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**2015-16 Winter Mark-Selective Recreational Chinook Fisheries  
In Marine Areas 5, 6, 7, 8-1, 8-2, 9, 10, 11, 12 and 13**

**Post-season Report**

**DRAFT**

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## INTRODUCTION

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

Since the Washington Department of Fish and Wildlife (WDFW) implemented the first marine mark-selective Chinook fisheries in Marine Catch 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 Puget Sound Marine Catch Areas during both the summer and winter seasons. As of the close of the summer 2016 fishing season, *summer* Chinook MSFs have occurred in Areas 5 and 6 for fourteen consecutive seasons, in Areas 9, 10, 11, and 13 for ten consecutive seasons and in Area 12 for five consecutive seasons. Additionally, *winter* Chinook MSFs have occurred in Areas 8-1 and 8-2 for eleven consecutive seasons, in Areas 7, 9 and 10 for nine consecutive seasons, in Areas 11 and 12 for seven consecutive seasons, in Area 6 for four seasons, and the second seasons for both Area 5 and Area 13<sup>2</sup>.

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<sup>1</sup> The regulations specific to winter Chinook MSFs in Puget Sound Marine Catch Areas allowed for the retention of up to two legal-sized ( $\geq 22$  inches [56 cm]) marked Chinook salmon per day and required the immediate release of all unmarked or sublegal Chinook. 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.

<sup>2</sup> For information regarding effort, harvest and impacts estimates related to these fisheries, see the references listed at the end of this report, or visit: <http://wdfw.wa.gov/publications/search.php?Cat=Fishing / Shellfishing&SubCat=Selective Fishing>. The 2014 summer mark-selective fisheries report is currently in preparation.

During the 2015-16 winter season (October 2015 through April 2016), WDFW implemented ten Chinook MSFs in Areas 5, 6, 7, 8-1, 8-2, 9, 10, 11, 12, 13. The scheduled seasons in each of the areas were as follows:

- Area 5 from October 1-31, 2015 and February 16, 2016 through April 30, 2016;
- Area 6 from December 1, 2015 through April 10, 2016;
- Area 7 from October 1-31, 2015 and December 1, 2015 through April 30, 2016;
- Areas 8-1 and 8-2 from November 1, 2015 through April 30, 2016;
- Area 9 from November 1-30, 2015 and January 16 – April 15, 2016;
- Area 10 from October 1, 2015 through January 31, 2016;
- Area 11 from October 1 – December 31, 2015 and February 1, 2016 - April 30, 2016;
- Area 12 from October 1 – December 31, 2015 and February 1 - April 30, 2016 and
- Area 13 from October 1, 2015 – April 30, 2016.

Consistent with the 2004 (and 2010 update) Puget Sound Chinook Harvest Management Plan (Puget Sound Indian Tribes and WDFW 2004 and 2010), a key goal of implementing each of these Chinook MSFs has been to provide meaningful opportunity to the recreational angling public while minimally impacting ESA-listed Puget Sound Chinook salmon.

#### Comprehensive Sampling and Monitoring Program

WDFW's Puget Sound Sampling Unit (PSSU) was tasked with implementing a comprehensive sampling and monitoring program in Areas 5, 6, 7, 8-1, 8-2, 9,10,11, 12 and 13 to collect the data needed to evaluate each Chinook MSF and its impact on unmarked salmon. Through state-tribal agreement (WDFW and NWIFC 2014), we developed area-specific sampling plans consisting of several comprehensive and complementary sampling components, including dockside creel sampling, test fishing, on-water or aerial effort surveys, and angler-completed voluntary trip reports (VTRs). We tailored area-specific sampling plans so that we could reliably estimate the following critical parameters needed for evaluating MSFs:

- i) the mark rate of the targeted Chinook population
- ii) the total number of Chinook salmon harvested (by size [legal or sublegal] and mark-status [marked or unmarked] group)
- iii) the total number of Chinook salmon released (by size and mark-status group)
- iv) the coded-wire tag (CWT) and/or DNA-based stock composition of marked and unmarked Chinook mortalities
- v) the total mortality of marked and unmarked double index tag (DIT) CWT stocks

In addition, we acquired and analyzed relevant data characterizing other aspects of the fisheries, including descriptors of fishing effort, fishing success (catch [landed Chinook] per unit effort), the length composition of encountered Chinook, and the overall intensity of our sampling efforts.

### Reporting Efficiencies

In July 2010, technical staffs from the WDFW Puget Sound Sampling Unit, Northwest Indian Fisheries Commission (NWIFC), and Puget Sound Treaty Tribes met to discuss potential reporting efficiencies in WDFW's Chinook MSF post-season reports. NWIFC and tribal representatives had initiated the idea for such a meeting, considering that WDFW had been submitting a separate post-season report for each area and season (since 2003) to the co-managers, resulting in redundancies between individual reports, particularly in the Methods section. Also, over the years we kept adding sections to the selective fishery annual reports, in response to individual tribal co-manager requests, and sustained those additions in each future report, resulting in ever-lengthening post-season reports. From both the WDFW and tribal technical perspectives, we needed to prioritize the most essential reporting elements and achieve efficiencies to streamline the selective fishery reporting work load.

Thus, at the July 2010 meeting the WDFW and tribal staffs worked on prioritizing the most essential elements (i.e., tables, figures, and appendices) needed in WDFW's annual post-season selective fishery reports in an effort to define reporting efficiencies. Based on these decisions (details available in a WDFW memo dated August 16, 2010 summarizing the July 2010 meeting), we began implementing reporting efficiencies starting with the 2009-10 winter Chinook MSF post-season report and continuing thereafter.

At the July 2010 meeting we also agreed that a key efficiency in the annual reporting process would be for WDFW staff to produce a centralized Methods Report. The Methods Report would be a stand-alone document that includes the details of each area's Chinook MSF study design (for both winter and summer fisheries), sampling procedures, data analysis methods, and all equations used to generate estimates and variances. Thus, we refer the reader to our Methods Report (WDFW 2012a) for detailed descriptions of the diverse study designs and protocols used to monitor and evaluate the Chinook MSFs in Areas 5, 6, 7, 8-1, 8-2, 9, 10, 11, 12 and 13.

In the following pages, we report the results generated through our monitoring activities during the 2015-16 winter Chinook MSFs. We report results based on our more efficient reporting format agreed-to between state and tribal technical representatives, in which we focus on presenting data tables and figures rather than interpretive text (unless text is needed to specify noteworthy in-season adjustments or other circumstances unique to the particular season). We present 2015-16 winter Chinook MSF results in separate chapters (1 through 7) by area, and within each chapter the data are presented in a series of tables and figures generally according to the following sequence: i) estimates of fishery characteristics obtained from the dockside creel survey data, including catch and effort total estimates, Chinook length-frequency data, and CWT recovery results; ii) results from our recreational test fishery (where applicable); iii) results from our VTR collection efforts; iv) total mortality estimates of marked and unmarked DIT CWT



*Draft; November 25, 2016*

stocks by hatchery and brood year; v) total fishery Chinook encounters and impacts—estimated based on creel survey and test fishery or VTR data—which we compare with pre-season expectations (based on Fishery Regulation Assessment Model [FRAM] predictions); vi) sample rate information based on dockside sampling of harvested Chinook; and vii) historical Chinook encounters estimates for each area’s winter Chinook MSF.

## **RESULTS**

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

The Washington Department of Fish and Wildlife (WDFW) implemented the first winter Chinook MSF in Marine Area 5 from October 1, 2015 – October 31, 2015; February 16, 2016 – April 10, 2016. Data collection methods used to monitor the Area 5 Chinook MSF included dockside angler interviews (with catch sampling).

WDFW dockside samplers conducted “Baseline Sampling” at selected access sites during the 2015-16 winter Chinook MSF in Area 5. Complete details of these methods are presented in a separate Methods Report (WDFW 2012a). Briefly, 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 Area 5 baseline sample frame included eight access sites (**Table 1.2**), and a total of 86 site visits during the four-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 Area 5 fishery at the selected access site. The interview and catch-sampling procedures employed were identical to those used in other MSFs. Thus, Area 5 samplers acquired information about: 1) angling effort (boat and angler trips, trip length), 2) encounters composition (retained and/or released) by species and mark status (marked vs. unmarked, Chinook and Coho salmon only), and 3) landed Chinook size (fork and total length) and age (scales were collected) 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, Area 5 sampling results could not be used to produce fishery-total estimates of effort, encounters (retained catch + releases), and unmarked-DIT Chinook impacts. However, 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-total level. Thus, 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 Area 5 winter 2015-16 Chinook MSF.

**Table 1.1** Observations of fishing effort, salmon harvest, and reported salmon releases, by week, for the October 1, 2015 – October 31, 2015, February 16, 2016 – April 10, 2016 winter Chinook 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.

StatWk	Start	End	Effort		Retained Fish			Released Fish		
			Boats	Anglers	Chin.AD	Chin.UM	Chin.UD	Chin.AD	Chin.UM	Chin.UK
40	1-Oct	5-Oct	126	315	0	0	0	1	1	16
41	6-Oct	12-Oct	142	367	0	0	0	9	12	44
42	13-Oct	19-Oct	78	196	0	0	0	0	0	13
43	20-Oct	26-Oct	36	67	0	0	0	2	1	1
44	27-Oct	31-Oct	1	2	1	1	1	0	0	0
October Sub-Total			383	947	1	1	1	12	14	74
8	16-Feb	21-Feb	7	16	1	0	0	2	2	0
9	22-Feb	28-Feb	25	56	8	0	0	14	21	0
10	29-Feb	6-Mar	14	38	10	0	0	12	20	0
11	7-Mar	13-Mar	2	4	0	0	0	0	0	0
12	14-Mar	20-Mar	24	54	6	0	0	18	16	0
13	21-Mar	27-Mar	10	20	5	0	0	11	5	0
14	28-Mar	3-Apr	31	68	22	0	0	59	14	21
15	4-Apr	10-Apr	26	65	15	0	2	24	19	0
16	11-Apr	17-Apr	31	72	28	1	0	20	25	0
17	18-Apr	24-Apr	27	56	17	0	0	7	15	0
18	25-Apr	30-Apr	11	23	13	0	0	3	3	18
Feb 16th - Apr 30th Sub-Total			208	472	125	1	2	170	140	39
<b>Season Total</b>			<b>591</b>	<b>1419</b>	<b>126</b>	<b>2</b>	<b>3</b>	<b>182</b>	<b>154</b>	<b>113</b>

**Table 1.2** List of sites sampled with the number of sampling events (site-days) during the 2015-16 winter Chinook MSF in Marine Area 5.

Location Name	Number of Site Days Sampled Per Month				Total Site-Days	% of Total
	October	February	March	April		
Curleys/Straitside	2	0	0	0	2	2.3%
Olson's East Docks	7	0	0	0	7	8.1%
Olson's Ramp & Docks	11	0	0	0	11	12.8%
Olson's Resort	8	7	22	21	58	67.4%
Olson's South Dock	2	0	0	0	2	2.3%
Olson's West Docks	4	0	0	0	4	4.7%
Port Angeles Boat Haven	1	0	0	0	1	1.2%
Van Rippers Resort	1	0	0	0	1	1.2%
<b>Grand Total</b>	<b>36</b>	<b>7</b>	<b>22</b>	<b>21</b>	<b>86</b>	<b>100.0%</b>

**Table 1.3** Summary of CWTs recovered from Chinook salmon harvested during the 2015-16 winter Chinook MSF in Marine Area 5. The field “Number DITs” indicates the number of tags that belonged to double-index tag groups.

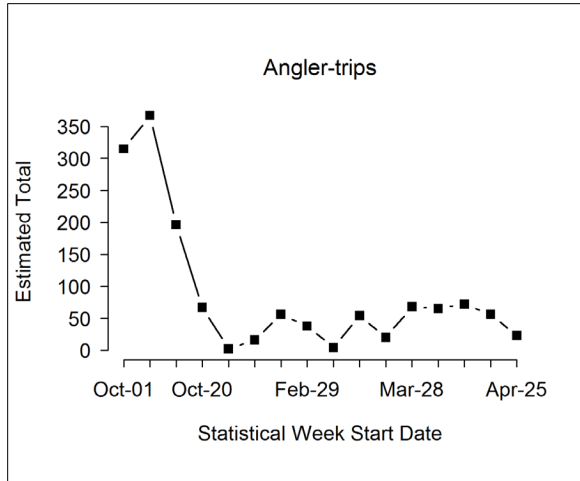
Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	Hood Canal (35.3%)	Finch Cr 16.0222	Hoodsport Hatchery	3 (17.6%)	0
		Purdy Cr 16.0005	George Adams Hatchery	3 (17.6%)	1
	N Puget Sound (23.5%)	Wallace R 07.0940	Wallace R Hatchery	4 (23.5%)	2
	Skagit River (5.9%)	Cascade R 03.1411	Marblemount Hatchery	1 (5.9%)	1
	S Puget Sound (11.8%)	Clear Cr 11.0013C	Clear Creek Hatchery	1 (5.9%)	1
		Minter Cr Tr 15.0051	Hupp Springs Rearing	1 (5.9%)	0
Col. Riv	Lower Columbia River (23.5%)	Gobar Cr 27.0073	Gobar Pond (27)	1 (5.9%)	0
		Mckenzie R 1	Mckenzie Hatchery	1 (5.9%)	0
		Santiam R & N Fk-1	Marion Forks Hatch	1 (5.9%)	0
		Tanner Cr (Bnville)	Bonneville Hatchery	1 (5.9%)	0
<b>Total</b>				<b>17</b>	<b>5</b>

**Table 1.4** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2016-15 winter Chinook MSF in Marine Area 5.

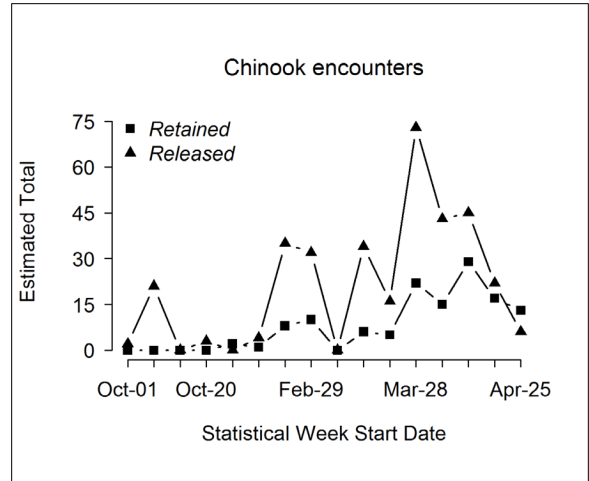
Mark Type	Legal	Sublegal	Total
Marked	117	8	125
Unmarked	1	0	1
Total	118	8	126

**Table 1.5** Fishery-total estimates of retained and released salmon (other than Chinook) during the 2015-16 winter Chinook MSF in Marine Area 5. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status.

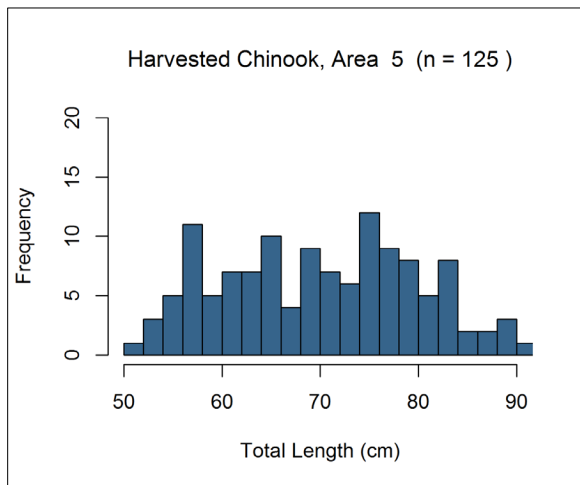
StatWk	Start	End	Retained Fish				Released Fish				
			CohoAD	CohoUM	Pink	Chum	Pink	CohoAD	CohoUM	CohoUK	UNK
40	1-Oct	5-Oct	91	407	1	0	0	88	136	131	468
41	6-Oct	12-Oct	92	415	0	0	18	87	101	354	379
42	13-Oct	19-Oct	34	213	0	0	0	53	82	147	549
43	20-Oct	26-Oct	3	48	0	2	0	16	34	19	107
44	27-Oct	31-Oct	0	1	0	0	0	0	0	2	0
October Sub-Total			220	1084	1	2	18	244	353	653	1503
8	16-Feb	21-Feb	0	0	0	0	0	0	0	0	0
9	22-Feb	28-Feb	0	1	0	0	0	1	1	0	0
10	29-Feb	6-Mar	0	0	0	0	0	0	0	0	0
11	7-Mar	13-Mar	0	0	0	0	0	0	1	0	0
12	14-Mar	20-Mar	0	0	0	0	0	0	0	0	0
13	21-Mar	27-Mar	0	0	0	0	0	0	0	0	0
14	28-Mar	3-Apr	0	0	0	0	0	0	0	0	0
15	4-Apr	10-Apr	0	0	0	0	0	0	0	0	0
16	11-Apr	17-Apr	0	0	0	0	0	0	0	0	0
17	18-Apr	24-Apr	0	0	0	0	0	0	0	0	0
18	25-Apr	30-Apr	0	0	0	0	0	0	0	0	0
Feb 16th - Apr 30th Sub-Total			0	1	0	0	0	0	0	0	0
<b>Season Total</b>			<b>220</b>	<b>1085</b>	<b>1</b>	<b>2</b>	<b>18</b>	<b>245</b>	<b>355</b>	<b>653</b>	<b>1503</b>



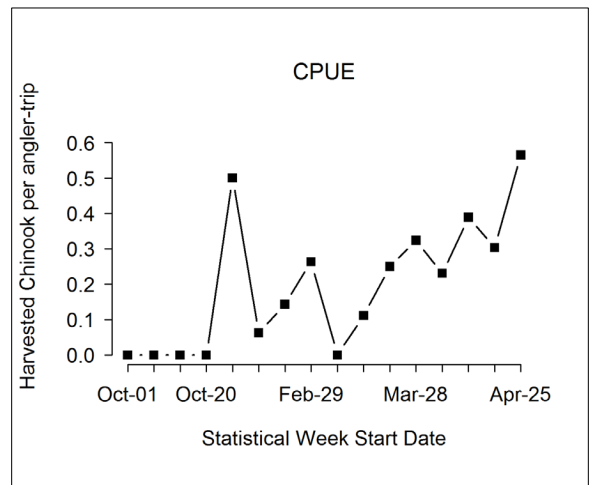
**Figure 1.1** Temporal patterns in fishing effort during the 2015-16 winter Chinook MSF in Marine Area 5. Note: displayed values are sample observations (summed across sampled sites)



**Figure 1.3** Temporal patterns in Chinook encounters (number retained and released) during the 2015-16 winter Chinook MSF in Marine Area 5. Note: displayed values are sample observations (summed across sampled sites)



**Figure 1.2** Length-frequency distributions of retained marked Chinook sampled in dockside angler interviews during the 2015-16 winter Chinook MSF in Marine Area 5.



**Figure 1.4** Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2015-16 winter Chinook MSF in Marine Area 5. Note: displayed values are sample observations (summed across sampled sites)

## **2) Marine Area 6 Winter Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented a winter Chinook MSF in Marine Area 6 for the fourth time from December 1, 2015 through April 10, 2016. WDFW's Puget Sound Sampling Unit (PSSU) implemented an intensive monitoring program in Area 6 throughout the season in order to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, aerial effort surveys and collection of VTRs 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 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 Area 6 winter Chinook MSF from December 1, 2015 through April 10, 2016. In addition to the major components of the results described previously (page 3), we present aerial survey and dockside data used to estimate the sample fraction in Area 6 (see WDFW 2012a, Aerial-Access Design). The four sites included in the Area 6 dockside sample frame are John Wayne Marina, Port Angeles Boat Haven, Ediz Hook and Coronet Ramp, which are assumed to be the highest-use access sites for Area 6 anglers. The Olympic Peninsula Derby took place from February 20-22 over portions of Marine Areas 6 and 9. Total derby effort was allocated to each Marine Area using the proportion of effort that occurred in each area based on dockside sampling efforts at designated weigh-in stations during the derby. Total catch by Marine Area was obtained from derby organizers.

**Table 2.1** Sampling/estimation details on target parameters associated with the overall Area 6 Chinook 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	Creel estimates were produced for two-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 $N=8$ available weekdays per two-week period. For the weekend stratum we sampled $n=2$ days out of $N=3$ available weekend days per week.
Aerial Surveys	Fraction of Area 6 effort (boats) captured in the four-site sample frame via creel surveys (Sample Fraction, $f_{ij}$ ).	Total boat counts at assumed peak effort time interval (instantaneous count); spatial distribution of fishing boats in the area.	Boats	Season	The sample fraction was calculated for individual aerial survey dates (see <b>Table 2.12</b> ; $n=12$ surveys conducted out of $N=161$ days available in the season). Season-wide sample fraction was calculated as the average sample fraction over the 12 individual aerial surveys.
Voluntary Trip Reports (VTRs)	Size (legal/sublegal) and mark-status (marked/unmarked) of encountered Chinook	Encounter data for non-Chinook species (e.g., Coho) that the angler may record on the VTR form	Fish encounter	Season	VTR data ( <b>Table 2.5</b> ) were used to estimate the size/mark-status proportions (LM = 19%, LU = 8%, SM = 59%, SU = 15%) needed to produce encounter and mortality estimates.
Overall Fishery Impacts Estimation	Total Chinook encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook	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.

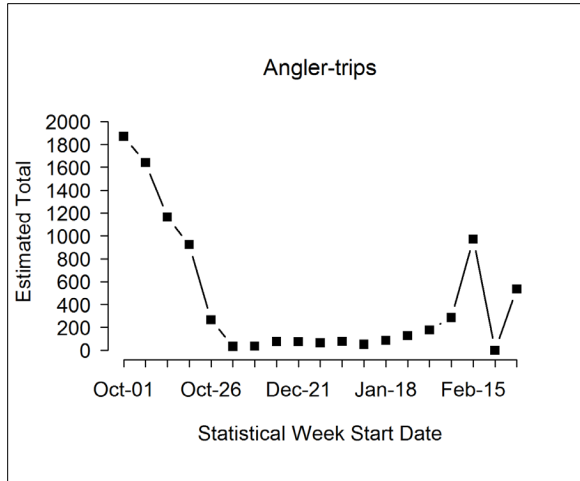
<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.

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

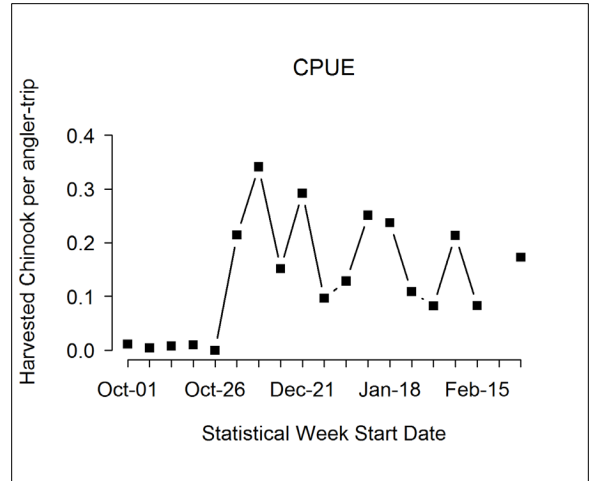
**Table 2.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2015-16 winter Chinook MSF in Marine Area 6. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

StatMonth	StatWk	Start.Date	End.Date	Boats	Anglers	Chin.AD.ret	Chin.UM.ret	Chin.AD.rel	Chin.UM.rel	Enc.Tot
10	40	1-Oct	4-Oct	802	1,869	21	0	92	53	166
10	41	5-Oct	11-Oct	808	1,641	7	0	29	17	53
10	42	12-Oct	18-Oct	579	1,164	9	0	40	23	71
10	43	19-Oct	25-Oct	470	923	9	0	40	23	71
10	44	26-Oct	31-Oct	148	266	0	0	0	0	0
October Total				2,807	5,863	46	0	201	115	361
Variance				72,725	323,411	83	0	18,684	2,817	46,944
SD				270	569	9	0	137	53	217
CV				10	10	20	0	68	46	60
95% CI				2,279-3,336	4,748-6,977	28-63	0-0	0-469	11-219	0-786
12	49	1-Dec	6-Dec	28	32	7	0	22	8	36
12	50	7-Dec	13-Dec	29	34	12	0	36	13	60
12	51	14-Dec	20-Dec	43	76	12	0	36	13	60
12	52	21-Dec	27-Dec	37	74	22	0	67	24	113
12/1	53/1	28-Dec	3-Jan	33	64	6	0	19	7	32
1	2	4-Jan	10-Jan	46	78	10	0	31	11	52
1	3	11-Jan	17-Jan	41	51	13	0	40	14	67
1	4	18-Jan	24-Jan	52	84	20	0	62	22	104
1	5	25-Jan	31-Jan	72	127	14	0	43	15	73
2	6	1-Feb	7-Feb	113	177	15	0	45	16	76
2	7	8-Feb	14-Feb	193	285	61	0	190	67	317
2	8	15-Feb	21-Feb	439	973	81	0	252	89	422
3	11	12-Mar	13-Mar	0	0	0	0	0	0	0
3	12	14-Mar	18-Mar	268	536	93	0	289	102	483
December - April Subtotal				1,392	2,591	363	0	1,134	400	1,897
Olympic Peninsula Derby				228	560	35	0	109	39	183
December - April Total				1,620	3,151	398	0	1,243	439	2,080
Variance				24,848	103,523	2,527	0	49,878	5,064	113,061
SD				158	322	50	0	223	71	336
CV				10	10	13	0	18	16	16
95% CI				1,311-1,929	2,520-3,782	299-497	0-0	805-1,681	299-578	1,421-2,739
<b>Season Total</b>				<b>4,427</b>	<b>9,014</b>	<b>444</b>	<b>0</b>	<b>1,444</b>	<b>554</b>	<b>2,441</b>
Variance				97,573	426,934	2,610	0	68,562	7,881	160,005
SD				312	653	51	0	262	89	400
CV				7%	7%	12%	0%	18%	16%	16%
95% CI				3,815-5,039	7,733-10,295	344-544	0-0	931-1,957	380-728	1,657-3,225

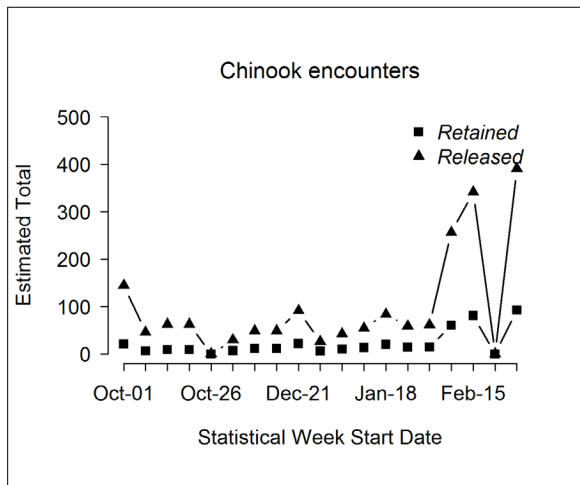




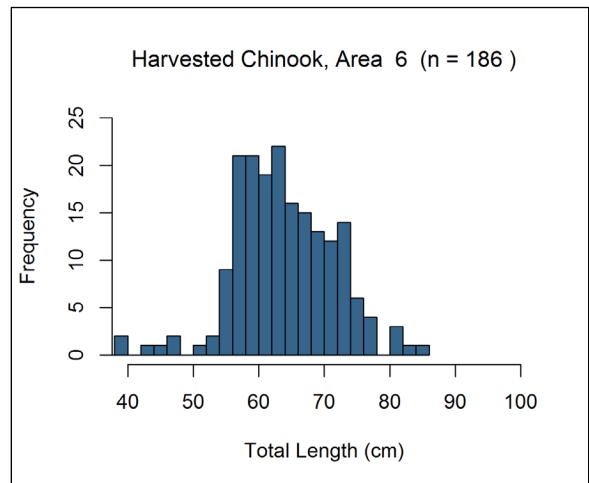
**Figure 2.1** Temporal patterns in fishing effort during the 2015-16 winter Chinook MSF in Marine Area 6.



**Figure 2.3** Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2015-16 winter Chinook MSF in Marine Area 6.



**Figure 2.2** Temporal patterns in Chinook encounters (number retained and released) during the 2015-16 winter Chinook MSF in Marine Area 6.



**Figure 2.4** Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2015-16 winter Chinook MSF in Marine Area 6.

**Table 2.3** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2015-16 winter Chinook MSF in Marine Area 6.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	168	18	186
Unmarked	1	0	1
<b>Total</b>	<b>169</b>	<b>18</b>	<b>187</b>

**Table 2.4** Summary of CWTs recovered from Chinook salmon harvested during the 2015-16 winter Chinook MSF in Marine Area 6. 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 (7.1%)	Kendall Cr 01.0406	Kendall Cr Hatchery	1 (7.1%)	0
	Hood Canal (42.9%)	Finch Cr 16.0222	Hoodsport Hatchery	1 (7.1%)	0
		Purdy Cr 16.0005	George Adams Hatchery	5 (35.7%)	2
	N Puget Sound (14.3%)	Wallace R 07.0940	Wallace R Hatchery	2 (14.3%)	1
	Mid Puget Sound (14.3%)	Grovers Cr 15.0299	Grovers Cr Hatchery	1 (7.1%)	1
			Grovers Cr Hatchery	1 (7.1%)	1
S Puget Sound (14.3%)	Minter Cr Tr 15.0051	Hupp Springs Rearing	2 (14.3%)	0	
Col Riv	Snake River (7.1%)	Lyons Ferry Rel.Site	Lyons Ferry Hatchery	1 (7.1%)	0
Total				14	5

**Table 2.5** Total Chinook encountered (retained and released) by private-boat anglers logging their trips on VTRs, with estimates of legal-size and overall (legal and sublegal) mark rates during the 2015-2016 winter Chinook MSF in Marine Area 6. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

Time Frame	Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
			AD	UM	AD	UM		Overall	Legal
Dec-Apr	Private VTR	108 1-trip VTRs, 191 Angler Trips	80	22	223	59	384	0.79	0.78
			Size/mark-status composition: 0.21 0.06 0.58 0.15		Variance: (0.0004) (0.0001) (0.0006) (0.0003)				
Oct	Private VTR	79 1-trip VTRs, 148 Angler Trips	4	12	39	8	63	0.68	0.25
			Size/mark-status composition: 0.06 0.19 0.62 0.13		Variance: (0.0010) (0.0025) (0.0038) (0.0018)				
Season	Private VTR	339 1-trip VTRs, 187 Angler Trips	84	34	262	67	447	0.77	0.71
			Size/mark-status composition: 0.19 0.08 0.59 0.15		Variance: (0.0003) (0.0002) (0.0005) (0.0003)				

**Table 2.6** Summary of season-wide fishery impact estimates for the 2015-16 winter Chinook MSF in Marine Area 6. 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	456	397	59	9	406	2,563	51	307 - 505	12
Legal UM	188	0	188	28	28	65	8	12 - 44	29
Sublegal AD	1,431	47	1,385	277	324	2473	50	226 - 421	15
Sublegal UM	365	0	365	73	73	200	14	45 - 101	19
<b>Total</b>	<b>2,441</b>	<b>444</b>	<b>1,997</b>	<b>387</b>	<b>831</b>	<b>5,301</b>	<b>73</b>	<b>688 - 973</b>	<b>9</b>

**Table 2.7** Comparison of modeled (FRAM model run 2115) and estimated total Chinook encounters for the 2015-16 winter Chinook MSF in Marine Area 6. 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	564	381	183	19
	AD	2,022	1,626	396	1,415
	Total	2,586	2,007	579	1,434
	% Marked	78	81	68	99
Estimated (Creel) Encounters	UM	553	188	365	0
	AD	1,887	456	1,431	444
	Total	2,441	644	1,797	444
	% Marked	77	71	80	100

**Table 2.8** Comparison of modeled (FRAM model run 2115) and estimated total Chinook mortalities for the 2015-16 winter Chinook MSF in Marine Area 6. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

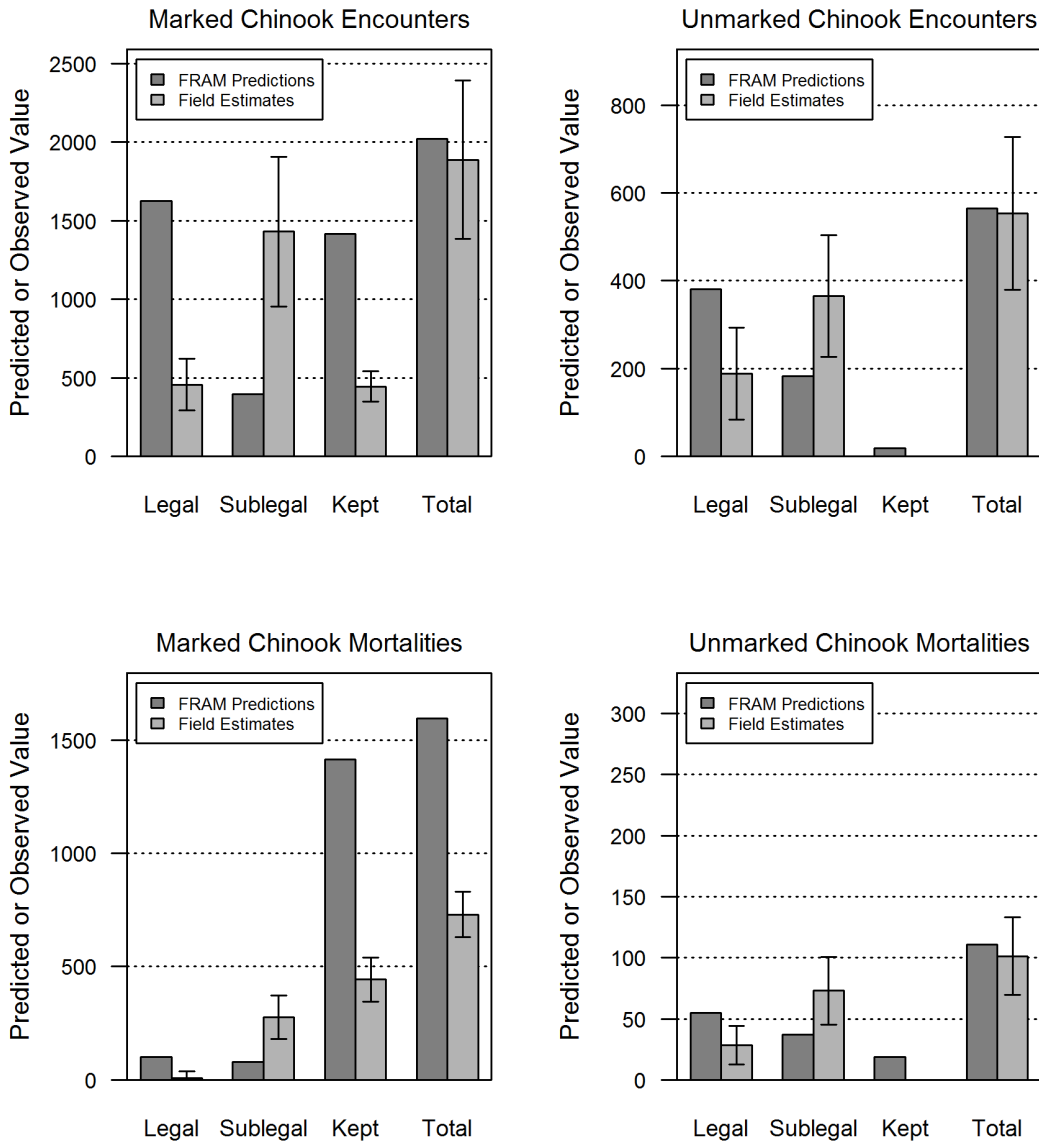
Mortality Category	FRAM Chinook Mortalities			Estimated Chinook Mortalities		
	UM	AD	Total	UM	AD	Total
Total (Landed + Released)	111	1,596	1,707	101	729	831
Released Legal	55	102	157	28	9	37
Released Sublegal	37	79	116	73	277	350
Landed Only	19	1,415	1,434	0	444	444

**Table 2.9** Monthly sample rates (Total retained Chinook sampled<sup>1</sup> / Estimated retained Chinook) for the 2015-16 winter Chinook MSF in Marine Area 6. 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	
October	40 - 44	01 Oct - 31 Oct	46	0	46	16	0	16	35.1
December	49 - 53/1	01 Dec - 03 Jan	58	0	58	11	1	12	20.8
January	2-5	04 Jan - 31 Jan	57	0	57	45	0	45	79.5
February	6-8	01 Feb - 21 Feb	190	0	190	82	0	82	52.5
March	11-12	12 Mar - 18 Mar	93	0	93	32	0	32	34.6
<b>Season Total</b>			<b>444</b>	<b>0</b>	<b>444</b>	<b>186</b>	<b>1</b>	<b>187</b>	<b>0.42</b>

**Table 2.10** Summary of double-index tagged (DIT) Chinook kept by anglers, and estimated total mortality of unmarked DIT Chinook due to hook-and-release impacts resulting from the 2015-16 winter Chinook MSF in Marine Area 6. 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)
George Adams Hatchery	2011	1	2.3	3.09	2.3	0.2	0.031	0.18
	2012	1	2.3	3.09	2.3	0.2	0.031	0.18
Grovers Cr Hatchery	2011	1	2.3	3.09	2.3	0.2	0.03	0.17
	2013	1	2.3	3.09	2.3	0.2	0.03	0.17
Wallace R Hatchery	2012	1	2.3	3.09	2.3	0.2	0.031	0.18
<b>Total</b>		<b>5</b>	<b>11.6</b>	<b>15.45</b>	<b>11.6</b>	<b>1.2</b>	<b>0.154</b>	<b>0.88</b>



**Figure 2.5** Comparison of modeled (FRAM model run 2115) and estimated total Chinook encounters and mortalities for the 2015-16 winter Chinook MSF in Marine Area 6. Error bars represent approximate 95% confidence intervals for field estimates.

**Table 2.11** Summary of double-index tagged (DIT) Chinook kept by anglers, and estimated total mortality of unmarked DIT Chinook due to hook-and-release impacts resulting from the 2015-16 winter Chinook MSF in Marine Area 6. 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)
George Adams Hatchery	2011	1	2.3	3.09	2.3	0.2	0.031	0.18
	2012	1	2.3	3.09	2.3	0.2	0.031	0.18
Grovers Cr Hatchery	2011	1	2.3	3.09	2.3	0.2	0.03	0.17
	2013	1	2.3	3.09	2.3	0.2	0.03	0.17
Wallace R Hatchery	2012	1	2.3	3.09	2.3	0.2	0.031	0.18
Total		5	11.6	15.45	11.6	1.2	0.154	0.88

**Table 2.12** Summary of aerial survey and dockside data used to estimate the fraction of effort captured in the four-site sample frame during the 2015-16 winter Chinook MSF in Marine Area 6. See Methods Report (WDFW 2012a) for computational details and notation.

Survey Date	Stratum	Aerial Survey Details			Dockside Sampling Details			Sample Fraction, $f_{ij}$
		Start Time	End Time	Total Boats, $m_{ij}$	Sampled Boats	Active Boats, $X_{ij}$	Total Boats, $S_{ijk}$	
3-Oct	WE	9:59	10:55	140	140	94	209	0.671
6-Oct	WD	9:30	10:21	97	77	47	159	0.485
15-Oct	WD	11:18	12:10	61	81	38	130	0.623
16-Oct	WE	10:40	11:30	103	90	45	206	0.437
<b>October Totals:</b>				<b>401</b>	<b>388</b>	<b>224</b>	<b>703</b>	
Mean:				100	97	56	176	0.554
St Dev:				32	29	26	38	0.25
CV(%):				32.3%	30.1%	45.8%	21.7%	45.1%
1-Dec	WD	10:00	10:44	11	10	8	14	0.727
11-Dec	WE	10:02	10:58	5	13	3	22	0.600
19-Dec	WE	9:56	11:00	16	41	16	41	1.000
2-Jan	WE	10:52	12:02	22	54	22	54	1.000
24-Jan	WE	11:54	12:55	13	7	6	15	0.462
5-Feb	WE	10:29	11:21	1	0	0		0.000
9-Feb	WD	12:34	13:18	15	20	9	33	0.600
13-Feb	WE	11:29	12:23	15	13	12	16	0.800
<b>December - April Totals:</b>				<b>98</b>	<b>158</b>	<b>76</b>	<b>195</b>	
Mean:				12	20	10	28	0.649
St Dev:				7	18	7	15	0.25
CV(%):				53.9%	93.0%	74.6%	55.2%	38.5%
<b>Season Totals:</b>				<b>499</b>	<b>546</b>	<b>300</b>	<b>899</b>	
Mean:				42	46	25	82	0.6171
St Dev:				47	44	27	78	0.269
CV(%):				112.6%	95.6%	108.5%	96.0%	43.6%

Draft; November 25, 2016

StatWk	Start.Date	End.Date	Coho.AD.ret	Coho.UM.ret	Chum.ret	Coho.AD.rel	Coho.UM.rel	Coho.UK.rel	Chum.rel	Unknown.salmonid.rel
40	1-Oct	4-Oct	538	1888	4	176	474	910	0	962
41	5-Oct	11-Oct	413	1569	9	111	279	851	3	709
42	12-Oct	18-Oct	192	1093	27	73	255	672	6	304
43	19-Oct	25-Oct	125	803	17	78	210	528	12	378
44	26-Oct	31-Oct	23	116	0	38	8	53	0	671
49	1-Dec	6-Dec	0	0	0	0	0	0	0	0
50	7-Dec	13-Dec	0	0	0	0	0	0	0	0
51	14-Dec	20-Dec	0	0	0	0	0	0	0	6
52	21-Dec	27-Dec	0	0	0	0	0	0	0	6
53.1	28-Dec	3-Jan	0	0	0	0	0	0	0	0
2	4-Jan	10-Jan	0	0	0	0	0	7	0	7
3	11-Jan	17-Jan	0	0	0	0	0	0	0	57
4	18-Jan	24-Jan	0	0	0	0	0	0	0	67
5	25-Jan	31-Jan	0	0	0	0	0	0	0	18
6	1-Feb	7-Feb	0	0	0	0	0	0	0	24
7	8-Feb	14-Feb	0	0	0	0	0	0	0	16
8	15-Feb	21-Feb	0	0	0	0	0	0	0	34
11	12-Mar	13-Mar	0	0	0	0	0	0	0	0
12	14-Mar	18-Mar	0	0	0	0	0	0	0	9
<b>Total</b>			<b>1,291</b>	<b>5,470</b>	<b>57</b>	<b>475</b>	<b>1,225</b>	<b>3014</b>	<b>21</b>	<b>3023</b>
Variance			19,215	171,514	122	5,178	16,908	93162	48	84,546
SE			139	414	11	72	130	305	7	291
CV			11.0%	80.0%	19.0%	15.0%	11.0%	10.1%	33.0%	9.6%
95% CI			1,019-1,563	4,659-6,281	35-79	334-616	970-1,480	2,416-3,612	7-35	2,453-3,593

**Table 2.13** Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Area 6 Winter Chinook 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.

Area	Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
			LM	LU	SM	SU	LM	LU	SM	SU	
6	Dec 1, 2012 - Apr 10, 2013	4,916	1,395	21	14	0	209	385	315	135	2,474
6	Dec 1, 2013 - Apr 10, 2014	4,323	2,117	13	72	0	316	372	742	165	3,797
6	Dec 1, 2014 - Apr 10, 2015	6,751	2,215	3	40	0	331	417	1,124	229	4,358
6	Oct 1, 2015 - Apr 10, 2016	9,014	397	0	47	0	59	188	1,385	366	2,441



### **3) Marine Area 7 Winter Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented a ninth consecutive winter Chinook MSF in Marine Area 7 from October 1 – 31, 2015 and from December 1, 2015 through February 15, 2016. WDFW's Puget Sound Sampling Unit (PSSU) implemented an intensive monitoring program in Area 7 throughout the season in order to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, aerial effort surveys, test fishing and collection of VTRs 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 this section we present results from our monitoring activities during the Area 7 winter Chinook MSF from October 1 – 31, 2015 and from December 1, 2016 through February 15, 2016. In addition to the major components of the results described previously, we present aerial survey and dockside data used to estimate the sample fraction in Area 7 (see WDFW 2012a, Aerial-Access Design). The three sites included in the Area 7 dockside sample frame are Washington Park Ramp, Bellingham Ramp and Coronet Ramp, which are assumed to be the highest-use access sites for Area 7 anglers. Due to safety concerns and in an effort to improve sampling efficiencies, we modified the flight path of Area 7 aerial surveys to exclude the area of open water north of Patos Island beginning in December 2012. An examination of flight survey data from previous years suggests that approximately 5% of the boats observed during flights were located in this area. Given the limited amount of effort occurring in this area we assumed the effect on effort and harvest estimates would be negligible.

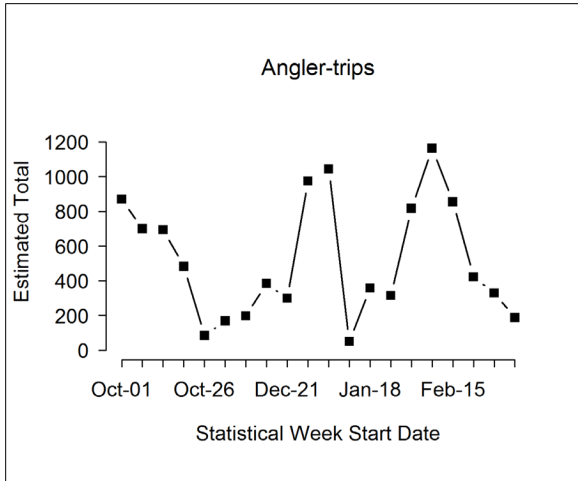
**Table 3.1** Sampling/estimation details on target parameters associated with the overall Area 7 Chinook MSF monitoring program.

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	Creel estimates were produced for two-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 $N=8$ available weekdays per two-week period. For the weekend stratum we sampled $n=2$ days out of $N=3$ available weekend days per week.
Aerial Surveys	Fraction of Area 7 effort (boats) captured in the four-site sample frame via creel surveys (Sample Fraction, $f_{ij}$ ).	Total boat counts at assumed peak effort time interval (instantaneous count); spatial distribution of fishing boats in the area.	Boats	Season	The sample fraction was calculated for individual aerial survey dates (see <b>Table 3.13</b> ; $n=15$ surveys conducted out of $N=106$ days available in the season). Season-wide sample fraction was calculated as the average sample fraction over the 11 individual aerial surveys.
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	We used the test fishery data only to estimate the size/mark-status proportions (LM = 20%, LU = 8%, SM = 28%, SU = 8%; <b>Table 3.6</b> ) needed to produce encounter and mortality estimates.
Voluntary Trip Reports (VTRs)	Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook	Encounter data for non-Chinook species (e.g., Coho) that the angler may record on the VTR form	Fish encounter	Season	VTR data ( <b>Table 3.5</b> ) were not used for impact estimation steps due to the assumed higher data quality and sufficient sample size of test fishery data. See comment in row above.
Overall Fishery Impacts Estimation	Total Chinook encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook	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.

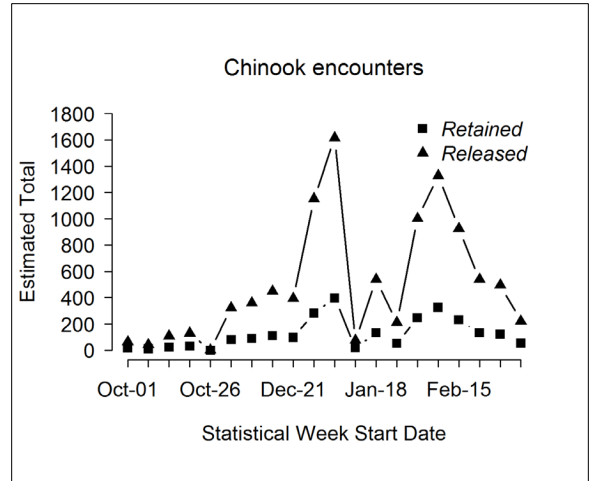
<sup>1</sup> The length and CWT composition of landed catch was assessed on a season-wide basis for impact estimation.<sup>2</sup> Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery.

**Table 3.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2015-16 winter Chinook MSF in Marine Area 7. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

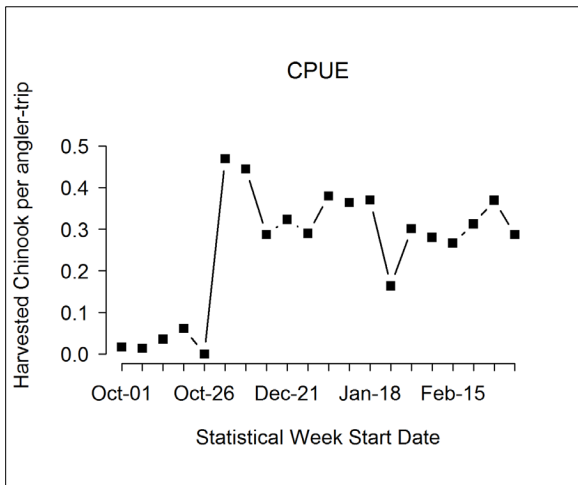
Month	Stat Week	Start Date	End Date	Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
October	40	1-Oct	4-Oct	379	869	14	0	36	26	76
	41	5-Oct	11-Oct	349	699	10	0	24	18	51
	42	12-Oct	18-Oct	322	694	25	0	62	46	132
	43	19-Oct	25-Oct	253	482	30	0	74	55	159
	44	26-Oct	31-Oct	43	85	0	0	0	0	0
<b>October Total:</b>				1,345	2,830	78	0	196	144	419
<b>Variance:</b>				33,229	158,834	1,372	0	12,364	2,900	44,131
<b>Standard Error:</b>				182	399	37	0	111	54	210
<b>CV (%):</b>				14	14	48	0	57	37	50
<b>95% CI:</b>				988-1,703	2,049-3,612	5-150	0-0	0-414	39-250	7-830
Dec - Apr	49	1-Dec	6-Dec	79	169	79	0	184	139	402
	50	7-Dec	13-Dec	111	199	88	0	206	155	449
	51	14-Dec	20-Dec	194	385	110	0	257	193	560
	52	21-Dec	27-Dec	156	298	96	0	224	169	490
	53/1	28-Dec	3-Jan	471	975	282	0	657	495	1,434
	2	4-Jan	10-Jan	515	1,043	396	0	922	694	2,012
	3	11-Jan	17-Jan	28	51	18	0	43	32	93
	4	18-Jan	24-Jan	176	357	132	0	307	231	671
	5	25-Jan	31-Jan	153	316	52	0	120	90	262
	6	1-Feb	7-Feb	436	817	246	0	573	431	1,250
	7	8-Feb	14-Feb	614	1,163	326	0	758	570	1,654
	8	15-Feb	21-Feb	420	855	228	3	530	395	1,156
9	22-Feb	28-Feb	228	422	132	0	307	231	671	
10	29-Feb	6-Mar	173	329	122	0	283	213	618	
11	7-Mar	13-Mar	98	188	54	0	126	94	274	
<b>Subtotal</b>				3,853	7,566	2,362	3	5,497	4,133	11,995
<b>Resurrection Derby</b>				73	222	48	0	112	84	244
<b>Friday Harbor Classic</b>				155	281	85	0	198	149	432
<b>Roche Harbor Derby</b>				100	343	93	0	216	163	472
<b>Dec - Apr Total</b>				4181	8412	2588	3	6023	4529	13143
<b>Variance</b>				272,717	1,000,203	134,768	6	2,498,924	799,407	7,908,561
<b>SD</b>				522	1000	367	2	1581	894	2,812
<b>CV</b>				12	12	14	70	26	20	21
<b>95% CI</b>				3,157-5,204	6,452 - 10,372	1,868-3,307	0-8	2,925-9,122	2,776-6,281	7,631-18,655
<b>Season Total</b>				<b>5,526</b>	<b>11,242</b>	<b>2,666</b>	<b>3</b>	<b>6,219</b>	<b>4,673</b>	<b>13,562</b>
<b>Variance</b>				305,946	1,159,037	136,140	6	2,511,288	802,307	7,952,692
<b>SD</b>				553.1239	1076.586	368.9715	2.44949	1584.704	895.7159	2820.052
<b>CV</b>				10%	10%	14%	82%	25%	19%	21%
<b>95% CI</b>				4,442-6,610	9,132-13,352	1,943-3,389	0-8	3,113-9,325	2,917-6,429	8,035-19,089



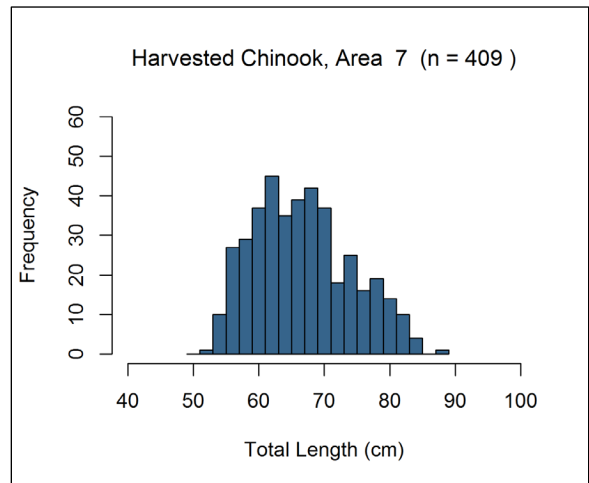
**Figure 3.1** Temporal patterns in fishing effort during the 2015-16 winter Chinook MSF in Marine Area 7.



**Figure 3.3** Temporal patterns in Chinook encounters (number retained and released) during the 2015-16 winter Chinook MSF in Marine Area 7.



**Figure 3.2** Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2015-16 winter Chinook MSF in Marine Area 7.



**Figure 3.4** Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2015-16 winter Chinook MSF in Marine Area

**Table 3.3** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the Area 7 Chinook MSF from October 1-31, 2015 (left panel) and December 1, 2015 - April 30, 2016 (right panel).

Marked Type	Number Sampled			Marked Type	Number Sampled		
	Legal-size	Sublegal-Size	Total		Legal-size	Sublegal-Size	Total
Marked	11	0	11	Marked	376	22	398
Unmarked	0	0	0	Unmarked	2	0	2
<b>Total</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>Total</b>	<b>378</b>	<b>22</b>	<b>400</b>

**Table 3.4** Summary of CWTs recovered from Chinook salmon harvested during the 2015-16 winter Chinook MSF in Marine Area 7. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

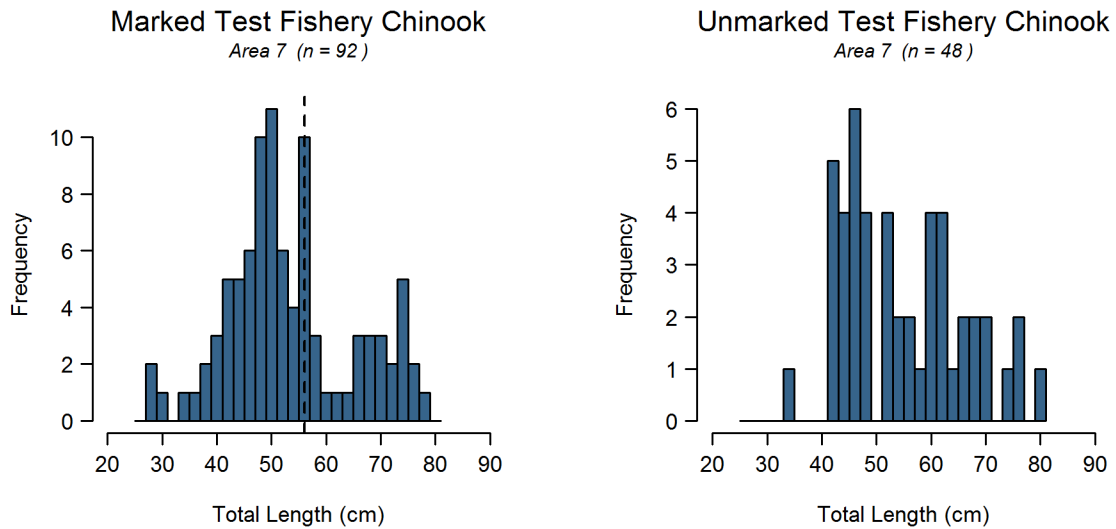
Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
BC	Georgia Strait (1.8%)	R-Cowichan R	H-Cowichan River H	1 (1.8%)	0
WA	N Washington (10.7%)	Friday Cr 03.0017	Samish Hatchery	1 (1.8%)	1
		East Sound Bay (San)	Glenwood Springs	1 (1.8%)	0
		Kendall Cr 01.0406	Kendall Cr Hatchery	4 (7.1%)	0
	Hood Canal (8.9%)	Finch Cr 16.0222	Hoodsport Hatchery	2 (3.6%)	0
		Purdy Cr 16.0005	George Adams Hatchery	3 (5.4%)	0
	N Puget Sound (37.5%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	5 (8.9%)	5
		Wallace R 07.0940	Wallace R Hatchery	16 (28.6%)	9
	Skagit River (26.8%)	Cascade R 03.1411	Marblemount Hatchery	13 (23.2%)	8
		County Line Cr3.2363	Marblemount Hatchery	2 (3.6%)	0
	Mid Puget Sound (8.9%)	Big Soos Cr 09.0072	Soos Creek Hatchery	4 (7.1%)	4
		Grovers Cr 15.0299	Grovers Cr Hatchery	1 (1.8%)	1
	S Puget Sound (5.4%)	Clear Cr 11.0013C	Clear Creek Hatchery	1 (1.8%)	1
		Minter Cr 15.0048	Minter Cr Hatchery	1 (1.8%)	0
Minter Cr Tr 15.0051		Hupp Springs Rearing	1 (1.8%)	0	
<b>Total</b>				<b>56</b>	<b>29</b>

**Table 3.5** Total Chinook encountered (retained and released) by private-boat anglers logging their trips on VTRs, with estimates of legal-size and overall (legal and sublegal) mark rates during the 2015-16 winter Chinook MSF in Marine Area 7. 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	16 1-trip VTRs, 28 Angler Trips	16	2	26	8	52	0.81	0.89
Size/mark-status composition:		0.31	0.04	0.50	0.15			
Variance:		(0.0042)	(0.0007)	(0.0049)	(0.0026)			

**Table 3.6** Composition of test fishery Chinook encounters and associated mark-rate and size/mark-status proportion estimates from the 2015-16 winter Chinook MSF in Marine Area 7. AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hrs Fished	AD	UM	AD	UM	
40	1	7	1	1	2	1	5
41	2	12	1	1	2	3	7
42	4	24	1	1	6	4	12
44	3	14	0	0	5	1	6
50	3	15	2	5	3	0	10
51	4	24	3	1	9	3	16
52	1	6	1	0	0	2	3
2	4	24	4	1	3	3	11
3	3	15	2	1	4	1	8
4	1	3	1	0	1	0	2
5	1	6	1	1	5	1	8
6	1	6	0	0	1	0	1
7	4	26	1	1	7	6	15
8	2	12	1	0	6	1	7
9	4	26	8	6	8	2	24
11	2	11	1	1	2	0	4
<b>Total</b>	<b>40</b>	<b>232</b>	<b>28</b>	<b>20</b>	<b>64</b>	<b>28</b>	<b>140</b>
<b>Size/mark-status composition:</b>			0.20	0.08	0.28	0.17	
<b>Legal size mark rate:</b>			0.5833				
<b>Overall mark rate:</b>			0.6592				



**Figure 3.5** Length-frequency distributions of marked (*left panel*) and unmarked (*right panel*) Chinook encountered by test fishers during the 2015-16 winter Chinook MSF in Marine Area 7. The vertical dashed line in the left panel corresponds to the legal size limit (22 in or 56 cm).

We used Pearson’s chi-square test to compare the Chinook size and mark-status composition of the Area 7 test fishery and VTR data. Results suggest no significant difference in composition between the two data sets ( $\chi^2 = 6.1046$ ,  $df = 3$ ,  $p > 0.05$ ), indicating that they could be combined. Given the sufficient sample sizes in the test fishery data (and assuming higher data quality), we elected to use only this data as an estimate of the Chinook size/mark-status proportions needed for estimating total Chinook encounters and associated mortalities in the Area 7 mark-selective fishery.

**Table 3.7** Summary of season-wide fishery impact estimates for the 2015-16 winter Chinook MSF in Marine Area 7. 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.

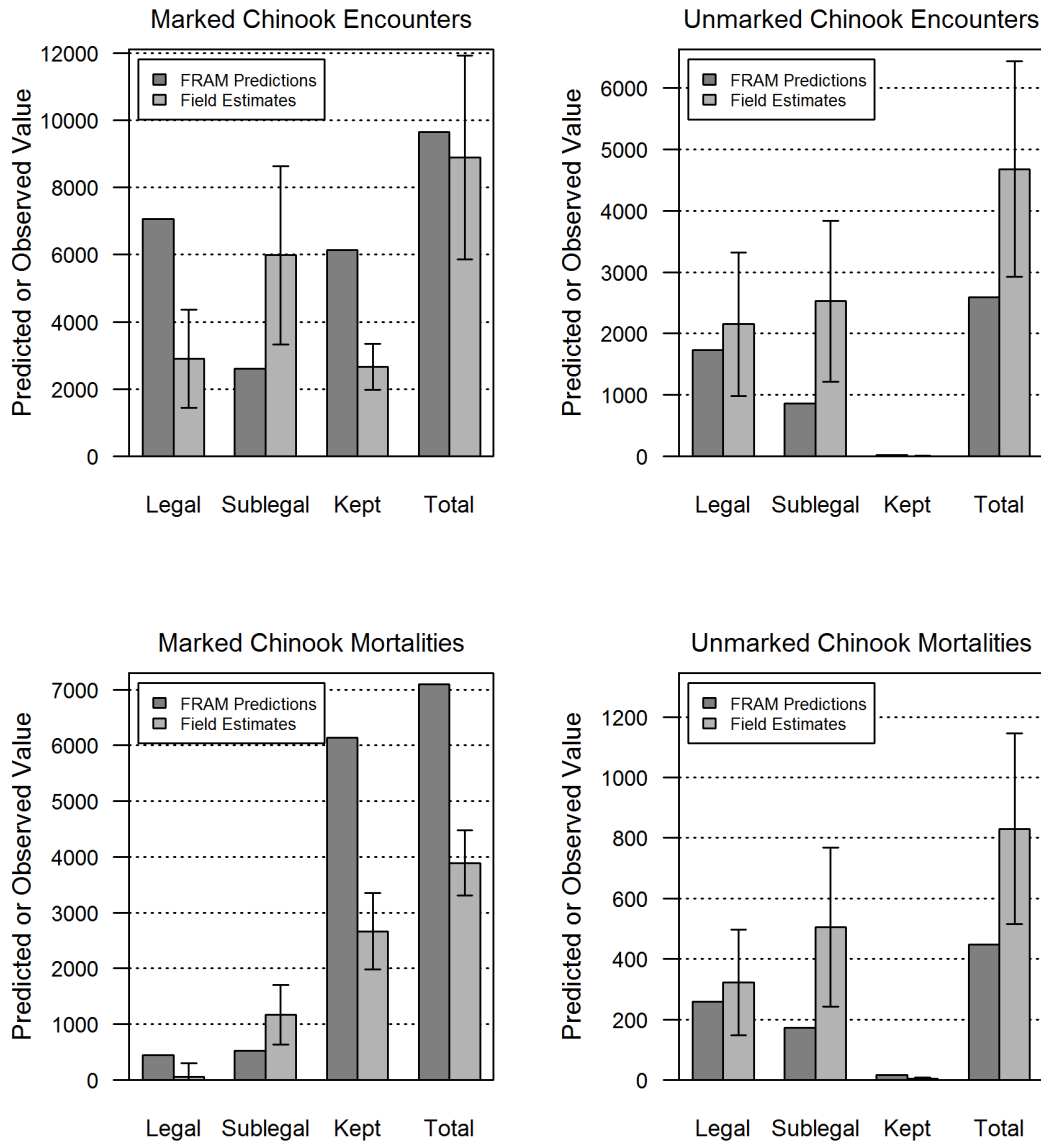
Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
Legal AD	2,899	2,522	377	57	2,579	137,633	371	1,852 - 3,306	14%
Legal UM	2151	3	2148	322	326	7948	89	151 - 500	27%
Sublegal AD	5,986	143	5,843	1169	1312	74,443	273	777 - 1,846	21%
Sublegal UM	2525	0	2525	505	505	17,973	134	242 - 768	27%
<b>Total</b>	<b>13,561</b>	<b>2,669</b>	<b>10,893</b>	<b>2,052</b>	<b>4,721</b>	<b>237,997</b>	<b>488</b>	<b>3,765 - 5,677</b>	<b>10%</b>

**Table 3.8** Comparison of modeled (FRAM model run 2115) and estimated total Chinook encounters for the 2015-16 winter Chinook MSF in Marine Area 7. 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	2592	1727	865	17
	AD	9,656	7,052	2,604	6,135
	Total	12,248	8,779	3,469	6,152
	% Marked	79	80	75	100
Estimated (Creel) Encounters	UM	4,676	2151	2525	3
	AD	8,885	2,899	5,986	2,665
	Total	13,561	5,050	8,511	2,669
	% Marked	66	57	70	100

**Table 3.9** Comparison of modeled (FRAM model run 2115) and estimated total Chinook mortalities for the 2015-16 winter Chinook MSF in Marine Area 7. 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)	448	7,100	7,548	831	3891	4721
Released Legal	258	444	702	322	57	379
Released Sublegal	173	521	694	505	1169	1674
Landed Only	17	6,135	6,152	3	2665	2669



**Figure 3.6** Comparison of modeled (FRAM model run 2115) and estimated total Chinook encounters and mortalities for the 2015-15 winter Chinook MSF in Marine Area 7. Error bars represent approximate 95% confidence intervals for field estimates



**Table 3.10** Summary of double-index tagged (DIT) Chinook kept by anglers, and estimated total mortality of unmarked DIT Chinook due to hook-and-release impacts resulting from the 2015-16 winter Chinook MSF in Marine Area 7. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Bernie Gobin Hatch	2011	1	6.5	35.48	6.6	0.7	0.366	0.6
	2012	3	20	114.01	20.8	2.1	1.227	1.92
	2013	1	6.5	35.48	6.4	0.6	0.35	0.59
Clear Creek Hatchery	2012	1	6.5	35.48	6.8	0.7	0.385	0.62
Grovers Cr Hatchery	2012	1	6.5	35.48	6.4	0.6	0.351	0.59
Marblemount Hatchery	2011	1	6.5	35.48	6.5	0.6	0.355	0.6
	2012	4	19.4	106.44	26.3	8.5	36.588	7.78
	2013	3	19.4	106.44	19.5	2	1.074	1.79
Samish Hatchery	2013	1	6.5	35.48	6.5	0.6	0.356	0.6
Soos Creek Hatchery	2012	2	13	70.96	13.8	1.4	0.808	1.27
	2013	2	13	70.96	12.9	1.3	0.707	1.19
Wallace R Hatchery	2012	8	52.4	291.42	52.5	5.3	2.923	4.83
	2013	1	6.5	35.48	6.6	0.7	0.366	0.61
<b>Total</b>		<b>29</b>	<b>182.6</b>	<b>1008.61</b>	<b>191.6</b>	<b>25</b>	<b>45.854</b>	<b>22.99</b>

**Table 3.11** Monthly sample rates (Total retained Chinook sampled<sup>1</sup> / Estimated retained Chinook) for the 2015-16 winter Chinook MSF in Marine Area 7. 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	
October	40 - 44	01 Oct - 31 Oct	78	0	78	11	0	11	14.1
December	49 - 53/1	01 Dec - 03 Jan	790	0	790	112	0	112	14.2
January	2-5	04 Jan - 31 Jan	691	0	691	135	1	136	19.7
February	6-9	01 Feb - 28 Feb	931	3	935	126	1	127	13.6
March	10-11	29 Feb - 13 Mar	176	0	176	25	0	25	14.2
<b>Season Total</b>			<b>2,666</b>	<b>3</b>	<b>2,670</b>	<b>409</b>	<b>2</b>	<b>411</b>	<b>15.4</b>

<sup>1</sup> Number of retained Chinook sampled includes all retained Chinook inspected for CWTs, from all sites sampled during the winter 2015-16 Area 7 Chinook MSF (the three sample-frame sites included in the creel estimates, derby samples, and the fish sampled as part of baseline sampling in Area 7)

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**Table 3.12** Fishery-total estimates of retained and released salmon (*other than Chinook*) during the 2015-16 winter Chinook MSF in Marine Area 7. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status.

Week	Start Date	End Date	Kept Salmon			Released Salmon			
			Coho AD	Coho UM	Chum	Coho AD	Coho UM	Coho Unk	UNK
40	1-Oct	4-Oct	188	353	5	7	45	87	0
41	5-Oct	11-Oct	109	240	5	10	57	143	0
42	12-Oct	18-Oct	136	397	5	46	51	143	25
43	19-Oct	25-Oct	57	259	0	56	26	39	0
44	26-Oct	31-Oct	0	26	0	0	0	13	0
49	1-Dec	6-Dec	0	0	0	0	0	0	0
50	7-Dec	13-Dec	0	0	0	0	0	0	0
51	14-Dec	20-Dec	0	0	0	0	0	0	0
52	21-Dec	27-Dec	0	0	0	0	0	0	0
53/1	28-Dec	3-Jan	0	0	0	0	0	3	4
2	4-Jan	10-Jan	0	0	0	3	0	0	0
3	11-Jan	17-Jan	0	0	0	0	0	0	0
4	18-Jan	24-Jan	0	0	0	0	0	0	0
5	25-Jan	31-Jan	0	0	0	0	0	0	0
6	1-Feb	7-Feb	0	0	0	0	0	0	0
7	8-Feb	14-Feb	0	0	0	0	0	0	0
8	15-Feb	21-Feb	0	0	0	0	0	0	0
9	22-Feb	28-Feb	0	0	0	0	0	0	0
10	29-Feb	6-Mar	0	0	0	0	0	0	0
11	7-Mar	13-Mar	0	0	0	0	0	0	0
<b>Season Total:</b>			<b>491</b>	<b>1276</b>	<b>15</b>	<b>202</b>	<b>179</b>	<b>425</b>	<b>25</b>
<b>Variance:</b>			<b>6267</b>	<b>63432</b>	<b>31</b>	<b>1358</b>	<b>3418</b>	<b>8304</b>	<b>260</b>
<b>Standard Error:</b>			<b>79</b>	<b>252</b>	<b>6</b>	<b>37</b>	<b>58</b>	<b>91</b>	<b>16</b>
<b>CV (%):</b>			<b>16</b>	<b>20</b>	<b>38</b>	<b>18.2%</b>	<b>33</b>	<b>21</b>	<b>65</b>
<b>95% CI:</b>			<b>335 - 646</b>	<b>782 - 1,769</b>	<b>4 - 26</b>	<b>0-546</b>	<b>65 - 294</b>	<b>247 - 604</b>	<b>0 - 56</b>

**Table 3.13** Summary of aerial survey and dockside data used to estimate the fraction of effort captured in the three-site sample frame during the 2015-16 winter Chinook MSF in Marine Area 7. See Methods Report (WDFW 2012a) for computational details and notation.

Survey Date	Stratum	Aerial Survey Details			Dockside Sampling Details			Sample Fraction, $f_{ij}$
		Start Time	End Time	Total Boats, $m_{ij}$	Sampled Boats	Active Boats, $X_{ij}$	Total Boats, $S_{yijk}$	
3-Oct	WE	10:55	11:56	126	35	14	315	0.111
6-Oct	WD	10:21	11:30	58	43	20	125	0.345
15-Oct	WD	12:10	13:17	46	35	16	101	0.348
16-Oct	WE	11:30	12:37	77	49	32	118	0.416
<b>October Totals:</b>				<b>307</b>	<b>162</b>	<b>82</b>	<b>658</b>	
Mean:				77	41	21	165	0.305
St Dev:				35	7	8	101	0.25
CV(%):				11.5%	4.2%	9.8%	15.3%	
1-Dec	WD	10:44	11:48	41	10	9	46	0.220
11-Dec	WE	10:58	12:05	18	28	16	32	0.889
19-Dec	WE	11:00	12:04	35	30	19	55	0.543
20-Dec	WE	12:35	13:40	10	7	4	18	0.400
2-Jan	WE	12:02	13:14	143	88	75	168	0.524
24-Jan	WE	12:56	14:07	71	55	29	135	0.408
5-Feb	WE	11:21	12:30	17	0	0		0.000
9-Feb	WD	11:32	12:34	87	58	41	123	0.471
13-Feb	WE	12:23	13:30	32	27	10	86	0.313
24-Feb	WD	10:36	11:57	45	26	24	49	0.533
26-Feb	WE	10:12	11:11	53	51	26	104	0.491
<b>December - April Totals:</b>				<b>552</b>	<b>380</b>	<b>253</b>	<b>814</b>	
Mean:				50	35	23	81	0.436
St Dev:				69	37	22	149	0.25
CV(%):				12.5%	9.8%	8.8%	18.3%	
<b>Season Totals:</b>				<b>859</b>	<b>542</b>	<b>335</b>	<b>1473</b>	
Mean:				57	36	22	105	0.401
St Dev:				38	23	18	75	0.21
CV(%):				4.5%	4.2%	5.4%	5.1%	

**Table 3.14** Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Area 7 Winter Chinook 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.

Area	Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
			LM	LU	SM	SU	LM	LU	SM	SU	
7	Feb 1 - Feb 29, 2008	4,862	1,301	2	24	0	200	1,042	244	155	2,967
7	Feb 1 - Apr 15, 2009	8,167	1,406	9	14	0	210	708	139	17	2,501
7	Dec 1, 2009 - Apr 30, 2010	9,589	1,400	0	18	0	209	673	150	74	2,524
7	Dec 1, 2010 - Apr 30, 2011	11,814	2,368	4	10	0	354	1,988	521	531	5,776
7	Dec 1, 2011 - Apr 30, 2012	10,536	2,359	0	54	0	353	1,446	1,935	678	6,825
7	Dec 1, 2012 - Apr 30, 2013	10,322	3,469	3	106	0	518	1,363	817	332	6,609
7	Dec 1, 2013 - Apr 30, 2014	12,382	3,359	11	86	0	502	1,591	941	493	6,982
7	Oct 1 2014 - Feb 15, 2015	9,092	3,423	16	47	0	511	1,062	3,857	1,077	9,992
7	Oct 1 2015- April 30, 2016	11,242	2,523	3	143	0	377	2,147	5,843	2,525	13,562

#### **4) Marine Areas 8-1 & 8-2 Winter Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented a eleventh consecutive winter Chinook MSF in Marine Areas 8-1 and 8-2 from November 1, 2015 through April 30, 2016. WDFW's Puget Sound Sampling Unit (PSSU) implemented an intensive monitoring program in Areas 8-1 and 8-2 during the November-April season in order 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, and collection of VTRs from the angling public. **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 the following section we present results from our monitoring activities during the Areas 8-1 and 8-2 winter Chinook MSF from November 1, 2015 through April 30, 2016.

**Table 4.1** Sampling/estimation details on target parameters associated with the overall Areas 8-1 and 8-2 Chinook 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	Creel estimates were produced for two-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 $N=8$ available weekdays per two-week period. For the weekend stratum we sampled $n=2$ days out of $N=3$ available weekend days per week.
On-the-water Surveys	Proportion of total angler effort that uses sample-frame sites (i.e., “size measures” or “weights” of sampled sites) versus out-of-frame sites.	Total on-water boat and angler counts at assumed peak effort time interval (instantaneous count); spatial distribution of fishing boats in the area.	Boats and anglers.	Month	A total of 5 boat surveys were conducted during the six-month fishery. The results of these surveys were incorporated into multi-year site-weight averages.
Voluntary Trip Reports (VTRs)	Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook	Encounter data for non-Chinook species (e.g., Coho) that the angler may record on the VTR form	Fish encounter	Season (6 months)	We combined the Area 8-1 and 8-2 VTR data to estimate the size/mark-status proportions (LM = 17%, LU = 5%, SM = 59%, SU = 19%; <b>Table 4.7</b> ) needed to produce encounter and mortality estimates.
Overall Fishery Impacts Estimation	Total Chinook encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook	N/A	Season (6 months)	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 (6 months)	The temporal resolution of DIT impacts is constrained by the total number of tags recovered.

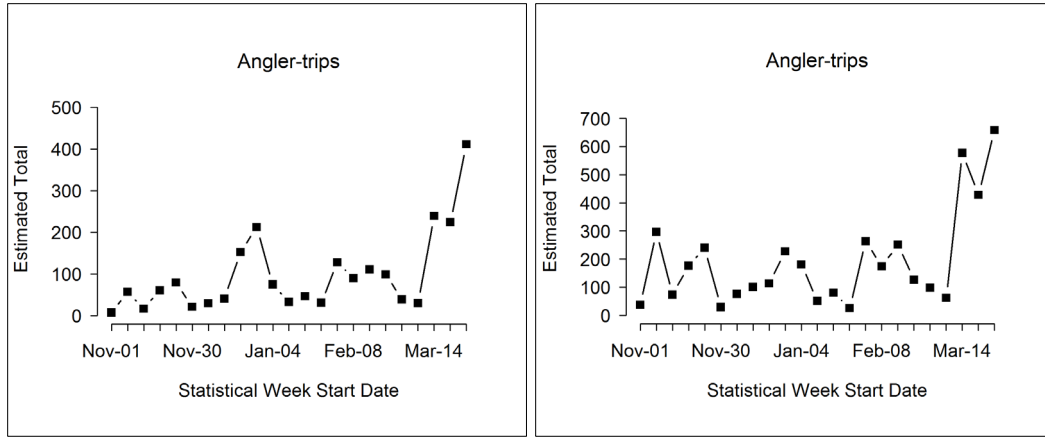
**Table 4.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2015-16 winter Chinook MSF in Marine Area 8-1. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

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	
Nov	44	1-Nov	1-Nov	7	7	2	0	6	2	10
	45	2-Nov	8-Nov	46	57	6	0	23	10	39
	46	9-Nov	15-Nov	9	16	0	0	0	0	0
	47	16-Nov	22-Nov	33	61	14	2	52	19	87
	48	23-Nov	29-Nov	40	80	2	0	8	3	14
Dec	49	30-Nov	6-Dec	12	21	0	0	0	0	0
	50	7-Dec	13-Dec	22	30	0	0	0	0	0
	51	14-Dec	20-Dec	26	40	0	0	0	0	0
	52	21-Dec	27-Dec	59	153	7	0	26	11	43
Jan	53.1	28-Dec	3-Jan	87	212	9	0	35	14	59
	2	4-Jan	10-Jan	47	75	5	0	18	7	30
	3	11-Jan	17-Jan	19	33	5	0	18	7	30
	4	18-Jan	24-Jan	27	46	10	0	36	15	61
	5	25-Jan	31-Jan	21	31	5	0	19	8	31
Feb	6	1-Feb	7-Feb	66	128	24	0	88	36	148
	7	8-Feb	14-Feb	50	90	21	0	78	32	131
	8	15-Feb	21-Feb	53	111	25	0	91	37	153
	9	22-Feb	28-Feb	47	99	16	0	60	25	101
Mar	10	29-Feb	6-Mar	21	39	7	0	24	10	41
	11	7-Mar	13-Mar	13	30	4	0	16	6	27
	12	14-Mar	20-Mar	112	239	89	0	331	135	555
	13	21-Mar	27-Mar	117	224	88	0	325	133	546
Apr	14	28-Mar	3-Apr	201	411	119	0	444	181	744
<b>Sub-Total:</b>				1134	2,231	457	2	1701	691	2,851
<b>Everett Derby:</b>				10	26	8	0	30	12	50
<b>Standwood Derby:</b>				22	55	27	0	100	41	168
<b>Season Total:</b>				1166	2,312	492	2	1831	744	3,069
<b>Variance:</b>				9,626	69,072	2,531	2	77,437	10566	184,038
<b>SE:</b>				98	263	50	1	278	103	429
<b>CV (%):</b>				8	11	10	65	15	14	14
<b>95% CI:</b>				973 - 1,358	1,797 - 2,827	394 - 591	0 - 5	1,285 - 2,376	543 - 945	2,228 - 3,910

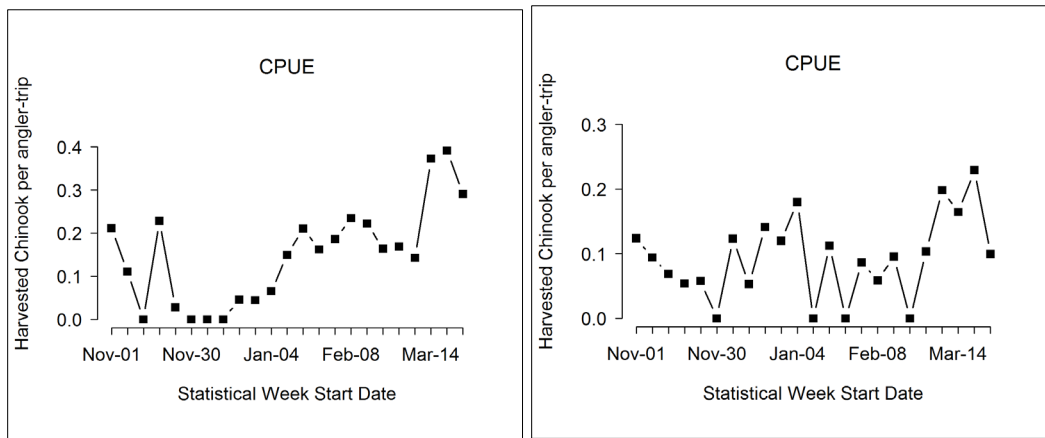
**Table 4.3** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2015-16 winter Chinook MSF in Marine Area 8-2. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

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	
Nov	44	1-Nov	1-Nov	19	37	5	0	17	7	29
	45	2-Nov	8-Nov	150	296	28	0	105	43	175
	46	9-Nov	15-Nov	35	73	5	0	19	8	32
	47	16-Nov	22-Nov	82	176	9	0	36	14	59
	48	23-Nov	29-Nov	119	240	14	0	52	21	87
Dec	49	30-Nov	6-Dec	17	29	0	0	0	0	0
	50	7-Dec	13-Dec	57	76	9	0	35	14	59
	51	14-Dec	20-Dec	67	101	5	0	20	8	34
	52	21-Dec	27-Dec	66	113	16	0	60	24	101
Jan	53/1	28-Dec	3-Jan	124	227	27	0	103	42	171
	2	4-Jan	10-Jan	104	181	32	0	123	50	205
	3	11-Jan	17-Jan	35	51	0	0	0	0	0
	4	18-Jan	24-Jan	45	81	9	0	34	14	57
	5	25-Jan	31-Jan	19	26	0	0	0	0	0
Feb	6	1-Feb	7-Feb	151	263	23	0	86	35	143
	7	8-Feb	14-Feb	108	174	10	0	39	16	64
	8	15-Feb	21-Feb	131	251	24	0	90	37	151
	9	22-Feb	28-Feb	73	127	0	0	0	0	0
Mar	10	29-Feb	6-Mar	49	98	10	0	38	16	64
	11	7-Mar	13-Mar	33	62	12	0	46	19	77
	12	14-Mar	20-Mar	259	577	95	0	358	145	598
	13	21-Mar	27-Mar	224	428	98	0	370	150	618
Apr	14	28-Mar	3-Apr	342	658	65	0	246	100	412
<b>Sub-Total:</b>				<b>2309</b>	<b>4,346</b>	<b>497</b>	<b>0</b>	<b>1876</b>	<b>763</b>	<b>3,136</b>
Everett Derby:				69	175	29	0	109	44	183
Standwood Derby:				2	4	2	0	8	3	13
<b>Season Total:</b>				<b>2380</b>	<b>4,525</b>	<b>528</b>	<b>0</b>	<b>1993</b>	<b>810</b>	<b>3,331</b>
<b>Variance:</b>				36,509	140,746	4,155	0	109,898	14316	264,086
<b>SE:</b>				191	375	64	0	332	120	514
<b>CV (%):</b>				8	8	12	0	17	15	15
<b>95% CI:</b>				2,005 - 2,754	3,789 - 5,260	402 - 655	0 - 0	1,343 - 2,643	576 - 1,045	2,324 - 4,339

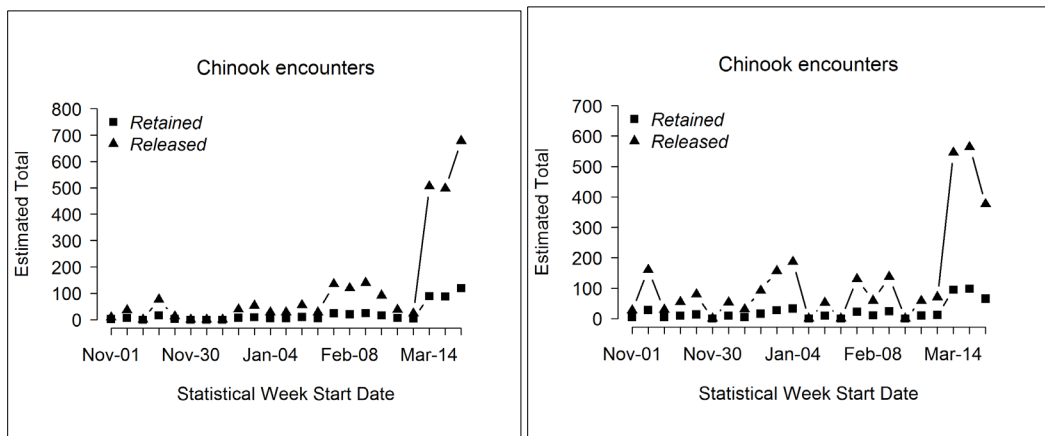




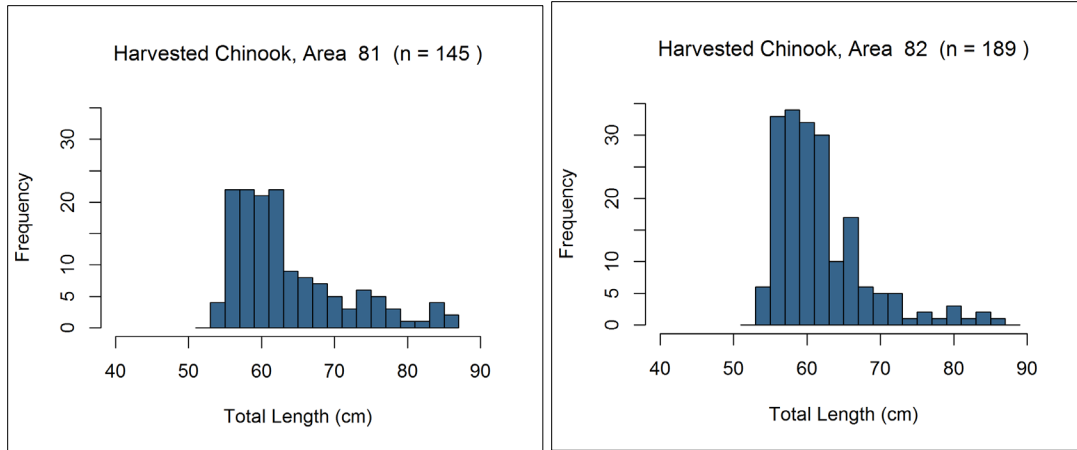
**Figure 4.1** Temporal patterns in fishing effort during the 2015-16 winter Chinook MSFs in Marine Areas 8-1 (*left panel*) and 8-2 (*right panel*).



**Figure 4.2** Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2015-16 winter Chinook MSFs in Marine Areas 8-1 (*left panel*) and 8-2 (*right panel*).



**Figure 4.3** Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2015-16 winter Chinook MSFs in Marine Areas 8-1 (*left panel*) and 8-2 (*right panel*).



**Figure 4.4** Length-frequency distributions of retained marked Chinook sampled in dockside angler interviews during the 2015-16 winter Chinook MSFs in Marine Areas 8-1 (left panel) and 8-2 (right panel).

**Table 4.4** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2015-16 winter Chinook MSFs in Marine Areas 8-1 (left panel) and 8-2 (right panel).

Mark Type	Number Sampled			Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total		Legal-size	Sublegal-size	Total
Marked	132	13	145	Marked	174	15	189
Unmarked	1	0	1	Unmarked	1	0	1
<b>Total</b>	<b>133</b>	<b>13</b>	<b>146</b>	<b>Total</b>	<b>175</b>	<b>13</b>	<b>190</b>

**Table 4.5** Summary of CWTs recovered from Chinook salmon harvested during the 2015-16 winter Chinook MSFs in Marine Areas 8-1. 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 (44.4%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	1 (5.6%)	1
		Wallace R 07.0940	Wallace R Hatchery	5 (27.8%)	2
		Whitehorse Springs	Whitehorse Pond	2 (11.1%)	0
	Skagit River (5.6%)	Co Line Pd2 03.1853B	Marblemount Hatchery	1 (5.6%)	0
	Mid Puget Sound (16.7%)	Big Soos Cr 09.0072	Soos Creek Hatchery	1 (5.6%)	1
		Icy Cr 09.0125	Icy Cr Hatchery	1 (5.6%)	0
		Grovers Cr 15.0299	Grovers Cr Hatchery	1 (5.6%)	1
	S Puget Sound (27.8%)	Minter Cr Tr 15.0051	Hupp Springs Rearing	3 (16.7%)	0
		Clear Cr 11.0013C	Clear Creek Hatchery	1 (5.6%)	1
Kalama Cr 11.0017		Kalama Cr Hatchery	1 (5.6%)	0	
Col Riv	Lower Columbia River (5.6%)	Cowlitz R 26.0002	Cowlitz Salmon Hatchery	1 (5.6%)	0
<b>Total</b>				<b>18</b>	<b>6</b>

**Table 4.6** Summary of CWTs recovered from Chinook salmon harvested during the 2015-16 winter Chinook MSFs in Marine Areas 8-2. 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 (40%)	Wallace R 07.0940	Wallace R Hatchery	6 (40%)	0
	Mid Puget Sound (26.7%)	Big Soos Cr 09.0072	Soos Creek Hatchery	1 (6.7%)	1
		Grovers Cr 15.0299	Grovers Cr Hatchery	3 (20%)	3
	S Puget Sound (33.3%)	Clear Cr 11.0013C	Clear Creek Hatchery	2 (13.3%)	2
		Kalama Cr 11.0017	Kalama Cr Hatchery	1 (6.7%)	0
		Minter Cr Tr 15.0051	Hupp Springs Rearing	2 (13.3%)	0
<b>Total</b>				<b>15</b>	<b>6</b>

**Table 4.7** Total Chinook encountered (retained and released) by private-boat anglers logging their trips on VTRs during the 2015-16 winter Chinook MSFs in Marine Areas 8-1 and 8-2, 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.

Area	Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
			AD	UM	AD	UM		Overall	Legal
8-1	Private VTR	13 1-trip VTRs, 29 Angler Trips	11	3	28	7	49	0.80	0.79
8-2	Private VTR	175 1-trip VTRs, 395 Angler Trips	87	26	316	106	535	0.75	0.77
	Charter VTR	3 1-trip VTRs, 8 Angler Trips	0	0	20	6	26	0.77	0
	Private/Charter Pooled VTR	178 1-trip VTRs, 403 Angler Trips	87	26	336	112	561	0.75	0.77
8-1 & 8-2	<b>Private VTR</b>	<b>188 1-trip VTRs, 424 Angler Trips</b>	<b>98</b>	<b>29</b>	<b>344</b>	<b>113</b>	<b>584</b>	<b>0.76</b>	<b>0.77</b>
Size/mark-status composition:			0.17	0.05	0.59	0.19			
Variance:			(0.0036)	(0.0012)	(0.0051)	(0.0026)			

**Table 4.8** Summary of season-wide fishery impact estimates for the 2015-16 winter Chinook MSFs in Marine Areas 8-1 (*upper panel*) and 8-2 (*lower panel*). 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	515	448	67	10	458	2431	49	361 - 555	11
Legal UM	152	2	150	23	25	29	5	14 - 35	22
Sublegal AD	1808	44	1764	353	397	2850	53	292 - 502	13
Sublegal UM	594	0	594	119	119	374	19	81 - 157	16
<b>Total</b>	<b>3,069</b>	<b>494</b>	<b>2575</b>	<b>504</b>	<b>999</b>	<b>5,685</b>	<b>75</b>	<b>851 - 1,146</b>	<b>8</b>

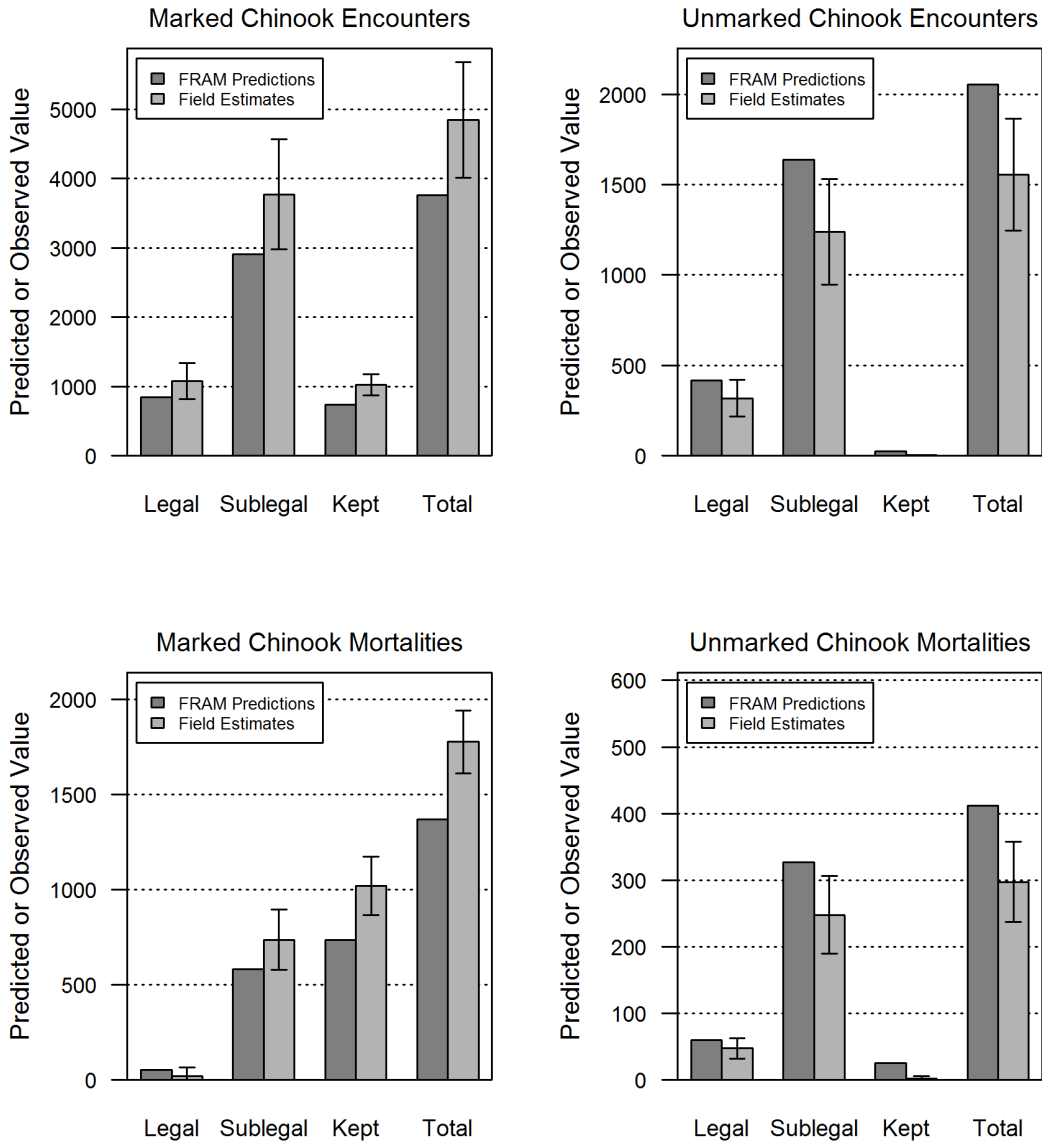
Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
Legal AD	559	486	73	11	497	3924	63	375 - 620	13
Legal UM	165	0	165	25	25	34	6	13 - 36	24
Sublegal AD	1962	42	1920	384	426	3971	63	303 - 550	15
Sublegal UM	645	0	645	129	129	511	23	85 - 173	18
<b>Total</b>	<b>3,331</b>	<b>528</b>	<b>2803</b>	<b>549</b>	<b>1077</b>	<b>8,440</b>	<b>92</b>	<b>897 - 1,257</b>	<b>9</b>

**Table 4.9** Comparison of modeled (FRAM model run 2115) and estimated total Chinook encounters for the 2015-16 winter Chinook MSFs in Marine Areas 8-1 and 8-2, combined. 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	2,055	418	1,637	25
	AD	3,756	846	2,910	736
	Total	5,811	1,264	4,547	761
	% Marked	65	67	64	97
Estimated (Creel) Encounters	UM	1556	318	1238	2
	AD	4844	1074	3770	1021
	Total	6,401	1392	5009	1023
	% Marked	76	77	75	100

**Table 4.10** Comparison of modeled (FRAM model run 2115) and estimated total Chinook mortalities for the 2015-16 winter Chinook MSFs in Marine Areas 8-1 and 8-2, combined. 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)	412	1,371	1,783	297	1778	2076
Released Legal	60	53	113	47	21	68
Released Sublegal	327	582	909	248	737	985
Landed Only	25	736	761	2	1021	1023



**Figure 4.5** Comparison of modeled (FRAM model run 2115) and estimated total Chinook encounters and mortalities for the 2015-16 winter Chinook MSFs in Marine Areas 8-1 and 8-2, combined. Error bars represent approximate 95% confidence intervals for field estimates.

**Table 4.11** Summary of double-index tagged (DIT) Chinook kept by anglers, and estimated total mortality of unmarked DIT Chinook due to hook-and-release impacts resulting from the 2015-16 winter Chinook MSFs in Marine Areas 8-1 (*upper panel*) and 8-2 (*lower panel*). AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Bernie Gobin Hatch	2013	1	3.4	8.08	3.4	0.3	0.08	0.28
Clear Creek Hatchery	2013	1	3.4	8.08	3.4	0.3	0.08	0.28
Grovers Cr Hatchery	2013	1	3.4	8.08	3.3	0.3	0.079	0.28
Soos Creek Hatchery	2013	1	3.4	8.08	3.4	0.3	0.081	0.28
Wallace R Hatchery	2013	2	6.8	16.17	6.9	0.7	0.167	0.58
<b>Total</b>		<b>6</b>	<b>20.3</b>	<b>48.5</b>	<b>20.3</b>	<b>2</b>	<b>0.485</b>	<b>1.71</b>

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Clear Creek Hatchery	2013	2	5.4	9.38	5.4	0.5	0.093	0.43
Grovers Cr Hatchery	2013	3	8.2	14.07	8.1	0.8	0.137	0.64
Soos Creek Hatchery	2013	1	2.7	4.69	2.7	0.3	0.047	0.22
<b>Total</b>		<b>6</b>	<b>16.3</b>	<b>28.14</b>	<b>16.2</b>	<b>1.6</b>	<b>0.276</b>	<b>1.29</b>

**Table 4.12** Monthly sample rates (Total retained Chinook sampled / Estimated retained Chinook) for the 2015-16 winter Chinook MSFs in Marine Areas 8-1 (*upper panel*) and 8-2 (*lower panel*).

Time period			Estimated Retained Chinook			Number of Chinook sampled			Sample Rate
Month	Stat Weeks	Dates	AD	UM	Total	AD	UM	Total	
November	44 - 48	01 Nov - 29 Nov	24	2	26	9	1	10	38.1%
December	49 - 53.1	30 Nov - 03 Jan	16	0	16	2	0	2	12.2%
January	2-5	04 Jan - 31 Jan	25	0	25	10	0	10	40.8%
February	6-9	01 Feb - 28 Feb	86	0	86	28	0	28	32.7%
March	10-14	29 Feb - 03 Apr	342	0	342	96	0	96	28.1%
<b>Season Total</b>			<b>492</b>	<b>2</b>	<b>494</b>	<b>145</b>	<b>1</b>	<b>146</b>	<b>29.5%</b>

Time period			Estimated Retained Chinook			Number of Chinook sampled			Sample Rate
Month	Stat Weeks	Dates	AD	UM	Total	AD	UM	Total	
November	44 - 48	01 Nov - 29 Nov	61	0	61	23	0	23	37.9%
December	49 - 53.1	30 Nov - 03 Jan	58	0	58	10	0	10	17.3%
January	2-5	04 Jan - 31 Jan	42	0	42	14	0	14	33.7%
February	6-9	01 Feb - 28 Feb	57	0	57	26	0	26	45.8%
March	10-14	29 Feb - 03 Apr	312	0	312	116	1	117	37.6%
<b>Season Total</b>			<b>528</b>	<b>0</b>	<b>528</b>	<b>189</b>	<b>1</b>	<b>190</b>	<b>36.0%</b>

<sup>1</sup> Number of retained Chinook sampled includes all retained Chinook inspected for CWTs, from all sites sampled during the winter 2015-16 Area 8-1 and 8-2 Chinook MSFs (the sample-frame sites included in the creel estimates and the fish sampled as part of baseline sampling in the Area)

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**Table 4.13** Fishery-total estimates of retained and released salmon (*other than Chinook*) during the 2015-16 winter Chinook MSFs in Marine Areas 8-1 and 8-2. AD = marked (adipose-clipped), UM = Unmarked, UK = unknown mark-status. Values may not add exactly due to rounding error.

Week	Start Date	End Date	8-1 Released	8-2 Retained		8-2 Released					
			UNK	Coho UM	Chum	Coho AD	Coho UM	Coho UK	Chum	Steelhead	UNK
44	1-Nov	1-Nov	0	1	1	0	0	6	0	0	0
45	2-Nov	8-Nov	0	6	6	0	0	26	0	0	25
46	9-Nov	15-Nov	0	0	0	0	0	0	0	0	0
47	16-Nov	22-Nov	0	0	0	0	0	0	0	0	18
48	23-Nov	29-Nov	0	0	0	0	0	0	0	0	0
49	30-Nov	6-Dec	0	0	0	0	0	0	0	0	2
50	7-Dec	13-Dec	0	0	0	0	0	0	0	0	0
51	14-Dec	20-Dec	0	0	0	0	2	0	0	0	0
52	21-Dec	27-Dec	5	0	0	0	0	0	0	0	3
53/1	28-Dec	3-Jan	5	0	0	0	0	0	0	0	21
2	4-Jan	10-Jan	0	0	0	0	0	0	0	0	0
3	11-Jan	17-Jan	0	0	0	0	0	0	0	0	0
4	18-Jan	24-Jan	0	0	0	0	0	0	0	0	0
5	25-Jan	31-Jan	0	0	0	0	0	0	0	0	0
6	1-Feb	7-Feb	0	0	0	0	0	0	0	0	0
7	8-Feb	14-Feb	0	0	0	0	0	0	0	0	0
8	15-Feb	21-Feb	0	0	0	0	0	0	0	0	0
9	22-Feb	28-Feb	0	0	0	0	0	0	0	0	0
10	29-Feb	6-Mar	0	0	0	0	0	0	0	0	0
11	7-Mar	13-Mar	0	0	0	0	0	0	0	0	0
12	14-Mar	20-Mar	0	0	0	2	2	2	0	0	11
13	21-Mar	27-Mar	0	0	0	2	0	0	0	0	26
14	28-Mar	3-Apr	0	0	0	0	0	0	4	4	4
<b>Season Total:</b>			<b>10</b>	<b>7</b>	<b>7</b>	<b>4</b>	<b>4</b>	<b>34</b>	<b>4</b>	<b>4</b>	<b>109</b>
Variance:			82	1	1	4	4	17	10	10	718
Standard Error:			9	1	1	2	2	4	3	3	27
CV (%):			94	13	13	45	44	12	81	81	25
95% CI:			0 - 27	6 - 9	6 - 9	1 - 8	1 - 8	25 - 42	0 - 10	0 - 10	57 - 162

**Table 4.14** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2015-16 winter Chinook MSFs in Marine Areas 8-1 and 8-2. Bold sites indicate those included in the dockside sample frame.

Area	Site Name	Total Anglers	Season Total (unadjusted) Size Measure
<b>8-1</b>	<b>Camano Island State Park Public Ramp</b>	<b>17</b>	<b>0.4048</b>
8-1	Coronet Bay Public Ramp	2	0.0476
<b>8-1</b>	<b>Everett Ramp</b>	5	0.1190
8-1	Maplegrove Ramp, Camano Is	5	0.1190
<b>8-1</b>	<b>Oak Harbor Marina &amp; Public Ramp</b>	<b>1</b>	<b>0.0238</b>
8-1	Onamac (Private)	5	0.1190
8-1	Private	3	0.0714
8-1	Skyline Marina/Sling (Flounder Bay)	4	<b>0.0952</b>
<b>Area 8-1 Total Anglers</b>		<b>42</b>	<b>1</b>
<b>8-2</b>	<b>Bayside Marina/Drystack</b>	<b>6</b>	0.0400
8-2	Camano Island Ramp	16	0.1067
<b>8-2</b>	<b>Camano Island State Park Public Ramp</b>	21	0.1400
8-2	<b>Dagmar's Landing</b>	7	0.0467
<b>8-2</b>	Edmonds Boat Basin	2	0.0133
<b>8-2</b>	Edmonds Marina	2	0.0133
8-2	Everett Marina	5	0.0333
<b>8-2</b>	<b>Everett Ramp</b>	71	0.4733
8-2	Langley Marina/Ramp	11	0.0733
<b>8-2</b>	<b>Mukilteo Lighthouse Park</b>	2	0.0133
<b>8-2</b>	New Marysville Public Ramp	2	0.0133
<b>8-2</b>	Private	5	0.0333
<b>Area 8-2 Total Anglers</b>		<b>150</b>	<b>1</b>



**Table 4.15** Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Area 8-1 and 8-2 Winter Chinook MSFs. 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.

Area	Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
			LM	LU	SM	SU	LM	LU	SM	SU	
8-1	Oct 1, 2005 - Apr 30, 2006	3,976	303	0	39	0	45	188	763	575	1,914
8-1	Oct 1, 2006 - Apr 30, 2007	3,454	278	8	37	4	42	118	1,437	857	2,781
8-1	Nov 1, 2007 - Apr 30, 2008	3,288	638	5	36	0	95	304	1,345	577	3,000
8-1	Jan 1, 2009 - Apr 30, 2009	2,518	396	12	7	0	59	45	1,443	909	2,870
8-1	Nov 1, 2009 - Apr 30, 2010	3,192	273	0	11	0	41	45	595	269	1,234
8-1	Nov 1, 2010 - Apr 30, 2011	2,398	87	0	9	0	13	15	91	69	283
8-1	Nov 1, 2011 - Apr 30, 2012	2,767	284	0	7	0	42	136	1,027	272	1,768
8-1	Nov 1, 2012 - Apr 30, 2013	2,046	268	0	14	0	40	88	955	793	2,158
8-1	Nov 1, 2013 - Apr 30, 2014	1,579	97	0	3	0	15	34	70	37	255
8-1	Nov 1, 2014 - Apr 30, 2015	1,927	151	0	0	0	23	35	416	658	1,282
8-1	Nov 01, 2015 - Apr 30, 2016	2,312	448	2	44	0	67	150	1764	594	3,069
8-2	Oct 1, 2005 - Apr 30, 2006	8,521	735	40	35	0	106	618	1,706	876	4,116
8-2	Oct 1, 2006 - Apr 30, 2007	7,848	766	18	95	3	113	183	10,486	5,407	17,071
8-2	Nov 1, 2007 - Apr 30, 2008	5,678	795	15	74	3	114	181	942	303	2,428
8-2	Jan 1, 2009 - Apr 30, 2009	5,946	495	15	14	0	74	18	1,557	468	2,641
8-2	Nov 1, 2009 - Apr 30, 2010	6,732	814	4	10	0	122	164	1,300	487	2,902
8-2	Nov 1, 2010 - Apr 30, 2011	3,505	111	0	5	0	17	20	122	88	363
8-2	Nov 1, 2011 - Apr 30, 2012	5,197	470	2	27	0	70	223	1,683	450	2,925
8-2	Nov 1, 2012 - Apr 30, 2013	4,260	346	0	17	0	52	113	1,231	1,021	2,780
8-2	Nov 1, 2013 - Apr 30, 2014	4,076	369	0	13	0	55	127	266	139	970
8-2	Nov 1, 2014 - Apr 30, 2015	3,953	186	0	2	0	28	43	510	810	1,578
8-2	Nov 01, 2015 - Apr 30, 2016	4,525	486	0	42	0	73	165	1920	645	3,331

## 5) Marine Area 9 Winter Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented a ninth consecutive winter Chinook MSF in Marine Area 9 from November 1-30, 2015 and January 16– April 15, 2016. Although the fishery was scheduled in month of November, no fishery took place during the month due to presence of sub-legal salmon in the area. WDFW’s Puget Sound Sampling Unit (PSSU) implemented an intensive monitoring program in Area 9 throughout the season in order to collect the data needed to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, aerial effort surveys, test fishing and collection of VTRs from the angling public. **Table 5.1** 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 Area 9 winter Chinook MSF from November 1-30, 2014 and January 16-April 30, 2015. In addition to the major components of the results described previously (page 3), we present the aerial survey and dockside data used to estimate the sample fraction in Area 9 (see WDFW 2012a, *Aerial-Access Design*). The four sites included in the Area 9 dockside sample frame are Port Townsend Ramp, Kingston Ramp, Everett Ramp and Edmonds Ramp, which are assumed to be the highest-use access sites for Area 9 anglers. The Olympic Peninsula Derby took place from February 20-22 over portions of Marine Areas 6 and 9. Total derby effort was allocated to each Marine Area using the proportion of effort that occurred in each area based on dockside sampling efforts at designated weigh-in stations during the derby. Total catch by Marine Area was obtained from derby organizers.

**Table 5.1** Sampling/estimation details on target parameters associated with the overall Area 9 winter Chinook MSF monitoring program.

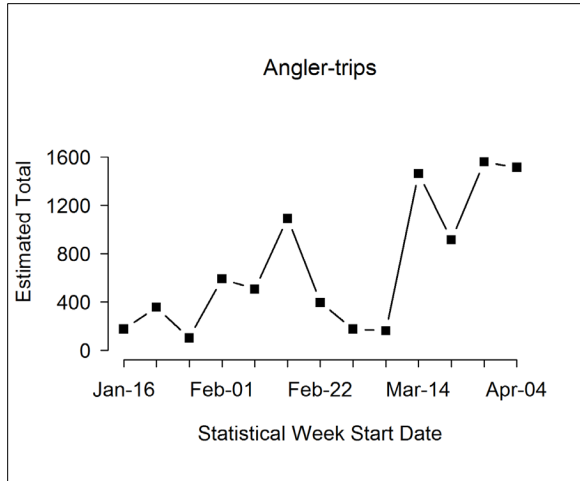
Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Creel Sampling	Fishing effort (boat & angler trips); kept and released fish	Catch rates (CPUE); length, age, and CWT composition of harvest <sup>1</sup> ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	Two weeks	Creel estimates were produced for two-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 $N=8$ available weekdays per two-week period. For the weekend stratum we sampled $n=2$ days out of $N=3$ available weekend days per week.
Aerial Surveys	Fraction of Area 9 effort (boats) captured in the four-site sample frame via creel surveys (Sample Fraction, $f_{ij}$ ).	Total boat counts at assumed peak effort time interval (instantaneous count); spatial distribution of fishing boats in the area.	Boats	Month	The sample fraction was calculated for individual aerial survey dates (see <b>Table 5.12</b> ; $n=8$ surveys conducted out of $N=90$ days available in the season). Since mean sample fractions were similar between the Nov and Jan-Apr time strata, one season total sample fraction was calculated and used to calculate estimates of Chinook encounters and mortality.
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	We used the Jan-Apr test fishery data to estimate the size/mark-status proportions (LM = 26%, LU = 3%, SM = 32% and SU = 13%; see <b>Table 5.6</b> ) needed to produce encounter and mortality estimates.
Voluntary Trip Reports (VTRs)	Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook	Encounter data for non-Chinook species (e.g., Coho) that the angler may record on the VTR form	Fish encounter	Season	VTR data ( <b>Table 5.5</b> ) were not used for impact estimation steps due to the assumed higher data quality and sufficient sample size of the test fishery data. See comment in row above.
Overall Fishery Impacts Estimation	Total Chinook encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook	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.

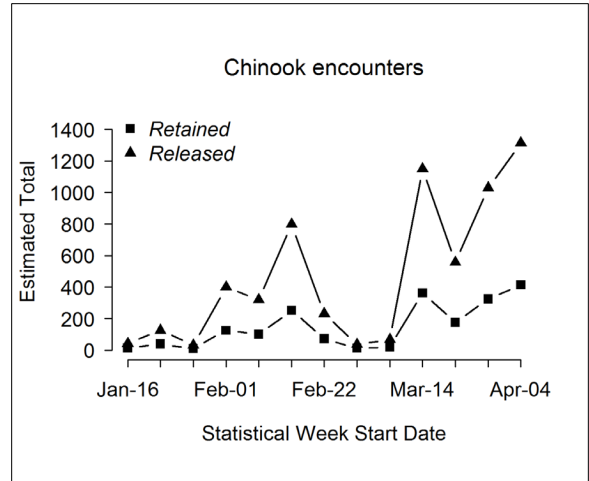
<sup>2</sup> Though samples were collected, DNA-based estimates of stock composition are not yet available for this fishery.

**Table 5.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2015-16 winter Chinook MSF in Marine Area 9. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

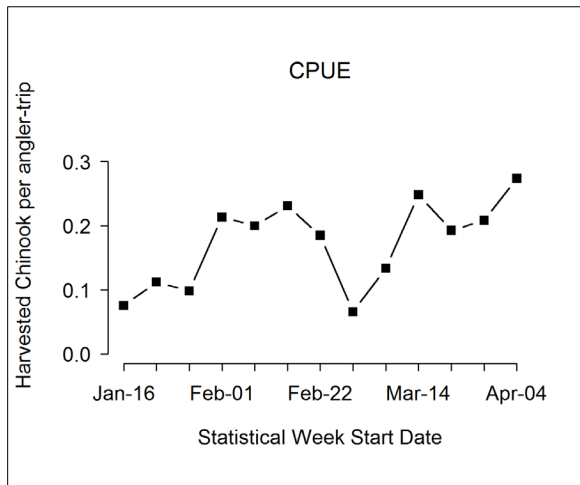
Month	Stat Week	Start Date	End Date	Estimated Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
Jan - Apr	3	16-Jan	17-Jan	80	176	13	0	32	11	55
	4	18-Jan	24-Jan	196	355	40	0	95	32	166
	5	25-Jan	31-Jan	56	101	10	0	24	8	41
	6	1-Feb	7-Feb	353	590	126	0	299	100	525
	7	8-Feb	14-Feb	308	506	101	0	240	80	422
	8	15-Feb	21-Feb	557	1091	252	0	599	200	1051
	9	22-Feb	28-Feb	249	395	73	0	173	58	304
	10	29-Feb	6-Mar	93	176	12	0	28	9	48
	11	7-Mar	13-Mar	98	161	22	0	51	17	90
	12	14-Mar	20-Mar	703	1462	363	0	863	287	1513
	13	21-Mar	27-Mar	504	913	176	0	418	139	733
	14	28-Mar	3-Apr	759	1559	325	0	772	257	1355
15	4-Apr	10-Apr	759	1514	414	0	985	328	1728	
<b>Sub Total</b>				4,715	8,997	1,927	0	4,579	1,526	8,032
<b>Olympic Peninsula Derby</b>				100	220	28	0	67	22	117
<b>Everett Derby</b>				46	113	34	0	81	27	142
<b>Season Total:</b>				<b>4,861</b>	<b>9,330</b>	<b>1,989</b>	<b>0</b>	<b>4,727</b>	<b>1,575</b>	<b>8,290</b>
<b>Variance:</b>				325,165	1,157,433	65,421	0	1,047,281	113,826	2,229,661
<b>Standard Error:</b>				570	1076	256	0	1023	337	1493
<b>CV (%):</b>				12%	12%	13%	0%	22%	21%	18%
<b>95% CI:</b>				3,744 - 5,979	7,221 - 11,438	1,487 - 2,490	0 - 0	2,721 - 6,733	913 - 2,236	5,363 - 11,217



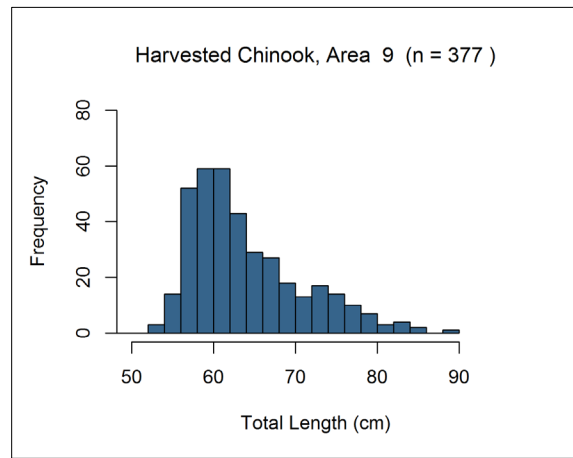
**Figure 5.1** Temporal patterns in fishing effort during the 2015-16 winter Chinook MSF in Marine Area 9.



**Figure 5.3** Temporal patterns in Chinook encounters (number retained and released) during the 2015-16 winter Chinook MSF in Marine Area 9.



**Figure 5.2** Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2015-16 winter Chinook MSF in Marine Area 9.



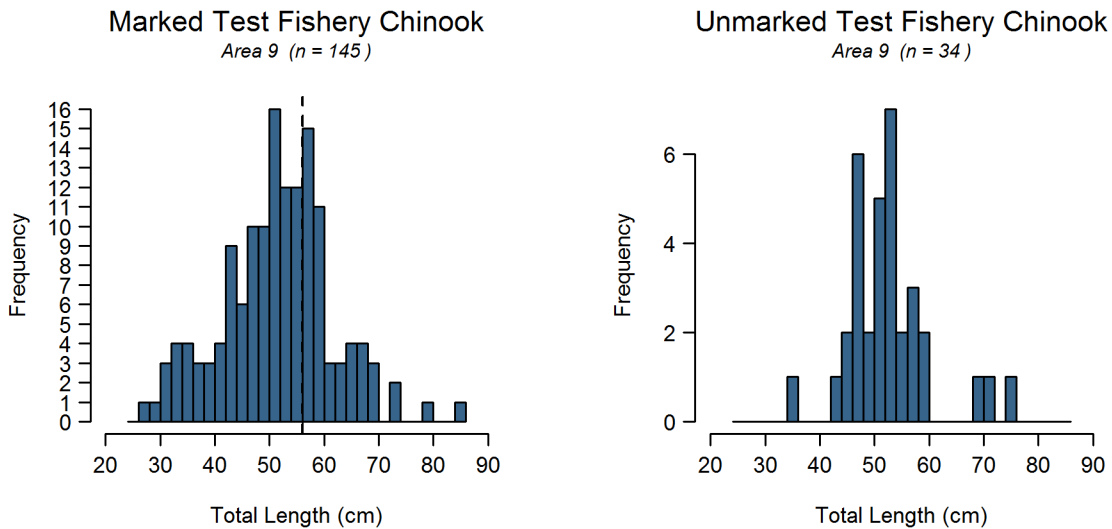
**Figure 5.4** Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2015-16 winter Chinook MSF in Marine Area 9.

**Table 5.3** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the during the 2015-16 winter Chinook MSF in Area 9.

Mark Type	Dockside		
	Legal-size	Sublegal-size	Total
Marked	359	18	377
Unmarked	1	0	1
<b>Total</b>	<b>360</b>	<b>18</b>	<b>378</b>

**Table 5.4** Summary of CWTs recovered from Chinook salmon harvested during the 2015-16 winter Chinook MSF in Marine Area 9. 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 (2.9%)	East Sound Bay (San)	Glenwood Springs	1 (2.9%)	0
	Hood Canal (25.7%)	Finch Cr 16.0222	Hoodsport Hatchery	2 (5.7%)	0
		Purdy Cr 16.0005	George Adams Hatchery	7 (20%)	1
	N Puget Sound (34.3%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	2 (5.7%)	2
		Wallace R 07.0940	Wallace R Hatchery	8 (22.9%)	4
		Whitehorse Springs	Whitehorse Pond	2 (5.7%)	0
	Skagit River (5.7%)	Cascade R 03.1411	Marblemount Hatchery	2 (5.7%)	1
	Mid Puget Sound (20%)	Grovers Cr 15.0299	Grovers Cr Hatchery	4 (11.4%)	4
		Icy Cr 09.0125	Icy Cr Hatchery	1 (2.9%)	0
		Big Soos Cr 09.0072	Soos Creek Hatchery	2 (5.7%)	2
	S Puget Sound (11.4%)	Clear Cr 11.0013C	Clear Creek Hatchery	2 (5.7%)	2
		Minter Cr Tr 15.0051	Hupp Springs Rearing	2 (5.7%)	0
<b>Total</b>				<b>35</b>	<b>16</b>



**Figure 5.5** Length-frequency distributions of marked (*left panel*) and unmarked (*right panel*) Chinook encountered by test fishers during the 2015-16 winter Chinook MSF in Marine Area 9. The vertical dashed line in the left panel corresponds to the legal size limit (22 in or 56 cm).

**Table 5.5** Total Chinook encountered (retained and released) by private-boat and charter anglers logging their trips on VTRs, with estimates of legal-size and overall (legal and sublegal) mark rates during the 2015-16 winter Chinook MSF in Marine Area 9. 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	256 1-trip VTRs, 515 Angler Trips	223	35	334	88	682	0.82	0.86
Charter VTR	6 1-trip VTRs, 21 Angler Trips	10	6	42	5	63	0.83	0.63
Pooled Private/Charter	262 1-trip VTRs, 536 Angler Trips	233	41	376	93	745	0.82	0.85
Size/mark-status composition:		0.33	0.05	0.49	0.13			
Variance:		(0.0003)	(0.0001)	(0.0004)	(0.0002)			

We used Pearson’s chi-square test to compare size/mark-status between private VTR and test fishing data. Results indicated no significant difference in proportions between the two datasets ( $\chi^2 = 3.217$ ,  $df = 3$ ,  $p\text{-value} = 0.3592$ ), suggesting that they may be combined. Due to the assumed higher quality of the test fishing data, only test fishing data was used in the estimate.

**Table 5.6** Composition of test fishery Chinook encounters and associated mark-rate and size/mark-status proportion estimates for the 2015-16 winter Chinook MSF in Marine Area 9. AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hrs Fished	AD	UM	AD	UM	
4	4	17	6	1	4	1	12
6	6	24	4	1	16	7	28
7	3	14	3	1	8	1	13
8	5	23	2	1	8	4	15
9	4	20	4	1	9	4	18
10	3	17	2	0	6	0	8
11	4	21	5	0	10	3	18
12	6	28	10	2	15	4	31
13	2	11	5	0	9	2	16
14	3	16	3	1	3	0	7
15	5	26	3	0	10	0	13
<b>Total</b>	<b>37</b>	<b>175</b>	<b>47</b>	<b>8</b>	<b>98</b>	<b>26</b>	<b>179</b>
<b>Size/mark-status composition:</b>			0.26	0.03	0.32	0.13	
<b>Legal size mark rate:</b>			0.8545				
<b>Overall mark rate:</b>			0.7934				

**Table 5.7** Summary of season-wide fishery impact estimates for the 2015-16 winter Chinook MSF in Marine Area 9. 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	2,177	1,894	283	42	1,936	66,195	257	1,432 - 2,440	13
Legal UM	371	0	371	56	56	459	21	14 - 98	39
Sublegal AD	4,539	95	4,444	889	984	31,049	176	638 - 1,329	18
Sublegal UM	1204	0	1204	241	241	3737	61	121 - 361	25
<b>Total</b>	<b>8,290</b>	<b>1,989</b>	<b>6,301</b>	<b>1228</b>	<b>3,216</b>	<b>101,440</b>	<b>318</b>	<b>2,592 - 3,841</b>	<b>10</b>

**Table 5.8** Comparison of modeled (FRAM model run 2115) and estimated total Chinook encounters for the 2015-16 winter Chinook MSF in Marine Area 9. 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	874	242	632	5
	AD	3,855	1,117	2,738	972
	Total	4,729	1,359	3,370	977
	% Marked	82	82	81	99
Estimated (Creel) Encounters	UM	1,575	371	1204	0
	AD	6,715	2,177	4,539	1,989
	Total	8,290	2,547	5,743	1,989
	% Marked	81	85	79	100



**Table 5.9** Comparison of modeled (FRAM model run 2115) and estimated total Chinook mortalities for the 2015-16 winter Chinook MSF in Marine Area 9. 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)	167	1,590	1,757	296	2,920	3,216
Released Legal	36	70	106	56	42	98
Released Sublegal	126	548	674	241	889	1130
Landed Only	5	972	977	0	1,989	1,989

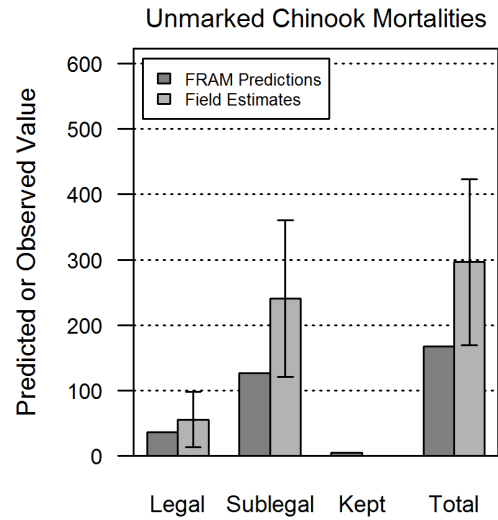
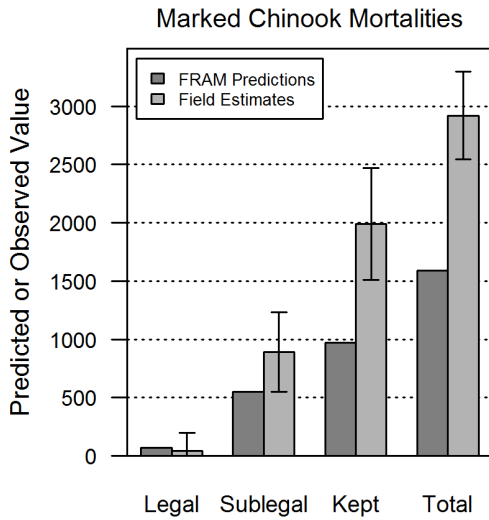
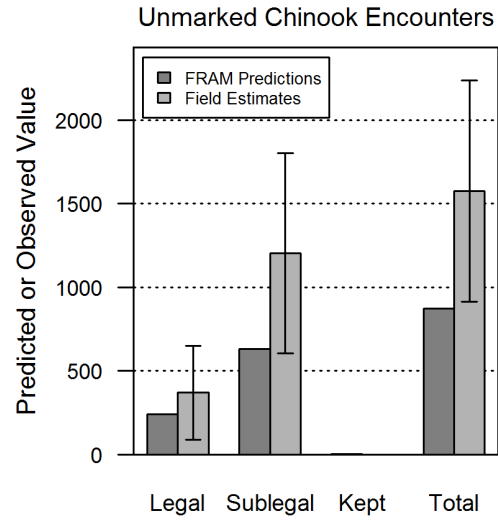
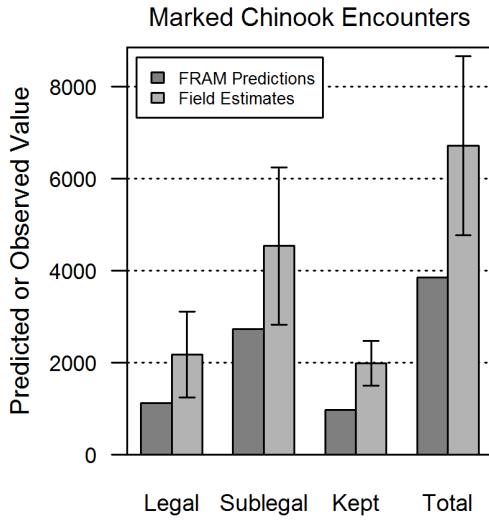
**Table 5.10** Summary of double-index tagged (DIT) Chinook kept by anglers, and estimated total mortality of unmarked DIT Chinook due to hook-and-release impacts resulting from the 2015-16 winter Chinook MSF in Marine Area 9. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Bernie Gobin Hatch	2012	2	10.5	44.84	10.9	1.1	0.483	0.98
Clear Creek Hatchery	2013	2	10.5	44.84	10.5	1	0.443	0.94
George Adams Hatchery	2011	1	5.3	22.42	5.3	0.5	0.227	0.48
Grovers Cr Hatchery	2013	3	15.8	67.26	15.6	1.6	0.655	1.4
Grovers Cr Hatchery	2014	1	5.3	22.42	5.4	0.5	0.237	0.49
Marblemount Hatchery	2013	1	5.3	22.42	5.3	0.5	0.226	0.48
Soos Creek Hatchery	2013	2	10.5	44.84	10.5	1.1	0.447	0.95
Wallace R Hatchery	2012	1	5.3	22.42	5.3	0.5	0.225	0.47
Wallace R Hatchery	2013	3	15.8	67.26	16	1.6	0.694	1.44
<b>Total</b>		<b>16</b>	<b>84.2</b>	<b>358.7</b>	<b>84.7</b>	<b>8.5</b>	<b>3.637</b>	<b>7.63</b>

**Table 5.11** Monthly sample rates (Total retained Chinook sampled<sup>1</sup> / Estimated retained Chinook) in the 2015-16 winter Chinook MSF in Marine Area 9.

Time period			Estimated Retained Chinook			Number of Chinook sampled			Sample Rate
Month	Stat Weeks	Dates	AD	UM	Total	AD	UM	Total	
January	3-5	16 Jan - 31 Jan	63	0	63	14	0	14	22.2%
February	6-9	01 Feb - 28 Feb	552	0	552	98	0	98	17.8%
March	10-14	29 Feb - 03 Apr	897	0	897	154	0	154	17.2%
April	15 - 15	04 Apr - 10 Apr	414	0	414	111	1	112	27.0%
<b>Season Total</b>			<b>1,927</b>	<b>0</b>	<b>1,927</b>	<b>377</b>	<b>1</b>	<b>378</b>	<b>19.6%</b>

<sup>1/</sup> Number of retained Chinook sampled includes all retained Chinook inspected for CWTs, from all sites sampled during the winter 2015-16 Area 9 Chinook MSF (the sample-frame sites included in the creel estimates and the fish sampled as part of derbies and other baseline sampling in the Area).



**Table 5.12** Fishery-total estimates of retained and released salmon (*other than Chinook*) during the 2015-16 winter Chinook MSF in Marine Area 9. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status.

Week	Start Date	End Date	Released Salmon			
			Coho AD	Coho UM	Coho UK	Unk Salmon
3	16-Jan	17-Jan	0	0	0	0
4	18-Jan	24-Jan	0	0	0	0
5	25-Jan	31-Jan	0	0	0	15
6	1-Feb	7-Feb	0	0	0	7
7	8-Feb	14-Feb	0	0	0	7
8	15-Feb	21-Feb	7	0	0	22
9	22-Feb	28-Feb	7	0	0	7
10	29-Feb	6-Mar	0	0	0	0
11	7-Mar	13-Mar	0	0	0	0
12	14-Mar	20-Mar	5	0	5	21
13	21-Mar	27-Mar	0	0	0	28
14	28-Mar	3-Apr	5	5	5	10
15	4-Apr	10-Apr	20	15	5	45
<b>Season Total:</b>			<b>43</b>	<b>20</b>	<b>15</b>	<b>160</b>
<b>Variance:</b>			211	28	31	1,586
<b>Standard Error:</b>			15	5	6	40
<b>CV (%):</b>			34%	27%	37%	25%
<b>95% CI:</b>			15 - 72	9 - 30	4 - 26	82 - 238

**Table 5.13** Summary of aerial survey and dockside data used to estimate the fraction of effort captured in the four-site sample frame during the 2015-16 winter Chinook MSF in Marine Area 9. See Methods Report (WDFW 2012a) for computational details and notation.

Survey Date	Stratum	Aerial Survey Details			Dockside Sampling Details			Sample Fraction, $f_{ij}$
		Start Time	End Time	Total Boats, $m_{ij}$	Sampled Boats	Active Boats, $X_{ij}$	Total Boats, $S_{yijk}$	
24-Jan	WE	11:12	11:54	99	36	29	123	0.293
5-Feb	WE	9:53	10:29	6	2	1	12	0.167
13-Feb	WE	10:54	11:25	8	8	2	32	0.250
24-Feb	WD	9:44	10:31	26	17	11	40	0.423
26-Feb	WE	9:46	10:08	28	10	6	47	0.214
11-Mar	WE	9:17	9:38	23	13	9	33	0.391
25-Mar	WE	9:44	10:06	34	17	7	83	0.206
26-Mar	WE	9:21	9:56	79	48	37	102	0.468
<b>Totals:</b>				<b>303</b>	<b>151</b>	<b>102</b>	<b>472</b>	
Mean:				38	19	13	59	0.302
St Dev:				33	15	13	39	0.11
CV(%):				11.0%	10.2%	12.8%	8.3%	

**Table 5.14** Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all seasons to date of the Area 9 Winter Chinook 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	
Jan 16, 2007 - Apr 15, 2008	6,887	1,333	3	72	0	195	304	1,288	375	3,570
Nov 1-30, 2008 & Jan 16 - Apr 15, 2009	7,064	871	14	14	0	130	158	3,520	2,837	7,545
Nov 1-30, 2009 & Jan 16 - Apr 15, 2010	6,823	1,450	18	106	10	217	353	2,166	615	4,934
Nov 1-30, 2010 & Jan 16 - Apr 15, 2011	4,425	428	0	3	0	64	117	583	422	1,618
Nov 1-30, 2011 & Jan 16 - Apr 15, 2012	4,361	421	0	34	3	63	140	1,433	548	2,642
Nov 1-30, 2012 & Jan 16 - Apr 15, 2013	6,801	1,504	0	31	18	225	469	2,617	986	5,849
Nov 1-30, 2013 & Jan 16 - Apr 15, 2014	7,910	2,003	0	61	19	299	767	2,460	611	6,221
Nov 1-30, 2014 & Jan 16 - Apr 15, 2015	9,192	1,476	21	46	0	221	432	2,554	679	5,427
Jan 16, 2016 - Apr 15, 2016	9,330	1,894	0	95	0	283	371	4,444	1204	8,290

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

The Washington Department of Fish and Wildlife (WDFW) implemented a ninth consecutive winter Chinook MSF in Marine Area 10 from October 1, 2015 through January 31, 2016. Due to abnormally high rates of sublegal Chinook encounters in Area 10, the fishery was closed after only three weeks of fishing on October 18, 2015. WDFW's Puget Sound Sampling Unit (PSSU) implemented an intensive monitoring program in Area 10 throughout the season in order 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 VTRs from the angling public. **Table 6.1** 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 Area 10 winter Chinook MSF from October 1, 2015 through January 31, 2016.

**Table 6.1** Sampling/estimation details on target parameters associated with the overall Area 10 winter Chinook 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	Creel estimates were produced for two-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 $N=8$ available weekdays per two-week period. For the weekend stratum, we sampled $n=2$ days out of $N=3$ available weekend days per week.
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 2 boat surveys were conducted during the three 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	Chinook length, age, and DNA-based <sup>2</sup> stock composition; species composition of non-Chinook encounters	Fish encounter	Season (4 months)	Season-total size/mark-status proportions from the test fishery data were used to estimate total Chinook encounters and associated impacts; LM=5%, LU=2%, SM=76%, SU=25%. (See <b>Tables 6.5 and 6.6</b> ).
Voluntary Trip Reports (VTRs)	Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook	Encounter data for non-Chinook species (e.g., Coho) that the angler may record on the VTR form	Fish encounter	Season (4 months)	VTR data ( <b>Table 6.6</b> ) were not used for impact estimation steps due to the assumed higher data quality and sufficient sample size of the test fishery data. See comment in row above.
Overall Fishery Impacts Estimation	Total Chinook encounters and mortalities, by size/mark-status group	Ratios of encounters and mortalities per kept Chinook	N/A	Season (4 months)	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 (4 months)	The temporal resolution of DIT impacts is constrained by the total number of tags recovered.

**Table 6.2** Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2015-16 winter Chinook MSF in Marine Area 10. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

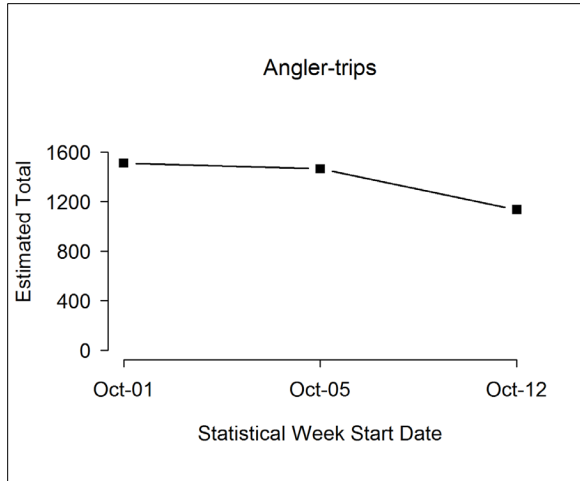
Month	Stat Week	Start Date	End Date	Est. Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
Oct	40	1-Oct	4-Oct	734	1,510	10	6	86	25	127
	41	5-Oct	11-Oct	787	1,465	55	15	495	168	734
	42	12-Oct	18-Oct	676	1135	53	3	472	172	700
<b>Season Total:</b>				<b>2,197</b>	<b>4,110</b>	<b>118</b>	<b>25</b>	<b>1053</b>	<b>365</b>	<b>1,561</b>
<b>Variance:</b>				122,310	480,602	1,159	47	372,733	43,051	739,782
<b>SE:</b>				350	693	34	7	611	207	860
<b>CV (%):</b>				16	17	29	28	58	57	55
<b>95% CI:</b>				1,512 - 2,883	2,751 - 5,469	51 - 185	11 - 38	0 - 2,249	0 - 772	0 - 3,247

**Table 6.3** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2015-16 winter Chinook MSF in Marine Area 10.

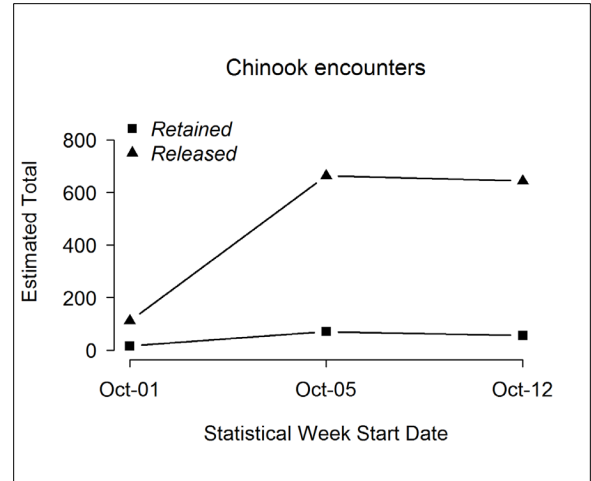
Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	16	14	30
Unmarked	0	5	5
<b>Total</b>	<b>16</b>	<b>19</b>	<b>35</b>

**Table 6.4** Summary of CWTs recovered from Chinook salmon harvested during the 2015-16 winter Chinook MSF in Marine Area 10. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

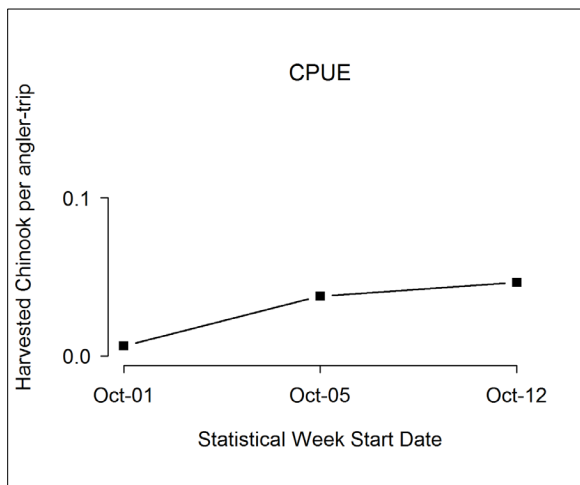
Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	Strait of Juan De Fuca (14.3%)	Elwha R 18.0272	Elwha Hatchery	1 (14.3%)	0
	Hood Canal (14.3%)	Finch Cr 16.0222	Hoodsport Hatchery	1 (14.3%)	0
	N Puget Sound (28.6%)	Wallace R 07.0940	Wallace R Hatchery	1 (14.3%)	0
		Whitehorse Springs	Whitehorse Pond	1 (14.3%)	0
	Mid Puget Sound (28.6%)	Big Soos Cr 09.0072	Soos Creek Hatchery	1 (14.3%)	1
		Grovers Cr 15.0299	Grovers Cr Hatchery	1 (14.3%)	1
	S Puget Sound (14.3%)	Kalama Cr 11.0017	Kalama Cr Hatchery	1 (14.3%)	0
<b>Total</b>				<b>7</b>	<b>2</b>



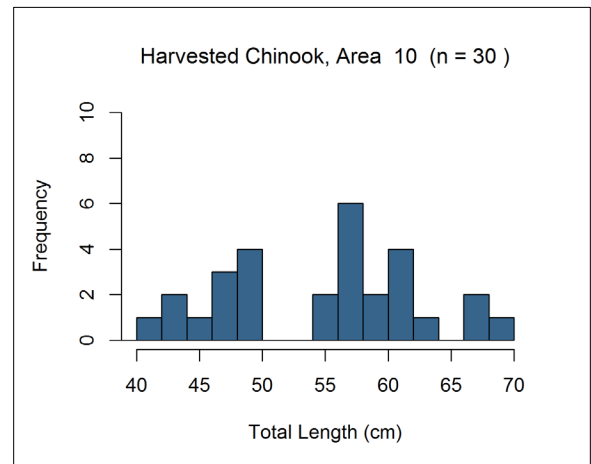
**Figure 6.1** Temporal patterns in fishing effort during the 2015-16 winter Chinook MSF in Marine Area 10.



**Figure 6.3** Temporal patterns in Chinook encounters (number retained and released) during the 2015-16 winter Chinook MSF in Marine Area 10.



**Figure 6.2** Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2015-16 winter Chinook MSF in Marine Area 10.

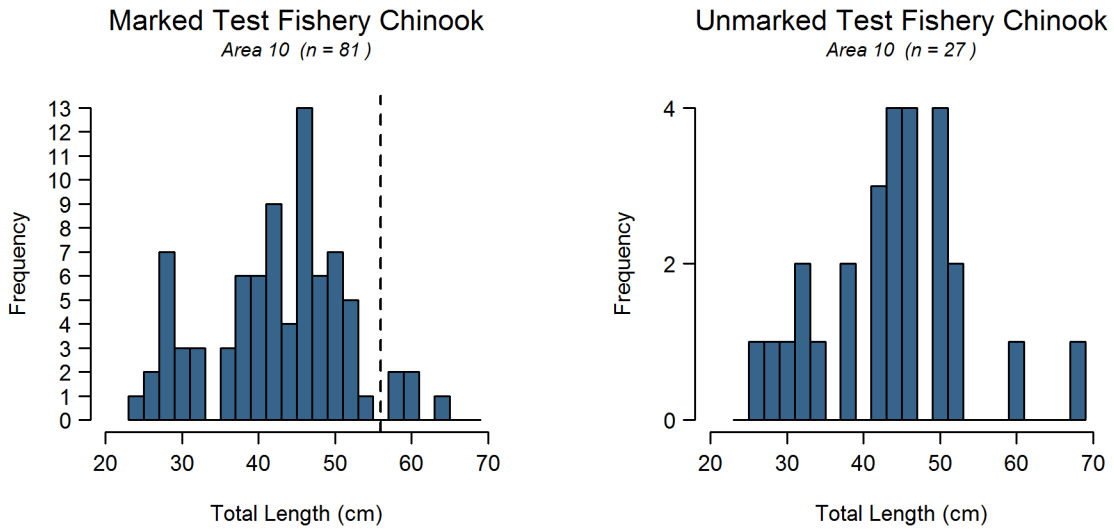


**Figure 6.4** Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2015-16 winter Chinook MSF in Marine Area 10.



**Table 6.5** Composition of test fishery Chinook encounters and associated mark-rate and size/mark-status proportion estimates for the 2015-16 winter Chinook MSF in Marine Area 10. AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hrs Fished	AD	UM	AD	UM	
40	2	12	1	1	9	5	16
41	5	30	2	0	50	16	68
42	3	14	2	1	17	4	24
<b>Total</b>	<b>10</b>	<b>57</b>	<b>5</b>	<b>2</b>	<b>76</b>	<b>25</b>	<b>108</b>
<b>Size/mark-status composition:</b>			0.05	0.01	0.36	0.19	
<b>Legal size mark rate:</b>			0.7143				
<b>Overall mark rate:</b>			0.6749				



**Figure 6.5** Length-frequency distributions of marked (*left panel*) and unmarked (*right panel*) Chinook encountered by test fishers during the 2015-16 winter Chinook 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 6.6** Total Chinook encountered (retained and released) by private-boat and charter boat anglers logging their trips on VTRs, with estimates of legal-size and overall (legal and sublegal) mark rates during the 2015-16 winter Chinook 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	9 1-trip VTRs, 14 Angler Trips	1	1	0	10	12	0.08	0.50
Size/mark-status composition:		0.08	0.08	0.00	0.83			
Variance:		(0.0069)	(0.0069)	(0.0000)	(0.0126)			

We used Pearson’s chi-square test to compare the size/mark-status composition of the private VTR and test fishery datasets. Results were significant ( $\chi^2 = 23.968$ ,  $df = 3$ ,  $p\text{-value} = < 0.01$ ), suggesting that the two datasets can’t be combined into one pooled season-total estimate of size/mark-status proportions. However, even though there was no significant difference between the two datasets, we elected to use only the test fishing data to calculate encounter and mortality estimates, as it is assumed to be of higher quality and sample sizes were sufficient.

**Table 6.7** Summary of season-wide fishery impact estimates for the 2015-16 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.

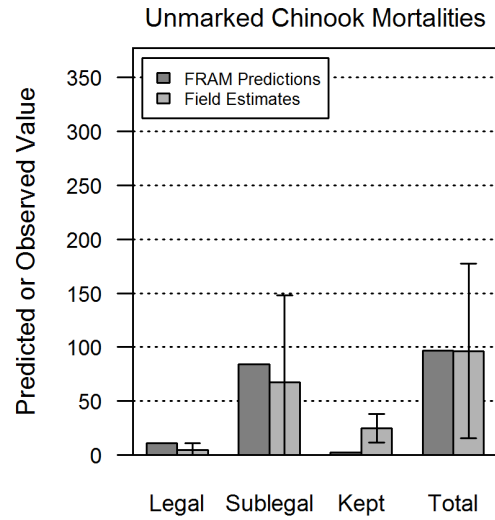
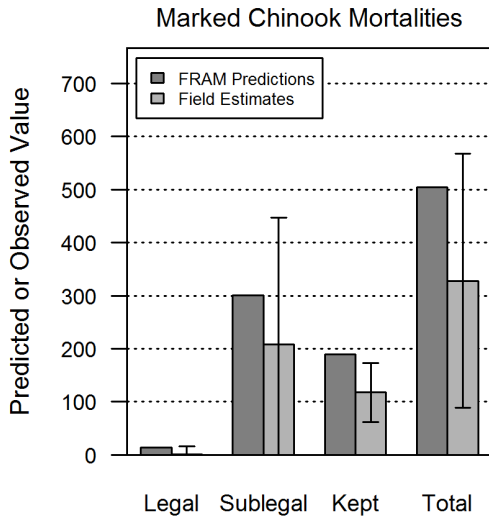
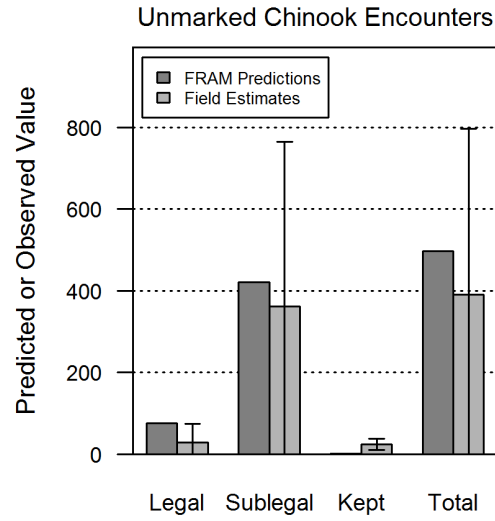
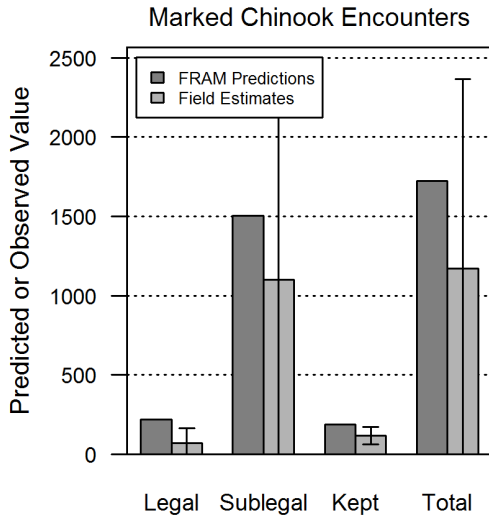
Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
Legal AD	72	63	9	1	64	500	22	20 - 108	35
Legal UM	29	0	29	4	4	12	3	0 - 11	81
Sublegal AD	1098	55	1043	209	264	15,162	123	22 - 505	47
Sublegal UM	361	25	337	67	92	1747	42	10 - 174	45
<b>Total</b>	<b>1,561</b>	<b>143</b>	<b>1,418</b>	<b>282</b>	<b>424</b>	<b>17,422</b>	<b>132</b>	<b>166 - 683</b>	<b>31</b>

**Table 6.8** Comparison of modeled (FRAM model run 2115) and estimated total Chinook encounters for the 2015-16 winter Chinook 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	498	76	422	2
	AD	1,723	218	1,505	189
	Total	2,221	294	1,927	191
	% Marked	78	74	78	99
Estimated (Creel) Encounters	UM	390	29	361	25
	AD	1171	72	1098	118
	Total	1,561	101	1460	143
	% Marked	75	71	75	83

**Table 6.9** Comparison of modeled (FRAM model run 2115) and estimated total Chinook mortalities for the 2015-16 winter Chinook 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)	97	504	601	96	328	424
Released Legal	11	14	25	4	1	6
Released Sublegal	84	301	385	67	209	276
Landed Only	2	189	191	25	118	143



**Table 6.10** Summary of double-index tagged (DIT) Chinook kept by anglers, and estimated total mortality of unmarked DIT Chinook due to hook-and-release impacts resulting from the 2015-16 winter Chinook MSF in Marine Area 10. AD = marked (adipose-clipped), UM = unmarked.

Hatchery	Brood Year	DITs Obs'd	AD DIT Harvest		UM DIT Enc.	UM DIT Mortality		
			Est.	var(Est.)		Est.	var(Est.)	SE(Est.)
Grovers Cr Hatchery	2013	1	5.8	28.35	5.8	0.6	0.276	0.53
Soos Creek Hatchery	2013	1	5.8	28.35	5.8	0.6	0.283	0.53
<b>Total</b>		<b>2</b>	<b>11.7</b>	<b>56.7</b>	<b>11.6</b>	<b>1.2</b>	<b>0.559</b>	<b>1.06</b>

**Table 6.11** Monthly sample rates (Total retained Chinook sampled<sup>1</sup> / Estimated retained Chinook) in the 2015-16 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	
October	40 - 42	01 Oct - 18 Oct	118	25	143	30	5	35	24.5%
<b>Season Total</b>			<b>118</b>	<b>25</b>	<b>143</b>	<b>30</b>	<b>5</b>	<b>35</b>	<b>24.5%</b>

<sup>1</sup> Number of retained Chinook sampled includes all retained Chinook inspected for CWTs, from all sites sampled during the four-month winter Area 10 fishery (i.e., the two selected sites per sampling day for creel [Murthy] estimates, plus the fish sampled as part of baseline [non-Murthy] sampling in the Area).

**Table 6.12** Fishery-total estimates of retained and released salmon (*other than Chinook*) during the 2015-16 winter Chinook MSF in Marine Area 10. Values may not add 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	Chum	Coho AD	Coho UM	Coho UK	Chum	Cutthroat	Unk Salmon
40	1-Oct	4-Oct	351	267	9	51	23	374	0	101	2292
41	5-Oct	11-Oct	421	327	12	78	0	485	0	76	2527
42	12-Oct	18-Oct	66	189	5	5	8	539	3	0	2684
<b>Area 10 Season Total:</b>			<b>838</b>	<b>783</b>	<b>26</b>	<b>133</b>	<b>31</b>	<b>1,397</b>	<b>3</b>	<b>177</b>	<b>7,503</b>
<b>Variance:</b>			41,469	11,240	93	2,265	73	65,027	6	10789	2,023,736
<b>Standard Error:</b>			204	106	10	48	9	255	3	104	1423
<b>CV (%):</b>			24	14	38	36	28	18	72	59	19
<b>95% CI:</b>			439 - 1,237	576 - 991	7 - 44	40 - 227	14 - 48	897 - 1,897	0 - 8	0 - 381	4,714 - 10,291

**Table 6.13** Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2015-16 winter Chinook MSF in Marine Area 10. Bold sites indicate those included in the dockside sample frame.

Site Name	Total Anglers	Season Total (unadjusted) Size Measure
<b>Armeni Public Ramp</b>	<b>19</b>	<b>0.1267</b>
Brownsville Marina/Dock/Ramp	2	0.0133
Eagle Harbor Waterfront Park	6	0.0400
Edmonds Boat Basin	17	0.1133
<b>Edmonds Dry Storage</b>	<b>8</b>	<b>0.0533</b>
Edmonds Marina	9	0.0600
Elliott Bay Marina	1	0.0067
Kingston Marina	3	0.0200
<b>Kingston Public Ramp</b>	<b>24</b>	<b>0.1600</b>
<b>Manchester Public Ramp</b>	<b>2</b>	<b>0.0133</b>
Point Defiance Public Ramp	1	0.0067
Private	13	0.0867
Shilshole Marina	8	0.0533
<b>Shilshole Public Ramp</b>	<b>37</b>	<b>0.2467</b>
<b>Area 10 Total Anglers</b>	<b>150</b>	<b>1</b>

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 01, 2015 – Oct 18, 2016	4,110	63	0	55	25	9	29	1043	337	1,561

## **7) Marine Area 11 Winter Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented a seventh consecutive winter Chinook MSF in Marine Area 11 from October 1 –April 30, 2015. Data collection methods used to monitor the Area 11 Chinook MSF included dockside angler interviews (with catch sampling) and voluntary trip reports provided by private anglers. From these activities, we were able to estimate catch rates (CPUE), mark rates (based on VTRs), and landed-catch composition (age, length, and CWT). 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 dockside samplers conducted “Baseline Sampling” at selected access sites during the 2015-16 winter Chinook MSF in Area 11. Complete details of these methods are presented in a separate Methods Report (WDFW 2012a). Briefly, 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 Area 11 baseline sample frame included 16 different access sites (Table 7.2), and a total of 356 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 Area 11 fishery at the selected access site. The interview and catch-sampling procedures employed were identical to those used in other MSFs. Thus, Area 11 samplers acquired information about: 1) angling effort (boat and angler trips, trip length), 2) encounters composition (retained and/or released) by species and mark status (marked vs. unmarked, Chinook and Coho salmon only), and 3) landed Chinook size (fork and total 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, Area 11 sampling results could not be used to produce fishery-total estimates of effort, encounters (retained catch + releases), and unmarked-DIT Chinook impacts. However, Area 11 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. Thus, 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 Area 11 winter 2015-16 Chinook MSF.

Draft; November 25, 2016

**Table 7.1** Observations of fishing effort, salmon harvest, and reported salmon releases, by week, for the 2015-16 winter Chinook MSF in Marine Area 11. 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	Chin AD	Chin UM	Chin UD	Coho AD	Coho UM	Coho UK	Chum	Chin AD	Chin UM	Chin UK	Cutthroat	
40	1-Oct	5-Oct	89	161	1	0	0	0	0	0	0	0	5	1	18	0
41	6-Oct	12-Oct	98	129	0	0	0	0	0	0	0	0	19	15	26	1
42	13-Oct	19-Oct	64	108	0	0	0	0	0	0	0	0	3	1	11	20
43	20-Oct	26-Oct	43	69	1	0	0	1	0	0	0	2	38	19	27	18
44	27-Oct	2-Nov	21	31	0	0	0	0	0	0	0	0	0	1	1	1
45	3-Nov	9-Nov	16	22	0	0	0	0	0	0	0	1	7	1	26	2
46	10-Nov	16-Nov	8	11	1	0	0	0	0	0	0	0	10	0	4	0
47	17-Nov	23-Nov	14	24	0	0	0	0	0	0	0	0	4	0	4	16
48	24-Nov	30-Nov	12	19	0	0	0	0	0	0	0	0	2	0	0	1
49	1-Dec	7-Dec	8	10	0	0	0	0	0	0	0	0	0	0	0	0
50	8-Dec	14-Dec	4	5	0	0	0	0	0	0	0	0	0	0	0	0
51	15-Dec	21-Dec	11	18	0	0	0	0	0	0	0	0	1	0	0	0
52	22-Dec	28-Dec	7	9	1	0	0	0	0	0	0	0	1	0	0	4
53	29-Dec	31-Dec	9	10	0	0	0	14	11	0	0	0	0	0	0	20
Oct 1st - Dec 31st Sub-Total			404	626	4	0	0	15	11	0	3	90	38	117	83	
6	1-Feb	7-Feb	18	27	1	0	0	14	8	0	0	10	2	0	0	
7	8-Feb	14-Feb	13	15	0	0	0	17	10	0	0	0	0	0	2	
8	15-Feb	21-Feb	6	9	0	1	0	0	1	0	0	3	0	0	0	
9	22-Feb	28-Feb	27	32	1	0	0	1	0	0	0	2	1	0	0	
10	29-Feb	6-Mar	34	51	2	0	0	0	0	0	0	8	0	1	0	
11	7-Mar	13-Mar	14	15	0	0	0	0	0	0	0	0	0	1	0	
12	14-Mar	20-Mar	41	62	2	0	0	0	0	0	0	4	1	0	0	
13	21-Mar	27-Mar	25	34	5	0	0	0	0	0	0	4	4	0	1	
14	28-Mar	3-Apr	68	101	12	0	0	0	0	0	0	18	5	1	1	
15	4-Apr	10-Apr	46	70	5	0	0	0	0	0	0	4	2	7	0	
16	11-Apr	17-Apr	78	119	14	0	0	0	0	0	0	16	9	7	0	
17	18-Apr	24-Apr	59	82	5	0	0	0	0	0	0	4	5	1	1	
18	25-Apr	30-Apr	49	55	9	0	0	0	0	0	0	11	2	0	0	
Feb 1st - Apr 30th Sub-Total			478	672	56	1	0	32	19	0	0	84	31	18	5	
<b>Season Total</b>			<b>882</b>	<b>1298</b>	<b>60</b>	<b>1</b>	<b>0</b>	<b>47</b>	<b>30</b>	<b>0</b>	<b>3</b>	<b>174</b>	<b>69</b>	<b>135</b>	<b>88</b>	

**Table 7.2** List of sites sampled with the number of sampling events (site-days) during the 2015-16 winter Chinook MSF in Marine Area 11.

Location Name	Number of Site Days Sampled Per Month						Total Site-Days	% of Total
	October	November	December	February	March	April		
Armeni Public Ramp	4	1	0	0	0	2	7	2.0%
Browns Point Shore	2	0	0	0	0	0	2	0.6%
Dash Point Dock	6	0	0	2	3	1	12	3.4%
Dash Point Shore	1	0	0	0	0	0	1	0.3%
Day Island Marina	0	0	0	0	0	1	1	0.3%
Gig Harbor Ramp	9	4	1	8	14	7	43	12.1%
Les Davis Pier	0	0	0	0	3	1	4	1.1%
Manchester Public Ramp	0	1	0	0	0	0	1	0.3%
Narrows Marina Private	1	0	0	8	19	10	38	10.7%
Narrows Ramp	0	0	0	1	0	0	1	0.3%
Olalla Public Ramp	6	7	2	3	7	5	30	8.4%
Point Defiance Boathouse	21	13	10	19	26	26	115	32.3%
Point Defiance Public Ramp	19	9	5	13	20	20	86	24.2%
Redondo Pier	0	0	0	1	0	0	1	0.3%
Redondo Ramp	4	0	0	2	5	2	13	3.7%
Zittels Marina	0	0	0	0	1	0	1	0.3%
<b>Grand Total</b>	<b>73</b>	<b>35</b>	<b>18</b>	<b>57</b>	<b>98</b>	<b>75</b>	<b>356</b>	<b>100.0%</b>

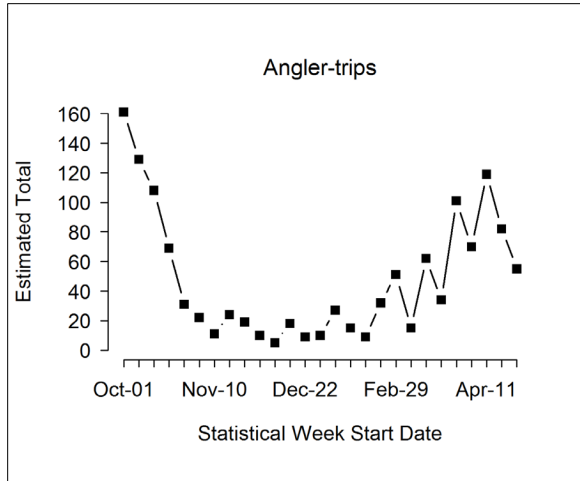
**Table 7.3** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2015-16 winter Chinook MSF in Marine Area 11.

Mark Type	Number Sampled		Total
	Legal-size	Sublegal-size	
Marked	52	0	52
Unmarked	0	0	0
<b>Total</b>	<b>52</b>	<b>0</b>	<b>52</b>

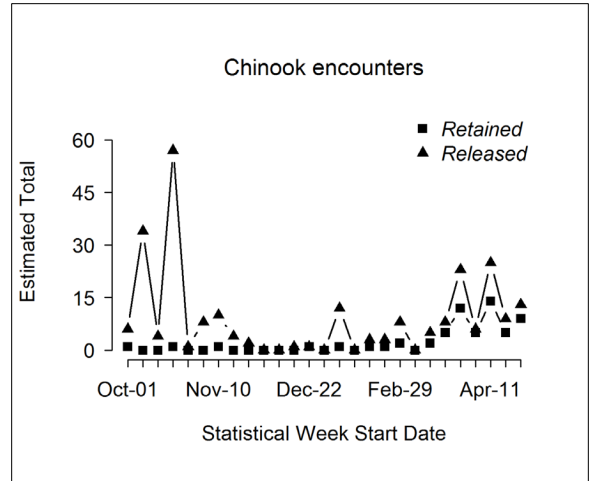
**Table 7.4** Summary of CWTs recovered from Chinook salmon harvested during the 2015-16 winter Chinook MSF in Marine Area 11. The field “Number DITs” indicates the number of tags that belonged to double-index tag groups.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	N Washington (25%)	Kendall Cr 01.0406	Kendall Cr Hatchery	1 (25%)	0
	N Puget Sound (25%)	Wallace R 07.0940	Wallace R Hatchery	1 (25%)	1
	Skagit River (25%)	Co Line Pd2 03.1853B	Marblemount Hatchery	1 (25%)	0
	S Sound (25%)	Minter Cr 15.0048	Hupp Springs Rearing	1 (25%)	0
<b>Total</b>				<b>4</b>	<b>1</b>

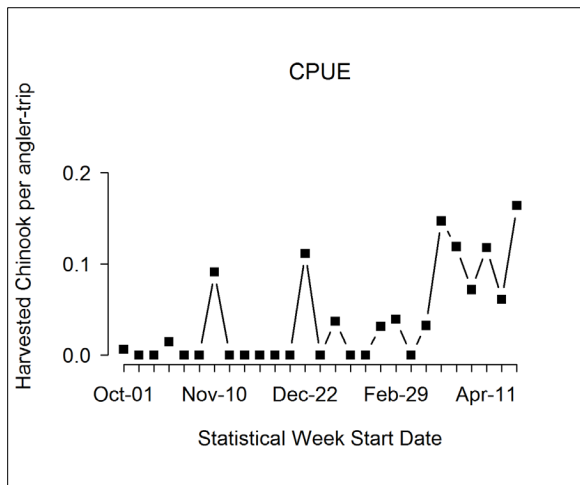




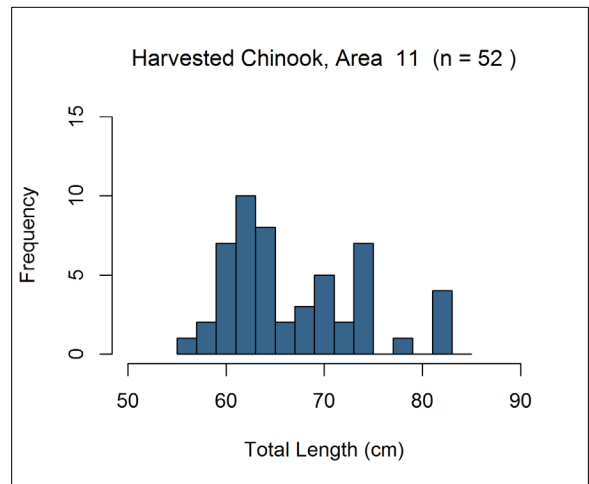
**Figure 7.1** Temporal patterns in fishing effort during the 2015-16 winter Chinook MSF in Marine Area 11. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 7.3** Temporal patterns in Chinook encounters (number retained and released) during the 2015-16 winter Chinook MSF in Marine Area 11. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 7.2** Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2015-16 winter Chinook MSF in Marine Area 11. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates



**Figure 7.4** Length-frequency distributions of retained marked Chinook sampled in dockside angler interviews during the 2015-16 winter Chinook MSF in Marine Area 11. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

**Table 7.5** Total Chinook encountered (retained and released) by private-boat anglers logging their trips on VTRs during the 2015-16 winter Chinook 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 VTR	37 1-trip VTRs, 53 Angler Trips	7	3	56	18	84	0.75	0.70
Size/mark-status composition:		0.08	0.04	0.67	0.21			
Variance:		(0.0009)	(0.0004)	(0.0027)	(0.0020)			

## **8) Marine Area 12 Winter Mark-Selective Chinook Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented a seventh consecutive winter Chinook MSF in Marine Area 12 from October 1 – December 31, 2015 and February 1 – April 30, 2016. Data collection methods used to monitor the Area 12 Chinook MSF included dockside angler interviews (with catch sampling) and voluntary trip reports provided by private anglers. From these activities, we were able to estimate catch rates (CPUE), mark rates (based on VTRs), and landed-catch composition (age, length, and CWT). 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 dockside samplers conducted “Baseline Sampling” at selected access sites during the 2015-16 winter Chinook MSF in Area 12. Complete details of these methods are presented in a separate Methods Report (WDFW 2012a). Briefly, 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 Area 12 baseline sample frame included 15 different access sites (**Table 8.2**), and a total of 136 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 Area 12 fishery at the selected access site. The interview and catch-sampling procedures employed were identical to those used in other MSFs. Thus, Area 12 samplers acquired information about: 1) angling effort (boat and angler trips, trip length), 2) encounters composition (retained and/or released) by species and mark status (marked vs. unmarked, Chinook and Coho salmon only), and 3) landed Chinook size (fork and total 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, Area 12 sampling results could not be used to produce fishery-total estimates of effort, encounters (retained catch + releases), and unmarked-DIT Chinook impacts. However, Area 12 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. Thus, 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 Area 12 winter 2015-16 Chinook MSF.

Draft; November 25, 2016

**Table 8.1** Observations of fishing effort, salmon harvest, and reported salmon releases, by week, for the 2015-16 winter Chinook MSF in Marine Area 12. 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	Chin AD	Chin UM	Chin UD	Coho AD	Coho UM	Chum	Chin AD	Chin UM	Chin UK	Coho AD	Coho UM	Chum	Cutthroat
40	1-Oct	5-Oct	4	9	0	0	0	0	0	0	0	0	0	0	0	0	0
41	6-Oct	12-Oct	2	2	0	0	0	1	0	0	0	0	0	0	0	0	0
42	13-Oct	19-Oct	39	45	0	0	0	5	9	10	0	0	0	0	0	0	0
43	20-Oct	26-Oct	47	52	0	0	0	2	2	0	0	0	0	0	3	9	6
44	27-Oct	2-Nov	20	22	0	0	0	0	3	0	0	0	0	0	0	0	1
45	3-Nov	9-Nov	6	10	0	0	0	0	0	0	0	0	0	1	0	0	5
46	10-Nov	16-Nov	45	45	0	0	0	0	0	131	0	0	0	0	0	263	0
47	17-Nov	23-Nov	10	10	1	0	0	0	0	25	13	0	0	0	0	34	0
48	24-Nov	30-Nov	2	2	0	0	0	0	0	0	0	1	0	0	0	0	0
49	1-Dec	7-Dec	3	3	0	0	0	0	0	0	11	0	0	0	0	0	0
50	8-Dec	14-Dec	2	4	1	0	0	0	0	0	2	0	0	0	0	0	0
51	15-Dec	21-Dec	4	4	0	0	0	0	0	0	4	0	0	0	0	0	0
52	22-Dec	28-Dec	4	10	1	0	0	0	0	0	4	0	0	0	0	0	0
53	29-Dec	31-Dec	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct 1st - Dec 31st Sub-Total			189	219	3	0	0	8	14	166	34	1	0	1	3	306	12
6	1-Feb	7-Feb	16	26	2	0	0	0	0	0	4	0	1	0	0	0	0
7	8-Feb	14-Feb	63	148	18	0	0	0	0	0	73	5	22	0	0	0	6
8	15-Feb	21-Feb	21	49	11	0	0	0	0	0	25	1	2	0	0	0	0
9	22-Feb	28-Feb	28	57	16	0	0	0	0	0	35	6	30	0	0	0	4
10	29-Feb	6-Mar	37	81	46	0	0	0	0	0	42	21	13	0	0	0	4
11	7-Mar	13-Mar	10	12	3	0	0	0	0	0	17	0	0	0	0	0	8
12	14-Mar	20-Mar	18	32	9	0	0	0	0	0	26	4	4	1	0	0	3
13	21-Mar	27-Mar	20	31	6	0	0	0	0	0	12	2	1	1	0	0	13
14	28-Mar	3-Apr	34	61	8	0	0	0	0	0	15	2	7	0	0	0	26
15	4-Apr	10-Apr	52	133	28	0	0	0	0	0	38	5	6	0	0	0	0
16	11-Apr	17-Apr	23	41	8	0	0	0	0	0	25	4	4	0	0	0	16
17	18-Apr	24-Apr	12	21	3	0	0	0	0	0	11	0	0	0	0	0	4
18	25-Apr	30-Apr	12	23	1	0	0	0	0	0	7	3	0	0	0	0	0
Feb 1st - Apr 30th Sub-Total			346	715	159	0	0	0	0	0	330	53	90	2	0	0	84
<b>Season Total</b>			<b>535</b>	<b>934</b>	<b>162</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>14</b>	<b>166</b>	<b>364</b>	<b>54</b>	<b>90</b>	<b>3</b>	<b>3</b>	<b>306</b>	<b>96</b>

**Table 8.2** List of sites sampled with the number of sampling events (site-days) during the 2015-16 winter Chinook MSF in Marine Area 12.

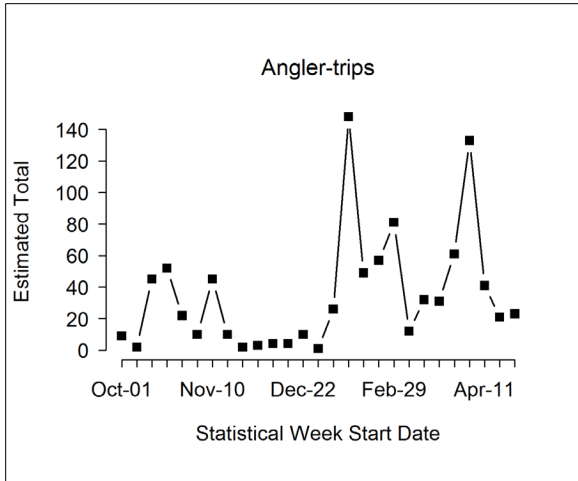
Location Name	Numer of Site Days Sampled Per Month						Total Site-Days	% of Total
	October	November	December	February	March	April		
Big Beef Beach	13	1	1	0	0	0	15	11.0%
Dewatto Creek Watch	1	0	0	0	0	0	1	0.7%
Everett Ramp	0	0	0	2	0	0	2	1.5%
Hoodsport Shore	1	2	0	0	0	0	3	2.2%
Menard's Landing (Rendsland Creek Shore)	0	1	0	0	0	0	1	0.7%
Misery Point Ramp	10	4	6	17	13	18	68	50.0%
Pleasant Harbor Boat Ramp	0	0	0	3	4	9	16	11.8%
Pleasant Harbor Marina	0	0	0	0	2	0	2	1.5%
Potlatch State Park, Hood Canal Ramp	0	0	0	1	0	0	1	0.7%
Salsbury County Park Ramp	1	0	0	1	1	0	3	2.2%
Skokomish Ramp	0	0	0	5	2	1	8	5.9%
Tahuya Ramp	4	0	0	0	1	0	5	3.7%
Triton Cove State Park	0	0	0	0	1	5	6	4.4%
Twanoh State Park	0	0	0	2	2	0	4	2.9%
Union Ramp	0	0	0	1	0	0	1	0.7%
<b>Grand Total</b>	<b>30</b>	<b>8</b>	<b>7</b>	<b>32</b>	<b>26</b>	<b>33</b>	<b>136</b>	<b>100.0%</b>

**Table 8.3** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2015-16 winter Chinook MSF in Marine Area 12

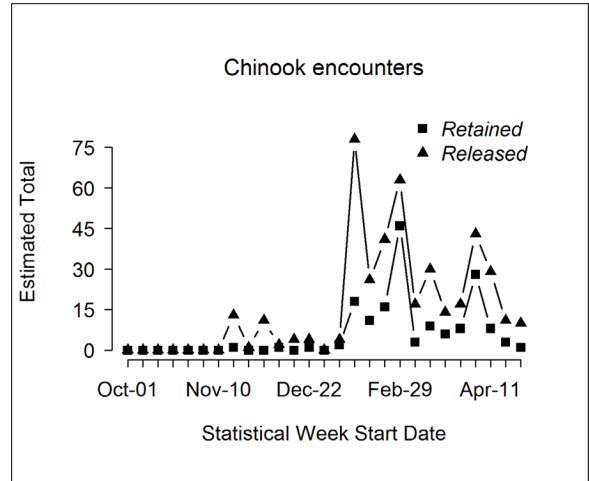
Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	144	14	158
Unmarked	0	0	0
<b>Total</b>	<b>144</b>	<b>14</b>	<b>158</b>

**Table 8.4** Summary of CWTs recovered from Chinook salmon harvested during the 2015-16 winter Chinook MSF in Marine Area 12. The field "Number DITs" indicates the number of tags that belonged to double-index tag groups.

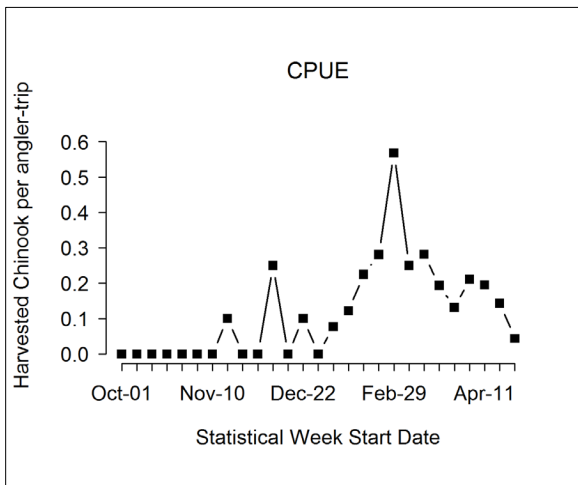
Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	Hood Canal (54.5%)	Finch Cr 16.0222	Hoodsport Hatchery	5 (45.5%)	0
		Purdy Cr 16.0005	George Adams Hatchery	1 (9.1%)	0
	N Puget Sound (9.1%)	Wallace R 07.0940	Wallace R Hatchery	1 (9.1%)	0
	Skagit River (9.1%)	Cascade R 03.1411	Marblemount Hatchery	1 (9.1%)	1
	Mid Puget Sound (27.3%)	Huckleberry C10.0253	Puyallup Tribal Hatchery	1 (9.1%)	0
		Icy Cr 09.0125	Icy Cr Hatchery	2 (18.2%)	0
<b>Total</b>				<b>11</b>	<b>1</b>



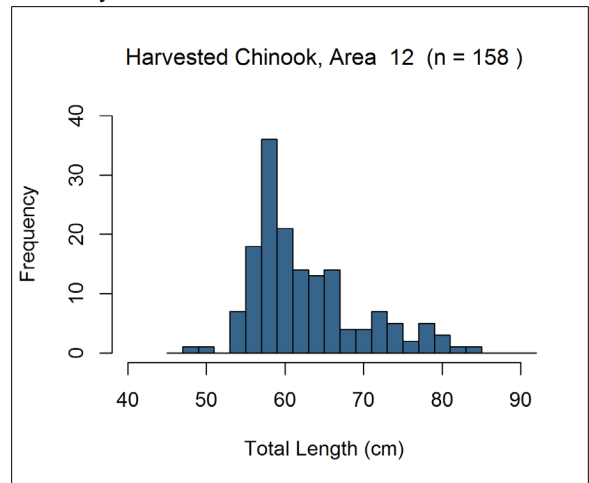
**Figure 8.1** Temporal patterns in fishing effort during the 2015-16 winter Chinook MSF in Marine Area. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 8.3** Temporal patterns in Chinook encounters (number retained and released) during the 2015-16 winter Chinook MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 8.2** Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2015-16 winter Chinook MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates



**Figure 8.4** Length-frequency distributions of retained marked Chinook sampled in dockside angler interviews during the 2015-16 winter Chinook MSF in Marine Area 12.

**Table 8.5** Total Chinook encountered (retained and released) by private-boat anglers logging their trips on VTRs during the 2015-16 winter Chinook MSF in Marine Area 12, 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 VTR	1 1-trip VTRs, 1 Angler Trips	0	0	1	0	1	1	0
Size/mark-status composition:		0	0	1	0			
Variance:		(0.0000)	(0.0000)	(0.0001)	(0.0000)			

## **9) Marine Area 13 Winter Mark-Selective Fishery**

The Washington Department of Fish and Wildlife (WDFW) implemented the second winter Chinook MSF in Marine Area 13 from October 1, 2014 – April 30, 2015. Data collection methods used to monitor the Area 13 Chinook MSF included dockside angler interviews (with catch sampling) and voluntary trip reports provided by private anglers. From these activities, we were able to estimate catch rates (CPUE), mark rates (based on VTRs). Although we usually 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 dockside samplers conducted “Baseline Sampling” at selected access sites during the 2015-16 winter Chinook MSF in Area 13. Complete details of these methods are presented in a separate Methods Report (WDFW 2012a). Briefly, 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 Area 13 baseline sample frame included 26 different access sites (**Table 9.2**), and a total of 241 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 Area 13 fishery at the selected access site. The interview and catch-sampling procedures employed were identical to those used in other MSFs. Thus, Area 13 samplers acquired information about: 1) angling effort (boat and angler trips, trip length), 2) encounters composition (retained and/or released) by species and mark status (marked vs. unmarked, Chinook and Coho salmon only), and 3) landed Chinook size (fork and total 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, Area 13 sampling results could not be used to produce fishery-total estimates of effort, encounters (retained catch + releases), and unmarked-DIT Chinook impacts. However, 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. Thus, 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 Area 13 winter 2015-16 Chinook MSF.



**Table 9.1** Observations of fishing effort, salmon harvest, and reported salmon releases, by week, for the 2015-16 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.

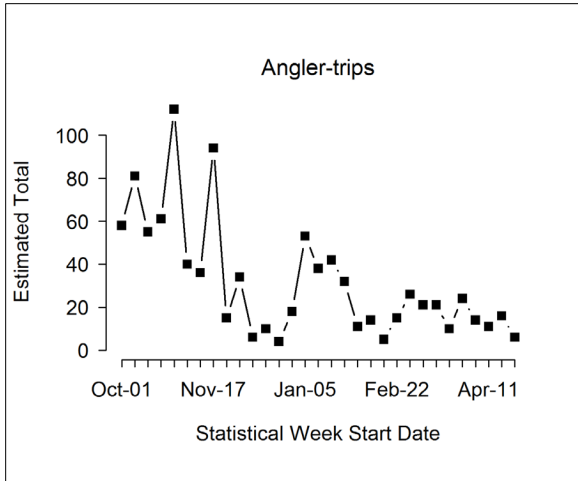
Stat Wk	Start	End	Effort		Retained Fish							Released Fish							
			Boats	Anglers	Chin AD	Chin UM	Chin UD	Coho AD	Coho UM	Chum	Pink	Chin AD	Chin UM	Chin UK	Coho AD	Coho UM	Coho UK	Chum	Pink
40	1-Oct	5-Oct	47	58	0	0	0	10	3	0	1	1	0	3	7	2	0	0	0
41	6-Oct	12-Oct	70	81	0	0	0	6	0	0	0	0	0	1	2	5	2	0	0
42	13-Oct	19-Oct	52	55	0	0	0	2	0	3	0	0	0	2	1	1	0	8	1
43	20-Oct	26-Oct	52	61	0	0	0	1	1	1	0	1	0	0	5	0	1	1	0
44	27-Oct	2-Nov	111	112	0	0	0	0	0	75	0	0	0	0	0	0	1	94	0
45	3-Nov	9-Nov	40	40	0	0	0	0	0	18	0	0	0	0	0	0	0	38	0
46	10-Nov	16-Nov	36	36	0	0	0	0	0	18	0	0	0	0	0	0	0	68	0
47	17-Nov	23-Nov	93	94	0	0	0	0	0	47	0	0	0	0	0	0	1	90	0
48	24-Nov	30-Nov	15	15	0	0	0	0	0	13	0	0	0	0	0	0	0	9	0
49	1-Dec	7-Dec	33	34	0	0	0	0	0	6	0	0	0	0	0	0	0	16	0
50	8-Dec	14-Dec	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	15-Dec	21-Dec	10	10	0	0	0	0	0	0	0	0	0	0	7	1	0	0	0
52	22-Dec	28-Dec	3	4	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
53/1	29-Dec	4-Jan	14	18	0	0	0	0	0	0	0	5	0	1	2	0	1	0	0
2	5-Jan	11-Jan	49	53	0	0	0	0	0	0	0	8	0	0	4	0	1	0	0
3	12-Jan	18-Jan	36	38	1	0	0	2	0	0	0	1	0	0	31	7	8	0	0
4	19-Jan	25-Jan	39	42	0	0	0	1	0	0	0	0	0	2	23	3	3	0	0
5	26-Jan	31-Jan	30	32	0	0	0	0	0	0	0	0	0	0	42	6	0	0	0
6	1-Feb	7-Feb	8	11	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0
7	8-Feb	14-Feb	14	14	0	0	0	2	0	0	0	0	0	0	9	3	3	0	0
8	15-Feb	21-Feb	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	22-Feb	28-Feb	13	15	0	0	0	0	0	0	0	2	0	0	5	0	2	0	0
10	29-Feb	6-Mar	26	26	0	0	0	1	0	0	0	4	1	0	23	5	3	0	0
11	7-Mar	13-Mar	21	21	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0
12	14-Mar	20-Mar	20	21	0	0	0	0	0	0	0	3	0	0	4	1	0	0	0
13	21-Mar	27-Mar	7	10	0	0	0	3	0	0	0	0	0	0	2	0	0	0	0
14	28-Mar	3-Apr	20	24	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0
15	4-Apr	10-Apr	13	14	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
16	11-Apr	17-Apr	7	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	18-Apr	24-Apr	13	16	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
18	25-Apr	30-Apr	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Season Total</b>			<b>754</b>	<b>818</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>29</b>	<b>4</b>	<b>181</b>	<b>1</b>	<b>27</b>	<b>1</b>	<b>10</b>	<b>177</b>	<b>37</b>	<b>29</b>	<b>324</b>	<b>1</b>

**Table 9.2** List of sites sampled with the number of sampling events (site-days) during the 2015-16 winter Chinook MSF in Marine Area 13.

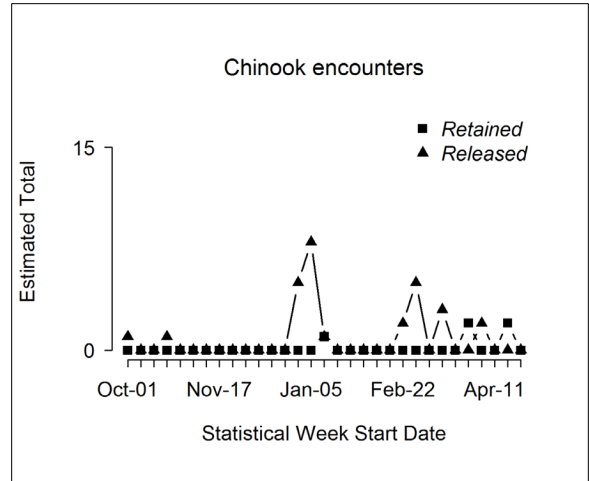
Location Name	Number of Site Days Sampled Per Month							Total Site-Days	% of Total
	October	November	December	January	February	March	April		
Allyn Public Ramp	0	0	0	0	0	1	0	1	0.4%
Boston Harbor Ramp/Marina	5	0	0	0	1	0	1	7	2.9%
Concrete Dock	1	0	1	0	0	0	0	2	0.8%
Fox Island Public Ramp	0	0	0	3	0	1	0	4	1.7%
Gig Harbor Ramp	2	0	0	6	1	0	1	10	4.1%
Hartstene Is. Ramp	2	1	0	0	0	0	1	4	1.7%
Home Public Ramp	2	0	0	0	0	1	0	3	1.2%
Horsehead Bay Ramp	1	0	0	0	0	0	0	1	0.4%
John's Creek	8	0	0	0	0	0	0	8	3.3%
Kennedy Creek Mouth	11	6	0	0	0	0	0	17	7.1%
Lemons Beach	1	0	0	0	0	0	0	1	0.4%
Longbranch Public Ramp	0	1	0	0	0	0	0	1	0.4%
Luhr Beach Ramp	3	0	0	2	2	2	1	10	4.1%
Narrows Marina Private	0	2	0	0	0	2	4	8	3.3%
Narrows Park	19	4	6	17	8	15	9	78	32.4%
Perry Creek	0	7	5	0	0	0	0	12	5.0%
Point Defiance Boathouse	3	2	2	6	0	2	2	17	7.1%
Point Defiance Public Ramp	1	0	0	0	1	2	2	6	2.5%
Shorecrest Mason Co. Park Ramp	1	0	0	0	0	0	0	1	0.4%
Solo Point	2	0	1	1	3	0	1	8	3.3%
Solo Point Shore	0	0	2	1	0	0	0	3	1.2%
Steamboat Island Bridge	1	0	0	0	0	0	0	1	0.4%
Steilacoom Public Ramp	0	0	0	0	0	1	1	2	0.8%
Swan Town/East Bay Marina/Ramp	0	0	1	0	0	0	0	1	0.4%
Wauna Ramp	0	1	0	0	0	0	0	1	0.4%
Wauna Shore	0	1	2	12	1	8	3	27	11.2%
Zittels Marina	2	0	1	0	1	2	1	7	2.9%
<b>Grand Total</b>	<b>65</b>	<b>25</b>	<b>21</b>	<b>48</b>	<b>18</b>	<b>37</b>	<b>27</b>	<b>241</b>	<b>100.0%</b>

**Table 9.3** Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2015-16 winter Chinook MSF in Marine Area 13.

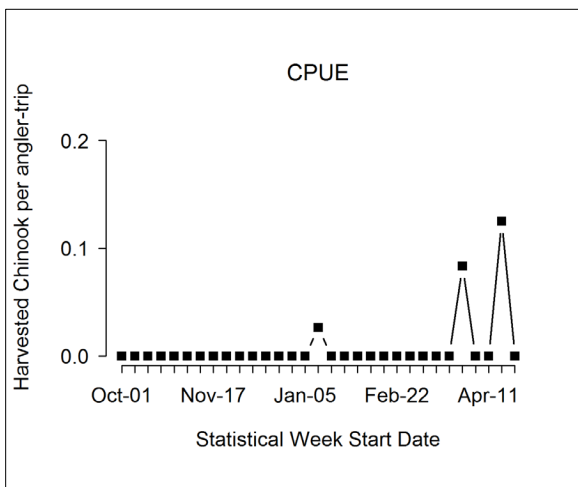
Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	3	0	3
Unmarked	0	0	0
<b>Total</b>	<b>3</b>	<b>0</b>	<b>3</b>



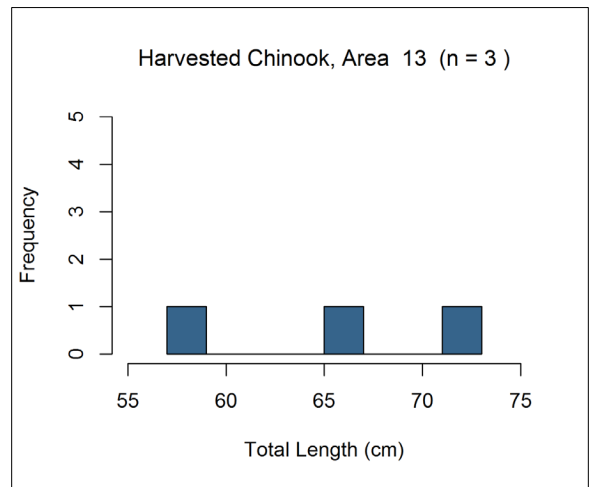
**Figure 9.1** Temporal patterns in fishing effort during the 2015-16 winter Chinook MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 9.3** Temporal patterns in Chinook encounters (number retained and released) during the 2015-16 winter Chinook MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 9.2** Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2015-16 winter Chinook MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.



**Figure 9.4** Length-frequency distributions of retained marked Chinook sampled in dockside angler interviews during the 2015-16 winter Chinook MSF in Marine Area 13.

**Table 9.4** Total Chinook encountered (retained and released) by private-boat anglers logging their trips on VTRs during the 2015-16 winter Chinook 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 VTR	9 1-trip VTRs, 14 Angler Trips	0	0	6	0	6	1.00	0
Size/mark-status composition:		0.00	0.00	1.00	0.00			
Variance:		(0.0000)	(0.0000)	(0.0000)	(0.0000)			

## **ACKNOWLEDGEMENTS**

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## APPENDICIES

### 1) SITE MEASURES

**Appendix 1.1** Size measures by sample date, for sites sampled during dockside creel surveys for the 2015-16 winter Chinook MSF in Marine Area 8-1.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
11/2/2015	45	Camano Island State Park Public Ramp	0.5263	Maple Grove Ramp; Camano Is	0.175
11/6/2015	45	Camano Island State Park Public Ramp	0.5263	Maple Grove Ramp; Camano Is	0.175
11/7/2015	45	Camano Island State Park Public Ramp	0.5263	Maple Grove Ramp; Camano Is	0.175
11/12/2015	46	Camano Island State Park Public Ramp	0.5263	Oak Harbor Marina & Public Ramp	0.2775
11/14/2015	46	Camano Island State Park Public Ramp	0.5263	Maple Grove Ramp; Camano Is	0.175
11/15/2015	46	Camano Island State Park Public Ramp	0.5263	Maple Grove Ramp; Camano Is	0.175
11/17/2015	47	Camano Island State Park Public Ramp	0.5263	Oak Harbor Marina & Public Ramp	0.2775
11/20/2015	47	Camano Island State Park Public Ramp	0.5263	Maple Grove Ramp; Camano Is	0.175
11/21/2015	47	Camano Island State Park Public Ramp	0.5263	Oak Harbor Marina & Public Ramp	0.2775
11/23/2015	48	Camano Island State Park Public Ramp	0.5263	Oak Harbor Marina & Public Ramp	0.2775
11/28/2015	48	Camano Island State Park Public Ramp	0.5263	Oak Harbor Marina & Public Ramp	0.2775
11/29/2015	48	Camano Island State Park Public Ramp	0.5263	Maple Grove Ramp; Camano Is	0.175
12/1/2015	49	Camano Island State Park Public Ramp	0.1511	Maple Grove Ramp; Camano Is	0.1811
12/4/2015	49	Camano Island State Park Public Ramp	0.1511	Oak Harbor Marina & Public Ramp	0.2713
12/6/2015	49	Camano Island State Park Public Ramp	0.1511	Coupeville Public Ramp	0.1007
12/9/2015	50	Camano Island State Park Public Ramp	0.1511	Oak Harbor Marina & Public Ramp	0.2713
12/11/2015	50	Camano Island State Park Public Ramp	0.1511	Norton Street (Everett) Ramp	0.2443
12/12/2015	50	Camano Island State Park Public Ramp	0.1511	Maple Grove Ramp; Camano Is	0.1811
12/14/2015	51	Camano Island State Park Public Ramp	0.1511	Coupeville Public Ramp	0.1007
12/19/2015	51	Camano Island State Park Public Ramp	0.1511	Norton Street (Everett) Ramp	0.2443
12/20/2015	51	Camano Island State Park Public Ramp	0.1511	Oak Harbor Marina & Public Ramp	0.2713
12/22/2015	52	Camano Island State Park Public Ramp	0.1511	Maple Grove Ramp; Camano Is	0.1811
12/27/2015	52	Camano Island State Park Public Ramp	0.1511	Norton Street (Everett) Ramp	0.2443
12/28/2015	53	Camano Island State Park Public Ramp	0.1511	Norton Street (Everett) Ramp	0.2443
1/2/2016	1	Camano Island State Park Public Ramp	0.4682	Oak Harbor Marina & Public Ramp	0.1294

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1/3/2016	1	Camano Island State Park Public Ramp	0.4682	Norton Street (Everett) Ramp	0.1168
1/6/2016	2	Camano Island State Park Public Ramp	0.4682	Oak Harbor Marina & Public Ramp	0.1294
1/8/2016	2	Camano Island State Park Public Ramp	0.4682	Maple Grove Ramp; Camano Is	0.1612
1/9/2016	2	Camano Island State Park Public Ramp	0.4682	Maple Grove Ramp; Camano Is	0.1612
1/14/2016	3	Camano Island State Park Public Ramp	0.4682	Maple Grove Ramp; Camano Is	0.1612
1/16/2016	3	Camano Island State Park Public Ramp	0.4682	Maple Grove Ramp; Camano Is	0.1612
1/17/2016	3	Camano Island State Park Public Ramp	0.4682	Coupeville Public Ramp	0.0557
1/21/2016	4	Camano Island State Park Public Ramp	0.4682	Utsalady Ramp; Camano Is	0.0687
1/22/2016	4	Camano Island State Park Public Ramp	0.4682	Oak Harbor Marina & Public Ramp	0.1294
1/24/2016	4	Camano Island State Park Public Ramp	0.4682	Maple Grove Ramp; Camano Is	0.1612
1/28/2016	5	Camano Island State Park Public Ramp	0.4682	Maple Grove Ramp; Camano Is	0.1612
1/29/2016	5	Camano Island State Park Public Ramp	0.4682	Coupeville Public Ramp	0.0557
1/31/2016	5	Camano Island State Park Public Ramp	0.4682	Norton Street (Everett) Ramp	0.1168
2/1/2016	6	Camano Island State Park Public Ramp	0.4442	Maple Grove Ramp; Camano Is	0.2265
2/5/2016	6	Camano Island State Park Public Ramp	0.4442	Maple Grove Ramp; Camano Is	0.2265
2/6/2016	6	Camano Island State Park Public Ramp	0.4442	Norton Street (Everett) Ramp	0.0791
2/9/2016	7	Camano Island State Park Public Ramp	0.4442	Maple Grove Ramp; Camano Is	0.2265
2/12/2016	7	Camano Island State Park Public Ramp	0.4442	Oak Harbor Marina & Public Ramp	0.1362
2/13/2016	7	Camano Island State Park Public Ramp	0.4442	Maple Grove Ramp; Camano Is	0.2265
2/16/2016	8	Norton Street (Everett) Ramp	0.0791	Camano Island State Park Public Ramp	0.4442
2/20/2016	8	Oak Harbor Marina & Public Ramp	0.1362	Camano Island State Park Public Ramp	0.4442
2/21/2016	8	Maple Grove Ramp; Camano Is	0.2265	Camano Island State Park Public Ramp	0.4442
2/24/2016	9	Oak Harbor Marina & Public Ramp	0.1362	Camano Island State Park Public Ramp	0.4442
2/26/2016	9	Oak Harbor Marina & Public Ramp	0.1362	Camano Island State Park Public Ramp	0.4442
2/28/2016	9	Oak Harbor Marina & Public Ramp	0.1362	Camano Island State Park Public Ramp	0.4442
3/1/2016	10	Camano Island State Park Public Ramp	0.5353	Oak Harbor Marina & Public Ramp	0.0728
3/4/2016	10	Camano Island State Park Public Ramp	0.5353	Norton Street (Everett) Ramp	0.1513
3/5/2016	10	Camano Island State Park Public Ramp	0.5353	Maple Grove Ramp; Camano Is	0.1754
3/9/2016	11	Camano Island State Park Public Ramp	0.5353	Oak Harbor Marina & Public Ramp	0.0728
3/11/2016	11	Camano Island State Park Public Ramp	0.5353	Norton Street (Everett) Ramp	0.1513
3/13/2016	11	Camano Island State Park Public Ramp	0.5353	Norton Street (Everett) Ramp	0.1513
3/16/2016	12	Camano Island State Park Public Ramp	0.5353	Maple Grove Ramp; Camano Is	0.1754
3/19/2016	12	Camano Island State Park Public Ramp	0.5353	Norton Street (Everett) Ramp	0.1513
3/20/2016	12	Camano Island State Park Public Ramp	0.5353	Maple Grove Ramp; Camano Is	0.1754
3/24/2016	13	Camano Island State Park Public Ramp	0.5353	Maple Grove Ramp; Camano Is	0.1754

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3/25/2016	13	Camano Island State Park Public Ramp	0.5353	Oak Harbor Marina & Public Ramp	0.0728
3/26/2016	13	Camano Island State Park Public Ramp	0.5353	Maple Grove Ramp; Camano Is	0.1754
3/28/2016	14	Camano Island State Park Public Ramp	0.5353	Maple Grove Ramp; Camano Is	0.1754
4/2/2016	14	Camano Island State Park Public Ramp	0.5353	Oak Harbor Marina & Public Ramp	0.0728
4/3/2016	14	Camano Island State Park Public Ramp	0.5353	Maple Grove Ramp; Camano Is	0.1754

**Appendix 1.2** Size measures by sample date, for sites sampled during dockside creel surveys for the 2015-16 winter Chinook MSF in Marine Area 8-2.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
11/2/2015	45	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
11/6/2015	45	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
11/7/2015	45	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
11/12/2015	46	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
11/14/2015	46	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
11/15/2015	46	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
11/17/2015	47	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
11/20/2015	47	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
11/21/2015	47	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
11/23/2015	48	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
11/28/2015	48	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
11/29/2015	48	Norton Street (Everett) Ramp	0.566	Camano Island State Park Public Ramp	0.3107
12/1/2015	49	Norton Street (Everett) Ramp	0.6725	Camano Island State Park Public Ramp	0.1436
12/4/2015	49	Norton Street (Everett) Ramp	0.6725	Camano Island State Park Public Ramp	0.1436
12/6/2015	49	Norton Street (Everett) Ramp	0.6725	Camano Island State Park Public Ramp	0.1436
12/9/2015	50	Norton Street (Everett) Ramp	0.6725	Camano Island State Park Public Ramp	0.1436
12/11/2015	50	Norton Street (Everett) Ramp	0.6725	Camano Island State Park Public Ramp	0.1436
12/12/2015	50	Norton Street (Everett) Ramp	0.6725	Dagmar's Landing; Forklift Launch	0.0912
12/14/2015	51	Norton Street (Everett) Ramp	0.6725	Camano Island State Park Public Ramp	0.1436
12/19/2015	51	Norton Street (Everett) Ramp	0.6725	Dagmar's Landing; Forklift Launch	0.0912

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12/20/2015	51	Norton Street (Everett) Ramp	0.6725	Camano Island State Park Public Ramp	0.1436
12/22/2015	52	Norton Street (Everett) Ramp	0.6725	Camano Island State Park Public Ramp	0.1436
12/27/2015	52	Norton Street (Everett) Ramp	0.6725	Camano Island State Park Public Ramp	0.1436
12/28/2015	53	Norton Street (Everett) Ramp	0.6725	Camano Island State Park Public Ramp	0.1436
1/2/2016	1	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/3/2016	1	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/6/2016	2	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/8/2016	2	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/9/2016	2	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/14/2016	3	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/16/2016	3	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/17/2016	3	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/21/2016	4	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/22/2016	4	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/24/2016	4	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/28/2016	5	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/29/2016	5	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
1/31/2016	5	Norton Street (Everett) Ramp	0.62	Camano Island State Park Public Ramp	0.1876
2/1/2016	6	Norton Street (Everett) Ramp	0.707	Camano Island State Park Public Ramp	0.1297
2/5/2016	6	Norton Street (Everett) Ramp	0.707	Camano Island State Park Public Ramp	0.1297
2/6/2016	6	Norton Street (Everett) Ramp	0.707	Camano Island State Park Public Ramp	0.1297
2/9/2016	7	Norton Street (Everett) Ramp	0.707	Camano Island State Park Public Ramp	0.1297
2/12/2016	7	Norton Street (Everett) Ramp	0.707	Dagmar's Landing; Forklift Launch	0.0748
2/13/2016	7	Norton Street (Everett) Ramp	0.707	Camano Island State Park Public Ramp	0.1297
2/16/2016	8	Camano Island State Park Public Ramp	0.1297	Norton Street (Everett) Ramp	0.707
2/20/2016	8	Camano Island State Park Public Ramp	0.1297	Norton Street (Everett) Ramp	0.707
2/21/2016	8	Camano Island State Park Public Ramp	0.1297	Norton Street (Everett) Ramp	0.707
2/24/2016	9	Camano Island State Park Public Ramp	0.1297	Norton Street (Everett) Ramp	0.707
2/26/2016	9	Camano Island State Park Public Ramp	0.1297	Norton Street (Everett) Ramp	0.707

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2/28/2016	9	Camano Island State Park Public Ramp	0.1297	Norton Street (Everett) Ramp	0.707
3/1/2016	10	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
3/4/2016	10	Norton Street (Everett) Ramp	0.6246	Bayside Marine	0.0774
3/5/2016	10	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
3/9/2016	11	Norton Street (Everett) Ramp	0.6246	Bayside Marine	0.0774
3/11/2016	11	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
3/13/2016	11	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
3/16/2016	12	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
3/19/2016	12	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
3/20/2016	12	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
3/24/2016	13	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
3/25/2016	13	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
3/26/2016	13	Camano Island State Park Public Ramp	0.155	Norton Street (Everett) Ramp	0.6246
3/28/2016	14	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
4/2/2016	14	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
4/3/2016	14	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
4/6/2016	14	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155
4/8/2016	15	Norton Street (Everett) Ramp	0.6246	Bayside Marine	0.0774
4/9/2016	15	Norton Street (Everett) Ramp	0.6246	Camano Island State Park Public Ramp	0.155

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**Appendix 1.3** Size measures by sample date, for sites sampled during dockside creel surveys for the 2015-16 winter Chinook MSF in Marine Area 10.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
10/1/2015	40	Shilshole Public Ramp	0.4628	Armeni Public Ramp	0.247
10/3/2015	40	Shilshole Public Ramp	0.4111	Kingston Public Ramp	0.2667
10/4/2015	40	Shilshole Public Ramp	0.4111	Armeni Public Ramp	0.2111
10/6/2015	41	Armeni Public Ramp	0.247	Edmonds Boat Loft (Priv. fork lift)	0.1469
10/10/2015	41	Shilshole Public Ramp	0.4111	Kingston Public Ramp	0.2667
10/11/2015	41	Shilshole Public Ramp	0.4111	Armeni Public Ramp	0.2111
10/15/2015	42	Armeni Public Ramp	0.247	Edmonds Boat Loft (Priv. fork lift)	0.1469
10/16/2015	42	Shilshole Public Ramp	0.4111	Kingston Public Ramp	0.2667
10/17/2015	42	Shilshole Public Ramp	0.4111	Armeni Public Ramp	0.2111

## 2) CWT RECOVERIES

**Appendix 2.1** Coded-wire tag (CWT) recoveries from the 2015-16 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	3/19/2016	635669	2011	GOBAR CR 27.0073	GOBAR POND (27)	WDFW		77	OSP00201	AD Fin Clp
5	3/20/2016	90533	2010	MCKENZIE R 1	MCKENZIE HATCHERY	ODFW		84	79904	AD Fin Clp
5	3/26/2016	90664	2011	SANTIAM R & N FK-1	MARION FORKS HATCH	ODFW		78	79905	AD Fin Clp
5	3/26/2016	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	49	79912	AD Fin Clp
5	3/30/2016	636498	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		63	79906	AD Fin Clp
5	4/1/2016	636166	2011	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		65	79903	AD Fin Clp
5	4/2/2016	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		53	79697	AD Fin Clp
5	4/3/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		76	79188	AD Fin Clp
5	4/3/2016	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	68	79698	AD Fin Clp
5	4/3/2016	636503	2012	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW	636502	73	79699	AD Fin Clp
5	4/3/2016	636291	2012	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636290	78	79700	AD Fin Clp

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5	4/7/2016	55476	2013	TANNER CR (BNVILLE)	BONNEVILLE HATCHERY	ODFW		61	79914	AD Fin Clp
5	4/10/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		62	79907	AD Fin Clp
5	4/16/2016	636499	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	211091	71	79913	Unmarked
5	4/16/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		54	79917	AD Fin Clp
5	4/29/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		72	79915	AD Fin Clp
5	4/29/2016	636489	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		71	79916	AD Fin Clp

**Appendix 2.2** Coded-wire tag (CWT) recoveries from the 2015-16 winter Chinook MSF in Marine Area 6.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL(cm)	Label	Recovery Mark
6	12/4/2015	636489	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		74	80057	Unmarked
6	12/14/2015	636367	2011	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW	636366	60	79694	AD Fin Clp
6	1/14/2016	636494	2013	KENDALL CR 01.0406	KENDALL CR HATCHERY	WDFW		52	79851	AD Fin Clp
6	1/15/2016	636497	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		60	80058	AD Fin Clp
6	1/24/2016	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	54	80059	AD Fin Clp
6	2/6/2016	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	69	74170	AD Fin Clp
6	2/9/2016	636498	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		58	77629	AD Fin Clp
6	2/20/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		64	79760	AD Fin Clp
6	2/20/2016	211011	2011	GROVERS CR HATCHERY	GROVERS CR HATCHERY	SUQ	636092	69	79852	AD Fin Clp
6	2/20/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		57	79855	AD Fin Clp
6	2/20/2016	636503	2012	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW	636502	59	80060	AD Fin Clp
6	2/21/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		52	79695	AD Fin Clp
6	2/21/2016	636584	2012	LYONS FERRY REL.SITE	LYONS FERRY HATCHERY	WDFW		59	79901	AD Fin Clp
6	3/16/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		52	79696	AD Fin Clp



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Appendix 2.3 Coded-wire tag (CWT) recoveries from the 2015-16 winter Chinook MSF in Marine Area 7.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL(cm)	Label	Recovery Mark
7	10/18/2015	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	58	74400	AD Fin Clp
7	10/25/2015	211061	2012	TULALIP CR 07.0001	BERNIE GOBIN HATCH	TULA	211060	66	74167	AD Fin Clp
7	12/1/2015	636289	2012	KENDALL CR 01.0406	KENDALL CR HATCHERY	WDFW		63	73061	AD Fin Clp
7	12/1/2015	636489	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		71	73301	AD Fin Clp
7	12/1/2015	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		65	73302	AD Fin Clp
7	12/4/2015	636661	2013	FRIDAY CR 03.0017	SAMISH HATCHERY	WDFW	636662	54	73151	AD Fin Clp
7	12/4/2015	636632	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW		55	73152	AD Fin Clp
7	12/4/2015	211051	2012	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636286	67	73318	AD Fin Clp
7	12/4/2015	636489	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		63	73319	AD Fin Clp
7	12/4/2015	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		66	73320	AD Fin Clp
7	12/4/2015	636495	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636496	57	73321	AD Fin Clp
7	12/5/2015	636277	2011	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636278	87	73153	AD Fin Clp
7	12/5/2015	211048	2012	COUNTY LINE CR3.2363	MARBLEMOUNT HATCHERY	WDFW		68	73154	AD Fin Clp
7	12/5/2015	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		68	73249	AD Fin Clp
7	12/5/2015	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		65	73250	AD Fin Clp
7	12/16/2015	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	56	62108	AD Fin Clp
7	12/22/2015	636495	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636496	61	73107	AD Fin Clp
7	12/23/2015	636291	2012	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636290	69	62109	AD Fin Clp
7	12/28/2015	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	66	73108	AD Fin Clp
7	12/28/2015	635199	2011	MINTER CR 15.0048	MINTER CR HATCHERY	WDFW		80	73109	AD Fin Clp
7	1/2/2016	636291	2012	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636290	62	73013	AD Fin Clp
7	1/2/2016	636298	2012	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636297	64	74174	AD Fin Clp
7	1/3/2016	636495	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636496	62	73110	AD Fin Clp
7	1/6/2016	211048	2012	COUNTY LINE CR3.2363	MARBLEMOUNT HATCHERY	WDFW		59	73111	AD Fin Clp
7	1/8/2016	636291	2012	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636290	78	73112	AD Fin Clp

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7	1/8/2016	636497	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		48	74168	AD Fin Clp
7	1/9/2016	211061	2012	TULALIP CR 07.0001	BERNIE GOBIN HATCH	TULA	211060	77	73113	AD Fin Clp
7	1/9/2016	211061	2012	TULALIP CR 07.0001	BERNIE GOBIN HATCH	TULA	211060	66	73114	AD Fin Clp
7	1/9/2016	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	64	73115	AD Fin Clp
7	1/9/2016	636291	2012	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636290	76	73116	Unkn Marks
7	1/10/2016	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	67	73117	AD Fin Clp
7	1/10/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		71	73118	AD Fin Clp
7	1/22/2016	211015	2011	TULALIP CR 07.0001	BERNIE GOBIN HATCH	TULA	211014	68	73156	AD Fin Clp
7	1/22/2016	636578	2012	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW		73	73157	AD Fin Clp
7	1/22/2016	211101	2013	TULALIP CR 07.0001	BERNIE GOBIN HATCH	TULA	211099	56	73158	AD Fin Clp
7	1/22/2016	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	61	73159	AD Fin Clp
7	1/23/2016	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	75	73119	AD Fin Clp
7	1/23/2016	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	63	73155	AD Fin Clp
7	1/23/2016	636632	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW		59	73161	AD Fin Clp
7	1/24/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		53	73011	AD Fin Clp
7	1/24/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		54	73014	AD Fin Clp
7	1/24/2016	636289	2012	KENDALL CR 01.0406	KENDALL CR HATCHERY	WDFW		77	73120	AD Fin Clp
7	1/24/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		54	73121	AD Fin Clp
7	1/24/2016	636298	2012	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636297	53	74169	AD Fin Clp
7	1/30/2016	636494	2013	KENDALL CR 01.0406	KENDALL CR HATCHERY	WDFW			4795	AD Fin Clp
7	1/30/2016	636289	2012	KENDALL CR 01.0406	KENDALL CR HATCHERY	WDFW			4796	AD Fin Clp
7	2/6/2016	636580	2012	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		74	73123	AD Fin Clp
7	2/9/2016	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	61	73012	AD Fin Clp
7	2/9/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		60	73124	AD Fin Clp
7	2/9/2016	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	58	73125	AD Fin Clp
7	2/13/2016	636632	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW		66	73015	AD Fin Clp
7	2/20/2016	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	54	73126	AD Fin Clp

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7	2/24/2016	183367	2013	R-Cowichan R	H-Cowichan River H	CDFO		71	73016	AD Fin Clp
7	2/27/2016	210487	2012	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636288	65	73127	AD Fin Clp
7	3/9/2016	636632	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW		64	73128	AD Fin Clp
7	3/11/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		76	73017	AD Fin Clp

**Appendix 2.4** Coded-wire tag (CWT) recoveries from the 2015-16 winter Chinook MSF in Marine Area 8-1.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL(cm)	Label	Recovery Mark
81	1/24/2016	636497	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		61	62112	AD Fin Clp
81	2/6/2016	636267	2012	COWLITZ R 26.0002	COWLITZ SALMON HATCHERY	WDFW		75	43160	AD Fin Clp
81	2/12/2016	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		56	62113	AD Fin Clp
81	2/20/2016	211104	2013	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		60	73323	AD Fin Clp
81	2/20/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		82	73324	AD Fin Clp
81	3/8/2016	211090	2013	WHITEHORSE SPRINGS	WHITEHORSE POND	STIL		72	43161	AD Fin Clp
81	3/19/2016	636498	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		64	73325	AD Fin Clp
81	3/20/2016	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	59	43164	AD Fin Clp
81	3/25/2016	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	58	62114	AD Fin Clp
81	3/25/2016	211101	2013	TULALIP CR 07.0001	BERNIE GOBIN HATCH	TULA	211099	56	73326	AD Fin Clp
81	3/26/2016	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	63	43162	AD Fin Clp
81	3/26/2016	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		54	62115	AD Fin Clp
81	3/28/2016	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	59	62116	AD Fin Clp
81	3/29/2016	636644	2013	ICY CR 09.0125	ICY CR HATCHERY	WDFW		53	62117	AD Fin Clp
81	3/29/2016	211088	2013	CO LINE PD2 03.1853B	MARBLEMOUNT HATCHERY	WDFW		56	62118	AD Fin Clp
81	4/2/2016	636498	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		53	62121	AD Fin Clp
81	4/3/2016	211090	2013	WHITEHORSE SPRINGS	WHITEHORSE POND	STIL		62	62119	AD Fin Clp
81	4/3/2016	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	57	80966	AD Fin Clp

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**Appendix 2.5** Coded-wire tag (CWT) recoveries from the 2015-16 winter Chinook MSF in Marine Area 8-2.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL(cm)	Label	Recovery Mark
82	11/2/2015	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		64	84528	AD Fin Clp
82	11/15/2015	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	55	84503	AD Fin Clp
82	11/28/2015	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	61	80869	AD Fin Clp
82	1/2/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		64	62111	AD Fin Clp
82	2/6/2016	636498	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		57	80870	AD Fin Clp
82	2/6/2016	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	55	80871	AD Fin Clp
82	2/25/2016	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		55	80961	AD Fin Clp
82	2/27/2016	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		59	80874	AD Fin Clp
82	3/16/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		62	73251	AD Fin Clp
82	3/18/2016	211104	2013	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		66	80875	AD Fin Clp
82	3/19/2016	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	54	80876	AD Fin Clp
82	3/26/2016	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	67	80877	AD Fin Clp
82	3/26/2016	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		58	80878	AD Fin Clp
82	3/29/2016	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	59	80879	AD Fin Clp
82	3/30/2016	636498	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		63	80965	AD Fin Clp

**Appendix 2.6** Coded-wire tag (CWT) recoveries from the 2015-16 winter Chinook MSF in Marine Area 9.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL(cm)	Label	Recovery Mark
9	2/6/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		56	70136	AD Fin Clp
9	2/7/2016	636367	2011	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW	636366	58	70137	AD Fin Clp
9	2/7/2016	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	57	80872	AD Fin Clp
9	2/20/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		68	79059	AD Fin Clp
9	2/20/2016	636495	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636496	52	79060	AD Fin Clp
9	2/20/2016	636489	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		62	79853	AD Fin Clp
9	2/20/2016	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	58	79854	AD Fin Clp
9	2/26/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		55	77631	AD Fin Clp

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9	2/26/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		59	77632	AD Fin Clp
9	2/26/2016	211061	2012	TULALIP CR 07.0001	BERNIE GOBIN HATCH	TULA	211060	73	80873	AD Fin Clp
9	3/17/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		57	77634	AD Fin Clp
9	3/17/2016	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	61	77635	AD Fin Clp
9	3/17/2016	211061	2012	TULALIP CR 07.0001	BERNIE GOBIN HATCH	TULA	211060	65	77650	AD Fin Clp
9	3/19/2016	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	80	77630	AD Fin Clp
9	3/19/2016	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	59	77636	AD Fin Clp
9	3/19/2016	211090	2013	WHITEHORSE SPRINGS	WHITEHORSE POND	STIL		62	80962	AD Fin Clp
9	3/20/2016	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	57	77649	AD Fin Clp
9	3/26/2016	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	59	77637	AD Fin Clp
9	3/30/2016	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	57	80964	AD Fin Clp
9	4/1/2016	636749	2013	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		61	77648	AD Fin Clp
9	4/2/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		80	77638	AD Fin Clp
9	4/3/2016	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	56	80725	AD Fin Clp
9	4/6/2016	636497	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		59	72055	AD Fin Clp
9	4/6/2016	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		53	72056	AD Fin Clp
9	4/6/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		57	81011	AD Fin Clp
9	4/7/2016	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	54	77640	AD Fin Clp
9	4/8/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		57	81012	AD Fin Clp
9	4/9/2016	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		56	72057	AD Fin Clp
9	4/9/2016	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	54	72058	AD Fin Clp
9	4/9/2016	636497	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		57	72059	AD Fin Clp
9	4/9/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		71	77222	AD Fin Clp
9	4/9/2016	636632	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW		62	77639	AD Fin Clp
9	4/10/2016	211005	2011	WHITEHORSE SPRINGS	WHITEHORSE POND	STIL		83	72060	AD Fin Clp
9	4/10/2016	211134	2014	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636815	34	80726	AD Fin Clp
9	4/10/2016	636644	2013	ICY CR 09.0125	ICY CR HATCHERY	WDFW		60	80727	AD Fin Clp

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**Appendix 2.7** Coded-wire tag (CWT) recoveries from the 2015-16 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	10/2/2015	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		38	80710	AD Fin Clp
10	10/11/2015	211090	2013	WHITEHORSE SPRINGS	WHITEHORSE POND	STIL		51	80960	AD Fin Clp
10	10/16/2015	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		55	80719	AD Fin Clp
10	10/16/2015	636671	2013	ELWHA R 18.0272	ELWHA HATCHERY	WDFW		39	80720	Unmarked
10	10/17/2015	211067	2012	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		54	80721	AD Fin Clp
10	10/17/2015	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	49	80722	AD Fin Clp
10	10/17/2015	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	55	80723	AD Fin Clp

**Appendix 2.8** Coded-wire tag (CWT) recoveries from the 2015-16 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	4/10/2016	636285	2012	MINTER CR 15.0048	HUPP SPRINGS REARING	WDFW		69	62646	AD Fin Clp
11	4/16/2016	636494	2013	KENDALL CR 01.0406	KENDALL CR HATCHERY	WDFW		57	54052	AD Fin Clp
11	4/23/2016	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	78	56503	AD Fin Clp
11	4/30/2016	211088	2013	CO LINE PD2 03.1853B	MARBLEMOUNT HATCHERY	WDFW		73	62645	AD Fin Clp

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Appendix 2.9 Coded-wire tag (CWT) recoveries from the 2015-16 winter Chinook MSF in Marine Area 12.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL(cm)	Label	Recovery Mark
12	12/22/2015	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		51	87651	AD Fin Clp
12	2/13/2016	636645	2013	HUCKLEBERRY C10.0253	PUYALLUP TRIBAL HATCHERY	PUYA		53	87656	AD Fin Clp
12	2/13/2016	636644	2013	ICY CR 09.0125	ICY CR HATCHERY	WDFW		55	87657	AD Fin Clp
12	2/27/2016	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		57	87955	AD Fin Clp
12	3/6/2016	636644	2013	ICY CR 09.0125	ICY CR HATCHERY	WDFW		55	87661	AD Fin Clp
12	3/20/2016	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		54	87956	AD Fin Clp
12	3/25/2016	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		82	87957	AD Fin Clp
12	3/25/2016	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		55	87958	AD Fin Clp
12	4/9/2016	636495	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636496	62	87658	AD Fin Clp
12	4/10/2016	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		57	87959	AD Fin Clp
12	4/16/2016	636477	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		78	87659	AD Fin Clp