2012 OCEAN SELECTIVE FISHERY SAMPLING REPORT

SUBMITTED BY:

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1. INTRODUCTION

The Pacific Fishery Management Council (PFMC) adopted 2012 recreational and commercial troll fisheries for all salmon species in the area between Cape Falcon, Oregon and the U.S./Canada border. Mark-selective recreational fisheries for Chinook and coho and mark-selective coho commercial fisheries were included in all four Catch Record Card (CRC) areas of coastal Washington (Areas 1, 2, 3, and 4). Council-area fisheries were adopted based on assumptions regarding coho and Chinook abundance, distribution of stocks, Chinook age class distributions, coho mark rates, compliance with selective fishery regulations, and incidental mortality.

The PFMC adopted an ocean mark-selective Chinook fishery (MSF) in Marine Areas 1 through 4 for the third consecutive year, following state-tribal agreement during the North of Falcon process, operating for 15 days beginning June 9 in the southern areas and June 16 in the northern areas. Consistent with the Washington Department of Fish and Wildlife's (WDFW) intent of Puget Sound/Strait of Juan de Fuca mark-selective Chinook fisheries as well as the 2010 and 2011 ocean mark-selective Chinook pilot fisheries, the primary goal for this selective fishery was to provide meaningful opportunity to the recreational angling public while minimally impacting ESA-listed Chinook salmon encountered in the mixed-stock ocean fisheries. WDFW's Ocean Sampling Program (OSP) continued its intensive monitoring program in all ocean ports during the season to collect data to estimate key parameters characterizing the fishery and its impacts on unmarked salmon. Sampling activities included dockside creel sampling, on-water observation, and a Voluntary Trip Report (VTR) system. Among other parameters, sampling activities emphasized data collection needs for the estimation of: *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]), *iii*) the total number of Chinook salmon released (by size/mark-status), *iv*) the coded-wire tag- (CWT) and/or DNA-based stock composition of marked and unmarked Chinook mortalities, and v) the total mortality of marked and unmarked double index tag (DIT) CWT stocks.

Additionally, coho mark-selective fisheries were adopted in 2012 for the fourteenth consecutive year, and the OSP continued its intensive monitoring program in all ocean ports. Sampling activities were identical to those employed during the Chinook MSF. Sampling activities during the coho MSF emphasized data collection needs for the estimation of: *i*) the mark rate of the targeted coho population, *ii*) the total number of coho harvested by mark-status, including an estimate of angler compliance rate with coho MSF regulations, *iii*) the total number of coho released (by size/mark-status), *iv*) the coded-wire tag- (CWT) stock composition of landed coho, and *v*) the total mortality of marked and unmarked coho.

2. SEASON DESCRIPTION

2.1 Ocean Recreational Chinook MSF

Catch Record Card (CRC) Area 1 (from Cape Falcon, OR to Leadbetter Point, WA) was open for all salmon except coho seven days per week from June 9 through June 22. A daily bag limit of two salmon was in effect. All retained Chinook were required to have a healed adipose fin clip, and the minimum size limit was 24 inches total length for Chinook. A total of 14 fishing days were available during this fishery.

CRC Area 2 (from Leadbetter Point to the Queets River) was open for all salmon except coho seven days per week from June 9 through June 23. A daily bag limit of two salmon was in effect. All retained Chinook were required to have a healed adipose fin clip, and the minimum size limit was 24 inches total length for Chinook. A total of 15 fishing days were available during this fishery.

CRC Areas 3 (from the Queets River to Cape Alava) and 4 (from Cape Alava to the U.S./Canada border) were open for all salmon except coho seven days per week from June 16 through June 30. A daily bag limit of two salmon was in effect. All retained Chinook were required to have a healed adipose fin clip, and the minimum size limit was 24 inches total length for Chinook. A total of 15 fishing days were available during this fishery.

The fishery was operating under a coastwide landed quota of 8,000 marked Chinook. **Figure 1** shows the Washington ocean Catch Record Card areas.

2.2 Ocean Recreational All-Species Fisheries (Coho Mark-Selective)

CRC Area 1: The ocean recreational fishery in CRC Area 1 was open for all salmon species seven days per week from June 23 through September 30. A daily bag limit of two salmon, one of which could be a Chinook, was in effect June 26 - August 26; the bag limit was modified in-season to two salmon from August 27 – September 30. All retained coho were required to have a healed adipose fin clip from June 23 – September 2. The fishery was modified to allow retention of unmarked coho beginning September 3 through the season. The Columbia Control Zone was closed. A total of 100 fishing days were available in the area.

CRC Area 2: The ocean recreational fishery in CRC Area 2 was open for all salmon species Sunday through Thursday June 24 - August 2, and seven days per week August 3 - September 23. A daily bag limit of two salmon, one of which could be a Chinook, was in effect June 24 - August 16; the bag limit was modified in-season to two salmon from August 17 – August 31. From June 24-August 31, all retained coho were required to have a healed adipose fin clip. The fishery was modified to allow retention of unmarked coho beginning September 1 with a bag limit of two salmon, one of which could be a coho; the bag limit was modified to 2 salmon effective September 13. The season closed as scheduled on September 23. A total of 82 fishing days were available in the area.

CRC Area 3: The ocean recreational fishery in CRC Area 3 was open for all salmon species seven days per week from July 1 through September 23. From September 29 - October 14, salmon fishing was open and restricted to the part of Area 3 north of 47°50'00" north latitude and south of 48°00'00" north latitude, seven days per week. A daily bag limit of two salmon was in effect throughout the season. All retained coho were required to have a healed adipose fin clip. A total of 101 fishing days were available in the area.

CRC Area 4: The ocean recreational fishery in CRC Area 4 was open for all salmon species seven days per week from July 1 through September 23. A daily bag limit of two salmon was in effect July 1 - July 15 and August 17 – September 23; the bag limit was modified in-season to two salmon, one of which could be a Chinook July 16 - August 16. Beginning August 1, Chinook retention east of the Bonilla-Tatoosh line and chum retention were prohibited. All retained coho were required to have a healed adipose fin clip. A total of 85 fishing days were available in the area.

The all-species fishery operated under preseason quotas of 43,500 landed Chinook and 69,720 landed marked coho.

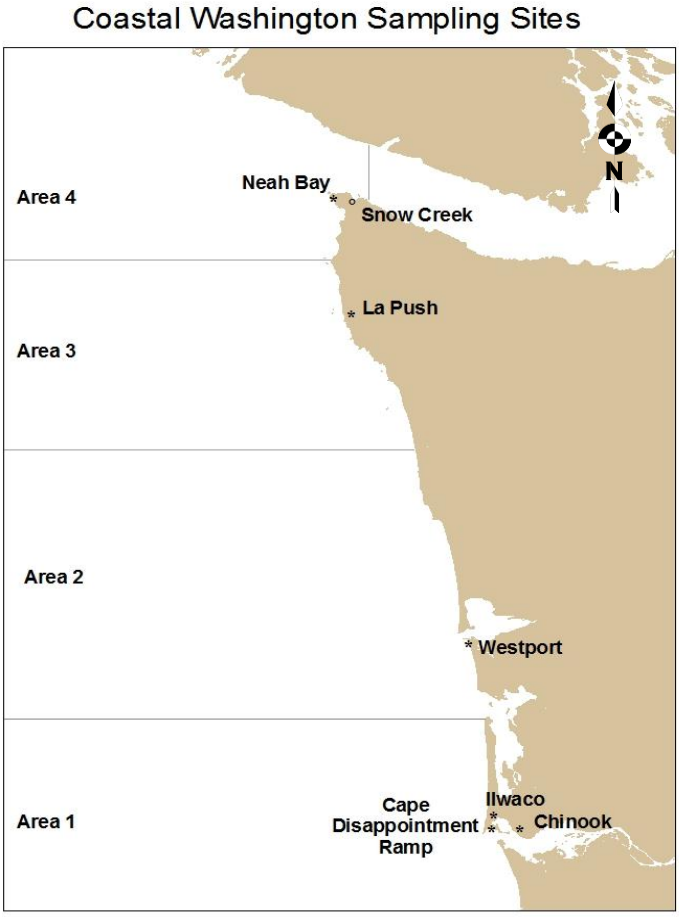

Figure 1. Map of coastal Washington showing the ocean catch record card areas (Areas 1 through 4) and major sampling sites**.**

2.3 Non-Treaty Commercial Troll Fisheries (Coho Mark-Selective)

The non-Treaty troll fishery was open from Cape Falcon, Oregon to the U.S./Canada border May 1-June 20 and June 22-29 for all salmon except coho (a total of 59 days). The fishery reopened from Cape Falcon to the U.S./Canada border July 1-4, 6-10, 13-17, 20-24, July 27-31, August 3-7, 10-14, 17-21, 24-28, August 31-September 4, for all salmon species except no chum retention north of Cape Alava, WA in August and September. All retained coho were required to have a healed adipose fin clip. A total of 49 fishing days were available during the summer mark-selective coho fishery. The fishery was open September 7-11 and September 14-18 in the area between Cape Falcon and Cape Alava for all salmon species and no mark restriction on coho (a total of 10 days).

3. METHODS

WDFW's Ocean Sampling Program (OSP) implemented a comprehensive monitoring program in all ocean ports during the Chinook and coho selective fishery seasons in Washington ocean Areas 1-4. OSP collected the data needed to estimate key fishery parameters characterizing the ocean mark-selective fisheries and associated impacts on unmarked salmon. Sampling activities included dockside angler interviews (with catch sampling), total boat counts via exit or entrance counts at each major coastal port, direct on-the-water observations of salmon encounters during charter ride-along trips, and voluntary trip reports of completed trips provided by the angling public.

3.1 On-Board Observation

WDFW samplers conducted direct on-water observation of salmon encounters onboard charter vessels during both the recreational Chinook MSF and the recreational all-species coho MSF. Data collected onboard the charter boats were used to estimate the encounter rates of Chinook by size class and mark group (legal-size and marked [LM], legal-size and unmarked [LU], sublegal-size and marked [SM], and sublegal-size and unmarked [SU]), as well as encounter rates of marked and unmarked coho, and drop-offs. In addition, samplers collected DNA samples from legal sized and sublegal sized Chinook while onboard the charter vessels.

WDFW observers rode along on charter vessels and recorded all hook-ups aboard the vessel; for each hook-up, the following information was recorded: result of the hook-up (fish kept, released, or dropped off), species, mark status (marked or unmarked), and size class (legal or sublegal). A sampling protocol was established for the charter observers so that the most important information relative to this study was collected first. The first priority for the observers was to record the species, mark status, size category, and result of each hook-up aboard the vessel. Collection of these data enabled estimation of encounter rates for Chinook (by size/mark status) and coho (by mark status), and drop-off numbers. The second priority was to collect DNA samples (a small non-lethal clipping from the tip of the dorsal fin), lengths, and scale samples from all Chinook during the June Chinook MSF and from sublegal-sized Chinook during the all-species fishery. DNA from sublegal-sized Chinook was prioritized above that from legal-sized Chinook when Chinook retention was not mark-selective since legal-sized fish were available on the dock as well as at sea. The third priority was to collect DNA, lengths, and scale samples from legal-sized Chinook.

Direct on-water observation of salmon encounters was the primary method used in CRC Areas 1 and 2 to determine mark rates, encounter rates, and drop-off rates where charter vessel salmon fishing trips are numerous. The Voluntary Trip Report (VTR) system (see Section 3.2 below) was the secondary method used to collect encounter data in these two areas.

In CRC Areas 3 and 4, where few charter vessels take salmon fishing trips, and those who do are very small, the VTR system was the primary method used to collect on-water encounter data; the charter ride-along method was used secondarily in these areas.

3.2 Voluntary Trip Reports

Selective fishery encounter statistics were also acquired through Voluntary Trip Reports that WDFW samplers distributed and collected from the angling public in Areas 1 through 4. The VTR form is designed to capture information identical to that collected by on-board observers. Anglers complete the information on the form as they fish, minimizing recall error.

Samplers distributed VTRs beginning at 5:00 AM five days per week in La Push (CRC Area 3) and Neah Bay (CRC Area 4) during the Chinook MSF and the all-species fishery. In Ilwaco (CRC Area 1) and Westport (CRC Area 2), samplers were dedicated to distributing VTRs most weekend days and one to two days per week during weekdays. These samplers approached anglers as they prepared to depart for fishing, explained the purpose of the VTR and how to complete it, and encouraged anglers to record all encounters and return the form to a dockside sampler at the end of the day. Anglers could also mail these forms to the WDFW Region 6 office postage-paid.

Collection of VTR data was the primary method used in CRC Areas 3 and 4 to estimate mark rates, encounter rates, and drop-off rates. The VTR method was the secondary method used in CRC Areas 1 and 2.

3.3 Dockside Sampling

Dockside samplers were stationed in the four major landing ports for the ocean fisheries: Neah Bay, La Push, Westport, and Ilwaco (including the port of Chinook). The recreational fisheries in each port were sampled a minimum of 4 to 5 days per week, with weekend (Saturday, Sunday, and holidays) and weekday days (non-holiday Monday through Friday) stratified. Typically, all weekend days and a randomly-selected 3 of 5 weekdays were sampled. Total fishery catch and effort estimates were generated by the OSP using three types of data obtained during dockside sampling: effort counts, interview data, and examination of catch. Each is described below.

Effort Counts

On each sample day, a total recreational boat count was obtained either by counting boats exiting the port or entering the port. A minimum of 20% of the boats returning to the port within each boat type (charter and private) was sampled. An exit count (a count of boats leaving the port) typically began at 4:30AM and continued through the end of the sampling day (exact time was port-specific). An entrance count (a count of boats entering the port) usually began near 8:00AM and continued through dusk. Whether OSP samplers conducted exit or entrance counts varied based on specific considerations for each port. Regardless of the method used, this effort count, taken on every sampled day, provided the total counts of charter and private boats to which sample data were expanded.

Angler Interviews and Catch Sampling

WDFW samplers stationed in coastal ports collected catch and effort information during dockside angler interviews of boats exiting the fishery in Areas 1-4. Information collected

during each sample included number of anglers, target species, area fished, landed catch by species, mark status of landed salmon, identification and recovery of coded wire tags, and angler estimates of released salmon by species and mark status and of released groundfish by species. Additionally, dockside samplers collected DNA samples, lengths, and scale samples from landed Chinook as time allowed.

3.4 Estimating Catch and Effort

3.4.i Estimated Stratum Totals (Primary Stage)

Combined (total) catch estimates are typically stratified by weekend/holiday and weekday. In some strata, every day is sampled. In those strata the combined estimates are simply sums of the daily catches. In other strata, where some days are not sampled, the average catch per day over all sampled days is multiplied by the number of days in the stratum to estimate the total catch.

Let:

a = the marine catch area,

i = trip type,

t = Weekend/holiday or Weekday stratum,

N_t = the number of days in stratum t,

T_t = collection of all days in stratum t,

n_t = the number of days sampled in stratum t,

S_t = collection of sampled days in stratum t (when S=T, n=N),

Y_{taik} = estimated catch (or effort) on day k for stratum t in area a from trip type i,

C_{tai} = catch for stratum t in area a from trip type i,

Then

$$\hat{C}_{tai} = N_t \frac{\sum_{k \in S_t} \hat{Y}_{taik}}{n_t}$$

with estimated variance (see Thompson 1992, p. 129):

$$\hat{V}\left(\hat{C}_{tai}\right) = \frac{N_t (N_t - n_t)}{n_t} \frac{\sum_{k \in S_t} \left(\hat{Y}_{taik} - \hat{\bar{Y}}_{tai}\right)^2}{n_t - 1} + \frac{N_t}{n_t} \sum_{k \in S_t} \hat{V}\left(\hat{Y}_{taik}\right)$$

where

$$\hat{\bar{Y}}_{tai} = \frac{\sum_{k \in S_t} \hat{Y}_{taik}}{n_t}.$$

For strata with all days sampled, $n_t = N_t$, and the catch and variance estimators reduce to:

$$\hat{C}_{tai} = \sum_{k \in T_t} \hat{Y}_{taik}$$

and

$$\hat{V}\left(\hat{C}_{tai}\right) = \sum_{k \in T_t} \hat{V}\left(\hat{Y}_{taik}\right).$$

3.4.ii Daily Catch and Effort Estimation (Secondary Stage)

Both catch and effort are post-stratified by trip-type and area fished. Effort in terms of boat-trips is simply the sample number of boats for each trip-type and area expanded by the appropriate boat-type (charter or private) exit/entrance count. Effort in terms of angler-trips is calculated as the mean number of anglers per boat (indexed by trip-type and area) expanded by the counted total population of boats.

The total catch for a given species on a sampled day is the product of the population of boats and the estimated catch per boat, again post-stratified by trip-type and area fished. Key assumptions in the current estimation procedures are that:

1) All boats exiting/entering a port are included in the exit/entrance count
2) Exit/entrance counts are made without error
3) The approximate systematic sample of boats can be treated as a simple random sample
4) Anglers answer questions accurately and do not conceal fish

In the following discussion, subscripts referring to port and boat-type are suppressed. Let:

M_t = total exit or entrance count for a given port on day *t* (assumed known without error),

m_t = total boats sampled on day *t*,

m_{tai} = number of boats sampled of trip type *i* fishing in area *a* on day *t*,

a_{taij} = number of anglers on the *j*th boat from trip type *i* fishing in area *a* on day *t*,

y_{taij} = number of species specific fish caught on the *j*th boat from trip type *i* in area *a* on day *t*, and

Y_{tai} = total catch of specific species caught from trip type *i* in area *a* on day *t*.

The estimate of the number of boat-trips of trip-type *i* and area *a* follows the procedure outlined in Lai et. al. (1991) where the proportion of boats in each category is estimated by:

$$\hat{p}_{tai} = \frac{m_{tai}}{m_t}$$

with estimated variance (see Cochran 1977, p. 52):

$$V(\hat{p}_{tai}) = \frac{\hat{p}_{tai} \cdot (1 - \hat{p}_{tai})}{(m_t - 1)} \cdot (\frac{M_t - m_t}{M_t})$$

The estimated total boat-trips is then obtained by:

$$\hat{M}_{tai} = M_t \cdot \hat{p}_{tai}$$

with estimated variance:

$$\hat{V}(\hat{M}_{tai}) = M^2{}_t \cdot \hat{V}(\hat{p}_{tai})$$

Effort expressed in terms of angler-trips is the product of the average anglers per boat-trip times the total number of boat-trips. The mean number of anglers per boat-trip (for trip-type *i* and fishing area *a*) is estimated as:

$$\hat{\bar{a}}_{tai} = \frac{\sum_j a_{taij}}{m_t}$$

with variance:

$$\hat{V}(\hat{\bar{a}}_{tai}) = \frac{\sum_j (a_{taij} - \hat{\bar{a}}_{tai})^2}{m_t (m_t - 1)} \cdot (\frac{M_t - m_t}{M_t})$$

Thus the estimated total number of angler-trips is:

$$\hat{a}_{tai} = M_t \cdot \hat{\bar{a}}_{tai}$$

with variance:

$$\hat{V}(\hat{a}_{tai}) = M^2{}_t \cdot \hat{V}(\hat{\bar{a}}_{tai})$$

The catch (or number released) for a specific species on sampled day *t* in area *a* from trip type *i* is similarly estimated by:

$$\hat{Y}_{tai} = \frac{\sum_j y_{taij}}{m_t} M_t$$

with estimated variance:

$$\hat{V}\left(\hat{Y}_{tai}\right) = \frac{\sum_j \left(y_{taij} - \hat{\bar{y}}_{tai}\right)^2}{m_t\left(m_t - 1\right)} M_t\left(M_t - m_t\right)$$

This estimate and its variance differs somewhat from that described in Lai et al. (1991) since the total count, M_t (assumed to be a known quantity), is used to expand the estimated CPUE (calculated over all sampled boats) rather than the estimated boat-trips by trip-type and area fished.

3.5 Estimating Chinook Encounters and Mortalities

The overall impacts of the June 2012 recreational mark-selective Chinook fishery in ocean Areas 1-4 are characterized in terms of grand-total estimates of Chinook encounters and mortalities and by using estimates specific to each of the four size/mark-status groups (i.e., legal-marked [LM], sublegal-marked [SM], legal-unmarked [LU], and sublegal-unmarked [SU]; **Table 1**). The method described above in section 3.4 was used to generate total estimates of angler effort, retained catch by species, and releases of all fish species except for Chinook salmon released during the June 2012 Chinook MSF in Areas 1-4. To estimate Chinook salmon releases (and thus, total encounters) by size/mark group, we applied Conrad and McHugh's (2008) bias-corrected approach, the same method that the Puget Sound Sampling Unit (PSSU) has used since 2008 to estimate Chinook releases in Puget Sound mark-selective Chinook fisheries (e.g., WDFW 2011).

Prior to summer 2008, PSSU had generated two different Chinook encounters estimates based on two separate estimation methods ("Method 1" and "Method 2"; see WDFW 2011 and Conrad and McHugh 2008 for details). Method 1 estimates of total Chinook encounters were derived from the combination of dockside observations of landed catch and angler interview responses about salmon releases; thus, as Conrad and McHugh explain, the accuracy of Method 1 estimates depended heavily on the ability of anglers to correctly recall and report the number of Chinook they actually encountered and released. Method 2 estimates of Chinook encounters were obtained using the creel survey estimates of the total number of legal-size, marked Chinook harvested in combination with the on-water observation or VTR data to estimate both the total number of Chinook encounters and to apportion the encounters to four size/mark status categories (LM, LU, SM, SU). The Method 2 estimator was derived assuming that anglers retain all LM Chinook encountered; therefore, its accuracy depended on the extent to which angler behavior deviates from this idealized case. Based on their analyses and practical considerations regarding the most feasible bias correction approaches, Conrad and McHugh ultimately recommended using Method 2 with a correction for the release of legal-size marked Chinook as the preferred method for estimating total Chinook encounters in mark-selective Chinook fisheries. After a thorough state-tribal technical review of Conrad and McHugh's method in

August 2008, state and tribal technical representatives agreed to use this bias-corrected approach to produce a "best estimate" of Chinook encounters.

Thus, we estimated Chinook releases in the June 2012 Chinook MSF as the difference between retained catch (i.e., from the dockside creel survey) and total Chinook encounters (i.e., releases = encounters – retained catch) generated using Conrad and McHugh (2008) approach. We first divided the creel estimate of legal-marked Chinook harvest by the onboard observer-based estimate of the proportion of the fishable Chinook population that was of legal size and marked (i.e., the former "Method 2" approach; WDFW 2011). Given that this approach yields negatively biased estimates if anglers release any of the legal-marked Chinook they encounter, we then applied Conrad and McHugh's bias correction factor to account for this phenomenon (13%) and incorporated it into the estimator (See **Appendix A** for complete computational details).

We estimated total Chinook mortality resulting from the June 2012 selective Chinook fishery by applying assumed mortality rates to the total harvest and release estimates for the four size/mark-status groups (LM, LU, SM, and SU). For retained Chinook, the mortality estimate was equivalent to the total harvest estimate for the applicable size/mark-status group. We applied a selective fishing mortality (*sfm*) rate of 14% to legal (marked and unmarked) and sublegal (marked and unmarked) release totals, to estimate release mortality in the ocean (the same *sfm* value used in FRAM). See **Appendix A** for a complete description of our impact estimation procedure, including formulae for total and variance estimators.

The final step of our overall impacts assessment involved comparing fishery outcomes to pre-season expectations. To do this, we compared season-total estimates of Chinook encounters and mortalities to pre-season modeled values (FRAM model run no. 1512) for each size and mark status category.

Table 1. Sampling/estimation details on target parameters associated with the overall mark-selective Chinook fishery monitoring program in Washington coastal Areas 1 through 4.

Activity	Focal Parameter(s)	Secondary Parameter(s)	Sample Unit(s)	Finest Estimation Time Step	Comments
Dockside Creel Sampling	Fishing effort (boat & angler trips); retained and released fish[1]	Catch rates (CPUE); length, age, and CWT composition of harvest	Boat trip; kept fish; reported fish release	Week	Within weeks, estimates are also produced by strata (weekday/weekend).
Onboard observation and VTRs	Size (legal/sublegal) and mark-status composition (marked, unmarked) of encountered Chinook	Chinook length, age, and DNA-based stock composition; species composition of non-Chinook encounters	Fish encounter	Season	Too few encounters occurred to assess mark rates on a finer time scale.
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	The temporal resolution of impact estimates is constrained by that of the observer encounters data.
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/] Under the "bias-corrected Method-2" approach, Chinook releases can be estimated only as finely as onboard observer data allow.

3.6 CWT Impacts

To understand the potential effects of the June, 2012 recreational mark-selective Chinook fishery in the ocean on the CWT program, we estimated the total number of unmarked-tagged Chinook mortalities that may have occurred during the course of the fishery. To do this, we acquired information for all marked CWT double index tag (DIT) groups present in landed catch from the Pacific States Marine Fisheries Commission's Regional Mark Information System (RMIS) and then applied the methods described by the Pacific Salmon Commission's Selective Fisheries Evaluation Committee–Analysis Work Group (SFEC-AWG 2002) to estimate the number of unmarked DIT fish encountered[1]. We subsequently estimated the number of these fish that may have died due to hook-and-release impacts using an *sfm* analogous to that used in FRAM modeling. Given our interest in characterizing the impacts of mark-selective regulations on the CWT program and not recreational fishing in general, we used an *sfm* of 14% in all unmarked-DIT mortality calculations. The *sfm* value of 14% did not include unseen drop-off mortality (assumed to be 5% in FRAM) because drop-off mortality occurs in both selective and non-selective recreational Chinook fisheries.

[1] For all unmarked-DIT encounters and mortalities calculations, we relied on the unmarked-to-marked abundance ratio (λ) estimated for DIT groups at the time of juvenile release.

We estimated Chinook encounters and mortalities for each recovered DIT individually and then summed estimates for each hatchery, brood year, and area based on the methods described by SFEC-AWG 2002. Thus, the estimated number of unmarked mortalities was calculated as:

$$\hat{U}_a^{MSF} = \lambda^{REL} \hat{M}_a^{MSF} sfm$$

with associated variance:

$$Var(\hat{U}_a^{MSF}) \approx \left(\lambda^{REL}\right)^2 sfm^2 \hat{M}_a^{MSF} \frac{1-s}{s}.$$

where:

sfm = selective fishing mortality rate (10%, *excludes drop-off mortality*),
$U_{a,i}^{MSF}$ = aged *a* unmarked DIT mortalities from stock *i* in the selective fishery,
$M_{a,i}^{MSF}$ = aged *a* marked DIT mortalities from stock *i* in the selective fishery,
s = sampling rate of the catch,
λ^{REL} = unmarked-to-marked ratio *at release* for fish in a DIT group
$Var(U_{a,i}^{MSF})$ = variance of $U_{a,i}^{MSF}$.

In addition to estimating unmarked-DIT mortalities, we pooled all CWTs (DIT and otherwise) recovered during the fishery and, based on this total, report the proportional contribution (unexpanded recoveries) of different hatcheries to the total Chinook harvest (See CWT Results below).

4. RESULTS IN JUNE CHINOOK MARK SELECTIVE RECREATIONAL FISHERY

4.1 Dockside Sampling Results

WDFW dockside samplers interviewed an estimated 44% of all anglers fishing in Washington coastal Areas 1 through 4 during the June 2012 mark-selective Chinook fishery; a total of 3,451 anglers in 981 boats were enumerated in-sample (**Table 2**). In addition, a total of 43% (3,153) of all Chinook harvested in ocean Areas 1 through 4 were sampled, from which 498 readable coded wire tags (CWTs) were collected in Washington's coastal ports (**Table 2**).

Estimates of Fishing Effort and Chinook Catch

An estimated 8,096 angler trips (7,852 from Washington, 244 from Oregon) were completed by private and charter anglers during the 2012 coastwide Chinook MSF. These anglers harvested a total of 7,673 Chinook coastwide (7,383 WA, 290 OR) (**Table 3**). Landed Chinook catch totaled 96% of the overall fishery quota of 8,000.

A total of 15,234 Chinook encounters were estimated in Washington ocean waters during the 2012 mark-selective Chinook fishery, for CRC Areas 1 through 4 combined (**Table 4**). This total consisted of an estimated 7,383 retained (7,339 marked, 43 unmarked) and 7,852 released (2,867marked, 4,984 unmarked) Chinook salmon.

CWT Samples

Observed (unexpanded) stock composition results for the 498 in-sample coded wire tag recoveries are presented by area in **Tables 5-1** through **5-4** for Areas 1 through 4, respectively.

In Area 1, samplers recovered a total of 132 readable CWTs, 27% of the CWTs recovered in all four areas combined. The majority of these recoveries (74%) were from Columbia River hatcheries, with 43% from Upper Columbia River hatcheries, 16% from Snake River hatcheries, 9% from Lower Columbia River hatcheries and 6% from Central Columbia River hatcheries. The remaining recoveries were from California (24%), Washington (2%) and British Columbia (1%) hatcheries (**Table 5-1**). Ten of the CWT recoveries in Area 1 were from double index tag (DIT) release groups.

In Area 2, samplers recovered a total of 300 readable CWTs, 60% of the total tags recovered in all four ocean areas combined. The majority of these recoveries (80%) were from Columbia River hatcheries, with 35% from Upper Columbia River hatcheries, 22% from Snake River hatcheries, 14% from Lower Columbia River hatcheries and 9% from Central Columbia River hatcheries. The remaining recoveries were from California (13%), Washington (6%) and Oregon (1%) hatcheries (**Table 5-2**). Forty-one of the CWT recoveries in Area 2 were from double index tag (DIT) release groups.

In Area 3, samplers recovered a total of 4 readable CWTs, 1% of the total tags recovered in all four ocean areas combined. The majority of these recoveries (75%) were from Columbia River hatcheries, with 50% from Lower Columbia River hatcheries and 25% from Upper Columbia

River hatcheries. The remaining 25% were from Washington hatcheries (**Table 5-3**). One of the CWT recoveries in Area 3 was from a double index tag (DIT) release group.

In Area 4, samplers recovered a total of 62 readable CWTs, 12% of the total tags recovered in all four ocean areas combined. The majority of these recoveries (69%) were from Columbia River hatcheries, with 26% from Upper Columbia River hatcheries, 18% from Snake River hatcheries, 16% from Central Columbia River hatcheries and 10% from Lower Columbia River hatcheries. The remaining 31% were from Washington (18%), British Columbia (6%), Oregon (3%) and California (3%) hatcheries (**Table 5-4)**. Twenty-three of the CWT recoveries in Area 4 were from a double index tag (DIT) release group.

Table 2. Dockside sampling statistics during the June, 2012 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4.

	Boats Sampled	**Sample Rate**	**Anglers Sampled**	**Sample Rate**	**Landed Chinook Sampled**	**Sample Rate**	**Coded wire tags processed**
Area 4	298	64%	786	65%	538	66%	62
Area 3	68	76%	183	78%	62	72%	4
Area 2	493	31%	1,964	35%	1,946	36%	300
Area 1	122	60%	518	64%	607	59%	132
Total WA	**981**	**42%**	**3,451**	**44%**	**3,153**	**43%**	**498**

Table 3. Estimates of total fishing effort and number of Chinook retained during the June, 2012 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4.

			Estimated Chinook Retained		
	Total Boat Trips	**Total Angler Trips**	**Marked**	**Unmarked**	**TOTAL**
Area 4	466	1,204	806	6	812
Area 3	90	236	84	2	86
Area 2	1,573	5,601	5,444	15	5,459
Area 1	204	811	1,004	22	1,026
TOTAL WA	**2,333**	**7,852**	**7,339**	**43**	**7,383**
TOTAL OR	N/A	244	282	8	290
Season Total:	**2,333**	**8,096**	**7,621**	**51**	**7,673**
Variance: 1/	16,796	145,336	185,849	773	186,622
WA Standard Error:	130	381	431	28	432
WA CV (%):	6%	5%	6%	64%	6%
WA 95% CI:	2,079-2,587	7,105-8,599	6,494-8,184	-11-98	6,536-8,229

[1/] Variance estimates are unavailable for Oregon statistics.

Table 4. Total estimates of fishing effort and the number of Chinook retained and released by mark status and by week, during the June, 2012 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4 combined.

Dates	Stat Week	Stratum Start Date	Stratum End Date	Effort		Retained Chinook		Released Chinook		Chinook Encounters Total
				Boats	Anglers	Marked	Unmarked	Marked	Unmarked	
June 9 - June 30, 2012 (See area-specific regs)	24	9-Jun	10-Jun	252	1,018	1,409	0	551	965	2,925
	25	11-Jun	17-Jun	959	3,339	3,238	18	1,265	2,200	6,721
	26	18-Jun	24-Jun	866	2,819	2,249	21	879	1,520	4,669
	27	25-Jun	30-Jun	254	677	443	4	173	299	919
Season Total:				2,332	7,853	7,339	43	2,867	4,984	15,234
Variance:				16,796	145,336	185,849	773	596,664	132,765	1,006,119
Standard Error:				130	381	431	28	772	364	1,003
CV (%):				5.6%	4.9%	5.9%	63.9%	26.9%	7.3%	6.6%
95% CI:				2,078-2,586	7,106-8,600	6,494-8,184	-11-98	1,353-4,381	4,270-5,699	13,268-17,200

[1/] Released Chinook were estimated as the difference between total Chinook encounters generated using the bias-corrected "Method 2" estimator (see Conrad and McHugh 2008) and creel-based estimates of retained Chinook.

Table 5-1. Summary of coded-wire tags recovered from Chinook salmon harvested in Washington coastal **Area 1** during the June 9-22, 2012 mark-selective Chinook fishery. The field "No. DITs" corresponds to the number of tags that belonged to double-index tag groups. Percentages in parentheses indicate the proportional contribution (unexpanded recoveries) of different hatcheries to the total Chinook harvest in Area 1.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	Number DITs
British Columbia (0.8%)	Fraser River – Thompson River (0.8%)	R-Chilliwack R	H-Chilliwack River H	1 (0.8%)	1
Washington (1.5%)	Northern Washington (0.8%)	East Sound Bay (SAN)	Glenwood Springs	1 (0.8%)	0
	Hood Canal (0.8%)	Finch Cr 16.0222	Hoodsport Hatchery	1 (0.8%)	0
Columbia River (74.2%)	Upper Columbia R (above McNary Dam; excludes Snake River) (43.2%)	Similkameen R 490325	Similkameen Hatchery	1 (0.8%)	0
		Col R @ Preist Rapids	Priest Rapids Hatchery	2 (1.5%)	2
		Col R @ Turtle Rock	Turtle Rock Hatchery	6 (4.5%)	0
		Okanogan R 49.0019	Bonaparte Pond	2 (1.5%)	0
		Columbia Near Wells	Wells Hatchery	9 (6.8%)	0
		Methow R+Banks Lk	Eastbank+Carlton Rearing	1 (0.8%)	0
		Similkameen R 490325	Similkameen Hatchery	16 (12.1%)	0
		Wenatchee R 45.0030	Dryden Pond	10 (7.6%)	0
		Chelan R 47.0052	Chelan River NP	6 (4.5%)	0
		Methow R 48.0002	Carlton Acclimation Pond	4 (3%)	0
	Central Columbia River (Bonneville Dam to McNary Dam) (6.1%)	Umatilla R	Umatilla Hatchery	1 (0.8%)	0
		Ltl White Salmon@NFH	Ltl White Salmon NFH	2 (1.5%)	1
		Spring Cr 29.0159	Spring Cr NFH	4 (3%)	4
		Klickitat Hatchery (YKFP)	Klickitat Hatchery (YKFP)	1 (0.8%)	0
	Lower Columbia River (mouth to Bonneville Dam) (9.1%)	Youngs R & Bay	Cedc Youngs Bay Net	1 (0.8%)	0
		Fallert Cr 27.0017	Fallert Cr Hatchery	1 (0.8%)	0
		Big Cr (Lwr Col R)	Big Cr Hatchery	1 (0.8%)	1
		Cowlitz R 26.0002	Cowlitz Salmon Hatchery	7 (5.3%)	0
		Cedar Cr #1 (Sandy R)	Sandy Hatchery	1 (0.8%)	0
		Blind Sl (Lwr Col R)	Cedc Youngs Bay Net	1 (0.8%)	0
	Snake River (15.9%)	Big Canyon Accl Pond	Lyons Ferry Hatchery	3 (2.3%)	0
		Couse Cr 35.2147	Lyons Ferry Hatchery	3 (2.3%)	0
		Snake L.Mon-Ltl Goos	Lyons Ferry Hatchery	1 (0.8%)	0
		Grand Ronde R35.2192	Irrigon Hatchery	1 (0.8%)	0
		Snake R-1 (Hells Canyon)	Umatilla Hatchery	1 (0.8%)	0
		CAPTAIN JOHNS PD	Lyons Ferry Hatchery	2 (1.5%)	0
		Snake @ Hells Canyon Dam	Oxbow Hatchery	1 (0.8%)	1
		Lyons Ferry Rel. Site	Lyons Ferry Hatchery	8 (6.1%)	0
		Snake R @ Pitt. Landing	Lyons Ferry Hatchery	1 (0.8%)	0
California (23.5%)	Central California Coast (6.1%)	Tiburon Net Pens	Feather R Hatchery	1 (0.8%)	0
		Santa Cruz Harbor Net Pen	Feather R Hatchery	1 (0.8%)	0
		Mare Island Net Pen	Nimbus Fish Hatchery	1 (0.8%)	0
		San Pablo Bay Net Pens	Feather R Hatchery	4 (3%)	0
		Mare Island Minor Pt	Coleman NFH	1 (0.8%)	0
	Sacramento River (10.6%)	Feather Boyds Pump Ramp	Feather R Hatchery	1 (0.8%)	0
		Coleman NFH	Coleman NFH	7 (5.3%)	0
		Sac R At Discovery Park	Nimbus Fish Hatchery	5 (3.8%)	0
		Sac R Colusa To RBDD	Coleman NFH	1 (0.8%)	0
	San Joaquin River (6.8%)	San Joaq Riv Jersey Pt	Merced R Fish Facility	1 (0.8%)	0
		San Joaq Shrm Isl Net Pen	Mok R Fish Ins	8 (6.1%)	0
			Total	**132**	**10**

Table 5-2. Summary of coded-wire tags recovered from Chinook salmon harvested in Washington coastal **Area 2** during the June 9-23, 2012 mark-selective Chinook fishery. The field "No. DITs" corresponds to the number of tags that belonged to double-index tag groups. Percentages in parentheses indicate the proportional contribution (unexpanded recoveries) of different hatcheries to the total Chinook harvest in Area 2.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	Number DITs
Washington (6%)	Northern Washington (1%)	Samish R 03.0005	Samish Hatchery	1 (0.3%)	1
		East Sound Bay (SAN)	Glenwood Springs	2 (0.7%)	0
	Hood Canal (2.7%)	Purdy Cr 16.0005	George Adams Hatchery	4 (1.3%)	4
		Finch Cr 16.0222	Hoodsport Hatchery	4 (1.3%)	0
	Mid Puget Sound (0.7%)	Voight Cr Tr 10.0428	Voights Cr Hatchery	1 (0.3%)	0
		Grovers Cr Hatchery	Grovers Cr Hatchery	1 (0.3%)	1
	Southern Puget Sound (1.7%)	Chambers Cr 12.0007	Chambers Cr Hatchery	1 (0.3%)	0
		Clear Cr 11.0013C	Clear Creek Hatchery	1 (0.3%)	1
		Kalama Cr 11.0017	Kalama Cr Hatchery	2 (0.7%)	0
		Lakewood Hatchery	Lakewood Hatchery	1 (0.3%)	0
Columbia River (80%)	Upper Columbia R (above McNary Dam; excludes Snake River) (35%)	Col R @ Priest Rapids	Priest Rapids Hatchery	2 (0.7%)	2
		Chelan R 47.0052	Chelan River NP	9 (3%)	0
		Entiat R 46.0042	Entiat NFH	1 (0.3%)	0
		Columbia Near Wells	Wells Hatchery	21 (7%)	0
		Methow R 48.0002	Carlton Acclimation Pond	6 (2%)	0
		Okanogan R 49.0019	Bonaparte Pond	4 (1.3%)	0
		Similkameen R 490325	Similkameen Hatchery	22 (7.3%)	0
		Col R @ Turtle Rock	Turtle Rock Hatchery	15 (5%)	0
		Wenatchee R 45.0030	Dryden Pond	23 (7.7%)	0
		Chelan R 47.0052	Chelan PUD Hatchery	1 (0.3%)	0
		Okanogan R 49.0019	Carlton Acclimation Pond	1 (0.3%)	0
	Central Columbia River (Bonneville Dam to McNary Dam) (9%)	Klickitat Hatchery (YKFP)	Klickitat Hatchery (YKFP)	2 (0.7%)	0
		Spring Cr 29.0159	Spring Cr NFH	10 (3.3%)	10
		Ltl White Salmon @ NFH	Ltl White Salmon NFH	9 (3%)	2
		Umatilla R	Umatilla Hatchery	4 (1.3%)	0
		Umatilla R	Bonneville Hatchery	2 (0.7%)	2
	Lower Columbia River (mouth to Bonneville Dam) (13.7%)	Youngs R & Bay	Cedc Youngs Bay Net	1 (0.3%)	0
		Big Cr (Lwr Col R)	Big Cr Hatchery	7 (2.3%)	7
		Santiam R S FK	South Santiam Hatch	2 (0.7%)	0
		Kalama R 27.0002	Kalama Falls Hatchery	2 (0.7%)	0
		Detroit Res (Santiam)	Marion Forks Hatch	1 (0.3%)	0
		Mckenzie R 1	Mckenzie Hatchery	4 (1.3%)	4
		Clackamas R	Clackamas Hatchery	2 (0.7%)	0
		Cedar Cr #1 (Sandy R)	Sandy Hatchery	7 (2.3%)	0
		Fallert Cr 27.0017	Fallert Cr Hatchery	2 (0.7%)	0
		Willamette R M FK-1	Dexter Ponds (Willamette)	4 (1.3%)	0
		Tanner Cr (Bonneville)	Bonneville Hatchery	3 (1%)	0
		Cowlitz R 26.0002	Cowlitz Salmon Hatch	6 (2%)	0
	Snake River (22.3%)	Clwtr @ Lapwai Crk	NPT Hatchery	1 (0.3%)	0
		Snake L.Mon-Ltl Goos	Lyons Ferry Hatchery	1 (0.3%)	0
		Luke's Gulch A F	NPT Hatchery	2 (0.7%)	0
		Grand Ronde R35.2192	Irrigon Hatchery	4 (1.3%)	0
		Captain Johns Pd	Lyons Ferry Hatchery	4 (1.3%)	0
		Big Canyon Accl Pond	Lyons Ferry Hatchery	8 (2.7%)	0
		Snake R-1 (Hells Canyon)	Umatilla Hatchery	5 (1.7%)	0
		Cottonwood Cr Pond	Lyons Ferry Hatchery	1 (0.3%)	0
		Snake@Hells Canyon Dam	Oxbow Hatchery	7 (2.3%)	7
		Couse Cr 35.2147	Lyons Ferry Hatchery	1 (0.3%)	0
		Snake R @ Pitt. Landing	Lyons Ferry Hatchery	7 (2.3%)	0
		Lyons Ferry Rel. Site	Lyons Ferry Hatchery	26 (8.7%)	0

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	Number DITs
Oregon (1%)	Northern Oregon Coast (0.3%)	Trask R	Trask R Ponds	1 (0.3%)	0
	Southern Oregon Coast (0.7%)	Rock Cr (N Umpqua R)	Rock Cr Hatchery	1 (0.3%)	0
		Elk R	Elk R Hatchery	1 (0.3%)	0
California (13%)	Central California Coast (4%)	Mare Island Net Pen	Nimbus Fish Hatchery	4 (1.3%)	0
		Mare Island Minor Pt	Coleman NFH	1 (0.3%)	0
		San Pablo Bay Net Pens	Feather R Hatchery	7 (2.3%)	0
	Sacramento River (5.3%)	Coleman NFH	Coleman NFH	5 (1.7%)	0
		Sac R At Discovery Park	Nimbus Fish Hatchery	10 (3.3%)	0
		American R At Sunrise	Nimbus Fish Hatchery	1 (0.3%)	0
		San Joaq Shrm Isl Net Pen	Mok R Fish Ins	11 (3.7%)	0
			Total	**300**	**41**

Table 5-3. Summary of coded-wire tags recovered from Chinook salmon harvested in Washington coastal **Area 3** during the June 16-30, 2012 mark-selective Chinook fishery. The field "No. DITs" corresponds to the number of tags that belonged to double-index tag groups. Percentages in parentheses indicate the proportional contribution (unexpanded recoveries) of different hatcheries to the total Chinook harvest in Area 3.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	Number DITs
Washington (25%)	Northern Washington Coast (25%)	Cook Cr 21.0429	Quinault NFH -Cook C	1 (25%)	0
Columbia River (75%)	Upper Columbia R (above McNary Dam; excludes Snake River) (25%)	Wenatchee R 45.0030	Dryden Pond	1 (25%)	0
	Lower Columbia River (mouth to Bonneville Dam) (50%)	Big Cr (Lower Col R)	Big Cr Hatchery	1 (25%)	1
		Klaskanine R N Fk	Klaskanine Hatchery	1 (25%)	0
			Total	**4**	**1**

Table 5-4. Summary of coded-wire tags recovered from Chinook salmon harvested in Washington coastal **Area 4** during the June 16-30, 2012 mark-selective Chinook fishery. The field "No. DITs" corresponds to the number of tags that belonged to double-index tag groups. Percentages in parentheses indicate the proportional contribution (unexpanded recoveries) of different hatcheries to the total Chinook harvest in Area 4.

Release Domain	Release Region	Release Site	Rearing Location	CWTs Recovered	Number DITs
British Columbia (6%)	Fraser River – Thompson River (4.8%)	R-Shuswap R Low	H-Shuswap River, Middle,	1 (1.6%)	0
		R-Shuswap R Middle	H-Shuswap River, Middle,	1 (1.6%)	0
		R-Chilliwack R	H-Chilliwack River H	1 (1.6%)	1
	Georgia Strait (1.6%)	R-Cowichan R	H-Cowichan River H	1 (1.6%)	0
Washington (18%)	North Washington (3.2%)	Samish R 03.0005	Samish Hatchery	1 (1.6%)	1
		Friday Cr 03.0017	Samish Hatchery	1 (1.6%)	1
	Hood Canal (6.5%)	Finch Cr 16.0222	Hoodsport Hatchery	2 (3.2%)	0
		Purdy Cr 16.0005	George Adams Hatchery	2 (3.2%)	2
	Mid Puget S (6.5%)	Grovers Cr Hatchery	Grovers Cr Hatchery	4 (6.5%)	4
	South Puget S (1.6%)	Clear Cr 11.0013C	Clear Creek Hatchery	1 (1.6%)	1
Columbia River (69%)	Upper Columbia R (above McNary Dam; excludes Snake River) (25.8%)	Columbia Near Wells	Wells Hatchery	2 (3.2%)	0
		Springs Cr 36.0114	Ringold Springs Hatchery	1 (1.6%)	0
		Okanogan R 49.0019	Carlton Acclimation Pond	1 (1.6%)	0
		Col R @ Turtle Rock	Turtle Rock Hatchery	3 (4.8%)	0
		Similkameen R 490325	Similkameen Hatchery	4 (6.5%)	0
		Okanogan R 49.0019	Bonaparte Pond	1 (1.6%)	0
		Wenatchee R 45.0030	Dryden Pond	4 (6.5%)	0
	Central Col River (Bville to McNary Dams) (16.1%)	Spring Cr 29.0159	Spring Cr NFH	8 (12.9%)	8
		Wind R 29.0023	Carson NFH	1 (1.6%)	0
		Ltl White Salmon @ NFH	Ltl White Salmon NFH	1 (1.6%)	0
	Lower Columbia River (mouth to Bonneville Dam) (9.7%)	Big Cr (Lower Col R)	Big Cr Hatchery	3 (4.8%)	3
		Cedar Cr #1 (Sandy R)	Sandy Hatchery	1 (1.6%)	0
		Sandy R	Clackamas Hatchery	1 (1.6%)	0
		Tongue Pt (Astoria)	Cedc Youngs Bay Net	1 (1.6%)	0
	Snake River (17.7%)	Couse Cr 35.2147	Lyons Ferry Hatchery	1 (1.6%)	0
		Snake R @ Pitt. Landing	Lyons Ferry Hatchery	1 (1.6%)	0
		Grand Ronde R35.2192	Irrigon Hatchery	1 (1.6%)	0
		Snake @ Hells Canyon Dam	Oxbow Hatchery	2 (3.2%)	2
		Captain Johns PD	Lyons Ferry Hatchery	1 (1.6%)	0
		Magrudor Corridor	NPT Hatchery	1 (1.6%)	0
		Lyons Ferry Rel. Site	Lyons Ferry Hatchery	2 (3.2%)	0
		Snake R-1 (Hells Canyon)	Umatilla Hatchery	2 (3.2%)	0
Oregon (3%)	S Oregon Coast (3.2%)	Elk R	Elk R Hatchery	2 (3.2%)	0
California (3%)	Klamath R – Trinity R (1.6%)	Trinity R Hatchery	Trinity R Hatchery	1 (1.6%)	0
	San Joaquin River (1.6%)	San Joaq Shrm Isl Net Pen	Mok R Fish Ins	1 (1.6%)	0
			Total	**62**	**23**

4.2 On-water Observations of Chinook Encounters

On-Board Observer Data

WDFW's observer staff conducted 11 on-the-water catch surveys onboard charter boats during the 15-day June 2012 selective Chinook fishery. Observers recorded a total of 237 encountered Chinook salmon in all four ocean areas combined. The size/mark status composition of these Chinook encounters is presented in **Table 6**. The following size/mark group composition was estimated from the 237 encounters: 42% LM, 26% LU, 19% SM, and 13% SU.

These estimated size/mark group proportions based on onboard observer data were combined with those estimated from our VTR data and used in subsequent impact estimation steps, as discussed further in the section below titled *Estimated Chinook Encounters and Mortalities* (see **Table 10** and **Appendix A)**. The decision to combine these data was based on *i)* the short duration of the fishery and the limited numbers of fish encountered during on-water observer trips, *ii)* the potential for differences in fishing patterns between charter and private vessels and the desire to represent both patterns, and *iii)* the lack of representation of catch in Areas 3 and 4 in the observer data.

DNA Results

Chinook DNA samples were collected only by onboard observers who had access to both marked and unmarked Chinook encounters during the June 2012 Chinook MSF. A total of 136 DNA samples were collected from legal sized Chinook and 58 from sublegal sized Chinook during the fishery (**Table 7**).

VTR Data

Additional on-the-water encounters data was provided via angler-completed voluntary trip reports (VTRs). Dockside samplers collected 117 completed and useable VTRs containing 728 Chinook encounters (**Table 8**). Chinook encounters of unknown size and/or unknown mark status were excluded in determining the size/mark status composition results based on VTR data, yielding a useable sample size of 675 Chinook encounters for Areas 1-4 combined. The following size/mark group composition was estimated from these 675 useable encounters: 60% LM, 23% LU, 9% SM, and 8% SU. The VTR data were used in conjunction with observer data in subsequent fishery-wide impacts estimation steps (i.e., **Appendix A**).

We also combined the onboard observer- and VTR-based encounters data to compare observed (field-estimated) mark rates in each area with preseason FRAM-predicted values. The combined onboard observer and VTR data indicated mark rates of 70% for legal sized Chinook and 55% for sublegal sized Chinook coast-wide (**Table 9**).

Table 6. Summary of on-water Chinook encounters data by size and mark group, collected by WDFW observers sampling onboard charter boats during the June, 2012 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4.

	Total Observer Trips	OBSERVER DATA								
		LEGAL SIZED			SUBLEGAL SIZED			UNKNOWN SIZE		
		Marked	Unmarked	Unknown	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown
Area 4	2	1	2	0	1	1	0	0	0	0
Area 3	0	-	-	-	-	-	-	-	-	-
Area 2	7	57	36	0	23	15	0	0	0	0
Area 1	2	41	24	0	22	14	0	0	0	0
TOTAL	**11**	**99**	**62**	**0**	**46**	**30**	**0**	**0**	**0**	**0**
Size/Mark Comp 1/		41.8%	26.2%	-	19.4%	12.7%	-	-	-	-

1/ Chinook encounters of unknown size and/or unknown mark status were excluded in determining the overall size/mark status composition based on observer data, as indicated by the dash (--).

Table 7. Number of Chinook DNA samples collected by WDFW observers onboard charter vessels during the June, 2012 mark-selective Chinook fishery in Washington coastal Areas 1-4.

	LEGAL SIZED			SUBLEGAL SIZED		
	Marked	Unmarked	Total	Marked	Unmarked	Total
Area 4	1	2	3	0	1	1
Area 3	0	0	0	0	0	0
Area 2	49	29	78	18	14	32
Area 1	38	17	55	17	8	25
TOTAL	**88**	**48**	**136**	**35**	**23**	**58**

Table 8. Summary of on-water Chinook encounters by size class and mark status, as reported on angler-completed voluntary trip reports (VTRs) during the June, 2012 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4.

	Total VTRs Collected	VOLUNTARY TRIP REPORT DATA								
		LEGAL SIZED			SUBLEGAL SIZED			UNKNOWN SIZE		
		Marked	Unmarked	Unknown	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown
Area 4	20	74	23	0	8	17	0	0	0	2
Area 3	2	1	1	0	0	0	0	0	0	0
Area 2	86	312	111	5	50	32	14	3	5	2
Area 1	9	19	17	1	2	8	21	0	0	0
TOTAL	**117**	**406**	**152**	**6**	**60**	**57**	**35**	**3**	**5**	**4**
Size/Mark Comp		60.1%	22.5%	-	8.9%	8.4%	-	-	-	-

1/ Chinook encounters of unknown size and/or unknown mark status were excluded in determining the overall size/mark status composition based on VTR data, as indicated by the dash (--).

Table 9. Estimated mark rates for legal- and sublegal-sized Chinook during the June, 2012 recreational Chinook mark-selective fishery in Washington coastal Areas 1 through 4, based on onboard observer and VTR data combined, compared with FRAM preseason predicted values.

	LEGAL SIZED			SUBLEGAL SIZED			FRAM preseason projected mark rate (legal sized)
	Marked	Unmarked	Mark Rate	Marked	Unmarked	Mark Rate	
Area 4	75	25	75%	9	18	33%	79%
Area 3	1	1	50%	0	0	-	79%
Area 2	369	147	72%	73	47	61%	64%
Area 1	60	41	59%	24	22	52%	74%
TOTAL	**505**	**214**	**70%**	**106**	**87**	**55%**	

4.3 Overall Fishery Impacts

Estimated Total Chinook Encounters and Mortalities

We derived size/mark-status group-specific estimates of Chinook encounters from a combination of the dockside sampling results (i.e., retained harvest estimates presented in **Tables 2** and **4**) and the on-water observer and VTR based size/mark-status composition data (**Tables 6 and 8**; see **Appendix A** for computational details). In total, we estimated that anglers fishing in Washington coastal Areas 1 through 4 (combined) encountered 8,435 LM, 3,575 LU, 1,771 SM, and 1,453 SU Chinook during the 15-day June 2012 selective Chinook fishery (**Table 10**). Given the estimates of harvest and the assumed selective fishing mortality (*sfm*) rate of 0.14 for both legal-sized and sublegal-sized Chinook, these encounters translated into a total of 8,482 estimated Chinook mortalities (7,382 retained and 1,099 released; 7,492 LM, 538 LU, 248 SM, and 203 SU) in ocean Areas 1 through 4 combined (**Table 10**). Of the total estimated mortalities, 87% were attributed to retention of legal-size marked Chinook.

FRAM versus Creel Comparison

Comparisons of Chinook encounters and mortalities projected in the final preseason FRAM model run (FRAM number 1512) with observed encounters and mortalities are presented in **Tables 11** and **12**. These comparisons are illustrated in **Figure 2**. FRAM projections include encounters and mortalities in Oregon waters; however, observed total encounters and mortalities are not available for Oregon waters. Oregon landed catch comprised 4% of the total landed catch in the ocean Chinook MSF. Both observed encounters and estimated mortalities were less than those projected in preseason FRAM model run 1512 for both legal and sublegal marked and unmarked Chinook (**Tables 11** and **12**, **Figure 2**).

Estimated CWT-DIT Impacts

Of the 498 decoded coded-wire tags recovered during the June 2012 ocean mark-selective Chinook fishery in Areas 1-4 combined, a total of 75 belonged to double-index tag (DIT) release groups (**Table 13**). Based on the release details associated with these tags and their unmarked sister groups, we obtained an estimate of the unmarked-to-marked ratio (λ) at juvenile release for each applicable hatchery of origin and brood year, and we used this value to estimate total

unmarked DIT encounters for the entirety of the June 2012 selective Chinook fishery in the four areas. In total, we estimated that 140 unmarked-DIT Chinook were encountered during the fishery. Given an assumed *sfm* rate of 0.14 for the estimated unmarked DIT fish that were encountered and released, we estimate that 20 unmarked DIT fish may have died as a result of the June 2012 ocean selective Chinook fishery (**Table 13**).

Table 10. Summary of the fishery impact estimates for the June, 2012 mark-selective Chinook fishery in Washington coastal Areas 1 through 4.

Size/Mark Group	Encounters	Number Retained	Number Released	Release Mortality Rate	Release Mortality	Total Mortality	Variance	SE	95% CI	CV (%)
Legal Marked	8,435	7,339	1,097	0.14	154	7,492	196,767	444	6,623-8,362	6%
Legal Unmarked	3,575	43	3,531	0.14	494	538	2,767	53	435-641	10%
Sublegal Marked	1,771	0	1,771	0.14	248	248	777	28	193-303	11%
Sublegal Unmarked	1,453	0	1,453	0.14	203	203	608	25	155-252	12%
TOTAL ALL GROUPS	15,234	7,382	7,852	0.14	1,099	8,482	200,919	448	7,603-9,360	5%

Table 11. Comparison of modeled (FRAM model run #1512) and estimated total Chinook encounters in the June, 2012 mark-selective Chinook fishery in Washington coastal Areas 1 through 4.

Data Source	Group	Total Encounters 1/	Legal	Sublegal	Landed Only (WA + OR)
FRAM Encounters (WA and OR)	Unmarked	6,543	4,164	2,379	83
	Marked	12,851	9,101	3,750	7,917
	Total	19,394	13,265	6,129	8,000
	% Marked	66%	69%	61%	99%
Estimated (Creel) Encounters (WA only)	Unmarked	5,028	3,575	1,453	51
	Marked	10,206	8,435	1,771	7,621
	Total	15,234	12,010	3,224	7,673
	% Marked	67%	70%	55%	99%

1/ Observed (field-estimated) Chinook encounters by size class and mark status are not available for Oregon waters; landed catch includes Oregon.

Table 12. Comparison of modeled (FRAM model run #1512) and estimated total Chinook mortalities in the June, 2012 mark-selective Chinook fishery in Washington coastal Areas 1 through 4.

Mortality Category	FRAM Chinook Mortalities (WA + OR)			Estimated Chinook Mortalities 1/ (WA only)		
	Unmarked	Marked	Total	Unmarked	Marked	Total
Total (Landed + Released)	1,196	9,063	10,259	749	8,022	8,772
Released Legal	780	621	1,401	494	154	648
Released Sublegal	333	525	858	203	248	451
Landed Only (WA + OR)	83	7,917	8,000	51	7,621	7,673

1/ Observed (field-estimated) Chinook mortalities by size class and mark status are not available for Oregon waters; landed catch includes Oregon.

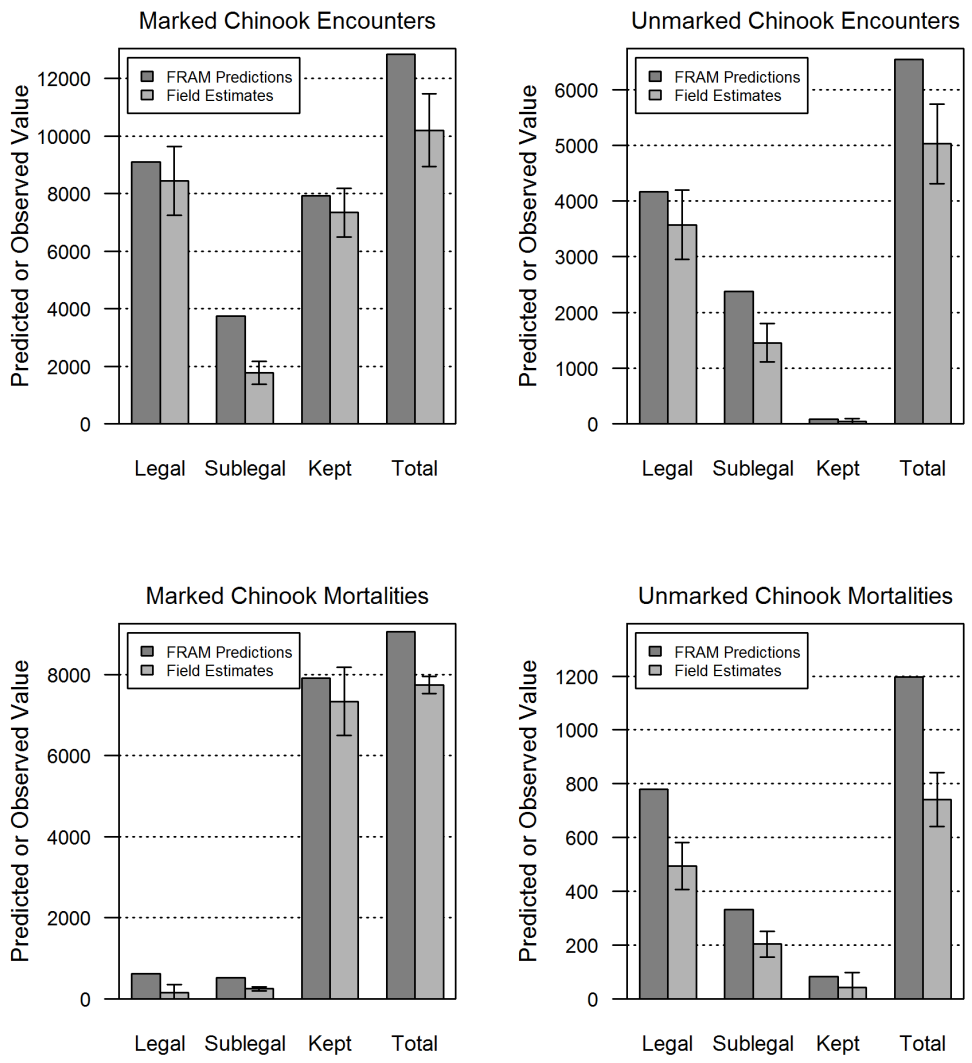

Figure 2. Comparison of modeled (i.e., using FRAM, model run 1512) and estimated total Chinook encounters (*top panel*) and mortalities (*bottom panel*) for the June, 2012 mark-selective Chinook fishery in Washington coastal Areas 1-4.

Table 13. 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 June 2012 mark-selective Chinook fishery in Washington coastal Areas 1 through 4.

Area	Hatchery	Brood Year	DITs Obs	AD DIT Harvest Est	AD DIT Harvest v(Est)	UM DIT Enc	UM DIT Mortality Est	UM DIT Mortality v(Est)	UM DIT Mortality SE(Est)
1	BIG CR HATCHERY	2009	1	1.7	1.2	1.7	0.2	0.023	0.2
	H-CHILLIWACK RIVER H	2009	1	1.7	1.2	0.9	0.1	0.006	0.1
	LTL WHITE SALMON NFH	2009	1	1.7	1.2	1.7	0.2	0.023	0.2
	OXBOW HATCHERY	2009	1	1.7	1.2	0	0	0	0
	PRIEST RAPIDS HATCHERY	2009	2	3.4	2.3	5.6	0.8	0.1	0.5
	SPRING CR NFH	2009	4	6.8	4.7	6.8	0.9	0.1	0.6
	Total		**10**	**16.9**	**11.7**	**16.6**	**2.3**	**0.3**	**1.5**
2	BIG CR HATCHERY	2009	7	19.6	35.4	19.6	2.7	0.7	2.2
	BONNEVILLE HATCHERY	2008	1	2.8	5.1	4.6	0.7	0.3	0.5
	BONNEVILLE HATCHERY	2009	1	2.8	5.1	3.8	0.5	0.2	0.4
	CLEAR CREEK HATCHERY	2009	1	2.8	5.1	2.8	0.4	0.1	0.3
	GEORGE ADAMS HATCHRY	2008	1	2.8	5.1	2.8	0.4	0.1	0.3
	GEORGE ADAMS HATCHRY	2009	3	8.4	15.2	8.4	1.2	0.3	0.9
	GROVERS CR HATCHERY	2009	1	2.8	5.1	2.7	0.4	0.1	0.3
	LTL WHITE SALMON NFH	2009	2	5.6	10.1	5.7	0.8	0.2	0.6
	MCKENZIE HATCHERY	2008	3	8.4	15.2	0.2	0.026	0	0.021
	MCKENZIE HATCHERY	2009	1	2.8	5.1	0.039	0.005	0	0.004
	OXBOW HATCHERY	2009	7	19.6	35.4	0	0	0	0
	PRIEST RAPIDS HATCHERY	2009	2	5.6	10.1	9.3	1.3	0.5	1
	SAMISH HATCHERY	2009	1	2.8	5.1	2.8	0.4	0.1	0.3
	SPRING CR NFH	2009	10	28.1	50.6	28.1	3.9	1	3.2
	Total		**41**	**115**	**207.6**	**90.9**	**12.7**	**3.6**	**10.2**
3	BIG CR HATCHERY	2009	1	1.4	0.5	1.4	0.2	0.01	0.1
	Total		**1**	**1.4**	**0.5**	**1.4**	**0.2**	**0.01**	**0.1**
4	BIG CR HATCHERY	2009	3	4.5	2.3	4.5	0.6	0.045	0.4
	CLEAR CREEK HATCHERY	2009	1	1.5	0.8	1.5	0.2	0.015	0.1
	GEORGE ADAMS HATCHRY	2009	2	3	1.5	3	0.4	0.03	0.2
	GROVERS CR HATCHERY	2008	1	1.5	0.8	1.7	0.2	0.019	0.1
	GROVERS CR HATCHERY	2009	3	4.5	2.3	4.4	0.6	0.042	0.4
	H-CHILLIWACK RIVER H	2009	1	1.5	0.8	0.8	0.1	0.004	0.1
	OXBOW HATCHERY	2009	2	3	1.5	0	0	0	0
	SAMISH HATCHERY	2008	1	1.5	0.8	1.5	0.2	0.015	0.1
	SAMISH HATCHERY	2009	1	1.5	0.8	1.5	0.2	0.015	0.1
	SPRING CR NFH	2009	8	12.1	6.1	12.1	1.7	0.1	1
	Total		**23**	**34.7**	**17.7**	**31**	**4.3**	**0.3**	**2.5**
Grand Total (All WA Ocean Areas)			**75**	**168**	**237.5**	**139.9**	**19.5**	**4.21**	**14.3**

Table 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 Summer mark-selective Chinook fisheries in Washington coastal Areas 1 through 4.

Year	Effort (Angler-trips)	Retained Chinook				Released Chinook				Total Encounters
		LM	LU	SM	SU	LM	LU	SM	SU	
2010	10,004	4,981	19	0	0	744	2,620	1,892	946	11,202
2011	4,895	2,301	35	0	0	344	1,247	2,759	1,462	8,146
2012	7,853	7,339	43	0	0	1,097	3,531	1,771	1,453	15,234

5. RESULTS IN THE ALL-SPECIES COHO MARK SELECTIVE RECREATIONAL FISHERY

5.1 Dockside Sampling Results

An estimated 63,520 angler trips (59,376 from Washington, 4,144 from Oregon) were completed by private and charter anglers during the 2012 coastwide all-species coho MSF. These anglers harvested a total of 26,259 Chinook coastwide (24,890 WA, 1,369 OR) and 26,081 coho (24,640 WA, 1,441 OR). **Table 15** shows effort and catch by month and area during the 2012 coho MSF. Note that effort and catch from the non-mark-selective fishery in September in Areas 1 and 2 are not included in this analysis.

WDFW dockside samplers interviewed an estimated 47% of all anglers fishing from WA coastwide during the coho MSF. A total of 45% of all Chinook and 52% of all coho harvested in WA were sampled; 1,600 coded wire tags (CWTs) were collected from sampled Chinook and 1,218 were collected from sampled coho in WA ports (**Table 16**).

5.2 On-water Observation and VTR Results

OSP observer staff conducted a total of 43 on-the-water catch surveys during the all-species coho mark-selective fishery and encountered a total of 249 legal sized Chinook, 175 sublegal sized Chinook, 636 legal sized coho, and 34 sublegal sized coho. Dockside samplers also collected 241 completed and useable VTRs containing 353 legal sized Chinook encounters, 196 sublegal sized Chinook encounters, 1,143 legal sized coho encounters, and 50 sublegal sized coho encounters (**Tables 17 and 18**). Mark rates calculated from onboard observer and VTR data are shown in **Table 19** and compared to preseason FRAM coho mark rate projections.

5.3 Overall Fishery Impacts

Estimated Total Coho Encounters and Mortalities

FRAM pre-season projections of coho encounters (Washington and Oregon) in the 2012 ocean recreational all-species coho mark-selective fisheries are compared with field estimates (Washington only) in **Table 20**. **Table 21** compares total coho mortalities projected pre-season by FRAM (Washington and Oregon) with estimated coho mortalities (Washington only).

The overall impacts of the 2012 recreational mark-selective coho fishery in ocean Areas 1-4 are characterized in terms of grand-total estimates of coho encounters and mortalities and by using estimates specific to mark group (i.e., marked and unmarked). The method described in section 3.4 was used to generate total estimates of retained catch by mark group. To estimate coho salmon encounters and releases by mark group, we applied Conrad's (2012) proposed alternative method for estimating coho encounters and release mortalities in ocean mark-selective fisheries, which independently calculates charter and private vessel totals based on observer and VTR data. This method differs from that used in 2011 and prior years.

Observed marked and unmarked coho retention is calculated from dockside sampling data as described in Section 3.4; note that since catch estimates are stratified by week, monthly total proportions of marked and unmarked retained estimated catch may vary slightly from monthly

total proportions of marked and unmarked sampled coho. Encounters are calculated by boat type and area based on landed catch of legal sized marked coho, the proportion of observed encounters that were legal sized marked coho, and the proportion of observed encounters that were legal sized marked coho retained. Mortality was estimated for each mark group based on calculated encounters and the proportion of the legal sized coho of that mark status that were released multiplied by the PFMC ocean *sfm* rate of 14% (Conrad, 2012).

Figure 3 summarizes the projected and estimated coho encounters and mortality by area in the all-species fishery. Note that projected encounters and mortality includes the Oregon portion of the fishery while the field estimates do not.

Both estimated coho encounters and total mortalities were lower than projected preseason in Catch Areas 1 and 2 since total catch was well below preseason expectations. Estimated coho encounters and total mortalities were higher than projected preseason in Catch Areas 3 and 4, as total catch was greater than preseason expectations. Overall, total coastwide estimated encounters and mortalities were less than those projected preseason.

Compliance

Table 22 reports compliance rates observed by dockside samplers for the recreational fisheries by area and month. Coastwide, compliance with selective fishery regulations averaged 99%, similar to that observed in the last eight seasons.

Drop Off Mortality

On-water observers and volunteer anglers were asked to record information on fish that were hooked but lost before being brought to the boat, commonly referred to as drop offs. For this study, the definition of drop off was that the fish was actually hooked but became free before it could be landed. Current PFMC methodology for estimating mortality due to drop off uses a rate of 5% of the total number of fish handled (retention plus release).

Estimates of drop off mortality rates from on-water observation and VTR data collected during the recreational fisheries are compared with FRAM projections in **Table 23**.

5.4 DNA Data Collection

A total of 1,944 DNA samples were collected from Chinook by onboard and dockside samplers during the summer all-species recreational fishery. **Table 24** describes the numbers of samples by size class, mark status, and method of collection.

Table 15. Estimates of total fishing effort and number of Chinook and coho retained during the 2012 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

	TOTAL ANGLER TRIPS						CHINOOK RETAINED						COHO RETAINED					
	June	**July**	**August**	**Sept**	**Oct**	**TOTAL**	**June**	**July**	**August**	**Sept**	**Oct**	**TOTAL**	**June**	**July**	**August**	**Sept**	**Oct**	**TOTAL**
Area 4	-	7,324	3,641	1,268	-	**12,234**	-	3,524	1,173	42	-	**4,740**	27	3,643	3,094	784	-	**7,548**
Area 3	-	1,190	1,379	768	353	**3,690**	-	463	443	153	133	**1,192**	-	473	1,052	698	21	**2,243**
Area 2	2,586	8,898	14,147	-	-	**25,632**	2,116	4,033	6,709	-	-	**12,857**	184	3,124	3,375	-	-	**6,683**
Area 1	1,153	5,420	9,341	1,906	-	**17,820**	767	2,191	2,663	480	-	**6,101**	196	3,057	4,404	509	-	8,166
TOTAL WA	**3,739**	**22,833**	**28,509**	**3,942**	**353**	**59,376**	**2,883**	**10,211**	**10,988**	**676**	**133**	**24,890**	**407**	**10,297**	**11,925**	**1,990**	**21**	**24,640**
OREGON (Area 1)	398	1,792	1,954	-	-	**4,144**	288	650	431	0	-	**1,369**	86	615	740	0	-	**1,441**
TOTAL NOF	**4,137**	**24,625**	**30,463**	**3,942**	**353**	**63,520**	**3,171**	**10,861**	**11,419**	**676**	**133**	**26,259**	**493**	**10,912**	**12,665**	**1,990**	**21**	**26,081**
WA Variance: 1/						431,952						188,767						186,335
WA Standard Error:						657						434						432
WA CV (%):						1%						2%						2%
WA 95% CI:						58,088-60,664						24,038-25,741						23,794-25,486

[1/] Variance estimates are unavailable for Oregon statistics.

Table 16. WA dockside sampling statistics during the 2012 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

	Anglers Sampled	**Sample Rate**	**Landed Chinook Sampled**	**Sample Rate**	**Landed Coho Sampled**	**Sample Rate**	**Chinook CWTs collected**	**Coho CWTs collected**
Area 4	6,206	51%	2,368	50%	4,023	53%	285	319
Area 3	2,516	68%	819	69%	1,540	69%	59	106
Area 2	9,900	39%	4,851	38%	2,523	38%	684	246
Area 1	9,437	53%	3,237	53%	4,697	58%	572	547
TOTAL WA	**28,059**	**47%**	**11,275**	**45%**	**12,783**	**52%**	**1,600**	**1,218**

Table 17. On-board Chinook encounters by size class and mark status in the 2012 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

		On-board observation							VTRs						
		Total Observer Trips	LEGAL-SIZED			SUBLEGAL-SIZED			Total VTRs Collected	LEGAL-SIZED			SUBLEGAL-SIZED		
			Marked	Unmarked	Unknown	Marked	Unmarked	Unknown		Marked	Unmarked	Unknown	Marked	Unmarked	Unknown
Area 4	June	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July	1	2	3	0	0	1	1	46	30	37	7	7	15	2
	August	-	-	-	-	-	-	-	15	13	6	1	0	4	0
	September	-	-	-	-	-	-	-	4	1	1	0	1	6	0
	TOTAL	**1**	**2**	**3**	**0**	**0**	**1**	**1**	**65**	**44**	**44**	**8**	**8**	**25**	**2**
Area 3	June	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July	1	0	1	0	0	0	0	22	27	10	1	5	4	0
	August	1	0	3	0	0	0	0	9	1	1	0	1	1	0
	September	-	-	-	-	-	-	-	14	1	6	0	0	3	0
	TOTAL	**2**	**0**	**4**	**0**	**0**	**0**	**0**	**45**	**29**	**17**	**1**	**6**	**8**	**0**
Area 2	June	3	28	8	0	6	5	0	11	18	6	2	2	4	3
	July	8	38	27	0	23	27	1	51	44	22	7	20	40	4
	August	10	45	29	0	7	9	0	24	25	22	2	1	3	3
	September	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL	**21**	**111**	**64**	**0**	**36**	**41**	**1**	**86**	**87**	**50**	**11**	**23**	**47**	**10**
Area 1	June	3	3	10	0	9	16	0	4	6	5	2	5	2	3
	July	8	18	9	0	6	12	0	21	16	17	1	11	11	6
	August	8	15	10	0	29	23	0	18	10	5	0	7	7	12
	September	-	-	-	-	-	-	-	2	0	0	0	2	1	0
	TOTAL	**19**	**36**	**29**	**0**	**44**	**51**	**0**	**45**	**32**	**27**	**3**	**25**	**21**	**21**

Table 18. On-board coho encounters by size class and mark status in the 2012 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

		On-board observation							VTRs						
		Total Observer Trips	LEGAL-SIZED			SUBLEGAL-SIZED			Total VTRs Collected	LEGAL-SIZED			SUBLEGAL-SIZED		
			Marked	Unmarked	Unknown	Marked	Unmarked	Unknown		Marked	Unmarked	Unknown	Marked	Unmarked	Unknown
Area 4	June	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July	1	6	11	0	0	0	0	46	88	197	0	2	2	0
	August	-	-	-	-	-	-	-	15	44	65	0	1	0	0
	September	-	-	-	-	-	-	-	4	16	20	0	4	6	0
	TOTAL	**1**	**6**	**11**	**0**	**0**	**0**	**0**	**65**	**148**	**282**	**0**	**7**	**8**	**0**
Area 3	June	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	July	1	0	0	0	0	0	0	22	36	58	2	0	0	0
	August	1	5	6	0	0	0	0	9	26	56	0	0	1	0
	September	-	-	-	-	-	-	-	14	41	162	0	1	4	0
	TOTAL	**2**	**5**	**6**	**0**	**0**	**0**	**0**	**45**	**103**	**276**	**2**	**1**	**5**	**0**
Area 2	June	3	3	3	0	0	0	0	11	2	3	0	0	1	0
	July	8	39	80	0	2	1	0	51	35	86	0	0	8	2
	August	10	57	157	0	8	3	0	24	20	54	0	1	3	0
	September	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	TOTAL	**21**	**99**	**240**	**0**	**10**	**4**	**0**	**86**	**57**	**143**	**0**	**1**	**12**	**2**
Area 1	June	3	8	25	0	0	2	0	4	0	0	0	0	0	0
	July	8	41	51	0	1	0	0	21	23	19	0	2	4	0
	August	8	52	92	0	9	6	2	18	27	54	0	2	2	0
	September	-	-	-	-	-	-	-	2	3	6	0	2	2	0
	TOTAL	**19**	**101**	**168**	**0**	**10**	**8**	**2**	**45**	**53**	**79**	**0**	**6**	**8**	**0**

Table 19. Estimated Chinook and coho mark rates during the 2012 all-species recreational fishery (coho mark-selective) by size class using onboard observer and VTR encounters.

		LEGAL SIZED CHINOOK			SUBLEGAL SIZED CHINOOK			LEGAL SIZED COHO			FRAM Projected Coho Mark Rate
		Observer	VTR	Combined	Observer	VTR	Combined	Observer	VTR	Combined	
Area 4	June	-	-	-	-	-	-	-	-	-	-
	July	40%	45%	44%	0%	32%	30%	35%	31%	31%	48%
	August	-	68%	68%	-	0%	0%	-	40%	40%	45%
	September	-	50%	50%	-	14%	14%	-	44%	44%	48%
	TOTAL	**40%**	**50%**	**49%**	**0%**	**24%**	**24%**	**35%**	**34%**	**34%**	**47%**
Area 3	June	-	-	-	-	-	-	-	-	-	-
	July	0%	73%	73%	-	56%	56%	-	38%	38%	47%
	August	0%	50%	50%	-	50%	50%	45%	32%	33%	49%
	September	-	14%	14%	-	0%	0%	-	20%	20%	37%
	TOTAL	**0%**	**63%**	**58%**	**-**	**43%**	**43%**	**45%**	**27%**	**28%**	**46%**
Area 2	June	78%	75%	77%	55%	33%	47%	50%	40%	45%	53%
	July	58%	67%	63%	46%	33%	39%	33%	29%	31%	51%
	August	61%	53%	58%	44%	25%	40%	27%	27%	27%	45%
	September	-	-	-	-	-	-	-	-	-	37%
	TOTAL	**63%**	**64%**	**63%**	**47%**	**33%**	**40%**	**29%**	**29%**	**29%**	**45%**
Area 1	June	23%	55%	38%	36%	71%	44%	24%	-	24%	62%
	July	67%	48%	57%	33%	50%	43%	45%	55%	48%	58%
	August	60%	67%	63%	56%	50%	55%	36%	33%	35%	51%
	September	-	-	-	-	67%	67%	-	33%	33%	50%
	TOTAL	**55%**	**54%**	**55%**	**46%**	**54%**	**49%**	**38%**	**40%**	**38%**	**53%**

Table 20. Comparison of modeled (FRAM model run #1229, includes Washington and Oregon) and estimated (Washington only) total coho encounters in the 2012 ocean coho mark-selective fishery.

Data Source	Area	Marked	Unmarked	Total Encounters	Landed Catch
FRAM (WA and OR)	Area 4	7,529	8,659	16,188	7,250
	Area 3	1,880	2,169	4,049	1,810
	Area 2	26,745	33,008	59,753	25,800
	Area 1	36,389	32,654	69,043	34,860
	TOTAL	**72,543**	**76,490**	**149,033**	**69,720**
Estimated Actual Encounters (WA only)	Area 4	8,125	15,434	23,559	7,548
	Area 3	2,266	5,234	7,500	2,243
	Area 2	6,898	16,995	23,894	6,683
	Area 1	8,121	12,850	20,971	8,166
	TOTAL	**25,411**	**50,512**	**75,923**	**24,640**
	Variance:	1,127,761	4,542,465	10,104,070	186,335
	Standard Error:	1,062	2,131	3,179	432
	CV (%):	4%	4%	4%	2%
	95% CI:	23,330-27,493	46,335-54,690	69,693-82,154	23,794-25,486

Table 21. Comparison of modeled (FRAM model run #1229, includes Washington and Oregon) and estimated (Washington only) total coho mortalities in the 2012 ocean coho mark-selective fishery.

Data Source	Area	Release Mortality		Drop Off Mortality a/		Landed Catch		Total Mortality
		Marked	Unmarked	Marked	Unmarked	Marked	Unmarked	
FRAM (WA and OR)	Area 4	64	1,188	376	433	7,076	174	9,311
	Area 3	16	297	94	108	1,766	44	2,325
	Area 2	225	4,529	1,337	1,650	25,140	660	33,541
	Area 1	306	4,480	1,820	1,634	34,205	654	43,099
	TOTAL	**611**	**10,494**	**3,627**	**3,825**	**68,187**	**1,532**	**88,276**
Estimated Actual Encounters (WA only)	Area 4	100	2,154	406	772	7,409	139	10,980
	Area 3	7	733	113	262	2,217	27	3,358
	Area 2	37	2,364	345	850	6,636	47	10,278
	Area 1	0	1,769	406	642	8,121	45	10,984
	TOTAL	**144**	**7,019**	**1,271**	**2,526**	**24,383**	**257**	**35,599**
	Variance:	1,166	104,253	2,819	11,356	183,351	2,984	-
	Standard Error:	34	323	53	107	428	55	-
	CV (%):	24%	5%	4%	4%	2%	21%	-
	95% CI:	77-211	6386-7,651	1,166-1,375	2,317-2,734	23,544-25,222	150-364	-

a/ Observed drop off mortality calculated as 5% of observed encounters.

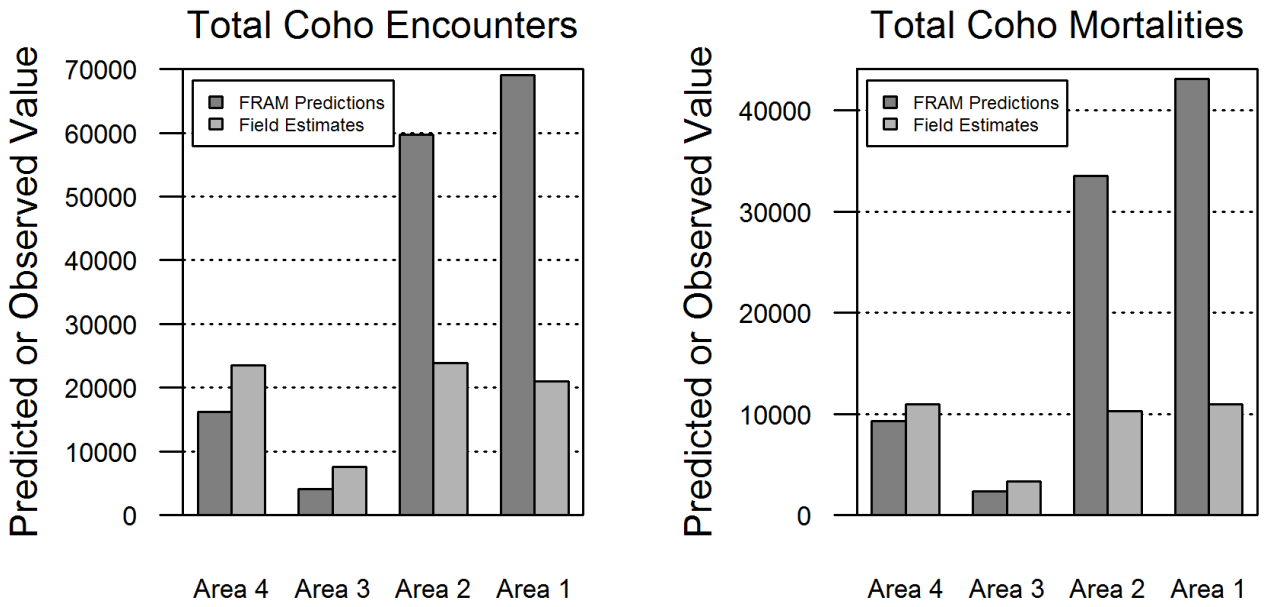

Figure 3. Comparison of modeled (FRAM model run #1229, includes Washington and Oregon) and estimated (Washington only) total coho encounters and mortality in the 2012 all-species recreational fishery (coho mark-selective).

Table 22. Compliance with coho selective fishery regulations observed during dockside sampling interviews in the 2012 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

		Total Coho Sampled	Marked Coho Sampled	Unmarked Coho Sampled	% Sampled Coho Marked
Area 4	June	-	-	-	-
	July	1,861	1,827	34	98.2%
	August	1,748	1,714	34	98.1%
	September	414	413	1	99.8%
	Total	**4,023**	**3,954**	**69**	**98.3%**
Area 3	June	-	-	-	-
	July	305	305	0	100.0%
	August	730	720	10	98.6%
	Sept./Oct.	505	499	6	98.8%
	Total	**1,540**	**1,524**	**16**	**99.0%**
Area 2	June	45	44	1	97.8%
	July	1,423	1,416	7	99.5%
	August	1,055	1,045	10	99.1%
	September	-	-	-	-
	Total	**2,523**	**2,505**	**18**	**99.3%**
Area 1	June	99	98	1	99.0%
	July	2,044	2,034	10	99.5%
	August	2,443	2,436	7	99.7%
	September	113	109	4	96.5%
	Total	**4,699**	**4,677**	**22**	**99.5%**

Table 23. Estimated drop off mortality rate in the 2012 all-species recreational fishery (coho mark-selective only) using on-water observation data and voluntary trip reports.

		On-Board Observation					VTRs				
		Total Salmon Handled	Observed Drop Offs	Estimated Observed Drop Off Mortality a/	FRAM Total Drop Off Mortality b/	Observed Drop Off Mortality Rate c/	Total Salmon Handled	Observed Drop Offs	Estimated Observed Drop Off Mortality a/	FRAM Total Drop Off Mortality b/	Observed Drop Off Mortality Rate c/
Area 4	June	-	-	-	-	-	-	-	-	-	-
	July	24	3	0	1	1.8%	387	39	5	19	1.4%
	August	-	-	-	-	-	137	10	1	7	1.0%
	September	-	-	-	-	-	55	1	0	3	0.3%
	Total	**24**	**3**	**0**	**1**	**1.8%**	**579**	**50**	**7**	**29**	**1.2%**
Area 3	June	-	-	-	-	-	-	-	-	-	-
	July	1	3	0	0	42.0%	143	9	1	7	0.9%
	August	14	1	0	1	1.0%	89	2	0	4	0.3%
	Sept./Oct.	-	-	-	-	-	218	59	8	11	3.8%
	Total	**15**	**4**	**1**	**1**	**3.7%**	**450**	**70**	**10**	**23**	**2.2%**
Area 2	June	53	7	1	3	1.8%	41	5	1	2	1.7%
	July	238	36	5	12	2.1%	268	41	6	13	2.1%
	August	315	43	6	16	1.9%	134	16	2	7	1.7%
	September	-	-	-	-	-	-	-	-	-	-
	Total	**606**	**86**	**12**	**30**	**2.0%**	**443**	**62**	**9**	**22**	**2.0%**
Area 1	June	73	21	3	4	4.0%	23	5	1	1	3.0%
	July	138	36	5	7	3.7%	112	29	4	6	3.6%
	August	238	45	6	12	2.6%	126	23	3	6	2.6%
	September	-	-	-	-	-	16	11	2	1	9.6%
	Total	**449**	**102**	**14**	**22**	**3.2%**	**277**	**68**	**10**	**14**	**3.4%**

[a/] Assume 14% hooking mortality rate on observed drop offs.
[b/] Total drop off mortality calculated using FRAM methodology (5% of handled fish).
[c/] Estimated drop off mortality/Total salmon handled; 5% used by FRAM pre-season.

Table 24. Number of Chinook DNA samples collected by onboard and dockside samplers from the 2012 ocean recreational all-species fishery, by size class, mark status, and sample type.

		On-Board Sampling						Dockside Sampling			Total Number of DNA Samples
		Legal Sized			Sublegal Sized			Legal-Sized			
		Marked	Unmarked	Unknown	Marked	Unmarked	Unknown	Marked	Unmarked	Unknown	
Area 4	June	-	-	-	-	-	-	-	-	-	-
	July	2	3	0	0	1	0	92	55	0	153
	August	-	-	-	-	-	-	55	48	0	103
	September	-	-	-	-	-	-	3	3	2	8
	Total	**2**	**3**	**0**	**0**	**1**	**0**	**150**	**106**	**2**	**264**
Area 3	June	-	-	-	-	-	-	-	-	-	-
	July	0	1	0	0	0	0	27	25	0	53
	August	0	3	0	0	0	0	19	27	0	49
	Sept./Oct.	-	-	-	-	-	-	14	37	0	51
	Total	**0**	**4**	**0**	**0**	**0**	**0**	**60**	**89**	**0**	**153**
Area 2	June	27	7	0	5	5	0	44	7	0	95
	July	37	27	0	23	28	0	142	65	1	323
	August	46	27	0	6	9	0	143	79	0	310
	September	-	-	-	-	-	-	70	78	0	148
	Total	**110**	**61**	**0**	**34**	**42**	**0**	**399**	**229**	**1**	**876**
Area 1	June	3	10	0	7	13	0	29	10	0	72
	July	18	9	0	6	9	0	116	85	5	248
	August	15	9	0	23	18	0	94	66	1	226
	September	-	-	-	-	-	-	47	58	0	105
	Total	**36**	**28**	**0**	**36**	**40**	**0**	**286**	**219**	**6**	**651**

6. RESULTS IN THE ALL-SPECIES COHO MARK SELECTIVE NON-TREATY COMMERCIAL TROLL FISHERY

The non-Treaty commercial troll fishery harvested a total of 16,212 Chinook (14,168 WA, 2,044 OR) and 2,327 coho (2,252 WA, 75 OR) during the 2012 coastwide all-species coho MSF operating July through September. **Table 25** shows catch by month and area.

WDFW dockside samplers sampled a total of 30% of all Chinook and 31% of all coho harvested and landed in WA. Coded wire tag collections totaled 304 from Chinook and 53 from coho in WA ports (**Table 26**).

Table 27 details numbers of Chinook DNA samples collected in WA by month and area, including during the non mark-selective spring Chinook fishery. A total of 776 DNA samples were collected from Chinook by dockside samplers throughout the May – September non-Treaty troll fishery (504 in May-June, 272 in July-September).

Table 25. Total Chinook and coho retained during the 2012 all-species non-Treaty commercial troll fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

	Chinook				Coho			
	July	**August**	**September**	**TOTAL**	**July**	**August**	**September**	**TOTAL**
Area 4	157	421	225	803	0	125	79	204
Area 3	3,524	5,868	1,747	11,139	256	839	278	1,373
Area 2	1,631	109	186	1,926	490	152	8	650
Area 1	66	0	234	300	23	2	0	25
TOTAL WA	**5,378**	**6,398**	**2,392**	**14,168**	**769**	**1,118**	**365**	**2,252**
OREGON (Area 1)	210	149	1,685	2,044	39	35	1	75
TOTAL NOF	**5,588**	**6,547**	**4,077**	**16,212**	**808**	**1,153**	**366**	**2,327**

Table 26. Chinook and coho sampled in WA during the 2012 all-species non-Treaty commercial troll fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

	Chinook			Coho		
	Total Sampled	**Sample Rate**	**CWTs Collected**	**Total Sampled**	**Sample Rate**	**CWTs Collected**
Area 4	204	25%	14	120	59%	10
Area 3	3,458	31%	207	405	29%	31
Area 2	481	25%	72	147	23%	10
Area 1	63	21%	11	22	88%	2
TOTAL WA	**4,206**	**30%**	**304**	**694**	**31%**	**53**

Table 27. Number of chinook DNA samples collected from the 2012 non-treaty troll fishery by size class, mark status.

AREA	MONTH	Dockside Sampling			Total Number of DNA Samples
		Legal-Sized			
		Marked	Unmarked	Unknown	
Area 4	May	13	17	0	30
	June	0	9	0	9
	July	2	3	0	5
	August	2	6	0	8
	September	0	0	0	0
	Total	**17**	**35**	**0**	**52**
Area 3	May	86	127	0	213
	June	32	64	0	96
	July	15	69	0	84
	August	15	86	0	101
	September	7	37	0	44
	Total	**155**	**383**	**0**	**538**
Area 2	May	1	0	0	1
	June	46	16	6	68
	July	12	8	0	20
	August	0	0	0	0
	September	0	0	0	0
	Total	**59**	**24**	**6**	**89**
Area 1	May	13	4	0	17
	June	52	18	0	70
	July	5	5	0	10
	August	0	0	0	0
	September	0	0	0	0
	Total	**70**	**27**	**0**	**97**

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APPENDICES

Appendix A. Mark-selective fishery impact estimation details for the pilot recreational selective Chinook fishery in Washington coastal Areas 1 through 4.

Below are definitions and equations for all quantities used in estimating mark-selective fishery impacts from the combination of dockside creel survey information, on-water observer data, and/or voluntary trip report (VTR) results as applicable. The estimation sequence builds from monthly[2] estimators of encounters-by-class (i.e., the four size [legal, sublegal] × mark-status [marked, unmarked] groups) to season-wide impact estimates.

A. Total and Class-specific Encounters Estimation

The first step towards quantifying mark-selective fishery impacts by size/mark-status class is to estimate total Chinook encounters ($\hat{E}_i$, includes retained + released Chinook; See *Monthly Encounters* below) for each month of the fishery. Secondarily, encounters are apportioned to the appropriate size/mark-status group using encounters-composition data collected from onboard sampling on charter boats (See *Estimating Chinook Encounter Composition* on following page).

Monthly Encounters

$\hat{E}_i$ = Total Chinook encounters for month *i*, which is estimated by combining creel estimates of legal-marked Chinook harvest ($\hat{K}_{LM\,i}$, defined on subsequent page) with an estimate of the proportion of the fishable Chinook population that is of legal size and marked ($\hat{p}_{LM\,i}$, defined on subsequent page). Given the potential for negative bias in $\hat{E}_i$ if anglers release any of the legal-marked Chinook that they encounter, the $\hat{E}_i$ estimator also includes a "correction" to account for this phenomenon (i.e., 1-$p_{\text{LM-R}}$, where $p_{\text{LM-R}}$ is the estimated legal-marked Chinook release rate)[3]. $\hat{E}_i$ and its variance are estimated as:

$$(1) \qquad \hat{E}_i = \frac{\hat{K}_{LM}}{[\hat{p}_{LM}(1-p_{LM-R})]}$$

$$(2) \qquad \text{var}(\hat{E}_i) = \frac{1}{[(1-p_{LM-R})^2]} * \left[\frac{\hat{K}_{LM\,i}^{\,2}}{\hat{p}_{LM\,i}^{\,2}} * \left(\frac{\text{var}(\hat{K}_{LM\,i})}{\hat{K}_{LM\,i}^{\,2}} + \frac{\text{var}(\hat{p}_{LM\,i})}{\hat{p}_{LM\,i}^{\,2}} \right) \right]$$

[2] **Note:** For fisheries characterized by short-duration seasons (i.e., ~ 1 month), the "monthly" estimators described in this appendix are synonymous season-total estimators.

[3] Equations 1 and 2 were modified based on a 2008 state–tribal evaluation of sources of bias in estimates of total Chinook encounters in mark-selective fisheries. Based on a review of relevant data, the current operational $p_{\text{LM-R}}$ (combined intentional and unintentional LM Chinook release rate) applied in the bias-corrected $\hat{E}_i$ estimator is 0.13. See Conrad and McHugh (2008) for further detail.

Estimating Chinook Encounter Composition

$\hat{p}_{LMi}$ = the onboard observer (charter ride-along)-based estimate of the proportion of Chinook encounters that are legal-sized (*L*) and marked (*M*) during month *i*

$\hat{p}_{LUi}$ = the estimated proportion of encounters that are legal-sized (*L*) and unmarked (*U*)

$\hat{p}_{SMi}$ = the estimated proportion of encounters that are sublegal-sized (*S*) and unmarked (*M*)

$\hat{p}_{LUi}$ = the estimated proportion of encounters that are sublegal-sized (*S*) and unmarked (*U*)

For each *XY* combination (where *X* = *L* or *S* and *Y* = *M* or *U*), $\hat{p}_{XYi}$ and its variance is estimated as:

(3) $\hat{p}_{XYi} = n_{XYi} / n_i$, and

(4) $\text{var}(\hat{p}_{XYi}) = [\hat{p}_{XYi}(1 - \hat{p}_{XYi})]/(n_i - 1)$,

Where, n_i = the total number of fish encountered by the onboard observers during month *i*.

Encounters by Size/Mark-status Class

$\hat{E}_{LMi}$ = estimated legal (*L*), marked (*M*) encounters during month *i*

$\hat{E}_{LUi}$ = estimated legal (*L*), unmarked (*U*) encounters during month *i*

$\hat{E}_{SMi}$ = estimated sublegal (*S*), marked (*M*) encounters during month *i*

$\hat{E}_{SUi}$ = estimated sublegal (*S*), marked (*U*) encounters during month *i*

For each *XY* combination (where *X* = *L* or *S* and *Y* = *M* or *U*) $\hat{E}_{XYi}$ and an estimate of its variance are obtained from:

(5) $\hat{E}_{XYi} = \hat{E}_i * \hat{p}_{XYi}$

(6) $\text{var}(\hat{E}_{XYi}) = \text{var}(\hat{E}_i) * \hat{p}_{XYi}^{\,2} + \hat{E}_i^{\,2} * \text{var}(\hat{p}_{XYi}) - \text{var}(\hat{E}_i) * \text{var}(\hat{p}_{XYi})$

B. Estimating Retained and Released Numbers by Size/Mark-status Class

Before total mortality can be estimated for each class (LM, SM, LU, SU), class-specific encounters must be separated into retention and release categories. First, given that harvest is estimated only to mark-status class for creel survey purposes, estimates of marked and unmarked Chinook retention must be assigned to size classes (See *Apportioned Estimates of Retention to Size Classes* on subsequent page); this is done using mark-status-specific size composition data from dockside sampling (See *Dockside Observations for Apportioning Retained Catch to Class* on subsequent page). Subsequently, size/mark-status group-specific releases are estimated as the difference between class-specific encounters and retention (See *Estimating Release Numbers by Class* on subsequent page).

Dockside Observations for Apportioning Retained Catch to Class

$\hat{d}_{LMK}$ = the estimated proportion of retained (kept, *K*), marked (*M*) Chinook salmon that were legal (*L*); based on *season-wide*[4] dockside observations of marked Chinook (as is $\hat{d}_{SMK}$)

$\hat{d}_{SMK}$ = the estimated proportion of retained (kept, *K*), marked (*M*) Chinook that were sublegal (*S*)

The proportion of retained, marked fish in size class *X* (*X* = *L* or *S*) and its variance are estimated as:

$$(7) \qquad \hat{d}_{XMK} = n_{XMK} / n_{MK}$$

$$(8) \qquad \text{var}(\hat{d}_{XMK}) = [\hat{d}_{XMK} * (1 - \hat{d}_{XMK})] / (n_{MK} - 1),$$

where n_{MK} and n_{XMK} are *season-wide* total dockside counts of marked fish and the subset of marked fish in size-class *X*, respectively.

$\hat{d}_{LUK}$ = the estimated proportion of retained (kept, *K*), unmarked (*U*) Chinook salmon that are legal (*L*); estimated from *season-wide* dockside observations of unmarked Chinook (as is $\hat{d}_{SUK}$)

$\hat{d}_{SUK}$ = the estimated proportion of retained (kept, *K*), unmarked (*U*) Chinook that are sublegal (*S*)

The proportions of retained, unmarked fish belonging to legal and sublegal size classes and their respective variances are estimated as above (Eqns. 7 and 8) but using *season-wide* dockside observations on unmarked (*U*), not marked Chinook salmon.

Apportioned Estimates of Retention to Size Classes

$\hat{K}_{LMi}$ = the estimated number of legal (*L*), marked (*M*) Chinook kept in month *i*

$\hat{K}_{LUi}$ = the estimated number of legal (*L*), unmarked (*U*) Chinook kept in month *i*

The number of kept, marked encounters, marked fish in size class *X* (*L* or *S*) and its variance is estimated as:

$$(9) \qquad \hat{K}_{XMi} = \hat{d}_{XMK} * \hat{N}_{MKi}$$

$$(10) \qquad \text{var}(\hat{K}_{XMi}) = \text{var}(\hat{N}_{MKi}) * \hat{d}_{XMK}^{\,2} + \hat{N}_{MKi}^{\,2} * \text{var}(\hat{d}_{XMK}) - \text{var}(\hat{N}_{MKi}) * \text{var}(\hat{d}_{XMK})$$

where $\hat{d}_{XMK}$ and its variance are from 6 and 7 above and $\hat{N}_{MKi}$ is the survey estimate of retained marked fish for month *i* defined in Eqn. 1.

$\hat{K}_{SMi}$ = estimated number of sublegal (*S*), marked (*M*) Chinook kept in month *i*

$\hat{K}_{SUi}$ = estimated number of sublegal (*S*), unmarked (*U*) Chinook kept in month *i*

[4] Due to small sample sizes for observed, harvested Chinook—particularly for sublegal and/or unmarked classes—dockside length data are pooled across the season to estimate $\hat{d}_{XYK}$.

The number of retained, unmarked fish belonging to legal and sublegal size classes is estimated according to Eqns. 9 and 10 above but using unmarked fish proportions and monthly retention estimates.

Estimating Release Numbers by Class

$\hat{R}_{LM\,i}$ = the estimated number of legal (*L*), marked (*M*) Chinook released in month *i*

$\hat{R}_{LU\,i}$ = the estimated number of legal (*L*), unmarked (*U*) Chinook released in month *i*

$\hat{R}_{SM\,i}$ = the estimated number of sublegal (*S*), marked (*M*) Chinook released in month *i*

$\hat{R}_{SU\,i}$ = the estimated number of sublegal (*S*), unmarked (*U*) Chinook released in month *i*

For each size/mark-status class (i.e., *XY* combination [*X* = *L* or *S* and *Y* = *M* or *U*]), the number of fish encountered and released is estimated as the difference between total size/mark-status class encounters ($\hat{E}_{XY\,i}$) and retention ($\hat{K}_{XY\,i}$) during month *i*. The estimator and its variance are:

$$\hat{R}_{XY\,i} = \hat{E}_{XY\,i} - \hat{K}_{XY\,i} \tag{11}$$

$$\mathrm{var}(\hat{R}_{XY\,i}) = \mathrm{var}(\hat{E}_{XY\,i}) + \mathrm{var}(\hat{K}_{XY\,i}) \tag{12}$$

C. Estimating Total (and Class-specific) Monthly and Season-wide Mortality

The application of assumed mortality rates (See *Assumed Mortality Rates for Retained and Released Chinook* below) to class-specific estimates of total retention and releases constitutes the final step in quantifying mark-selective fishery impacts.

Assumed Mortality Rates for Retained and Released Chinook

m_K = retention mortality rate, 100% for all retained Chinook (reincarnation is rare among fishes)
sfm_L = release mortality rate for legal (*L*) Chinook, assumed to be a constant of 14% in ocean fisheries
sfm_S = release mortality rate for sublegal (*S*) Chinook, assumed to be a constant of 14% in ocean fisheries

Retention-mortality Estimates

$\hat{M}_{LMK\,i}$ = estimated mortality due to legal (*L*), marked (*M*) Chinook harvest in month *i* (= $\hat{K}_{LM\,i}$).

$\hat{M}_{LUK\,i}$ = estimated mortality due to harvest of legal (*L*), unmarked (*U*) Chinook in month *i* (= $\hat{K}_{LU\,i}$).

$\hat{M}_{SMK\,i}$ = estimated mortality due to harvest of sublegal (*S*), marked (*M*) Chinook in month *i* (= $\hat{K}_{SM\,i}$).

$\hat{M}_{SUK\,i}$ = estimated mortality due to harvest of sublegal (*S*), marked (*M*) Chinook in month *i* (= $\hat{K}_{SU\,i}$).

Release-mortality Estimates

$\hat{M}_{LMR\,i}$ = estimated post-release mortality for legal (*L*), marked (*M*) Chinook in month *i*

$\hat{M}_{LUR\,i}$ = estimated post-release mortality for legal (*L*), unmarked (*U*) Chinook in month *i*

$\hat{M}_{SMRi}$ = estimated post-release mortality for sublegal (*S*), marked (*M*) Chinook in month *i*

$\hat{M}_{SURi}$ = estimated post-release mortality for sublegal (*S*), unmarked (*U*) Chinook in month *i*

All class-specific (*XY* [*X* = *L* or *S*, *Y* = *M* or *U*]) release mortality estimates are obtained from:

$$(13) \qquad \hat{M}_{XYRi} = \hat{R}_{XYi} * sfm_Y$$

$$(14) \qquad \text{var}(\hat{M}_{XYRi}) = \text{var}(\hat{R}_{XYi}) * sfm_Y{}^2$$

Season-wide Total and Class-specific Mortality Estimation

$\hat{M}_{total}$ = total season-wide Chinook salmon mortality; this parameter and its variance [$\text{var}(\hat{M}_{total})$] are computed as the sum of all monthly retention and release mortality estimates [i.e., $\hat{M}_{total} = \sum_{i=1}^{\max i} (\hat{M}_{XYKi} + \hat{M}_{XYRi})$] and variances [$\text{var}(\hat{M}_{total}) = \sum_{i=1}^{\max i} [\text{var}(\hat{M}_{XYKi}) + \text{var}(\hat{M}_{XYRi})]$], respectively, for all four size/mark-status groups (*X* = *L* or *S*, *Y* = *M* or *U*). Season total estimates for subgroups of interest (e.g., unmarked, sublegal Chinook, $\hat{M}_{SU-total}$) are obtained by summing monthly estimates (and variances) across the season for just that group.

D. Characterizing Precision of Estimates

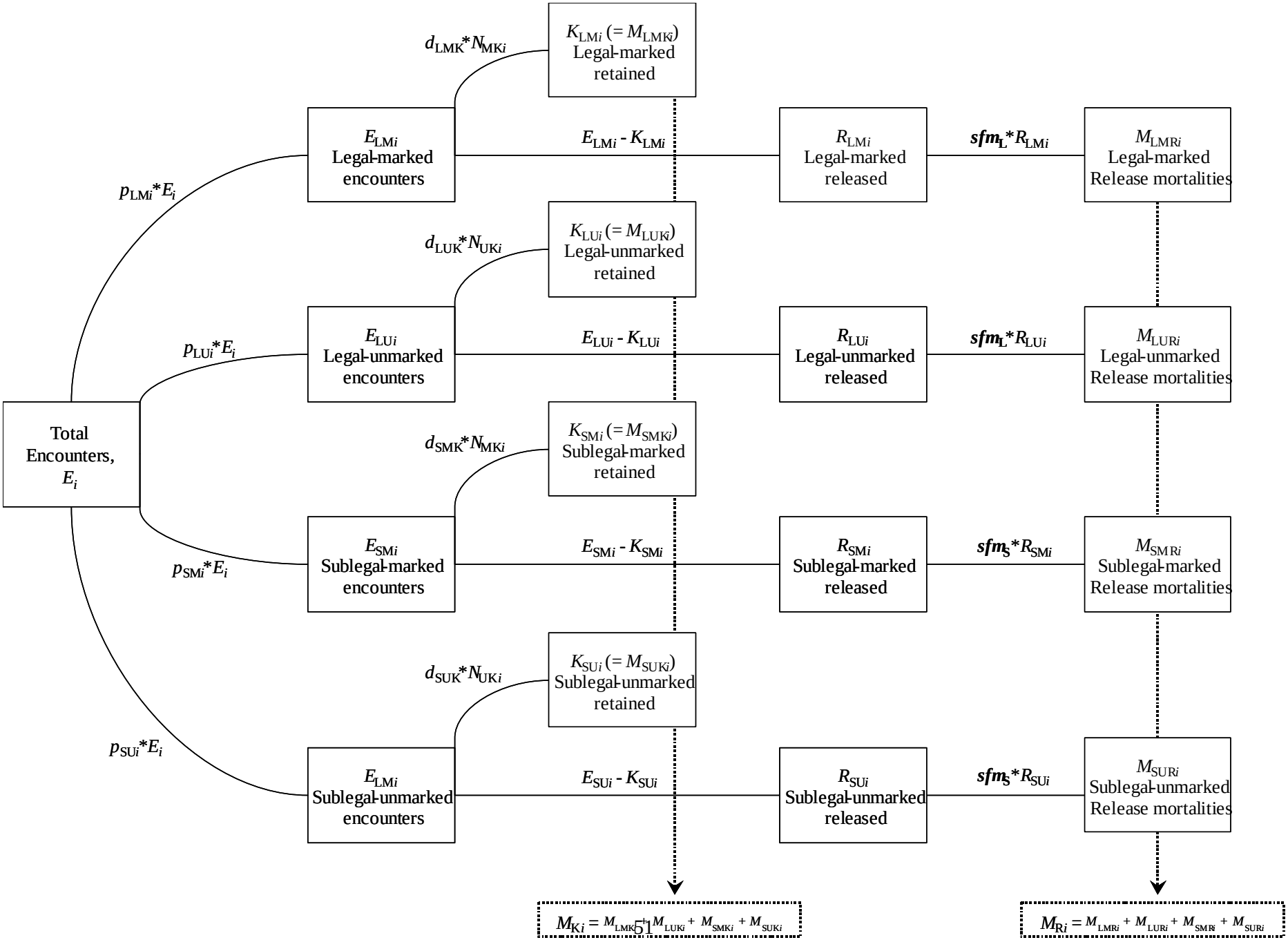
The precision of estimates generated from creel surveys and the preceding fishery impact estimation scheme is characterized using estimates of a parameter's standard error (*SE*), coefficient of variation (*CV* or relative standard error), and approximate 95% confidence interval. For any parameter estimate $\hat{\theta}$ (e.g., $\hat{M}_{total}$, $\hat{K}_{LMi}$, $\hat{E}_i$, etc.), these metrics are estimated using:

$$(15) \qquad SE(\hat{\theta}) = \sqrt{\text{var}(\hat{\theta})}$$

$$(16) \qquad CV(\hat{\theta}) = [SE(\hat{\theta}) / \hat{\theta}] * 100$$

$$(17) \qquad CI = \hat{\theta} \pm 1.96 * SE(\hat{\theta})$$

Figure A1. (*On following page*) Graphical representation of the approach used to estimate monthly encounters and mortalities by size/mark-status category in mark-selective Chinook fisheries. Boxes depict abundance estimates (encounters, mortalities) whereas the mathematical operations depicted on intermediate connector lines are estimator formulae yielding quantities found in subsequent boxes (moving from left to right). Parameter definitions, complete formulae, and variances are defined in the preceding pages. For short-duration fisheries (~ 1 month or less), monthly and season-total values are equivalent; for all others, season-total impacts are equivalent to the sum of monthly impact estimates (and variances).


Total Encounters, E_i
$p_{LMi}*E_i$
E_{LMi} Legal-marked encounters
$E_{LMi} - K_{LMi}$
K_{LMi} (= M_{LMKi}) Legal-marked retained
$d_{LMK}*N_{MKi}$
R_{LMi} Legal-marked released
sfm_L*R_{LMi}
M_{LMRi} Legal-marked Release mortalities
$p_{LUi}*E_i$
E_{LUi} Legal-unmarked encounters
$E_{LUi} - K_{LUi}$
K_{LUi} (= M_{LUKi}) Legal-unmarked retained
$d_{LUK}*N_{UKi}$
R_{LUi} Legal-unmarked released
sfm_L*R_{LUi}
M_{LURi} Legal-unmarked Release mortalities
$p_{SMi}*E_i$
E_{SMi} Sublegal-marked encounters
$E_{SMi} - K_{SMi}$
K_{SMi} (= M_{SMKi}) Sublegal-marked retained
$d_{SMK}*N_{MKi}$
R_{SMi} Sublegal-marked released
sfm_S*R_{SMi}
M_{SMRi} Sublegal-marked Release mortalities
$p_{SUi}*E_i$
E_{LMi} Sublegal-unmarked encounters
$E_{SUi} - K_{SUi}$
K_{SUi} (= M_{SUKi}) Sublegal-unmarked retained
$d_{SUK}*N_{UKi}$
R_{SUi} Sublegal-unmarked released
sfm_S*R_{SUi}
M_{SURi} Sublegal-unmarked Release mortalities
$M_{Ki} = M_{LMKi} + M_{LUKi} + M_{SMKi} + M_{SUKi}$
$M_{Ri} = M_{LMRi} + M_{LURi} + M_{SMRi} + M_{SURi}$

Appendix B. Coded-wire tag (CWT) recovery data collected during dockside sampling activities in the June 2012 recreational mark-selective Chinook fishery in Washington coastal Marine Areas 1, 2, 3 and 4.

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
1	10-Jun-12	55187	2009	MARE ISLAND MINOR PT	COLEMAN NFH	FWS		63	2270	AD
1	10-Jun-12	635087	2009	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		58	2271	AD
1	11-Jun-12	634365	2007	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WREG		79	2273	AD
1	11-Jun-12	68624	2009	TIBURON NET PENS	FEATHER R HATCHERY	CDFG		66	2274	AD
1	11-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		68	2275	AD
1	11-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		66	2276	AD
1	11-Jun-12	55221	2009	COLEMAN NFH	COLEMAN NFH	FWS		67	2277	AD
1	14-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		71	2278	AD
1	15-Jun-12	68675	2009	SANTA CRUZ H NET PEN	FEATHER R HATCHERY	CDFG		70	2279	AD
1	15-Jun-12	635095	2008	METHOW R 48.0002	CARLTON ACCL POND	WDFW		75	2280	AD
1	15-Jun-12	635095	2008	METHOW R 48.0002	CARLTON ACCL POND	WDFW		79	2281	AD
1	15-Jun-12	220309	2009	CAPTAIN JOHNS PD	LYONS FERRY HATCH	NEZP		62	2282	AD
1	15-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		63	2283	AD
1	15-Jun-12	55184	2009	SAC R COLUSA TO RBDD	COLEMAN NFH	FWS		66	2284	AD
1	15-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	70	2285	AD
1	15-Jun-12	90331	2009	SNAKE R-1 (HELLS CAN	UMATILLA HATCHERY	ODFW		64	2286	AD
1	15-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	64	2287	AD
1	15-Jun-12	635371	2009	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		60	2288	AD
1	15-Jun-12	106482	2009	SNAKE,HELLS CAN DAM	OXBOW HATCHERY	IDFG	Unk	71	2289	AD
1	15-Jun-12	635093	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		66	2290	AD
1	15-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		71	2291	AD
1	15-Jun-12	635177	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		67	2292	AD
1	15-Jun-12	68687	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		66	2293	AD
1	15-Jun-12	55191	2009	COLEMAN NFH	COLEMAN NFH	FWS		60	2294	AD
1	15-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	69	2295	AD
1	16-Jun-12	68677	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		61	2296	AD
1	16-Jun-12	68641	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		68	2297	AD
1	16-Jun-12	635178	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		79	2298	AD
1	16-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		68	2299	AD
1	16-Jun-12	634783	2008	OKANOGAN R 49.0019	BONAPARTE POND	COOP		65	2300	AD
1	16-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	73	2322	AD
1	16-Jun-12	635371	2009	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		60	2323	AD
1	17-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		78	2324	AD
1	17-Jun-12	68680	2009	MARE ISLAND NET PEN	NIMBUS FISH HATCH	CDFG		72	2325	AD
1	17-Jun-12	634390	2007	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		73	2326	AD
1	17-Jun-12	635179	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		65	2327	AD
1	17-Jun-12	55182	2009	COLEMAN NFH	COLEMAN NFH	FWS		82	2328	AD
1	17-Jun-12	635181	2009	COUSE CR 35.2147	LYONS FERRY HATCH	WDFW		65	2329	AD

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
1	17-Jun-12	635364	2009	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		57	2331	AD
1	17-Jun-12	90270	2008	CEDAR CR #1 (SANDY R	SANDY HATCHERY	ODFW		67	2332	AD
1	17-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		72	2336	AD
1	17-Jun-12	635279	2009	METHOW R+BANKS LK	EASTBANK+CARLTON	WDFW		56	2337	AD
1	17-Jun-12	634295	2009	COWLITZ R 26.0002	COWLITZ SALMON H	WDFW		58	2338	AD
1	17-Jun-12	635371	2009	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		60	2339	AD
1	17-Jun-12	68708	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		67	2340	AD
1	17-Jun-12	55179	2009	COLEMAN NFH	COLEMAN NFH	FWS		76	2341	AD
1	17-Jun-12	634297	2007	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		59	2342	AD
1	17-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		69	2343	AD
1	21-Jun-12	90256	2008	BLIND SL (LWR COL R)	CEDC YOUNGS BAY NET	ODFW		71	2344	AD
1	21-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		70	2345	AD
1	21-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		77	2346	AD
1	21-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		73	2347	AD
1	21-Jun-12	634279	2008	COWLITZ R 26.0002	COWLITZ SALMON H	WDFW		75	2348	AD
1	21-Jun-12	635194	2009	FALLERT CR 27.0017	FALLERT CR HATCHERY	WDFW		71	2349	AD
1	21-Jun-12	635177	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		75	2350	AD
1	21-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		71	2351	AD
1	21-Jun-12	68683	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		65	2352	AD
1	21-Jun-12	64577	2009	SAN JOAQ R JERSEY PT	MERCED R FISH FACIL	CDFG		73	2353	AD
1	21-Jun-12	634783	2008	OKANOGAN R 49.0019	BONAPARTE POND	COOP		66	2354	AD
1	21-Jun-12	634390	2007	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		76	2355	AD
1	21-Jun-12	90328	2009	UMATILLA R	UMATILLA HATCHERY	ODFW		65	2356	AD
1	22-Jun-12	68750	2010	SAN PABLO NET PENS	FEATHER R HATCHERY	CDFG		58	2357	AD
1	22-Jun-12	634295	2009	COWLITZ R 26.0002	COWLITZ SALMON H	WDFW		61	2358	AD
1	22-Jun-12	634295	2009	COWLITZ R 26.0002	COWLITZ SALMON H	WDFW		62	2359	AD
1	22-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	75	2360	AD
1	22-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		68	2361	AD
1	22-Jun-12	635485	2009	COL R @ PRIEST RAPIDS	PRIEST RAPIDS HATCH	WDFW	635,488,635,489,635	65	2362	AD
1	22-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		80	2363	AD
1	22-Jun-12	55188	2009	COLEMAN NFH	COLEMAN NFH	FWS		71	2364	AD
1	22-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		68	2365	AD
1	22-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		62	2366	AD
1	22-Jun-12	635469	2009	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		63	2367	AD
1	22-Jun-12	635164	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		73	2368	AD
1	22-Jun-12	634776	2008	COWLITZ R 26.0002	COWLITZ SALMON HA	WDFW		64	2369	AD
1	16-Jun-12	68678	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		72	5101	AD
1	16-Jun-12	68708	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		66	5102	AD
1	16-Jun-12	635368	2009	KLICKITAT H (YKFP)	KLICKITAT H (YKFP)	YAKA		64	5103	AD
1	16-Jun-12	68677	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		64	5104	AD

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
1	16-Jun-12	68687	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		68	5106	AD
1	16-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		71	5107	AD
1	16-Jun-12	68678	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		62	5108	AD
1	9-Jun-12	635178	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		74	5201	AD
1	15-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		68	5202	AD
1	16-Jun-12	635182	2009	GRAND RONDE R35.2192	IRRIGON HATCHERY	ODFW		64	5203	AD
1	16-Jun-12	635364	2009	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		55	5204	AD
1	16-Jun-12	635179	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		73	5205	AD
1	22-Jun-12	180896	2009	R-Chilliwack R	H-Chilliwack River H	CDFO	180,898,180,895	67	5206	AD
1	22-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		71	5207	AD
1	22-Jun-12	634295	2009	COWLITZ R 26.0002	COWLITZ SALMON H	WDFW		60	5208	AD
1	22-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		70	5209	AD
1	22-Jun-12	220307	2009	BIG CAN ACCL POND	LYONS FERRY HATCH	NEZP		74	5210	AD
1	22-Jun-12	55181	2009	COLEMAN NFH	COLEMAN NFH	FWS		65	5211	AD
1	16-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		67	11272	AD
1	16-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		71	11273	AD
1	16-Jun-12	220311	2009	SNAKE R@PITT. LNDG	LYONS FERRY HATCH	NEZP		64	11274	AD
1	17-Jun-12	68672	2009	SAN PABLO NET PENS	FEATHER R HATCHERY	CDFG		71	11362	AD
1	17-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		70	11363	AD
1	17-Jun-12	54596	2009	LTL WHITE SAL. NFH	LTL WHITE SAL. NFH	FWS	54,597,054,595,053,500	67	11364	AD
1	17-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		75	11365	AD
1	17-Jun-12	55226	2009	COLEMAN NFH	COLEMAN NFH	FWS		80	11366	AD
1	17-Jun-12	635180	2009	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		66	11367	AD
1	17-Jun-12	220307	2009	BIG CAN ACCL POND	LYONS FERRY HATCH	NEZP		63	11368	AD
1	17-Jun-12	635087	2009	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		60	11369	AD
1	10-Jun-12	90251	2008	YOUNGS R & BAY	CEDC YOUNGS BAY NET	ODFW		66	14251	AD
1	10-Jun-12	68613	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		62	14253	AD
1	11-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		77	14254	AD
1	11-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		81	14255	AD
1	10-Jun-12	68669	2009	SAN PABLO NET PENS	FEATHER R HATCHERY	CDFG		65	14256	AD
1	11-Jun-12	220317	2009	BIG CAN ACCL POND	LYONS FERRY HATCH	NEZP		58	14259	AD
1	11-Jun-12	635564	2009	SNAKE L.MON-LTL GOOS	LYONS FERRY HATCH	WDFW		58	14261	AD
1	12-Jun-12	635095	2008	METHOW R 48.0002	CARLTON ACCL POND	WDFW		70	14264	AD
1	15-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		73	14265	AD
1	15-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		79	14266	AD
1	15-Jun-12	635375	2009	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		74	14268	AD
1	15-Jun-12	220305	2008	CAPTAIN JOHNS PD	LYONS FERRY HATCH	NEZP		72	14269	AD
1	15-Jun-12	68708	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		71	14270	AD
1	15-Jun-12	68677	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		66	14271	AD
1	16-Jun-12	635181	2009	COUSE CR 35.2147	LYONS FERRY HATCH	WDFW		69	14273	AD

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
1	16-Jun-12	635181	2009	COUSE CR 35.2147	LYONS FERRY HATCH	WDFW		60	14274	AD
1	17-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		67	14275	AD
1	18-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		76	14276	AD
1	18-Jun-12	68034	2009	FEATHER BOYDS PUMP	FEATHER R HATCHERY	CDWR		62	14277	AD
1	18-Jun-12	68669	2009	SAN PABLO NET PENS	FEATHER R HATCH	CDFG		69	14278	AD
1	21-Jun-12	635164	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		64	14279	AD
1	21-Jun-12	635177	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		76	14281	AD
1	21-Jun-12	53277	2009	LTL WHITE SAL. NFH	LTL WHITE SAL. NFH	FWS		67	14282	AD
1	21-Jun-12	635178	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		71	14283	AD
1	21-Jun-12	634295	2009	COWLITZ R 26.0002	COWLITZ SALMON H	WDFW		62	14284	AD
1	21-Jun-12	635094	2008	METHOW R 48.0002	CARLTON ACCL POND	WDFW		68	14285	AD
1	21-Jun-12	635180	2009	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		60	14286	AD
1	21-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		66	14287	AD
1	22-Jun-12	635488	2009	COL R @ PRIEST RAPIDS	PRIEST RAPIDS HATCH	WDFW	635,489,635,487,635	68	14288	AD
2	9-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		71	6201	AD
2	9-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	77	6202	AD
2	9-Jun-12	635178	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		75	6203	AD
2	9-Jun-12	68684	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		71	6204	AD
2	9-Jun-12	90270	2008	CEDAR CR #1 (SANDY R	SANDY HATCHERY	ODFW		65	6205	AD
2	9-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	68	6206	AD
2	9-Jun-12	90330	2009	UMATILLA R	UMATILLA HATCHERY	ODFW		60	6207	AD
2	9-Jun-12	68677	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		66	6208	AD
2	9-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		75	6209	AD
2	9-Jun-12	220307	2009	BIG CAN ACCL POND	LYONS FERRY HATCH	NEZP		60	6210	AD
2	9-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		75	6211	AD
2	9-Jun-12	634390	2007	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		78	6212	AD
2	9-Jun-12	210912	2009	GROVERS CR HATCHERY	GROVERS CR HATCHERY	SUQ	635089	69	6213	AD
2	9-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		76	6214	AD
2	9-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		78	6215	AD
2	9-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		62	6217	AD
2	10-Jun-12	635179	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		70	6219	AD
2	10-Jun-12	68670	2009	SAN PABLO NET PENS	FEATHER R HATCHERY	CDFG		68	6220	AD
2	10-Jun-12	94529	2007	SANTIAM R S FK	SOUTH SANTIAM HATCH	ODFW		76	6221	AD
2	10-Jun-12	635177	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		70	6222	AD
2	10-Jun-12	210928	2009	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		64	6223	AD
2	10-Jun-12	220303	2008	BIG CAN ACCL POND	LYONS FERRY HATCH	NEZP		67	6224	AD
2	10-Jun-12	635177	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		63	6225	AD
2	10-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		73	6226	AD
2	11-Jun-12	635288	2009	VOIGHT CR TR 10.0428	VOIGHTS CR HATCHERY	WDFW		71	6227	AD
2	11-Jun-12	634695	2007	CHELAN R 47.0052	CHELAN PUD HATCHERY	WDFW		84	6228	AD

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
2	11-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		71	6229	AD
2	11-Jun-12	220304	2008	SNAKE R@PITT. LNDG	LYONS FERRY HATCH	NEZP		65	6230	AD
2	11-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		66	6231	AD
2	11-Jun-12	90331	2009	SNAKE R-1 (HELLS CAN	UMATILLA HATCHERY	ODFW		64	6232	AD
2	11-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		71	6233	AD
2	11-Jun-12	90331	2009	SNAKE R-1 (HELLS CAN	UMATILLA HATCHERY	ODFW		64	6234	AD
2	11-Jun-12	635178	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		72	6235	AD
2	11-Jun-12	633475	2007	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		84	6236	AD
2	11-Jun-12	90326	2009	TANNER CR (BNVILLE)	BONNEVILLE HATCH	ODFW		72	6238	AD
2	11-Jun-12	635095	2008	METHOW R 48.0002	CARLTON ACCL POND	WDFW		61	6239	AD
2	11-Jun-12	68708	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		64	6240	AD
2	11-Jun-12	220311	2009	SNAKE R@PITT. LNDG	LYONS FERRY HATCH	NEZP		61	6241	AD
2	12-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		64	6242	AD
2	12-Jun-12	633475	2007	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		85	6243	AD
2	12-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		69	6244	AD
2	12-Jun-12	90196	2008	SANTIAM R S FK	SOUTH SANTIAM HATCH	ODFW		74	6245	AD
2	12-Jun-12	635093	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		74	6246	AD
2	12-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		59	6247	AD
2	12-Jun-12	90277	2008	DETROIT RES (SANTIAM	MARION FORKS HATCH	ODFW		81	6248	AD
2	12-Jun-12	635366	2009	PURDY CR 16.0005	GEORGE ADAMS HATCH	WDFW	635367	72	6249	AD
2	12-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		68	6250	AD
2	12-Jun-12	635368	2009	KLICKITAT H (YKFP)	KLICKITAT H (YKFP)	YAKA		57	6251	AD
2	12-Jun-12	54595	2009	LTL WHITE SALM NFH	LTL WHITE SALM NFH	FWS	54,597,054,596,053,500	63	6252	AD
2	14-Jun-12	90327	2009	UMATILLA R	UMATILLA HATCHERY	ODFW		64	6253	AD
2	14-Jun-12	90255	2008	YOUNGS R & BAY	CEDC YOUNGS BAY NET	ODFW		70	6254	AD
2	14-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	78	6255	AD
2	16-Jun-12	53277	2009	LTL WHITE SALM NFH	LTL WHITE SALM NFH	FWS		74	6256	AD
2	16-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		66	6257	AD
2	16-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	75	6258	AD
2	16-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	58	6259	AD
2	16-Jun-12	90331	2009	SNAKE R-1 (HELLS CAN	UMATILLA HATCHERY	ODFW		62	6260	AD
2	17-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		73	6261	AD
2	17-Jun-12	635564	2009	SNAKE L.MON-LTL GOOS	LYONS FERRY HATCH	WDFW		56	6263	AD
2	20-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	68	6264	AD
2	20-Jun-12	634392	2007	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		88	6265	AD
2	22-Jun-12	635165	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		70	6266	AD
2	23-Jun-12	634777	2008	OKANOGAN R 49.0019	BONAPARTE POND	COOP		70	6267	AD
2	23-Jun-12	90270	2008	CEDAR CR #1 (SANDY R	SANDY HATCHERY	ODFW		72	6268	AD
2	23-Jun-12	635093	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		74	6269	AD
2	23-Jun-12	68671	2009	SAN PABLO NET PENS	FEATHER R HATCHERY	CDFG		68	6270	AD

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
2	9-Jun-12	635095	2008	METHOW R 48.0002	CARLTON ACCL POND	WDFW		71	6401	AD
2	10-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		70	6402	AD
2	10-Jun-12	220309	2009	CAPTAIN JOHNS PD	LYONS FERRY HATCH	NEZP		62	6403	AD
2	10-Jun-12	100142	2009	SNAKE HELLS CAN DAM	OXBOW HATCHERY	IDFG	Unk	73	6404	AD
2	10-Jun-12	53480	2008	LTL WHITE SALM NFH	LTL WHITE SALM NFH	FWS		58	6405	AD
2	10-Jun-12	635180	2009	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		63	6406	AD
2	10-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		73	6407	AD
2	10-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		70	6408	AD
2	10-Jun-12	220304	2008	SNAKE R@PITT. LNDG	LYONS FERRY HATCH	NEZP		76	6409	AD
2	10-Jun-12	104383	2009	SNAKE HELLS CAN DAM	OXBOW HATCHERY	IDFG	Unk	64	6410	AD
2	10-Jun-12	635093	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		71	6411	AD
2	10-Jun-12	220303	2008	BIG CAN ACCL POND	LYONS FERRY HATCH	NEZP		74	6412	AD
2	10-Jun-12	55192	2009	COLEMAN NFH	COLEMAN NFH	FWS		72	6413	AD
2	11-Jun-12	612748	2009	LUKE'S GULCH A F	NPT HATCHERY	NEZP		61	6414	AD
2	11-Jun-12	220309	2009	CAPTAIN JOHNS PD	LYONS FERRY HATCH	NEZP		62	6415	AD
2	11-Jun-12	90192	2008	WILLAMETTE R M FK-1	DEXTER PONDS	ODFW		66	6416	AD
2	11-Jun-12	634775	2008	KALAMA R 27.0002	KALAMA FALLS HATCH	WDFW		77	6417	AD
2	11-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		75	6418	AD
2	11-Jun-12	68613	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		74	6419	AD
2	11-Jun-12	220303	2008	BIG CAN ACCL POND	LYONS FERRY HATCH	NEZP		78	6420	AD
2	11-Jun-12	635178	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		78	6421	AD
2	11-Jun-12	634295	2009	COWLITZ R 26.0002	COWLITZ SALMON H	WDFW		60	6422	AD
2	11-Jun-12	68679	2009	AMERICAN R @ SUNRISE	NIMBUS FISH HATCH	CDFG		66	6423	AD
2	11-Jun-12	68677	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		65	6424	AD
2	11-Jun-12	55197	2009	COLEMAN NFH	COLEMAN NFH	FWS		71	6425	AD
2	11-Jun-12	635094	2008	METHOW R 48.0002	CARLTON ACCL POND	WDFW		59	6426	AD
2	11-Jun-12	90326	2009	TANNER CR (BNVILLE)	BONNEVILLE HATCH	ODFW		65	6428	AD
2	11-Jun-12	68672	2009	SAN PABLO NET PENS	FEATHER R HATCHERY	CDFG		60	6429	AD
2	14-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		70	6430	AD
2	14-Jun-12	635291	2009	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		63	6431	AD
2	14-Jun-12	635194	2009	FALLERT CR 27.0017	FALLERT CR HATCHERY	WDFW		73	6432	AD
2	14-Jun-12	634694	2007	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		83	6433	AD
2	14-Jun-12	90331	2009	SNAKE R-1 (HELLS CAN	UMATILLA HATCHERY	ODFW		55	6434	AD
2	14-Jun-12	635180	2009	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		63	6435	AD
2	16-Jun-12	632974	2007	WENATCHEE R 45.0030	DRYDEN POND	WDFW		84	6436	AD
2	16-Jun-12	68677	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		64	6437	AD
2	16-Jun-12	68680	2009	MARE ISLAND NET PEN	NIMBUS FISH HATCH	CDFG		66	6438	AD
2	16-Jun-12	635165	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		76	6439	AD
2	16-Jun-12	220307	2009	BIG CAN ACCL POND	LYONS FERRY HATCH	NEZP		67	6440	AD
2	17-Jun-12	104383	2009	SNAKE HELLS CAN DAM	OXBOW HATCHERY	IDFG	Unk	68	6441	AD

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2	17-Jun-12	220307	2009	BIG CAN ACCL POND	LYONS FERRY HATCH	NEZP		58	6442	AD
2	17-Jun-12	634778	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		60	6443	AD
2	17-Jun-12	90331	2009	SNAKE R-1 (HELLS CAN	UMATILLA HATCHERY	ODFW		68	6444	AD
2	22-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		69	6446	AD
2	22-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		76	6448	AD
2	22-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		70	6449	AD
2	22-Jun-12	635180	2009	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		66	6450	AD
2	22-Jun-12	220307	2009	BIG CAN ACCL POND	LYONS FERRY HATCH	NEZP		59	6451	AD
2	22-Jun-12	635180	2009	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		65	6701	AD
2	22-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		66	6703	AD
2	22-Jun-12	220311	2009	SNAKE R@PITT. LNDG	LYONS FERRY HATCH	NEZP		70	6704	AD
2	20-Jun-12	54966	2009	LTL WHITE SALM NFH	LTL WHITE SALM NFH	FWS		77	6746	AD
2	20-Jun-12	220304	2008	SNAKE R@PITT. LNDG	LYONS FERRY HATCH	NEZP		66	6747	AD
2	20-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		65	6749	AD
2	20-Jun-12	68664	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		75	6750	AD
2	9-Jun-12	68680	2009	MARE ISLAND NET PEN	NIMBUS FISH HATCH	CDFG		62	6751	AD
2	9-Jun-12	635180	2009	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		68	6753	AD
2	9-Jun-12	634783	2008	OKANOGAN R 49.0019	BONAPARTE POND	COOP		73	6756	AD
2	9-Jun-12	68673	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		67	6757	AD
2	9-Jun-12	90239	2008	MCKENZIE R 1	MCKENZIE HATCHERY	ODFW	Unk	80	6758	AD
2	9-Jun-12	53277	2009	LTL WHITE SALM NFH	LTL WHITE SALM NFH	FWS		79	6759	AD
2	10-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		70	6761	AD
2	10-Jun-12	55185	2009	COLEMAN NFH	COLEMAN NFH	FWS		83	6762	AD
2	10-Jun-12	635179	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		74	6763	AD
2	10-Jun-12	612748	2009	LUKE'S GULCH A F	NPT HATCHERY	NEZP		67	6764	AD
2	10-Jun-12	635469	2009	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		68	6766	AD
2	10-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		65	6767	AD
2	10-Jun-12	635179	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		74	6768	AD
2	10-Jun-12	634295	2009	COWLITZ R 26.0002	COWLITZ SALMON H	WDFW		61	6769	AD
2	10-Jun-12	635286	2009	COWLITZ R 26.0002	COWLITZ SALMON H	WDFW		71	6770	AD
2	10-Jun-12	90167	2008	TRASK R	TRASK R PONDS	ODFW		73	6771	AD
2	10-Jun-12	635488	2009	COL R @ PRIEST RAPIDS	PRIEST RAPIDS HATCH	WDFW	635,489,635,487,354	66	6772	AD
2	10-Jun-12	106482	2009	SNAKE HELLS CAN DAM	OXBOW HATCHERY	IDFG	Unk	63	6773	AD
2	10-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		61	6774	AD
2	10-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		73	6775	AD
2	11-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		76	6776	AD
2	11-Jun-12	90238	2008	MCKENZIE R 1	MCKENZIE HATCHERY	ODFW	Unk	74	6777	AD
2	11-Jun-12	55193	2009	COLEMAN NFH	COLEMAN NFH	FWS		64	6778	AD
2	11-Jun-12	54278	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	54283	67	6779	AD
2	11-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		67	6780	AD

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2	11-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		60	6781	AD
2	11-Jun-12	635182	2009	GRAND RONDE R35.2192	IRRIGON HATCHERY	ODFW		66	6782	AD
2	11-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		70	6783	AD
2	12-Jun-12	635366	2009	PURDY CR 16.0005	GEORGE ADAMS HATCH	WDFW	635367	77	6785	AD
2	12-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		65	6786	AD
2	12-Jun-12	90237	2008	MCKENZIE R 1	MCKENZIE HATCHERY	ODFW	Unk	81	6787	AD
2	12-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		76	6788	AD
2	12-Jun-12	612676	2008	COTTONWOOD CR POND	LYONS FERRY HATCH	WDFW		71	6789	AD
2	12-Jun-12	634694	2007	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		85	6790	AD
2	16-Jun-12	635178	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		77	6792	AD
2	16-Jun-12	90356	2009	UMATILLA R	BONNEVILLE HATCH	ODFW	90355	70	6794	AD
2	17-Jun-12	635291	2009	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		72	6795	AD
2	17-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		73	6796	AD
2	17-Jun-12	90342	2009	ELK R	ELK R HATCHERY	ODFW		59	6797	AD
2	17-Jun-12	54595	2009	LTL WHITE SALM NFH	LTL WHITE SALM NFH	FWS	54,597,054,596,053,500	63	6798	AD
2	17-Jun-12	68677	2009	SAC R AT DISCPARK	NIMBUS FISH HATCH	CDFG		72	6799	AD
2	11-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		68	7201	AD
2	11-Jun-12	635182	2009	GRAND RONDE R35.2192	IRRIGON HATCHERY	ODFW		58	7202	AD
2	11-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		72	7203	AD
2	11-Jun-12	90270	2008	CEDAR CR #1 (SANDY R	SANDY HATCHERY	ODFW		71	7204	AD
2	11-Jun-12	90326	2009	TANNER CR (BNVILLE)	BONNEVILLE HATCH	ODFW		76	7205	AD
2	11-Jun-12	68677	2009	SAC R AT DISCPARK	NIMBUS FISH HATCH	CDFG		74	7206	AD
2	11-Jun-12	635578	2009	WENATCHEE R 45.0030	DRYDEN POND	WDFW		56	7207	AD
2	12-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		73	7208	AD
2	11-Jun-12	68641	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		64	7210	AD
2	11-Jun-12	90194	2008	WILLAMETTE R M FK-1	DEXTER PONDS	ODFW		78	7211	AD
2	12-Jun-12	634287	2007	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		77	7212	AD
2	12-Jun-12	210905	2009	CLEAR CR 11.0013C	CLEAR CREEK HATCH	NISQ	635096	62	7213	AD
2	12-Jun-12	635086	2009	CHAMBERS CR 12.0007	CHAMBERS CR HATCH	WDFW		73	7214	AD
2	12-Jun-12	634783	2008	OKANOGAN R 49.0019	BONAPARTE POND	COOP		67	7215	AD
2	12-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		63	7216	AD
2	12-Jun-12	90270	2008	CEDAR CR #1 (SANDY R	SANDY HATCHERY	ODFW		78	7217	AD
2	12-Jun-12	68677	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		74	7218	AD
2	14-Jun-12	635178	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		72	7220	AD
2	14-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	72	7223	AD
2	14-Jun-12	53568	2009	ENTIAT R 46.0042	ENTIAT NFH	FWS		50	7224	AD
2	14-Jun-12	68672	2009	SAN PABLO NET PENS	FEATHER R HATCHERY	CDFG		68	7226	AD
2	14-Jun-12	104383	2009	SNAKE HELLS CAN DAM	OXBOW HATCHERY	IDFG	Unk	61	7228	AD
2	14-Jun-12	68687	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		69	7229	AD
2	14-Jun-12	54966	2009	LTL WHITE SALM NFH	LTL WHITE SALM NFH	FWS		77	7230	AD

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2	14-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		67	7231	AD
2	14-Jun-12	90327	2009	UMATILLA R	UMATILLA HATCHERY	ODFW		64	7232	AD
2	17-Jun-12	635179	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		70	7233	AD
2	17-Jun-12	635285	2009	SAMISH R 03.0005	SAMISH HATCHERY	WDFW	635284	73	7234	AD
2	17-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	76	7235	AD
2	17-Jun-12	220305	2008	CAPTAIN JOHNS PD	LYONS FERRY HATCH	NEZP		65	7237	AD
2	20-Jun-12	68677	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		68	7238	AD
2	20-Jun-12	635289	2009	KLICKITAT H (YKFP)	KLICKITAT H (YKFP)	YAKA		66	7239	AD
2	20-Jun-12	220202	2009	CLWTR @ LAPWAI CRK	NPT HATCHERY	NEZP		68	7240	AD
2	20-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	70	7241	AD
2	20-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		72	7242	AD
2	23-Jun-12	635164	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		75	7243	AD
2	23-Jun-12	220307	2009	BIG CAN ACCL POND	LYONS FERRY HATCH	NEZP		65	7244	AD
2	23-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		72	7245	AD
2	23-Jun-12	68678	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		66	7246	AD
2	23-Jun-12	635286	2009	COWLITZ R 26.0002	COWLITZ SALMON H	WDFW		66	7247	AD
2	23-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	68	7248	AD
2	23-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	78	7249	AD
2	23-Jun-12	634392	2007	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		90	10801	AD
2	23-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		68	10802	AD
2	23-Jun-12	635194	2009	FALLERT CR 27.0017	FALLERT CR HATCHERY	WDFW		58	14981	AD
2	10-Jun-12	210928	2009	KALAMA CR 11.0017	KALAMA CR HATCHERY	NISQ		65	95869	AD
2	10-Jun-12	635196	2009	KALAMA R 27.0002	KALAMA FALLS HATCH	WDFW		65	95871	AD
2	10-Jun-12	54966	2009	LTL WHITE SALM NFH	LTL WHITE SALM NFH	FWS		78	95872	AD
2	10-Jun-12	635182	2009	GRAND RONDE R35.2192	IRRIGON HATCHERY	ODFW		62	95873	AD
2	10-Jun-12	90270	2008	CEDAR CR #1 (SANDY R	SANDY HATCHERY	ODFW		78	95874	AD
2	10-Jun-12	635181	2009	COUSE CR 35.2147	LYONS FERRY HATCH	WDFW		54	95875	AD
2	10-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		71	95876	AD
2	10-Jun-12	68688	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		74	95877	AD
2	10-Jun-12	635180	2009	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		61	95879	AD
2	11-Jun-12	104383	2009	SNAKE HELLS CAN DAM	OXBOW HATCHERY	IDFG	Unk	64	95880	AD
2	11-Jun-12	68680	2009	MARE ISLAND NET PEN	NIMBUS FISH HATCH	CDFG		73	95881	AD
2	11-Jun-12	90279	2008	WILLAMETTE R M FK-1	DEXTER PONDS	ODFW		71	95882	AD
2	11-Jun-12	55187	2009	MARE ISLAND MINOR PT	COLEMAN NFH	FWS		67	95883	AD
2	11-Jun-12	68670	2009	SAN PABLO NET PENS	FEATHER R HATCHERY	CDFG		76	95884	AD
2	11-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	71	95885	AD
2	11-Jun-12	54278	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	54283	75	95886	AD
2	11-Jun-12	635375	2009	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		66	95887	AD
2	11-Jun-12	68680	2009	MARE ISLAND NET PEN	NIMBUS FISH HATCH	CDFG		68	95888	AD
2	11-Jun-12	68677	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		76	95889	AD

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
2	11-Jun-12	634295	2009	COWLITZ R 26.0002	COWLITZ SALMON H	WDFW		57	95890	AD
2	11-Jun-12	220311	2009	SNAKE R@PITT. LNDG	LYONS FERRY HATCH	NEZP		62	95891	AD
2	11-Jun-12	635081	2008	EAST SOUND BAY (SAN)	GLENWOOD SPRINGS	COOP		76	95892	AD
2	11-Jun-12	90245	2008	UMATILLA R	BONNEVILLE HATCH	ODFW	90246	70	95894	AD
2	11-Jun-12	90390	2009	MCKENZIE R 1	MCKENZIE HATCHERY	ODFW	Unk	58	95895	AD
2	11-Jun-12	635180	2009	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		76	95896	AD
2	11-Jun-12	634997	2008	GRAND RONDE R35.2192	IRRIGON HATCHERY	ODFW		76	95897	AD
2	11-Jun-12	90270	2008	CEDAR CR #1 (SANDY R	SANDY HATCHERY	ODFW		76	95898	AD
2	11-Jun-12	68708	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		75	95899	AD
2	11-Jun-12	68757	2010	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		56	95900	AD
2	9-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		73	96651	AD
2	9-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	75	96652	AD
2	9-Jun-12	54278	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	54283	82	96653	AD
2	9-Jun-12	635094	2008	METHOW R 48.0002	CARLTON ACCL POND	WDFW		79	96655	AD
2	9-Jun-12	635484	2009	COL R @ PRIEST RAPIDS	PRIEST RAPIDS HATCH	WDFW	635,488,635,489,635	65	96656	AD
2	9-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		81	96657	AD
2	9-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		73	96658	AD
2	10-Jun-12	90280	2008	WILLAMETTE R M FK-1	DEXTER PONDS	ODFW		79	96659	AD
2	10-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		67	96660	UM
2	10-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	78	96661	AD
2	10-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		74	96662	AD
2	10-Jun-12	55197	2009	COLEMAN NFH	COLEMAN NFH	FWS		74	96663	AD
2	10-Jun-12	634792	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		72	96664	AD
2	12-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		75	96666	AD
2	12-Jun-12	68670	2009	SAN PABLO NET PENS	FEATHER R HATCH	CDFG		75	96667	AD
2	16-Jun-12	635366	2009	PURDY CR 16.0005	GEORGE ADAMS HATCH	WDFW	635367	73	96669	AD
2	16-Jun-12	635095	2008	METHOW R 48.0002	CARLTON ACCL POND	WDFW		73	96670	AD
2	16-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		75	96671	AD
2	16-Jun-12	635180	2009	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		65	96672	AD
2	16-Jun-12	635179	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		67	96673	AD
2	16-Jun-12	635093	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		71	96674	AD
2	16-Jun-12	68708	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		76	96675	AD
2	16-Jun-12	93942	2008	ROCK CR (N UMPQUA R)	ROCK CR HATCHERY	ODFW		65	96676	AD
2	16-Jun-12	635180	2009	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		64	96677	AD
2	17-Jun-12	635094	2008	METHOW R 48.0002	CARLTON ACCL POND	WDFW		73	96678	AD
2	20-Jun-12	631427	2008	LAKEWOOD HATCHERY	LAKEWOOD HATCHERY	WDFW		68	96679	AD
2	20-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		74	96680	AD
2	20-Jun-12	632975	2007	WENATCHEE R 45.0030	DRYDEN POND	WDFW		87	96681	AD
2	20-Jun-12	106482	2009	SNAKE HELLS CAN DAM	OXBOW HATCHERY	IDFG	Unk	62	96682	AD
2	20-Jun-12	634872	2008	PURDY CR 16.0005	GEORGE ADAMS HATCH	WDFW	634873	NA	96683	AD

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
2	20-Jun-12	220311	2009	SNAKE R@PITT. LNDG	LYONS FERRY HATCH	NEZP		63	96684	AD
2	20-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		73	96685	AD
2	20-Jun-12	634778	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		72	96686	AD
2	23-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		73	96687	AD
2	23-Jun-12	634783	2008	OKANOGAN R 49.0019	BONAPARTE POND	COOP		73	96688	AD
2	23-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		66	96689	AD
2	23-Jun-12	54966	2009	LTL WHITE SALM NFH	LTL WHITE SALM NFH	FWS		80	96690	AD
2	23-Jun-12	635179	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		72	96691	AD
2	23-Jun-12	634295	2009	COWLITZ R 26.0002	COWLITZ SALMON HA	WDFW		71	96692	AD
2	12-Jun-12	635291	2009	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		65	96742	AD
2	12-Jun-12	635093	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		69	96747	AD
2	12-Jun-12	635178	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		73	96749	AD
2	12-Jun-12	68678	2009	SAC R AT DISC PARK	NIMBUS FISH HATCH	CDFG		77	96751	AD
2	12-Jun-12	90327	2009	UMATILLA R	UMATILLA HATCHERY	ODFW		67	96752	AD
2	12-Jun-12	635291	2009	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		64	96753	AD
2	12-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		63	96754	AD
2	12-Jun-12	635097	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		70	96755	AD
2	12-Jun-12	635164	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		73	96756	AD
2	12-Jun-12	220305	2008	CAPTAIN JOHNS PD	LYONS FERRY HATCH	NEZP		65	96757	AD
2	9-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		74	98970	AD
2	9-Jun-12	635093	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		83	98971	AD
2	9-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		60	98972	AD
2	9-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		72	98973	AD
2	9-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		75	98975	AD
2	9-Jun-12	90271	2008	CLACKAMAS R	CLACKAMAS HATCHERY	ODFW		70	98976	AD
2	9-Jun-12	635092	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		81	98977	AD
2	9-Jun-12	90270	2008	CEDAR CR #1 (SANDY R	SANDY HATCHERY	ODFW		73	98978	AD
2	9-Jun-12	635179	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		74	98979	AD
2	9-Jun-12	68670	2009	SAN PABLO NET PENS	FEATHER R HATCHERY	CDFG		75	98980	AD
2	9-Jun-12	634778	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		72	98981	AD
2	23-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		76	98982	AD
2	23-Jun-12	94649	2007	CLACKAMAS R	CLACKAMAS HATCHERY	ODFW		79	98983	AD
2	23-Jun-12	634691	2007	OKANOGAN R 49.0019	CARLTON ACCL POND	WDFW		73	98984	AD
2	23-Jun-12	635178	2008	CHELAN R 47.0052	CHELAN RIVER NP	WDFW		79	98986	AD
3	25-Jun-12	92047	2009	KLASKANINE R N FK	KLASKANINE HATCH	ODFW		83	99401	AD
3	25-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	78	99402	AD
3	25-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		78	99403	AD
3	27-Jun-12	54379	2007	COOK CR 21.0429	QUINAULT NFH -COOK C	FWS		84	99404	AD
4	22-Jun-12	90331	2009	SNAKE R-1 (HELLS CAN	UMATILLA HATCHERY	ODFW		61	2045	AD
4	22-Jun-12	180477	2009	R-Shuswap R Middle	H-Shuswap River, Middle,	CDFO		69	2046	AD

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
4	22-Jun-12	90331	2009	SNAKE R-1 (HELLS CAN	UMATILLA HATCHERY	ODFW		64	2401	AD
4	23-Jun-12	210905	2009	CLEAR CR 11.0013C	CLEAR CREEK HATCH	NISQ	635096	NA	2402	AD
4	23-Jun-12	54278	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	54283	76	2403	AD
4	23-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	73	2404	AD
4	24-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		72	2405	AD
4	24-Jun-12	634783	2008	OKANOGAN R 49.0019	BONAPARTE POND	COOP		68	2406	AD
4	29-Jun-12	210822	2008	GROVERS CR HATCHERY	GROVERS CR HATCHERY	SUQ	634796	77	2407	AD
4	29-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		68	2408	AD
4	16-Jun-12	635577	2009	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		66	10901	AD
4	23-Jun-12	634781	2008	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		68	10902	AD
4	24-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		76	10903	AD
4	24-Jun-12	634691	2007	OKANOGAN R 49.0019	CARLTON ACCL POND	WDFW		77	10904	AD
4	24-Jun-12	90270	2008	CEDAR CR #1 (SANDY R	SANDY HATCHERY	ODFW		80	10905	AD
4	24-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	68	10906	AD
4	24-Jun-12	635366	2009	PURDY CR 16.0005	GEORGE ADAMS HATCH	WDFW	635367	75	10907	AD
4	24-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	89	10908	AD
4	29-Jun-12	106482	2009	SNAKE HELLS CAN DAM	OXBOW HATCHERY	IDFG	Unk	58	10909	AD
4	29-Jun-12	634841	2008	FRIDAY CR 03.0017	SAMISH HATCHERY	WDFW	634842	74	10910	AD
4	29-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		64	10911	AD
4	24-Jun-12	635166	2008	LYONS FERRY REL.SITE	LYONS FERRY HATCH	WDFW		77	10912	AD
4	24-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		69	10913	AD
4	29-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		72	10914	AD
4	30-Jun-12	53877	2007	WIND R 29.0023	CARSON NFH	FWS		77	10915	AD
4	24-Jun-12	90227	2008	SPRINGS CR 36.0114	RINGOLD SPRINGS H	WDFW		76	10916	AD
4	27-Jun-12	54278	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	54283	68	10917	AD
4	29-Jun-12	180896	2009	R-Chilliwack R	H-Chilliwack River H	CDFO	180,898,180,895	66	10925	AD
4	16-Jun-12	635291	2009	FINCH CR 16.0222	HOODSPORT HATCHERY	WDFW		63	14225	AD
4	16-Jun-12	68822	2009	TRINITY R HATCHERY	TRINITY R HATCHERY	HVT		67	14226	AD
4	30-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	76	14227	AD
4	30-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	80	14228	AD
4	30-Jun-12	90177	2007	SANDY R	CLACKAMAS HATCHERY	ODFW		85	14229	AD
4	30-Jun-12	104383	2009	SNAKE HELLS CAN DAM	OXBOW HATCHERY	IDFG	Unk	60	14231	AD
4	30-Jun-12	90342	2009	ELK R	ELK R HATCHERY	ODFW		62	14233	AD
4	30-Jun-12	220311	2009	SNAKE R@PITT. LNDG	LYONS FERRY HATCH	NEZP		68	14234	AD
4	30-Jun-12	210912	2009	GROVERS CR HATCHERY	GROVERS CR HATCHERY	SUQ	635089	70	14235	AD
4	30-Jun-12	635366	2009	PURDY CR 16.0005	GEORGE ADAMS HATCH	WDFW	635367	66	14236	AD
4	30-Jun-12	635164	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		72	14237	AD
4	30-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	87	14238	AD
4	30-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	75	14239	AD
4	17-Jun-12	90323	2009	BIG CR (LWR COL R)	BIG CR HATCHERY	ODFW	90148	76	84756	AD

Area	Recovery Date	Tag Code	Brood Year	Release Site	Rearing Hatchery	Release Agency	DIT Codes	FL (cm)	Label	Recovery Mark
4	23-Jun-12	612765	2009	MAGRUDOR CORRIDOR	NPT HATCHERY	NEZP		56	84762	AD
4	23-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		71	84765	AD
4	24-Jun-12	634875	2008	SIMILKAMEEN R 490325	SIMILKAMEEN HATCH	WDFW		73	84768	AD
4	24-Jun-12	90257	2008	TONGUE PT (ASTORIA)	CEDC YOUNGS BAY NET	ODFW		69	84769	AD
4	28-Jun-12	54966	2009	LTL WHITE SALM NFH	LTL WHITE SALM NFH	FWS		72	84770	AD
4	28-Jun-12	635181	2009	COUSE CR 35.2147	LYONS FERRY HATCH	WDFW		62	84771	AD
4	28-Jun-12	180276	2008	R-Shuswap R Low	H-Shuswap River, Middle,	CDFO		NA	84772	AD
4	27-Jun-12	635093	2008	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		63	84773	AD
4	27-Jun-12	635375	2009	COLUMBIA NEAR WELLS	WELLS HATCHERY	WDFW		70	84774	AD
4	30-Jun-12	635285	2009	SAMISH R 03.0005	SAMISH HATCHERY	WDFW	635284	62	84775	AD
4	30-Jun-12	210912	2009	GROVERS CR HATCHERY	GROVERS CR HATCHERY	SUQ	635089	56	84777	AD
4	16-Jun-12	210912	2009	GROVERS CR HATCHERY	GROVERS CR HATCHERY	SUQ	635089	69	95236	AD
4	24-Jun-12	55228	2009	SPRING CR 29.0159	SPRING CR NFH	FWS	55229	76	95237	AD
4	28-Jun-12	635098	2008	WENATCHEE R 45.0030	DRYDEN POND	WDFW		79	95238	AD
4	28-Jun-12	68613	2009	SAN JOAQ ISL NET PEN	MOK R FISH INS	CDFG		72	95239	AD
4	28-Jun-12	220305	2008	CAPTAIN JOHNS PD	LYONS FERRY HATCH	NEZP		65	95240	AD
4	28-Jun-12	634778	2008	COL R @ TURTLE ROCK	TURTLE ROCK HATCH	WDFW		75	95241	AD
4	28-Jun-12	90342	2009	ELK R	ELK R HATCHERY	ODFW		64	95242	AD
4	28-Jun-12	635182	2009	GRAND RONDE R35.2192	IRRIGON HATCHERY	ODFW		61	95243	AD
4	28-Jun-12	180492	2009	R-Cowichan R	H-Cowichan River H	CDFO		68	95244	AD

Appendix C.1 Total number of coho encountered, released and retained by size and mark-status for charter observers and private VTRs during the 2012 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border.

	CHARTER BOAT OBSERVER DATA						PRIVATE BOAT VTR DATA					
Area	**Coho Encountered (Charter)**				**Proportion**		**Coho Encountered (Private)**				**Proportion**	
	LM	LU	SM	SU	LM	LU	LM	LU	SM	SU	LM	LU
Area 1	101	168	10	8	0.38	0.62	53	79	6	8	0.40	0.60
Area 2	99	240	10	4	0.29	0.71	57	143	1	12	0.29	0.72
Area 3	5	6	0	0	0.45	0.55	103	276	1	5	0.27	0.73
Area 4	6	11	0	0	0.35	0.65	148	282	7	8	0.34	0.66
Area	**Coho Released (Charter)**				**Proportion**		**Coho Released (Private)**				**Proportion**	
	LM	LU	SM	SU	LM	LU	LM	LU	SM	SU	LM	LU
Area 1	0	168	10	8	0.00	1.00	0	76	6	8	0.00	0.96
Area 2	1	240	10	4	0.01	1.00	4	141	1	12	0.07	0.99
Area 3	0	6	0	0	0.00	1.00	3	276	1	5	0.03	1.00
Area 4	1	11	0	0	0.17	1.00	12	281	7	8	0.08	1.00
Area	**Coho Retained (Charter)**				**Proportion**		**Coho Retained (Private)**				**Proportion**	
	LM	LU	SM	SU	LM	LU	LM	LU	SM	SU	LM	LU
Area 1	101	0	0	0	1.00	0.00	53	3	0	0	1.00	0.04
Area 2	98	0	0	0	0.99	0.00	53	2	0	0	0.93	0.01
Area 3	5	0	0	0	1.00	0.00	100	0	0	0	0.97	0.00
Area 4	5	0	0	0	0.83	0.00	136	1	0	0	0.92	0.00

Appendix C.2 Estimated of coho retained, released (including release mortality) and encountered during the 2012 all-species recreational fishery (coho mark-selective only) between Cape Falcon, Oregon and the U.S.-Canada border, including notes on calculation methods.

	Estimated Retained			**Estimated Encounters**			**Estimated Released**		**Estimated Release Mortality**	
Charter	**Total**	**AD**	**UM**	**Total**	**AD**	**UM**	**AD**	**UM**	**AD**	**UM**
Area 1	4,315	4,305	10	11,467	4,305	7,161	0	7,161	0	1,003
Area 2	3,652	3,645	7	12,607	3,682	8,926	37	8,926	5	1,250
Area 3	567	567	0	1,247	567	680	0	680	0	95
Area 4	560	557	3	1,894	668	1,225	111	1,225	16	172
Private	**Total**	**AD**	**UM**	**Total**	**AD**	**UM**	**AD**	**UM**	**AD**	**UM**
Area 1	3,851	3,816	35	9,505	3,816	5,688	0	5,472	0	766
Area 2	3,031	2,991	40	11,286	3,217	8,070	226	7,957	32	1,114
Area 3	1,676	1,650	27	6,253	1,699	4,553	49	4,553	7	637
Area 4	6,988	6,852	136	21,665	7,457	14,208	605	14,158	85	1,982
Total	**Total**	**AD**	**UM**	**Total**	**AD**	**UM**	**AD**	**UM**	**AD**	**UM**
Area 1	8,166	8,121	45	20,971	8,121	12,850	0	12,634	0	1,769
Area 2	6,683	6,636	47	23,894	6,898	16,995	263	16,883	37	2,364
Area 3	2,243	2,217	27	7,500	2,266	5,234	49	5,234	7	733
Area 4	7,548	7,409	139	23,559	8,125	15,434	716	15,383	100	2,154

- Total and marked (AD) retained are from catch estimates
- Unmarked (UM) retained = Total Retained - AD Retained
- Total encountered = AD Retained / (pLM[Enc] x pLM[Ret]); (Conrad, 2012 Equation 12)
- AD|UM encountered = Total encountered x pLM|LU[Enc]
- AD|UM released = Total encountered x pLM|LU[Enc] x pLM|LU[Rel]; (Conrad, 2012 see Equation 14)
- AD|UM release mortality = AD|UM released x 0.14; (Conrad, 2012 see Equation 14)