
Port Madison Marina	1	0.0030	2	0.0033
Port Orchard Marina	3	0.0091	5	0.0082
Port Orchard Public Ramp	4	0.0121	4	0.0066
Possession Waterfront Beach Park	5	0.0151	2	0.0033
Poulsbo Ramp/Marina	1	0.0030	3	0.0049
Private	6	0.0181	19	0.0313
Redondo Ramp	2	0.0060	0	0.0000
Seacrest Boathouse	0	0.0000	1	0.0016
Shilshole Marina	21	0.0634	27	0.0445
Shilshole Public Ramp	**37**	**0.1118**	**74**	**0.1219**
Shilshole Shore	0	0.0000	1	0.0016
South Park - Duwamish	1	0.0030	1	0.0016
Unknown	3	0.0091	0	0.0000
Winslow Marina	0	0.0000	2	0.0033
Total Anglers	**331**	**1**	**607**	**1**

Table 2.19 Season-total estimates of Chinook salmon encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Area 10 Winter Chinook salmon MSF. Values may not add exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Dec 1, 2007 - Jan 31, 2008	2,544	539	21	96	0	80	163	1,860	361	3,120
Dec 1, 2008 - Jan 31, 2009	2,029	247	0	4	0	37	36	1,010	462	1,796
Oct 1, 2009 - Jan 31 2010	5,560	354	2	42	0	53	83	2,531	898	3,962
Oct 1, 2010 - Jan 31, 2011	4,461	150	0	13	0	22	53	814	740	1,792
Oct 1, 2011 - Jan 31, 2012	4,615	227	5	15	9	34	183	2,870	1,230	4,573
Oct 1, 2012 - Jan 31, 2013	5,321	121	0	0	0	18	27	1,183	549	1,897
Oct 1, 2013 - Jan 31, 2014	6,216	328	4	22	4	49	122	1,852	584	2,964
Oct 1, 2014 - Jan 31, 2015	7,109	215	0	0	0	32	87	622	314	1,270
Oct 1, 2015 – Oct 18, 2016	4,110	63	0	55	25	9	29	1043	337	1,561
Nov 1, 2016 - Jan 23, 2017	1,841	225	0	5	0	34	86	1806	690	2,846
Nov 1, 2017 - Feb 28, 2018	1,836	235	0	82	0	35	48	1410	429	2,239
Jan 1, 2019 - Jan 19, 2019	1,700	721	5	66	0	108	161	928	249	2,237
Jan 1, 2020 - Mar 24, 2020	2,517	44	0	12	0	7	28	394	79	563
Jan 1, 2021 - Jan 18, 2021	1,868	173	0	62	0	26	62	1801	473	2,597
Jan 1, 2022 - Mar 31, 2022	5,020	958	0	77	13	143	176	2389	1176	4,932

3) Marine Area 11 Winter Mark-Selective Chinook Fishery

WDFW implemented a winter Chinook salmon MSF in Marine Area 11 from November 1 through November 19, 2021. Due to the likelihood of exceeding FRAM's pre-season projected catch, Marina Area 11 was closed to salmon fishing 42 days earlier than originally scheduled. The PSSU implemented an intensive monitoring program in Marine Area 11 throughout the season to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, on-the-water effort surveys, test fishing and collection of STRs from the angling public. **Table 3.1** summarizes the parameters estimated and the sampling activities associated with each parameter. Specific procedures used for collecting these data and estimating critical data parameters are presented in detail in our separate Methods Report (WDFW 2012a). In the following section we present results from our monitoring activities during the Marine Area 11 winter Chinook salmon MSF which occurred from November 1 through November 19, 2021, which was the last day of the fishery.

Table 3.1 Sampling/estimation details on target parameters associated with the overall Marine Area 11 winter Chinook salmon MSF monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Creel Sampling	Fishing effort (boat & angler trips); kept and released fish	Catch rates (CPUE); length, age, and CWT composition of harvest[1]; collection of angler fishing methods.	Angler trip; kept fish; reported fish release.	Two weeks	Within days, estimates were produced by day-type strata (weekday/weekend). Each week we sampled every Friday, Saturday, and Sunday, and we randomly selected *n*=2 out of *N*=4 weekdays (Monday-Thursday) for sampling.
		Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook salmon	Boat trip	Season	Bias-corrected encounter proportions from the Dockside data (**Table 3.7)** were not used to produce encounter and mortality estimates.
On-the-water Surveys	Proportion of total angler effort that uses sample-frame sites (i.e., site "size measures") versus out-of-frame sites.	Total on-water boat and angler counts at assumed peak effort time interval (instantaneous count); spatial distribution of recreational fishing boats in the area.	Boats and anglers	Month	A total of 5 boat surveys, (WE = 3, WD = 2) were conducted during the 3-week fishery. The results of these surveys were incorporated into multi-year site-weight averages.
Test Fishing	Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook salmon	Chinook salmon length, age, and DNA-based[2] stock composition; species composition of non-Chinook salmon encounters	Fish encounter	Season	Due to low sample size of test fishing data (LM% CV% = 57%), test fishing data (**Table 3.4)** and STR data (**Table 3.5)** were combined to produce legal-mark proportions used for estimates of encounters and mortalities. A Chi-Square test of independence showed there was no significant difference between the datasets (p-value = .07)
Voluntary Salmon Trip Reports (STRs)	Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook salmon	Encounter data for non-Chinook salmon species (e.g., Coho) that the angler may record on the STR form	Fish encounter	Season	Due to low sample size of test fishing data (LM% CV% = 57%), test fishing data (**Table 3.4)** and STR data (**Table 3.5)** were combined to produce legal-mark proportions used for estimates of encounters and mortalities. A Chi-Square test of independence showed there was no significant difference between the datasets (p-value = .07)
Overall Fishery Impacts Estimation	Total Chinook salmon encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook salmon	N/A	Season	Estimated on a monthly time step but considered at the season-total level.
Coded-wire tag (CWT) Impacts Estimation	Marked/unmarked double-index tag (DIT) encounters and mortalities	N/A	N/A	Season	The temporal resolution of DIT impacts is constrained by the total number of tags recovered.

[1] The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

[2] Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery

Table 3.2 Sampling/estimation details on target parameters associated with the overall Marine Area 11 winter Chinook salmon MSF monitoring program.

Month	Stat Week	Start Date	End Date	Est. Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
Nov	45	1-Nov	7-Nov	183	259	53	0	85	26	164
	46	8-Nov	14-Nov	212	291	81	0	129	39	249
	47	15-Nov	19-Nov	177	255	36	0	57	17	111
Season Total				**572**	**805**	**171**	**0**	**271**	**83**	**524**
Variance:				965	1,816	164	0	10,410	1,253	18,434
SE:				31	43	13	0	102	35	136
CV (%):				5	5	7	0	38	43	26
95% CI:				511 - 633	722 - 889	146 - 196	0 - 0	71 - 471	13 - 152	258 - 790

Table 3.3 Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the 2021-2022 winter Chinook salmon MSF in Marine Area 11.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	54	10	64
Unmarked	0	0	0
Total	**54**	**10**	**64**

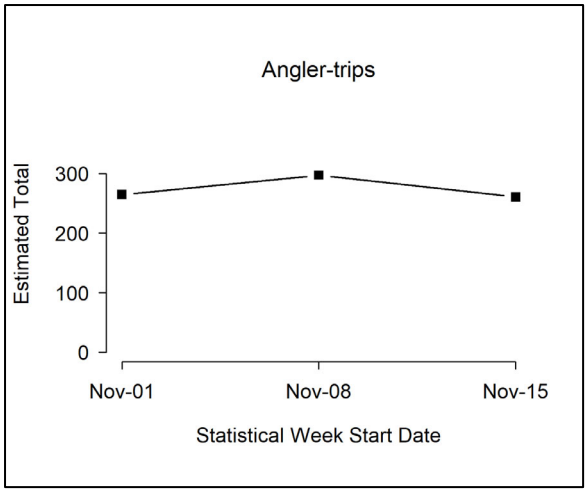

Figure 3.1 Temporal patterns in fishing effort during the 2021-2022 winter Chinook salmon MSF in Marine Area 11.

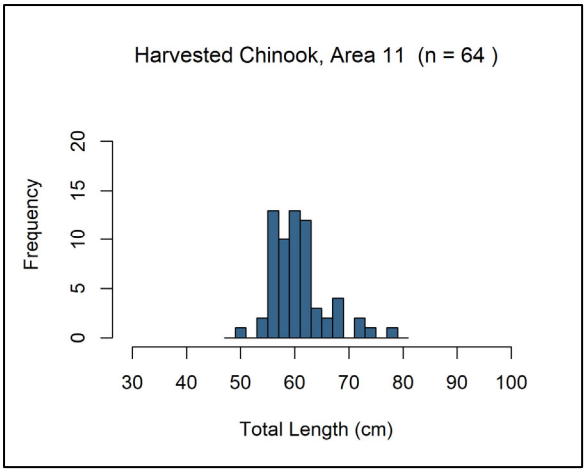

Figure 3.3 Length-frequency distribution of retained marked Chinook salmon sampled in dockside angler interviews during the 2021-2022 winter Chinook salmon MSF in Marine Area 11. Note: displayed values are observations where lengths were taken.

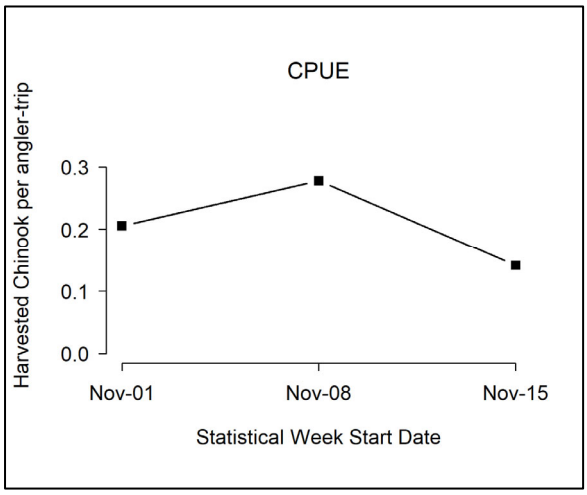

Figure 3.2 Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2021-2022 winter Chinook salmon MSF in Marine Area 11.

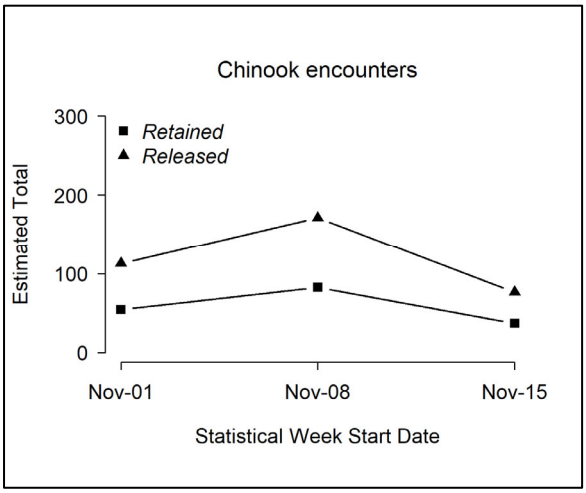

Figure 3.4 Temporal patterns in Chinook salmon encounters (number retained and released) during the 2021-2022 winter Chinook salmon MSF in Marine Area 11.

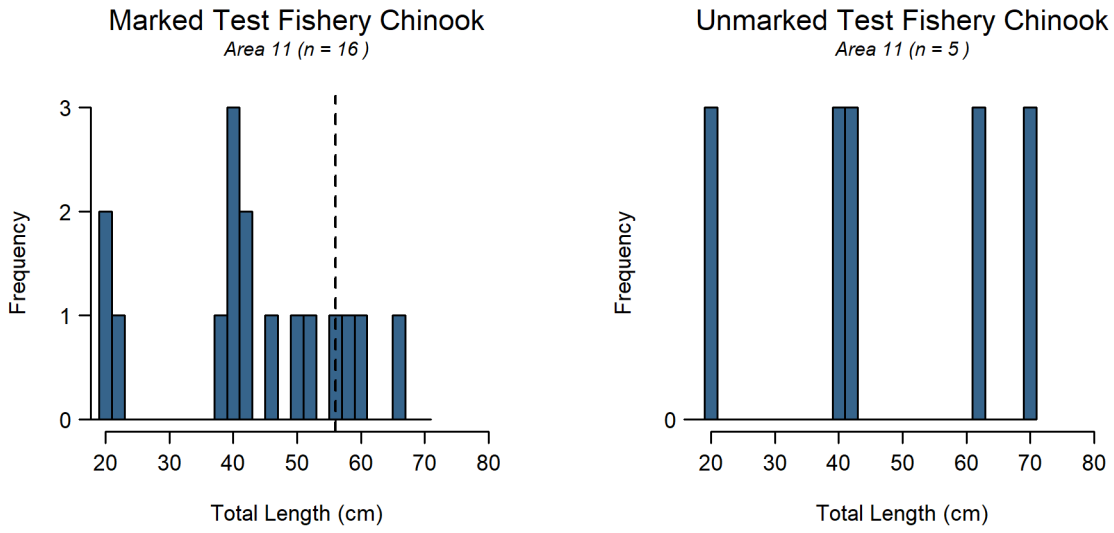

Figure 3.5 Length-frequency distributions of marked (left panel) and unmarked (right panel) Chinook salmon encountered by test fishers during the 2021-2022 winter Chinook salmon MSF in Marine Area 11. The vertical dashed line in the left panel corresponds to the legal-size limit (22 in or 56 cm).

Table 3.4 Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the 2021-2022 winter Chinook salmon MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hrs Fished	AD	UM	AD	UM	
45	5	25.37	2	1	8	1	12
46	3	15.23	1	1	2	2	6
47	3	14.68	0	0	3	0	3
Total	**11**	**55.26**	**3**	**2**	**13**	**3**	**21**
Size/mark-status composition:	0.14	0.10	0.62	0.14			
Variance:			(0.0061)	(0.0043)	(0.0118)	(0.0061)	
Legal size mark rate:			0.60				
Overall mark rate:			0.76				

Table 3.5 Total Chinook salmon encountered (retained and released) by private-boat and charter boat anglers logging their trips on STRs, with estimates of legal-size and overall (legal and sublegal) mark rates during the 2021-2022 winter Chinook salmon MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses

Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
		AD	UM	AD	UM		Overall	Legal
Private VTR	11 1-trip VTRs	9	0	7	1	17	0.94	1.00
Size/mark-status composition:		0.53	0.00	0.41	0.06			
Variance:		(0.0156)	(0.0000)	(0.0151)	(0.0035)			

Table 3.6 Monthly sample rates (Total retained Chinook salmon sampled/ Estimated retained Chinook salmon) in the 2021-2022 winter Chinook salmon MSF in Marine Area 11.

Time period			Estimated Retained Chinook			Number of Chinook sampled			Sample Rate
Month	Stat Weeks	Dates	AD	UM	Total	AD	UM	Total	
November	45 - 47	1 Nov - 19 Nov	171	0	171	64	0	64	37.50%
Season Total			**171**	**0**	**171**	**64**	**0**	**64**	**37.50%**

Table 3.7 Dockside encounters (retained and released) by size-mark category during the 2021-2022 winter Chinook salmon MSF in Marine Area 11. Retained fish were sampled for mark-status and length, released fish by size-mark status were reported by the angler.

Dockside Encounters				
Status	Legal		Sublegal	
	LM	LU	SM	SU
Encounters	55	6	39	0
Size/mark-status composition	0.55	0.06	0.39	0.00
Bias Corrected	0.49	0.06	0.39	0.06
Variance	0.0037	0.0006	0.0035	0.0000

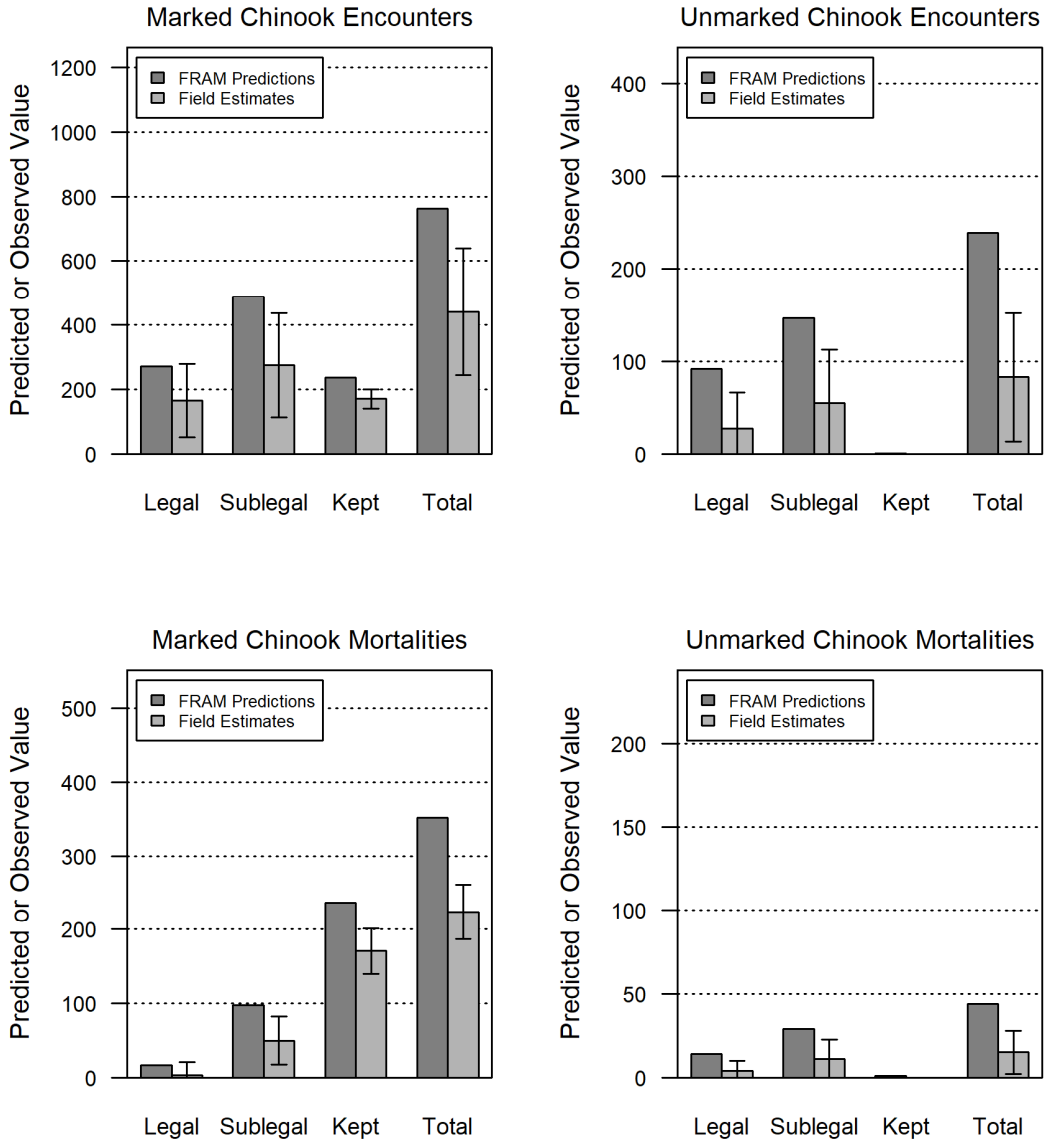

Figure 3.6 Comparison of modeled (FRAM model run 3721) and estimated total Chinook salmon encounters and mortalities for the 2021-2022 winter Chinook salmon MSFs in Marine Area 11. Error bars represent approximate 95% confidence intervals for field estimates.

Table 3.8 Comparison of modeled (FRAM model run 3721) and estimated total Chinook salmon encounters for the 2021-2022 winter Chinook salmon MSF in Marine Area 11. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	239	92	147	1
	AD	762	272	490	237
	Total	1,001	364	637	238
	% Marked	76	75	77	100
Estimated (Creel) Encounters	UM	83	28	55	0
	AD	441	166	276	171
	Total	524	193	331	171
	% Marked	84	86	83	100

Table 3.9 Summary of season-wide fishery impact estimates for the 2021-2022 winter Chinook salmon MSF in Marine Area 11. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
Legal AD	166	144	22	3	147	256	16	116 - 179	11
Legal UM	28	0	28	4	4	9	3	0 - 10	72
Sublegal AD	276	27	249	50	77	341	18	40 - 113	24
Sublegal UM	55	0	55	11	11	34	6	0 - 23	53
Total	**524**	**171**	**353**	**68**	**239**	**640**	**25**	**189 - 288**	**11**

Table 3.10 Comparison of modeled (FRAM model run 3721) and estimated total Chinook salmon mortalities for the 2021-2022 winter Chinook salmon MSF in Marine Area 11. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped) and UM = unmarked.

Mortality Category	FRAM Chinook Mortalities			Estimated Chinook Mortalities		
	UM	AD	Total	UM	AD	Total
Total (Landed + Released)	44	352	396	15	224	239
Released Legal	14	17	31	4	3	7
Released Sublegal	29	98	127	11	50	61
Landed Only	1	237	238	0	171	171

Table 3.11 Summary of CWTs recovered from Chinook salmon retained during the 2021-2022 winter Chinook salmon MSF in Marine Area 11. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	N Puget Sound (20%)	Whitehorse Springs	Whitehorse Pond	1 (20%)	0
	Mid Puget Sound (40%)	Grovers Cr Hatchery	Grovers Cr Hatchery	1 (20%)	1
		Icy Cr 09.0125	Icy Cr Hatchery	1 (20%)	0
	S Puget Sound (40%)	Deschutes R 13.0028	Tumwater Falls Hatchery	1 (20%)	0
		Minter Cr Tr 15.0051	Hupp Springs Rearing	1 (20%)	0
			Total	**5**	**1**

Table 3.12 Summary of double-index tagged (DIT) Chinook salmon kept by anglers and estimated total mortality of unmarked DIT Chinook salmon due to hook-and-release impacts resulting from the 2021-2022 winter Chinook salmon MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs	Est.AD	var(Est.AD)	UM DIT Enc	Est.UM	var(Est.UM)	SE(Est.UM)
Grovers Cr Hatchery	2019	1	2.7	4.44	2.7	0.3	0.047	0.22
Total		1	2.7	4.44	2.7	0.3	0.047	0.22

Table 3.13 Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2021-2022 winter Chinook salmon MSFs in Marine Area 11. Bold sites indicate those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
Armeni Public Ramp	**0**	**0.0000**	**0**	**0.0000**
Breakwater Marina	5	0.1471	3	0.0462
Dash Point Shore	0	0.0000	5	0.0769
Des Moines Marina	2	0.0588	0	0.0000
Gig Harbor Marina	0	0.0000	3	0.0462
Gig Harbor Ramp	**1**	**0.0294**	**7**	**0.1077**
Manchester Public Ramp	0	0.0000	3	0.0462
Narrows Marina	5	0.1471	5	0.0769
Point Defiance Boathouse	**11**	**0.3235**	**9**	**0.1385**
Point Defiance Public Ramp	**10**	**0.2941**	**30**	**0.4615**
Redondo Public Ramp	**0**	**0.0000**	**0**	**0.0000**
Total Anglers	**34**	**1**	**65**	**1**

Table 3.14 Fishery-total estimates of retained and released salmon (other than Chinook salmon) during the 2021-2022 winter Chinook salmon MSF in Marine Area 11. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status

Week	Start Date	End Date	Retained Salmon		Released Salmon			
			Coho AD	Coho UM	Coho AD	Coho UM	Cutthroat	Unknown Salmon
45	1-Nov	7-Nov	0	3	1	0	0	17
46	8-Nov	14-Nov	0	0	0	0	0	13
47	15-Nov	19-Nov	0	0	0	0	38	77
Season Total:			0	3	**1**	0	**38**	**107**
Variance:			**NA**	**6**	**0**	**NA**	**782**	**269**
Standard Error:			**NA**	**3**	**0**	**NA**	**28**	**16**
CV (%):			**NA**	**76%**	**24%**	**NA**	**73%**	**15%**
95% CI:			**NA**	**0 - 8**	**1 - 2**	**NA**	**0 - 93**	**77 - 145**

Table 3.15 Season-total estimates of Chinook salmon encounters by size/mark-status and total estimates of angler effort, summarized for all intensively monitored seasons to date of the Area 11 Winter Chinook salmon MSF. Values may not add exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Feb 1 - Apr 30, 2010	3,096	315	3	11	0	47	80	114	10	580
Feb 1 - Apr 30, 2011	1,515	78	3	9	0	12	87	322	241	752
Feb 1 - Apr 30, 2012	1,937	170	0	4	0	25	142	630	182	1,153
Feb 1 - Apr 30, 2013	2,141	149	0	22	0	22	47	237	35	513
Feb 1 - Apr 30, 2014	1,464	112	0	7	0	17	41	57	6	240
Nov 1 - Nov 19, 2021	805	144	0	27	0	22	28	249	55	524

4) Marine Area 13 Winter Mark-Selective Chinook Fishery

The WDFW implemented a Chinook salmon MSF in Marine Area 13 from October 1, 2021 through April 30, 2022. Data collection methods used to monitor the Marine Area 13 Chinook salmon MSF included dockside angler interviews (with catch sampling) and STRs provided by private anglers. From these activities, we were able to estimate catch rates (CPUE) and mark rates based on STRs. Additionally, we described relative catch and effort patterns throughout the season based on the assumption that baseline-sampling observations of these parameters are good indicators of associated fishery-wide trends.

WDFW samplers conducted dockside "Baseline Sampling" at selected access sites during the 2021-2022 winter Chinook salmon MSF in Marine Area 13. Complete details of these methods are presented in a separate Methods Report (WDFW 2012a). "Baseline Sampling" is opportunistic in nature, with overall sampling effort allocated across space and time in a manner that maximizes the number of angler interviews obtained per sample effort. The Marine Area 13 baseline sample frame included 31 different access sites (**Table 4.3**), and a total of 581 site visits during the six-month season. Site visits ranged from short (e.g., "no effort" samples) to full-day (8+ hours) sampling events. When present, samplers interviewed all anglers exiting the Marine Area 13 fishery at the selected access site. The interview and catch-sampling procedures employed were identical to those used in other MSFs. Marine Area 13 samplers acquired information about: 1) angling effort (boat and angler trips, trip length), 2) encounter composition (retained and/or released) by species and mark status (marked vs. unmarked, Chinook and Coho salmon only), and 3) landed Chinook salmon size (fork length) and age (scales were collected and ultimately read) composition. Samplers also inspected landed Chinook and Coho salmon for CWTs using wand detectors and acquired snouts when tags were present. Resulting tag data were used to estimate the CWT-based composition (unexpanded) of landed catch.

In contrast to the intensive "Murthy" survey design employed in other areas in Puget Sound, Marine Area 13 sampling results could not be used to produce fishery-total estimates of effort, encounters (retained catch + releases), and unmarked-DIT Chinook salmon impacts. However, Marine Area 13 Baseline Sampling observations will ultimately be combined with Catch Record Card (CRC) data, once they become available, to estimate catch and effort at the fishery-total level. While these descriptors of MSF impacts are not presented in this document, they will be available at a later date. In the following section we present results from our monitoring activities during the Marine Area 13 winter 2021-2022 Chinook salmon MSF.

Table 4.1 Observations of fishing effort, other than Chinook salmon retained, and reported other than Chinook salmon releases, by week, for the winter Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status, UD = undetermined mark-status.

Stat Week	Start	End	Effort		Retained Fish			Released Fish		
			Boats	Anglers	Chinook AD	Chinook UM	Chinook UK	Chin AD	Chin UM	Chin UK
40	1-Oct	3-Oct	14	22	0	0	0	1	1	0
41	4-Oct	10-Oct	15	29	0	0	0	0	0	0
42	11-Oct	17-Oct	19	27	0	0	0	0	0	0
43	18-Oct	19-Oct	2	4	0	0	0	0	0	0
44	29-Oct	31-Oct	9	17	0	0	0	1	0	0
45	6-Nov	6-Nov	3	5	0	0	0	0	0	0
46	8-Nov	14-Nov	41	74	0	0	0	0	0	0
47	15-Nov	21-Nov	27	41	1	0	0	0	0	0
48	22-Nov	28-Nov	9	13	0	0	0	0	0	0
49	29-Nov	5-Dec	8	9	0	0	0	0	0	0
50	10-Dec	10-Dec	2	3	0	0	0	0	0	0
51	19-Dec	19-Dec	1	1	0	0	0	0	0	0
52	21-Dec	21-Dec	4	5	0	0	0	0	0	0
2	8-Jan	9-Jan	9	15	2	0	0	1	1	1
3	14-Jan	16-Jan	20	33	2	0	1	14	0	0
4	19-Jan	23-Jan	21	37	3	0	0	5	0	5
5	24-Jan	30-Jan	32	53	5	0	0	4	1	6
6	2-Feb	6-Feb	41	70	16	0	0	7	1	5
7	9-Feb	13-Feb	47	83	10	0	0	13	7	6
8	16-Feb	20-Feb	22	35	7	0	0	5	2	3
9	24-Feb	27-Feb	15	21	3	0	0	6	2	4
10	2-Mar	6-Mar	33	60	13	0	0	12	0	10
11	7-Mar	13-Mar	36	63	24	0	0	7	4	6
12	14-Mar	20-Mar	23	40	5	0	0	3	2	1
13	21-Mar	27-Mar	34	58	13	0	0	13	5	3
14	28-Mar	3-Apr	22	36	6	0	0	2	3	0
15	6-Apr	10-Apr	22	44	3	0	0	2	1	6
16	12-Apr	17-Apr	13	23	15	0	0	0	0	1
17	20-Apr	24-Apr	35	64	8	0	0	1	2	1
18	27-Apr	30-Apr	19	34	10	0	0	1	3	0
Season Total			**598**	**1,019**	**146**	**0**	**1**	**98**	**35**	**58**

Table 4.2 Observations of fishing effort, other than Chinook salmon retained, and reported other than Chinook salmon releases, by week, for the winter Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status, UD = undetermined mark-status.

Stat Week	Start	End	Effort		Retained Fish			Released Fish				
			Boats	Anglers	Coho AD	Coho UM	Chum	Coho AD	Coho UM	Coho UNK	Chum	Unknown Salmon
40	1-Oct	3-Oct	14	22	0	0	0	1	1	0	0	0
41	4-Oct	10-Oct	15	29	1	0	0	2	0	0	0	0
42	11-Oct	17-Oct	19	27	4	0	0	2	2	1	0	0
43	18-Oct	19-Oct	2	4	1	0	0	0	0	0	0	0
44	29-Oct	31-Oct	9	17	0	0	6	1	0	0	0	0
45	6-Nov	6-Nov	3	5	0	0	3	0	0	0	0	0
46	8-Nov	14-Nov	41	74	0	0	59	0	0	0	103	0
47	15-Nov	21-Nov	27	41	0	0	16	0	0	0	93	0
48	22-Nov	28-Nov	9	13	0	0	3	0	0	0	12	0
49	29-Nov	5-Dec	8	9	0	0	6	0	0	0	7	0
50	10-Dec	10-Dec	2	3	0	0	0	0	0	0	0	0
51	19-Dec	19-Dec	1	1	0	0	0	0	0	0	0	0
52	21-Dec	21-Dec	4	5	0	0	0	0	0	0	0	0
2	8-Jan	9-Jan	9	15	0	0	0	0	0	0	0	0
3	14-Jan	16-Jan	20	33	0	0	0	0	0	0	0	0
4	19-Jan	23-Jan	21	37	0	0	0	4	0	0	0	0
5	24-Jan	30-Jan	32	53	0	0	0	0	0	0	0	0
6	2-Feb	6-Feb	41	70	0	0	0	2	0	0	0	0
7	9-Feb	13-Feb	47	83	0	0	0	0	1	1	0	0
8	16-Feb	20-Feb	22	35	0	0	0	0	0	0	0	0
9	24-Feb	27-Feb	15	21	0	0	0	0	0	0	0	0
10	2-Mar	6-Mar	33	60	0	0	0	0	0	0	0	0
11	7-Mar	13-Mar	36	63	0	0	0	0	0	0	0	0
12	14-Mar	20-Mar	23	40	0	0	0	0	0	0	0	0
13	21-Mar	27-Mar	34	58	0	0	0	0	0	0	0	0
14	28-Mar	3-Apr	22	36	0	0	0	0	0	0	0	0
15	6-Apr	10-Apr	22	44	0	0	0	0	0	0	0	0
16	12-Apr	17-Apr	13	23	0	0	0	0	0	0	0	0
17	20-Apr	24-Apr	35	64	0	0	0	0	0	0	0	0
18	27-Apr	30-Apr	19	34	0	0	0	0	0	0	0	0
Season Total			**598**	**1,019**	**6**	**0**	**93**	**12**	**4**	**2**	**215**	**0**

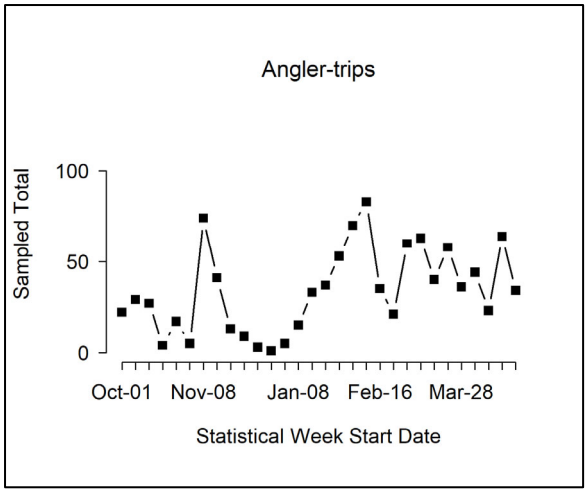

Figure 4.1 Temporal patterns in fishing effort during the 2021-2022 winter Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

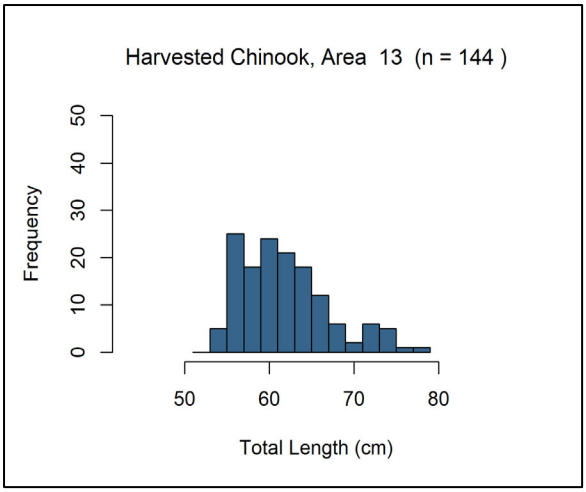

Figure 4.3 Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2021-2022 winter Chinook salmon MSF in Marine Area 13.

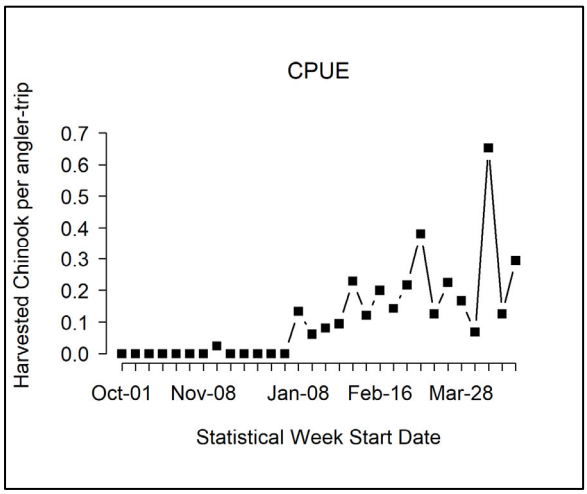

Figure 4.2 Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2021-2022 winter Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

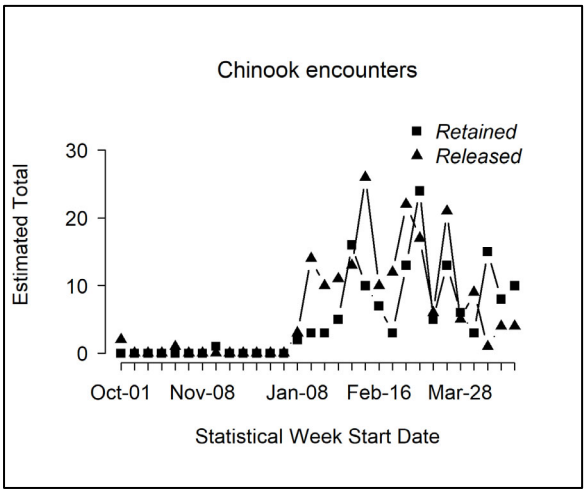

Figure 4.4 Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2021-2022 winter Chinook salmon MSF in Marine Area 13.

Table 4.3 List of sites sampled with the number of sampling events (site-days) during the 2021-2022 winter Chinook salmon MSF in Marine Area 13.

Location Name	Number of Site Days Sampled Per Month							Total Site-Days	% of Total
	October	November	December	January	February	March	April		
Allyn Public Ramp	0	0	1	4	1	5	0	11	1.89%
Arcadia Ramp	0	0	0	4	0	1	0	5	0.86%
Boston Harbor Ramp	17	0	2	9	6	11	9	54	9.29%
Concrete Dock	0	0	0	2	0	1	1	4	0.69%
East Bay Marina	5	0	4	10	2	9	11	41	7.06%
Fox Island Public Ramp	4	0	0	1	0	0	2	7	1.20%
Grapeview Public Ramp	1	0	1	6	2	4	0	14	2.41%
Hartstene Is. Ramp	8	1	1	7	4	4	0	25	4.30%
Home Public Ramp	3	0	0	1	1	1	2	8	1.38%
Horsehead Bay Ramp	4	0	0	1	0	1	0	6	1.03%
Joemma Beach Ramp	0	0	0	1	0	0	0	1	0.17%
Longbranch Public Ramp	1	0	0	2	1	2	1	7	1.20%
Luhr Beach Ramp	22	0	6	20	19	24	16	107	18.42%
Luhr Beach Shore	0	0	0	1	0	0	0	1	0.17%
Narrows Marina	20	6	1	17	19	17	15	95	16.35%
Narrows Park	0	4	4	2	1	1	0	12	2.07%
Narrows Ramp	0	0	0	1	1	0	0	2	0.34%
Solo Point	4	0	1	7	8	5	3	28	4.82%
Wauna Shore	0	0	5	10	5	1	2	23	3.96%
Wollochet Bay Public Ramp	0	1	0	2	0	2	1	6	1.03%
Zittels Marina	15	0	4	6	9	11	12	57	9.81%
Allyn Dock	0	0	0	0	1	1	0	2	0.34%
Vaughn Public Ramp	3	0	0	0	1	1	2	7	1.20%
Jarrell Cove Marina	0	0	0	0	0	1	0	1	0.17%
Longbranch Marina	0	0	0	0	0	1	1	2	0.34%
Steilacoom Public Ramp	6	0	0	0	0	0	1	7	1.20%
Nyne's Marina	6	0	0	0	0	0	0	6	1.03%
Priest Point Park	5	0	0	0	0	0	0	5	0.86%
Steamboat Island Bridge	2	4	0	0	0	0	0	6	1.03%
John's Creek	0	1	0	0	0	0	0	1	0.17%
Kennedy Creek Mouth	0	10	1	0	0	0	0	11	1.89%
McLane Creek Shore	0	4	1	0	0	0	0	5	0.86%
Perry Creek	0	11	3	0	0	0	0	14	2.41%
Grand Total	**126**	**42**	**35**	**114**	**81**	**104**	**79**	**581**	**100.00%**

Table 4.4 Summary of total lengths from retained Chinook salmon collected during dockside angler interviews in the 2021-2022 winter Chinook salmon MSF in Marine Area 13.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	125	19	144
Unmarked	0	0	0
Total	**125**	**19**	**144**

Table 4.5 Summary of CWTs recovered from Chinook salmon retained during the 2021-2022 winter Chinook salmon MSF in Marine Area 13. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	N Puget Sound (42.9%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	1 (7.1%)	1
		Wallace R 07.0940	Wallace R Hatchery	2 (14.3%)	0
		Whitehorse Springs	Whitehorse Pond	3 (21.4%)	0
	Mid Puget Sound (14.3%)	Icy Cr 09.0125	Icy Cr Hatchery	2 (14.3%)	0
	S Puget Sound (42.9%)	Clear Cr 11.0013C	Clear Creek Hatchery	1 (7.1%)	1
		Minter Cr 15.0048	Minter Cr Hatchery	5 (35.7%)	0
			Total	**14**	**2**

Table 4.6 Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on STRs during the 2021-2022 winter Chinook salmon MSF in Marine Area 13, with estimates of legal-size and overall (legal and sublegal) mark rates. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
		AD	UM	AD	UM		Overall	Legal
Private STR	0 1-trip STRs	0	0	0	0	0	NA	NA
Size/mark-status composition:		0.00	0.00	0.00	0.00			
Variance:		NA	NA	NA	NA			

Table 4.7 Dockside encounters (retained and released) by size-mark category during the 2021-2022 winter Chinook salmon MSF in Marine Area 13. Retained fish were sampled for mark-status and length, released fish by size-mark status were reported by the angler.

Dockside Encounters				
Status	Legal		Sublegal	
	LM	LU	SM	SU
Encounters	129	17	113	18
Size/mark-status composition	0.47	0.06	0.41	0.06
Bias Corrected	0.41	0.06	0.41	0.12
Variance	0.0013	0.0002	0.0012	0.0003

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APPENDICES

1) SITE WEIGHTS

Appendix 1 Size measures by sample date, for sites sampled during dockside creel surveys for the 2021-2022 winter Chinook MSF in Marine Area 10.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
1/2/2022	1	Armeni Public Ramp	0.1634	Shilshole Public Ramp	0.3598
1/3/2022	2	Shilshole Public Ramp	0.3598	Kingston Public Ramp	0.1785
1/8/2022	2	Shilshole Public Ramp	0.2672	Kingston Public Ramp	0.0903
1/9/2022	2	Armeni Public Ramp	0.5282	Shilshole Public Ramp	0.2672
1/10/2022	3	Armeni Public Ramp	0.1634	Edmonds Boat Loft	0.1333
2/24/2022	9	Armeni Public Ramp	0.2174	Shilshole Public Ramp	0.3739
2/25/2022	9	Armeni Public Ramp	0.2174	Kingston Public Ramp	0.1887
2/26/2022	9	Armeni Public Ramp	0.2174	Shilshole Public Ramp	0.3739
3/3/2022	10	Armeni Public Ramp	0.1625	Kingston Public Ramp	0.2172
3/4/2022	10	Armeni Public Ramp	0.1625	Shilshole Public Ramp	0.3685
3/5/2022	10	Armeni Public Ramp	0.1625	Shilshole Public Ramp	0.3685
3/10/2022	11	Shilshole Public Ramp	0.3685	Kingston Public Ramp	0.2172
3/11/2022	11	Shilshole Public Ramp	0.3685	Armeni Public Ramp	0.1625
3/12/2022	11	Shilshole Public Ramp	0.3685	Kingston Public Ramp	0.2172
3/16/2022	12	Shilshole Public Ramp	0.3685	Kingston Public Ramp	0.2172
3/17/2022	12	Shilshole Public Ramp	0.3685	Edmonds Boat Loft	0.1612
3/18/2022	12	Shilshole Public Ramp	0.3685	Manchester Public Ramp	0.0905
3/19/2022	12	Shilshole Public Ramp	0.3685	Armeni Public Ramp	0.1625
3/20/2022	12	Shilshole Public Ramp	0.3685	Armeni Public Ramp	0.1625
3/21/2022	13	Armeni Public Ramp	0.1625	Kingston Public Ramp	0.2172
3/23/2022	13	Shilshole Public Ramp	0.3685	Edmonds Boat Loft	0.1612
3/25/2022	13	Shilshole Public Ramp	0.3685	Armeni Public Ramp	0.1625
3/26/2022	13	Shilshole Public Ramp	0.3685	Manchester Public Ramp	0.0905
3/27/2022	13	Shilshole Public Ramp	0.3685	Armeni Public Ramp	0.1625
3/29/2022	14	Shilshole Public Ramp	0.3685	Armeni Public Ramp	0.1625
3/31/2022	14	Shilshole Public Ramp	0.3685	Kingston Public Ramp	0.2172

Appendix 2 Size measures by sample date, for sites sampled during dockside creel surveys for the 2021-2022 winter Chinook MSF in Marine Area 11.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
11/1/2021	45	Point Defiance Boathouse	0.3077	Point Defiance Public Ramp	0.6
11/3/2021	45	Point Defiance Boathouse	0.3077	Point Defiance Public Ramp	0.6
11/5/2021	45	Point Defiance Boathouse	0.3077	Point Defiance Public Ramp	0.6
11/6/2021	45	Point Defiance Boathouse	0.3077	Point Defiance Public Ramp	0.6
11/7/2021	45	Point Defiance Boathouse	0.3077	Point Defiance Public Ramp	0.6
11/8/2021	46	Point Defiance Boathouse	0.3077	Point Defiance Public Ramp	0.6
11/12/2021	46	Gig Harbor Ramp	0.0923	Point Defiance Public Ramp	0.6
11/13/2021	46	Point Defiance Boathouse	0.3077	Point Defiance Public Ramp	0.6
11/14/2021	46	Point Defiance Boathouse	0.3077	Point Defiance Public Ramp	0.6
11/16/2021	47	Point Defiance Boathouse	0.3077	Point Defiance Public Ramp	0.6
11/18/2021	47	Point Defiance Boathouse	0.3077	Point Defiance Public Ramp	0.6
11/19/2021	47	Point Defiance Boathouse	0.3077	Point Defiance Public Ramp	0.6

2) CWT RECOVERIES

Appendix 3 Coded-wire tag (CWT) recoveries from the 2021-2022 Winter Chinook MSF in Marine Area 5.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL(cm)	Label	Recovery Mark
5	2-Mar-22	211336	2018	Nooksack -Sf 01.0246	Skookum Cr Hatchery	LUMMI		75	CWT00052578	AD
5	2-Mar-22	56278	2019	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56387	67	CWT00087232	UNK
5	2-Mar-22	637626	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		60	CWT00087233	AD
5	4-Mar-22	637371	2018	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		55	CWT00087234	AD
5	4-Mar-22	637439	2018	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		61	CWT00087235	AD
5	4-Mar-22	211315	2018	Skookum Cr 01.0273	Skookum Cr Hatchery	LUMMI		80	CWT00087236	AD
5	5-Mar-22	211411	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA		59	CWT00045312	AD
5	5-Mar-22	201703	2017	Omak Pond	Chief Joseph Hatchery	CCT		81	CWT00048613	AD
5	5-Mar-22	637507	2018	Cowlitz R 26.0002	Cowlitz Salmon Hatchery	WDFW		55	CWT00048629	AD
5	5-Mar-22	56161	2018	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56019	70	CWT00087237	AD
5	5-Mar-22	637749	2019	Purdy Cr 16.0005	George Adams Hatchery	WDFW	637750	53	CWT00087238	AD
5	5-Mar-22	56390	2019	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56389	63	CWT00087239	AD
5	6-Mar-22	637348	2018	Clark Cr 03.1421	Marblemount Hatchery	WDFW		74	CWT00045311	AD
5	6-Mar-22	211322	2018	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	211323; 637442; 637443	68	CWT00048614	AD
5	6-Mar-22	211323	2018	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	211322; 637442; 637443	60	CWT00052577	AD
5	6-Mar-22	91460	2019	Big Cr (Lwr Col R)	Big Cr Hatchery	ODFW		57	CWT00052579	AD
5	6-Mar-22	637446	2018	Cascade R 03.1411	Marblemount Hatchery	WDFW		56	CWT00052580	AD
5	6-Mar-22	637439	2018	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		63	CWT00087240	AD
5	6-Mar-22	56390	2019	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56389	58	CWT00087241	AD
5	6-Mar-22	211411	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA		58	CWT00087242	AD
5	6-Mar-22	637524	2018	Purdy Cr 16.0005	George Adams Hatchery	WDFW		67	CWT00087243	AD
5	6-Mar-22	56278	2019	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56387	55	CWT00087244	AD
5	6-Mar-22	637446	2018	Cascade R 03.1411	Marblemount Hatchery	WDFW		56	CWT00087245	AD
5	6-Mar-22	637788	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW		56	CWT00087247	AD
5	6-Mar-22	637524	2018	Purdy Cr 16.0005	George Adams Hatchery	WDFW		58	CWT00087248	AD
5	7-Mar-22	211391	2019	Whitehorse Springs	Whitehorse Pond	STIL		58	CWT00045307	AD
5	7-Mar-22	637446	2018	Cascade R 03.1411	Marblemount Hatchery	WDFW		56	CWT00045308	AD
5	7-Mar-22	637611	2019	Chambers Cr 12.0007	Garrison Hatchery	WDFW		56	CWT00048615	AD
5	7-Mar-22	637765	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW		56	CWT00048617	AD
5	7-Mar-22	91458	2019	Tanner Cr (Bnville)	Bonneville Hatchery	ODFW		55	CWT00048627	AD
5	7-Mar-22	637413	2018	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		57	CWT00048628	AD

5	7-Mar-22	56162	2018	Entiat R 46.0042	Entiat Nfh	USFWS		54	CWT00087249	AD
5	7-Mar-22	211320	2018	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	637438; 211321; 637437	57	CWT00087250	AD
5	7-Mar-22	91387	2018	Willamette R M Fk-1	Dexter Ponds (Willam	ODFW		71	CWT00087251	AD
5	7-Mar-22	637627	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		61	CWT00087252	AD
5	7-Mar-22	211313	2018	Whitehorse Springs	Fortson Pond Net Pen	STIL		73	CWT00087253	AD
5	8-Mar-22	56161	2018	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56019	68	CWT00087254	AD
5	8-Mar-22	637524	2018	Purdy Cr 16.0005	George Adams Hatchery	WDFW		58	CWT00087255	AD
5	11-Mar-22	637439	2018	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		70	CWT00087256	AD
5	11-Mar-22	201707	2017	Similkameen R 490325	Similkameen Hatchery	WDFW		77	CWT00087257	AD
5	12-Mar-22	637444	2018	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		58	CWT00045303	AD
5	12-Mar-22	637369	2018	Deschutes R 13.0028	Minter Cr Hatchery	WDFW		62	CWT00045304	AD
5	12-Mar-22	637348	2018	Clark Cr 03.1421	Marblemount Hatchery	WDFW		69	CWT00048618	AD
5	12-Mar-22	637615	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		58	CWT00087258	AD
5	12-Mar-22	91460	2019	Big Cr (Lwr Col R)	Big Cr Hatchery	ODFW		58	CWT00087259	AD
5	12-Mar-22	637627	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		51	CWT00087260	AD
5	13-Mar-22	91393	2018	Santiam R S Fk	South Santiam Hatch	ODFW		63	CWT00087098	AD
5	13-Mar-22	637337	2018	Wallace R 07.0940	Wallace R Hatchery	WDFW		66	CWT00087099	AD
5	13-Mar-22	637765	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW		54	CWT00087100	AD
5	13-Mar-22	211392	2019	Stillaguamish R -Sf	Brenner Hatchery	STIL		59	CWT00087261	AD
5	13-Mar-22	56018	2017	Entiat R 46.0042	Entiat Nfh	USFWS		77	CWT00087262	AD
5	14-Mar-22	211384	2019	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	211383; 637619; 637620	56	CWT00087263	AD
5	18-Mar-22	637352	2018	Friday Cr 03.0017	Samish Hatchery	WDFW		58	CWT00087082	AD
5	19-Mar-22	211333	2019	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637775; 211339; 637720	66	CWT00047567	AD
5	19-Mar-22	211315	2018	Skookum Cr 01.0273	Skookum Cr Hatchery	LUMMI		72	CWT00047569	AD
5	19-Mar-22	211339	2019	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637775; 211333; 637720	59	CWT00047572	AD
5	19-Mar-22	637807	2019	Narrows Marina Pens	Narrows Marina Pens	PUYA		56	CWT00049909	AD
5	19-Mar-22	637749	2019	Purdy Cr 16.0005	George Adams Hatchery	WDFW	637750	55	CWT00087264	AD
5	19-Mar-22	211339	2019	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637775; 211333; 637720	55	CWT00087265	AD
5	20-Mar-22	637524	2018	Purdy Cr 16.0005	George Adams Hatchery	WDFW		63	CWT00049911	AD
5	20-Mar-22	211322	2018	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	211323; 637442; 637443	55	CWT00049960	AD
5	20-Mar-22	637524	2018	Purdy Cr 16.0005	George Adams Hatchery	WDFW		63	CWT00087081	AD
5	20-Mar-22	637743	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW	637744	57	CWT00087266	AD
5	20-Mar-22	91305	2018	Bull Run R	Sandy Hatchery	ODFW		64	CWT00087267	AD

5	21-Mar-22	91320	2018	Blind Sl (Lwr Col R)	Cedc Net Pens	CCF		68	CWT00047571	AD
5	21-Mar-22	637336	2018	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		62	CWT00087268	AD
5	21-Mar-22	637788	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW			CWT00087269	AD
5	21-Mar-22	211411	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA		55	CWT00087270	AD
5	23-Mar-22	637716	2019	Cascade R 03.1411	Marblemount Hatchery	WDFW		61	CWT00047568	AD
5	23-Mar-22	637788	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW		63	CWT00047573	AD
5	24-Mar-22	637439	2018	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		55	CWT00049916	AD
5	24-Mar-22	91458	2019	Tanner Cr (Bnville)	Bonneville Hatchery	ODFW		55	CWT00087271	AD
5	24-Mar-22	637765	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW		54	CWT00087272	AD
5	24-Mar-22	637749	2019	Purdy Cr 16.0005	George Adams Hatchery	WDFW	637750	53	CWT00087273	AD
5	24-Mar-22	91458	2019	Tanner Cr (Bnville)	Bonneville Hatchery	ODFW		57	CWT00087274	AD
5	25-Mar-22	637788	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW		50	CWT00087275	AD
5	25-Mar-22	637426	2019	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW	637427	62	CWT00087276	AD
5	25-Mar-22	637229	2017	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		67	CWT00087277	AD
5	26-Mar-22	211353	2018	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211352	52	CWT00049912	AD
5	26-Mar-22	637350	2018	Wallace R 07.0940	Wallace R Hatchery	WDFW		59	CWT00049915	AD
5	26-Mar-22	637371	2018	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		61	CWT00087001	AD
5	26-Mar-22	211333	2019	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637775; 211339; 637720	56	CWT00087016	AD
5	26-Mar-22	211322	2018	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	211323; 637442; 637443	65	CWT00087278	AD
5	27-Mar-22	91388	2018	Willamette R Cst Fk	Dexter Ponds (Willam	ODFW		72	CWT00049917	AD
5	27-Mar-22	56390	2019	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56389	56	CWT00049918	AD
5	27-Mar-22	637371	2018	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW		69	CWT00049956	AD
5	27-Mar-22	91311	2018	Tongue Pt (Astoria)	Cedc Net Pens	CCF		72	CWT00049958	AD
5	27-Mar-22	637246	2018	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		64	CWT00049959	AD
5	27-Mar-22	637426	2019	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW	637427	57	CWT00087279	AD
5	27-Mar-22	637413	2018	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		67	CWT00087280	AD
5	28-Mar-22	637765	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW		63	CWT00087003	AD
5	28-Mar-22	90714	2019	Klaskanine R N Fk	Klaskanine Hatchery	ODFW		56	CWT00087014	AD
5	28-Mar-22	637373	2018	Kendall Cr 01.0406	Kendall Cr Hatchery	WDFW		65	CWT00087015	AD
5	28-Mar-22	637603	2018	Lyons Ferry Rel.Site	Lyons Ferry Hatchery	WDFW		61	CWT00087281	AD
5	28-Mar-22	637627	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		59	CWT00087282	AD
5	28-Mar-22	637716	2019	Cascade R 03.1411	Marblemount Hatchery	WDFW		54	CWT00087283	AD
5	28-Mar-22	637807	2019	Narrows Marina Pens	Narrows Marina Pens	PUYA		53	CWT00087284	AD
5	1-Apr-22	637336	2018	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		64	CWT00049962	AD
5	2-Apr-22	91389	2018	Willamette R Cst Fk	Dexter Ponds (Willam	ODFW		63	CWT00049920	AD
5	2-Apr-22	211315	2018	Skookum Cr 01.0273	Skookum Cr Hatchery	LUMMI		63	CWT00049921	AD

5	2-Apr-22	91391	2018	Willamette R Cst Fk	Willamette Hatchery	ODFW		66	CWT00049961	AD
5	2-Apr-22	637443	2018	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	211322; 211323; 637442	53	CWT00049963	AD
5	2-Apr-22	637506	2018	East Sound Bay (San)	Glenwood Springs	COOP		64	CWT00087002	AD
5	3-Apr-22	637747	2019	Purdy Cr 16.0005	George Adams Hatchery	WDFW		55	CWT00049964	UM
5	3-Apr-22	211383	2019	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	211384; 637619; 637620	59	CWT00087013	AD
5	3-Apr-22	637352	2018	Friday Cr 03.0017	Samish Hatchery	WDFW		59	CWT00087285	AD
5	3-Apr-22	91311	2018	Tongue Pt (Astoria)	Cedc Net Pens	CCF		61	CWT00087286	AD
5	4-Apr-22	637749	2019	Purdy Cr 16.0005	George Adams Hatchery	WDFW	637750	56	CWT00087287	AD
5	4-Apr-22	56278	2019	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56387	57	CWT00087288	AD
5	7-Apr-22	637414	2018	Columbia R - General	Wells Hatchery	DCPUD		55	CWT00049966	AD

Appendix 4 Coded-wire tag (CWT) recoveries from the 2021-2022 Winter Chinook MSF in Marine Area 10.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
10	09-Jan-22	211411	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA		59	CWT00041210	AD
10	10-Jan-22	211333	2019	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637775; 211339; 637720	67	CWT00087232	AD
10	10-Jan-22	637788	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW		60	CWT00087233	AD
10	10-Jan-22	637616	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		55	CWT00087234	AD
10	11-Jan-22	637627	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		61	CWT00087235	AD
10	25-Feb-22	637627	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		80	CWT00087236	AD
10	26-Feb-22	211391	2019	Whitehorse Springs	Whitehorse Pond	STIL		59	CWT00045312	AD
10	27-Feb-22	211409	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211410	81	CWT00048613	AD
10	27-Feb-22	637765	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW		55	CWT00048629	AD
10	06-Mar-22	637615	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		56	CWT00048630	AD
10	11-Mar-22	637336	2018	Finch Cr 16.0222	Hoodsport Hatchery	WDFW		57	CWT00048631	AD
10	11-Mar-22	637444	2018	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ		58	CWT00048632	AD
10	18-Mar-22	637446	2018	Cascade R 03.1411	Marblemount Hatchery	WDFW		59	CWT00048633	AD
10	20-Mar-22	211384	2019	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	211383; 637619; 637620	60	CWT00048634	AD
10	21-Mar-22	637413	2018	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		61	CWT00048635	AD
10	26-Mar-22	637716	2019	Cascade R 03.1411	Marblemount Hatchery	WDFW		62	CWT00048636	AD
10	27-Mar-22	211387	2019	Co Line Slu	Marblemount Hatchery	WDFW		63	CWT00048637	AD
10	27-Mar-22	211409	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211410	64	CWT00048638	AD
10	28-Mar-22	637413	2018	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		65	CWT00048639	AD
10	28-Mar-22	637413	2018	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		66	CWT00048640	AD

Appendix 5 Coded-wire tag (CWT) recoveries from the 2021-2022 Winter Chinook MSF in Marine Area 11.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
11	02-Nov-21	637413	2018	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		52	CWT00085000	AD
11	04-Nov-21	211391	2019	Whitehorse Springs	Whitehorse Pond	STIL		46	CWT00083985	AD
11	14-Nov-21	211333	2019	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637775; 211339; 637720	57	CWT00085206	AD
11	14-Nov-21	637419	2019	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW		52	CWT00085207	AD
11	15-Nov-21	637499	2019	Minter Cr Tr 15.0051	Hupp Springs Rearing	WDFW		56	CWT00085208	AD

Appendix 6 Coded-wire tag (CWT) recoveries from the 2021-2022 Winter Chinook MSF in Marine Area 11.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
13	24-Jan-22	637616	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		68	CWT00048543	AD
13	07-Feb-22	211391	2019	Whitehorse Springs	Whitehorse Pond	STIL		70	CWT00050850	AD
13	07-Feb-22	637765	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW		52	CWT00050851	AD
13	11-Feb-22	637615	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		52	CWT00050852	AD
13	03-Mar-22	211391	2019	Whitehorse Springs	Whitehorse Pond	STIL		54	CWT00048542	AD
13	07-Mar-22	637413	2018	Icy Cr 0 9.0125	Icy Cr Hatchery	WDFW		65	CWT00050853	AD
13	11-Mar-22	637616	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		59	CWT00050854	AD
13	12-Mar-22	637616	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		58	CWT00046063	AD
13	12-Mar-22	637765	2019	Wallace R 0 7.0940	Wallace R Hatchery	WDFW		65	CWT00046064	AD
13	13-Mar-22	211391	2019	Whitehorse Springs	Whitehorse Pond	STIL		63	CWT00046096	AD
13	13-Mar-22	637413	2018	Icy Cr 09.0125	Icy Cr Hatchery	WDFW		61	CWT00050855	AD
13	16-Apr-22	211409	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211410	52	CWT00051805	AD
13	24-Apr-22	637615	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW		NA	CWT00050856	AD
13	25-Apr-22	211384	2019	Clear Cr 11.0013C	Clear Creek Hatchery	NISQ	211383; 637619; 637620	63	CWT00086123	AD