

*Draft; November 30, 2023*

**2022-2023 Winter Mark-Selective Recreational Chinook Fisheries  
In Marine Areas 5, 10, 11, and 13**

**Post-season Report**

**DRAFT**

**November 30, 2023**

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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<sup>1</sup>.

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, 2005b, & 2006; 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. (we got rid of this a number of years back)

During the October 2022 through April 2023 winter season, 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, 2023;
- Marine Area 10 from February 1 through March 31, 2023;
- Marine Area 11 from November 1 through December 31, 2022;
- Marine Area 13 from October 1, 2022 through April 30, 2023.

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<sup>1</sup>The regulations specific to winter mark-selective fisheries in Puget Sound Marine Catch Areas typically 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.

## **Marine Area 5 Winter Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented a Chinook MSF in Marine Area 5 from March 1 through April 30, 2023. The fishery closed a week early on April 23 when the fishery controls for the fishery were met. This was the first winter season WDFW's Puget Sound Sampling Unit (PSSU) implemented a Full Murthy intensive monitoring program in Area 5. The program aimed 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 efforts to collect voluntary salmon trip reports (STRs) from the angling public. **Table 1.1** summarizes the parameters estimated and the sampling activities associated with each parameter. Specific procedures used for collecting these data and estimating critical parameters are presented in detail in our separate Methods Report (WDFW 2012a). The fishery control for this area was based on the preseason Fishery Regulation Assessment Model (FRAM) prediction of 4,263 sublegal Chinook salmon encounters (**Table 1.4**). In this section we present results from our monitoring activities during the Area 5 winter Chinook MSF.

**Table 1.1** Sampling/estimation details on target parameters associated with the overall Area 5 winter mark-selective fishery 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 <sup>1</sup>	Catch rates (CPUE); length, age, and CWT composition of harvest <sup>1</sup> ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	Two weeks	Creel estimates were produced for one-week estimation periods and stratified into “weekday” (Mon.-Thurs.) and “weekend” (Fri.-Sun.) day-type strata within weeks. For the weekday stratum we sampled $n=2$ days out of $N=4$ available weekdays per one-week period. For the weekend stratum we sampled $n=3$ days out of $N=3$ available weekend days per week.
		Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook salmon	Boat trip	Season	Dockside encounter data were not used for estimation of Chinook encounters for this fishery. <b>Table 1.9.</b> (See Conrad & McHugh 2008).
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	6 weekday and 8 weekend surveys were conducted during the Area 5 winter Chinook MSF. Recent average site weights to compute catch and effort estimates.
Test Fishing	Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook	Chinook length, age, and DNA-based <sup>2</sup> stock composition; species composition of non-Chinook encounters	Fish encounter	Season	Test fishing collected data when the fishery was open to Chinook retention were used for estimate of encounters and mortalities during this fishery. LM = 23%; LU = 13%; SM = 45%; SU = 18%. <b>Table 1.11</b>
Voluntary Salmon Trip Reports (STRs)	Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook salmon	Encounter data for non-Chinook salmon species (e.g., Coho salmon) that the angler may record on the STR form	Fish encounter	Season	No STRs were returned during this fishery. Test fishing data were used for estimates of encounters and mortalities for this fishery.
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.

<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

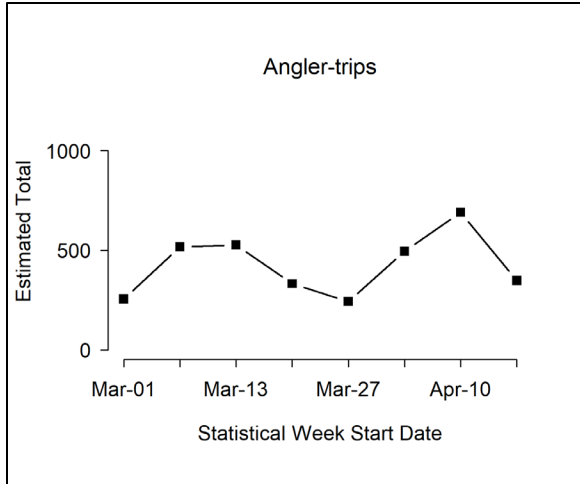
<sup>2</sup> Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery

**Table 1.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the winter Chinook MSF in Marine Area 5. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

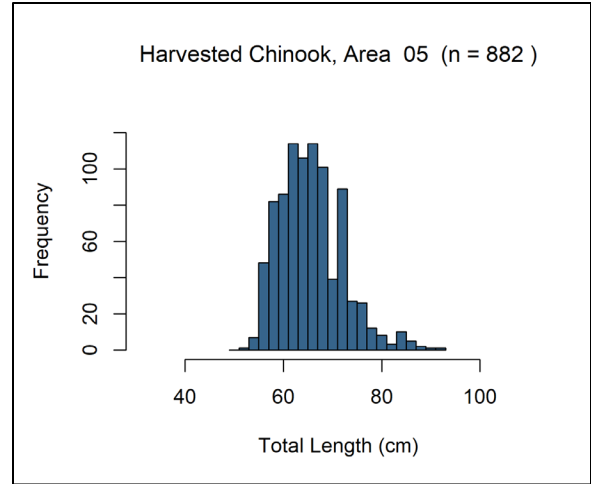
Month	Stat Week	Start Date	End Date	Est. Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
March	10	1-Mar	5-Mar	103	255	82	0	185	123	391
	11	6-Mar	12-Mar	203	517	129	0	289	193	610
	12	13-Mar	19-Mar	210	527	273	1	613	408	1,295
	13	20-Mar	26-Mar	135	333	154	0	346	231	732
April	14	27-Mar	2-Apr	94	243	106	1	239	158	505
	15	3-Apr	9-Apr	196	495	193	0	435	290	918
	16	10-Apr	16-Apr	278	690	267	2	600	398	1,268
	17	17-Apr	23-Apr	150	348	120	0	270	180	571
<b>Season Total:</b>				<b>1,369</b>	<b>3,407</b>	<b>1,325</b>	<b>4</b>	<b>2,978</b>	<b>1,982</b>	<b>6,289</b>
<b>Variance:</b>				4,783	27,923	3,423	2	316,929	103,137	840,591
<b>SE:</b>				69	167	59	2	563	321	917
<b>CV (%):</b>				5	5	4	36	19	16	15
<b>95% CI:</b>				1,234 - 1,505	3,080 - 3,735	1,210 - 1,440	1 - 7	1,875 - 4,081	1,352 - 2,611	4,492 - 8,086

**Table 1.3** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the winter Chinook MSF in Marine Area 5.

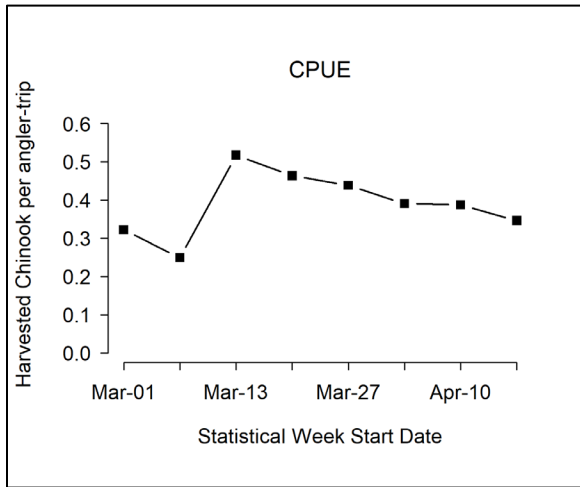
Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	852	30	882
Unmarked	2	0	2
<b>Total</b>	<b>854</b>	<b>30</b>	<b>884</b>



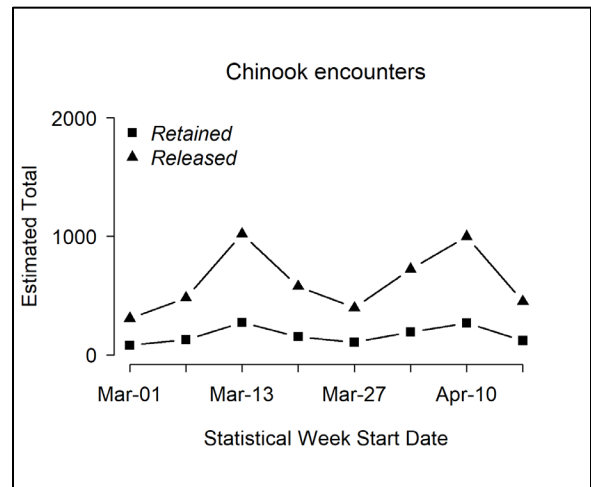
**Figure 1.1** Temporal patterns in fishing effort during the winter Chinook MSF in Marine Area 5.



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



**Figure 1.2** Temporal patterns in CPUE (landed Chinook per angler trip) during the winter Chinook MSF in Marine Area 5.



**Figure 1.4** Temporal patterns in Chinook salmon encounters (number retained and released) during the 2022-2023 winter Chinook salmon MSF in Marine Area 5.

**Table 1.4** Comparison of modeled and estimated total Chinook salmon encounters for the winter Chinook MSF in Marine Area 5. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

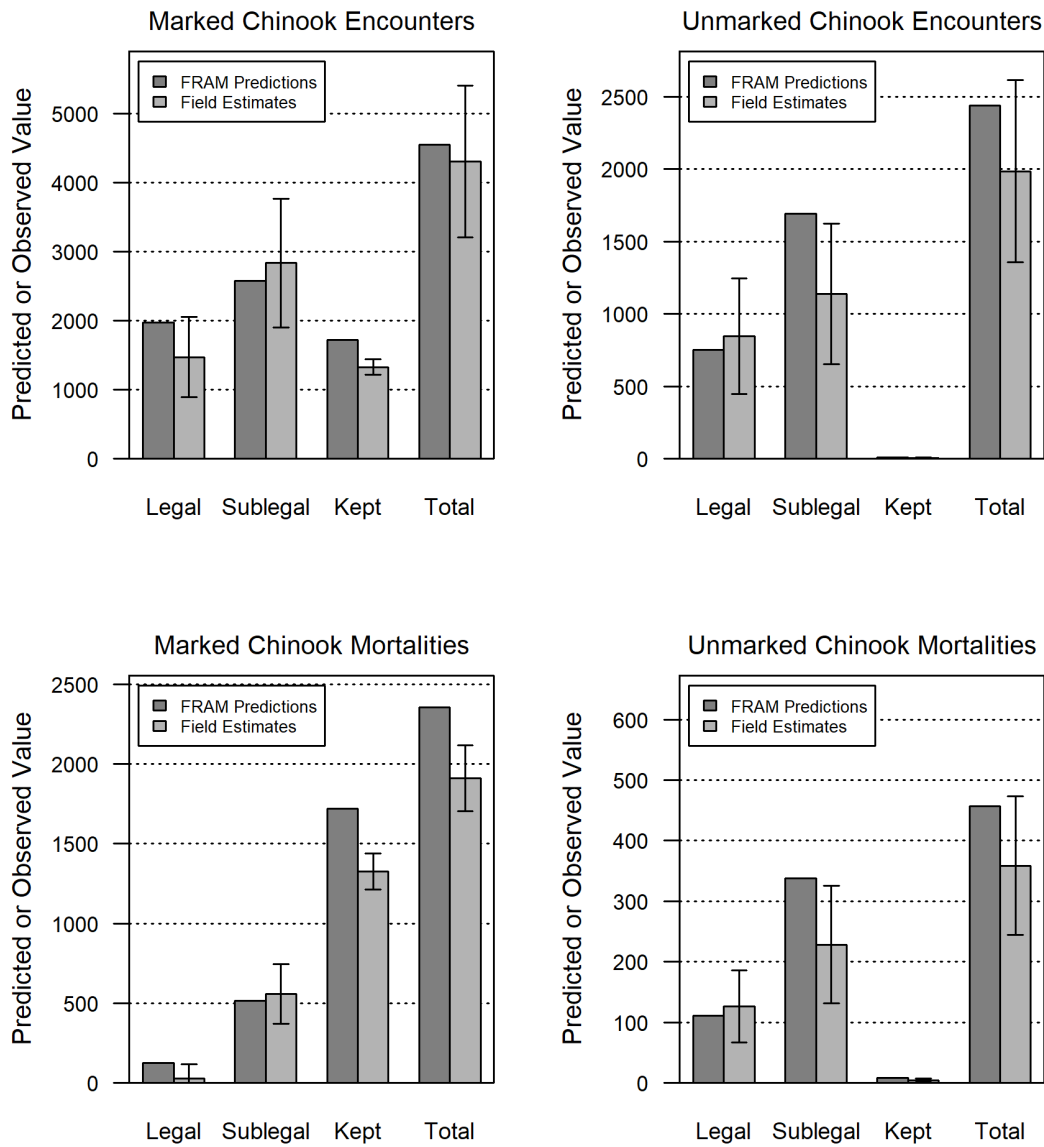
Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	2,442	751	1,691	8
	AD	4,548	1,976	2,572	1,719
	Total	6,990	2,727	4,263	1,727
	% Marked	65	72	60	100
Estimated (Creel) Encounters	UM	1,986	846	1,140	4
	AD	4,303	1,471	2,832	1,325
	Total	6,289	2,317	3,972	1,329
	% Marked	68	63	71	100

**Table 1.5** Summary of season-wide fishery impact estimates for the winter Chinook MSF in Marine Area 5. 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	1,471	1,280	191	29	1,309	5,285	73	1,166 - 1,451	6
Legal UM	846	4	841	126	131	941	31	70 - 191	23
Sublegal AD	2,832	45	2,787	557	602	9,144	96	415 - 790	16
Sublegal UM	1,140	0	1,140	228	228	2,457	50	131 - 325	22
<b>Total</b>	<b>6,289</b>	<b>1,329</b>	<b>4,960</b>	<b>940</b>	<b>2,270</b>	<b>17,827</b>	<b>134</b>	<b>2,008 - 2,531</b>	<b>6</b>

**Table 1.6** Comparison of modeled and estimated total Chinook salmon mortalities for the winter Chinook MSF in Marine Area 5. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Mortality Category	FRAM Chinook Mortalities			Estimated Chinook Mortalities		
	UM	AD	Total	UM	AD	Total
Total (Landed + Released)	457	2,357	2,814	359	1,911	2,270
Released Legal	111	124	235	126	29	155
Released Sublegal	338	514	852	228	557	785
Landed Only	8	1,719	1,727	4	1,325	1,329



**Figure 1.5** Comparison of modeled and estimated total Chinook salmon encounters and mortalities for the winter Chinook MSF in Marine Area 5. Error bars represent 95% confidence intervals for field estimates.



**Table 1.7** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the winter Chinook MSF in Marine Area 5. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
Coho Resort	2	0.009434	0	0
Neah Bay General	7	0.033019	8	0.016529
<b>Mason's East Docks</b>	<b>76</b>	<b>0.358491</b>	<b>121</b>	<b>0.25</b>
<b>Mason's Ramp &amp; Docks</b>	<b>41</b>	<b>0.193396</b>	<b>235</b>	<b>0.485537</b>
Mason's Resort	23	0.108491	18	0.03719
Mason's South Docks	8	0.037736	6	0.012397
<b>Mason's West Docks</b>	<b>37</b>	<b>0.174528</b>	<b>56</b>	<b>0.115702</b>
Private	2	0.009434	2	0.004132
Unknown	3	0.014151	2	0.004132
<b>Van Riper's South</b>	<b>4</b>	<b>0.018868</b>	<b>17</b>	<b>0.035124</b>
Van Riper's Resort	6	0.028302	1	0.002066
Whiskey Creek Camp	3	0.014151	3	0.006198
Ediz Hook, Port Angeles Public Ramp	0	0	3	0.006198
Edmonds Marina	0	0	2	0.004132
Everett Marina	0	0	2	0.004132
Port Angeles Boat Haven	0	0	2	0.004132
Port Angeles Boat Haven West	0	0	6	0.012397
<b>Total</b>	<b>212</b>	<b>1</b>	<b>484</b>	<b>1</b>

**Table 1.8** Monthly sample rates (Total retained Chinook sampled<sup>1</sup> / Estimated retained Chinook) for the winter Chinook MSF in Marine Area 5. AD = marked (adipose-clipped), UM = unmarked.

Time period			Estimated Retained Chinook			Number of Chinook sampled			Sample Rate
Month	Stat Weeks	Dates	AD	UM	Total	AD	UM	Total	
March	10 - 14	1 Mar - 2 Apr	744	2	746	596	2	598	80.1%
April	15 - 17	3 Apr - 23 Apr	581	2	583	414	1	415	71.2%
<b>Season Total</b>			<b>1325</b>	<b>4</b>	<b>1329</b>	<b>1,010</b>	<b>3</b>	<b>1,013</b>	<b>76.2%</b>

<sup>1/</sup> Number of retained Chinook salmon sampled includes all retained Chinook salmon inspected for CWT's, from all sites sampled during the winter Chinook MSF in Marine Area 5 (creel estimates and fish sampled as part of baseline sampling).

**Table 1.9** Dockside encounters (retained and released) by size-mark category during the 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.

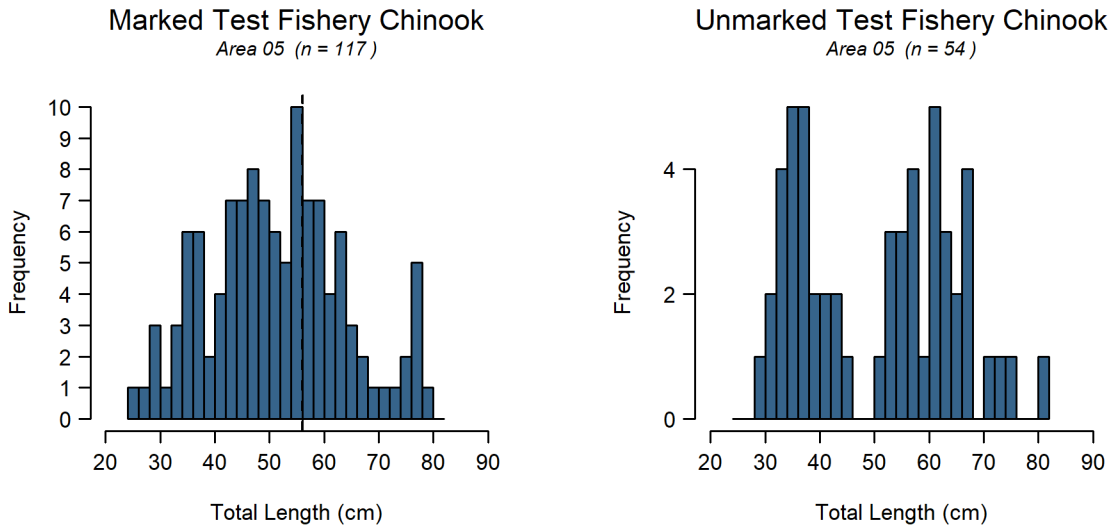
Dockside Encounters				
Metric	Legal		Sublegal	
	LM	LU	SM	SU
Encounters	899	153	456	157
Bias-corrected size/mark composition	48.1%	9.2%	27.4%	15.4%
Variance	0.0003	0.0001	0.0003	0.0001

**Table 1.10** Fishery-total estimates of retained and released salmon (other than Chinook) for the winter Chinook MSF in Marine Area 5. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Start Date	End Date	Retained Salmon	Released Salmon				
			Unknown	Coho AD	Coho UM	Coho UNK	Pink	Unknown
10	1-Mar	5-Mar	0	2	1	0	4	3
11	6-Mar	12-Mar	0	0	0	1	0	12
12	13-Mar	19-Mar	0	0	0	1	0	1
13	20-Mar	26-Mar	0	0	0	0	0	2
14	27-Mar	2-Apr	0	0	0	9	0	2
15	3-Apr	9-Apr	0	2	0	2	0	15
16	10-Apr	16-Apr	4	5	0	2	0	14
17	17-Apr	23-Apr	0	4	2	12	0	4
<b>Season Total:</b>			<b>4</b>	<b>13</b>	<b>3</b>	<b>28</b>	<b>4</b>	<b>54</b>
<b>Variance:</b>			10	15	2	54	0	101
<b>Standard Error:</b>			3	4	2	7	0	10
<b>CV (%):</b>			71%	29%	48%	26%	4%	19%
<b>95% CI:</b>			0 - 11	6 - 21	0 - 6	13 - 42	4 - 5	34 - 74

**Table 1.11** Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the winter Chinook salmon MSF in Marine Area 5. AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hrs Fished	AD	UM	AD	UM	
10	2	10.99167	0	0	0	0	0
11	4	-2.176667	7	3	14	4	28
12	2	12.99083	3	3	5	2	13
13	3	23.82111	2	2	15	6	25
14	4	20.70472	4	2	9	6	21
15	5	28.40333	8	6	17	7	38
16	3	11.81944	10	5	5	3	23
17	3	23.95417	6	2	12	3	23
<b>Total</b>	<b>26</b>	<b>130.5086</b>	<b>40</b>	<b>23</b>	<b>77</b>	<b>31</b>	<b>171</b>
<b>Size/mark-status composition:</b>			0.23	0.13	0.45	0.18	
<b>Variance:</b>			(0.0011)	(0.0007)	(0.0015)	(0.0009)	
<b>Legal size mark rate:</b>			0.63				
<b>Overall mark rate:</b>			0.68				



**Figure 1.6** Length-frequency distributions of marked (*left panel*) and unmarked (*right panel*) Chinook salmon encountered by test fishers during the winter Chinook salmon MSF in Marine Area 5. The vertical dashed line in the left panel corresponds to the legal-size limit (22 in or 56 cm).

**Table 1.12** 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 winter Chinook MSF in Marine Area 5. 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 Hatchery	2019	4	6	3.03	6.7	0.7	0.037	0.39
George Adams Hatchery	2019	5	7.5	3.79	8.4	0.8	0.047	0.48
George Adams Hatchery	2020	2	3	1.51	3	0.3	0.015	0.18
Grovers Cr Hatchery	2018	1	0	0	1.5	1.5	0.757	0.87
Grovers Cr Hatchery	2019	5	7.5	3.79	7.7	0.8	0.04	0.45
Marblemount Hatchery	2019	1	1.5	0.76	1.5	0.2	0.008	0.09
Marblemount Hatchery	2020	2	3	1.51	3.1	0.3	0.016	0.18
Samish Hatchery	2019	4	6	3.03	6	0.6	0.031	0.35
Samish Hatchery	2020	1	1.5	0.76	1.5	0.2	0.008	0.09
Soos Creek Hatchery	2019	3	4.5	2.27	4.5	0.5	0.023	0.26
Soos Creek Hatchery	2020	1	1.5	0.76	1.5	0.2	0.008	0.09
Spring Cr Hatchery NFH	2019	3	4.5	2.27	4.5	0.5	0.023	0.26
Spring Cr Hatchery NFH	2020	2	3	1.51	3	0.3	0.015	0.17
Wallace R Hatchery	2019	3	4.5	2.27	4.7	0.5	0.025	0.27
Wallace R Hatchery	2020	3	4.5	2.27	4.6	0.5	0.023	0.27
<b>Total</b>		<b>40</b>	<b>58.6</b>	<b>29.54</b>	<b>62.2</b>	<b>7.6</b>	<b>1.075</b>	<b>4.39</b>

**Table 1.13** Summary of CWTs recovered from Chinook salmon harvested during the 2022-2023 winter Chinook MSF in Marine Area 5. The field “Number DITs” corresponds to the number of tags that belonged to double-index tag groups. Note: Not all tags have been processed before the writing of this report.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	N Washington (10.4%)	Nooksack -SF 01.0246	Skookum Cr Hatchery	1 (1%)	0
		Friday Cr 03.0017	Samish Hatchery	6 (6.2%)	6
		Lummi Sea Ponds	Lummi Sea Ponds	1 (1%)	0
		Kendall Cr 01.0406	Kendall Cr Hatchery	2 (2.1%)	0
	Hood Canal (16.7%)	Purdy Cr 16.0005	George Adams Hatchery	8 (8.3%)	0
		Finch Cr 16.0222	Hoodsport Hatchery	8 (8.3%)	7
	N Puget Sound (16.7%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	5 (5.2%)	4
		Wallace R 07.0940	Wallace R Hatchery	10 (10.4%)	6
		Stillaguamish R SF	Brenner Hatchery	1 (1%)	0
	Skagit River (4.2%)	Cascade R 03.1411	Marblemount Hatchery	4 (4.2%)	3
	Mid Puget Sound (14.6%)	Grovers Cr Hatchery	Grovers Cr Hatchery	4 (4.2%)	4
		Gorst Cr Rear. Pond	Gorst Cr Rearing Pond	1 (1%)	0
		Green R 09.0001	Palmer Hatchery	2 (2.1%)	0
		Grovers Cr Hatchery	Grovers Cr Hatchery	5 (5.2%)	5
		Icy Cr 09.0125	Icy Cr Hatchery	1 (1%)	0
		Grovers Cr 15.0299	Grovers Cr Hatchery	1 (1%)	1
	S Puget Sound (10.4%)	Minter Cr 15.0048	Minter Cr Hatchery	5 (5.2%)	0
		Narrows Marina Pens	Narrows Marina Pens	1 (1%)	0
		Deschutes R 13.0028	Tumwater Falls Hatchery	2 (2.1%)	0
		Chambers Cr 12.0007	Garrison Hatchery	1 (1%)	0
Kalama Cr 11.0017		Kalama Cr Hatchery	1 (1%)	0	
Col. Riv.	Upper Columbia R (1%)	Chelan R 47.0052	Chelan Falls Hatchery	1 (1%)	0
	Central Columbia River (6.2%)	Deschutes R-2/OR	Round Butte Hatchery	1 (1%)	0
		Spring Cr 29.0159	Spring Cr Nfh	5 (5.2%)	5
	Lower Columbia River (15.6%)	Big Cr (Lwr Col R)	Big Cr Hatchery	4 (4.2%)	0
		Klaskanine R N Fk	Klaskanine Hatchery	2 (2.1%)	0
		Tanner Cr (Bnville)	Bonneville Hatchery	5 (5.2%)	0
		Santiam R S FK	South Santiam Hatchery	2 (2.1%)	0
		Willamette R CST FK	Leaburg Hatchery	1 (1%)	0
		Willamette R M FK-1	Dexter Ponds	1 (1%)	0
	Snake River (2.1%)	Lyons Ferry Rel.Site	Lyons Ferry Hatchery	1 (1%)	0
		Captain Johns PD	Lyons Ferry Hatchery	1 (1%)	0
	Central California Coast (2.1%)	Klaskanine R N Fk	Klaskanine Hatchery	1 (1%)	0
		Mare Island Net Pen	Lyons Ferry Hatchery	1 (1%)	0
<b>Total</b>				<b>96</b>	<b>41</b>

**Table 1.14** 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 5 winter Chinook MSF. Values may not add up exactly due to rounding error.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Mar 1, 2023 - Apr 23, 2023	3407	1280	4	45	0	191	841	2787	1140	6289

## **Marine Area 10 Winter Mark-Selective Chinook Fishery**

WDFW implemented a winter Chinook salmon MSF in Marine Area 10 from February 1 through March 31, 2023. Fishery controls were met early and the fishery only remained open through February 10. 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 2.1** summarizes the parameters estimated and the sampling activities associated with each parameter. Specific procedures used for collecting these data and estimating critical parameters are presented in detail in our separate Methods Report (WDFW 2012a). The fishery controls for this area were based on the preseason FRAM predictions of 7,152 total Chinook salmon encounters, 6,295 sublegal encounters and 1,089 unmarked encounters (**Table 2.4**). In the following section we present results from our monitoring activities during the Marine Area 10 winter Chinook salmon MSF which occurred from February 1 through 10, 2023.

**Table 2.1** 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 <sup>1</sup> ; 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	Dockside encounter data were not used for estimation of Chinook encounters for this fishery ( <b>Table 2.9</b> ). (See Conrad & McHugh 2008)
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	Only 2 boat surveys, (WE = 1, WD = 1) were conducted during the 10 - day 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 <sup>2</sup> 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. LM = 8%; LU = 3%; SM = 64%; SU = 25% (See <b>Table 2.11</b> ).
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	No STRs were returned during this fishery. Test fishing data were used for estimates of encounters and mortalities for this fishery
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.

<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

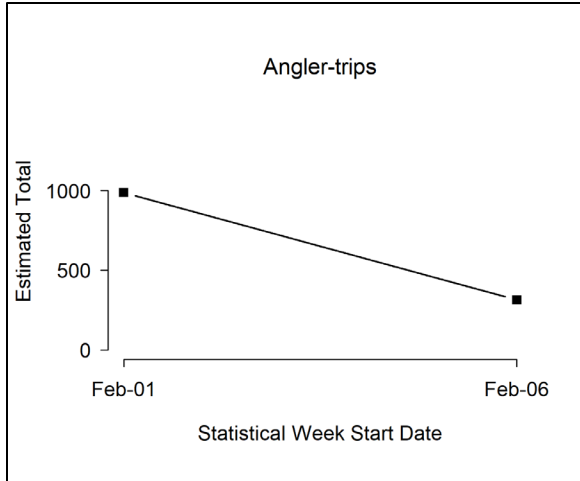
<sup>2</sup> Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery

**Table 2.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the winter Chinook MSF in Marine Area 10. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

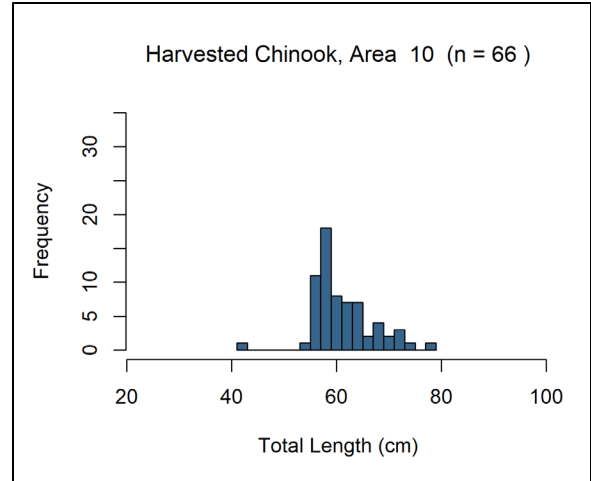
Month	Stat Week	Start Date	End Date	Estimated Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
February	6	1-Feb	5-Feb	511	987	166	3.9	1264	546	1980
	7	6-Feb	10-Feb	181	313	116	0	881	383	1380
<b>Season Total</b>				<b>693</b>	<b>1,301</b>	<b>282</b>	<b>4</b>	<b>2144</b>	<b>929</b>	<b>3,360</b>
<b>Variance:</b>				10,540	33,848	6,555	5	1,934,000	326,482	4,502,743
<b>Standard Error:</b>				103	184	81	2	1391	571	2122
<b>CV (%):</b>				15%	14%	29%	57%	65%	61%	63%
<b>95% CI:</b>				491 - 894	940 - 1,661	123 - 441	0 - 8	0 - 4,870	0 - 2,049	0 - 7,519

**Table 2.3** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the winter Chinook MSF in Marine Area 10.

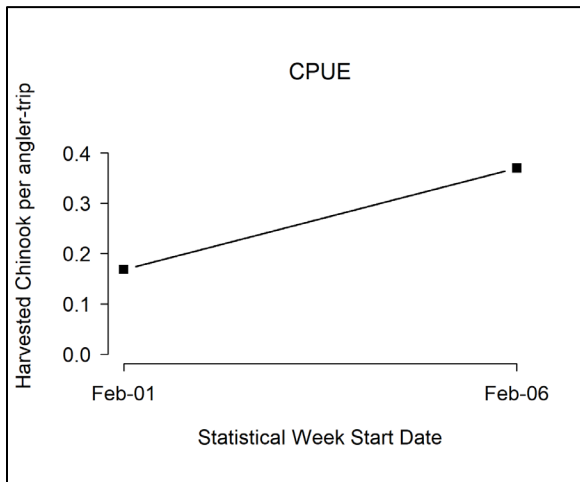
Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	57	9	66
Unmarked	1	0	1
<b>Total</b>	<b>58</b>	<b>9</b>	<b>67</b>



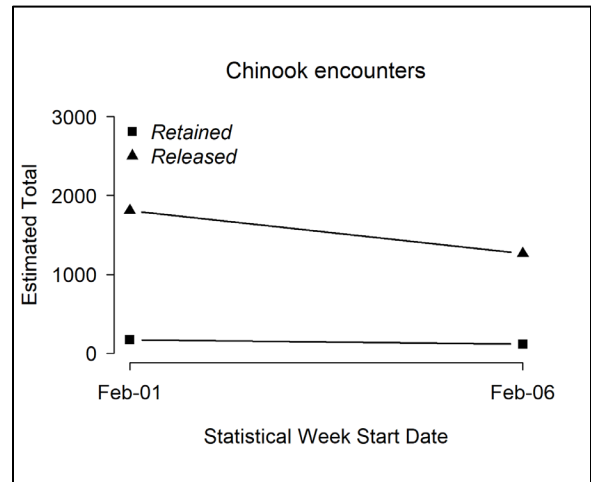
**Figure 2.7** Temporal patterns in fishing effort during the winter Chinook MSF in Marine Area 10.



**Figure 2.9** Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the winter Chinook MSF in Marine Area 10. Note: displayed values are observations where lengths were taken.



**Figure 2.8** Temporal patterns in CPUE (landed Chinook per angler trip) during the winter Chinook MSF in Marine Area 10.



**Figure 2.10** Temporal patterns in Chinook salmon encounters (number retained and released) during the 2022-2023 winter Chinook salmon MSF in Marine Area 10.



**Table 2.4** Comparison of modeled and estimated total Chinook salmon encounters for the winter Chinook MSF in Marine Area 10. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

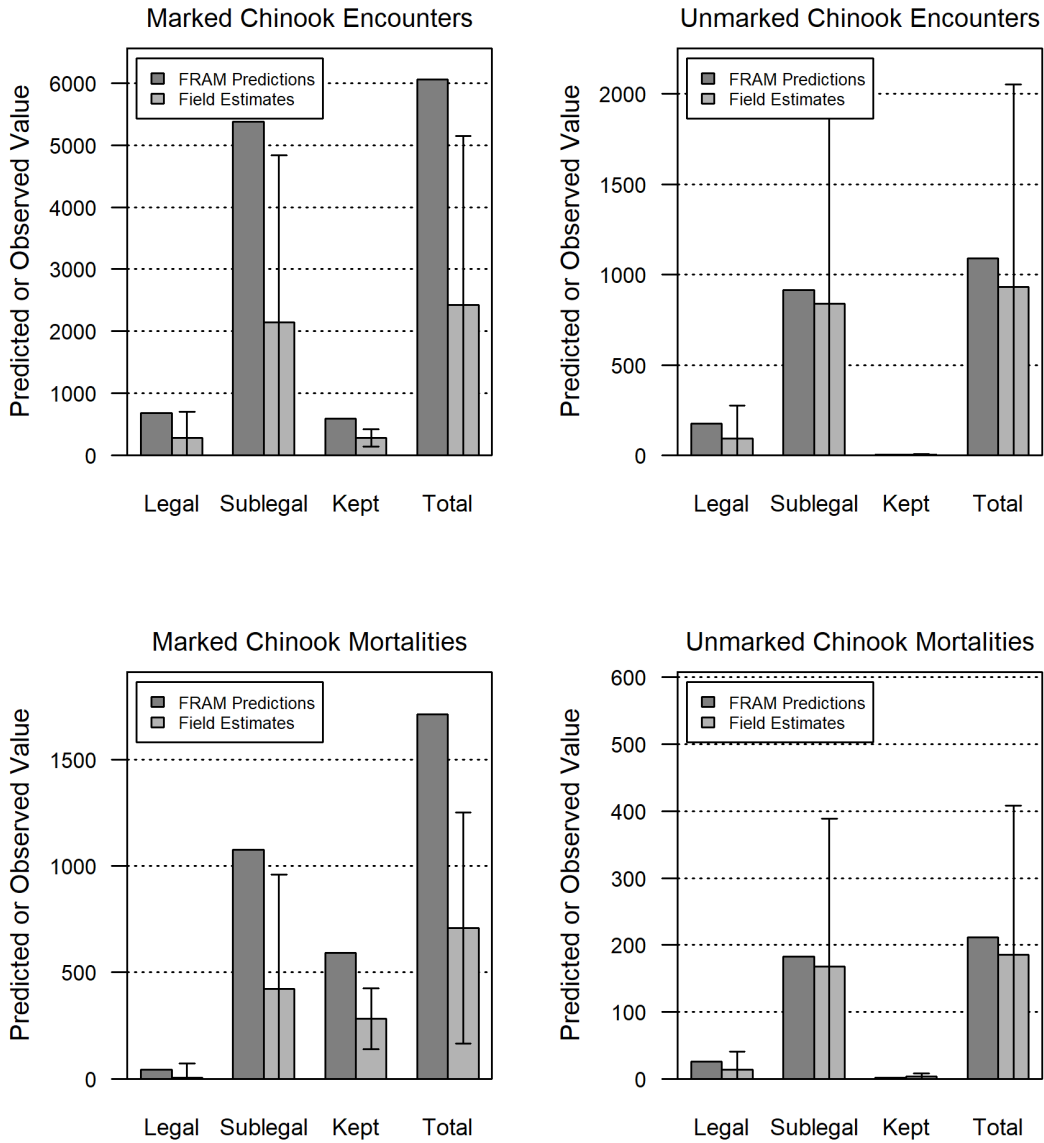
Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	1,089	176	913	2
	AD	6,063	681	5,382	592
	Total	7,152	857	6,295	594
	% Marked	85	79	85	100
Estimated (Creel) Encounters	UM	933	93	840	4
	AD	2,426	280	2,146	282
	Total	3,360	373	2,986	286
	% Marked	72	75	72	99

**Table 2.5** Summary of season-wide fishery impact estimates for the winter Chinook 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	280	244	36	5	249	6,171	79	95 - 403	32
Legal UM	93	4	89	13	17	201	14	0 - 45	82
Sublegal AD	2,146	38	2,108	422	460	75,570	275	0 - 999	60
Sublegal UM	840	0	840	168	168	12,711	113	0 - 389	67
<b>Total</b>	<b>3,360</b>	<b>286</b>	<b>3,074</b>	<b>608</b>	<b>894</b>	<b>94,653</b>	<b>308</b>	<b>291 - 1,497</b>	<b>34</b>

**Table 2.6** Comparison of modeled and estimated total Chinook salmon mortalities for the winter Chinook MSF in Marine Area 10. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Mortality Category	FRAM Chinook Mortalities			Estimated Chinook Mortalities		
	UM	AD	Total	UM	AD	Total
Total (Landed + Released)	211	1,711	1,922	185	709	894
Released Legal	26	43	69	13	5	19
Released Sublegal	183	1,076	1,259	168	422	590
Landed Only	2	592	594	4	282	286



**Figure 2.11** Comparison of modeled and estimated total Chinook salmon encounters and mortalities for the winter Chinook MSF in Marine Area 10. Error bars represent 95% confidence intervals for field estimates.

**Table 2.7** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the winter Chinook MSF in Marine Area 10. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
<b>Armeni Public Ramp</b>	<b>2</b>	<b>0.037037</b>	<b>28</b>	<b>0.1157025</b>
Bayside Marina/Drystack	5	0.0925926	6	0.0247934
Brownsville Marina	0	0	7	0.0289256
Dagmar's Landing, Forklift Launch	0	0	6	0.0247934
Des Moines Marina	0	0	4	0.0165289
Eagle Harbor Waterfront Park	0	0	7	0.0289256
Edmonds Boat Basin	0	0	4	0.0165289
Edmonds Dry Storage	1	0.0185185	13	0.053719
Edmonds Marina	7	0.1296296	26	0.107438
Elliott Bay Marina	0	0	2	0.0082645
Everett Marina	0	0	2	0.0082645
Everett Ramp	12	0.2222222	39	0.161157
John Wayne Marina Docks	2	0.037037	0	0
Kingston Marina	4	0.0740741	8	0.0330579
<b>Kingston Public Ramp</b>	<b>5</b>	<b>0.0925926</b>	<b>21</b>	<b>0.0867769</b>
<b>Manchester Public Ramp</b>	<b>4</b>	<b>0.0740741</b>	<b>11</b>	<b>0.0454545</b>
Mukilteo Lighthouse Park	0	0	3	0.0123967
Port Madison Marina	0	0	2	0.0082645
Port Orchard Marina	1	0.0185185	0	0
Port Orchard Public Ramp	0	0	1	0.0041322
Private	0	0	8	0.0330579
Shilshole Marina	2	0.037037	13	0.053719
<b>Shilshole Public Ramp</b>	<b>9</b>	<b>0.1666667</b>	<b>28</b>	<b>0.1157025</b>
Silverdale Waterfront Ramp	0	0	3	0.0123967
<b>Total Anglers</b>	<b>54</b>	<b>1</b>	<b>242</b>	<b>1</b>

**Table 2.8** Monthly sample rates (Total retained Chinook sampled<sup>1</sup> / Estimated retained Chinook) in the winter Chinook 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	
February	6 - 7	1 Feb - 10 Feb	282	3.9	286	67	1	68	23.80%
<b>Season Total</b>			<b>282</b>	<b>3.9</b>	<b>286</b>	<b>67</b>	<b>1</b>	<b>68</b>	<b>23.80%</b>

<sup>1/</sup> Number of retained Chinook sampled includes all retained Chinook inspected for CWT's, from all sites sampled during the winter Marine Area 10 Chinook MSF (creel estimates and the fish sampled as part of baseline sampling).

**Table 2.9** Dockside encounters (retained and released) by size-mark category during the 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.

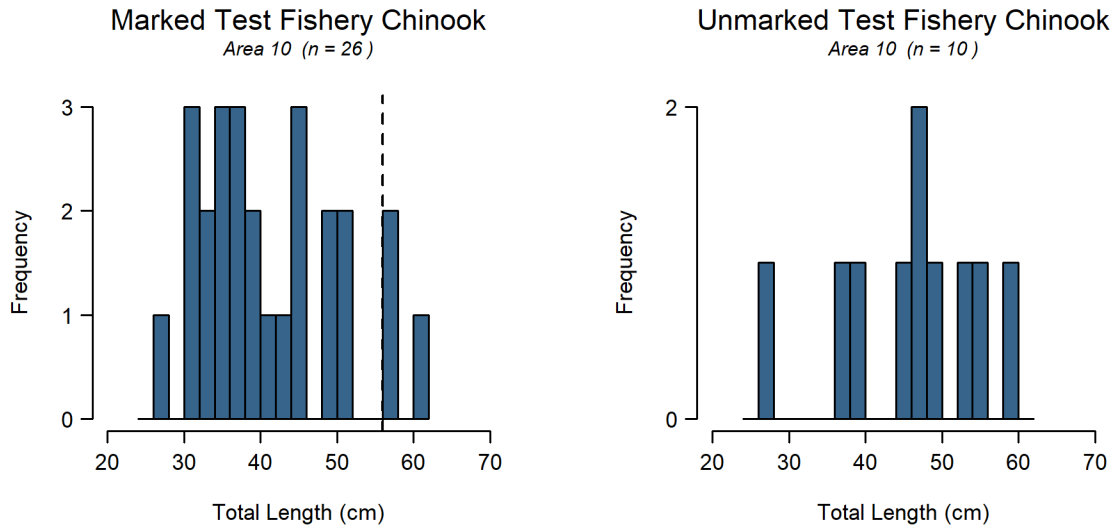
Dockside Encounters				
Metric	Legal		Sublegal	
	LM	LU	SM	SU
Encounters	62	15	199	26
Bias-corrected size/mark composition	18.27%	4.97%	65.89%	10.87%
Variance	0.0008679	0.0002491	0.0011832	0.0004017

**Table 2.10** Fishery-total estimates of retained and released salmon (other than Chinook) during the winter Chinook MSF in Marine Area 10. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status.

Stat Week	Start Date	End Date	Retained Salmon		Released Salmon			
			Coho AD	Coho UM	Coho AD	Coho UM	Coho UK	Unknown
6	1-Feb	5-Feb	14	8	19	15	35	57
7	6-Feb	10-Feb	8	0	0	0	22	17
<b>Season Total:</b>			<b>22</b>	<b>8</b>	<b>19</b>	<b>15</b>	<b>56</b>	<b>74</b>
<b>Variance:</b>			72	9	35	38	316	840
<b>Standard Error:</b>			9	3	6	6	18	29
<b>CV (%):</b>			38%	40%	31%	40%	31%	39%
<b>95% CI:</b>			6 - 39	2 - 14	7 - 31	3 - 28	22 - 91	17 - 131

**Table 2.1** Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion during the winter Chinook MSF in Marine Area 10.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hrs Fished	AD	UM	AD	UM	
6	7	40.429167	1	1	11	3	16
7	4	17.778333	2	0	12	6	20
<b>Total</b>	<b>11</b>	<b>58.2075</b>	<b>3</b>	<b>1</b>	<b>23</b>	<b>9</b>	<b>36</b>
<b>Size/mark-status composition:</b>			0.08	0.03	0.64	0.25	
<b>Variance:</b>			(0.0022)	(0.0008)	(0.0066)	(0.0054)	
<b>Legal size mark rate:</b>			0.75				
<b>Overall mark rate:</b>			0.72				



**Figure 21.12** Length-frequency distributions of marked (*left panel*) and unmarked (*right panel*) Chinook salmon encountered by test fishers during the winter Chinook salmon MSF in Marine Area 10. The vertical dashed line in the left panel corresponds to the legal-size limit (22 in or 56 cm).

**Table 2.12** 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 winter Chinook 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)
Soos Creek Hatchery	2020	1	0	0	0	0	0	0
Wallace R Hatchery	2020	1	0	0	0	0	0	0
<b>Total</b>		<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Table 2.13** Summary of CWTs recovered from Chinook salmon harvested during the winter Chinook MSF in Marine Area 10. The field “Number DITs” corresponds to the number of tags that belonged to double-index tag groups. Note: Not all tags have been processed before the writing of this report.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
Washington	Hood Canal (9.1%)	Finch Cr 16.0222	Hoodsport Hatchery	1 (9.1%)	0
	N Puget Sound (9.1%)	Wallace R 07.0940	Wallace R Hatchery	1 (9.1%)	1
	Mid Puget Sound (45.5%)	Big Soos Cr 09.0072	Soos Creek Hatchery	1 (9.1%)	1
		Gorst Cr 15.0216	Gorst Cr Rearing Pnd	1 (9.1%)	0
		Icy Cr 09.0125	Icy Cr Hatchery	2 (18.2%)	0
		Issaquah Cr 08.0178	Issaquah Hatchery	1 (9.1%)	0
	S Puget Sound (36.4%)	Minter Cr 15.0048	Minter Cr Hatchery	4 (36.4%)	0
<b>Total</b>				<b>11</b>	<b>2</b>

**Table 2.14** Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Marine Area 10 Winter Chinook MSF. Values may not add up 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
Feb 1, 2023 - Feb 10, 2023	1,301	244	4	38	0	36	89	2108	840	3,360

## Marine Area 11 Winter Mark-Selective Chinook Fishery

WDFW implemented a winter Chinook salmon MSF in Marine Area 11 from November 1 through November 30, 2022. The fishery closed early on November 27 after the fishery controls were met. Chinook retention in the winter Chinook MSF fishery was not uniform through the entire season; **Table 3.1** summarizes the dates when this fishery was open and closed to Chinook retention. 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 Salmon Trip Reports (STRs) from the angling public. **Table 3.2** summarizes the parameters estimated and the sampling activities associated with each parameter. Specific procedures used for collecting these data and estimating critical parameters are presented in detail in our separate Methods Report (WDFW 2012a). The fishery controls for this area were based on the preseason FRAM predictions of 1,093 total Chinook salmon encounters, 732 sublegal encounters and 256 unmarked encounters (**Table 3.5**). 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 27, 2022, which was the last day of the fishery.

**Table 3.2** Fishery dates and fishery retention status of Chinook salmon in the 2022-2023 winter Chinook salmon MSF in Marine Area 11.

Start Date	End Date	Fishery Status	Days
1-Nov	2-Nov	Open	2
3-Nov	5-Nov	Closed	3
6-Nov	9-Nov	Open	4
10-Nov	12-Nov	Closed	3
13-Nov	16-Nov	Open	4
17-Nov	19-Nov	Closed	3
20-Nov	23-Nov	Open	4
24-Nov	26-Nov	Closed	3
27-Nov	27-Nov	Open	1
<b>Total days open:</b>	<b>15</b>		

**Table 3.2** 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 <sup>1</sup> ; 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 ( <b>Table 3.10</b> ) were not used to produce encounter and mortality estimates. (See Conrad & McHugh 2008)
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 <sup>2</sup> 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. LM = 15%; LU = 4%; SM = 60%; SU = 21% (See <b>Table 3.13</b> ).
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	3 STRs were completed during this fishery. The addition of STRs to TF data did not lower the LM rate’s CV below the ideal 20% (estimated at 24%). Due to low STR sample size, high CV, and the large effect on total sublegal encounters of combining STR and TF data, a cautious decision was made to exclude STRs to avoid the risk of underestimating sublegal encounters by up to 11%. So, STR data were not used to produce encounter and mortality estimates
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.

<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

<sup>2</sup> Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery

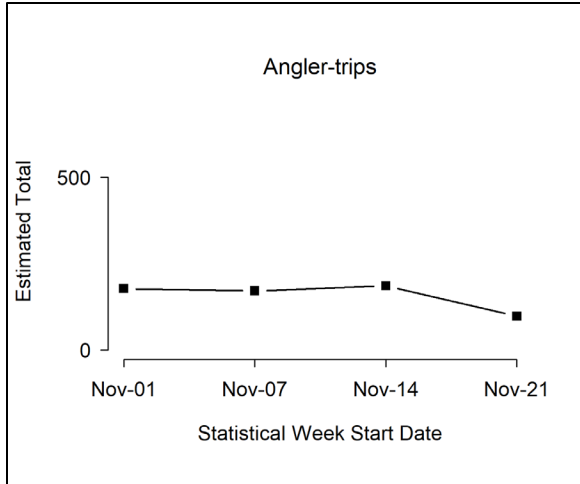


**Table 3.3** Estimates of total fishing effort and total salmon catch (harvest and releases) during the winter Chinook MSF in Marine Area 11. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

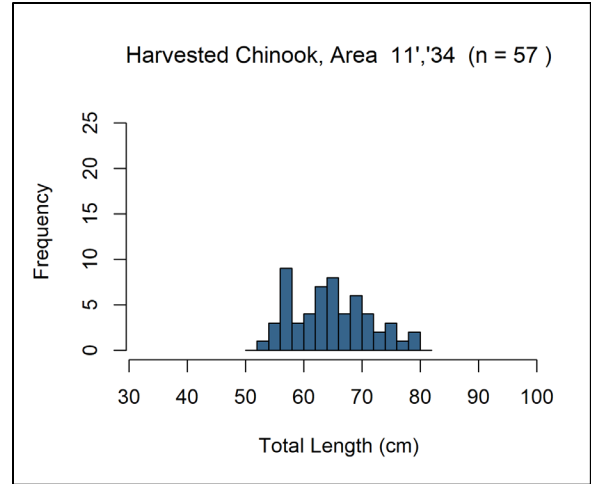
Month	Stat Week	Start Date	End Date	Est. Effort		Est. Retained Chinook		Est. Released Chinook		Est. Total Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
<b>November</b>	45	1-Nov	6-Nov	116	177	21	2	91	37	151
	46	7-Nov	13-Nov	112	171	31	0	138	59	228
	47	14-Nov	20-Nov	125	186	38	0	167	71	276
	48	21-Nov	27-Nov	73	97	15	0	68	29	112
<b>Total:</b>				<b>426</b>	<b>631</b>	<b>105</b>	<b>2</b>	<b>464</b>	<b>197</b>	<b>767</b>
<b>Variance:</b>				1,975	3,716	194	0	21,312	3,679	50,227
<b>SE:</b>				44	61	14	0	146	61	224
<b>CV (%):</b>				10	10	13	29	31	31	29
<b>95% CI:</b>				339 - 513	512 - 751	78 - 132	1 - 2	178 - 750	78 - 316	328 - 1,206

**Table 3.3** Number of total length samples collected from retained Chinook salmon collected during dockside angler interviews in the winter Chinook MSF in Marine Area 11.

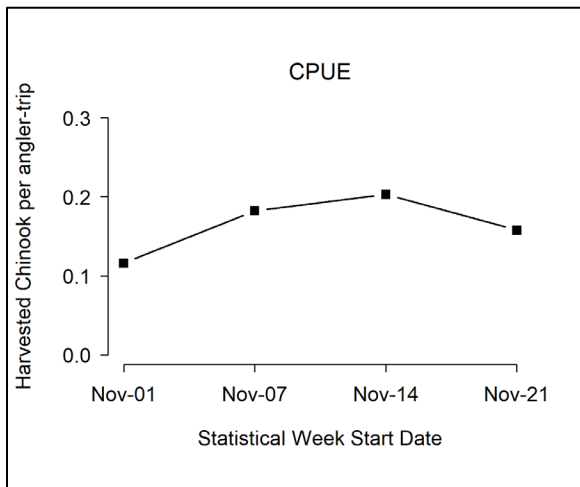
Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	53	4	57
Unmarked	1	0	1
<b>Total</b>	<b>54</b>	<b>4</b>	<b>58</b>



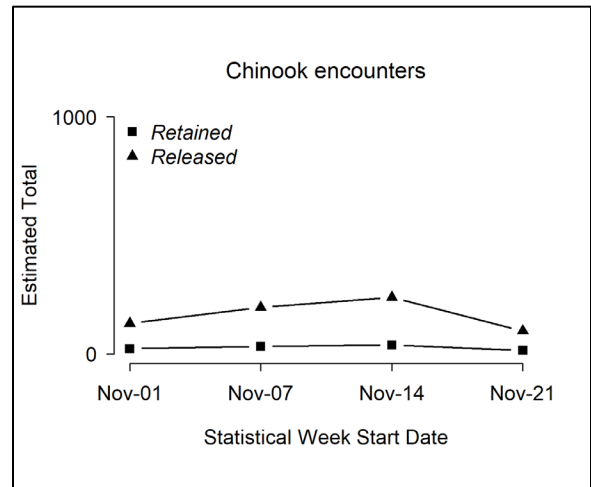
**Figure 3.13** Temporal patterns in fishing effort during the winter Chinook MSF in Marine Area 11.



**Figure 3.15** Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the winter Chinook MSF in Marine Area 11. Note: displayed values are observations where lengths were taken.



**Figure 3.14** Temporal patterns in CPUE (landed Chinook salmon per angler trip) during the winter Chinook MSF in Marine Area 11.



**Figure 3.16** Temporal patterns in Chinook salmon encounters (retained and released) during the winter Chinook MSF in Marine Area 11.

**Table 3.4** Comparison of modeled and estimated total Chinook salmon encounters for the winter Chinook MSF in Marine Area 11. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

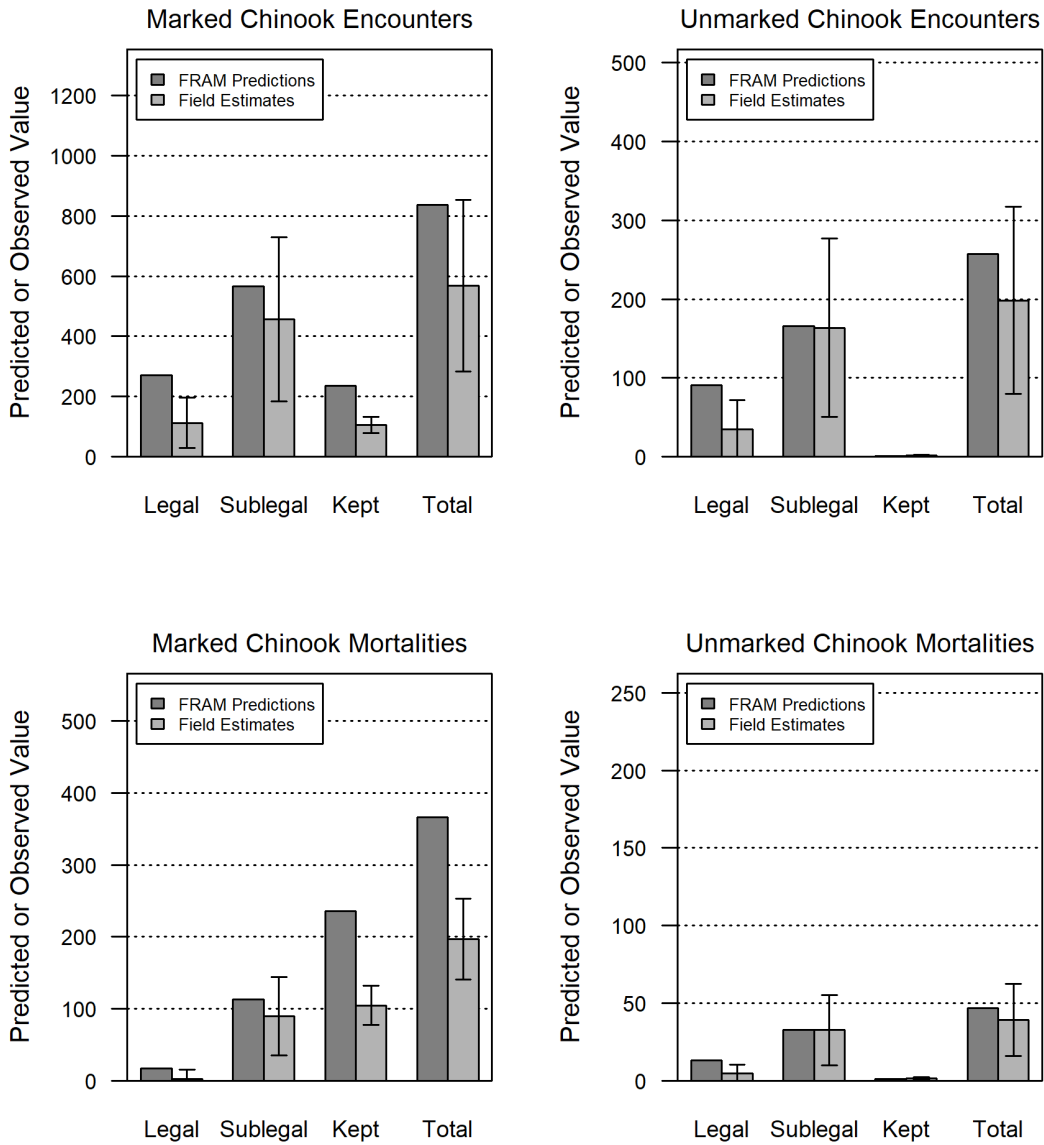
Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	257	91	166	1
	AD	837	271	566	236
	Total	1,094	362	732	237
	% Marked	77	75	77	100
Estimated (Creel) Encounters	UM	198	34	164	2
	AD	569	112	457	105
	Total	767	146	620	106
	% Marked	74	76	74	99

**Table 3.5** Summary of season-wide fishery impact estimates for the winter Chinook 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	112	97	15	2	100	225	15	70 - 129	15
Legal UM	34	2	33	5	6	8	3	1 - 12	45
Sublegal AD	457	7	449	90	97	785	28	42 - 152	29
Sublegal UM	164	0	164	33	33	133	12	10 - 55	35
Total	767	106	661	130	236	1,152	34	170 - 303	14

**Table 3.6** Comparison of modeled and estimated total Chinook salmon mortalities for the winter Chinook MSF in Marine Area 11. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Mortality Category	FRAM Chinook Mortalities			Estimated Chinook Mortalities		
	UM	AD	Total	UM	AD	Total
Total (Landed + Released)	47	366	413	39	197	236
Released Legal	13	17	30	5	2	7
Released Sublegal	33	113	146	33	90	123
Landed Only	1	236	237	2	105	106



**Figure 3.17** Comparison of modeled and estimated total Chinook salmon encounters and mortalities for the winter Chinook MSF in Marine Area 11. Error bars represent 95% confidence intervals for field estimates.

**Table 3.8** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the winter Chinook MSF in Marine Area 11. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
Breakwater Marina	2	<b>0.019802</b>	4	<b>0.0215054</b>
Commencement Bay Marina	7	0.0693069	6	0.0322581
Dash Point Shore	7	0.0693069	2	0.0107527
Des Moines Marina	6	0.0594059	7	0.0376344
Gig Harbor Marina	2	0.019802	0	0
<b>Gig Harbor Ramp</b>	<b>5</b>	<b>0.049505</b>	<b>15</b>	<b>0.0806452</b>
Narrows Marina	10	0.0990099	21	0.1129032
<b>Point Defiance Boathouse Dock</b>	<b>14</b>	<b>0.1386139</b>	<b>21</b>	<b>0.1129032</b>
<b>Point Defiance Public Ramp</b>	<b>39</b>	<b>0.3861386</b>	<b>82</b>	<b>0.4408602</b>
Private	2	0.019802	1	0.0053763
<b>Redondo Ramp</b>	<b>7</b>	<b>0.0693069</b>	<b>15</b>	<b>0.0806452</b>
<b>Armeni Public Ramp</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0.0215054</b>
Dockton Ramp, Vashon Is	0	0	3	0.016129
Narrows Ramp	0	0	2	0.0107527
Tyee Marina/Ramp	0	0	3	0.016129
<b>Total Anglers</b>	<b>101</b>	<b>1</b>	<b>186</b>	<b>1</b>

**Table 3.9** Monthly sample rates (Total retained Chinook salmon sampled<sup>1</sup> / Estimated retained Chinook salmon) in the winter Chinook MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked.

Time period			Estimated Retained Chinook			Number of Chinook sampled			Sample Rate
Month	Stat Weeks	Dates	AD	UM	Total	AD	UM	Total	
November	45 - 48	1 Nov - 27 Nov	105	2	106	57	1	58	54.50%
<b>Season Total</b>			<b>105</b>	<b>2</b>	<b>106</b>	<b>57</b>	<b>1</b>	<b>58</b>	<b>54.50%</b>

<sup>1/</sup> Number of retained Chinook sampled includes all retained Chinook inspected for CWT's, from all sites sampled during the winter Marine Area 10 Chinook MSF (creel estimates and the fish sampled as part of baseline sampling).

**Table 3.10** Dockside encounters (retained and released) by size-mark category during the 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				
Metric	Legal		Sublegal	
	LM	LU	SM	SU
Encounters	53	7	33	4
Bias-corrected size/mark composition	48.63%	7.22%	34.02%	10.13%
Variance	0.003614	0.0011064	0.0038426	0.0005879

**Table 3.11** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on STRs during the 2023-2023 winter Chinook salmon MSF in Marine Area 11, 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.

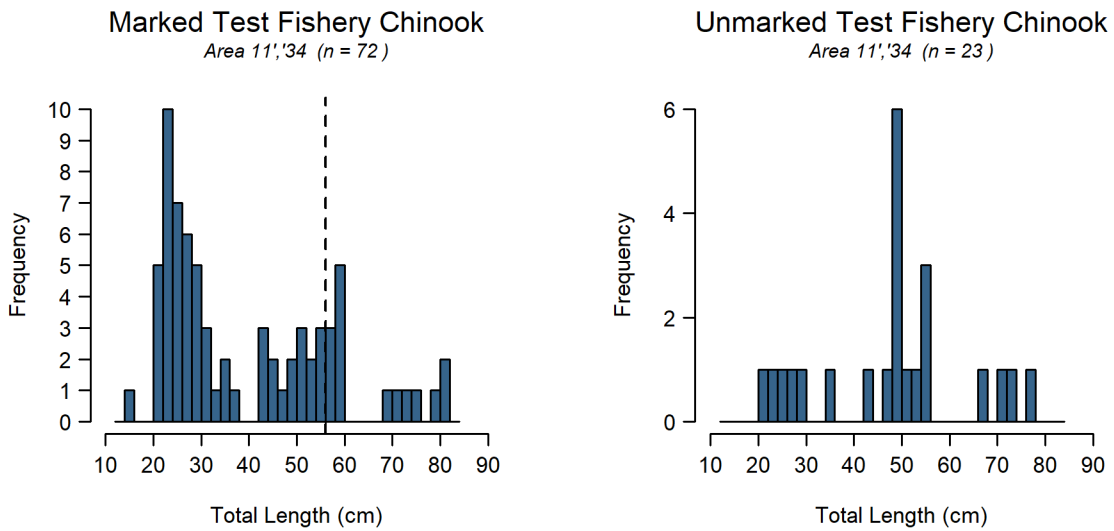
Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
		AD	UM	AD	UM		Overall	Legal
Private STR	3 1-trip STRs	2	0	1	0	3	1.00	1.00
Size/mark-status composition:		0.6667	0	0.3333	0			
Variance:		(0.1111)	(0.0000)	(0.1111)	(0.0000)			

**Table 3.12** Fishery-total estimates of retained and released salmon (other than Chinook salmon) for the winter Chinook MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status. Values may not add up exactly due to rounding error.

Stat Week	Start Date	End Date	Released Salmon			
			Coho AD	Coho UM	Coho UK	Unknown
45	1-Nov	6-Nov	6	0	6	36
46	7-Nov	13-Nov	12	2	5	14
47	14-Nov	20-Nov	0	2	12	30
48	21-Nov	27-Nov	7	2	12	8
<b>Season Total:</b>			<b>25</b>	<b>7</b>	<b>34</b>	<b>88</b>
<b>Variance:</b>			63	6	99	370
<b>Standard Error:</b>			8	3	10	19
<b>CV (%):</b>			32	36	29	22
<b>95% CI:</b>			9 - 40	2 - 12	14 - 53	50 - 126

**Table 3.13** Composition of test fishery Chinook salmon encounters and associated mark-rate and size/mark-status proportion estimates for the winter Chinook salmon MSF in Marine Area 11 when the fishery was open to salmon retention (see **Table 6.1**). AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hrs Fished	AD	UM	AD	UM	
45	9	37.20	1	1	11	3	16
46	9	40.40	4	2	17	5	28
47	11	64.20	4	1	14	8	27
48	8	97.38	4	0	11	3	18
<b>Total</b>	<b>37</b>	<b>239.18</b>	<b>13</b>	<b>4</b>	<b>53</b>	<b>19</b>	<b>89</b>
<b>Size/mark-status composition:</b>			0.15	0.04	0.60	0.21	
<b>Variance:</b>			(0.0014)	(0.0005)	(0.0027)	(0.0019)	
<b>Legal size mark rate:</b>			0.76				
<b>Overall mark rate:</b>			0.74				



**Figure 3.18** Length-frequency distributions of marked (left panel) and unmarked (right panel) Chinook salmon encountered by test fishers during the winter Chinook 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 3.7** 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 winter Chinook 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	2	3.7	3.06	3.8	0.4	0.032	0.25
<b>Total</b>		<b>2</b>	<b>3.7</b>	<b>3.06</b>	<b>3.8</b>	<b>0.4</b>	<b>0.032</b>	<b>0.25</b>

**Table 3.15** Summary of CWTs recovered from Chinook salmon harvested during the winter Chinook MSF in Marine Area 11. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag groups. Note: Not all tags have been processed before the writing of this report.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	Mid Puget Sound (80%)	Green R 09.0001	Palmer Hatchery	1 (20%)	0
		Grovers Cr Hatchery	Grovers Cr Hatchery	2 (40%)	2
		Icy Cr 09.0125	Icy Cr Hatchery	1 (20%)	0
	S Puget Sound (20%)	Minter Cr 15.0048	Minter Cr Hatchery	1 (20%)	0
<b>Total</b>				<b>5</b>	<b>2</b>

**Table 3.8** 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 Marine Area 11 winter Chinook MSF. Values may not add up exactly due to rounding error.

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
Nov 1 - Nov 27, 2022	631	97	2	7	0	15	33	449	164	767



## **Marine Area 13 Winter Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented a winter Chinook MSF in Marine Area 13 from October 1, 2022 through April 30, 2023. WDFW’s Puget Sound Sampling Unit (PSSU) implemented a “Baseline Sampling” program (see WDFW 2012a for details) consisting of dockside angler interviews with catch sampling along with efforts to distribute and collect voluntary salmon trip reports (STRs) from the angling public whenever possible.

Unlike the other survey designs, Baseline Sampling does not provide a means for generating in-season or immediate post-season estimates of fishery total catch and effort. These estimates will be available approximately one year after the close of the fishery through the WDFW Catch Record Card (CRC) program. Once available, CRC-based catch estimates will be used to generate estimates of total Chinook salmon encounters and mortalities by size and mark-status using the methods provided by Conrad, Garber, and Rose (2020). While these descriptors of MSF impacts are not presented in this document, they will be available in the 2023 Baseline report.

**Table 4.1** 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 this section we present results from our monitoring activities during the Marine Area 13 winter Chinook MSF, including relative catch and effort patterns over the course of the season based on the assumption that baseline-sampling observations of these parameters are good indicators of associated fishery-wide trends.

**Table 4.9** Sampling/estimation details on target parameters associated with the overall Marine Area 13 mark-selective fishery monitoring program

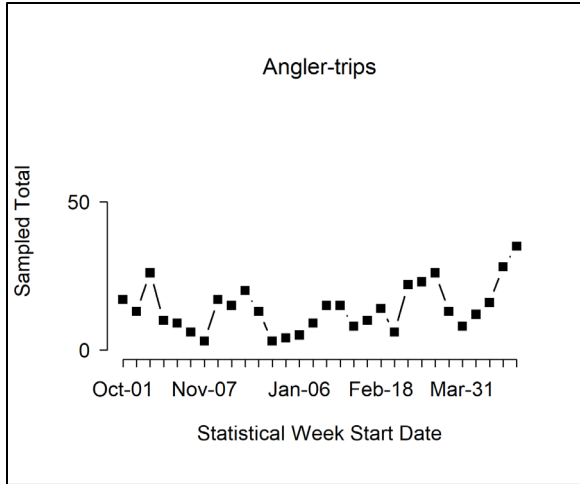
Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Angler Interviews (Baseline Sampling)	Observed (in-sample) fishing effort (boat & angler trips); kept and released fish.	Catch rates (CPUE); length, age, and CWT composition of harvest <sup>1</sup> ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	Week	Observed catch per angler trip and species composition data obtained from baseline sampling will ultimately be combined with Catch Record Card (CRC) data to produce fishery-total estimates at a later time (approximately one year following the fishery).
		Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook salmon	Boat trip	Season	Dockside encounter data will not be used for estimation of Chinook encounters for this fishery. <b>Table 4.7.</b>
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 salmon) that the angler may record on the STR form	Fish encounter	Season	With adequate sample size, STR data; (LM = 51%; LU = 18%; SM = 29%; SU = 2%;) will be used to estimate encounters and mortalities at a later date.
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	Will be estimated at a later date using the CRC-based retained Chinook salmon estimate, when it becomes available.
Coded-wire tag (CWT) Impacts Estimation	Marked/unmarked double-index tag (DIT) encounters and mortalities	N/A	N/A	Season	No CWTs were recovered during this fishery.

**Table 4.2** Observations of fishing effort, salmon harvest, and reported salmon releases, by week, for the winter Chinook 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.

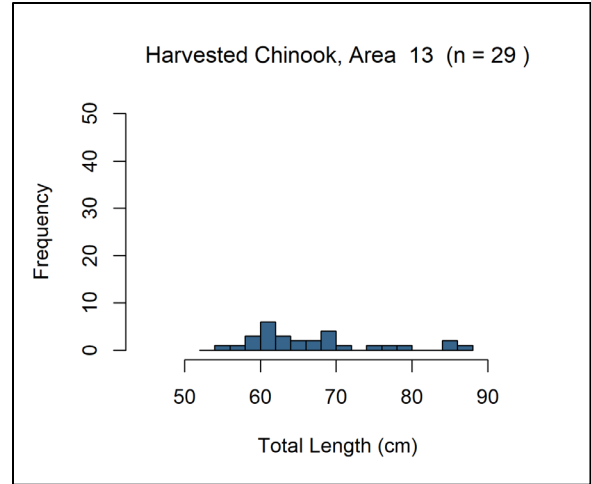
Stat Week	Start	End	Effort		Retained Fish		Released Fish		
			Boats	Anglers	Chinook AD	Chinook UK	Chin AD	Chin UM	Chin UK
40	1-Oct	2-Oct	10	17	0	0	0	0	0
41	3-Oct	9-Oct	7	13	0	0	1	0	0
42	10-Oct	16-Oct	15	26	0	0	1	1	4
43	17-Oct	23-Oct	5	10	0	0	1	0	0
44	24-Oct	29-Oct	5	9	0	0	0	0	0
45	3-Nov	6-Nov	3	6	0	0	0	0	5
46	7-Nov	7-Nov	1	3	0	0	0	0	0
47	14-Nov	17-Nov	14	17	0	0	0	0	0
48	27-Nov	27-Nov	7	15	0	0	0	0	0
49	2-Dec	4-Dec	13	20	0	0	0	0	0
50	8-Dec	11-Dec	7	13	0	0	0	0	0
51	13-Dec	15-Dec	2	3	0	0	0	0	2
53	31-Dec	31-Dec	2	4	0	0	2	1	0
2	6-Jan	8-Jan	4	5	0	0	0	0	0
3	10-Jan	15-Jan	5	9	0	0	2	2	0
4	20-Jan	22-Jan	10	15	0	0	0	0	0
5	23-Jan	28-Jan	8	15	0	0	1	4	0
6	4-Feb	5-Feb	5	8	1	0	2	0	1
7	10-Feb	11-Feb	7	10	3	0	4	0	1
8	18-Feb	19-Feb	8	14	2	0	2	1	0
9	25-Feb	25-Feb	4	6	1	1	0	0	0
10	27-Feb	5-Mar	13	22	2	0	3	3	3
11	6-Mar	12-Mar	11	23	3	0	0	1	2
12	16-Mar	19-Mar	21	26	4	0	17	5	4
13	20-Mar	26-Mar	8	13	3	1	0	0	0
14	31-Mar	2-Apr	4	8	0	0	0	0	0
15	3-Apr	9-Apr	6	12	1	0	0	3	2
16	14-Apr	16-Apr	10	16	2	0	0	1	2
17	17-Apr	23-Apr	18	28	6	0	5	5	0
18	24-Apr	30-Apr	19	35	1	0	1	2	2
<b>Season Total</b>			<b>252</b>	<b>421</b>	<b>29</b>	<b>2</b>	<b>42</b>	<b>29</b>	<b>28</b>

**Table 4.3** 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.

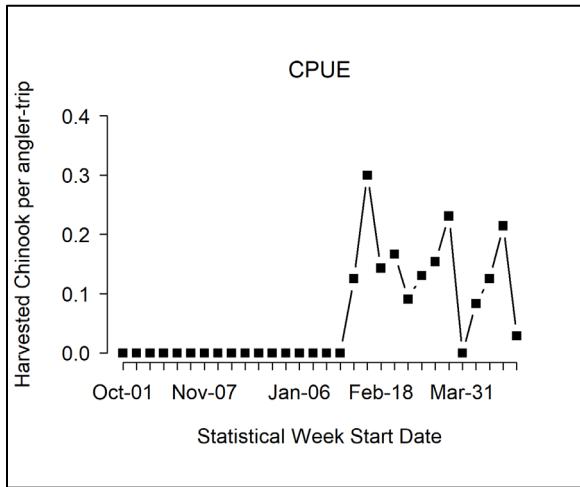
Stat Week	Start	End	Effort		Retained Fish		Released Fish				
			Boats	Anglers	Coho AD	Chum	Coho AD	Coho UM	Coho UNK	Pink	Chum
40	1-Oct	2-Oct	10	17	0	0	0	1	0	0	0
41	3-Oct	9-Oct	7	13	4	0	0	0	0	0	0
42	10-Oct	16-Oct	15	26	0	0	1	0	2	0	0
43	17-Oct	23-Oct	5	10	0	0	0	0	0	0	0
44	24-Oct	29-Oct	5	9	0	0	0	0	0	0	0
45	3-Nov	6-Nov	3	6	0	0	1	1	0	0	0
46	7-Nov	7-Nov	1	3	0	0	0	0	0	0	0
47	14-Nov	17-Nov	14	17	0	13	0	0	0	0	7
48	27-Nov	27-Nov	7	15	0	23	0	0	0	0	2
49	2-Dec	4-Dec	13	20	0	0	0	0	0	0	0
50	8-Dec	11-Dec	7	13	0	2	0	0	0	0	0
51	13-Dec	15-Dec	2	3	0	0	0	0	0	0	0
53	31-Dec	31-Dec	2	4	0	0	0	0	0	0	0
2	6-Jan	8-Jan	4	5	0	0	0	0	0	0	0
3	10-Jan	15-Jan	5	9	0	0	1	0	0	0	0
4	20-Jan	22-Jan	10	15	0	0	0	0	0	0	0
5	23-Jan	28-Jan	8	15	0	0	0	0	0	0	0
6	4-Feb	5-Feb	5	8	0	0	1	1	0	0	0
7	10-Feb	11-Feb	7	10	0	0	0	0	0	0	0
8	18-Feb	19-Feb	8	14	0	0	0	0	0	0	0
9	25-Feb	25-Feb	4	6	0	0	0	0	0	0	0
10	27-Feb	5-Mar	13	22	0	0	0	0	0	0	0
11	6-Mar	12-Mar	11	23	0	0	2	0	0	0	0
12	16-Mar	19-Mar	21	26	0	0	1	1	5	0	0
13	20-Mar	26-Mar	8	13	0	0	0	0	1	0	0
14	31-Mar	2-Apr	4	8	0	0	0	0	0	0	0
15	3-Apr	9-Apr	6	12	0	0	0	0	0	0	0
16	14-Apr	16-Apr	10	16	0	0	0	0	0	0	0
17	17-Apr	23-Apr	18	28	0	0	15	2	2	0	0
18	24-Apr	30-Apr	19	35	4	0	1	1	0	2	0
<b>Season Total</b>			<b>252</b>	<b>421</b>	<b>8</b>	<b>38</b>	<b>23</b>	<b>7</b>	<b>10</b>	<b>2</b>	<b>9</b>



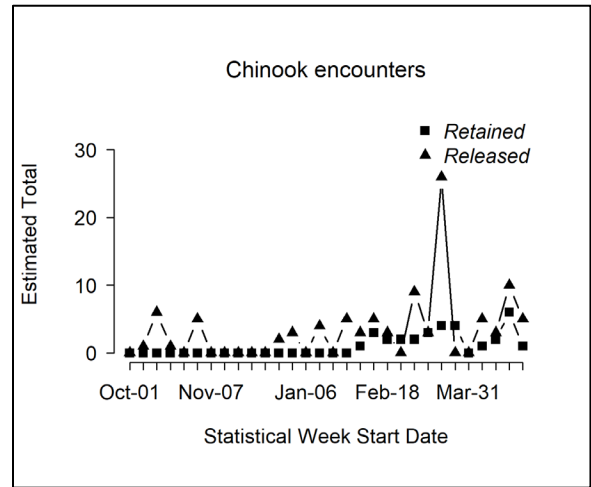
**Figure 4.19** Temporal patterns in fishing effort during the 2022-2023 winter Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total



**Figure 4.21** Length-frequency distributions of retained marked Chinook salmon sampled in dockside angler interviews during the 2022-2023 winter Chinook salmon MSF in Marine Area 13.



**Figure 4.20** Temporal patterns in CPUE (number of Chinook salmon landed per angler trip) during the 2022-2023 winter Chinook salmon MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 4.22** Temporal patterns in Chinook salmon encounters (number retained and released) during the 2022-2023 winter Chinook salmon MSF in Marine Area 13.

**Table 4.4** List of sites sampled with the number of sampling events (site-days) during the 2022-2023 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 Dock	0	0	0	1	0	0	0	1	0.19%
Allyn Public Ramp	4	0	1	2	2	3	3	15	2.78%
Arcadia Ramp	0	0	0	0	0	1	0	1	0.19%
Bayshore	0	0	0	0	1	0	0	1	0.19%
Boston Harbor Ramp	6	1	10	14	12	8	13	64	11.87%
Concrete Dock	0	0	0	1	0	3	1	5	0.93%
East Bay Marina	4	2	11	13	13	8	12	63	11.69%
Fox Island Public Ramp	0	0	1	1	0	8	3	13	2.41%
Fox Island Sand Spit	0	0	0	0	0	0	1	1	0.19%
Grapeview Public Ramp	4	0	0	2	2	3	3	14	2.60%
Hartstine Is. Ramp	8	0	2	2	2	3	3	20	3.71%
Home Public Ramp	1	0	0	2	0	2	4	9	1.67%
Horsehead Bay Ramp	0	0	0	0	0	3	0	3	0.56%
Joemma Beach Ramp	0	0	0	0	0	1	4	5	0.93%
John's Creek	1	0	0	0	0	0	0	1	0.19%
Kennedy Creek Mouth	0	3	7	0	0	0	0	10	1.86%
Longbranch Marina	0	0	0	1	0	1	0	2	0.37%
Longbranch Public Ramp	0	0	0	2	0	2	4	8	1.48%
Luhr Beach Ramp	20	3	13	15	14	15	18	98	18.18%
McLane Creek Shore	0	1	9	0	0	0	0	10	1.86%
Narrows Marina	2	5	10	12	8	10	8	55	10.20%
Narrows Park	0	0	1	0	2	2	0	5	0.93%
Narrows Ramp	1	0	0	0	0	0	0	1	0.19%
Perry Creek	0	5	10	0	1	0	0	16	2.97%
Solo Point	0	0	0	0	1	0	1	2	0.37%
Squaxin Park	3	1	0	0	0	0	0	4	0.74%
Steilacoom Public Ramp	0	0	2	1	1	0	1	5	0.93%
Vaughn Public Ramp	0	0	0	3	1	3	4	11	2.04%
Wauna Ramp	0	0	0	0	0	0	3	3	0.56%
Wauna Shore	0	0	1	1	2	5	5	14	2.60%
Wollochet Bay Public Ramp	0	0	0	0	1	3	0	4	0.74%
Zittels Marina	12	2	9	13	12	12	15	75	13.91%
<b>Grand Total</b>	<b>66</b>	<b>23</b>	<b>87</b>	<b>86</b>	<b>75</b>	<b>96</b>	<b>106</b>	<b>539</b>	<b>1</b>

**Table 4.5** Number of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2022-2023 winter Chinook salmon MSF in Marine Area 13.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	28	1	29
Unmarked	0	0	0
<b>Total</b>	<b>28</b>	<b>1</b>	<b>29</b>

**Table 4.6** Dockside encounters (retained and released) by size-mark category during the 2022-2023 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	28	14	43	15
Size/mark-status composition	0.28	0.14	0.43	0.15
Bias Corrected	0.25	0.14	0.43	0.18
Variance	0.002	0.001	0.003	0.002

**Table 4.7** Total Chinook salmon encountered (retained and released) by private-boat anglers logging their trips on STRs during the 2023-2023 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	5 1-trip STRs	1	1	8	1	11	0.82	0.5
Size/mark-status composition: Variance:		0.09 (0.0083)	0.09 (0.0083)	0.73 (0.0198)	0.09 (0.0083)			

## ACKNOWLEDGEMENTS

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## APPENDICES

### 1) Site Weights

**Appendix 1** Size measures by sample date, for sites sampled during dockside creel surveys for the winter Chinook MSF in Marine Area 5.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
3/1/2023	10	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/2/2023	10	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/3/2023	10	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/4/2023	10	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/5/2023	10	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/7/2023	11	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/8/2023	11	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/10/2023	11	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/11/2023	11	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/12/2023	11	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/13/2023	12	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/16/2023	12	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/17/2023	12	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/18/2023	12	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/19/2023	12	Olson's Resort	0.988235	Van Riper's Resort	0.011765
3/22/2023	13	Olson's Resort	0.994845	Van Riper's Resort	0.005155
3/23/2023	13	Olson's Resort	0.994845	Van Riper's Resort	0.005155
3/24/2023	13	Olson's Resort	0.994845	Van Riper's Resort	0.005155
3/25/2023	13	Olson's Resort	0.994845	Van Riper's Resort	0.005155
3/26/2023	13	Olson's Resort	0.994845	Van Riper's Resort	0.005155
3/28/2023	14	Olson's Resort	0.996644	Van Riper's Resort	0.003356
3/30/2023	14	Olson's Resort	0.996644	Van Riper's Resort	0.003356
3/31/2023	14	Olson's Resort	0.996644	Van Riper's Resort	0.003356
4/1/2023	14	Olson's Resort	0.996644	Van Riper's Resort	0.003356
4/2/2023	14	Olson's Resort	0.996644	Van Riper's Resort	0.003356
4/3/2023	15	Olson's Resort	0.997093	Van Riper's Resort	0.002907
4/6/2023	15	Olson's Resort	0.997093	Van Riper's Resort	0.002907
4/7/2023	15	Olson's Resort	0.997093	Van Riper's Resort	0.002907
4/8/2023	15	Olson's Resort	0.997093	Van Riper's Resort	0.002907
4/9/2023	15	Olson's Resort	0.997093	Van Riper's Resort	0.002907
4/11/2023	16	Olson's Resort	0.997354	Van Riper's Resort	0.002646
4/12/2023	16	Olson's Resort	0.997354	Van Riper's Resort	0.002646
4/14/2023	16	Olson's Resort	0.997354	Van Riper's Resort	0.002646
4/15/2023	16	Olson's Resort	0.997354	Van Riper's Resort	0.002646
4/16/2023	16	Olson's Resort	0.997354	Van Riper's Resort	0.002646
4/18/2023	17	Olson's Resort	0.997354	Van Riper's Resort	0.002646
4/19/2023	17	Olson's Resort	0.997354	Van Riper's Resort	0.002646
4/21/2023	17	Olson's Resort	0.997354	Van Riper's Resort	0.002646
4/22/2023	17	Olson's Resort	0.997354	Van Riper's Resort	0.002646
4/23/2023	17	Olson's Resort	0.997354	Van Riper's Resort	0.002646

**Appendix 2** Size measures by sample date, for sites sampled during dockside creel surveys for the winter Chinook MSF in Marine Area 10.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
2/1/2023	5	Shilshole Ramp	0.3739	Armeni Ramp	0.2174
2/2/2023	5	Shilshole Ramp	0.3739	Kingston	0.1887
2/3/2023	5	Shilshole Ramp	0.3739	Edmond Dry Storage	0.1033
2/4/2023	5	Shilshole Ramp	0.3739	Armeni Ramp	0.2174
2/5/2023	5	Shilshole Ramp	0.195596	Armeni Ramp	0.490933
2/7/2023	6	Shilshole Ramp	0.3739	Edmond Dry Storage	0.1033
2/8/2023	6	Shilshole Ramp	0.3739	Manchester	0.1167
2/10/2023	6	Shilshole Ramp	0.3739	Kingston	0.1887

**Appendix 3** Size measures by sample date, for sites sampled during dockside creel surveys for the winter Chinook MSF in Marine Area 11.

Sample Date	Wee	Location #1	Site Size	Location #2	Site Size
11/1/2022	45	Pt Defiance Ramp	0.6	Pt Defiance Boat House	0.3077
11/2/2022	45	Pt Defiance Ramp	0.6	Pt Defiance Boat House	0.3077
11/6/2022	45	Pt Defiance Ramp	0.6	Pt Defiance Boat House	0.3077
11/7/2022	46	Pt Defiance Ramp	0.6	Pt Defiance Boat House	0.3077
11/9/2022	46	Pt Defiance Ramp	0.6	Pt Defiance Boat House	0.3077
11/13/2022	46	Pt Defiance Ramp	0.6	Gig Harbor Ramp	0.0923
11/14/2022	47	Pt Defiance Ramp	0.6516	Pt Defiance Boat House	0.2198
11/15/2022	47	Pt Defiance Ramp	0.6516	Pt Defiance Boat House	0.2198
11/20/2022	47	Pt Defiance Ramp	0.6516	Gig Harbor Ramp	0.1286
11/21/2022	48	Pt Defiance Ramp	0.6516	Pt Defiance Boat House	0.2198
11/22/2022	48	Pt Defiance Ramp	0.6516	Gig Harbor Ramp	0.1286
11/27/2022	48	Pt Defiance Ramp	0.6516	Pt Defiance Boat House	0.2198
11/29/2022	49	Pt Defiance Ramp	0.6516	Gig Harbor Ramp	0.1286
11/30/2022	49	Pt Defiance Ramp	0.6516	Pt Defiance Boat House	0.2198



## 2) CWT Recoveries

**Appendix 4** Coded-wire tag (CWT) recoveries from the winter 2022-2023 Chinook MSF in Marine Area 5. Note: Not all tags have been processed before the writing of this report.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL(cm)	Label	Recovery Mark
5	2-Mar-23	637524	2018	Purdy Cr 16.0005	George Adams Hatchery	WDFW	NA	67	CWT00096201	AD
5	2-Mar-23	211435	2020	Nooksack SF 01.0246	Wallace R Hatchery	LUMMI	NA	75	CWT00096274	AD
5	3-Mar-23	637749	2019	Purdy Cr 16.0005	George Adams Hatchery	WDFW	637750	60	CWT00096275	AD
5	4-Mar-23	211411	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	NA	67	CWT00046199	AD
5	4-Mar-23	637686	2019	Narrows Marina Pens	Narrows Marina Pens	PUYA	NA	60	CWT00046563	AD
5	4-Mar-23	637429	2019	Green R 9.0001	Palmer Hatchery	WDFW	NA	64	CWT00092307	AD
5	4-Mar-23	637745	2019	Friday Cr 03.0017	Samish Hatchery	WDFW	637746	62	CWT00096276	AD
5	9-Mar-23	637891	2020	Cascade R 03.1411	Marblemount Hatchery	WDFW	637892	56	CWT00046536	AD
5	9-Mar-23	211333	2019	Grovers Creek Hatchery	Grovers Creek Hatchery	SUQ	637775	56	CWT00096245	AD
							211339			
							637720			
5	11-Mar-23	211393	2019	Kalama Cr 11.0017	Kalama Cr Hatchery	NISQ	NA	63	CWT00096277	AD
5	12-Mar-23	91458	2019	Tanner Cr (Bnville)	Bonneville Hatchery	ODFW	NA	70	CWT00046172	AD
5	12-Mar-23	91515	2020	Tanner Cr (Bnville)	Bonneville Hatchery	ODFW	NA	61	CWT00046173	AD
5	12-Mar-23	211406	2019	Lummi Sea Ponds	Lummi Sea Ponds	LUMMI	NA	75	CWT00046561	AD
5	12-Mar-23	637872	2020	Gorst Cr Rear.Pond-1	Gorst Cr Rearing Pond	SUQ	NA	61	CWT00046562	AD
5	12-Mar-23	637743	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW	637744	57	CWT00092308	AD
5	12-Mar-23	637743	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW	637744	74	CWT00096273	AD
5	13-Mar-23	62294	2020	Mare Island Net Pen	Feather R Hatchery	CDFW	NA	63	CWT00046174	AD
5	13-Mar-23	637426	2019	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW	637427	63	CWT00092423	AD
5	13-Mar-23	637580	2018	Chelan R 47.0052	Chelan Falls Hatchery	WDFW	NA	55	CWT00096246	AD
5	13-Mar-23	637901	2020	Wallace R 07.0940	Wallace R Hatchery	WDFW	637823	64	CWT00096272	AD
5	13-Mar-23	211409	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211410	59	CWT00096278	AD
5	13-Mar-23	211409	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211410	59	CWT00096279	AD
5	14-Mar-23	637631	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW	NA	70	CWT00046175	AD
5	14-Mar-23	211392	2019	Stillaguamish R -SF	Brenner Hatchery	STIL	NA	68	CWT00096247	AD
5	14-Mar-23	211339	2019	Grovers Creek Hatchery	Grovers Creek Hatchery	SUQ	637775	62	CWT00096281	AD
							211333			
							637720			
5	14-Mar-23	91443	2019	Willamette R M FK-1	Dexter Ponds (Willamette)	ODFW	NA	66	CWT00096282	AD

5	17-Mar-23	90714	2019	Klaskanine R N FK	Klaskanine Hatchery	ODFW	NA	67	CWT00046176	AD
5	17-Mar-23	637626	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW	NA	63	CWT00096271	AD
5	18-Mar-23	637627	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW	NA	67	CWT00046177	AD
5	18-Mar-23	637765	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW	NA	67	CWT00092300	AD
5	18-Mar-23	637439	2018	Minter Cr 15.0048	Minter Cr Hatchery	WDFW	NA	62	CWT00092440	AD
5	18-Mar-23	637856	2020	Finch Cr 16.0222	Hoodsport Hatchery	WDFW	NA	52	CWT00096249	AD
5	18-Mar-23	637442	2018	Grovers Creek Hatchery	Grovers Creek Hatchery	SUQ	211322	62	CWT00096270	UM
							211323			
							637443			
5	18-Mar-23	637352	2018	Friday Cr 03.0017	Samish Hatchery	WDFW	NA	65	CWT00096283	AD
5	19-Mar-23	91398	2018	Willamette R CST FK	Leaburg Hatchery	ODFW	NA	78	CWT00046560	AD
5	19-Mar-23	637898	2020	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW	637899	58	CWT00088018	AD
5	19-Mar-23	91512	2020	Big Cr (Lwr Col R)	Big Cr Hatchery	ODFW	NA	64	CWT00088020	AD
5	19-Mar-23	637429	2019	Green R 9.0001	Palmer Hatchery	WDFW	NA	66	CWT00092288	AD
5	19-Mar-23	637350	2018	Wallace R 07.0940	Wallace R Hatchery	WDFW	NA	72	CWT00092289	AD
5	19-Mar-23	637428	2019	Icy Cr 09.0125	Icy Cr Hatchery	WDFW	NA	58	CWT00096190	AD
5	19-Mar-23	637921	2020	Minter Cr 15.0048	Minter Cr Hatchery	WDFW	NA	55	CWT00096269	AD
5	20-Mar-23	637749	2019	Purdy Cr 16.0005	George Adams Hatchery	WDFW	637750	54	CWT00046503	AD
5	20-Mar-23	637626	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW	NA	60	CWT00088021	AD
5	20-Mar-23	637588	2019	Chambers Cr 12.0007	Garrison Hatchery	WDFW	NA	59	CWT00092514	AD
5	20-Mar-23	637745	2019	Friday Cr 03.0017	Samish Hatchery	WDFW	637746	59	CWT00096192	AD
5	20-Mar-23	56390	2019	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56389	66	CWT00096266	AD
5	20-Mar-23	211333	2019	Grovers Creek Hatchery	Grovers Creek Hatchery	SUQ	637775	52	CWT00096267	AD
							211339			
							637720			
5	20-Mar-23	637632	2019	Cascade R 03.1411	Marblemount Hatchery	WDFW	637633	71	CWT00096268	AD
							637634			
							637635			
5	23-Mar-23	637765	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW	NA	60	CWT00096250	AD
5	23-Mar-23	91393	2018	Santiam R S FK	South Santiam Hatchery	ODFW	NA	69	CWT00096251	AD
5	24-Mar-23	220196	2019	Captain Johns Pond	Lyons Ferry Hatchery	NPT	NA	65	CWT00046559	AD
5	25-Mar-23	637426	2019	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW	637427	61	CWT00046195	AD
5	26-Mar-23	637745	2019	Friday Cr 03.0017	Samish Hatchery	WDFW	637746	67	CWT00046196	AD
5	26-Mar-23	637720	2019	Grovers Cr 15.0299	Grovers Creek Hatchery	SUQ	637775	57	CWT00092290	AD
							211339			
							211333			
5	26-Mar-23	211409	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211410	66	CWT00096264	AD
5	26-Mar-23	637749	2019	Purdy Cr 16.0005	George Adams Hatchery	WDFW	637750	61	CWT00096265	AD

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5	27-Mar-23	91394	2018	Santiam R S FK	South Santiam Hatchery	ODFW	NA	78	CWT00046557	AD
5	27-Mar-23	637419	2019	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW	NA	54	CWT00092291	AD
5	27-Mar-23	62344	2020	Wickland Oil Terminal	Feather R Hatchery	CDFW	NA	65	CWT00092522	AD
5	27-Mar-23	56447	2020	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56446	68	CWT00096202	AD
5	31-Mar-23	91515	2020	Tanner Cr (Bnville)	Bonneville Hatchery	ODFW	NA	55	CWT00046537	AD
5	31-Mar-23	91516	2020	Big Cr (Lwr Col R)	Big Cr Hatchery	ODFW	NA	63	CWT00046556	AD
5	1-Apr-23	637615	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW	NA	62	CWT00096242	AD
5	1-Apr-23	56390	2019	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56389	79	CWT00096243	AD
5	2-Apr-23	90714	2019	Klaskanine R N FK	Klaskanine Hatchery	ODFW	NA	74	CWT00046538	AD
5	2-Apr-23	637922	2020	Purdy Cr 16.0005	George Adams Hatchery	WDFW	637923	51	CWT00046539	AD
5	2-Apr-23	637626	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW	NA	64	CWT00092292	AD
5	3-Apr-23	637704	2019	Cascade R 03.1411	Marblemount Hatchery	WDFW	NA	64	CWT00046540	AD
5	4-Apr-23	637426	2019	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW	637427	68	CWT00096244	AD
5	7-Apr-23	637627	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW	NA	61	CWT00046541	AD
5	7-Apr-23	637890	2020	Kendall Cr 01.0406	Kendall Cr Hatchery	WDFW	NA	55	CWT00046555	AD
5	7-Apr-23	637891	2020	Cascade R 03.1411	Marblemount Hatchery	WDFW	637892	NA	CWT00096240	AD
5	7-Apr-23	637749	2019	Purdy Cr 16.0005	George Adams Hatchery	WDFW	637750	57	CWT00096284	AD
5	7-Apr-23	637749	2019	Purdy Cr 16.0005	George Adams Hatchery	WDFW	637750	NA	CWT00096291	AD
5	9-Apr-23	637615	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW	NA	66	CWT00046197	AD
5	9-Apr-23	91515	2020	Tanner Cr (Bnville)	Bonneville Hatchery	ODFW	NA	58	CWT00046554	AD
5	9-Apr-23	91516	2020	Big Cr (Lwr Col R)	Big Cr Hatchery	ODFW	NA	52	CWT00096290	AD
5	9-Apr-23	91516	2020	Big Cr (Lwr Col R)	Big Cr Hatchery	ODFW	NA	56	CWT00096293	AD
5	10-Apr-23	637626	2019	Finch Cr 16.0222	Hoodsport Hatchery	WDFW	NA	65	CWT00096203	AD
5	10-Apr-23	637895	2020	Friday Cr 03.0017	Samish Hatchery	WDFW	637896	61	CWT00096214	AD
5	12-Apr-23	637743	2019	Wallace R 07.0940	Wallace R Hatchery	WDFW	637744	65	CWT00092441	AD
5	12-Apr-23	637856	2020	Finch Cr 16.0222	Hoodsport Hatchery	WDFW	NA	69	CWT00092442	AD
5	15-Apr-23	91499	2019	Deschutes R-2/OR	Round Butte Hatchery	ODFW	NA	69	CWT00046542	AD
5	15-Apr-23	637615	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW	NA	59	CWT00096253	AD
5	15-Apr-23	211409	2019	Tulalip Cr 07.0001	Bernie Gobin Hatch	TULA	211410	63	CWT00096292	AD
5	16-Apr-23	637742	2019	Kendall Cr 01.0406	Kendall Cr Hatchery	WDFW	NA	72	CWT00046200	AD
5	16-Apr-23	637901	2020	Wallace R 07.0940	Wallace R Hatchery	WDFW	637823	54	CWT00046543	AD
5	16-Apr-23	637901	2020	Wallace R 07.0940	Wallace R Hatchery	WDFW	637823	51	CWT00092293	AD
5	16-Apr-23	56278	2019	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56387	66	CWT00092294	AD
5	16-Apr-23	637745	2019	Friday Cr 03.0017	Samish Hatchery	WDFW	637746	64	CWT00092448	AD
5	16-Apr-23	211333	2019	Grovers Creek Hatchery	Grovers Creek Hatchery	SUQ	637775 211339 637720	67	CWT00096263	AD
5	17-Apr-23	56279	2020	Spring Cr 29.0159	Spring Cr Nfh	USFWS	56164	64	CWT00046553	AD

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5	17-Apr-23	637419	2019	Deschutes R 13.0028	Tumwater Falls Hatchery	WDFW	NA	67	CWT00096417	AD
5	17-Apr-23	637922	2020	Purdy Cr 16.0005	George Adams Hatchery	WDFW	637923	54	CWT00096418	AD
5	17-Apr-23	637762	2019	Lyons Ferry Rel.Site	Lyons Ferry Hatchery	WDFW	NA	58	CWT00096419	AD
5	22-Apr-23	91515	2020	Tanner Cr (Bnville)	Bonneville Hatchery	ODFW	NA	NA	CWT00092295	AD

**Appendix 5** Coded-wire tag (CWT) recoveries from the winter 2022-2023 Chinook MSF in Marine Area 10. Note: Not all tags have been processed before the writing of this report.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL(cm)	Label	Recovery Mark
10	2-Feb-23	637787	2020	Issaquah Cr 08.0178	Issaquah Hatchery	WDFW	NA	52	CWT00041222	AD
10	3-Feb-23	637921	2020	Minter Cr 15.0048	Minter Cr Hatchery	WDFW	NA	56	CWT00042284	AD
10	3-Feb-23	637428	2019	Icy Cr 09.0125	Icy Cr Hatchery	WDFW	NA	59	CWT00042285	AD
10	3-Feb-23	637921	2020	Minter Cr 15.0048	Minter Cr Hatchery	WDFW	NA	54	CWT00042286	AD
10	3-Feb-23	637871	2020	Gorst Cr 15.0216	Gorst Cr Rearing Pnd	SUQ	NA	40	CWT00042287	AD
10	3-Feb-23	637428	2019	Icy Cr 09.0125	Icy Cr Hatchery	WDFW	NA	66	CWT00083186	AD
10	3-Feb-23	637898	2020	Big Soos Cr 09.0072	Soos Creek Hatchery	WDFW	637899	55	CWT00083187	AD
10	5-Feb-23	637857	2020	Finch Cr 16.0222	Hoodsport Hatchery	WDFW	NA	53	CWT00038159	AD
10	5-Feb-23	637921	2020	Minter Cr 15.0048	Minter Cr Hatchery	WDFW	NA	60	CWT00038160	AD
10	5-Feb-23	637863	2020	Minter Cr 15.0048	Minter Cr Hatchery	WDFW	NA	58	CWT00083188	AD
10	6-Feb-23	637901	2020	Wallace R 07.0940	Wallace R Hatchery	WDFW	637823	55	CWT00038161	AD

**Appendix 6** Coded-wire tag (CWT) recoveries from the winter 2022-2023 Chinook MSF in Marine Area 11. Note: Not all tags have been processed before the writing of this report.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL(cm)	Label	Recovery Mark
11	3-Nov-22	637429	2019	Green R 09.0001	Palmer Hatchery	WDFW	NA	62	CWT00082717	AD
11	8-Nov-22	637428	2019	Icy Cr 09.0125	Icy Cr Hatchery	WDFW	NA	59	CWT00086445	AD
11	10-Nov-22	211339	2019	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637775	56	CWT00082718	AD
							211333			
							637720			
11	10-Nov-22	637614	2019	Minter Cr 15.0048	Minter Cr Hatchery	WDFW	NA	63	CWT00082800	AD
11	16-Nov-22	211333	2019	Grovers Cr Hatchery	Grovers Cr Hatchery	SUQ	637775	65	CWT00082798	AD
							211339			
							637720			

