

# **DRAFT**

**Total Encounters and Mortality Estimates for  
Puget Sound Recreational Chinook Mark-Selective Fisheries  
Monitored using Baseline Sampling: 2012-2014**

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# INTRODUCTION

Based on agreements between the State of Washington and the northwest treaty Indian tribes, the Washington Department of Fish and Wildlife (WDFW) has been conducting pilot<sup>1</sup> recreational mark-selective Chinook fisheries (MSFs) in the marine catch areas of Puget Sound since 2003. The goal of these fisheries is to allow increased angling opportunities on hatchery-raised, marked (adipose fin-clipped) salmon while limiting impacts on unmarked (adipose fin intact; typically wild origin) stocks of conservation concern, particularly ESA-listed Puget Sound Chinook.

To monitor each fishery, WDFW's Puget Sound Sampling Unit (PSSU) implements one of the four following sampling designs: *i*) Full Murthy Estimate Design, *ii*) Reduced Murthy Estimate Design, *iii*) Aerial-Access Design or *iv*) Baseline Sampling Design. The design selected depends on area and season considerations, the magnitude of the fishery and State-Tribal agreements made prior to the start of the fishing season. For a complete description of the methods associated with these sampling designs, see WDFW's "Methods Report: Monitoring Mark-Selective Recreational Chinook Fisheries in the Marine Catch Areas of Puget Sound (Areas 5 through 13)" (WDFW 2012).

With the exception of Baseline Sampling, all above sampling designs are characterized as comprehensive, "intensive" monitoring programs and have been tailored to reliably estimate the critical parameters needed for evaluating mark-selective fisheries (WDFW 2012). In addition, PSSU has acquired and analyzed relevant data characterizing other aspects of the pilot MSFs, including descriptors of fishing effort, fishing success (catch [landed Chinook] per unit effort), recreational fishing methods, the length and age composition of encountered Chinook, and the overall intensity of our sampling efforts. As such, the data collected through these comprehensive monitoring programs allow biologists to produce weekly in-season estimates and to finalize post-season estimates of effort, catch, total encounters and fishery impacts in a timely manner.

*Baseline Sampling*, however, is a scaled-back monitoring program that is currently implemented in lower-magnitude MSFs and year-round in non-selective sport fisheries throughout Puget Sound. Samplers collect data on salmon catch (retained and released) and effort via dockside sampling and angler interviews and obtain on-water encounter rate data from voluntary trip reports (VTR) submitted by private anglers. In contrast to the three comprehensive monitoring programs, the data collected through Baseline Sampling does not allow for in-season or immediate post-season estimates of effort, landed catch, total encounters, or fishery impacts.

Between 2011 and 2013, a framework was developed to estimate total Chinook encounters for a given MSF relying only on Baseline Sampling data and Catch Record Card (CRC) estimates of Chinook harvest (WDFW and NWIFC 2013). Two methods were established to estimate total Chinook encounters. The first method, the "M2" approach, requires an estimate of legal-marked Chinook harvest and an estimate of the proportion of legal-marked Chinook ( $p_{LM}$ ) in the target

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<sup>1</sup> As stated in state-tribal agreement documents (e.g., WDFW and NWIFC 2009): "The purpose of the 'pilot' fishery is to collect information necessary to enable evaluation and planning of potential future mark-selective fisheries. The 'pilot' fishery provides a basis for determining if the data needed to estimate critical parameters can be collected and if the sample sizes needed to produce these estimates with agreed levels of precision can be realistically obtained."



population, derived from test fishing or VTR data. Total encounters are then partitioned into size and mark-status groups using size/mark-status proportions from the test fishing or VTR data. If the precision of total encounters estimates is too high due to small sample sizes in test fishing or VTR data, the “M1” approach should be employed, which estimates total encounters using CRC-based Chinook harvest estimates and the ratio of encountered Chinook to retained Chinook observed during dockside sampling efforts. In the absence of sufficient test fishing or VTR data, size/mark-status proportions are estimated using a “product method” where the mark-rate and legal proportion are estimated independently using dockside sampling data and combined to provide an estimate of the proportion for each group.

As of the date of this report, finalized CRC-based Chinook harvest estimates were available through the close of the 2012 summer season. Contained in the following sections is a full analysis of fishery-total encounters and mortalities associated with the four Puget Sound Chinook MSFs that occurred and were sampled on a Baseline level only during the time period covered by this report; October 1, 2011 through September 30, 2012 (Table 1). For previous Baseline-sampled fisheries, see WDFW 2013c. The appropriate estimation method was selected by referring to the decision support schematic provided in WDFW and NWIFC (2013).

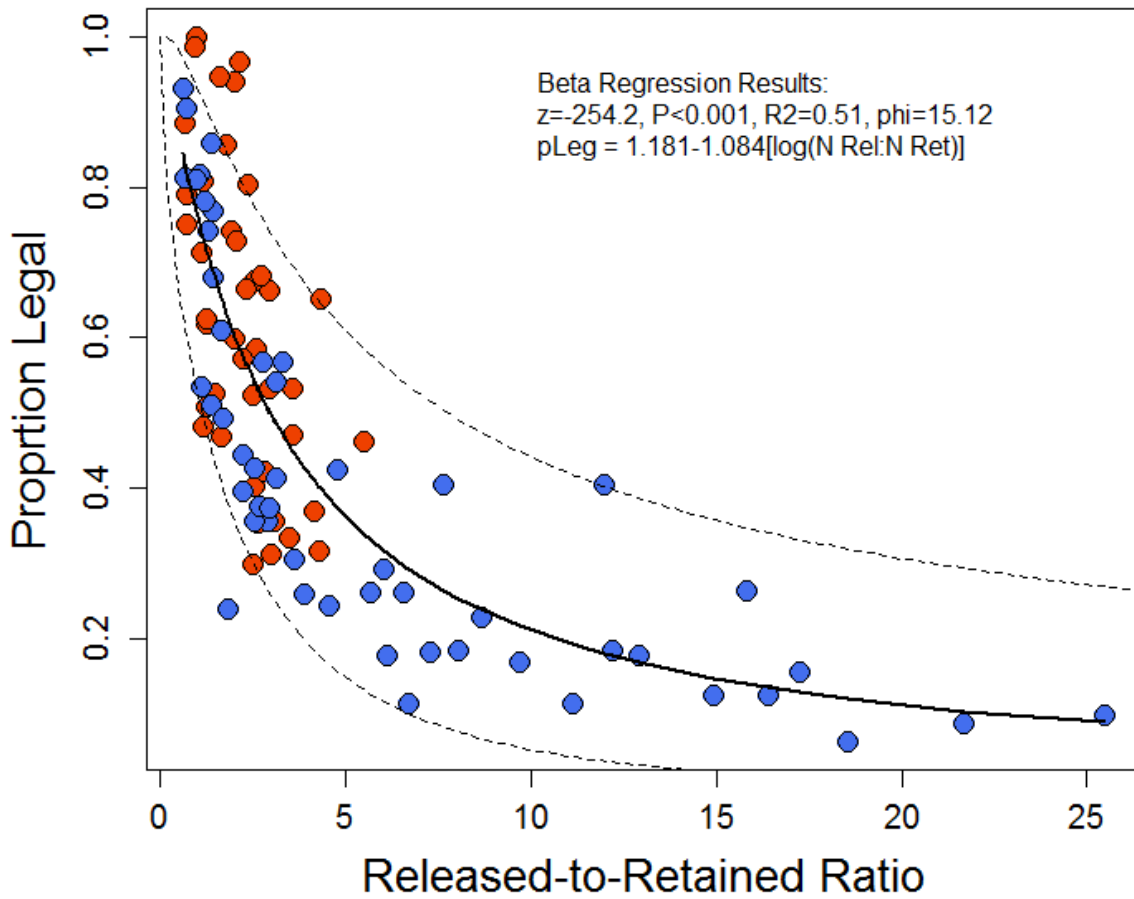
Estimates of the following parameters are presented below:

- i)* total Chinook salmon harvested (by size [legal or sublegal] and mark-status [marked or unmarked] group),
- ii)* total Chinook salmon released (by size and mark-status group),
- iii)* total Chinook salmon mortalities (by size and mark-status group),
- iv)* comparisons of Chinook salmon encounters and mortalities with pre-season expectations (based on Fishery Regulation Assessment Model [FRAM] predictions),
- v)* *dockside* sample rate for harvested Chinook, and
- vi)* total mortality of marked and unmarked double index tag (DIT) CWT stocks.

**Table 0.1** CRC-based total Chinook harvest estimates and variances for each Baseline-sampled Chinook MSF in Puget Sound between October 1, 2012 and September 30, 2014, along with the recommended estimation method based on VTR sample sizes and the resulting precision of encounters estimates.

CRC Area	Season	Year	Dates	Total Chinook Harvest	Variance	Estimation Method
12	Winter	12-2013	Oct 1 – Dec 31 Feb. 1 – Apr. 30	401	3000	M1
12	Winter	13-2014	Oct 1 – Dec 31 Feb. 1 – Apr. 30	224	1548	M1
12	Summer	2013	Jul 1 – Sept 30	609	8810	M1
12	Summer	2014	Jul 1 – Sept 30	637	9811	M1
6	Summer	2013	Jul 1 – Aug 15	4002	47634	M2
6	Summer	2014	Jul 1 – Aug 15	3221	28314	M1
13	Summer	2013	May 1 – Sep 30	1448	57222	M1

The beta regression was updated to include data from all intensively monitored fisheries through the 2012-15 winter season (Figure 1). Three parameters resulting from the beta regression were used to estimate the proportion of legal Chinook in the targeted population, based on the number of retained and released Chinook in the dockside sampling and interview data: the intercept ( $\beta_0$ ) = 1.181, slope ( $\beta_1$ ) = -1.804 and precision ( $\Phi$ ) = 15.12 (for further information see WDFW & NWIFC 2013).



**Figure 0.1** Beta regression results describing the relationship between released-to-retained ratio from dockside sampling data and proportion of legal Chinook from test fishery or VTR data, including parameters resulting from beta regression model. Red and blue dots represent summer and winter fisheries, respectively. Dotted lines represent 95% confidence bounds.

# 1 2012-13 Marine Area 12 Winter Mark-Selective Chinook Fishery

WDFW implemented a third consecutive winter Chinook MSF in Marine Area 12 from October 1 through December 31, 2012 and February 1 through April 30, 2013, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 6 of the 2012-13 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

**Table 1.1** Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from October 1– December 31 and February 1 – April 30, 2013. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Oct 1 – Dec 31 Feb. 1 – Apr. 30	182	0	439	85	191	25	1

**Table 1.2** Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2013. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	21	0	53	2	76
Dockside Harvest	166	0	6	0	172

**Table 1.3** Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2013. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

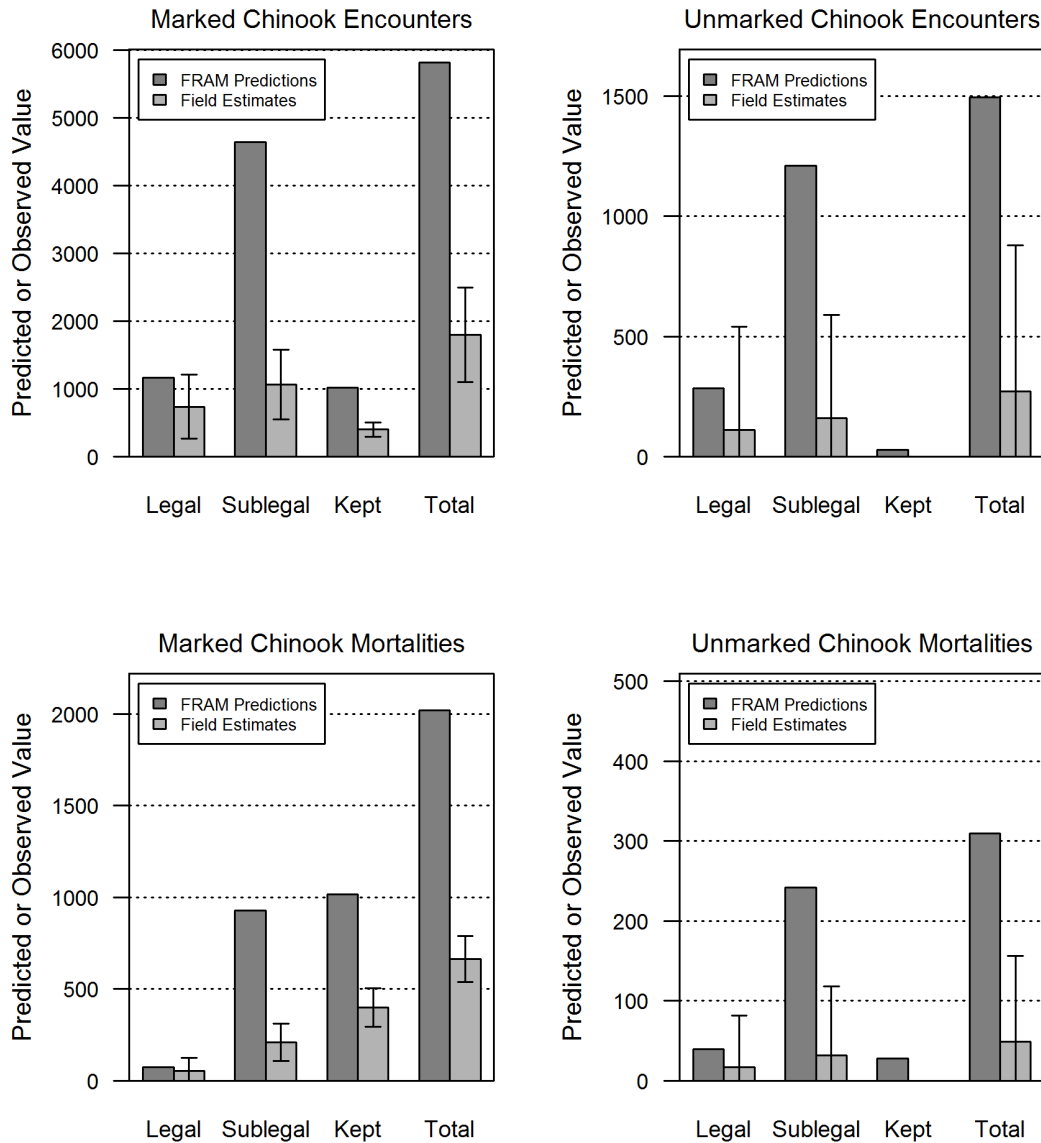
Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	737	387	350	53	440	4,192	65	313 - 566	15
LU	111	0	111	17	17	1080	33	0 - 81	198
SM	1062	14	1048	210	224	2,789	53	120 - 327	24
SU	160	0	160	32	32	1,929	44	0 - 118	137
<b>Total</b>	2070	401	1669	311	712	10,129	101	515 - 909	14

**Table 1.4** Comparison of modeled (FRAM model run 1512) and estimated total Chinook encounters for the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2013. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	1494	284	1210	28
	AD	5,815	1170	4,645	1018
	Total	7,309	1454	5,855	1046
	% Marked	80	80	79	97
Estimated (Creel) Encounters	UM	271	111	160	0
	AD	1,799	737	1062	401
	Total	2,070	848	1222	401
	% Marked	87	87	87	100

**Table 1.5** Comparison of modeled (FRAM model run 1512) and estimated total Chinook mortalities for the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2013. Values may not add up exactly 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)	310	2021	2331	49	663	712
Released Legal	40	74	114	17	53	69
Released Sublegal	242	929	1171	32	210	242
Landed Only	28	1018	1046	0	401	401



**Figure 1.1** Comparison of modeled (FRAM model run 1512) and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2013. Error bars represent 95% confidence intervals for field estimates.

**Table 1.6** Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2013. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Oct 1 – Dec 31 Feb. 1 – Apr. 30	401	0	401	172	0	172	42.9%

**Table 1.7** 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 Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2012. 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.)
Kendall Creek Hatchery	2010	1	1.3	0.33	1.2	0.1	0.003	0.06
Samish Hatchery	2010	1	1.3	0.33	1.3	0.1	0.004	0.06
<b>Total</b>		2	2.5	0.65	2.5	0.3	0.007	0.11

**Table 1.8** Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all previous seasons of the Area 12 winter Chinook MSF. Values may not add exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Feb 1 - Apr 30, 2010	1,736	244	0	8	0	176	79	262	51	818
Feb 1 - Apr 30, 2011	2,425	424	6	6	0	252	148	364	84	1,283
Feb 1 - Apr 30, 2012	2,299	398	0	5	0	293	165	777	186	1,824
Oct 1 – Dec 31, 2012 Feb 1 – Apr 30, 2013	6,061	387	0	14	0	350	111	1,048	160	2,070

## 2 2013-14 Marine Area 12 Winter Mark-Selective Chinook Fishery

WDFW implemented a third consecutive winter Chinook MSF in Marine Area 12 from October 1 through December 31, 2013 and February 1 through April 30, 2014, which was monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 6 of the 2013-14 winter post-season report for MSFs in Puget Sound (WDFW 2013a), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

**Table 2.1** Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from October 1– December 31 and February 1 – April 30, 2014. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark

Time Period	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
Oct 1 – Dec 31 Feb. 1 – Apr. 30	104	0	62	13	24	16	1

**Table 2.2** Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2014. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	26	10	0	4	40
Dockside Harvest	172	0	6	0	178

**Table 2.3** Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2014. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	282	216	65	10	226	1,561	40	149 - 304	17
LU	19	0	19	3	3	18	4	0 - 11	152
SM	46	8	39	8	15	46	7	42429	44
SU	3	0	3	1	1	32	6	0 - 12	922
<b>Total</b>	350	224	126	21	245	1,740	42	163 - 327	17

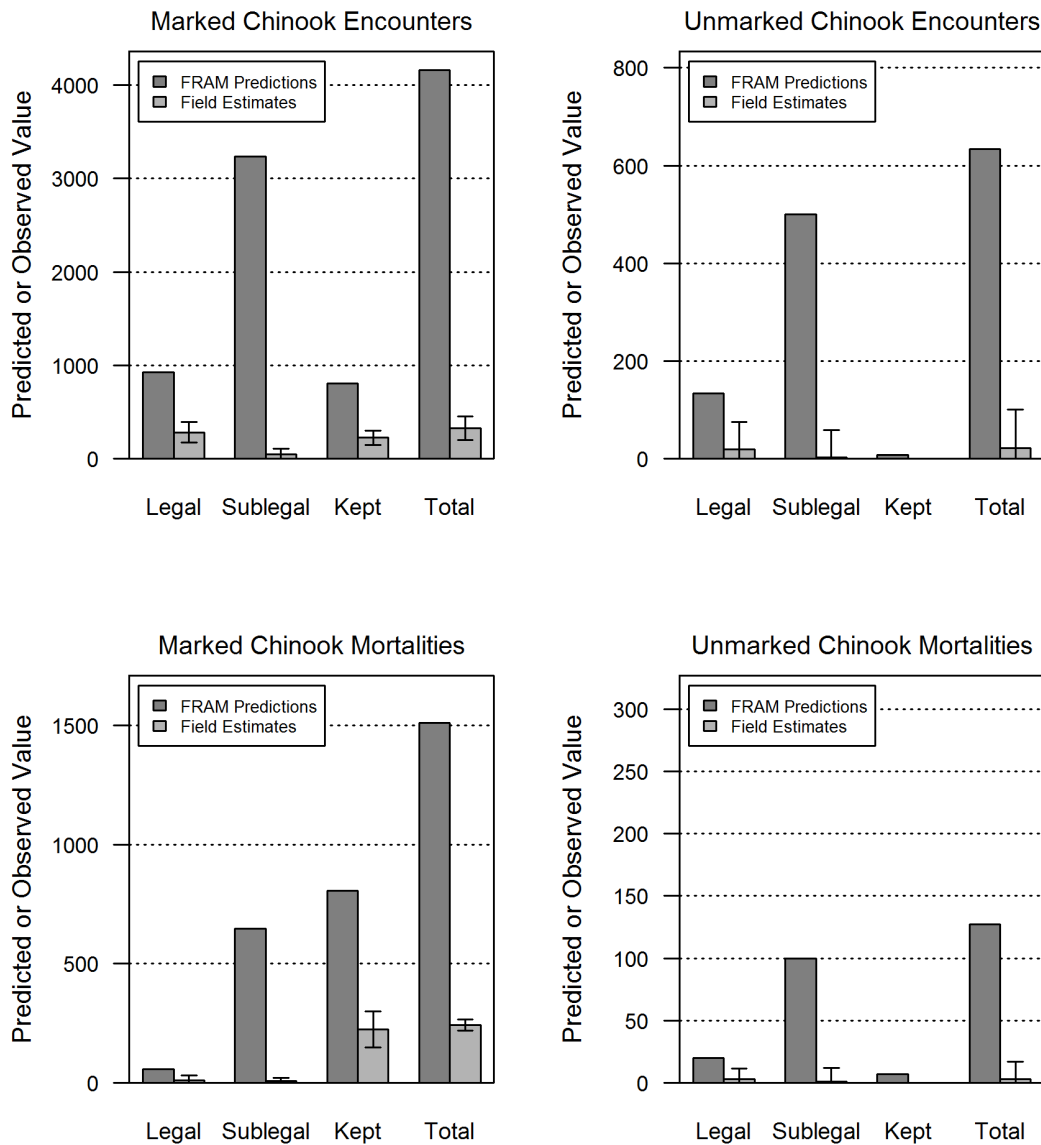


**Table 2.4** Comparison of modeled (FRAM model run 1213) and estimated total Chinook encounters for the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2014. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	634	134	500	7
	AD	4,162	927	3,235	806
	Total	4,796	1061	3,735	813
	% Marked	87	87	87	99
Estimated (Creel) Encounters	UM	22	19	3	0
	AD	328	282	46	224
	Total	350	300	49	224
	% Marked	94	94	94	100

**Table 2.5** Comparison of modeled (FRAM model run 1213) and estimated total Chinook mortalities for the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2014. Values may not add up exactly 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)	127	1511	1638	3	242	245
Released Legal	20	58	78	3	10	13
Released Sublegal	100	647	747	1	8	8
Landed Only	7	806	813	0	224	224



**Figure 2.1** Comparison of modeled (FRAM model run 1213) and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2014. Error bars represent 95% confidence intervals for field estimates.

**Table 2.6** Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from October 1– December 31 and February 1 - April 30, 2014. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Oct 1 – Dec 31 Feb. 1 – Apr. 30	224	0	224	178	0	178	79.50%

**Table 2.7** Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all previous seasons of the Area 12 winter Chinook MSF. Values may not add exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Feb 1 - Apr 30, 2010	1,736	244	0	8	0	176	79	262	51	818
Feb 1 - Apr 30, 2011	2,425	424	6	6	0	252	148	364	84	1,283
Feb 1 - Apr 30, 2012	2,299	398	0	5	0	293	165	777	186	1,824
Oct 1 – Dec 31, 2012 Feb 1 – Apr 30, 2013	6,061	387	0	14	0	350	111	1,048	160	2,070
Oct 1 – Dec 31, 2013 Feb 1 – Apr 30, 2014	4,602	216	0	8	0	65	19	39	3	350

### 3 2013 Marine Area 6 Summer Mark-Selective Chinook Fishery

WDFW implemented a tenth consecutive summer Chinook MSF in Marine Area 6 from July 1 through August 15, 2013. This fishery has been monitored using baseline sampling since 2008. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 2 of the 2013 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were sufficient to provide the desired level of precision in total encounters estimates allowing the use of the bias-corrected M2 approach (WDFW and NWIFC 2013).

**Table 3.1** Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 6 Chinook MSF from July 1 - August 15, 2013. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	313	98	147	93	651
Dockside Harvest	1442	2	24	1	1469

**Table 3.2** Summary of season-wide fishery impact estimates for the Area 6 Chinook MSF from July 1 - August 15, 2013. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

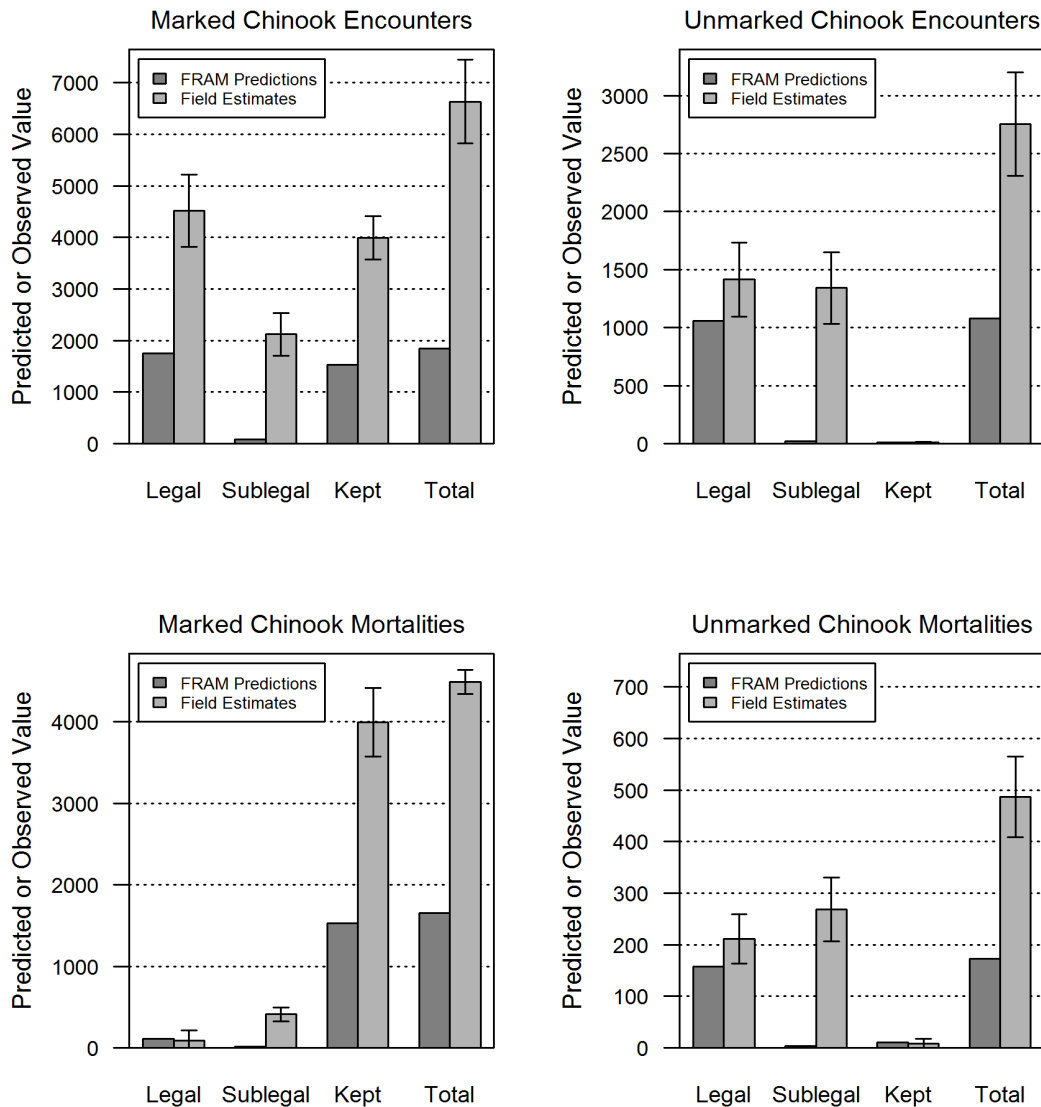
Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	4,515	3,928	587	88	4,016	50,021	224	3578 - 4455	6
LU	1,414	5	1,408	211	217	613	25	168 - 265	11
SM	2,121	65	2,055	411	476	1,975	44	389 - 564	9
SU	1,342	3	1,339	268	271	1,004	32	208 - 333	12
<b>Total</b>	<b>9,392</b>	<b>4,002</b>	<b>5,390</b>	<b>978</b>	<b>4,980</b>	<b>54,941</b>	<b>234</b>	<b>4521 - 5440</b>	<b>5</b>

**Table 3.3** Comparison of modeled (FRAM model run 1213) and estimated total Chinook encounters for the Area 6 Chinook MSF from July 1 - August 15, 2013. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	1,078	1058	20	11
	AD	1,841	1,756	85	1,527
	Total	2,919	2,814	105	1,538
	% Marked	63	62	81	99
Estimated (Creel) Encounters	UM	2,755	1,414	1,342	8
	AD	6,636	4,515	2,121	3,994
	Total	9,392	5,929	3,462	4,002
	% Marked	71	76	61	100

**Table 3.4** Comparison of modeled (FRAM model run 1213) and estimated total Chinook mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2013. Values may not add up exactly 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)	173	1,655	1,828	487	4,493	4,980
Released Legal	158	111	269	211	88	299
Released Sublegal	4	17	21	268	411	679
Landed Only	11	1,527	1,538	8	3,994	4,002



**Figure 3.1** Comparison of modeled (FRAM model run 1213) and estimated Chinook encounters and mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2013. Error bars represent 95% confidence intervals for field estimates.

**Table 3.5** Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 6 Chinook MSF from July 1 - August 15, 2013. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Jul. 1 – Aug. 15	3,994	8	4,002	1,466	3	1,469	36.70%

**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 Area 6 Chinook MSF from July 1 - August 15, 2013. 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 Creek Hatchery	2010	1	2.7	4.7	2.7	0.3	0.047	0.22
Clear Creek Hatchery	2010	2	5.4	9.4	5.6	0.6	0.099	0.45
George Adams Hatchery	2009	2	5.4	9.4	5.5	0.5	0.094	0.43
	2010	3	8.2	14.09	8.3	0.8	0.146	0.66
Grovers Creek Hatchery	2008	5	13.6	23.49	13.1	1.3	0.219	1.05
	2009	6	16.3	28.19	16.3	1.6	0.281	1.3
Chilliwack River Hatchery	2010	4	10.9	18.79	5.3	0.5	0.045	0.42
Samish Hatchery	2009	3	8.2	14.09	8.3	0.8	0.144	0.66
	2010	1	2.7	4.7	2.8	0.3	0.051	0.22
	2011	2	5.4	9.4	5.4	0.5	0.092	0.43
Spring Creek NFH	2009	1	2.7	4.7	2.7	0.3	0.047	0.22
	2010	2	5.4	9.4	5.4	0.5	0.093	0.43
<b>Total</b>		<b>32</b>	<b>87.2</b>	<b>150.32</b>	<b>81.6</b>	<b>8.2</b>	<b>1.359</b>	<b>6.49</b>

**Table 3.7** Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all previous seasons of the Area 6 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.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Jul 5 – Aug 3, 2003	5,195	941	22	0	0	141	1,283	52	103	2,542
Jul 1 – Aug 8, 2004	4,251	667	5	2	0	100	820	42	11	1,649
Jul 1 – Aug 10, 2005	3,971	404	0	0	4	60	790	70	0	1,323
Jul 1 – Aug 21, 2006	3,077	338	0	2	8	50	494	0	0	882
Jul 1 – Aug 9, 2007	3,221	715	7	7	0	107	404	9	0	1,249
Jul 1 – Aug 9, 2008	2,812	535	2	0	0	80	378	0	15	1,011
Jul 1 – Aug 6, 2009	9,394	2,336	0	36	0	349	1,216	193	275	4,406
Jul 1 – Aug 15, 2010	4,744	1,394	2	4	0	208	544	41	27	2,220
Jul 1 – Aug 15, 2011	10,463	3,202	7	97	14	479	1,746	634	512	6,690
Jul 1 – Aug 15, 2012	10,413	5,486	13	42	0	820	1,795	962	1,245	10,363
Jul 1 – Aug 15, 2013	10,191	3,928	5	65	3	587	1,408	2,055	1,339	9,392

## 4 2014 Marine Area 6 Summer Mark-Selective Chinook Fishery

WDFW implemented a tenth consecutive summer Chinook MSF in Marine Area 6 from July 1 through August 15, 2014. This fishery has been monitored using baseline sampling since 2008. In the following section we present estimates of total encounters and mortalities for this fishery. These data are meant to accompany section 2 of the 2013 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were sufficient to provide the desired level of precision in total encounters estimates allowing the use of the bias-corrected M2 approach (WDFW and NWIFC 2013).

**Table 4.1** Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 6 Chinook MSF from July 1 - August 15, 2014. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	149	54	28	8	239
Dockside Harvest	1190	5	102	1	1298

**Table 4.2** Summary of season-wide fishery impact estimates for the Area 6 Chinook MSF from July 1 - August 15, 2014. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	3,394	2,953	441	66	3,019	26,993	164	2697 - 3341	5
LU	1,230	12	1,218	183	195	701	26	143 - 247	14
SM	638	253	385	77	330	1,382	37	257 - 403	11
SU	182	2	180	36	38	174	13	13 - 64	34
<b>Total</b>	<b>5,444</b>	<b>3,221</b>	<b>2,223</b>	<b>362</b>	<b>3,583</b>	<b>32,367</b>	<b>180</b>	<b>3230 - 3935</b>	<b>5</b>

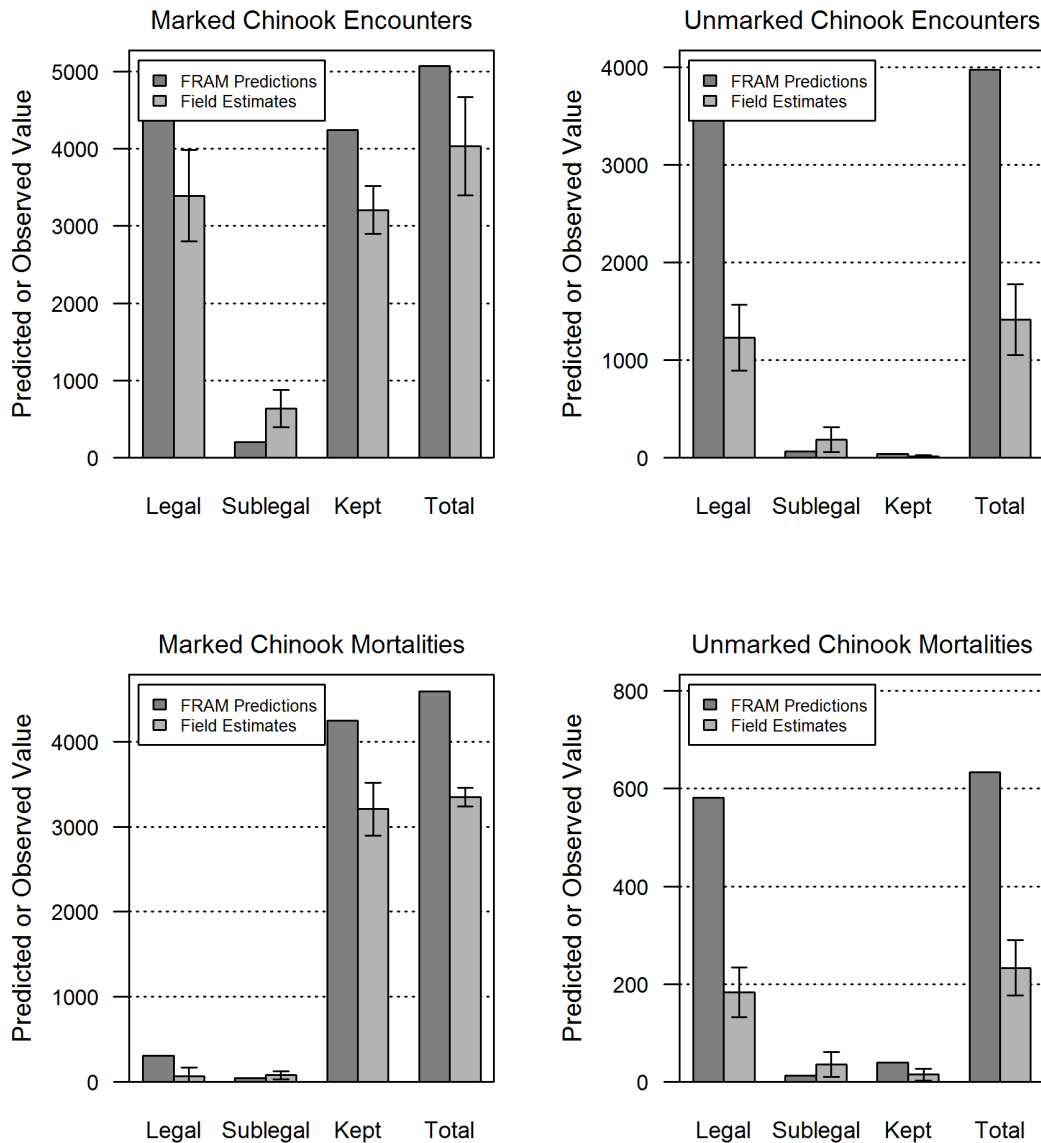
**Table 4.3** Comparison of modeled (FRAM model run 2814) and estimated total Chinook encounters for the Area 6 Chinook MSF from July 1 - August 15, 2014. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	3,971	3906	65	39
	AD	5,077	4,878	199	4,244
	Total	9,048	8,784	264	4,283
	% Marked	56	56	75	99
Estimated (Creel) Encounters	UM	1,412	1,230	182	15
	AD	4,032	3,394	638	3,206
	Total	5,444	4,624	820	3,221
	% Marked	74	73	78	100



**Table 4.4** Comparison of modeled (FRAM model run 2814) and estimated total Chinook mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2014. Values may not add up exactly 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)	634	4,591	5,225	233	3,349	3,583
Released Legal	582	307	889	183	66	249
Released Sublegal	13	40	53	36	77	113
Landed Only	39	4,244	4,283	15	3,206	3,221



**Figure 4.1** Comparison of modeled (FRAM model run 2814) and estimated Chinook encounters and mortalities for the Area 6 Chinook MSF from July 1 - August 15, 2014. Error bars represent 95% confidence intervals for field estimates.

**Table 4.5** Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 6 Chinook MSF from July 1 - August 15, 2014. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Jul. 1 – Aug. 15	3,206	15	3,221	1,292	6	1,298	40.30%

**Table 4.6** 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 Area 6 Chinook MSF from July 1 - August 15, 2014. 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 Creek Hatchery	2011	1	2.5	3.68	0.8	0.1	0.004	0.06
Clear Creek Hatchery	2010	3	7.4	11.03	7.6	0.8	0.116	0.59
	2011	3	7.4	11.03	7.5	0.7	0.111	0.58
George Adams Hatchery	2010	4	9.9	14.71	10.1	1	0.153	0.78
Grovers Creek Hatchery	2010	1	2.5	3.68	2.5	0.2	0.037	0.19
	2011	5	12.4	18.38	12.3	1.2	0.181	0.95
Chilliwack River Hatchery	2010	1	2.5	3.68	1.2	0.1	0.009	0.09
	2011	1	2.5	3.68	1.3	0.1	0.009	0.1
Samish Hatchery	2011	1	2.5	3.68	2.5	0.2	0.036	0.19
Spring Creek NFH	2010	1	2.5	3.68	2.5	0.2	0.037	0.19
Wallace Hatchery	2011	1	2.5	3.68	2.5	0.2	0.036	0.19
<b>Total</b>		<b>22</b>	<b>54.6</b>	<b>80.88</b>	<b>50.7</b>	<b>5.1</b>	<b>0.729</b>	<b>3.92</b>

**Table 4.7** Season-total estimates of Chinook encounters by size/mark-status and total estimates of angler effort, summarized for all previous seasons of the Area 6 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.

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
Jul 5 – Aug 3, 2003	5,195	941	22	0	0	141	1,283	52	103	2,542
Jul 1 – Aug 8, 2004	4,251	667	5	2	0	100	820	42	11	1,649
Jul 1 – Aug 10, 2005	3,971	404	0	0	4	60	790	70	0	1,323
Jul 1 – Aug 21, 2006	3,077	338	0	2	8	50	494	0	0	882
Jul 1 – Aug 9, 2007	3,221	715	7	7	0	107	404	9	0	1,249
Jul 1 – Aug 9, 2008	2,812	535	2	0	0	80	378	0	15	1,011
Jul 1 – Aug 6, 2009	9,394	2,336	0	36	0	349	1,216	193	275	4,406
Jul 1 – Aug 15, 2010	4,744	1,394	2	4	0	208	544	41	27	2,220
Jul 1 – Aug 15, 2011	10,463	3,202	7	97	14	479	1,746	634	512	6,690
Jul 1 – Aug 15, 2012	10,413	5,486	13	42	0	820	1,795	962	1,245	10,363
Jul 1 – Aug 15, 2013	10,191	3,928	5	65	3	587	1,408	2,055	1,339	9,392
Jul 1 – Aug 15, 2014	11,704	2,953	12	253	2	441	1,218	180	2,223	7,282

## 5 2013 Marine Area 13 Summer Mark-Selective Chinook Fishery

WDFW implemented a seventh consecutive summer Chinook MSF in Marine Area 13 from May 1 through September 30, 2013, monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are intended to accompany section 7 of the 2013 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

**Table 5.1** Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 13 Chinook MSF from May 1 – September 30, 2013. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Year	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
2013	269	2	21	31	31	18	89

**Table 5.2** Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 13 Chinook MSF from May 1 - September 30, 2013. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	1	1	1	0	3
Dockside Harvest	252	1	1	0	254

**Table 5.3** Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from May 1 - September 30, 2013. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

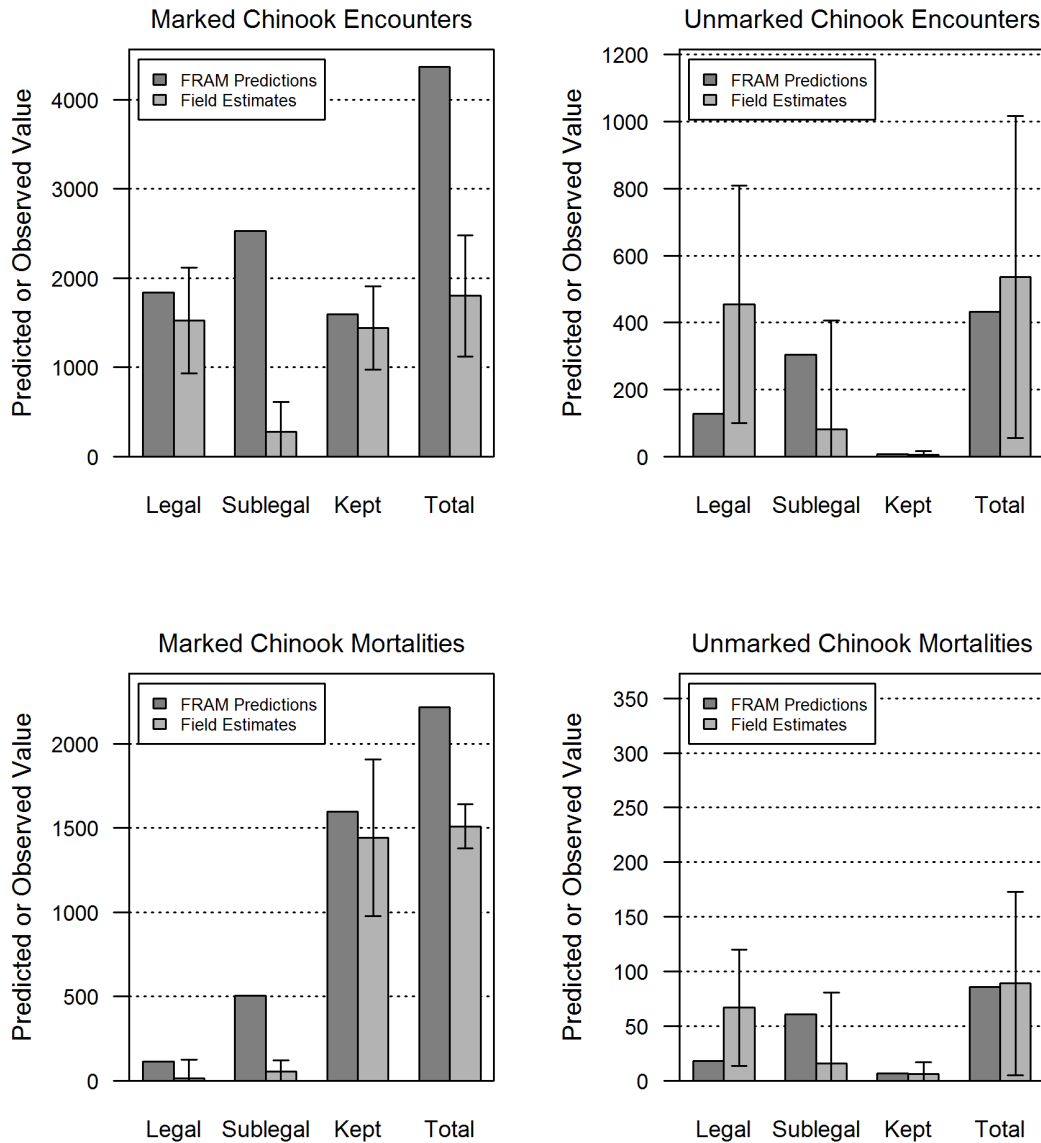
Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	1,525	1437	89	13	1450	59,697	244	971 - 1929	17
LU	454	6	448	67	73	769	28	19 - 127	38
SM	276	6	271	54	60	1,200	35	0 - 128	58
SU	82	0	82	16	16	1,090	33	0 - 81	201
<b>Total</b>	2,338	1448	890	151	1,599	63,526	252	1105 - 2093	16

**Table 5.4** Comparison of modeled (FRAM model run 1213) and estimated total Chinook encounters for the Area 13 Chinook MSF from May 1 - September 30, 2013. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked

<b>Data Source</b>	<b>Group</b>	<b>Total Encounters</b>	<b>Legal</b>	<b>Sublegal</b>	<b>Landed Only</b>
FRAM Encounters	UM	433	128	305	7
	AD	4,366	1,836	2,530	1,597
	Total	4,799	1,964	2,835	1,604
	% Marked	91	93	89	100
Estimated (Creel) Encounters	UM	536	454	82	6
	AD	1,802	1,525	276	1442
	Total	2,338	1,979	359	1448
	% Marked	77	77	77	100

**Table 5.5** Comparison of modeled (FRAM model run 1213) and estimated total Chinook mortalities for the Area 13 Chinook MSF from May 1 - September 30, 2013. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

<b>Mortality Category</b>	<b>FRAM Chinook Mortalities</b>			<b>Estimated Chinook Mortalities</b>		
	<b>UM</b>	<b>AD</b>	<b>Total</b>	<b>UM</b>	<b>AD</b>	<b>Total</b>
Total (Landed + Released)	86	2,218	2,304	89	1,510	1,599
Released Legal	18	115	133	67	13	81
Released Sublegal	61	506	567	16	54	71
Landed Only	7	1,597	1,604	6	1442	1448



**Figure 5.1** Comparison of modeled (FRAM model run 1213) and estimated Chinook encounters and mortalities for the Area 13 Chinook MSF from May 1 - September 30, 2013. Error bars represent 95% confidence intervals for field estimates.

**Table 5.6** Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from May 1 - September 30, 2013. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
May 1 – Sep. 30	1442	6	1448	253	1	254	17.50%

**Table 5.7** 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 Area 13 Chinook MSF from May 1 - September 30, 2013. 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	2010	1	5.7	26.8	5.9	0.6	0.283	0.53
<b>Total</b>		1	5.7	26.8	5.9	0.6	0.283	0.53

Season Dates	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
May 1 – Sep 30, 2007	28,080	2,697	78	101	0	1,095	1,648	2,032	971	8,622
May 1 – Sep 30, 2008	22,494	1,327	0	8	0	198	197	238	98	2,067
May 1 – Sep 30, 2009	40,967	1,172	24	72	0	839	471	1,227	320	4,125
May 1 – Sep 30, 2010	27,060	646	21	0	0	97	85	106	35	990
May 1 – Sep 30, 2011	15,818	1,006	8	8	0	266	268	250	56	1,861
May 1 – Sep 30, 2012	24,384	803	0	23	0	355	406	689	250	2,526
May 1 – Sep 30, 2013	24,853	1,437	6	6	0	89	448	271	82	2,339

## 6 2013 Marine Area 12 Summer Mark-Selective Chinook Fishery

WDFW implemented a summer Chinook MSF, monitored using Baseline Sampling, South of Ayock Point in Marine Area 12 from July 1 through September 30, 2013 for the second time. In the following section we present estimates of total encounters and mortalities for this fishery. These data are intended to accompany section 6 of the 2013 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

**Table 6.1** Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from July 1 – September 30, 2013. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Year	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
2013	50	0	2	29	3	6	2

**Table 6.2** Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from July 1 - September 30, 2013. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	6	1	0	0	7
Dockside Harvest	60	0	0	0	60

**Table 6.3** Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from July 1 - September 30, 2013. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	609	609	0	0	609	9,268	96	410 - 787	16
LU	289	0	289	43	43	149	12	19 - 67	28
SM	94	0	23	19	19	195	14	0 - 46	74
SU	50	0	50	10	10	189	14	0 - 37	136
<b>Total</b>	971	609	362	62	671	9,800	99	477 - 865	15

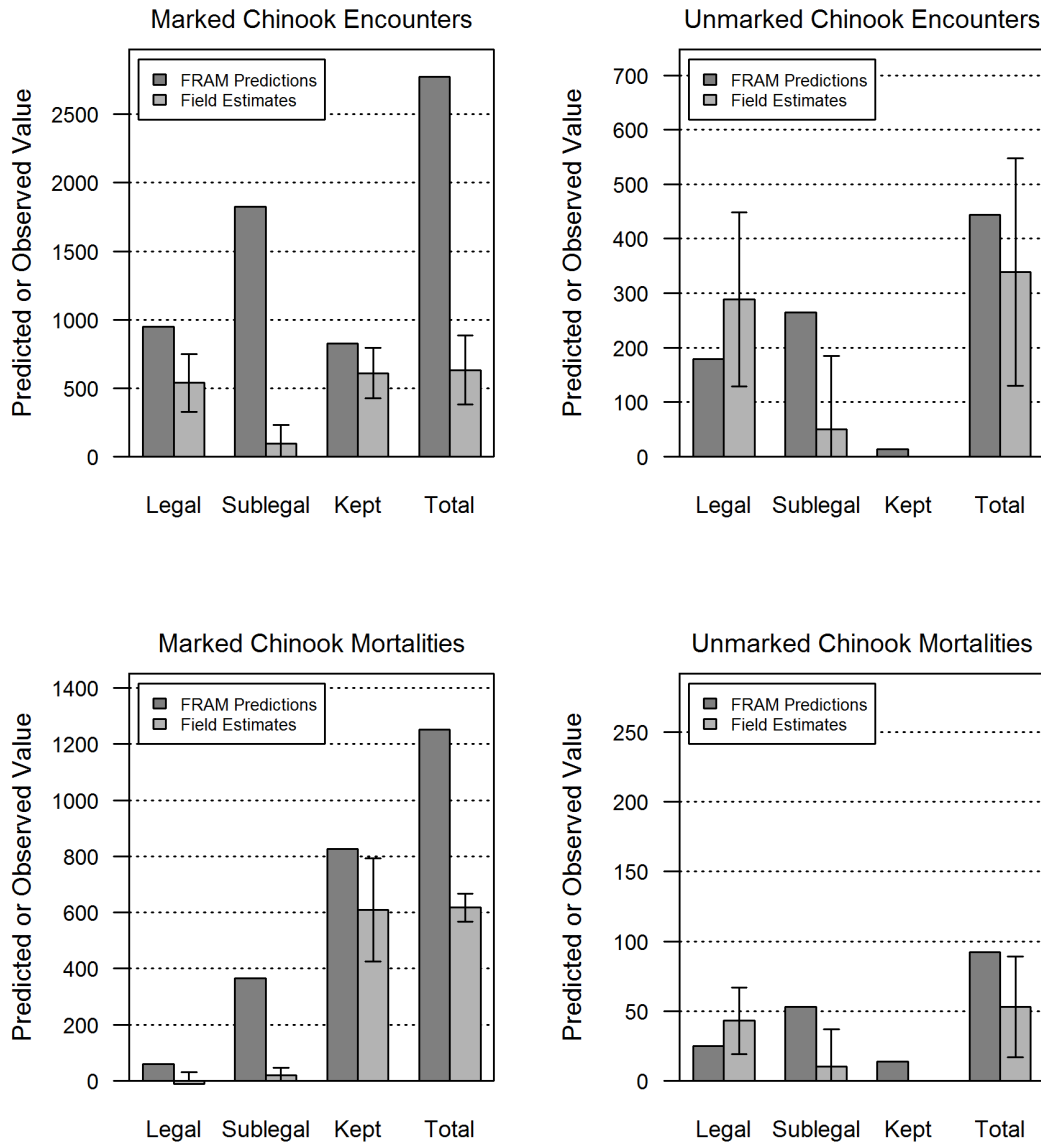


**Table 6.4** Comparison of modeled (FRAM model run 1213) and estimated total Chinook encounters for the Area 12 Chinook MSF from July 1 - September 30, 2013. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	444	179	265	14
	AD	2,775	950	1,825	827
	Total	3,219	1129	2,090	841
	% Marked	86	84	87	98
Estimated (Creel) Encounters	UM	339	289	50	0
	AD	632	538	94	609
	Total	971	827	145	609
	% Marked	65	65	65	100

**Table 6.5** Comparison of modeled (FRAM model run 1213) and estimated total Chinook mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2013. Values may not add up exactly 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)	92	1252	1344	53	617	671
Released Legal	25	60	85	43	0	43
Released Sublegal	53	365	418	10	19	29
Landed Only	14	827	841	0	609	609



**Figure 6.1** Comparison of modeled (FRAM model run 1213) and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2013. Error bars represent 95% confidence intervals for field estimates.

**Table 6.6** Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from July 1 - September 30, 2013. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Jul. 1 – Sep. 30	609	0	609	60	0	60	9.90%

**Table 6.7** 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 Area 12 Chinook MSF from July 1 - September 30, 2013. 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.)
George Adams Hatchery	2009	2	11.4	93.2	11.4	1.1	0.935	1.02
	2010	2	11.4	93.2	11.6	1.2	0.967	1.04
<b>Total</b>		4	22.8	186.4	23	2.3	1.902	2.06

## 7 2014 Marine Area 12 Summer Mark-Selective Chinook Fishery

WDFW implemented a summer Chinook MSF, monitored using Baseline Sampling, South of Ayock Point in Marine Area 12 from July 1 through September 30, 2014 for the second time. In the following section we present estimates of total encounters and mortalities for this fishery. These data are intended to accompany section 6 of the 2014 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

**Table 7.1** Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from July 1 – September 30, 2014. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Year	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
2014	79	0	6	9	4	0	0

**Table 7.2** Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from July 1 - September 30, 2014. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	5	0	0	0	5
Dockside Harvest	75	0	0	0	75

**Table 7.3** Summary of season-wide fishery impact estimates for the Area 12 Chinook MSF from July 1 - September 30, 2014. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

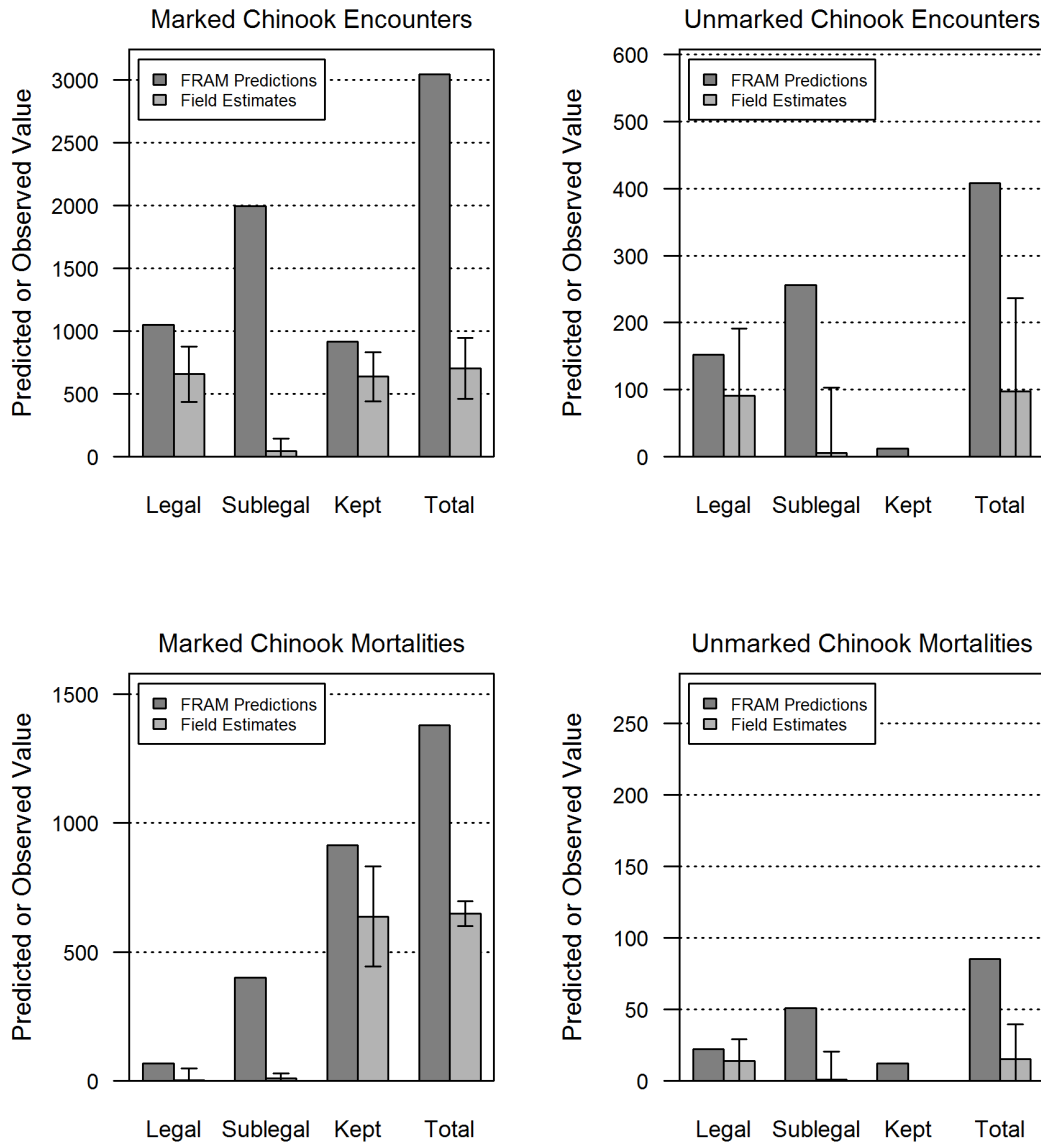
Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	656	637	19	3	640	10,321	102	441 - 839	16
LU	91	0	91	14	14	59	8	0 - 29	57
SM	45	0	45	9	9	99	10	0 - 29	109
SU	6	0	6	1	1	97	10	0 - 21	785
<b>Total</b>	798	637	161	27	664	10,576	103	462 - 865	15

**Table 7.4** Comparison of modeled (FRAM model run 2814) and estimated total Chinook encounters for the Area 12 Chinook MSF from July 1 - September 30, 2014. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked.

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	408	152	256	12
	AD	3,044	1051	1,993	914
	Total	3,452	1203	2,249	926
	% Marked	88	87	89	99
Estimated (Creel) Encounters	UM	97	91	6	0
	AD	702	656	45	637
	Total	798	747	52	637
	% Marked	88	88	88	100

**Table 7.5** Comparison of modeled (FRAM model run 2814) and estimated total Chinook mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2014. Values may not add up exactly 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)	85	1380	1465	15	649	664
Released Legal	22	67	89	14	3	16
Released Sublegal	51	399	450	1	9	10
Landed Only	12	914	926	0	637	637



**Figure 7.1** Comparison of modeled (FRAM model run 2814) and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2014. Error bars represent 95% confidence intervals for field estimates.

**Table 7.6** Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 12 Chinook MSF from July 1 - September 30, 2014. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
Jul. 1 – Sep. 30	637	0	637	75	0	75	11.80%

## 8 2014 Marine Area 13 Summer Mark-Selective Chinook Fishery

WDFW implemented a seventh consecutive summer Chinook MSF in Marine Area 13 from May 1 through September 30, 2014, monitored using baseline sampling. In the following section we present estimates of total encounters and mortalities for this fishery. These data are intended to accompany section 7 of the 2014 summer post-season report for MSFs in Puget Sound (WDFW 2013b), which includes information regarding sample sites, dockside sampling and interview data, and voluntary trip reports (VTR) related to the fishery. Sample sizes of VTR encounters were insufficient to provide the desired level of precision in total encounters estimates, requiring the estimation of total encounters using the M1 approach (WDFW and NWIFC 2013).

**Table 8.1** Number of Chinook retained and released by mark-status, number of other salmon (positively identified species other than Chinook) released and number of salmon of unidentified species released, from dockside interviews conducted during Baseline Sampling of the Area 12 Chinook MSF from July 1 – September 30, 2014. AD = marked (adipose-clipped), UM = unmarked, UK = unknown mark.

Year	Chinook Retained		Chinook Released			Other Salmon Released	Unidentified Salmon Released
	AD	UM	AD	UM	UK		
2014	56	0	5	18	26	7	6

**Table 8.2** Summary of VTR encounters and harvested Chinook sampled during dockside sampling for the Area 12 Chinook MSF from July 1 - September 30, 2014. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Data Type	LM	LU	SM	SU	Total
VTR Encounters	14	2	0	1	17
Dockside Harvest	51	0	1	0	52

**Table 8.3** Summary of season-wide fishery impact estimates for the Area 13 Chinook MSF from May 1 - September 30, 2014. Release mortality rate = 0.15 for legal fish and 0.20 for sublegal fish. Values may not add up exactly due to rounding error. LM = legal-sized marked, LU = legal-sized unmarked, SM = sublegal-sized marked, SU = sublegal-sized unmarked.

Size/mark group	Encounters	Retained	Released	Release Mortality	Total Mortality	Var	SE	95% CI	CV (%)
LM	560	591	0	0	587	22,885	151	290 - 883	26
LU	373	0	373	56	56	366	19	18 - 93	34
SM	180	12	168	34	45	527	23	0 - 90	51
SU	120	0	120	24	24	343	19	0 - 60	77
<b>Total</b>	1,232	603	661	109	712	24,719	157	404 - 1020	22

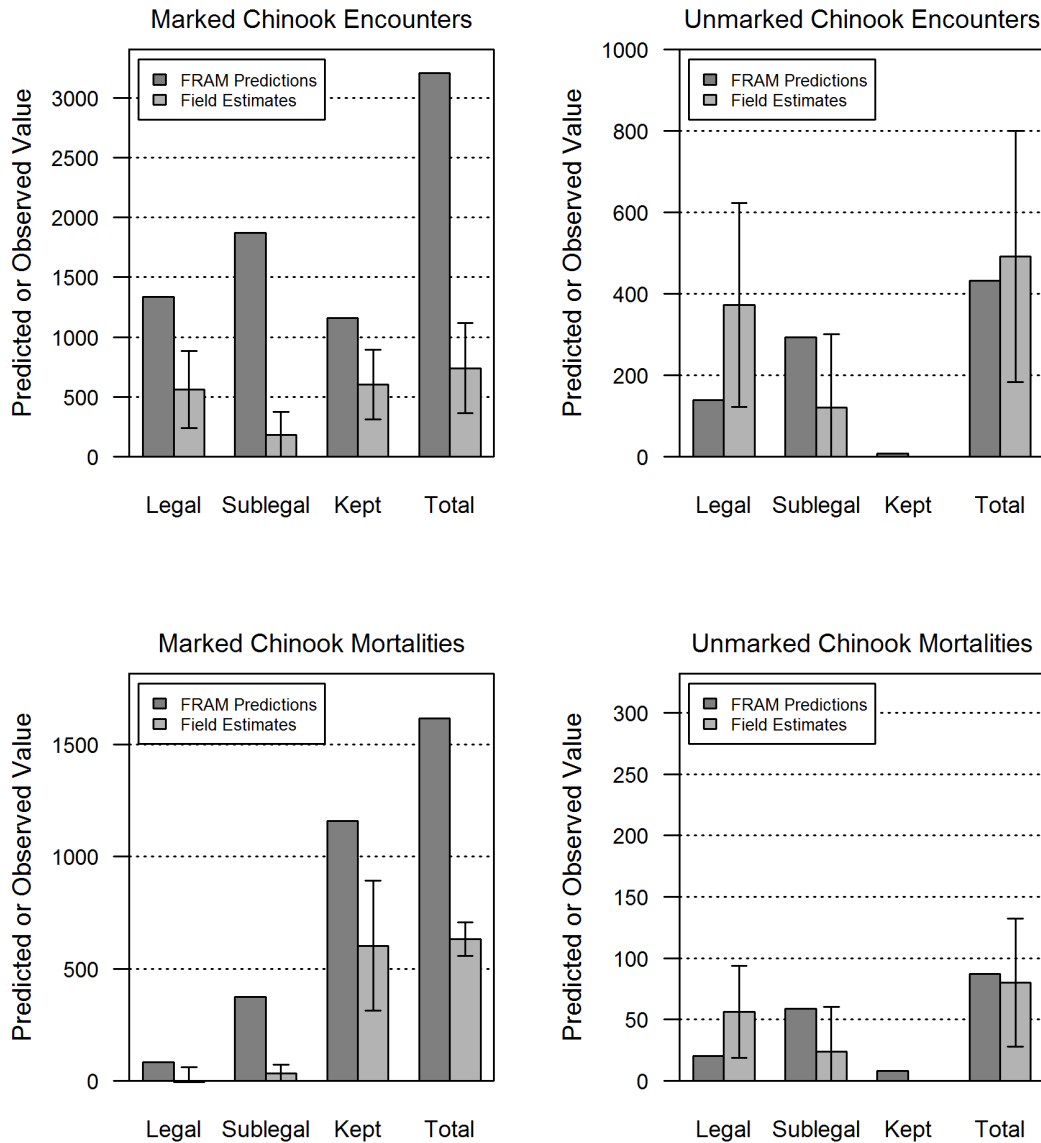
**Table 8.4** Comparison of modeled (FRAM model run 1213) and estimated total Chinook encounters for the Area 13 Chinook MSF from May 1 - September 30, 2014. Values may not add up exactly due to rounding error. AD = marked (adipose-clipped), UM = unmarked

Data Source	Group	Total Encounters	Legal	Sublegal	Landed Only
FRAM Encounters	UM	432	139	293	8
	AD	3,206	1,334	1,872	1,160
	Total	3,638	1,473	2,165	1,168
	% Marked	88	91	86	99
Estimated (Creel) Encounters	UM	492	373	120	0
	AD	740	560	180	603
	Total	1,232	932	300	603
	% Marked	60	60	60	100

**Table 8.5** Comparison of modeled (FRAM model run 1213) and estimated total Chinook mortalities for the Area 13 Chinook MSF from May 1 - September 30, 2014. Values may not add up exactly 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)	87	1,618	1,705	80	632	712
Released Legal	20	84	104	56	0	56
Released Sublegal	59	374	433	24	34	58
Landed Only	8	1,160	1,168	0	603	603





**Figure 8.1** Comparison of modeled (FRAM model run 1213) and estimated Chinook encounters and mortalities for the Area 12 Chinook MSF from July 1 - September 30, 2014. Error bars represent 95% confidence intervals for field estimates.

**Table 8.6** Season total sample rate (Total retained Chinook sampled during baseline sampling / Estimated retained Chinook) in the Area 13 Chinook MSF from May 1 - September 30, 2014. AD = marked (adipose-clipped), UM = unmarked.

Time period	Estimated Retained Chinook			Number of Chinook Sampled			Sample Rate
	AD	UM	Total	AD	UM	Total	
May 1 – Sep. 30	603	0	603	52	0	52	8.60%

## REFERENCES

- Washington Department of Fish and Wildlife (WDFW). 2012. Methods Report: Monitoring Mark-Selective Recreational Chinook Fisheries In the Marine Catch Areas of Puget Sound (Areas 5 through 13). Revised Draft Report: January 30, 2012. Washington Department of Fish and Wildlife. Olympia, Washington. 81 pp. <http://wdfw.wa.gov/publications/01357/>
- Washington Department of Fish and Wildlife (WDFW). 2013a. 2011-2012 Winter Mark-Selective Recreational Chinook Fisheries In Marine Areas 7, 8-1, 8-2, 9, 10, 11 and 12: Post-season Report. Revised Draft Report: January 24, 2013. Washington Department of Fish and Wildlife. Olympia, Washington. 90 pp. <http://wdfw.wa.gov/publications/01533/>
- Washington Department of Fish and Wildlife (WDFW). 2013b. 2012 Summer Mark-Selective Recreational Chinook Fisheries In Marine Areas 5, 6, 9, 10, 11, 12 and 13: Post-season Report. Revised Draft Report: February 26, 2013. Washington Department of Fish and Wildlife. Olympia, Washington. 91 pp. <http://wdfw.wa.gov/publications/01534/>
- Washington Department of Fish and Wildlife (WDFW). 2013c. Total Encounters and Mortality Estimates for Puget Sound Recreational Chinook Mark-Selective Fisheries Monitored using Baseline Sampling: 2007-2011. Draft Report: November 27, 2013. Olympia, Washington.
- Washington Department of Fish and Wildlife (WDFW) and Northwest Indian Fisheries Commission (NWIFC). 2013. Estimating Total Chinook Encounters using Catch Record Card-Based Estimates of Harvest. Draft Report: November 26, 2013. Olympia, Washington.