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**2016 Summer Mark-Selective Recreational Chinook Fisheries
In Marine Areas 5, 6, 7, 9, 11, 12 and 13**

Post-season Report

DRAFT

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INTRODUCTION

In the marine environments of the Strait of Juan de Fuca and Puget Sound, abundant runs of hatchery Chinook salmon (*Oncorhynchus tshawytscha*) have been mixed with depressed runs of wild Chinook salmon. 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 encountered¹.

Since the Washington Department of Fish and Wildlife (WDFW) implemented the first marine mark-selective Chinook fishery 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, 11, and 13 for ten consecutive seasons and in Area 12 for five consecutive seasons, Area 7 for its first season and a resumption of MSFs in 10. Additionally, *winter* Chinook MSFs have occurred in Areas 8-1 and 8-2 for eleven consecutive seasons, in Areas 7, and 9 for nine consecutive seasons, in Areas 11 and 12 for seven consecutive seasons, in Area 6 for four seasons and in Area 5 for its second season².

During the 2016 summer season (May through September), WDFW implemented six mark-selective Chinook fisheries in Areas 5, 6, 7, 9, 10, 11, 12 and 13. The Chinook MSF seasons in each area were scheduled as follows:

- Areas 5 and 6 from July 1 through August 15, 2016;
- Area 7 from July 1 through July 31, 2016;
- Area 9 from July 16 through August 15, 2016;
- Area 10 from July 16 through August 15, 2016;
- Area 11 from June 1 through September 30, 2016;
- Area 12 from July 1 through September 30, 2016; and
- Area 13 from May 1 through September 30, 2016.

¹The regulations specific to summer mark-selective fisheries in Puget Sound Marine Catch Areas allowed for the retention of up to two legal-sized (≥ 22 inches [56 cm]) marked Chinook salmon per day and required the immediate release of all unmarked or sublegal Chinook. 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.

² 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>.

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, 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 2015), 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 mortalities³
- 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.

WDFW and tribal staffs worked to prioritize the most essential elements (tables, figures and appendices) needed in WDFW's annual post-season MSF reports in an effort to define reporting

³ Though the necessary tissue samples have been collected, DNA-based estimates of stock composition are presently unavailable for Puget Sound/Strait of Juan de Fuca mark-selective fisheries. In the present report, methods for producing CWT-based (unexpanded) estimates of the stock composition of marked Chinook harvest are provided.

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 winter 2009-10 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, 9, 10, 11, 12 and 13 during summer 2016.

In the following pages, we report the results generated through our monitoring activities during the summer 2016 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 needed to specify noteworthy in-season adjustments or other circumstances unique to the particular season). We present summer 2016 Chinook MSF results in separate chapters (1 through 6) 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 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); *v*) sample rate information based on dockside sampling of harvested Chinook; *vi*) total mortality estimates of marked and unmarked DIT CWT stocks by hatchery and brood year; and *vii*) historical Chinook encounters estimates for each area's summer mark-selective Chinook fishery.

RESULTS

1) Marine Area 5 Summer Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented a thirteenth consecutive summer Chinook MSF in Marine Area 5 from July 1 through August 15, 2016. WDFW's Puget Sound Sampling Unit (PSSU) implemented an intensive monitoring program in Area 5 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 and intensive efforts to distribute and collect voluntary trip reports (VTRs) from the angling public. During the summer 2016 mark-selective Chinook fishery in Area 5 we maintained our enhanced VTR program in an effort to improve the return rate of voluntary trip reports, which provide estimates of Chinook encounter rates by size class (legal or sublegal) and mark status (ad-marked or unmarked). An additional WDFW technician was hired to work exclusively on distributing and collecting VTRs from the angling public in Area 5. This technician, along with the dockside samplers, also educated anglers about the VTR program and salmon species identification in a focused effort to increase the sample size of VTR-based encounter data. **Table 1.1** summarizes the parameters estimated and the sampling activities associated with each parameter. Specific procedures used for collecting these data and estimating critical 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 5 summer Chinook MSF.

Table 1.1 Sampling/estimation details on target parameters associated with the overall Area 5 summer mark-selective fishery monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Creel Sampling	Fishing effort (boat & angler trips); kept and released fish ¹	Catch rates (CPUE); length, age, and CWT composition of harvest ¹ ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	Two weeks	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	2 weekend boat surveys and 1 weekday survey were conducted during the 2016 Area 5 summer Chinook MSF. As in-season observations suggested that sites and effort patterns did not change substantially in 2016 compared to past years, we incorporated data from these surveys into recent average site weights to compute catch and effort 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	We used VTR data to estimate the size/mark-status proportions (LM = 14%, LU = 5%, SM = 58%, SU = 23%; Table 1.4) needed to produce encounter and mortality estimates. [GTJ(1)]
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.

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

Table 1.2 Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2016 summer Chinook MSF in Marine Area 5. 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	
July	27	1-Jul	3-Jul	508	1,269	307	0	1,414	678	2,399
	28	4-Jul	10-Jul	944	2,236	314	0	1,446	694	2,454
	29	11-Jul	17-Jul	842	1,903	272	0	1252	601	2,125
	30	18-Jul	24-Jul	883	1,956	750	0	3450	1655	5,856
	31	25-Jul	31-Jul	936	2,168	642	0	2952	1416	5,011
August	32	1-Aug	7-Aug	836	1,802	359	2	1651	790	2,802
	33	8-Aug	14-Aug	1,354	3,060	637	0	2930	1406	4,974
	34	15-Aug	15-Aug	140	289	59	0	272	131	462
Season Total:				6,443	14,684	3,343	2	15,368	7,370	26,083
Variance:				373,565	1,719,595	96,478	3	5,108,025	995,269	13,006,360
SE:				611	1311	311	2	2,260	998	3,606
CV (%):				9	9	9	74	15	14	14
95% CI:				5,245 - 7,641	12,114 - 17,254	2,734 - 3,951	0 - 6	10,938 - 19,798	5,414 - 9,325	19,014 - 33,152

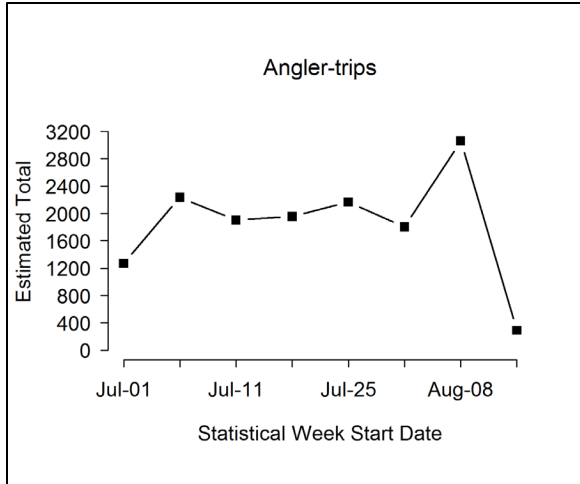


Figure 1.1 Temporal patterns in fishing effort during the 2016 summer Chinook MSF in Marine Area 5.

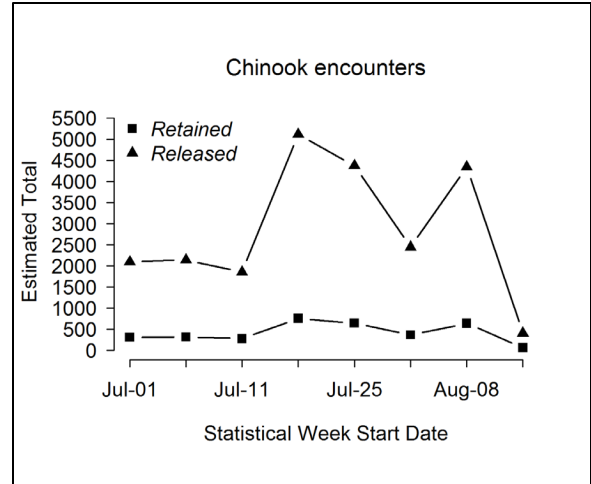


Figure 1.3 Temporal patterns in Chinook encounters (retained and released) during the 2016 summer Chinook MSF in Marine Area 5.

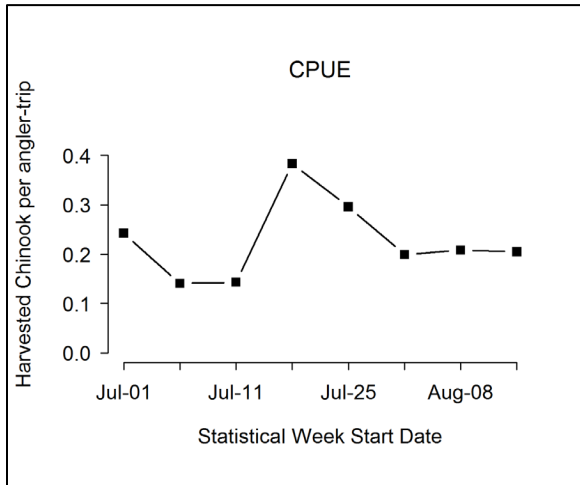


Figure 1.2 Temporal patterns in CPUE (landed Chinook per angler trip) during the 2016 summer Chinook MSF in Marine Area 5.

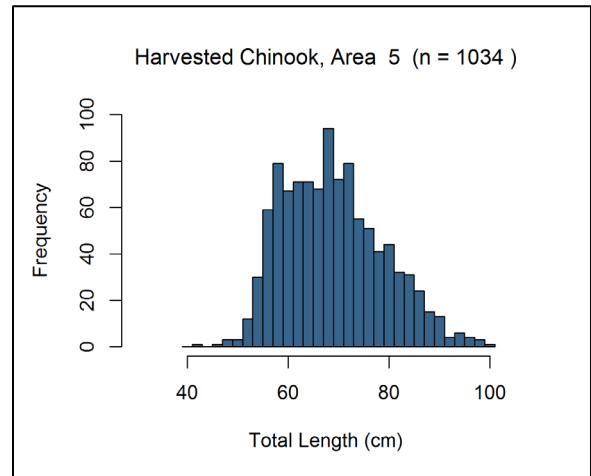


Figure 1.4 Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2016 summer Chinook MSF in Marine Area 5.

Table 1.3 Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2016 summer Chinook MSF in Marine Area 5.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	963	71	1,034
Unmarked	2	0	2
Total	965	71	1,036

Table 1.4 Total Chinook encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2016 summer Chinook MSF in Marine Area 5, with estimates of legal-size and overall (legal and sublegal) mark rates. AD = marked (adipose-clipped), UM = unmarked. Variances associated with size/mark-status proportions and mark rates are provided in parentheses.

Data Source	Effort and Sample Size	Legal		Sublegal		Totals	Mark Rate	
		AD	UM	AD	UM		Overall	Legal
Private VTR	108 1-trip VTRs, 222 Angler Trips	83	29	351	142	606	0.72	0.74
Size/mark-status composition:		0.14	0.05	0.58	0.23			
Variance:		(0.0002)	(0.0001)	(0.0004)	(0.0003)			

As no test fishery was conducted in the Area 5 summer mark-selective fishery, we focused our efforts on increasing the return rate of VTRs and thus, the sample size of fish encountered by recreational fishers. This year we received 108 VTRs, accounting for 222 angler trips during the 1.5 month fishery. We used these data to estimate the size/mark-status proportions needed to produce Chinook encounter and mortality estimates for the Area 5 summer Chinook MSF.

Table 1.5 Summary of season-wide fishery impact estimates for the 2016 summer Chinook MSF in Marine Area 5. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
Legal AD	3,578	3,113	465	70	3,183	94,718	308	2,580 - 3,786	10
Legal UM	1,250	2	1,248	187	190	1,810	43	106 - 273	22
Sublegal AD	15,132	230	14,903	2981	3,210	187,064	433	2,362 - 4,058	13
Sublegal UM	6,122	0	6,122	1,224	1,224	36,598	191	849 - 1,599	16
Total	26,083	3,345	22,738	4,462	7,807	320,191	566	6,698 - 8,916	7

Table 1.6 Summary of coded-wire tags recovered from Chinook salmon harvested during the 2016 summer Chinook MSF in Marine Area 5. The field “Number DITs” corresponds to the number of tags that belonged to double-index tag groups.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
BC	Fraser– Thompson River (4.8%)	R-Chilliwack R	H-Chilliwack River H	2 (1.9%)	0
		R-Harrison R	H-Chehalis River H	1 (1%)	0
		R-Shuswap R Low	H-Shuswap River, Middle,	2 (1.9%)	0
	Georgia Strait (2.9%)	R-Cowichan R	H-Cowichan River H	3 (2.9%)	0
WA	Northern Washington (4.8%)	Kendall Cr 01.0406	Kendall Cr Hatchery	1 (1%)	0
		Friday Cr 03.0017	Samish Hatchery	1 (1%)	1
		East Sound Bay (San)	Glenwood Springs	3 (2.9%)	0
	Northern Washington Coast (1%)	Tsoo-Yess R 20.0015	Makah Nfh On Tsoo-Yess R	1 (1%)	0
	Strait of Juan De Fuca (6.7%)	Hoko R 19.0148	Hoko Falls Hatchery	7 (6.7%)	0
	Hood Canal (26.7%)	Finch Cr 16.0222	Hoodsport Hatchery	14 (13.3%)	0
		Purdy Cr 16.0005	George Adams Hatchery	14 (13.3%)	1
	N Puget Sound (5.7%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	1 (1%)	1
		Wallace R 07.0940	Wallace R Hatchery	4 (3.8%)	3
		Whitehorse Springs	Whitehorse Pond	1 (1%)	0
	Skagit River (2.9%)	Cascade R 03.1411	Marblemount Hatchery	1 (1%)	1
		County Line Cr3.2363	Marblemount Hatchery	2 (1.9%)	0
	Mid Puget Sound (19%)	White R 10.0031	White River Hatchery	1 (1%)	0
		Big Soos Cr 09.0072	Soos Creek Hatchery	5 (4.8%)	5
		Grovers Cr 15.0299	Grovers Cr Hatchery	13 (12.4%)	13
		Palmer Hatchery	Keta Creek Complex	1 (1%)	0
	SPuget Sound (9.5%)	Clear Cr 11.0013C	Clear Creek Hatchery	7 (6.7%)	7
		Minter Cr Tr 15.0051	Hupp Springs Rearing	2 (1.9%)	0
		Kalama Cr 11.0017	Kalama Cr Hatchery	1 (1%)	0
	Col. Riv	Upper Columbia R (1.9%)	Columbia Near Wells	Wells Hatchery	1 (1%)
Chief Joseph Hatchery			Chief Joseph Hatchery	1 (1%)	0
Central Columbia River (1%)		Spring Cr 29.0159	Spring Cr Nfh	1 (1%)	1
Lower Columbia River (7.6%)		Cowlitz R 26.0002	Cowlitz Salmon Hatchery	2 (1.9%)	0
		Klaskanine R N Fk	Klaskanine Hatchery	1 (1%)	0
		Youngs R & Bay	Cedc Youngs Bay Net	1 (1%)	0
		Washougal R 28.0159	Washougal Hatchery	1 (1%)	0
		Big Cr (Lwr Col R)	Big Cr Hatchery	1 (1%)	1
		N Fk Reserv (Clackam	Clackamas Hatchery	1 (1%)	0
		Bull Run R	Sandy Hatchery	1 (1%)	0
Snake River (2.9%)		Big Canyon Accl Pond	Lyons Ferry Hatchery	1 (1%)	0
		Luke'S Gulch A F	Npt Hatchery	1 (1%)	0
Snake River (2.9%)		Lyons Ferry Rel.Site	Lyons Ferry Hatchery	1 (1%)	0
CA	Central California Coast (2.9%)	San Francisco Maj.Pt	Mok R Fish Ins	1 (1%)	0
		Wickland Oil Net Pen	Feather R Hatchery	1 (1%)	0
		Moss Landing Min. Pt	Mok R Fish Ins	1 (1%)	0
Total				105	34

Table 1.7 Comparison of modeled (FRAM model run 2916) and estimated total Chinook encounters for the 2016 summer Chinook MSF in Marine Area 5. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	11,480	6,619	4,861	66
	AD	16,306	7,011	9,295	6,100
	Total	27,786	13,630	14,156	6,166
	% Marked	59	51	66	99
Estimated (Creel) Encounters	UM	7,372	1,250	6,122	2
	AD	18,711	3,578	15,132	3,343
	Total	26,083	4,829	21,254	3,345
	% Marked	72	74	71	100

Table 1.8 Comparison of modeled (FRAM model run 2916) and estimated total Chinook mortalities for the 2016 summer Chinook MSF in Marine Area 5. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Mortality Category	FRAM Chinook Mortalities			Estimated Chinook Mortalities		
	UM	AD	Total	UM	AD	Total
Total (Landed + Released)	2,024	8,401	10,425	1,414	6,393	7,807
Released Legal	986	442	1,428	187	70	257
Released Sublegal	972	1,859	2,831	1,224	2981	4,205
Landed Only	66	6,100	6,166	2	3,343	3,345

Table 1.9 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 2016 summer Chinook MSF in Marine Area 5. 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.)
Big Cr Hatchery	2013	1	3.2	7.2	3.3	0.3	0.074	0.27
Clear Creek Hatchery	2012	2	6.5	14.39	6.7	0.7	0.156	0.56
Clear Creek Hatchery	2013	2	6.5	14.39	6.4	0.6	0.142	0.53
Clear Creek Hatchery	2014	3	9.7	21.59	9.8	1	0.222	0.82
George Adams Hatchery	2014	1	3.2	7.2	3.2	0.3	0.072	0.27
Grovers Cr Hatchery	2012	4	12.9	28.79	12.8	1.3	0.284	1.07
Grovers Cr Hatchery	2013	9	29.1	64.77	28.7	2.9	0.631	2.38
Marblemount Hatchery	2013	1	3.2	7.2	3.2	0.3	0.073	0.27
Samish Hatchery	2012	1	3.2	7.2	3.2	0.3	0.073	0.27
Soos Creek Hatchery	2012	1	3.2	7.2	3.4	0.3	0.082	0.29
Soos Creek Hatchery	2013	4	12.9	28.79	12.9	1.3	0.287	1.07
Spring Cr Nfh	2013	1	3.2	7.2	3.6	0.4	0.088	0.3
Wallace R Hatchery	2013	3	9.7	21.59	9.8	1	0.223	0.82
Total		34	109.8	244.68	110.6	11.1	2.484	9.19

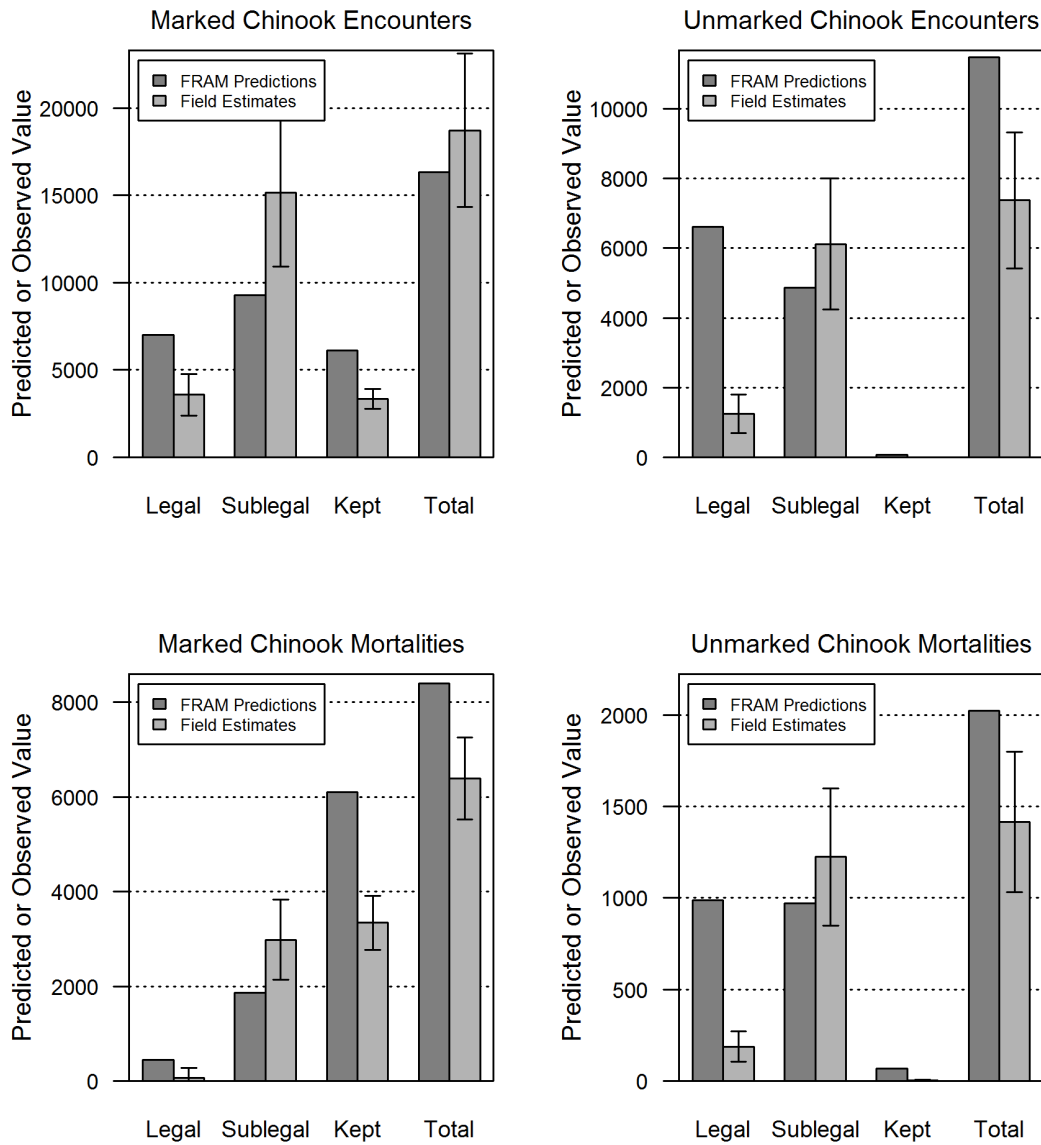


Figure 1.5 Comparison of modeled (using FRAM, model run 2916) and estimated total Chinook encounters and mortalities for the 2016 summer Chinook MSF in Marine Area 5. Error bars represent approximate 95% confidence intervals for field estimates.

Table 1.10 Monthly sample rates (Total retained Chinook sampled¹ / Estimated retained Chinook) for the 2016 summer Chinook MSF in Marine Area 5. AD = marked (adipose-clipped), UM = unmarked.

Time period			Estimated Retained Chinook			Number of Chinook sampled			Sample Rate
Month	Stat Weeks	Dates	AD	UM	Total	AD	UM	Total	
July	27 - 31	01 Jul - 31 Jul	2,287	0	2,287	725	1	726	31.70%
August	32 - 34	01 Aug - 15 Aug	1,056	2	1,058	309	1	310	29.30%
Season Total			3,343	2	3,345	1,034	2	1,036	31.00%

^{1/} Number of retained Chinook sampled includes all retained Chinook inspected for CWT's, from all sites sampled during the 2016 summer Chinook MSF in Marine Area 5 (creel estimates and fish sampled as part of baseline sampling).

Table 1.11 Fishery-total estimates of retained and released salmon (*other than Chinook*) for the 2016 summer Chinook MSF in Marine Area 5. Values may not add exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Stat Week	Start Date	End Date	Retained Salmon	Released Salmon			
			Coho AD	Coho AD	Coho UM	Coho UK	Unk Salmon
27	1-Jul	3-Jul	0	29	7	66	323
28	4-Jul	10-Jul	0	132	87	32	851
29	11-Jul	17-Jul	0	41	42	10	691
30	18-Jul	24-Jul	10	49	13	5	838
31	25-Jul	31-Jul	0	57	11	0	916
32	1-Aug	7-Aug	5	24	31	20	1650
33	8-Aug	14-Aug	10	61	54	35	3548
34	15-Aug	15-Aug	1	4	7	3	230
Season Total:			7,588	398	253	171	9,048
Variance:			1,200,634	5,046	5,706	2,967	1,190,845
Standard Error:			1096	71	76	54	1091
CV (%):			14	18	30	32	12
95% CI:			5,440 - 9,735	259 - 537	105 - 401	64 - 278	6,909 - 11,186

Table 1.12 Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2016 summer Chinook MSF in Marine Area 5. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
Coho Resort	2	0.007	14	0.060
Curley's/Straitside	26	0.097	4	0.017
Neah Bay Marina	0	0.000	6	0.026
Olson's East	87	0.326	3	0.013
Olson's Ramp & Docks	45	0.169	66	0.284
Olson's West	10	0.037	42	0.181
Olson's South	8	0.030	20	0.086
Silver King	13	0.049	11	0.047
Van Riper's North	14	0.052	16	0.069
Van Riper's South	62	0.232	50	0.216
Total Anglers	267	1	232	1

Two weekday and one weekend boat survey were conducted during the 2016 Area 5 summer mark-selective Chinook fishery. Results from these surveys indicated that sites and effort patterns did not change substantially in 2016 compared to past years. Data from these surveys were included with the average of the previous years' site weights to determine site selections and to compute catch and effort estimates. Sites in the summer 2016 sample frame remained the same and included: Olson's East Docks, Olson's West Docks, Olson's Ramp & Docks, Van Riper's North, Van Riper's South and Curley's Resort.

Table 1.13 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 5 summer Chinook MSF. Values may not add exactly due to rounding error.

Season Dates	Effort (Angler -trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Jul 5 - Aug 3, 2003	19,398	2,251	53	225	0	336	3,435	1,656	5,174	13,131
Jul 1 - Aug 10, 2004	25,174	2,706	0	194	0	404	4,017	1,167	2,462	10,950
Jul 1 - Aug 10, 2005	30,115	1,520	23	100	26	227	1,418	1,210	1,459	5,984
Jul 1 - Aug 14, 18-21, 2006	23,177	3,105	10	196	7	464	3,125	1,010	2,212	10,129
Jul 1 - Aug 9, 2007	18,830	2,969	23	280	94	444	2,509	1,371	1,118	8,808
Jul 1 - Aug 10, 2008	13,004	2,773	0	45	0	414	1,869	65	330	5,496
Jul 1 - Aug 6, 2009	23,662	4,843	78	1,115	362	724	6,210	9,823	14,309	37,463
Jul 1 - Aug 15, 2010	16,806	5,461	14	242	0	816	4,961	3,163	4,140	18,796
Jul 1 - Aug 15, 2011	24,848	4,259	70	276	22	636	9,275	1,593	5,319	21,450
Jul 1 - Aug 15, 2012	21,074	5,437	9	242	9	812	4,617	3,105	4,765	18,996
Jul 1 - Aug 15, 2013	25,725	7,473	77	933	81	1,117	7,188	8,173	8,702	33,743
Jul 1 - Aug 15, 2014	23,310	4,684	41	401	8	700	3,005	3,707	7,359	19,905
Jul 1 - Aug 15, 2015	21,313	4,434	35	316	17	663	7,562	14,302	8,445	35,774
Jul 1 - Aug 15, 2016	14,684	3,113	2	230	0	465	1,248	14,903	6,122	26,083

2) Marine Area 6 Summer Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented a fourteenth consecutive summer Chinook MSF in Marine Area 6 from July 1 through August 15, 2016. WDFW's Puget Sound Sampling Unit (PSSU) implemented a "Baseline Sampling" program (see WDFW 2012a for details) consisting of dockside angler interviews with catch sampling along with intensive efforts to distribute and collect voluntary trip reports (VTRs) from the angling public. We maintained our enhanced VTR program in an effort to improve the return rate of voluntary trip reports, which provide estimates of Chinook encounter rates by size class (legal or sublegal) and mark status (ad-marked or unmarked). An additional WDFW technician was hired to work exclusively on distributing and collecting VTRs from the angling public in Area 6. This technician, along with the dockside samplers, also educated anglers about the VTR program and salmon species identification in a focused effort to increase the sample size of VTR-based encounter data.

Unlike the other survey designs, Baseline Sampling does not provide a means for generating in-season or immediate post-season estimates of fishery total catch and effort. These estimates will be available approximately one year after the close of the fishery through the WDFW Catch Record Card (CRC) program. Once available, CRC-based catch estimates will be used to generate estimates of total Chinook encounters and mortalities by size and mark-status using the methods provided in WDFW & NWIFC (2013). Thus, while these descriptors of MSF impacts are not presented in the present document, they will be available at a future time.

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 summer Chinook MSF, including relative catch and effort patterns over the season based on the assumption that baseline-sampling observations of these parameters are good indicators of associated fishery-wide trends.

Table 2.1 Sampling/estimation details on target parameters associated with the overall Area 6 summer mark-selective fishery monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Angler Interviews (Baseline Sampling)	Observed (in-sample) fishing effort (boat & angler trips); kept and released fish.	Catch rates (CPUE); length, age, and CWT composition of harvest ¹ ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	Week	Observed catch per angler trip and species composition data obtained from baseline sampling will ultimately be combined with Catch Record Card (CRC) data to produce fishery-total estimates at a later time (approximately one year following the fishery).
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	When CRC-based retained Chinook estimates become available VTR data will be used in the estimation of total Chinook encounters by size/mark group (LM = 39%, LU = 25%, SM = 16%, SU = 28%; Table 2.5), along with associated impacts, using the methods described in WDFW & NWIFC (2013). [GTJ(2)]
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	Will be estimated at a later date using the CRC-based retained Chinook estimate, when it becomes available.
Coded-wire tag (CWT) Impacts Estimation	Marked/unmarked double-index tag (DIT) encounters and mortalities	N/A	N/A	Season	Will be estimated at a later date using the CRC-based retained Chinook estimate, when it becomes available. The temporal resolution of DIT impacts is constrained by the total number of tags recovered.

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

Table 2.2 Observations of fishing effort, salmon harvest, and reported salmon releases, by week, for the 2016 summer Chinook MSF in Marine Area 6. 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	Coho AD	Coho UM	Sockeye	Chin AD	Chin UM	Chin UK	Coho AD	Coho UM	Coho UK
27	1-Jul	3-Jul	237	520	330	0	0	0	0	0	69	84	44	0	1	1
28	4-Jul	10-Jul	257	506	225	1	0	0	0	0	54	51	41	0	0	0
29	11-Jul	17-Jul	178	346	87	0	0	0	0	3	49	30	72	1	0	0
30	18-Jul	24-Jul	107	198	72	0	0	0	0	1	19	25	31	0	0	0
31	25-Jul	31-Jul	189	336	95	0	0	1	0	75	57	49	56	3	1	3
32	1-Aug	7-Aug	152	271	81	0	0	0	0	18	49	44	41	2	0	5
33	8-Aug	15-Aug	207	382	80	0	0	1	0	18	85	56	64	3	0	2
Season Total			1327	2559	970	1	0	2	0	115	382	339	349	9	2	11

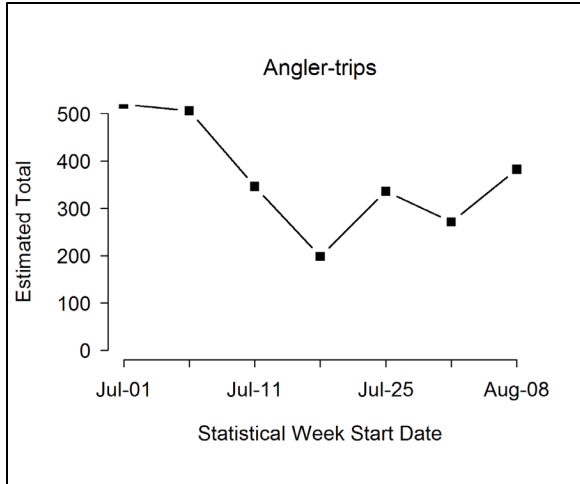


Figure 2.1 Temporal patterns in fishing effort during the 2016 summer Chinook MSF in Marine Area 6. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

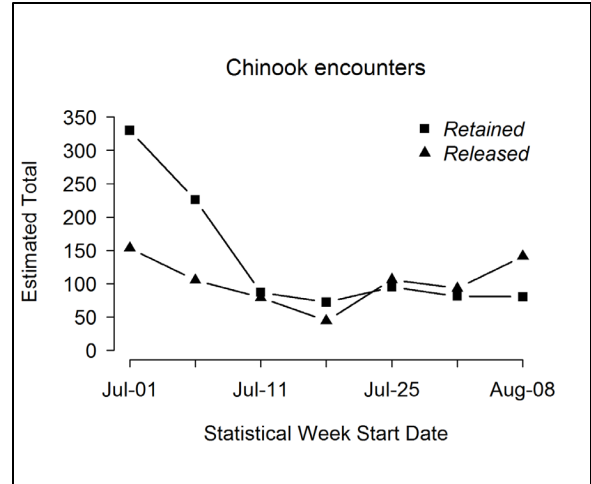


Figure 2.3 Temporal patterns in Chinook encounters (retained and released) during the 2016 summer Chinook MSF in Marine Area 6. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

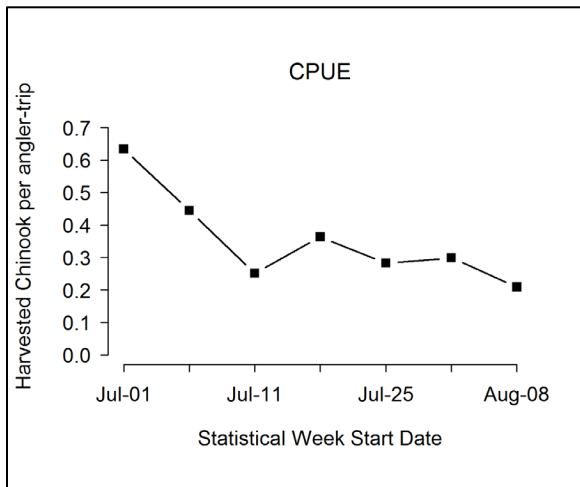


Figure 2.2 Temporal patterns in CPUE (landed Chinook per angler trip) during the 2016 summer Chinook MSF in Marine Area 6. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

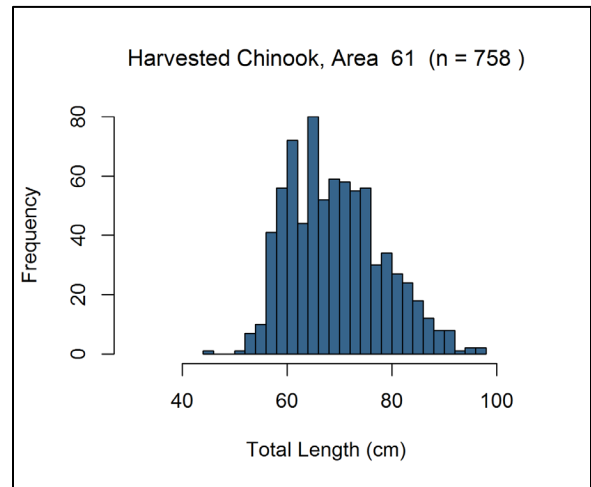


Figure 2.4 Length-frequency distributions of retained marked Chinook sampled in dockside angler interviews during the 2016 summer Chinook MSF in Marine Area 6.

Table 2.3 Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2016 summer Chinook MSF in Marine Area 6.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	740	18	758
Unmarked	1	0	1
Total	741	18	759

Table 2.4 Summary of coded-wire tags recovered from Chinook salmon harvested during the 2016 summer Chinook MSF in Marine Area 6. The field “Number DITs” corresponds to 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 (4.9%)	R-Cowichan R	H-Cowichan River H	1 (1.6%)	0
		R-Big Qualicum R	H-Big Qualicum River H	2 (3.3%)	0
WA	N Washington (4.9%)	Friday Cr 03.0017	Samish Hatchery	1 (1.6%)	1
		East Sound Bay (San)	Glenwood Springs	2 (3.3%)	0
	Strait of Juan De Fuca (6.6%)	Elwha R 18.0272	Elwha Hatchery	2 (3.3%)	0
		Hoko R 19.0148	Hoko Falls Hatchery	2 (3.3%)	0
	Hood Canal (27.9%)	Finch Cr 16.0222	Hoodsport Hatchery	10 (16.4%)	0
		Purdy Cr 16.0005	George Adams Hatchery	7 (11.5%)	0
	N Puget Sound (13.1%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	1 (1.6%)	1
		Wallace R 07.0940	Wallace R Hatchery	6 (9.8%)	4
		Whitehorse Springs	Whitehorse Pond	1 (1.6%)	0
	Skagit River (4.9%)	County Line Cr3.2363	Marblemount Hatchery	1 (1.6%)	0
		Co Line Pd2 03.1853B	Marblemount Hatchery	2 (3.3%)	0
	Mid Puget Sound (23%)	Big Soos Cr 09.0072	Soos Creek Hatchery	1 (1.6%)	1
		Grovers Cr 15.0299	Grovers Cr Hatchery	12 (19.7%)	12
		Icy Cr 09.0125	Icy Cr Hatchery	1 (1.6%)	0
	S Puget Sound (13.1%)	Clear Cr 11.0013C	Clear Creek Hatchery	1 (1.6%)	1
Minter Cr Tr 15.0051		Hupp Springs Rearing	1 (1.6%)	0	
Kalama Cr 11.0017		Kalama Cr Hatchery	5 (8.2%)	0	
Minter Cr 15.0048		Hupp Springs Rearing	1 (1.6%)	0	
Col Riv.	Central Columbia River (1.6%)	Spring Cr 29.0159	Spring Cr Nfh	1 (1.6%)	1
Total				61	21

Table 2.5 Total Chinook encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2016 summer Chinook MSF in Marine Area 6, 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	57 1-trip VTRs, 157 Angler Trips	56	35	23	28	142	0.56	0.62
Size/mark-status composition:		0.39	0.25	0.16	0.20			
Variance:		(0.0017)	(0.0013)	(0.0010)	(0.0011)			

Table 2.6 List of sites sampled with the number of sampling events (site-days) during the 2016 summer Chinook MSF in Marine Area 6.

Location	Site-Days Sampled per Month		Total Site-Days	% of Total
	July (1-31)	August (1-15)		
Ediz Hook, Port Angeles Public Ramp	23	11	34	53.13%
Freshwater Bay Ramp	9	4	13	20.31%
Port Angeles West Ramp	10	7	17	26.56%
Grand Total	42	22	64	100%

3) Marine Area 7 Summer Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented a first consecutive summer Chinook MSF in Marine Area 7 from July 1 through July 30, 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 intensive dockside creel sampling, on-the-water effort surveys, test fishing and collection of voluntary trip reports (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 summer Chinook MSF.

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 ¹ ; 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 Table 3.12 $n=5$ surveys conducted out of $N=31$ 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 ² stock composition; species composition of non-Chinook encounters	Fish encounter	Season	Due to a short season, testing proportions (LM = 21%, LU = 29%, SM = 36%, SU [GTJ(3)] = 14%; Table 3.13) and VTR proportions were combined and 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 (Table 3.4) were combined with test fishing data for encounter and mortality estimates. 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.

Table 3.2 Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2016 Summer 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	Est. Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
July	27	1-Jul	3-Jul	1029	2,325	446	0	547	710	1,703
	28	4-Jul	10-Jul	1387	3,288	472	0	578	750	1,800
	29	11-Jul	17-Jul	893	1,959	259	0	318	412	989
	30	18-Jul	24-Jul	346	750	26	0	32	42	100
	31	25-Jul	31-Jul	369	821	23	0	28	37	88
Sub-Total				4024	9,143	1227	0	1504	1950	4,680
Bellingham Derby				137	410	108	0	132	172	412
Season Total:				4,161	9,553	1,335	0	1,636	2,122	5,092
Variance:				130,750	735,341	57,316	0	1,064,002	2,122	3,575,055
SE:				362	858	239	0	1,032	817	1,891
CV (%):				9	9	18	0	63	38	37
95% CI:				3,452 - 4,870	7,872 - 11,234	865 - 1,804	0 - 0	0 - 3,658	521 - 3,723	1,386 - 8,798

Table 3.3 Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the Area 7 Chinook MSF

Marked Type	Number Sampled		
	Legal-size	Sublegal-Size	Total
Marked	274	9	283
Unmarked	3	0	3
Total	277	9	286

Table 3.4 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 2016 summer 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	3 1-trip VTRs, 5 Angler Trips	4	3	2	1	10	0.60	0.57
Size/mark-status composition:		0.40	0.30	0.20	0.10			
Variance:		(0.0267)	(0.0233)	(0.0178)	(0.0100)			

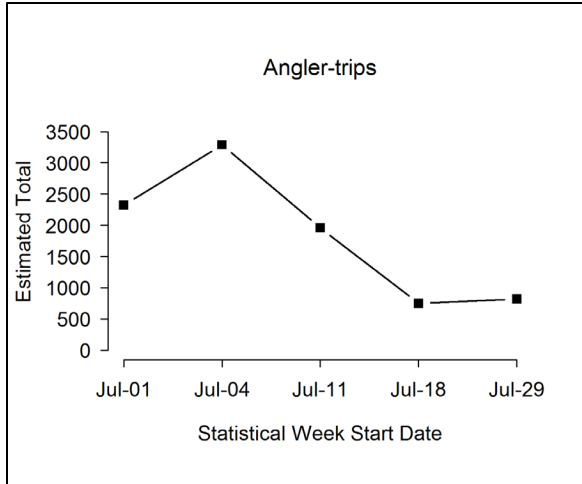


Figure 3.1 Temporal patterns in fishing effort during the 2016 summer Chinook MSF in Marine Area 7.

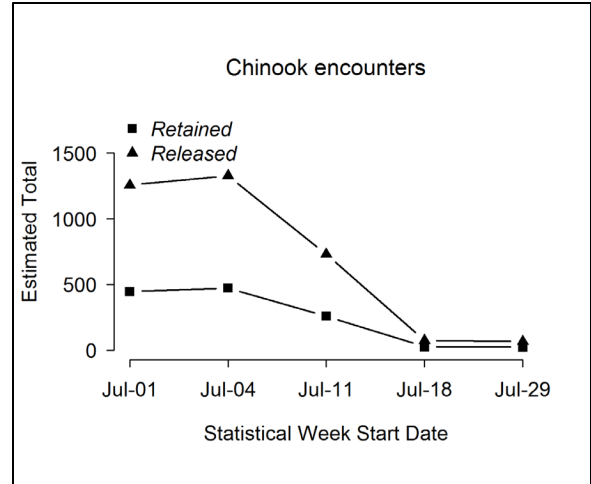


Figure 3.3 Temporal patterns in Chinook encounters (number retained and released) during the 2016 summer Chinook MSF in Marine Area 7.

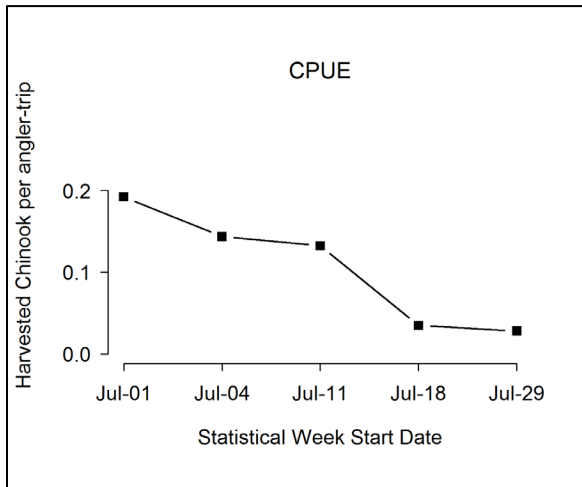


Figure 3.2 Temporal patterns in CPUE (number of Chinook landed per angler trip) during the 2016 summer Chinook MSF in Marine Area 7.

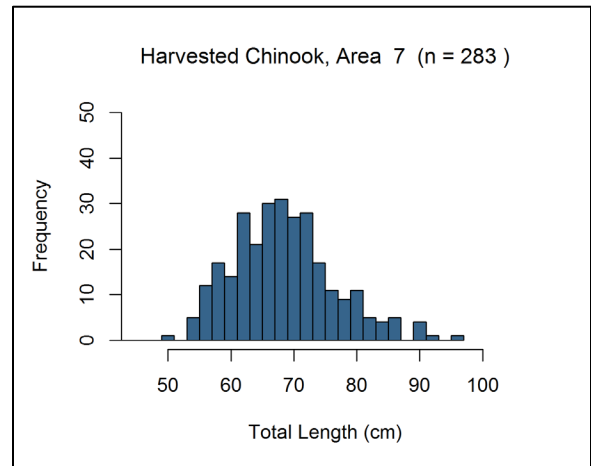


Figure 3.4 Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2016 summer Chinook MSF in Marine Area

Table 3.5 Summary of CWTs recovered from Chinook salmon harvested during the 2016 summer 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	Fraser River – Thompson River (4.8%)	R-Chilliwack R	H-Chilliwack River H	1 (4.8%)	0
WA	N Washington (14.3%)	East Sound Bay (San)	Glenwood Springs	1 (4.8%)	0
		Friday Cr 03.0017	Samish Hatchery	2 (9.5%)	2
	Hood Canal (9.5%)	Purdy Cr 16.0005	George Adams Hatchery	1 (4.8%)	0
		Finch Cr 16.0222	Hoodsport Hatchery	1 (4.8%)	0
	N Puget Sound (28.6%)	Tulalip Cr 07.0001	Bernie Gobin Hatch	1 (4.8%)	1
		Wallace R 07.0940	Wallace R Hatchery	5 (23.8%)	1
	Skagit River (9.5%)	Cascade R 03.1411	Marblemount Hatchery	2 (9.5%)	2
	Mid Puget Sound (23.8%)	Grovers Cr 15.0299	Grovers Cr Hatchery	4 (19%)	4
		Palmer Hatchery	Keta Creek Complex	1 (4.8%)	0
	S Puget Sound (9.5%)	Minter Cr Tr 15.0051	Hupp Springs Rearing	1 (4.8%)	0
Clear Cr 11.0013C		Clear Creek Hatchery	1 (4.8%)	1	
Total				21	11

Table 3.6 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 2016 summer 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	2012	1	4.7	17.11	4.8	0.5	0.184	0.43
Clear Creek Hatchery	2013	1	4.7	17.11	4.6	0.5	0.169	0.41
Grovers Cr Hatchery	2013	4	18.7	68.44	18.4	1.8	0.667	1.63
Marblemount Hatchery	2013	2	9.3	34.22	9.4	0.9	0.345	0.83
Samish Hatchery	2012	1	4.7	17.11	4.7	0.5	0.173	0.42
Samish Hatchery	2013	1	4.7	17.11	4.7	0.5	0.172	0.41
Wallace R Hatchery	2013	1	4.7	17.11	4.7	0.5	0.177	0.42
Total		11	51.3	188.21	51.4	5.1	1.886	4.55

Table 3.7 Summary of season-wide fishery impact estimates for the 2016 summer 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	1,485	1,292	193	29	1,321	66,460	258	816 - 1,826	20%
Legal UM	1,485	0	1485	223	223	11361	107	14 - 432	48%
Sublegal AD	1,485	42	1,443	289	331	20,423	143	51 - 611	43%
Sublegal UM	637	0	637	127	127	6,487	81	0 - 285	63%
Total	5,092	1,335	3,758	668	2,002	104,731	324	1,368 - 2,637	16%

Table 3.8 Comparison of modeled (FRAM model run 2916) and estimated total Chinook encounters for the 2016 summer 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	1250	885	365	71
	AD	2,756	1,411	1,345	1,228
	Total	4,006	2,296	1,710	1,299
	% Marked	69	61	79	95
Estimated (Creel) Encounters	UM	2,122	1485	637	0
	AD	2,971	1,485	1,485	1,335
	Total	5,092	2,971	2,122	1,335
	% Marked	58	50	70	100

Table 3.9 Comparison of modeled (FRAM model run 2916) and estimated total Chinook mortalities for the 2016 summer 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)	270	1,586	1,856	350	1652	2002
Released Legal	126	89	215	223	29	252
Released Sublegal	73	269	342	127	289	416
Landed Only	71	1,228	1,299	0	1335	1335

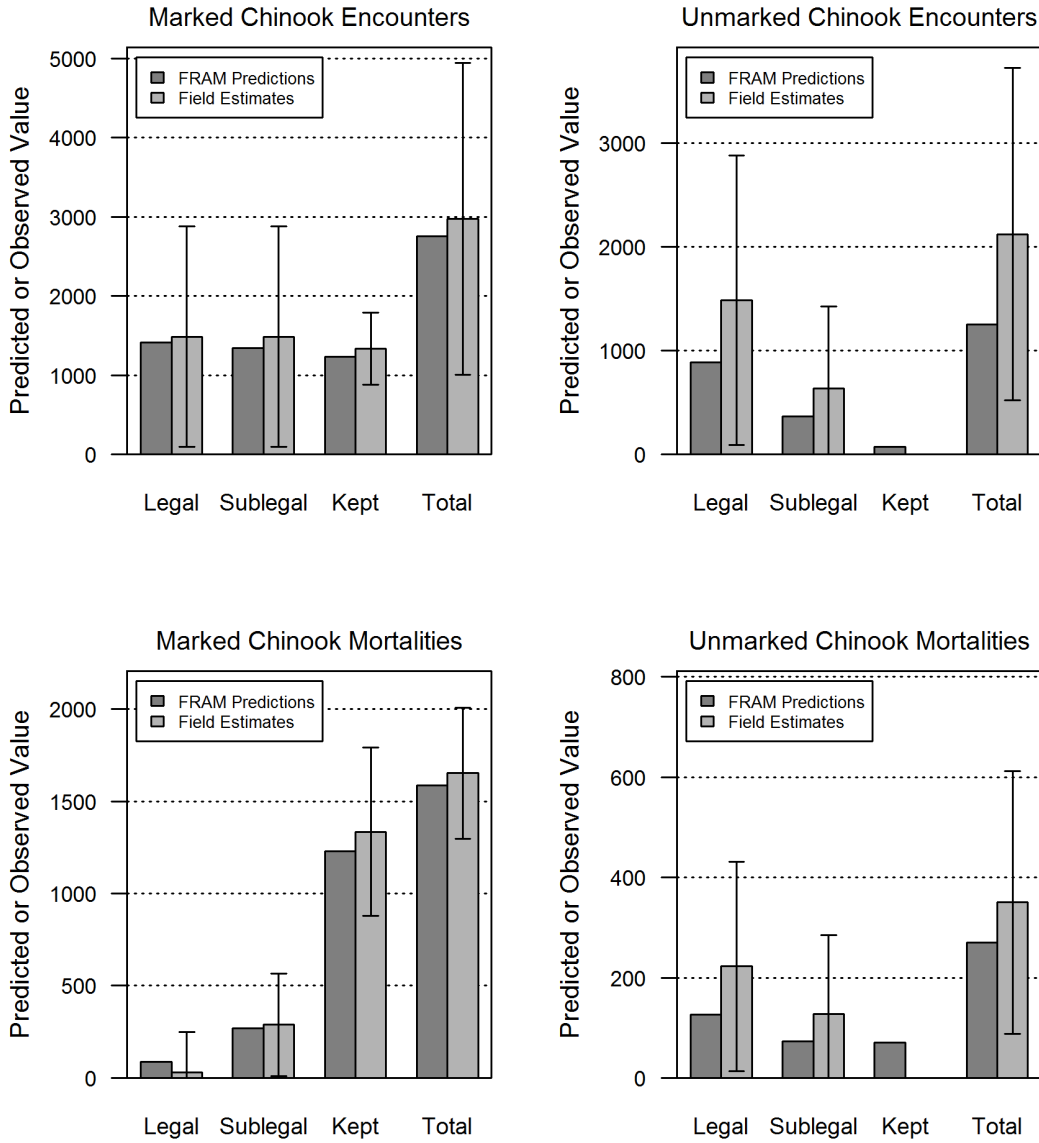


Figure 3.5 Comparison of modeled (FRAM model run 2916) and estimated total Chinook encounters and mortalities for the 2016 summer Chinook MSF in Marine Area 7. Error bars represent approximate 95% confidence intervals for field estimates

Table 3.10 Monthly sample rates (Total retained Chinook sampled / Estimated retained Chinook) for the 2016 summer 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	
July	27 - 31	1 Jul - 31 Jul	1227	0	1227	284	3	287	23.4
Season Total			1,227	0	1,227	284	3	287	23.4

Table 3.11 Fishery-total estimates of retained and released salmon (other than Chinook) during the 2016 summer 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	Sockeye	Coho Unk
27	1-Jul	3-Jul	0	0	0
28	4-Jul	10-Jul	0	0	0
29	11-Jul	17-Jul	0	5	5
30	18-Jul	24-Jul	5	0	5
31	29-Jul	31-Jul	5	0	0
Season Total:			9	5	9
Variance:			17	9	18
Standard Error:			4	3	4
CV (%):			45	64	45
95% CI:			1-17	0 - 11	1-18

Table 3.12 Summary of aerial survey and dockside data used to estimate the fraction of effort captured in the three-site sample frame during the 2016 summer 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}	
1-Jul	WE	10:55	11:56	281	163	96	477	0.342
12-Jul	WD	10:21	11:30	106	93	34	290	0.321
17-Jul	WD	12:10	13:17	177	260	92	500	0.520
20-Jul	WE	11:30	12:37	91	80	20	364	0.220
23-Jul	WD	10:44	11:48	201	177	45	791	0.224
Season Totals:				856	773	287	2422	
Mean:				171	155	57	484	0.325
St Dev:				77	73	35	191	0.122
CV(%):				9.0%	9.4%	12.1%	7.9%	

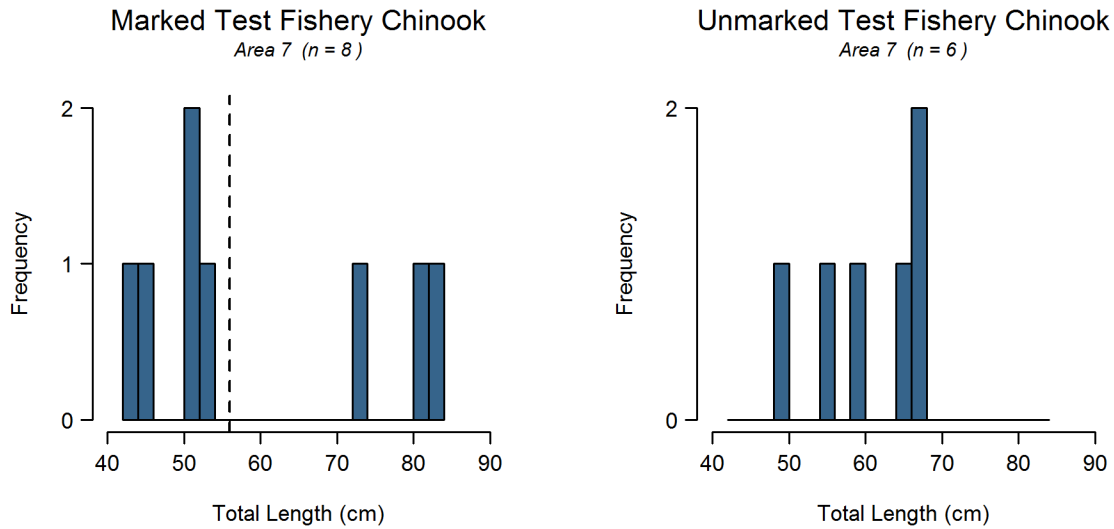


Figure 3.6 Length-frequency distributions of marked (left panel) and unmarked (right panel) Chinook encountered by test fishers during the 2016 summer Chinook MSF in Marine Area 7. The vertical dashed line in the left panel corresponds to the legal size limit (22 in or 56 cm).

Table 3.13 Composition of test fishery Chinook encounters and associated mark-rate and size/mark-status proportion estimates from the 2016 summer 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	
28	2	2	0	1	0	2	3
29	2	2	3	1	1	0	5
30	4	28	0	0	1	0	1
31	5	36	0	1	3	0	4
Total	13	68	3	4	5	2	14
Size/mark-status composition:			0.21	0.29	0.36	0.14	
Legal size mark rate:			0.43				
Overall mark rate:			0.57				

Size and mark-status proportions were not significantly different between private boat VTR and test fishery data (df=3, p-value=0.735422). Due to small sample size in the test fishing data we elected to combine test fishing and VTR data to produce Chinook encounter and mortality estimates for the Area 7 summer Chinook MSF.

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 Summer 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	Jul 1, 2016 - Jul 31, 2016	9,553	1,292	0	42	0	193	1,485	1443	637	5,092

4) Marine Area 9 Summer Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented a tenth consecutive summer Chinook MSF in Marine Area 9 from July 16 through August 4, 2016. 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 intensive dockside creel sampling, on-the-water effort surveys, test fishing and collection of voluntary trip reports (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 this section we present results from our monitoring activities during the Area 9 summer Chinook MSF.

Table 4.1 Sampling/estimation details on target parameters associated with the overall Area 9 summer mark-selective fishery monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Creel Sampling	Fishing effort (boat & angler trips); kept and released fish	Catch rates (CPUE); length, age, and CWT composition of harvest ¹ ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	One week	Within weeks, estimates were produced by day-type strata (weekday/weekend). Each week we sampled every Friday, Saturday and Sunday, and we randomly selected $n=2$ out of $N=4$ weekdays (Monday-Thursday) for sampling.
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 4 boat surveys (1 weekday and 3 weekend) were conducted during the two week fishery.
Test Fishing	Size (legal/sublegal) and mark-status (marked/unmarked) composition of encountered Chinook	Chinook length, age, and DNA-based ² stock composition; species composition of non-Chinook encounters	Fish encounter	Season	Given sufficient sample size ($n=46$) of fish caught in the test fishery, we used the test fishery data only to estimate the size/mark-status proportions (LM = 28%, LU = 7%, SM = 48%, SU = 17%; Table 4.13) 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	[The size/mark-status proportions of VTR data (LM = 51%, LU = 17%, SM = 29%, SU = 3%; Table 4.12) were not significantly different than those of the test fishery data. However, VTR data were not used in impact estimation due to the assumed higher data quality and sufficient sample sizes of the test fishery data.]GTJ(4)
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.

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

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

Table 4.2 Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2016 summer 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	Est. Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
July	29	16-Jul	17-Jul	1520	3,416	894	6	1,599	904	3,404
	30	18-Jul	24-Jul	3058	6,186	1265	3	2,261	1284	4,814
	31	25-Jul	31-Jul	1930	3,967	618	0	1105	629	2,352
August	32	1-Aug	4-Aug	742	1,342	195	0	348	198	742
Season Total:				7,250	14,911	2,972	9	5,314	3,016	11,311
Variance:				44,001	175,239	15,371	9	1,767,192	490,973	3,901,334
SE:				210	419	124	3	1,329	701	1,975
CV (%):				3	3	4	33	25	23	17
95% CI:				6,839	14,091	2,729	3	2,708 -	1,643 -	7,439 -
				7,661	15,732	3,215	15	7,919	4,389	15,182

Table 4.3 Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2016 summer Chinook MSF in Marine Area 9.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	769	30	799
Unmarked	1	0	1
Total	770	30	800

Table 4.4 Summary of coded-wire tags recovered from Chinook salmon harvested during the 2016 summer Chinook MSF in Marine Area 9. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag groups.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
BC	Fraser River – Thompson River (1.9%)	R-Chilliwack R	H-Chilliwack River H	1 (1.9%)	0
WA	N Washington (1.9%)	East Sound Bay (San)	Glenwood Springs	1 (1.9%)	0
	Hood Canal (35.2%)	Finch Cr 16.0222	Hoodsport Hatchery	12 (22.2%)	0
		Purdy Cr 16.0005	George Adams Hatchery	7 (13%)	0
	N Puget Sound (13%)	Wallace R 07.0940	Wallace R Hatchery	7 (13%)	2
	Mid Puget Sound (27.8%)	Icy Cr 09.0125	Icy Cr Hatchery	2 (3.7%)	0
		Voight Cr 10.0414	Voights Cr Hatchery	1 (1.9%)	0
		Big Soos Cr 09.0072	Soos Creek Hatchery	2 (3.7%)	1
		Grovers Cr 15.0299	Grovers Cr Hatchery	10 (18.5%)	10
	S Puget Sound (18.5%)	Clear Cr 11.0013C	Clear Creek Hatchery	9 (16.7%)	9
Kalama Cr 11.0017		Kalama Cr Hatchery	1 (1.9%)	0	
CA	Central California Coast (1.9%)	San Pablo Bay Net Pens	Coleman Nfh	1 (1.9%)	0
Total				54	22

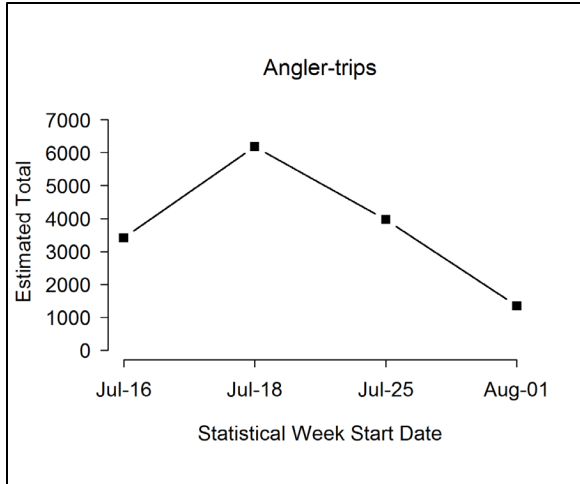


Figure 4.1 Temporal patterns in fishing effort during the 2016 summer Chinook MSF in Marine Area 9.

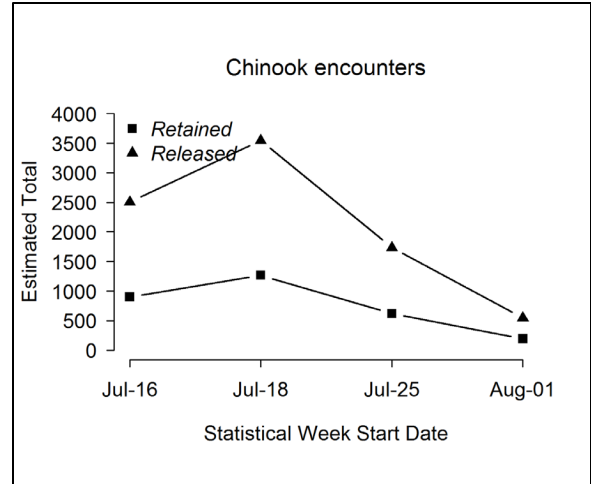


Figure 4.3 Temporal patterns in Chinook encounters (retained and released) during the 2016 summer Chinook MSF in Marine Area 9.

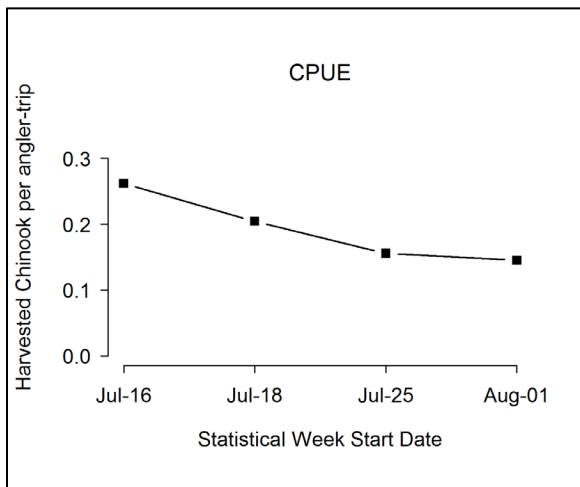


Figure 4.2 Temporal patterns in CPUE (landed Chinook per angler trip) during the 2016 summer Chinook MSF in Marine Area 9.

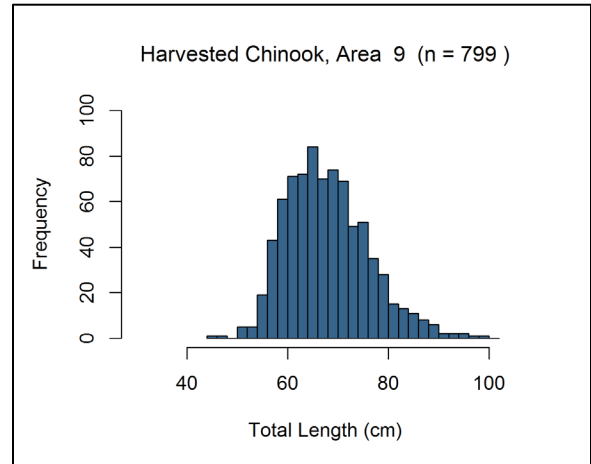


Figure 4.4 Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2016 summer Chinook MSF in Marine Area 9.

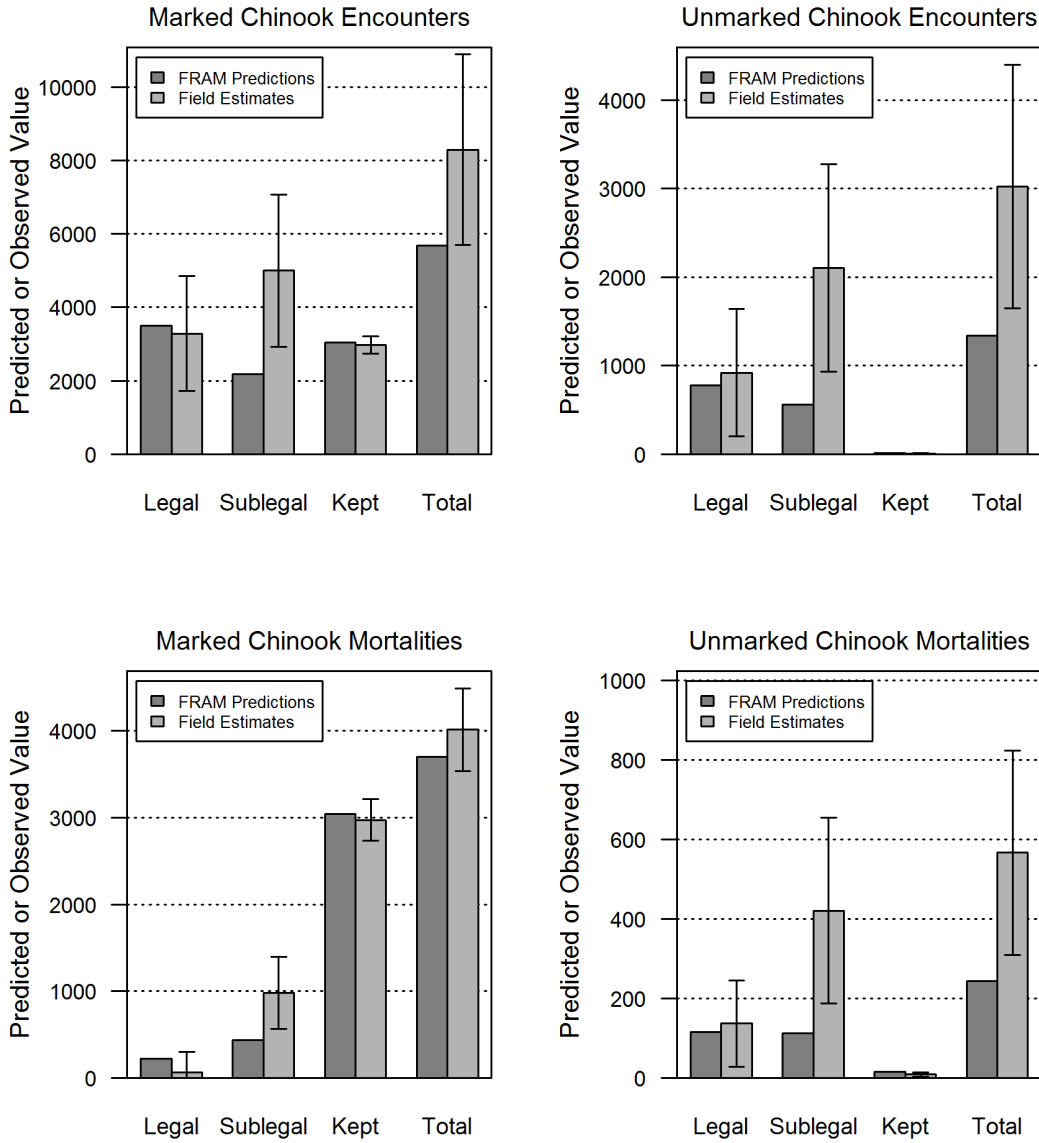


Figure 4.5 Comparison of modeled (using FRAM, model run 2916) and estimated total Chinook encounters and mortalities for the 2016 summer Chinook MSF in Marine Area 9. Error bars represent approximate 95% confidence intervals for field estimates.

Table 4.5 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 2016 summer 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.)
Clear Creek Hatchery	2011	1	3.7	10.16	3.7	0.4	0.102	0.32
Clear Creek Hatchery	2012	1	3.7	10.16	3.9	0.4	0.11	0.33
Clear Creek Hatchery	2013	6	22.4	60.96	22.2	2.2	0.602	1.9
Clear Creek Hatchery	2014	1	3.7	10.16	3.8	0.4	0.104	0.32
Grovers Cr Hatchery	2012	1	3.7	10.16	3.7	0.4	0.1	0.32
Grovers Cr Hatchery	2013	9	33.5	91.44	33.1	3.3	0.891	2.83
Soos Creek Hatchery	2013	1	3.7	10.16	3.7	0.4	0.101	0.32
Wallace R Hatchery	2012	1	3.7	10.16	3.7	0.4	0.102	0.32
Wallace R Hatchery	2013	1	3.7	10.16	3.8	0.4	0.105	0.32
Total		22	82	223.51	81.7	8.2	2.218	6.98

Table 4.6 Monthly sample rates (Total retained Chinook sampled¹ / Estimated retained Chinook) in the 2016 summer 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	
July	29 - 31	16 Jul - 31 Jul	2,777	9	2,786	762	1	763	27.40%
August	32 - 32	01 Aug - 04 Aug	195	0	195	37	0	37	19.00%
Season Total			2,972	9	2,981	799	1	800	26.80%

^{1/} Number of retained Chinook sampled includes all retained Chinook inspected for CWT's, from all sites sampled during the

Table 4.7 Comparison of modeled (FRAM model run 2916(GTJ(5))) and estimated total Chinook encounters for the 2016 summer 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	1,340	780	560	16
	AD	5,682	3,495	2,187	3,040
	Total	7,022	4,275	2,747	3,056
	% Marked	81	82	80	99
Estimated (Creel) Encounters	UM	3025	921	2104	9
	AD	8,286	3,288	4998	2,972
	Total	11,311	4,209	7,102	2,981
	% Marked	73	78	70	100

Table 4.8 Comparison of modeled (FRAM model run 2916) and estimated total Chinook mortalities for the 2016 summer 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)	244	3,698	3,942	567	4,014	4,580
Released Legal	115	221	336	137	64	201
Released Sublegal	113	437	550	421	977	1398
Landed Only	16	3,040	3,056	9	2,972	2,981

Table 4.9 Summary of season-wide fishery impact estimates for the 2016 summer 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	3,288	2,861	427	64	2,925	29,155	171	2,590 - 3,259	6
Legal UM	921	9	912	137	146	3,045	55	38 - 254	38
Sublegal AD	4,998	112	4,886	977	1089	45,301	213	672 - 1,506	20
Sublegal UM	2104	0	2104	421	421	14240	119	187 - 655	28
Total	11,311	2,981	8,330	1599	4,580	91,742	303	3,986 - 5,174	7

Table 4.10 Fishery-total estimates of retained and released salmon (*other than Chinook*) in the 2016 summer 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	Retained Salmon		Released Salmon				
			Coho AD	Coho UM	Coho AD	Coho UM	Coho UK	Cuttthroat	Unk Salmon
29	16-Jul	17-Jul	0	0	57	27	53	0	98
30	18-Jul	24-Jul	8	0	126	53	267	3	180
31	25-Jul	31-Jul	6	3	85	30	77	0	279
32	1-Aug	4-Aug	0	0	59	26	34	0	34
Season Total:			14	3	327	136	430	3	591
Variance:			24	3	2807	1291	7388	3	11,002
Standard Error:			5	2	53	36	86	2	105
CV (%):			35	57	16	26	20	57	18
95% CI:			4 - 24	0 - 6	223 - 431	65 - 206	262 - 599	0 - 6	385 - 796

Table 4.11 Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2016 summer Chinook MSF in Marine Area 9. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
Anacortes Marina	0	0.000	2	0.003
Armeni Public Ramp	0	0.000	7	0.009
Bayside Marina/Drystack	0	0.000	11	0.015
Brownsville Marina/Dock/Ramp	0	0.000	8	0.011
Bush Point Ramp and Beach	0	0.000	2	0.003
Camano Island State Park Ramp	0	0.000	2	0.003
Cape George Marina	0	0.000	4	0.005
Coupeville Public Ramp	0	0.000	6	0.008
Cultus Bay Marina	2	0.022	0	0.000
Dagmar's Landing, Forklift Launch	7	0.078	10	0.013
Driftwood Key Marina	6	0.067	19	0.025
Edmonds Dry Storage	6	0.067	30	0.040
Edmonds Guest Dock	0	0.000	5	0.007
Edmonds Marina	3	0.033	116	0.155
Edmonds Sling	1	0.011	31	0.042
Eglon Public Ramp	4	0.044	0	0.000
Elliott Bay Marina	0	0.000	3	0.004
Everett Marina	0	0.000	36	0.048
Everett Ramp	5	0.056	133	0.178
Fort Casey Public Ramp (Keystone)	8	0.089	49	0.066
Hat Island Marina	0	0.000	2	0.003
Kingston Marina	0	0.000	11	0.015
Kingston Public Ramp	7	0.078	27	0.036
LaConner Marina/Sling	0	0.000	3	0.004
Lagoon PT Moorage	2	0.022	9	0.012
Langley Marina/Ramp	0	0.000	2	0.003
Langus Riverfront Park Ramp	0	0.000	2	0.003
Mats Mats Bay Ramp	0	0.000	1	0.001
Mukilteo Lighthouse Park	0	0.000	40	0.054
Mystery Bay Dock/Moorage	0	0.000	1	0.001
Picnic Pt. Beach	0	0.000	1	0.001
Pleasant Harbor Marina	3	0.033	0	0.000
Point No Point Beach	0	0.000	3	0.004
Point Susan	0	0.000	2	0.003
Port Hadlock	2	0.022	0	0.000
Port Hadlock Marina	0	0.000	9	0.012
Port Hadlock Ramp	0	0.000	1	0.001
Port Ludlow Marina/Beach Launch	0	0.000	5	0.007
Port Townsend Boat Haven Marina	2	0.022	0	0.000
Port Townsend Boat Haven Ramp	10	0.111	66	0.088
Possession Ramp	0	0.000	1	0.001
Possession Waterfront Beach Park	3	0.033	0	0.000
Private	7	0.078	17	0.023
Salmon Club Ramp	8	0.089	11	0.015
Salsbury County Park Ramp	0	0.000	31	0.042
Shilshole Marina	1	0.011	8	0.011
Shilshole Public Ramp	3	0.033	17	0.023
Washington Park Launch Ramp	0	0.000	2	0.003
Total Anglers	90	1	746	1

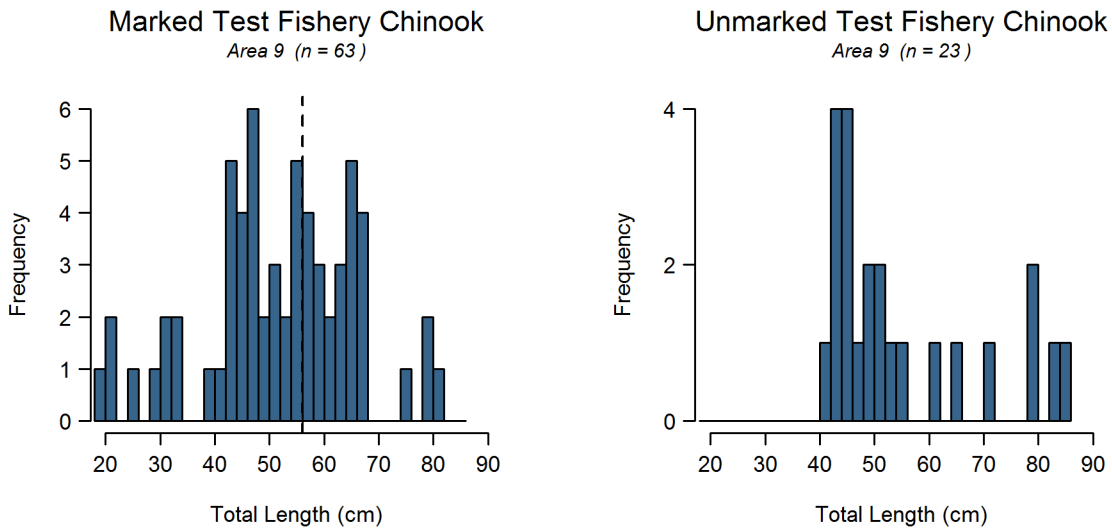


Figure 4.6 Length-frequency distributions of marked (left panel) and unmarked (right panel) Chinook encountered by test fishers during the 2016 summer Chinook MSF in Marine Area 9. The vertical dashed line in the left panel corresponds to the legal size limit (22 in or 56 cm).

Table 4.12 Total Chinook encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs), with estimates of legal-size and overall (legal and sublegal) mark rates during the 2016 summer 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	38 1-trip VTRs, 82 Angler Trips	40	13	23	2	78	0.81	0.75
Size/mark-status composition:		0.51	0.17	0.29	0.03			
Variance:		(0.0032)	(0.0018)	(0.0027)	(0.0003)			

Size and mark-status proportions were significantly different between private boat VTR and test fishery data (df=3, p-value=0.00091). We used only test fishery data to estimate the size/mark-status proportions needed to produce Chinook encounter and mortality estimates for the Area 9 summer Chinook MSF.

Table 4.13 Composition of test fishery Chinook encounters and associated mark-rate and size/mark-status proportion estimates for the 2016 summer 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.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hours Fished	AD	UM	AD	UM	
30	4	23.6	5	2	5	1	13
31	5	25.5	4	0	12	4	20
32	3	15.9	4	1	5	3	13
Total	12	65	13	3	22	8	46
Size/mark-status composition:			0.28	0.07	0.48	0.17	
Legal size mark rate:			0.81				
Overall mark rate:			0.76				

Table 4.14 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 summer Chinook MSF. Values may not add exactly due to rounding error.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Jul 16 - Jul 31, 2007	18,160	5,094	13	146	20	711	1,111	1,286	317	8,697
Jul 16 - Aug 15, 2008	20,399	4,035	3	10	0	597	1,608	3,212	3,826	13,290
Jul 16 - Aug 31, 2009	42,219	3,090	20	139	0	462	1,272	8,256	2,905	16,143
Jul 16 - Aug 31, 2010	31,200	5,282	33	10	6	740	2,125	750	249	9,194
Jul 16 - Aug 31, 2011	37,862	2,285	19	78	6	339	1,142	2,150	1,070	7,090
Jul 16 - Aug 19, 2012	24,886	6,972	12	101	2	1,039	2,351	5,168	4,721	20,366
Jul 16 - Aug 4, 2013	20,501	4,667	18	39	0	697	1,174	1,750	397	8,742
Jul 16 - Aug 15, 2014	23,113	2,865	6	4	0	428	668	745	299	5,015
Jul 16 - Jul 26, 2015	14,118	2,277	13	35	7	340	1,502	1,481	131	5,786
Jul 16, 2016 - Aug 15, 2016	14,911	2,861	9	112	0	427	912	4,886	2104	11,311

5) Marine Area 10 Summer Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented an ninth summer Chinook MSF in Marine Area 10 from July 16 through August 15, 2016, preempted by a catch and release fishery June 24, through July 15, 2016. Because the catch and release fishery has no harvest, which the Method 2 approach bases its encounter estimate on, we elected to use a Method 1 approach to estimating the salmon releases. 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 intensive dockside creel sampling, on-the-water effort surveys, test fishing and collection of voluntary trip reports (VTRs) from the angling public. **Table 5.3** [GTJ(6)] 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 10 summer Chinook MSF.

1) 2016 Catch and Release Fishery

Table 5.1 Method 1 estimates of total fishing effort and total salmon catch (harvest and releases) during the 2016 summer catch and release fishery in Marine Area 10. Release estimates based on creel interview data. 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	UK	
Jun	26	Jun-24	Jun-26	30	60	0	0	30	13	0	43
	27	Jun-27	Jul-03	916	2,523	0	0	68	0	8	76
Jul	28	Jul-04	Jul-10	477	1,004	0	0	76	15	64	154
	29	Jul-11	Jul-15	212	441	0	0	25	5	23	53
Season Total:				1,635	4,028	0	0	199	34	94	327
Variance:				68,760	526,931	0	0	4,871	236	1,005	625,110
Standard Error:				262	726	0	0	70	15	32	791
CV (%):				16%	18%	0	0	35.1%	45.7%	33.6%	23
95% CI:				1,121- 2,149	2,605- 5,451	0	0	62-335	4-64	32- 156	1,954 - 5,053

Table 5.2 Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2016 summer catch and release fishery in Marine Area 10. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
Armeni Public Ramp	1	0.111	2	0.029
Brownsville Marina	0	0.000	0	0.000
Des Moines Marina (Moorage)	0	0.000	2	0.029
Edmonds Boat Basin (Public Sling)	0	0.000	1	0.014
Edmonds Marina	0	0.000	6	0.087
Elliott Bay Marina	0	0.000	3	0.043
Everett Marina	0	0.000	3	0.043
Everett Ramp	0	0.000	2	0.029
Kingston Marina	0	0.000	1	0.014
Kingston Public Ramp	2	0.222	3	0.043
Manchester Ramp	0	0.000	0	0.000
Private	0	0.000	4	0.058
Shilshole Marina	2	0.222	37	0.536
Shilshole Public Ramp	4	0.444	5	0.072
Total Anglers	9	1	69	1

2) 2016 Mark Selective Fishery

Table 5.3 Sampling/estimation details on target parameters associated with the overall Area 10 summer mark-selective fishery monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Creel Sampling	Fishing effort (boat & angler trips); kept and released fish	Catch rates (CPUE); length, age, and CWT composition of harvest ¹ ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release.	One week	Within weeks, estimates were produced by day-type strata (weekday/weekend). Each week we sampled every Friday, Saturday and Sunday, and we randomly selected $n=2$ out of $N=4$ weekdays (Monday-Thursday) for sampling.
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 7 boat surveys (4 weekday and 3 weekend) were conducted during the 3 week fishery.
Test Fishing	Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook	Chinook length, age, and DNA-based ² stock composition; species composition of non-Chinook encounters	Fish encounter	Season	A sufficient number of fish caught in the test fishery ($n=69$; LM=38%, LU=9%, SM=35%, SU=19%; Table 5.13) so on test fishing numbers were used.
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	The size/mark-status proportions of VTR data (LM = 40%, LU = 16%, SM = 23%, SU = 23%; Table 5.12) were similar to those of the test fishery data and were combined with the test fishing data to estimates the size/mark-status proportions needed to produce encounter and mortality estimates. [GTJ(7)]
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.

Table 5.4 Method 2 estimates of total fishing effort and total salmon catch (harvest and releases) during the 2016 summer 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	Estimated Effort		Est. Retained Chinook		Est. Released Chinook		Total Est. Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
Jul	29	16-Jul	17-Jul	604	1,350	106	0	122	85	313
	30	18-Jul	24-Jul	860	1,752	134	0	153	107	394
	31	25-Jul	31-Jul	1,028	1,952	196	0	224	156	576
Aug	32	1-Aug	7-Aug	1,084	2,060	244	0	279	195	718
	33	8-Aug	14-Aug	1,014	1,949	335	0	383	268	986
	34	15-Aug	15-Aug	99	172	31	0	36	25	93
Sub-Total:				4688	9,235	1047	0	1197	836	3080
RCAW Derby				5	12	5	0	6	4	15
South King County PSA Derby				33	67	33	0	38	26	97
Season Total:				4,726	9,314	1,085	0	1,241	866	3,192
Variance:				23,283	98,210	2,980	0	143,115	44,581	277,156
Standard Error:				153	313	55	0	378	211	526
CV (%):				3	3	5	0	30	24	16
95% CI:				4,427 - 5,025	8,699 - 9,928	978 - 1,192	0 - 0	499 - 1,982	453 - 1,280	2,160 - 4,224

Table 5.5 Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2016 summer Chinook MSF in Marine Area 10.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	328	17	345
Unmarked	1	0	1
Total	329	17	346

Table 5.6 Summary of coded-wire tags recovered from Chinook salmon harvested during the 2016 summer Chinook MSF in Marine Area 10. The field "Number DITs" corresponds to the number of recovered CWTs that belonged to double-index tag

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
BC	Fraser River – Thompson River (5.6%)	R-Harrison R	H-Chehalis River H	1 (5.6%)	0
WA	Hood Canal (16.7%)	Finch Cr 16.0222	Hoodsport Hatchery	3 (16.7%)	0
	N Puget Sound (11.1%)	Wallace R 07.0940	Wallace R Hatchery	2 (11.1%)	0
	Mid Puget Sound (27.8%)	Icy Cr 09.0125	Icy Cr Hatchery	2 (11.1%)	0
	Mid Puget Sound (27.8%)	Grovers Cr 15.0299	Grovers Cr Hatchery	2 (11.1%)	2
	Mid Puget Sound (27.8%)	Voight Cr 10.0414	Voights Cr Hatchery	1 (5.6%)	0
	S Puget Sound (38.9%)	Clear Cr 11.0013C	Clear Creek Hatchery	3 (16.7%)	3
		Minter Cr 15.0048	Minter Cr Hatchery	1 (5.6%)	0
	Minter Cr Tr 15.0051	Hupp Springs Rearing	3 (16.7%)	0	
Total				18	5

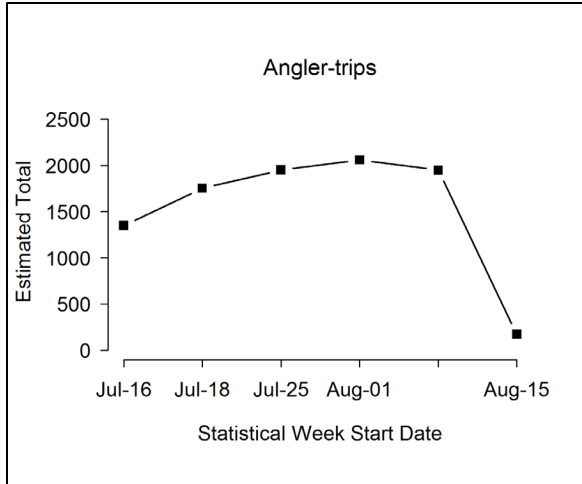


Figure 5.1 Temporal patterns in fishing effort during the 2016 summer Chinook MSF in Marine Area 10.

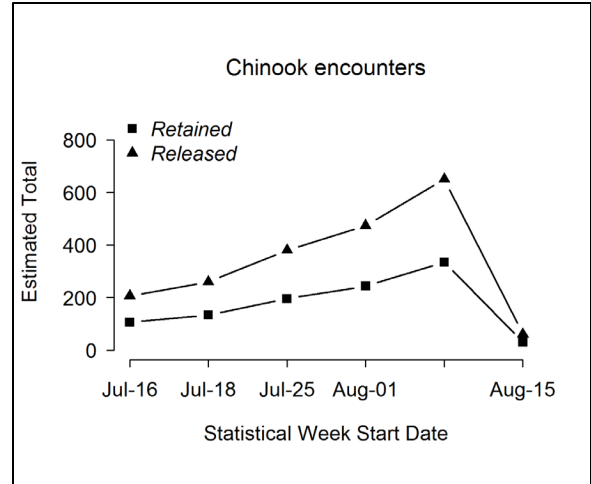


Figure 5.3 Temporal patterns in Chinook encounters (retained and released) during the 2016 summer Chinook MSF in Marine Area 10.

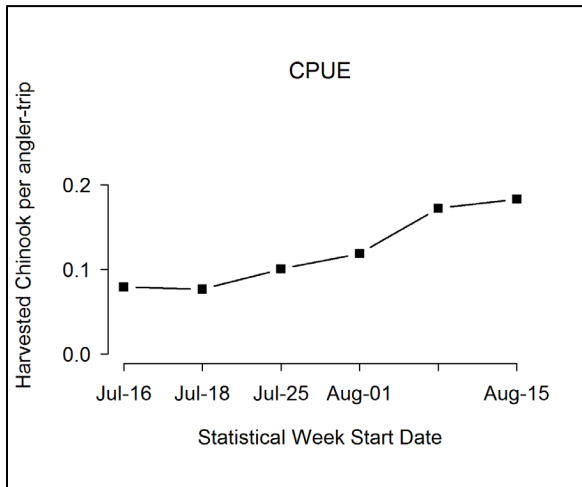


Figure 5.2 Temporal patterns in CPUE (landed Chinook per angler trip) during the 2016 summer Chinook MSF in Marine Area 10.

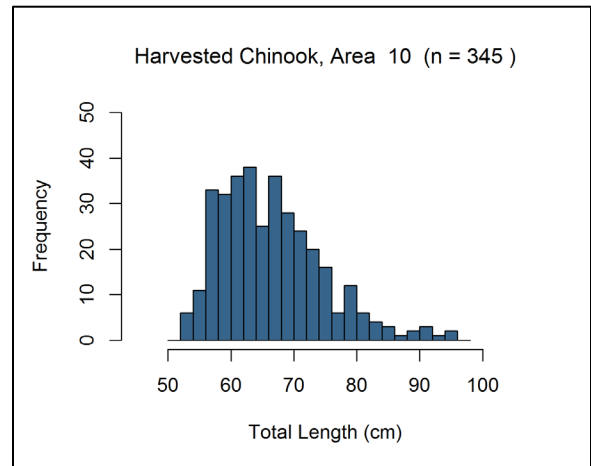


Figure 5.4 Length-frequency distribution of retained marked Chinook sampled in dockside angler interviews during the 2016 summer Chinook MSF in Marine Area 10.

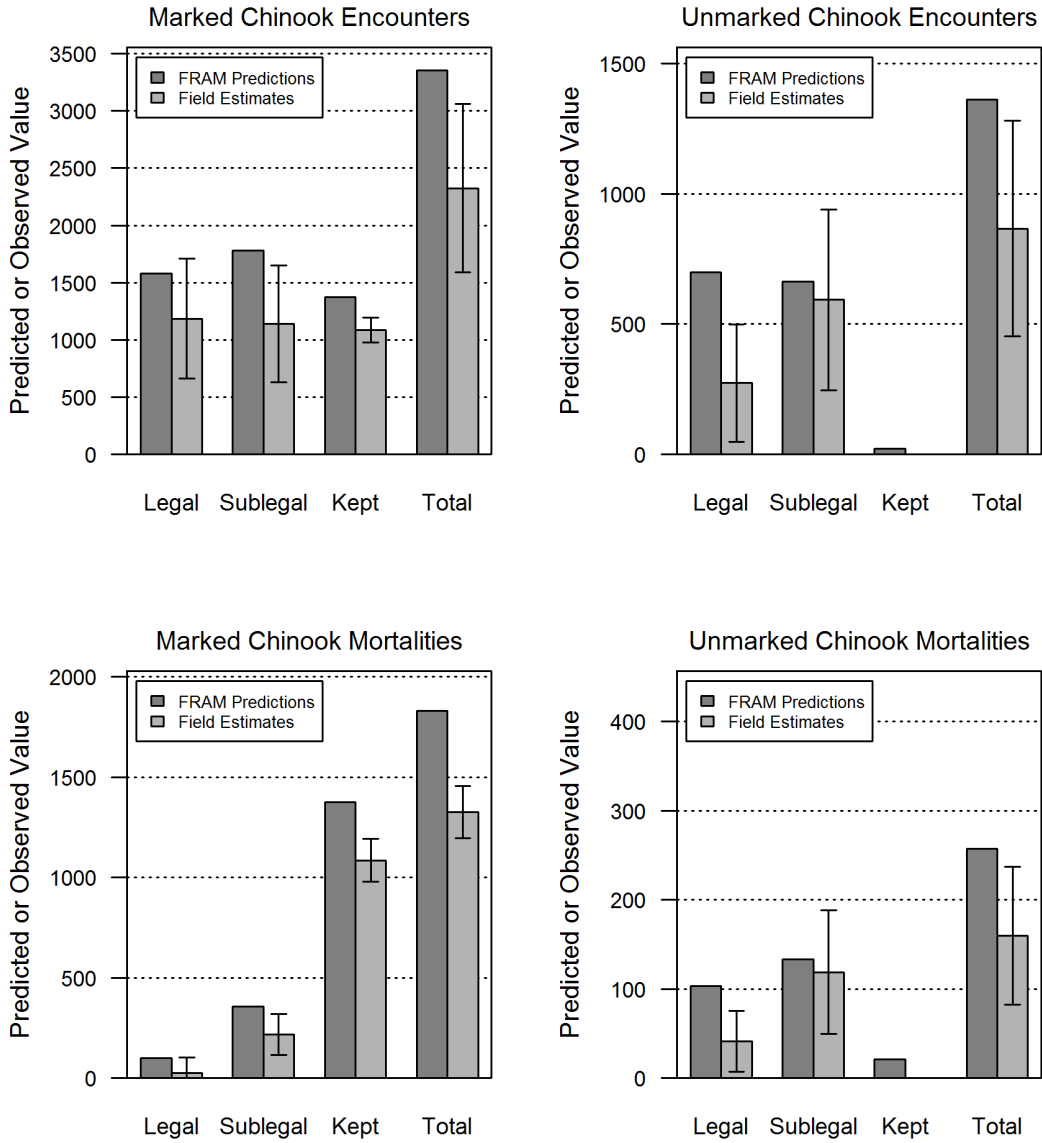


Figure 5.5 Comparison of modeled (using FRAM model run 2916) and estimated total Chinook encounters and mortalities for the 2016 summer Chinook MSF in Marine Area 10. Error bars represent approximate 95% confidence intervals for field estimates.

Table 5.7 Summary of season-wide fishery impact estimates for the 2016 summer 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	1,186	1,032	154	23	1,055	4,522	67	923 - 1,186	6
Legal UM	274	0	274	41	41	299	17	7 - 75	42
Sublegal AD	1,140	53	1,087	217	271	2,896	54	165 - 376	20
Sublegal UM	593	0	593	119	119	1,251	35	49 - 188	30
Total	3,192	1,085	2,107	400	1,485	8,968	95	1,299 - 1,671	6

Table 5.8 Comparison of modeled (FRAM model run 2916) and estimated total Chinook encounters for the 2016 summer 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	1,363	699	664	21
	AD	3,357	1,579	1,778	1,374
	Total	4,720	2,278	2,442	1,395
	% Marked	71	69	73	98
Estimated (Creel) Encounters	UM	1694	1186	508	0
	AD	2,371	1,186	1,186	1,085
	Total	4,065	2,371	1,694	1,085
	% Marked	58	50	70	100

Table 5.9 Comparison of modeled (FRAM model run 2916) and estimated total Chinook mortalities for the 2016 summer 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)	257	1,830	2,087	160	1,325	1,485
Released Legal	103	100	203	41	23	64
Released Sublegal	133	356	489	119	217	336
Landed Only	21	1,374	1,395	0	1,085	1,085

Table 5.10 Monthly sample rates (Total retained Chinook sampled¹ / Estimated retained Chinook) in the 2016 summer 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	
July	29 - 31	16 Jul - 31 Jul	436	0	436	141	0	141	32.30%
August	32 - 34	1 Aug - 15 Aug	649	0	649	204	1	205	31.60%
Season Total			1,085	0	1,085	345	1	346	31.90%

¹ Number of retained Chinook sampled includes all retained Chinook inspected for CWT's, from all sites sampled during the summer 2014 Area 10 Chinook MSF (creel estimates and the fish sampled as part of baseline sampling).

Table 5.11 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 2016 summer 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.)
Clear Creek Hatchery	2013	2	6.3	13.4	6.2	0.6	0.132	0.51
Clear Creek Hatchery	2014	1	3.1	6.7	3.2	0.3	0.069	0.26
Grovers Cr Hatchery	2013	1	3.1	6.7	3.1	0.3	0.065	0.26
Grovers Cr Hatchery	2014	1	3.1	6.7	3.2	0.3	0.071	0.27
Total		5	15.7	33.49	15.7	1.6	0.337	1.3

Table 5.12 Total Chinook encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs), with estimates of legal-size and overall (legal and sublegal) mark rates during the 2016 summer 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	29 1-trip VTRs, 45 Angler Trips	21	8	12	12	53	0.62	0.72
Size/mark-status composition:		0.40	0.15	0.23	0.23			
Variance:		(0.0046)	(0.0025)	(0.0034)	(0.0034)			

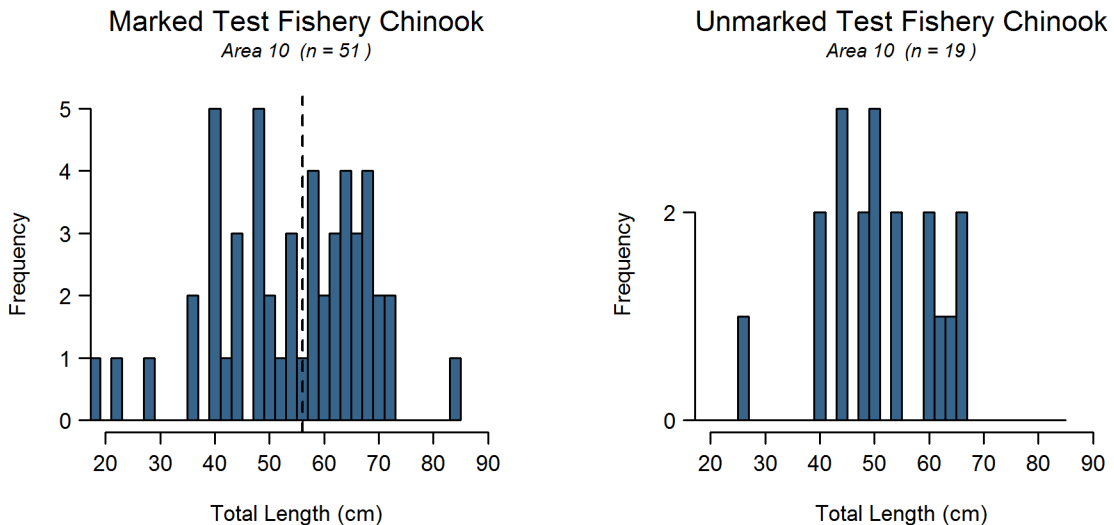


Figure 5.6 Length-frequency distributions of marked (left panel) and unmarked (right panel) Chinook encountered by test fishers during the 2016 summer Chinook MSF in Marine Area 10. The vertical dashed line in the left panel corresponds to the legal size limit (22 in or 56 cm).

Table 5.13 Composition of test fishery Chinook encounters and associated mark-rate and size/mark-status proportion estimates for the 2016 summer 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.

Stat Week	Fishing Effort		Legal		Sublegal		Total
	Days	Hours Fished	AD	UM	AD	UM	
30	5	26.5	11	2	5	2	20
31	5	28	6	0	6	1	13
32	5	26.7	6	4	12	3	24
33	5	27.8	3	0	2	7	12
Total	20	109	26	6	25	13	69
Size/mark-status composition:			0.37	0.09	0.36	0.19	
Legal size mark rate:			0.81				
Overall mark rate:			0.73				

Size and mark-status proportions were not significantly different between private boat VTR and test fishery data (df=3, p-value=0.422). However, based on sufficient sample size and assumed higher data quality, we used only test fishery data to estimate the size/mark-status proportions needed to produce Chinook encounter and mortality estimates for the Area 10 summer Chinook MSF.

Table 5.14 Fishery-total estimates of retained and released salmon (*other than Chinook*) in the 2016 summer 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.

Week	Start Date	End Date	Retained Salmon		Released Salmon			
			Coho AD	Coho UM	Coho AD	Coho UM	Coho UK	Unk Salmon
29	16-Jul	17-Jul	4	0	25	4	46	134
30	18-Jul	24-Jul	0	2	73	13	75	127
31	25-Jul	31-Jul	5	0	148	23	84	157
32	1-Aug	7-Aug	5	0	89	32	98	274
33	8-Aug	14-Aug	3	0	325	26	180	377
34	15-Aug	15-Aug	0	0	8	2	7	15
Season Total:			17	2	669	99	490	1083
Variance:			18	1	30444	211	2345	8,554
Standard Error:			4	1	174	15	48	92
CV (%):			25	49	26	15	10	9
95% CI:			9 - 25	0 - 5	327 - 1,011	71 - 128	395 - 584	902 - 1,264

Table 5.15 Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2016 summer Chinook MSF in Marine Area 10. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
Armeni Public Ramp	52	0.114	116	0.146
Bayside Marina/Drystack	0	0.000	2	0.003
Brownsville Marina/Dock/Ramp	13	0.029	21	0.026
Des Moines Marina (Moorage)	2	0.004	16	0.020
Duwamish Yacht Club	0	0.000	2	0.003
Eagle Harbor Waterfront Park	4	0.009	17	0.021
Edmonds Boat Basin (Public Sling)	8	0.018	2	0.003
Edmonds Dry Storage	17	0.037	29	0.036
Edmonds Guest Moorage	1	0.002	0	0.000
Edmonds Kayak Launch	0	0.000	1	0.001
Edmonds Marina	65	0.143	137	0.172
Edmonds Sling	4	0.009	23	0.029
Elliot Bay Marine	2	0.004	13	0.016
Everett Ramp	1	0.002	10	0.013
Evergreen Park Ramp	1	0.002	1	0.001
Fisherman Terminal	0	0.000	1	0.001
Jim Clark Marina	0	0.000	1	0.001
Keyport	2	0.004	0	0.000
Kingston Marina	10	0.022	10	0.013
Kingston Public Ramp	40	0.088	59	0.074
Lincoln Park Beach Launch	0	0.000	2	0.003
Manchester Public Ramp	12	0.026	8	0.010
Narrows Marina	0	0.000	2	0.003
Point Defiance Boathouse	0	0.000	3	0.004
Point Defiance Public Ramp	0	0.000	3	0.004
Port Orchard Public Ramp	2	0.004	1	0.001
Possession Pt Launch	0	0.000	3	0.004
Poulsbo Yacht Club	2	0.004	0	0.000
Private	15	0.033	18	0.023
Richmond Beach Launch	0	0.000	1	0.001
Salmon Bay Marina	2	0.004	2	0.003
Sandy Point Marina	0	0.000	2	0.003
Seacrest	0	0.000	2	0.003
Shilshole Marina	100	0.220	134	0.169
Shilshole Public Ramp	98	0.215	148	0.186
South Park Marina	0	0.000	3	0.004
Suquamish Ramp	2	0.004	0	0.000
Tyee Marina	0	0.000	2	0.003
Total Anglers	455	1	795	1

Table 5.16 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 10 summer Chinook MSF. Values may not add exactly due to rounding error.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Jul 16 - Jul 28, 2007	8,374	1,469	30	70	8	209	497	3,101	723	6,107
Jul 16 - Aug 15, 2008	13,808	1,027	3	4	0	128	510	189	385	2,246
Jul 16 - Aug 31, 2009	23,179	1,505	22	116	0	220	82	2,488	1,017	5,450
Jul 16 - Aug 31, 2010	21,636	2,950	33	37	9	432	1,026	1,024	1,665	7,178
Jul 16 - Aug 31, 2011	27,753	2,548	14	94	14	372	1,872	964	694	6,573
Jul 16 - Aug 19, 2012	17,823	2,976	17	88	17	443	377	6,343	1,950	12,212
Jul 16 - Aug 18, 2013	27,317	3,434	6	77	17	512	298	2,149	1,603	8,097
Jul 16 - Aug 7, 2014	11,892	1,063	4	0	4	159	322	1,629	322	3,503
Jul 16,- Aug 15, 2016	9,314	1,032	0	53	0	154	274	1,087	593	3,192

6) Marine Area 11 Summer Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented a ninth consecutive summer Chinook MSF in Marine Area 11 from June 1 through September 30, 2016. WDFW's Puget Sound Sampling Unit (PSSU) implemented an intensive monitoring program in Area 11 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 and collection of voluntary trip reports (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 this section we present results from our monitoring activities during the Area 11 summer Chinook MSF.

Table 6.1 Sampling/estimation details on target parameters associated with the overall Area 11 winter mark-selective fishery monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Creel Sampling	Fishing effort (boat & angler trips); kept and released fish	Catch rates (CPUE); length, age, and CWT composition of harvest ¹ ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	Two weeks	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 weekday and 8 weekend boat surveys were conducted during the four month fishery.
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	We used VTR data to estimate the size/mark-status proportions (LM = 56%, LU = 21%, SM = 6%, SU = 17%; Table 6.5) needed to produce encounter and mortality estimates.[GTJ(8)]
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.

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

Table 6.2 Estimates of total fishing effort and total salmon catch (harvest and releases) during the 2016 summer Chinook MSF in Marine Area 11. 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		Est. Total Chinook Encounters
				Boats	Anglers	AD	UM	AD	UM	
Jun	26	24-Jun	26-Jun	267	485	44	0	46	22	112
	27	27-Jun	3-Jul	1173	1,895	241	0	257	122	620
Jul	28	4-Jul	10-Jul	1,119	1,741	280	0	298	141	719
	29	11-Jul	17-Jul	1,073	1,879	96	0	103	49	248
	30	18-Jul	24-Jul	778	1,251	79	0	84	40	203
	31	25-Jul	31-Jul	1,187	1,921	170	0	181	86	438
Aug	32	1-Aug	7-Aug	1,122	1,717	179	4	191	87	461
	33	8-Aug	14-Aug	1,525	2,499	301	0	320	151	772
	34	19-Aug	19-Aug	132	245	7	0	8	4	19
Subtotal				8,377	13,632	1398	4	1489	701	3591
RCAW Derby Derby				5	12	5	0	5	3	13
South King County PSA Derby				33	67	33	0	35	17	85
Gig Harbor Derby				33	55	41	0	44	21	105
Season Total:				8,448	13,766	1,477	4	1,574	740	3,794
Variance:				168,853	352,317	87,085	6	319,837	22,515	649,137
SE:				411	594	295	3	566	150	806
CV (%):				5	4	20	70	36	20	21
95% CI:				7,642 - 9,253	12,603 - 14,929	898 - 2,055	0 - 9	465 - 2,682	446 - 1,034	2,215 - 5,374

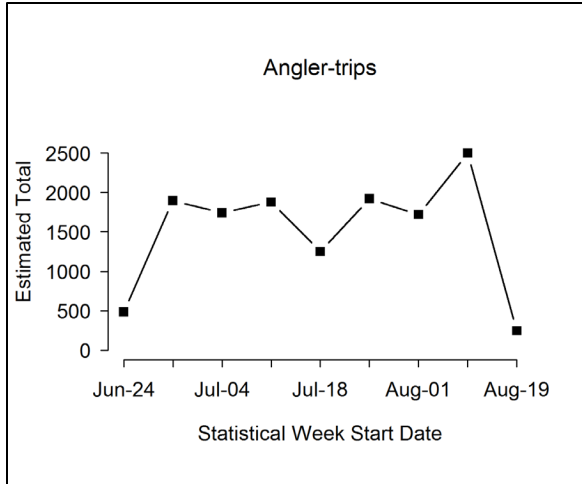


Figure 6.1 Temporal patterns in fishing effort during the 2016 summer Chinook MSF in Marine Area 11.

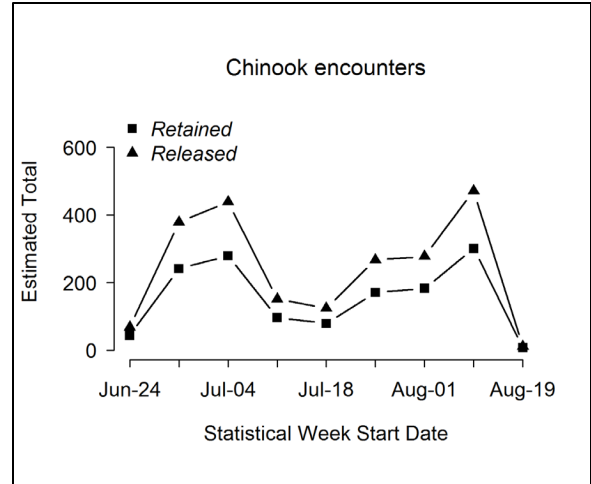


Figure 6.3 Temporal patterns in Chinook encounters (retained and released) during the 2016 summer Chinook MSF in Marine Area 11.

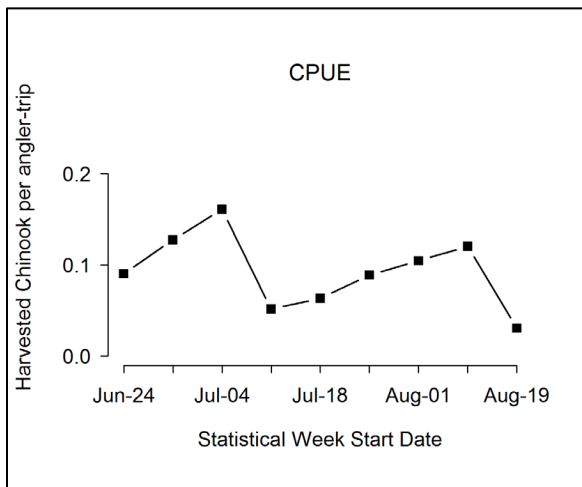


Figure 6.2 Temporal patterns in CPUE (landed Chinook per angler trip) during the 2016 summer Chinook MSF in Marine Area 11.

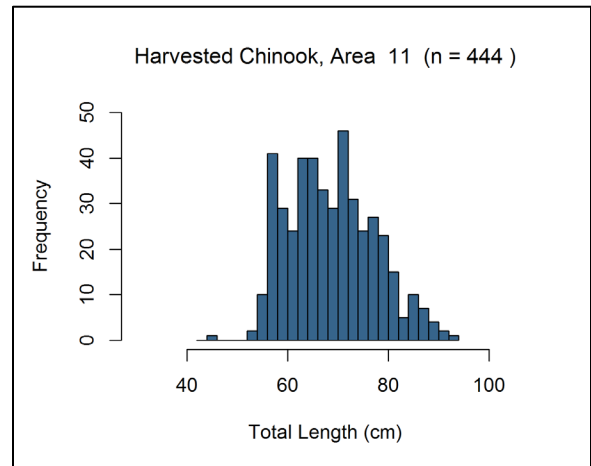


Figure 6.4 Length-frequency distributions of retained marked Chinook sampled in dockside angler interviews during the 2016 summer Chinook MSF in Marine Area 11.

Table 6.3 Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2016 summer Chinook MSF in Marine Area 11.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	432	12	444
Unmarked	4	0	4
Total	436	12	448

Table 6.4 Summary of coded-wire tags recovered from Chinook salmon harvested during the 2016 summer Chinook MSF in Marine Area 11. The field “Number DITs” corresponds to 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 (24%)	Finch Cr 16.0222	Hoodsport Hatchery	4 (16%)	0
		Purdy Cr 16.0005	George Adams Hatchery	2 (8%)	0
	N Puget Sound (12%)	Wallace R 07.0940	Wallace R Hatchery	2 (8%)	1
		Whitehorse Springs	Whitehorse Pond	1 (4%)	0
	Skagit River (4%)	Cascade R 03.1411	Marblemount Hatchery	1 (4%)	0
	Mid Puget Sound (28%)	Icy Cr 09.0125	Icy Cr Hatchery	3 (12%)	0
		Big Soos Cr 09.0072	Soos Creek Hatchery	2 (8%)	2
		Grovers Cr 15.0299	Grovers Cr Hatchery	1 (4%)	1
		Voight Cr 10.0414	Voights Cr Hatchery	1 (4%)	0
	S Puget Sound (28%)	Kalama Cr 11.0017	Kalama Cr Hatchery	1 (4%)	0
		Minter Cr Tr 15.0051	Hupp Springs Rearing	1 (4%)	0
		Clear Cr 11.0013C	Clear Creek Hatchery	5 (20%)	5
Col Riv	Lower Columbia River (4%)	Cowlitz R 26.0002	Cowlitz Salmon Hatchery	1 (4%)	0
Total				25	9

Table 6.5 Total Chinook encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2016 summer 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	152 1-trip VTRs, 304 Angler Trips	304	111	30	94	539	0.62	0.73
Size/mark-status composition:		0.56	0.21	0.06	0.17			
Variance:		(0.0005)	(0.0003)	(0.0001)	(0.0003)			

Table 6.6 Summary of season-wide fishery impact estimates for the 2016 summer Chinook MSF in Marine Area 11. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
Legal AD	1,652	1,437	215	32	1,469	87,476	296	889 - 2,049	20
Legal UM	446	4	443	66	70	335	18	34 - 106	26
Sublegal AD	1,399	40	1,359	272	312	4,214	65	184 - 439	21
Sublegal UM	298	0	298	60	60	316	18	25 - 94	30
Total	3,794	1,480	2,314	430	1,910	92,341	304	1,315 - 2,506	16

Table 6.7 Comparison of modeled (FRAM model run 2916) and estimated total Chinook encounters for the 2016 summer Chinook MSF in Marine Area 11. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	634	294	340	9
	AD	2,264	1,423	841	1,238
	Total	2,898	1,717	1,181	1,247
	% Marked	78	83	71	99
Estimated (Creel) Encounters	UM	744	446	298	4
	AD	3,050	1,652	1,399	1,477
	Total	3,794	2,098	1,696	1,480
	% Marked	80	79	82	100

Table 6.8 Comparison of modeled (FRAM model run 2916) and estimated total Chinook mortalities for the 2016 summer Chinook MSF in Marine Area 11. Values may not add up perfectly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Mortality Category	FRAM Chinook Mortalities			Estimated Chinook Mortalities		
	UM	AD	Total	UM	AD	Total
Total (Landed + Released)	120	1,495	1,615	130	1,781	1,910
Released Legal	43	89	132	66	32	99
Released Sublegal	68	168	236	60	272	331
Landed Only	9	1,238	1,247	4	1,477	1,480

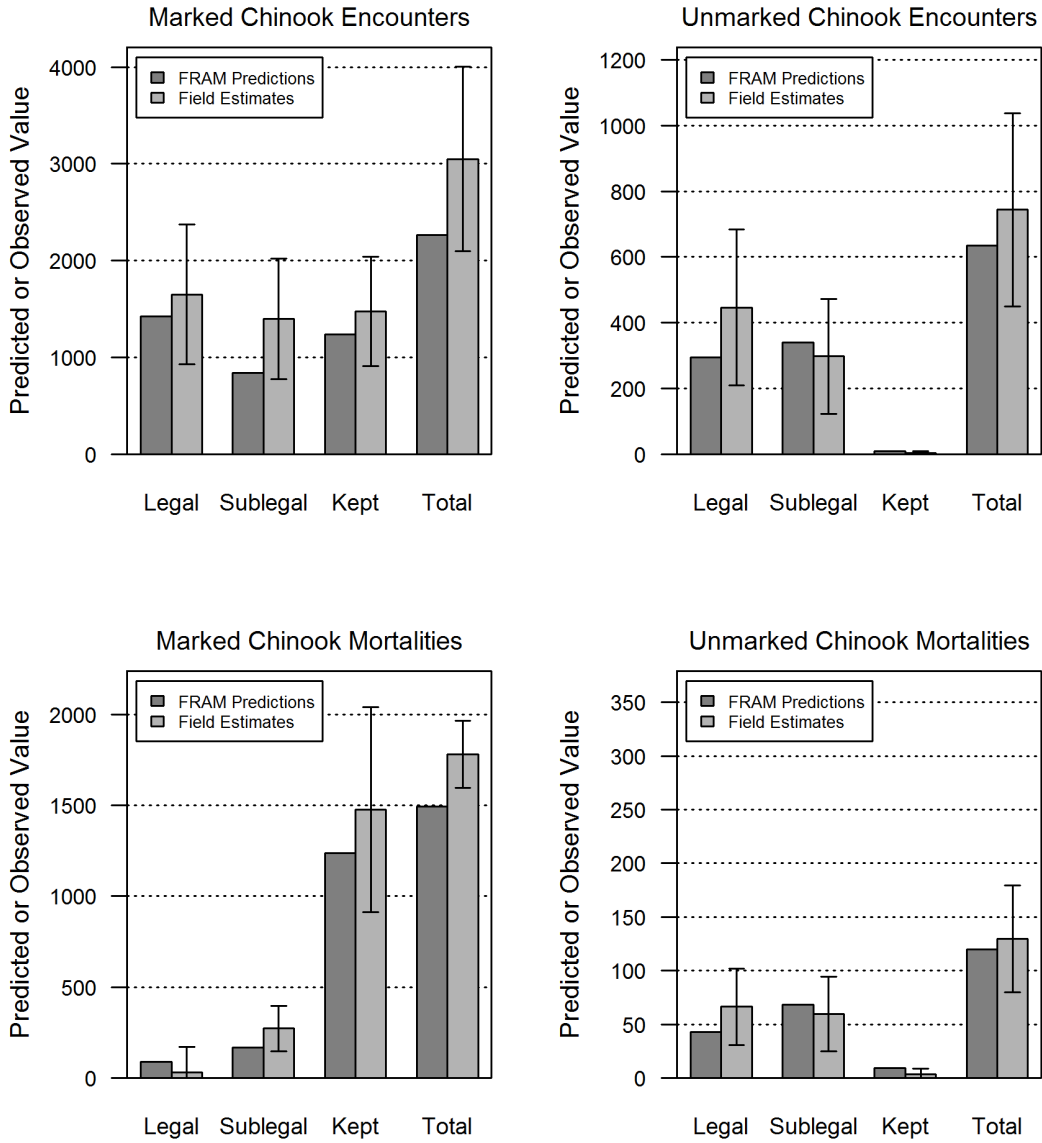


Figure 6.5 Comparison of modeled (FRAM model run 2916) and estimated total Chinook encounters and mortalities for the 2016 summer Chinook MSF in Marine Area 11. Error bars represent approximate 95% confidence intervals for field estimates.

Table 6.9 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 2016 summer Chinook MSF in Marine Area 11. 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.)
Clear Creek Hatchery	2012	1	3.3	7.49	3.4	0.3	0.081	0.29
Clear Creek Hatchery	2013	3	9.8	22.48	9.8	1	0.222	0.82
Clear Creek Hatchery	2014	1	3.3	7.49	3.3	0.3	0.077	0.28
Grovers Cr Hatchery	2013	1	3.3	7.49	3.2	0.3	0.073	0.27
Soos Creek Hatchery	2013	2	6.6	14.99	6.6	0.7	0.149	0.55
Wallace R Hatchery	2013	1	3.3	7.49	3.3	0.3	0.077	0.28
Total		9	29.5	67.44	29.7	3	0.68	2.47

Table 6.10 Monthly sample rates (Total retained Chinook sampled¹ / Estimated retained Chinook) in the 2016 summer Chinook MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked.

Time period			Estimated Retained Chinook			Number of Chinook sampled			Sample Rate
Month	Stat Weeks	Dates	AD	UM	Total	AD	UM	Total	
June	26 - 27	24 Jun - 03 Jul	285	0	285	130	1	131	46.00%
July	28 - 31	04 Jul - 31 Jul	626	0	626	158	2	160	25.60%
August	32 - 34	01 Aug - 19 Aug	566	4	570	157	1	158	27.70%
Season Total			1,477	4	1,480	445	4	449	30.30%

^{1/} Number of retained Chinook sampled includes all retained Chinook inspected for CWT's, from all sites sampled during the summer 2016 Area 11 Chinook MSF (creel estimates and the fish sampled as part of baseline sampling).

Table 6.11 Fishery-total estimates of retained and released salmon (other than Chinook) for the 2016 summer Chinook MSF in Marine Area 11. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark-status. Values may not add exactly due to rounding error.

Stat Week	Start Date	End Date	Retained Salmon		Released Salmon				
			Coho AD	Coho UM	Coho AD	Coho UM	Coho UK	Cutthroat Trout	Unknown Salmon
26	24-Jun	26-Jun	0	0	0	0	3	13	13
27	27-Jun	3-Jul	0	0	0	0	0	0	6
28	4-Jul	10-Jul	0	0	3	3	3	0	0
29	11-Jul	17-Jul	0	0	6	0	0	0	0
30	18-Jul	24-Jul	0	0	6	0	0	0	10
31	25-Jul	31-Jul	10	0	12	3	26	0	180
32	1-Aug	7-Aug	10	0	0	0	17	0	4
33	8-Aug	14-Aug	10	7	26	4	33	0	110
34	19-Aug	19-Aug	2	0	7	5	12	0	6
Season Total:			32	7	61	15	95	13	327
Variance:			342	26	150	17	896	137	25,195
Standard Error:			19	5	12	4	30	12	159
CV (%):			58	70	20	27	32	93	49
95% CI:			0 - 68	0 - 17	37 - 85	7 - 23	36 - 153	0 - 36	16 - 638

Table 6.12 Summary of the total number of anglers intercepted during on-the-water surveys conducted for the 2016 summer Chinook MSF in Marine Area 11. Sites in bold represent those included in the dockside sample frame.

Site Name	Weekday Anglers	Season Total (unadjusted) Size Measure	Weekend Anglers	Season Total (unadjusted) Size Measure
Armeni Public Ramp	0	0.000	1	0.004
Beach Launch	0	0.000	1	0.004
Breakwater Marina (Warters)	0	0.000	3	0.013
Browns Point Ramp	0	0.000	2	0.009
Browns's Point Shore	0	0.000	1	0.004
Commencement Bay Marina Services	0	0.000	3	0.013
Dash Point Shore	0	0.000	1	0.004
Day Island Marina	0	0.000	2	0.009
Day Island Yacht Club	0	0.000	1	0.004
Des Moines Marina (Moorage)	0	0.000	18	0.078
Dockton Ramp, Vashon Is	0	0.000	7	0.030
Foss Harbor	0	0.000	1	0.004
Fox Island Public Ramp	0	0.000	3	0.013
Gig Harbor Marina	0	0.000	10	0.043
Gig Harbor Ramp	1	0.200	13	0.056
Hood Canal Marina	0	0.000	5	0.022
Hylebos Boat Haven	0	0.000	1	0.004
Manchester Public Ramp	0	0.000	1	0.004
Narrows Marina	0	0.000	4	0.017
Narrows Marina (Private)	0	0.000	6	0.026
Olalla Public Ramp	1	0.200	1	0.004
Owen's Beach	0	0.000	1	0.004
Point Defiance Beach	0	0.000	1	0.004
Point Defiance Boathouse	0	0.000	43	0.185
Point Defiance Public Ramp	0	0.000	52	0.224
Port Orchard Marina	0	0.000	1	0.004
Port Orchard Public Ramp	0	0.000	2	0.009
Potlatch Ramp	0	0.000	2	0.009
Private	1	0.200	18	0.078
Redondo Ramp	0	0.000	12	0.052
Shilshole Public Ramp	1	0.200	0	0.000
Skokomish Ramp	0	0.000	2	0.009
Solo Point	0	0.000	1	0.004
Tacoma Yacht Club	0	0.000	2	0.009
Tahuya Port of Allyn	0	0.000	2	0.009
Tyee Marina/Ramp	0	0.000	4	0.017
Union Public Ramp	0	0.000	3	0.013
Wollochet Bay Public Ramp	1	0.200	0	0.000
Zittels Marina	0	0.000	1	0.004
Total Anglers	5	1	232	1

Table 6.13 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 11 summer Chinook MSF. Values may not add exactly due to rounding error.

Season Dates	Effort (Angler- trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Jun 1 - Sept 30, 2007	78,958	10,192	74	354	21	1,511	3,015	8,033	2,357	25,558
Jun 1 - Sept 30, 2008	65,728	7,277	18	100	5	1,087	1,999	1,969	248	12,703
Jun 1 - Sept 30, 2009	80,157	3,149	20	117	17	470	1,269	3,820	3,302	12,164
Jun 1 - Sept 30, 2010	54,594	3,883	64	27	0	580	1,105	900	405	6,965
Jun 1 - Sept 30, 2011	69,919	2,559	9	77	12	382	2,120	1,932	1,579	8,670
Jun 1 - Sept 30, 2012	56,065	4,894	57	72	14	731	2,665	2,649	1,157	12,240
Jun 1 - Sept 30, 2013	64,509	3,056	35	55	0	457	1,289	1,214	669	6,774
Jun 1 - Sept 30, 2014	39,426	2,912	20	11	0	435	1,585	2,142	861	7,966
Jun 1 - Sept 30, 2015	40,858	1,447	10	41	3	216	748	2,491	1599	6,556
Jun 24 - Aug 19, 2016	13,766	1,437	4	40	0	215	443	1,359	298	3,794

7) Marine Area 12 Summer Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented a fifth consecutive summer Chinook MSF in Marine Area 12 from July 1 through September 30, 2016. WDFW's Puget Sound Sampling Unit (PSSU) implemented a "Baseline Sampling" program (see WDFW 2012a for details) consisting of dockside angler interviews with catch sampling along with efforts to distribute and collect voluntary trip reports (VTRs) from the angling public.

Unlike the other survey designs, Baseline Sampling does not provide a means for generating in-season or immediate post-season estimates of fishery total catch and effort. These estimates will be available approximately one year after the close of the fishery through the WDFW Catch Record Card (CRC) program. Once available, CRC-based catch estimates will be used to generate estimates of total Chinook encounters and mortalities by size and mark-status using the methods provided in WDFW & NWIFC (2013). Thus, while these descriptors of MSF impacts are not presented in the present document, they will be available at a future time.

Table 7.1 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 12 summer Chinook MSF, including relative catch and effort patterns over the course of the season based on the assumption that baseline-sampling observations of these parameters are good indicators of associated fishery-wide trends.

Table 7.1 Sampling/estimation details on target parameters associated with the overall Area 12 mark-selective fishery monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Angler Interviews (Baseline Sampling)	Observed (in-sample) fishing effort (boat & angler trips); kept and released fish.	Catch rates (CPUE); length, age, and CWT composition of harvest ¹ ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	Week	Observed catch per angler trip and species composition data obtained from baseline sampling will ultimately be combined with Catch Record Card (CRC) data to produce fishery-total estimates at a later time (approximately one year following the fishery).
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	When CRC-based retained Chinook estimates become available VTR data may be used in the estimation of total Chinook encounters by size/mark group (LM = 20%, LU = 0%, SM = 0%, SU = 80%; Table 7.5), along with associated impacts, using the methods described in WDFW & NWIFC (2013).
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	Will be estimated at a later date using the CRC-based retained Chinook estimate, when it becomes available.
Coded-wire tag (CWT) Impacts Estimation	Marked/unmarked double-index tag (DIT) encounters and mortalities	N/A	N/A	Season	Will be estimated at a later date using the CRC-based retained Chinook estimate, when it becomes available. The temporal resolution of DIT impacts is constrained by the total number of tags recovered.

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

Table 7.2 Observations of fishing effort, salmon harvest, and reported salmon releases, by week, for the 2016 summer 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.

Month	Stat Week	Effort		Retained Fish					Released Fish									
		Boats	Anglers	Chinook		Coho			Cutthroat	Chinook			Coho			Unk. Salmon	Chum	Cutthroat
				AD	UM	AD	UM	UD		AD	UM	UK	AD	UM	UK			
Jul	27	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	28	7	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	29	7	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	30	10	21	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	31	8	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug	32	11	20	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	33	30	52	9	0	0	0	0	0	2	0	2	0	0	1	0	0	0
	34	61	118	25	1	28	0	0	0	31	1	22	1	1	0	0	1	2
	35	126	238	43	0	46	13	1	0	15	15	5	4	10	4	4	2	25
Sept	36	103	204	0	0	40	2	0	0	5	6	7	4	0	0	0	0	1
	37	72	123	7	0	6	0	0	1	2	4	24	0	0	19	12	0	14
	38	96	163	1	1	24	23	0	1	9	15	8	15	12	25	26	2	35
	39	64	112	1	0	8	21	0	0	5	1	11	0	0	11	6	0	30
	40	40	65	0	0	6	31	0	0	2	2	3	9	3	3	0	0	15
Total		638	1159	94	2	158	90	1	2	71	45	82	33	26	63	48	5	122

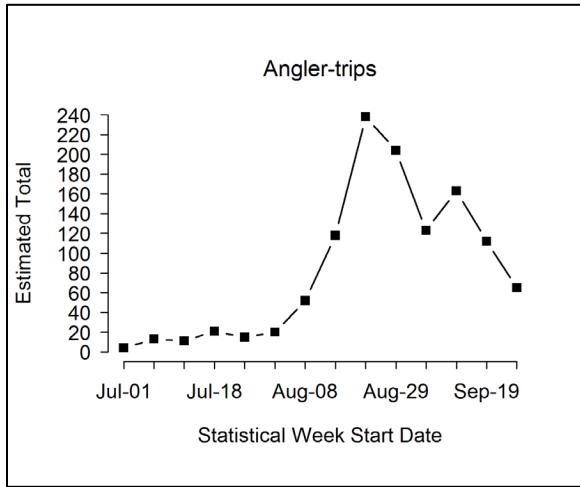


Figure 7.1 Temporal patterns in fishing effort during the 2016 summer Chinook MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

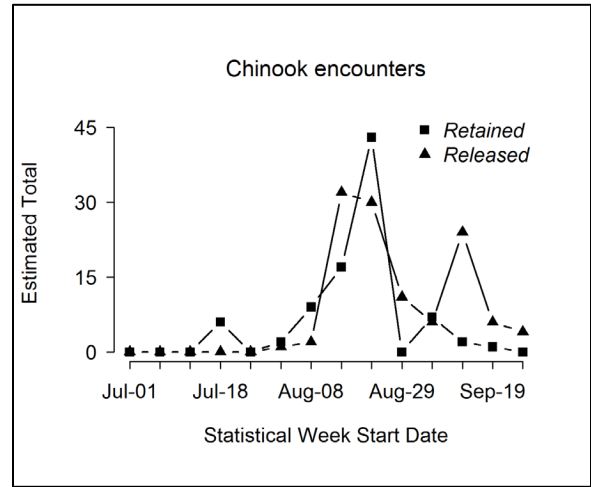


Figure 7.3 Temporal patterns in Chinook encounters (retained and released) during the 2016 summer Chinook MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

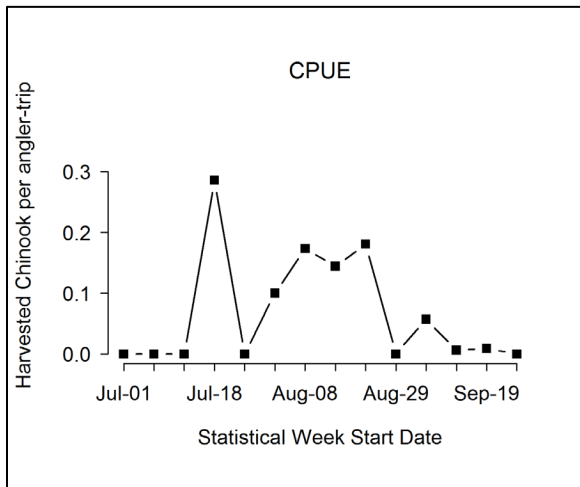


Figure 7.2 Temporal patterns in CPUE (landed Chinook per angler trip) during the 2016 summer Chinook MSF in Marine Area 12. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

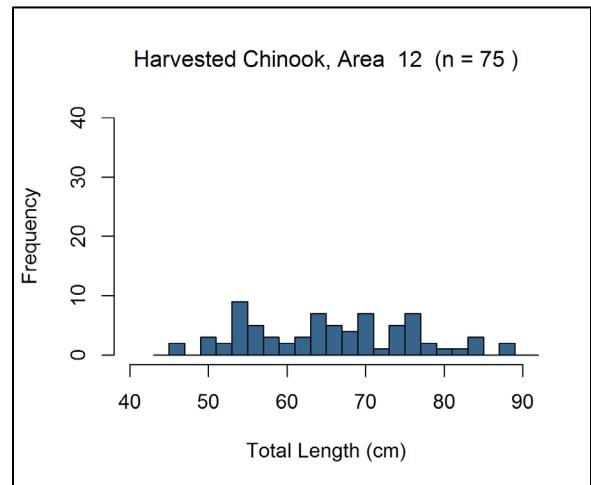


Figure 7.4 Length-frequency distributions of retained marked Chinook sampled in dockside angler interviews during the 2016 summer Chinook MSF in Marine Area 12.

Table 7.3 Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2016 summer Chinook MSF in Marine Area 12.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	54	21	75
Unmarked	0	2	2
Total	54	23	77

Table 7.4 List of sites sampled with the number of sampling events (site-days) during the 2016 summer Chinook MSF in Marine Area 12.

Location Name	Number of Site Days Sampled Per Month			Total Site-Days	% of Total
	July	August	September		
Big Beef Beach	0	0	2	2	1.24%
General - Area 12	0	1	0	1	0.62%
Hood Canal Marina (Union)	0	0	2	2	1.24%
Hoodsport Shore	2	1	0	3	1.86%
Lilliwaup Beach Launch	0	1	0	1	0.62%
Misery Point Ramp	0	7	12	19	11.80%
Pleasant Harbor Boat Ramp (WDFW)	0	1	9	10	6.21%
Pleasant Harbor Marina	0	0	2	2	1.24%
Quilcene Bay Ramp	0	10	15	25	15.53%
Skokomish Ramp	9	21	23	53	32.92%
Skokomish Tide Flats	0	1	0	1	0.62%
Summertide Resort	1	1	0	2	1.24%
Tahuya Ramp	3	5	2	10	6.21%
Triton Cove State Park	0	1	2	3	1.86%
Twanoh State Park	0	1	6	7	4.35%
Union Ramp	1	6	13	20	12.42%
Grand Total	16	57	88	161	1

Table 7.5 Total Chinook encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2016 summer 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	2 1-trip VTRs, 3 Angler Trips	1	0	0	4	5	0.20	1.00
Size/mark-status composition:		0.20	0.00	0.00	0.80			
Variance:		(0.0400)	(0.0000)	(0.0000)	(0.0400)			

Table 7.6 Summary of coded-wire tags recovered from Chinook salmon harvested during the 2016 summer Chinook MSF in Marine Area 12. The field “Number DITs” corresponds to the number of recovered CWTs that belonged to double-index tag

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	SJDF (16.7%)	Elwha R 18.0272	Elwha Hatchery	1 (16.7%)	0
	Hood Canal (83.3%)	Finch Cr 16.0222	Hoodsport Hatchery	4 (66.7%)	0
		Purdy Cr 16.0005	George Adams Hatchery	1 (16.7%)	0
Total				6	0

8) Marine Area 13 Summer Mark-Selective Chinook Fishery

The Washington Department of Fish and Wildlife (WDFW) implemented a tenth consecutive summer Chinook MSF in Marine Area 13 from June 24 through September 30, 2016. WDFW's Puget Sound Sampling Unit (PSSU) implemented a "Baseline Sampling" program (see WDFW 2012a for details) consisting of dockside angler interviews with catch sampling along with efforts to distribute and collect voluntary trip reports (VTRs) from the angling public.

Unlike the other survey designs, Baseline Sampling does not provide a means for generating in-season or immediate post-season estimates of fishery total catch and effort. These estimates will be available approximately one year after the close of the fishery through the WDFW Catch Record Card (CRC) program. Once available, CRC-based catch estimates will be used to generate estimates of total Chinook encounters and mortalities by size and mark-status using the methods provided in WDFW & NWIFC (2013). Thus, while these descriptors of MSF impacts are not presented in the present document, they will be available at a future time.

Table 8.1 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 13 summer Chinook MSF, including relative catch and effort patterns over the course of the season based on the assumption that baseline-sampling observations of these parameters are good indicators of associated fishery-wide trends.

Table 8.1 Sampling/estimation details on target parameters associated with the overall Area 13 mark-selective fishery monitoring program.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Angler Interviews (Baseline Sampling)	Observed (in-sample) fishing effort (boat & angler trips); kept and released fish.	Catch rates (CPUE); length, age, and CWT composition of harvest ¹ ; collection of angler fishing methods.	Angler trip; kept fish; reported fish release	Week	Observed catch per angler trip and species composition data obtained from baseline sampling will ultimately be combined with Catch Record Card (CRC) data to produce fishery-total estimates at a later time (approximately one year following the fishery).
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	When CRC-based retained Chinook estimates become available VTR data may be used in the estimation of total Chinook encounters by size/mark group (LM = 57%, LU = 11%, SM = 28%, SU = 4%; Table 8.5), along with associated impacts, using the methods described in WDFW & NWIFC (2013). [GTJ(12)]
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	Will be estimated at a later date using the CRC-based retained Chinook estimate, when it becomes available.
Coded-wire tag (CWT) Impacts Estimation	Marked/unmarked double-index tag (DIT) encounters and mortalities	N/A	N/A	Season	Will be estimated at a later date using the CRC-based retained Chinook estimate, when it becomes available. The temporal resolution of DIT impacts is constrained by the total number of tags recovered.

Table 8.2 Observations of fishing effort, salmon harvest, and reported salmon releases, by week, for the 2016 summer 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.

Month	Stat Week	Effort		Retained Fish					Released Fish					
		Boat s	Anglers	Chinook		Coho			Chinook			Coho		
				AD	UM	AD	UM	UD	AD	UM	UK	AD	UM	UK
Jun	26	3	3	1	0	0	0	0	0	0	1	1	0	0
Jul	27	7	13	0	0	0	0	0	0	1	0	0	0	0
	28	31	57	1	0	0	0	0	0	1	0	0	0	0
	29	30	61	1	0	0	0	0	3	0	0	0	1	0
	30	43	72	3	0	0	0	0	2	0	0	2	0	0
Aug	31	54	107	4	0	0	0	0	5	2	0	2	0	1
	32	75	130	17	0	0	0	0	4	4	1	1	0	0
	33	125	218	53	0	0	0	0	14	6	3	2	0	2
	34	142	255	60	0	0	0	0	15	5	3	0	0	0
Sept	35	148	286	65	0	1	0	0	17	3	4	3	1	0
	36	82	141	33	0	2	0	0	9	7	1	5	1	0
	37	1	2	0	0	0	0	0	1	0	0	0	0	0
	38	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Observed:		741	1345	238	0	3	0	0	70	29	13	16	3	3

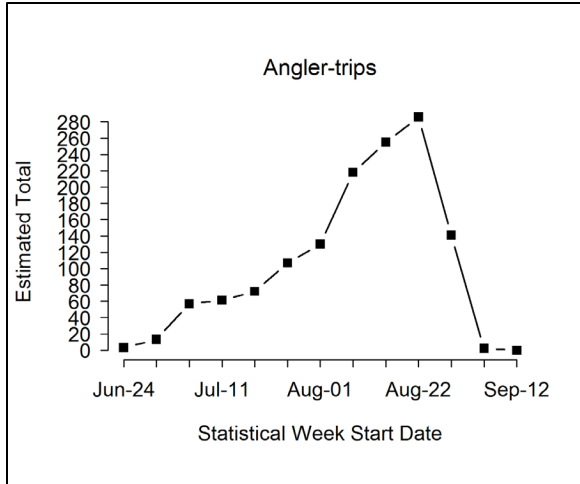


Figure 8.1 Temporal patterns in fishing effort during the 2016 summer Chinook MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

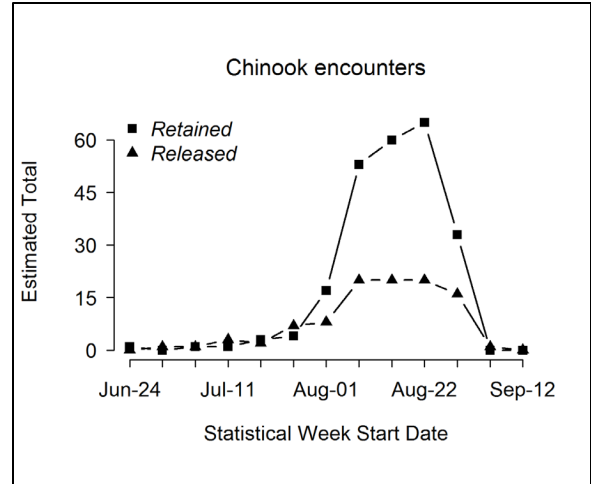


Figure 8.3 Temporal patterns in Chinook encounters (retained and released) during the 2016 summer Chinook MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

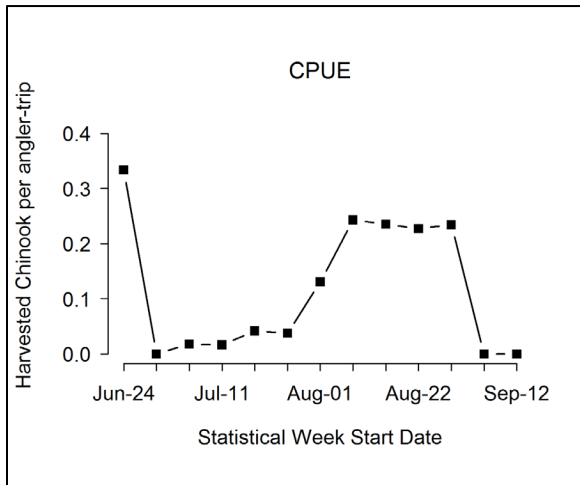


Figure 8.2 Temporal patterns in CPUE (landed Chinook per angler trip) during the 2016 summer Chinook MSF in Marine Area 13. Note: displayed values are sample observations (summed across sampled sites) and not fishery-total estimates.

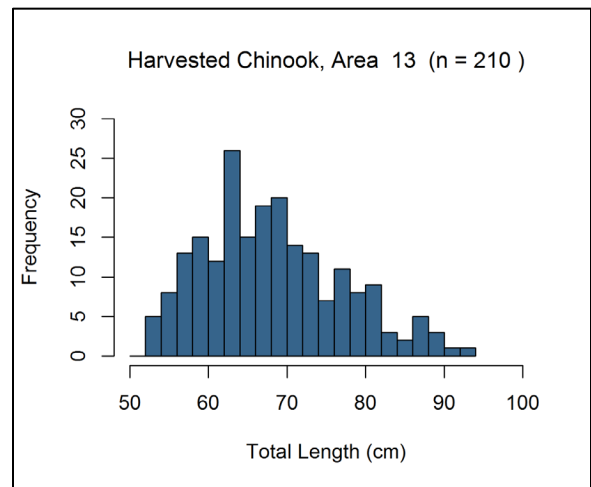


Figure 8.4 Length-frequency distributions of retained marked Chinook sampled in dockside angler interviews during the 2016 summer Chinook MSF in Marine Area 13.

Table 8.3 Summary of total length samples from retained Chinook salmon collected during dockside angler interviews in the 2016 summer Chinook MSF in Marine Area 13.

Mark Type	Number Sampled		
	Legal-size	Sublegal-size	Total
Marked	197	13	210
Unmarked	0	0	0
Total	197	13	210

Table 8.4 Summary of coded-wire tags recovered from Chinook salmon harvested during the 2016 summer Chinook MSF in Marine Area 13. The field “Number DITs” corresponds to the number of tags that belonged to double-index tag groups

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	No. DITs
WA	Mid Puget Sound (28.6%)	Big Soos Cr 09.0072	Soos Creek Hatchery	1 (14.3%)	0
	Mid Puget Sound (28.6%)	Voight Cr 10.0414	Voights Cr Hatchery	1 (14.3%)	0
	S Puget Sound (57.1%)	Clear Cr 11.0013C	Clear Creek Hatchery	4 (57.1%)	4
Col Riv	Lower Columbia River (14.3%)	Cowlitz R 26.0002	Cowlitz Salmon Hatchery	1 (14.3%)	0
Total				7	4

Table 8.5 Total Chinook encountered (retained and released) by private-boat anglers logging their trips on voluntary trip reports (VTRs) during the 2016 summer 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	23 1-trip VTRs, 39 Angler Trips	26	5	13	2	46	0.85	0.84
Size/mark-status composition:		0.57	0.11	0.28	0.04			
Variance:		(0.0055)	(0.0022)	(0.0045)	(0.0009)			

Table 8.6 List of sites sampled with the number of sampling events (site-days) during the 2016 summer Chinook MSF in Marine Area 13.

Location Name	Number of Site Days Sampled Per Month				Total Site-Days	% of Total
	June	July	August	September		
Boston Harbor Ramp/Marina	1	7	31	0	39	26.00%
Concrete Dock	0	0	0	1	1	0.67%
Fox Island Public Ramp	0	1	0	0	1	0.67%
Hartstene Is. Ramp	0	1	0	0	1	0.67%
Luhr Beach Ramp	0	16	23	0	39	26.00%
Narrows Marina Private	0	7	9	0	16	10.67%
Narrows Park (aka Narrows Properties Park)	0	1	0	0	1	0.67%
Narrows Ramp	0	0	1	0	1	0.67%
Solo Point (Tatsolo Pt-Ft Lewis) Rm	0	9	14	0	23	15.33%
Solo Point Shore	0	2	0	0	2	1.33%
Swan Town/East Bay Marina/Ramp (Oly. Isle)	1	0	0	0	1	0.67%
Zittels Marina	0	17	8	0	25	16.67%
Grand Total	2	61	86	1	150	1

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APPENDICES

Site Weights

Appendix A.1 Size measures by sample date, for sites sampled during dockside creel surveys in the 2016 summer Chinook MSF in Marine Area 5.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
7/1/2016	27	Olsons Ramp (1159)	0.3558	Olsons West Docks (1159)	0.0855
7/2/2016	27	Olsons Ramp (1159)	0.3558	Olsons East Docks (1159)	0.1941
7/7/2016	28	Olsons Ramp (1159)	0.2256	Van Riper's North	0.1334
7/9/2016	28	Olsons Ramp (1159)	0.3558	Olsons East Docks (1159)	0.1941
7/10/2016	28	Olsons East Docks (1159)	0.1941	Curleys Resort	0.0834
7/12/2016	29	Olsons Ramp (1159)	0.2256	Olsons East Docks (1159)	0.2114
7/16/2016	29	Olsons Ramp (1159)	0.3558	Van Riper's South	0.1834
7/17/2016	29	Olsons East Docks (1159)	0.1941	Van Riper's South	0.1834
7/20/2016	30	Olsons Ramp (1159)	0.2256	Olsons West Docks (1159)	0.1495
7/22/2016	30	Olsons East Docks (1159)	0.1941	Olsons West Docks (1159)	0.0855
7/23/2016	30	Olsons Ramp (1159)	0.3558	Olsons East Docks (1159)	0.1941
7/26/2016	31	Olsons East Docks (1159)	0.2419	Van Riper's South	0.2109
7/30/2016	31	Olsons East Docks (1159)	0.1941	Van Riper's North	0.0978
7/31/2016	31	Olsons Ramp (1159)	0.3558	Van Riper's South	0.1834
8/4/2016	32	Olsons East Docks (1159)	0.0887	Olsons West Docks (1159)	0.2728
8/5/2016	32	Olsons Ramp (1159)	0.4112	Van Riper's North	0.1247
8/7/2016	32	Olsons Ramp (1159)	0.4112	Olsons West Docks (1159)	0.1332
8/11/2016	33	Olsons West Docks (1159)	0.2728	Van Riper's North	0.201
8/12/2016	33	Olsons Ramp (1159)	0.4112	Olsons East Docks (1159)	0.075
8/14/2016	33	Olsons Ramp (1159)	0.4112	Olsons East Docks (1159)	0.075

Appendix A.2 Size measures by sample date, for sites sampled during dockside creel surveys in the 2016 summer Chinook MSF in Marine Area 9.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
7/16/2016	29	Norton Street (Everett) Ramp	0.3876	Fort Casey Public Ramp (Keystone)	0.1738
7/17/2016	29	Norton Street (Everett) Ramp	0.3876	Port Townsend Boat Haven Ramp	0.1672
7/19/2016	30	Norton Street (Everett) Ramp	0.3754	Port Townsend Boat Haven Ramp	0.2004
7/20/2016	30	Norton Street (Everett) Ramp	0.3754	Fort Casey Public Ramp (Keystone)	0.1786
7/22/2016	30	Norton Street (Everett) Ramp	0.3876	Fort Casey Public Ramp (Keystone)	0.1738
7/23/2016	30	Norton Street (Everett) Ramp	0.3876	Port Townsend Boat Haven Ramp	0.1672
7/24/2016	30	Norton Street (Everett) Ramp	0.3876	Port Townsend Boat Haven Ramp	0.1672
7/26/2016	31	Norton Street (Everett) Ramp	0.3754	Kingston Public Ramp	0.0964
7/27/2016	31	Norton Street (Everett) Ramp	0.3754	Port Townsend Boat Haven Ramp	0.2004
7/29/2016	31	Norton Street (Everett) Ramp	0.3876	Fort Casey Public Ramp (Keystone)	0.1738
7/30/2016	31	Norton Street (Everett) Ramp	0.3876	Port Townsend Boat Haven Ramp	0.1672
7/31/2016	31	Norton Street (Everett) Ramp	0.3876	Port Townsend Boat Haven Ramp	0.1672
8/1/2016	32	Norton Street (Everett) Ramp	0.3428	Port Townsend Boat Haven Ramp	0.1779
8/3/2016	32	Norton Street (Everett) Ramp	0.3428	Fort Casey Public Ramp (Keystone)	0.1276

Appendix A.3 Size measures by sample date, for sites sampled during dockside creel surveys in the 2016 summer catch and release and Chinook MSF in Marine Area 10.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
6/25/2016	26	Kingston Public Ramp	0.2857	Shilshole Public Ramp	0.5
6/26/2016	26	Kingston Public Ramp	0.2857	Shilshole Public Ramp	0.5714
6/27/2016	27	Kingston Public Ramp	0.2857	Shilshole Public Ramp	0.5714
7/1/2016	27	Shilshole Public Ramp	0.5	Armeni Public Ramp	0.2
7/2/2016	27	Shilshole Public Ramp	0.5	Armeni Public Ramp	0.2
7/7/2016	28	Shilshole Public Ramp	0.5714	Armeni Public Ramp	0.1429
7/9/2016	28	Shilshole Public Ramp	0.5	Armeni Public Ramp	0.2
7/10/2016	28	Armeni Public Ramp	0.2	Shilshole Public Ramp	0.5
7/12/2016	29	Shilshole Public Ramp	0.5714	Kingston Public Ramp	0.2857
7/16/2016	29	Shilshole Public Ramp	0.4433	Armeni Public Ramp	0.2141
7/17/2016	29	Shilshole Public Ramp	0.4433	Armeni Public Ramp	0.2141
7/19/2016	30	Shilshole Public Ramp	0.4899	Armeni Public Ramp	0.1773
7/20/2016	30	Shilshole Public Ramp	0.4899	Armeni Public Ramp	0.1773
7/22/2016	30	Shilshole Public Ramp	0.4433	Armeni Public Ramp	0.2141
7/23/2016	30	Shilshole Public Ramp	0.4433	Armeni Public Ramp	0.2141
7/24/2016	30	Shilshole Public Ramp	0.4433	Armeni Public Ramp	0.2141
7/26/2016	31	Shilshole Public Ramp	0.4899	Kingston Public Ramp	0.1666
7/27/2016	31	Shilshole Public Ramp	0.4899	Armeni Public Ramp	0.1773
7/29/2016	31	Shilshole Public Ramp	0.4433	Kingston Public Ramp	0.1566
7/30/2016	31	Shilshole Public Ramp	0.4433	Armeni Public Ramp	0.2141
7/31/2016	31	Shilshole Public Ramp	0.4433	Armeni Public Ramp	0.2141
8/1/2016	32	Shilshole Public Ramp	0.4726	Kingston Public Ramp	0.1161
8/3/2016	32	Shilshole Public Ramp	0.4726	Armeni Public Ramp	0.2595
8/5/2016	32	Shilshole Public Ramp	0.4014	Kingston Public Ramp	0.1199
8/6/2016	32	Shilshole Public Ramp	0.4014	Armeni Public Ramp	0.2948
8/7/2016	32	Shilshole Public Ramp	0.4014	Armeni Public Ramp	0.2948
8/8/2016	33	Shilshole Public Ramp	0.4726	Kingston Public Ramp	0.1161
8/11/2016	33	Shilshole Public Ramp	0.4726	Armeni Public Ramp	0.2595
8/12/2016	33	Shilshole Public Ramp	0.4014	Armeni Public Ramp	0.2948
8/13/2016	33	Shilshole Public Ramp	0.4014	Armeni Public Ramp	0.2948
8/14/2016	33	Armeni Public Ramp	0.2948	Kingston Public Ramp	0.1199

Appendix A.4 Size measures by sample date, for sites sampled during dockside creel surveys in the 2016 summer catch and release and Chinook MSF in Marine Area 11.

Sample Date	Week	Location #1	Site Size	Location #2	Site Size
6/25/2016	26	Point Defiance Public Ramp	0.4616	Gig Harbor Ramp	0.1294
6/26/2016	26	Point Defiance Public Ramp	0.4616	Armeni Public Ramp	0.0763
6/27/2016	27	Point Defiance Public Ramp	0.3685	Point Defiance Boathouse	0.2028
7/1/2016	27	Point Defiance Public Ramp	0.4657	Gig Harbor Ramp	0.0811
7/2/2016	27	Point Defiance Public Ramp	0.4657	Point Defiance Boathouse	0.1686
7/7/2016	28	Point Defiance Public Ramp	0.5359	Point Defiance Boathouse	0.1417
7/9/2016	28	Point Defiance Public Ramp	0.4657	Point Defiance Boathouse	0.1686
7/10/2016	28	Point Defiance Boathouse	0.1686	Point Defiance Public Ramp	0.4657
7/12/2016	29	Point Defiance Public Ramp	0.5359	Gig Harbor Ramp	0.108
7/16/2016	29	Point Defiance Public Ramp	0.4657	Point Defiance Boathouse	0.1686
7/17/2016	29	Point Defiance Boathouse	0.1686	Point Defiance Public Ramp	0.4657
7/20/2016	30	Point Defiance Public Ramp	0.5359	Gig Harbor Ramp	0.108
7/22/2016	30	Point Defiance Boathouse	0.1686	Point Defiance Public Ramp	0.4657
7/23/2016	30	Point Defiance Public Ramp	0.4657	Point Defiance Boathouse	0.1686
7/26/2016	31	Point Defiance Public Ramp	0.5359	Point Defiance Boathouse	0.1417
7/30/2016	31	Point Defiance Public Ramp	0.4657	Armeni Public Ramp	0.0539
7/31/2016	31	Point Defiance Public Ramp	0.4657	Point Defiance Boathouse	0.1686
8/4/2016	32	Point Defiance Public Ramp	0.4262	Gig Harbor Ramp	0.1025
8/5/2016	32	Point Defiance Public Ramp	0.4817	Gig Harbor Ramp	0.0881
8/7/2016	32	Point Defiance Public Ramp	0.4817	Point Defiance Boathouse	0.108
8/11/2016	33	Point Defiance Public Ramp	0.4262	Gig Harbor Ramp	0.1025
8/12/2016	33	Point Defiance Public Ramp	0.4817	Point Defiance Boathouse	0.108
8/14/2016	33	Point Defiance Public Ramp	0.4817	Point Defiance Boathouse	0.108
8/16/2016	34	Point Defiance Public Ramp	0.4262	Point Defiance Boathouse	0.1598
8/19/2016	34	Point Defiance Public Ramp	0.4817	Redondo Ramp	0.2573
8/20/2016	34	Point Defiance Public Ramp	0.4817	Point Defiance Boathouse	0.108

CWT Recoveries

Appendix B.1 Coded-wire tag (CWT) recoveries in the 2016 summer 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	1-Jul-16	181465	2012	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		73	80250	AD Fin Clp
5	2-Jul-16	636489	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		72	96507	AD Fin Clp
5	2-Jul-16	60593	2013	SAN FRANCISCO MAJ.PT	MOK R FISH INS	CDFW		65	96508	AD Fin Clp
5	2-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	58	79925	AD Fin Clp
5	2-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	60	80061	AD Fin Clp
5	2-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		57	80249	AD Fin Clp
5	3-Jul-16	92353	2011	N FK RESERV (CLACKAM	CLACKAMAS HATCHERY	ODFW		70	79561	AD Fin Clp
5	3-Jul-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	65	80248	AD Fin Clp
5	8-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	66	96506	AD Fin Clp
5	8-Jul-16	636646	2013	WASHOUGAL R 28.0159	WASHOUGAL HATCHERY	WDFW		66	79574	AD Fin Clp
5	9-Jul-16	211048	2012	COUNTY LINE CR3.2363	MARBLEMOUNT HATCHERY	WDFW		75	79586	AD Fin Clp
5	9-Jul-16	211039	2012	PALMER HATCHERY	KETA CREEK COMPLEX	MUCK		74	79924	AD Fin Clp
5	10-Jul-16	211061	2012	TULALIP CR 07.0001	BERNIE GOBIN HATCH	TULA	211060	82	79918	AD Fin Clp
5	10-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		65	80247	AD Fin Clp
5	11-Jul-16	636505	2012	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		78	80011	AD Fin Clp
5	12-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		53	79563	AD Fin Clp
5	12-Jul-16	636498	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		65	79564	AD Fin Clp
5	12-Jul-16	183287	2014	R-Cowichan R	H-Cowichan River H	CDFO		39	80062	AD Fin Clp
5	12-Jul-16	211051	2012	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636286	74	80246	AD Fin Clp
5	13-Jul-16	90855	2013	BULL RUN R	SANDY HATCHERY	ODFW		52	96505	AD Fin Clp
5	13-Jul-16	636298	2012	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636297	55	79565	AD Fin Clp
5	13-Jul-16	220142	2012	BIG CANYON ACCL POND	LYONS FERRY HATCHERY	NEZP		77	79919	AD Fin Clp
5	16-Jul-16	211137	2014	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636816	54	80063	AD Fin Clp
5	16-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		53	80064	AD Fin Clp
5	17-Jul-16	90740	2012	YOUNGS R & BAY	CEDC YOUNGS BAY NET	ODFW		75	96504	AD Fin Clp
5	17-Jul-16	636827	2014	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW	636828	50	79945	AD Fin Clp
5	17-Jul-16	211048	2012	COUNTY LINE CR3.2363	MARBLEMOUNT HATCHERY	WDFW		87	79950	AD Fin Clp
5	17-Jul-16	182490	2012	R-Harrison R	H-Chehalis River H	CDFO		53	80065	AD Fin Clp
5	18-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		65	79570	AD Fin Clp
5	19-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		65	79573	AD Fin Clp
5	20-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		72	79571	AD Fin Clp
5	20-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		65	79572	AD Fin Clp
5	20-Jul-16	211090	2013	WHITEHORSE SPRINGS	WHITEHORSE POND	STIL		73	79587	AD Fin Clp
5	20-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	63	80066	AD Fin Clp
5	21-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		71	80067	AD Fin Clp
5	21-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		55	80068	AD Fin Clp
5	22-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		62	79589	AD Fin Clp
5	22-Jul-16	636580	2012	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		74	80069	AD Fin Clp

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5	23-Jul-16	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	62	96560	AD Fin Clp
5	23-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		61	96561	AD Fin Clp
5	23-Jul-16	636365	2012	FRIDAY CR 03.0017	SAMISH HATCHERY	WDFW	636486	73	79590	AD Fin Clp
5	23-Jul-16	220236	2013	LUKE'S GULCH A F	NPT HATCHERY	NEZP		55	79946	AD Fin Clp
5	23-Jul-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	62	80070	AD Fin Clp
5	23-Jul-16	200110	2013	CHIEF JOSEPH HATCHERY	CHIEF JOSEPH HATCHERY	COLV		49	80071	AD Fin Clp
5	23-Jul-16	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	63	80073	AD Fin Clp
5	23-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		76	80074	AD Fin Clp
5	23-Jul-16	636498	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		59	80075	AD Fin Clp
5	23-Jul-16	636495	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636496	54	80076	AD Fin Clp
5	24-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		59	96559	AD Fin Clp
5	26-Jul-16	181972	2012	R-Chilliwack R	H-Chilliwack River H	CDFO		85	96562	AD Fin Clp
5	26-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		63	80015	AD Fin Clp
5	26-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		70	80077	AD Fin Clp
5	26-Jul-16	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	60	80100	AD Fin Clp
5	27-Jul-16	211051	2012	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636286	80	96563	AD Fin Clp
5	27-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		75	96564	AD Fin Clp
5	27-Jul-16	210623	2012	HOKO R 19.0148	HOKO FALLS HATCHERY	MAKA		86	96565	AD Fin Clp
5	27-Jul-16	211089	2013	HOKO R 19.0148	HOKO FALLS HATCHERY	MAKA		68	96566	AD Fin Clp
5	28-Jul-16	55480	2012	TSOO-YESS R 20.0015	MAKAH NFH ON TSOO-YESS R	FWS		79	96509	AD Fin Clp
5	28-Jul-16	636814	2014	KENDALL CR 01.0406	KENDALL CR HATCHERY	WDFW		49	96552	AD Fin Clp
5	28-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	64	96557	AD Fin Clp
5	28-Jul-16	211051	2012	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636286	76	80079	AD Fin Clp
5	28-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		66	80080	AD Fin Clp
5	29-Jul-16	211089	2013	HOKO R 19.0148	HOKO FALLS HATCHERY	MAKA		64	96510	AD Fin Clp
5	29-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	66	96511	AD Fin Clp
5	29-Jul-16	211051	2012	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636286	78	96555	AD Fin Clp
5	29-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		56	96558	AD Fin Clp
5	29-Jul-16	71250	2013	KLASKANINE R N FK	KLASKANINE HATCHERY	ODFW		61	79555	AD Fin Clp
5	29-Jul-16	90712	2013	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90449	75	80012	AD Fin Clp
5	29-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	64	80014	AD Fin Clp
5	29-Jul-16	636267	2012	COWLITZ R 26.0002	COWLITZ SALMON HATCHERY	WDFW		64	80081	AD Fin Clp
5	30-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		58	79814	AD Fin Clp
5	30-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		66	79832	AD Fin Clp
5	31-Jul-16	211067	2012	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		73	96512	AD Fin Clp
5	31-Jul-16	60565	2013	WICKLAND OIL NET PEN	FEATHER R HATCHERY	CDFW		70	96513	AD Fin Clp
5	31-Jul-16	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	54	79815	AD Fin Clp
5	31-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		56	79951	AD Fin Clp
5	31-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		66	80368	AD Fin Clp
5	3-Aug-16	210487	2012	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636288	72	79553	AD Fin Clp
5	3-Aug-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	57	79554	AD Fin Clp
5	3-Aug-16	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	65	79820	AD Fin Clp

5	3-Aug-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		66	79952	AD Fin Clp
5	3-Aug-16	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	59	79953	AD Fin Clp
5	4-Aug-16	636749	2013	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		68	79817	AD Fin Clp
5	6-Aug-16	211054	2012	WHITE R 10.0031	WHITE RIVER HATCHERY	MUCK		65	79955	AD Fin Clp
5	6-Aug-16	182892	2012	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		78	79957	AD Fin Clp
5	6-Aug-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		65	80000	AD Fin Clp
5	10-Aug-16	636489	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		82	79958	AD Fin Clp
5	10-Aug-16	210487	2012	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636288	57	79959	AD Fin Clp
5	11-Aug-16	636574	2012	LYONS FERRY REL.SITE	LYONS FERRY HATCHERY	WDFW		81	79960	AD Fin Clp
5	11-Aug-16	183485	2014	R-Cowichan R	H-Cowichan River H	CDFO		52	79961	AD Fin Clp
5	12-Aug-16	60661	2014	MOSS LANDING MIN. PT	MOK R FISH INS	CDFW		52	96681	AD Fin Clp
5	12-Aug-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		57	79551	AD Fin Clp
5	12-Aug-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	77	79552	AD Fin Clp
5	12-Aug-16	183281	2014	R-Cowichan R	H-Cowichan River H	CDFO		52	79962	AD Fin Clp
5	12-Aug-16	211089	2013	HOKO R 19.0148	HOKO FALLS HATCHERY	MAKA		61	79963	AD Fin Clp
5	12-Aug-16	636894	2014	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		55	79964	AD Fin Clp
5	13-Aug-16	211137	2014	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636816	55	79965	AD Fin Clp
5	13-Aug-16	181971	2012	R-Chilliwack R	H-Chilliwack River H	CDFO		91	79966	AD Fin Clp
5	13-Aug-16	636642	2013	COWLITZ R 26.0002	COWLITZ SALMON HATCHERY	WDFW		56	79967	AD Fin Clp
5	13-Aug-16	210623	2012	HOKO R 19.0148	HOKO FALLS HATCHERY	MAKA		84	79968	AD Fin Clp
5	14-Aug-16	211137	2014	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636816	54	96683	AD Fin Clp
5	14-Aug-16	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	74	79816	AD Fin Clp
5	14-Aug-16	55686	2013	SPRING CR 29.0159	SPRING CR NFH	FWS	55687	78	79969	AD Fin Clp
5	14-Aug-16	211089	2013	HOKO R 19.0148	HOKO FALLS HATCHERY	MAKA		60	79970	AD Fin Clp
5	14-Aug-16	211089	2013	HOKO R 19.0148	HOKO FALLS HATCHERY	MAKA		67	79971	AD Fin Clp

Appendix B.2 Coded-wire tag (CWT) recoveries in the 2016 summer 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	1-Jul-16	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	82	96740	AD Fin Clp
6	1-Jul-16	636497	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		65	79584	AD Fin Clp
6	1-Jul-16	636580	2012	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		57	79714	AD Fin Clp
6	2-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		63	96724	AD Fin Clp
6	2-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		61	96728	AD Fin Clp
6	2-Jul-16	636292	2012	ELWHA R 18.0272	ELWHA HATCHERY	WDFW		89	96819	AD Fin Clp
6	2-Jul-16	636364	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636299	60	79190	AD Fin Clp
6	2-Jul-16	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	82	79191	AD Fin Clp
6	2-Jul-16	211051	2012	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636286	75	79193	AD Fin Clp

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6	2-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		58	79194	AD Fin Clp
6	2-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		58	79580	AD Fin Clp
6	2-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	66	79581	AD Fin Clp
6	2-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		64	79582	AD Fin Clp
6	2-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		57	79583	AD Fin Clp
6	2-Jul-16	211104	2013	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		62	79761	AD Fin Clp
6	3-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	70	96721	AD Fin Clp
6	3-Jul-16	636292	2012	ELWHA R 18.0272	ELWHA HATCHERY	WDFW		71	96723	AD Fin Clp
6	3-Jul-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	64	79759	AD Fin Clp
6	3-Jul-16	211019	2011	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		70	79762	AD Fin Clp
6	7-Jul-16	636477	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		69	96731	AD Fin Clp
6	7-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		75	79715	AD Fin Clp
6	7-Jul-16	211090	2013	WHITEHORSE SPRINGS	WHITEHORSE POND	STIL		60	79716	AD Fin Clp
6	8-Jul-16	636285	2012	MINTER CR 15.0048	HUPP SPRINGS REARING	WDFW		67	96703	AD Fin Clp
6	8-Jul-16	182499	2012	R-Big Qualicum R	H-Big Qualicum River H	CDFO		79	96704	AD Fin Clp
6	8-Jul-16	211088	2013	CO LINE PD2 03.1853B	MARBLEMOUNT HATCHERY	WDFW		64	79771	AD Fin Clp
6	9-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		56	79196	AD Fin Clp
6	9-Jul-16	211101	2013	TULALIP CR 07.0001	BERNIE GOBIN HATCH	TULA	211099	58	79197	AD Fin Clp
6	9-Jul-16	636489	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		82	79198	AD Fin Clp
6	10-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	60	79199	AD Fin Clp
6	10-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		65	79718	AD Fin Clp
6	11-Jul-16	635589	2010	ICY CR 09.0125	ICY CR HATCHERY	WDFW		56	96601	AD Fin Clp
6	11-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	57	96602	AD Fin Clp
6	11-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		52	79200	AD Fin Clp
6	12-Jul-16	211104	2013	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		56	96603	AD Fin Clp
6	13-Jul-16	211134	2014	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636815	54	79717	AD Fin Clp
6	13-Jul-16	55433	2013	SPRING CR 29.0159	SPRING CR NFH	FWS	55529	73	79764	AD Fin Clp
6	14-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		58	79721	AD Fin Clp
6	17-Jul-16	211104	2013	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		53	96604	AD Fin Clp
6	17-Jul-16	636365	2012	FRIDAY CR 03.0017	SAMISH HATCHERY	WDFW	636486	72	96605	AD Fin Clp
6	19-Jul-16	211051	2012	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636286	75	96606	AD Fin Clp
6	21-Jul-16	211048	2012	COUNTY LINE CR3.2363	MARBLEMOUNT HATCHERY	WDFW		83	79719	AD Fin Clp
6	24-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	71	79722	AD Fin Clp
6	29-Jul-16	211088	2013	CO LINE PD2 03.1853B	MARBLEMOUNT HATCHERY	WDFW		65	96608	AD Fin Clp
6	29-Jul-16	211051	2012	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636286	70	96679	AD Fin Clp
6	29-Jul-16	636749	2013	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		76	96680	AD Fin Clp
6	31-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	78	96737	AD Fin Clp
6	4-Aug-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		57	79723	AD Fin Clp
6	4-Aug-16	211047	2012	HOKO R 19.0148	HOKO FALLS HATCHERY	MAKA		80	79725	AD Fin Clp
6	5-Aug-16	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	64	96736	AD Fin Clp
6	6-Aug-16	183368	2013	R-Cowichan R	H-Cowichan River H	CDFO		53	96628	AD Fin Clp
6	6-Aug-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		73	79724	AD Fin Clp
6	6-Aug-16	636489	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		79	79726	AD Fin Clp

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6	6-Aug-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	64	79727	AD Fin Clp
6	8-Aug-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		75	96643	AD Fin Clp
6	10-Aug-16	182497	2012	R-Big Qualicum R	H-Big Qualicum River H	CDFO		87	96644	AD Fin Clp
6	10-Aug-16	211089	2013	HOKO R 19.0148	HOKO FALLS HATCHERY	MAKA		74	96648	AD Fin Clp
6	11-Aug-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		73	79750	AD Fin Clp
6	12-Aug-16	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	64	96645	AD Fin Clp
6	13-Aug-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		66	96641	AD Fin Clp
6	14-Aug-16	211104	2013	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		62	74187	AD Fin Clp
6	14-Aug-16	211134	2014	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636815	59	79566	AD Fin Clp

Appendix B.3 Coded-wire tag (CWT) recoveries in the 2016 summer 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	1-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	63	43165	AD Fin Clp
7	1-Jul-16	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		69	84651	AD Fin Clp
7	2-Jul-16	636894	2014	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		55	97501	AD Fin Clp
7	2-Jul-16	636365	2012	FRIDAY CR 03.0017	SAMISH HATCHERY	WDFW	636486	82	42909	AD Fin Clp
7	2-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW			84751	AD Fin Clp
7	7-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		54	42910	AD Fin Clp
7	7-Jul-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	75	84652	AD Fin Clp
7	8-Jul-16	182973	2013	R-Chilliwack R	H-Chilliwack River H	CDFO		65	42911	AD Fin Clp
7	8-Jul-16	636477	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		71	84654	AD Fin Clp
7	8-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	61	84805	AD Fin Clp
7	9-Jul-16	636497	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		67	62110	AD Fin Clp
7	9-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	63	62124	AD Fin Clp
7	9-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	53	62125	AD Fin Clp
7	9-Jul-16	636495	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636496	63	62126	AD Fin Clp
7	9-Jul-16	211039	2012	PALMER HATCHERY	KETA CREEK COMPLEX	MUCK		77	62486	AD Fin Clp
7	10-Jul-16	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	70	62487	AD Fin Clp
7	12-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		65	84752	AD Fin Clp
7	16-Jul-16	636495	2013	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW	636496	58	84551	AD Fin Clp
7	16-Jul-16	211061	2012	TULALIP CR 07.0001	BERNIE GOBIN HATCH	TULA	211060	58	84552	AD Fin Clp
7	17-Jul-16	636661	2013	FRIDAY CR 03.0017	SAMISH HATCHERY	WDFW	636662	71	84754	AD Fin Clp
7	27-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		69	84802	AD Fin Clp

Appendix B.4 Coded-wire tag (CWT) recoveries in the 2016 summer 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	16-Jul-16	636580	2012	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		71	74183	AD Fin Clp
9	16-Jul-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	70	74192	AD Fin Clp
9	16-Jul-16	211051	2012	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636286	88	80759	AD Fin Clp
9	16-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		60	80760	AD Fin Clp
9	16-Jul-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	59	80761	AD Fin Clp
9	16-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		66	80881	AD Fin Clp
9	16-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		72	81211	AD Fin Clp
9	16-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		60	81213	AD Fin Clp
9	17-Jul-16	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	72	77251	AD Fin Clp
9	17-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		55	80732	AD Fin Clp
9	17-Jul-16	183864	2014	R-Chilliwack R	H-Chilliwack River H	CDFO		58	80733	AD Fin Clp
9	17-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		62	80762	AD Fin Clp
9	17-Jul-16	211104	2013	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		67	80763	AD Fin Clp
9	17-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		67	80764	AD Fin Clp
9	17-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		63	80967	AD Fin Clp
9	17-Jul-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	65	81063	AD Fin Clp
9	17-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		66	81193	AD Fin Clp
9	19-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		67	74186	AD Fin Clp
9	19-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	80	80765	AD Fin Clp
9	19-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		60	80766	AD Fin Clp
9	20-Jul-16	636197	2011	VOIGHT CR 10.0414	VOIGHTS CR HATCHERY	WDFW		84	80767	AD Fin Clp
9	20-Jul-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	57	81080	AD Fin Clp
9	21-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	62	81194	AD Fin Clp
9	22-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		80	74189	AD Fin Clp
9	22-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		62	77642	AD Fin Clp
9	22-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	61	80835	AD Fin Clp
9	23-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		63	74175	AD Fin Clp
9	23-Jul-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	75	80768	AD Fin Clp
9	23-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	65	80769	AD Fin Clp
9	23-Jul-16	636822	2014	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW		43	81065	AD Fin Clp
9	24-Jul-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	59	79895	AD Fin Clp
9	24-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	56	81071	AD Fin Clp
9	24-Jul-16	211137	2014	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636816	52	81083	AD Fin Clp
9	26-Jul-16	635672	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		76	80770	AD Fin Clp
9	28-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	64	96640	AD Fin Clp
9	29-Jul-16	211004	2011	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636091	74	77300	AD Fin Clp
9	29-Jul-16	636299	2012	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636364	70	80734	AD Fin Clp
9	29-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		55	80836	AD Fin Clp
9	29-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	69	81084	AD Fin Clp
9	30-Jul-16	210487	2012	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636288	70	74172	AD Fin Clp

9	30-Jul-16	636667	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		61	74173	AD Fin Clp
9	30-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		62	74184	AD Fin Clp
9	30-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		57	80771	AD Fin Clp
9	30-Jul-16	636644	2013	ICY CR 09.0125	ICY CR HATCHERY	WDFW		71	80772	AD Fin Clp
9	30-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	63	80837	AD Fin Clp
9	31-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		67	96639	AD Fin Clp
9	31-Jul-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	61	74176	AD Fin Clp
9	31-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		65	74182	AD Fin Clp
9	31-Jul-16	55706	2013	SAN PABLO BAY NET PENS	COLEMAN NFH	FWS		56	81072	AD Fin Clp
9	31-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		61	81172	AD Fin Clp
9	1-Aug-16	636644	2013	ICY CR 09.0125	ICY CR HATCHERY	WDFW		67	80970	AD Fin Clp
9	4-Aug-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		57	77232	AD Fin Clp
9	4-Aug-16	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	65	81175	AD Fin Clp

Appendix B.5 Coded-wire tag (CWT) recoveries in the 2016 summer 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	16-Jul-16	636644	2013	ICY CR 09.0125	ICY CR HATCHERY	WDFW		51	81151	AD Fin Clp
10	16-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		54	81171	AD Fin Clp
10	16-Jul-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	63	81212	AD Fin Clp
10	17-Jul-16	211137	2014	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636816	54	81153	AD Fin Clp
10	22-Jul-16	636497	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		55	72294	AD Fin Clp
10	26-Jul-16	636810	2014	MINTER CR 15.0048	MINTER CR HATCHERY	WDFW		58	72295	AD Fin Clp
10	29-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		52	80968	AD Fin Clp
10	30-Jul-16	636644	2013	ICY CR 09.0125	ICY CR HATCHERY	WDFW		57	81195	AD Fin Clp
10	31-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		62	80969	AD Fin Clp
10	3-Aug-16	636197	2011	VOIGHT CR 10.0414	VOIGHTS CR HATCHERY	WDFW		83	72296	AD Fin Clp
10	3-Aug-16	636498	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		53	81196	AD Fin Clp
10	4-Aug-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	72	81174	AD Fin Clp
10	6-Aug-16	182784	2013	R-Harrison R	H-Chehalis River H	CDFO		78	80736	AD Fin Clp
10	8-Aug-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		63	81197	AD Fin Clp
10	13-Aug-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		60	81177	AD Fin Clp
10	13-Aug-16	636497	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		59	81178	AD Fin Clp
10	14-Aug-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	66	81101	AD Fin Clp
10	14-Aug-16	211134	2014	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636815	53	81102	AD Fin Clp

Appendix B.6 Coded-wire tag (CWT) recoveries in the 2016 summer 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	24-Jun-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		60	87756	AD Fin Clp
11	25-Jun-16	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	67	87754	AD Fin Clp
11	26-Jun-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		60	62647	AD Fin Clp
11	26-Jun-16	211104	2013	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		60	70847	AD Fin Clp
11	27-Jun-16	636498	2013	MINTER CR TR 15.0051	HUPP SPRINGS REARING	WDFW		72	87516	AD Fin Clp
11	29-Jun-16	636644	2013	ICY CR 09.0125	ICY CR HATCHERY	WDFW		59	51926	AD Fin Clp
11	30-Jun-16	636669	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW	636670	70	87751	AD Fin Clp
11	30-Jun-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		63	87752	AD Fin Clp
11	1-Jul-16	636644	2013	ICY CR 09.0125	ICY CR HATCHERY	WDFW		64	85173	AD Fin Clp
11	1-Jul-16	636659	2013	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW	636660	67	87758	AD Fin Clp
11	11-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		68	87759	AD Fin Clp
11	11-Jul-16	211090	2013	WHITEHORSE SPRINGS	WHITEHORSE POND	STIL		69	87760	AD Fin Clp
11	15-Jul-16	636636	2013	WALLACE R 07.0940	WALLACE R HATCHERY	WDFW		69	87761	AD Fin Clp
11	15-Jul-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		67	87762	AD Fin Clp
11	15-Jul-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		67	87763	AD Fin Clp
11	15-Jul-16	210487	2012	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636288	63	87767	AD Fin Clp
11	20-Jul-16	636644	2013	ICY CR 09.0125	ICY CR HATCHERY	WDFW		57	70848	AD Fin Clp
11	5-Aug-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	54	87764	AD Fin Clp
11	6-Aug-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	54	87765	AD Fin Clp
11	6-Aug-16	211092	2013	GROVERS CR 15.0299	GROVERS CR HATCHERY	SUQ	636493	65	87766	AD Fin Clp
11	7-Aug-16	636642	2013	COWLITZ R 26.0002	COWLITZ SALMON HATCHERY	WDFW		73	85308	AD Fin Clp
11	12-Aug-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	62	70850	AD Fin Clp
11	12-Aug-16	636817	2014	CASCADE R 03.1411	MARBLEMOUNT HATCHERY	WDFW		54	85174	AD Fin Clp
11	13-Aug-16	636811	2014	VOIGHT CR 10.0414	VOIGHTS CR HATCHERY	WDFW		53	70857	AD Fin Clp
11	13-Aug-16	211137	2014	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636816	61	87514	AD Fin Clp

Appendix B.7 Coded-wire tag (CWT) recoveries in the 2016 summer 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	15-Aug-16	636813	2014	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		49	87960	AD Fin Clp
12	25-Aug-16	636674	2013	PURDY CR 16.0005	GEORGE ADAMS HATCHERY	WDFW		65	85306	AD Fin Clp
12	26-Aug-16	636489	2012	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		80	87965	AD Fin Clp
12	6-Sep-16	636813	2014	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		44	87552	AD Fin Clp
12	18-Sep-16	636812	2014	ELWHA R 18.0272	ELWHA HATCHERY	WDFW		39	85179	Unmarked
12	25-Sep-16	636635	2013	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		56	85030	AD Fin Clp

Appendix B.8 Coded-wire tag (CWT) recoveries in the 2016 summer Chinook MSF in Marine Area 13.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
13	23-Jul-16	636822	2014	BIG SOOS CR 09.0072	SOOS CREEK HATCHERY	WDFW		64	62808	AD Fin Clp
13	29-Jul-16	636811	2014	VOIGHT CR 10.0414	VOIGHTS CR HATCHERY	WDFW		56	87701	AD Fin Clp
13	8-Aug-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	66	85229	AD Fin Clp
13	19-Aug-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	65	87768	AD Fin Clp
13	20-Aug-16	211137	2014	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636816	58	87515	AD Fin Clp
13	22-Aug-16	636490	2012	COWLITZ R 26.0002	COWLITZ SALMON HATCHERY	WDFW		81	42061	AD Fin Clp
13	29-Aug-16	211091	2013	CLEAR CR 11.0013C	CLEAR CREEK HATCHERY	NISQ	636499	60	85311	AD Fin Clp