SELECT AREA FISHERY ENHANCEMENT PROJECT

Fiscal Year 2013-2016 REPORT

October 2012 - December 2016

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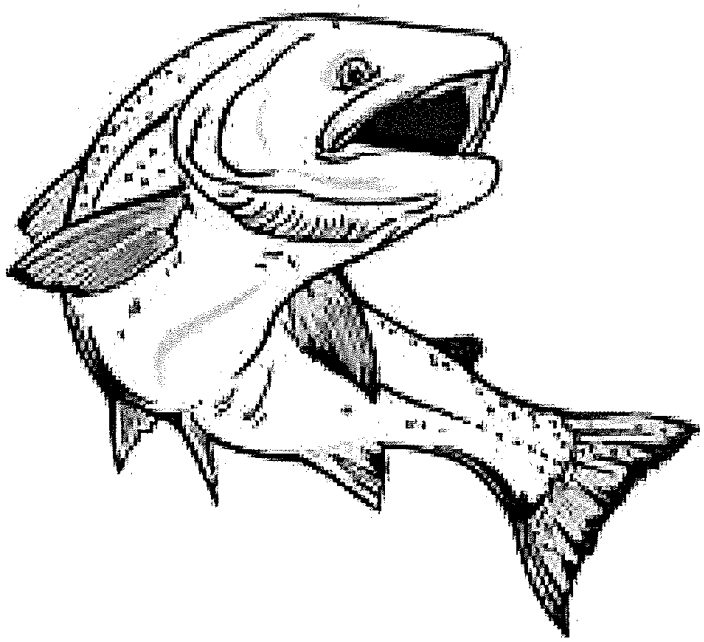
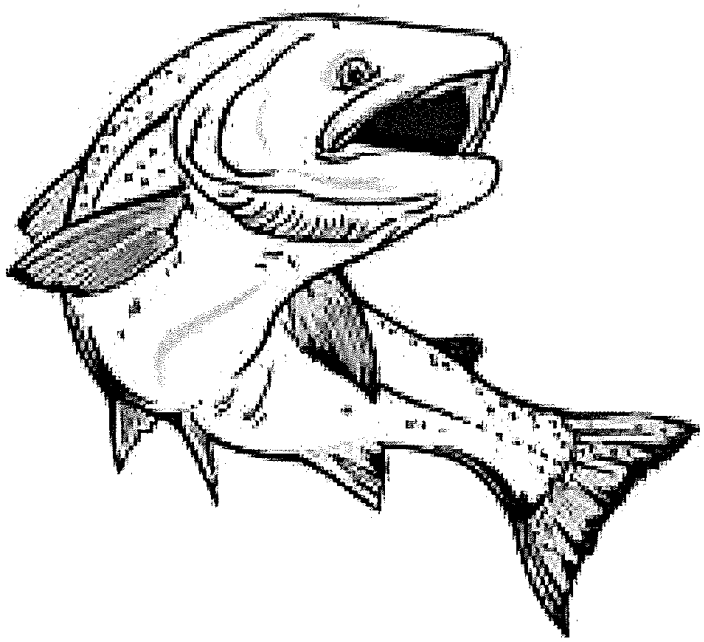


GLOSSARY OF ACRONYMS

AD	Adipose
ATPase	Adenosine Triphosphatase
BHS	Bacterial Hemorrhagic Septicemia
BKD	Bacterial Kidney Disease
BO	Biological Opinion
BPA	Bonneville Power Administration
CCF	Clatsop County Fisheries
CEDC	Clatsop Economic Development Committee
CREST	Columbia River Estuary Study Taskforce
CWT	Coded-Wire Tag
DEQ	Oregon Department of Environmental Quality
DO	Dissolved oxygen
ESA	Endangered Species Act
EMAP	Environmental Monitoring and Assessment Program
ESU	Evolutionarily Significant Unit
FIFO	Fish In Fish Out
FONSI	Finding Of No Significant Impact
FTE	Full Time Employee
HSRG	Hatchery Scientific Review Group
IEAB	Independent Economic Analysis Board
IFG	Idaho Fish and Game
IMW	Intensively Monitored Watershed
ISRP	Independent Scientific Review Panel
KK	Klaskanine Hatchery
LCR	Lower Columbia River
LHO	Low Head Oxygen
LV	Left Ventral
MERTS	Marine and Environmental Research and Training Station
NEV	Net Economic Value
NF	North Fork
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPCC	Northwest Power and Conservation Council
NPDES	National Pollutant Discharge Elimination Systems
NRCS	Natural Resource Conservation Service
NSD	No Survey Done
OASIS	Oregon Adult Salmonid Inventory and Sampling
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
OFWC	Oregon Fish and Wildlife Commission
OSU	Oregon State University
PPM	Parts per million
PIT	Passive Integrated Transponder
PSMFC	Pacific States Marine Fisheries Commission
R&E	Restoration and Enhancement
RMPC	Regional Mark Processing Center
SAB	Select Area Bright fall Chinook
SAFE	Select Area Fisheries Enhancement
SAS	Smolt-to-Adult Survival
SF	South Fork
STEP	Salmon and Trout Enhancement Program
TAC	Technical Advisory Committee
TOC	Total Organic Carbon
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
VSI	Visual Stock Identification
WDFW	Washington Department of Fish and Wildlife
WFWC	Washington Fish and Wildlife Commission



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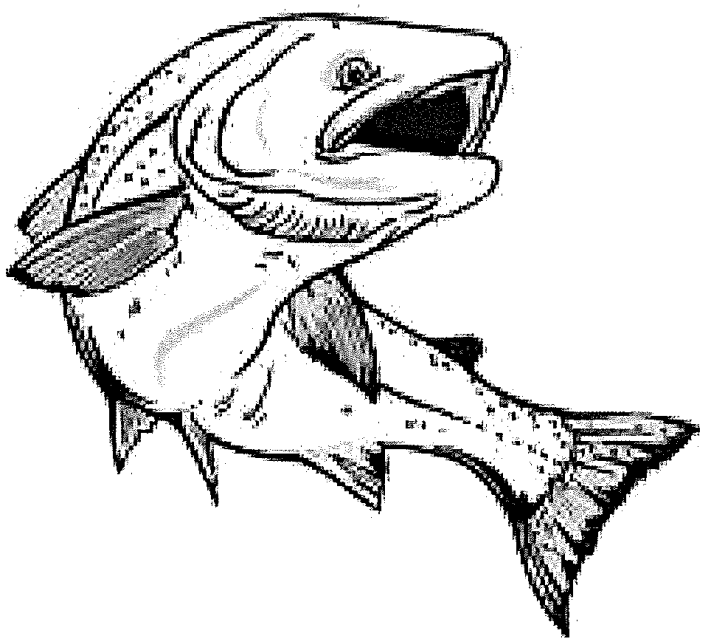

ACKNOWLEDGEMENTS

The accomplishments of this project have only been possible through the hard work and dedication of many individuals and agency representatives of local, state, and federal governments working together collaboratively.

We wish to acknowledge over two hundred gillnet fishermen and several local fish processors for their continued support. Other organizations such as Salmon For All, the Columbia River Fishermen's Protective Union, and many local businesses and private landowners have made contributions of volunteer time and resources to make the project a success.

The many people directly associated with on-the-ground daily work of fish culture and a wide range of activities associated with the production, monitoring, oversight, and program development are to be commended. They include but are not limited to:

- Land owners at net-pen sites
  - Oregon: Carol Kahn (Blind Slough)
    City of Astoria (Yacht Club)
    USACE (Tongue Point MERTS)
  - Washington (Deep River): Department of Natural Resources, the Fauver family

- Bonneville Power Administration
  - COTR: Tracy Hauser

- Clatsop County
  - Public Works Director: Ed Wegner
  - CCF staff: Dan Dunn, Christina Ketcham, Rod Litton, Keith Warren, Andrea Neys

- Oregon Department of Fish and Wildlife
  - Fishery Managers: Chris Kern, Tucker Jones, John North, Steve Williams (retired), Tony Nigro (retired)
  - Fish Propagation: Scott Patterson, John Thorpe (retired)
  - Commercial Fisheries Team: Doug Case, Bret Morgan, Sue Engwall
  - Northwest Region Hatchery Coordinators: Ryan Couture, Manny Farinas, Bill Otto
  - Big Creek Hatchery staff: Rob Dietrichs, Chris Lauman, Ross Mcdorman, Travis Axtell, Dustin Manwaring, Nicholas McConnell, Jessica Wentzek, Newton Langston, Mike Posey, Julian Gingerich, Kenny Taber
  - Gnat Creek Hatchery staff: Garth Gale, Michael Hazen, Samuel Welch, Steve Kellow (retired), Dave Sheldon (retired)
  - Klaskanine Hatchery staff: Whitney Crowell, Alexis Toney, Kyle Wilson, Shaun Montgomery, Josh Rist, Ryan Fenwick, Eddie Reed
  - Other hatcheries: Bonneville, Cascade, Clackamas, Leaburg, McKenzie, Marion Forks, Oxbow, Salmon River, South Santiam, Willamette
  - Fishery samplers: Adam Fleming, Chris Rodriguez, Devin Volenec, and several seasonal samplers
  - Fish ID: Ken Johnson (retired), Bill Haugen, and other fish marking staff
  - Coded-wire tag data coordinator: Gabe Garza, Mark Engelking (retired)
  - Fish Health/Pathology: Jerry Jones, Craig Banner, Tony Amandi (retired), John Kaufman, Leslie Lindsay

- Fish Liberation: Todd Hansen (coordinator), Hal Boldt (retired) and several liberation truck drivers

❖ Washington Department of Fish and Wildlife
- Fishery Managers: Guy Norman, Cindy LeFleur, Robin Ehlke, Patrick Frazier, Ron Roler (retired)
- Grays River Hatchery staff: Shane McEneny, Karl Mahlum, Mike Queener, Aaron Roberts, Cody Davis, Josh Osborn, and Adam Combs
- Other hatcheries: Beaver Creek, Cowlitz, Lewis, North Toutle, and Washougal
- Fishery samplers: Josh Laeder, Claire Landry, Bryan Nelson, Leif Rinearson, Sean Toomey, and Susanne Ranseen
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- Fish ID: Mark Kimble, Dan Thompson, and other fish marking staff
- Fish Health/Pathology: Elysa Ray, Joan Thomas, and other virology lab staff

The use of trade names throughout this report does not imply endorsement by the SAFE project.

EXECUTIVE SUMMARY

The Select Area Fisheries project is a well-established cooperative program that strives to deliver quality commercial and recreational salmon fishing opportunities in a setting that maximizes the return of hatchery production into fisheries. Funding support of the project is shared by the Bonneville Power Administration, the States of Oregon and Washington, Clatsop County, Mitchell Act (NOAA), commercial fisher/processor voluntary contributions, and occasionally, ODFW's Restoration and Enhancement program. The longevity of the partnership between the various entities involved in the SAFE project is a testament to the effectiveness of cost sharing and cooperation of multiple government agencies.

In 2007, the SAFE project was retitled Select Area Fisheries *Enhancement* to reflect the progression from project implementation and research toward a goal of maximizing fisheries potential. This report summarizes activities and findings of the SAFE project during fall 2012 through fall 2016, but includes some earlier information for context.

Key findings and results are:

- From 2012-2016, Select Area commercial fisheries have contributed an average of 56% of spring Chinook, 84% of Coho, and 23% of fall Chinook to the total non-Treaty Columbia River commercial harvest.
- Average harvest rates of 94% for spring Chinook, 97% for Coho, and 88% for SAB fall Chinook produced by the SAFE project far exceed rates for production from other regional hatcheries which typically have high escapement rates due to complexities associated with harvest in mixed-stock fisheries of the mainstem Columbia River.
- On average, 16% of spring Chinook, 42% of SAB fall Chinook, and 25% of Coho production from the SAFE project is harvested in other regional recreational and commercial fisheries.
- Due to spatial separation, Select Area fisheries have far less impact on non-target stocks per harvested fish than do mixed-stock commercial and recreational fisheries occurring in the mainstem Columbia River, even when these fisheries utilize mark-selective harvest methods.
- Stock composition in Select Area winter, spring, and summer commercial fisheries averages 83% local stock and fall fisheries average 90% local Chinook stocks.

Several goals and objectives of the project are being realized with continued funding support from BPA; one being to maximize Select Area production and fisheries. Hatchery release goals from SAFE net-pens and associated hatcheries for 2016 included about 5 million Coho, 2 million spring Chinook, 2.2 million SAB fall Chinook, and 6 million tule fall Chinook. Commercial and recreational fisheries have expanded substantially due to improved rearing strategies, increases in production, and adaptive management of the fisheries.

The goal of minimizing impact of Select Area fisheries on ESA listed and non-local stocks is being met through extensive sampling and active in-season management of the commercial fisheries. Fishing periods, gear restrictions, and area boundaries have been refined over time to minimize impacts to listed species.

Another goal, to minimize impact of Select Area production, is being met through the development of successful net-pen rearing strategies that facilitate rapid out-migration, reduced incidence of disease, and maintaining water quality through monitoring efforts. All associated hatcheries operate under the required permits and are monitored extensively. Sampling of local hatchery returns and spawning

grounds in local tributaries provides additional coded-wire tag recovery data that are used to monitor survival, straying, and fishery contributions.

During this reporting period, several Hatchery and Genetic Management Plans (HGMPs) associated with the program have been revised and updated with the most recent information and hatchery operation plans. The following HGMPs have been formally submitted to NOAA for review, have been posted for public comment, or are in final stages of review and will be submitted soon:

Big Creek Coho Salmon Program HGMP (submitted)
Big Creek Tule Fall Chinook Salmon HGMP (submitted)
Deep River Net Pen Fall Chinook Program (program discontinued as of 2017)
Deep River Net Pen (SAFE) Type-S Coho HGMP (submitted)
Deep River Net Pen Type-S Coho HGMP (submitted – program is Type-N Coho as of 2017)
Grays River Hatchery Type-N Coho HGMP (submitted)
Oregon SAFE Spring Chinook Program HGMP (submitted)
Oregon SAFE Coho Program HGMP (submitted)
Oregon SAFE Select Area Bright Fall Chinook HGMP (in process)

HGMPs can be found on the following links:
http://www.dfw.state.or.us/fish/HGMP/final.asp
http://wdfw.wa.gov/hatcheries/hgmp/2012_lower_columbia.html
http://www.westcoast.fisheries.noaa.gov/hatcheries/salmon_and_steelhead_hatcheries.html

1. INTRODUCTION

BACKGROUND

In its 1993 Strategy for Salmon, the Northwest Power Planning Council (NPPC, currently Northwest Power and Conservation Council, NPCC) recommended that terminal-fishing sites be identified and developed to harvest abundant fish stocks while minimizing the incidental harvest of weak stocks. The Council called on the Bonneville Power Administration (BPA) to "Fund a study to evaluate potential terminal fishery sites and opportunities. This study should include: general requirements for developing those sites (e.g., construction of acclimation/release facilities for hatchery smolts so that adult salmon would return to the area for harvest); the potential number of harvesters that might be accommodated; type of gear to be used; and other relevant information needed to determine the feasibility and magnitude of the program."

Referred to as the Select Area Fisheries Enhancement (SAFE) Project (since 2007), the sponsors are the Washington Department of Fish and Wildlife (WDFW), Oregon Department of Fish and Wildlife (ODFW), and Clatsop County Fisheries (CCF).

This report primarily covers the Select Area harvest from the fall of 2012 through the fall of 2016 and the fish releases from Select Area sites from spring of 2013 through summer of 2016. Detailed project information such as history, methodologies, research, and reviews are included in previous reports (North et al. 2006, Whisler et al. 2006, Whisler et al. 2009, Hulett et al. 2010, and Duff et al. 2013).

FISHING SITES AND FACILITES

The four current Select Area net-pen rearing, hatchery, and fishing sites are located in the lower Columbia River (LCR) between river miles 10 and 28 (Figure 1.1). Each site provides commercial and recreational fishing opportunities, although season structure and target species differ depending on current production goals and management objectives. Hatcheries that have contributed to production for these sites are South Fork Klaskanine (CCF); Big Creek, Gnat Creek, Klaskanine, Bonneville, Cascade, Cedar Creek, Clackamas, Leaburg, McKenzie, Marion Forks, Oxbow, Salmon River, South Santiam, and Willamette (all ODFW); Beaver Creek, Cowlitz, Elochoman, Grays River, Lewis River, and North Toutle (all WDFW), and Eagle Creek National Fish Hatchery (United States Fish and Wildlife Service (USFWS)). The SAFE project fully funds Gnat Creek Hatchery and partially funds Klaskanine and Grays River hatcheries; other hatcheries are funded by a blend of state, Mitchell Act (NOAA), and other funds.

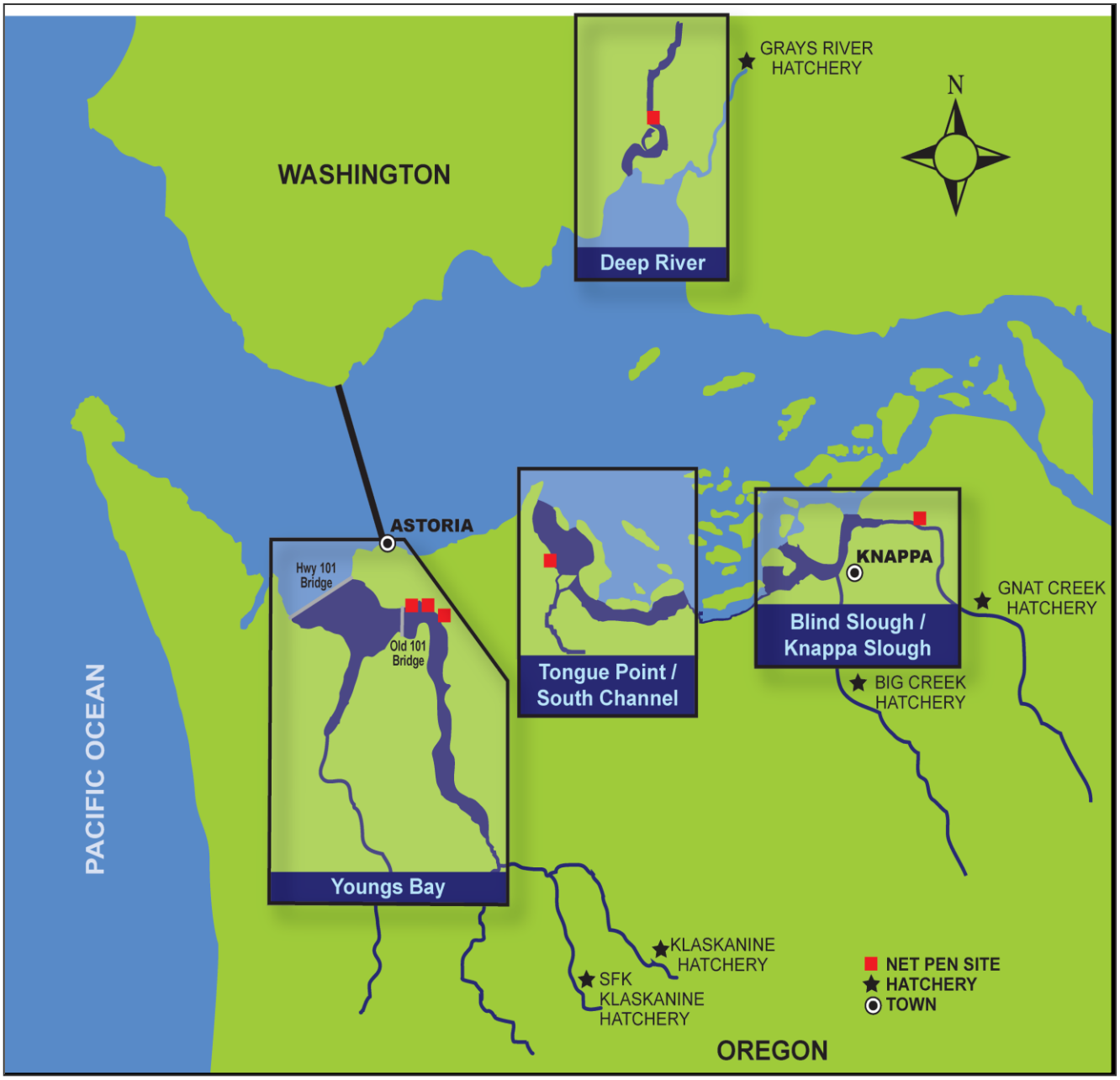


Figure 1.1. Select Area fishing locations in the lower Columbia River.

PROJECT GOALS

The primary goals of the Select Area Fisheries Enhancement (SAFE) project are mitigation, protection of ESA-listed species, minimizing negative impact of Select Area fisheries and production on environment, and minimizing the incidence of hatchery fish on spawning grounds by maximizing harvest of hatchery stocks. These goals will be accomplished by the following:

- Mitigation is accomplished by producing salmon for harvest in the lower Columbia River commercial and sports fisheries locally and regionally in the Pacific Northwest coastal zones. Since project inception, these fisheries have expanded substantially due to improved rearing strategies, production increases when possible, and adaptive management of the fisheries. Approximately 1 million Coho and 1 million spring Chinook hatchery smolts are currently reared and released annually from SAFE net-pens and associated hatcheries using BPA funds. These existing SAFE rearing sites also allow for the additional production of 3.4 million Coho, 700,000 spring Chinook, 2.8 million tule fall Chinook, and 3 million SAB fall Chinook smolts annually (based on 2016 release goals) that are funded by state and/or Mitchell Act funds.

- Protection of listed species is being met by fish production at Select Area sites. Select area bright fall Chinook, spring Chinook and lower Columbia River early hatchery Coho are provided for harvest in Select Areas where interception of protected fish is minimal and closely monitored. Active in-season management of the commercial fisheries, fishing periods, gear restrictions, and area boundaries have been refined over time to minimize impacts to listed species. The fish produced from this program are identified separately from the ESA-listed stocks through mass marking and coded-wire tags.

- Negative impact of SAFE production on the environment is avoided by development of successful net-pen rearing strategies that facilitate rapid out-migration, and reduce incidence of disease. Monitoring the cumulative results of rearing operations in the estuary is accomplished through benthic invertebrate and sediment sampling that is analyzed and reported to the Oregon Department of Environmental Quality through water quality permits. All associated hatcheries operate under the required permits and are monitored extensively.

- Minimizing the amount of hatchery fish on spawning grounds is being addressed through intensive harvest. Average harvest rates for fish produced by the SAFE project are 94% for spring Chinook, 97% for Coho, and 88% for SAB fall Chinook. These rates far exceed those for production from other regional hatcheries, which typically have high escapement rates due to complexities associated with harvest in mixed-stock fisheries of the mainstem Columbia River. Extensive sampling of local hatchery returns and spawning grounds in local tributaries provides additional coded-wire tag recovery data that are used to monitor survival, straying, and fishery contributions.

This project will continue the development of the select area sites to maximize harvest of returning adults and minimize catch of non-SAFE stocks at existing sites; coordinate activities with Washington and Oregon Departments of Fish and Wildlife, Clatsop County, Bonneville Power Administration, and the National Oceanic and Atmospheric Administration; and compile project results and information.

INDEPENDENT SCIENTIFIC REVIEW PANEL (ISRP)

With the FY 2012-2016 BPA funding proposal process the Independent Scientific Review Panel and Peer Review Groups (together referred to as ISRP) reviewed the SAFE proposal that was submitted for the 2010 Research, Monitoring and Evaluation (RME) and Artificial Production Category Review to implement the Columbia River Basin Fish and Wildlife Program (ISRP 2010). The ISRP found that the project's proposal "Meets Scientific Review Criteria" and that the project had provided thorough and detailed responses to the ISRP information request.

The panel recommended that the sponsors prepare a comprehensive analysis of the project, at least every five years, which includes project description, methods used to evaluate the project, project benefits, and project effects on natural-origin local and non-local stocks. The ISRP also requested that the sponsors respond to four key questions raised during the review process:

1. How many and what percentage of non-local stock populations are harvested and what is the stock composition of the non-local harvest?
2. How many local, natural-origin salmon are harvested?
3. What percentage of the local spawning escapement is represented by SAFE fish that escaped the fishery?
4. How will the SAFE project coexist with attempts to rebuild local natural origin fish?

The project intends to produce reports more frequently than the five-year period that the ISRP recommended during its review. Responses to the key questions, as well as the entire ISRP review, can be found at the following web site:

http://www.cbfish.org/Proposal.mvc/Summary/16

This 2013-2016 project report further addresses the ISRP concerns with updated data and results included in various sections.

2. PRODUCTION

The species and stocks of salmon reared and released under the SAFE program were chosen primarily because of their flesh quality, availability of gametes, timing of return, homing ability, and overall value to the economy. Salmon produced for the SAFE program consist of Chinook Salmon (*Oncorhynchus tshawytscha*, hereafter Chinook) and Coho Salmon (*Oncorhynchus kisutch*, hereafter Coho). For this reporting period, Spring Chinook originated from various Willamette River stocks and from Cowlitz and Lewis River stocks (Deep River Select Area), fall Chinook consisted of Select Area Bright (SAB) and tule stock, and Coho were from Big Creek and Tanner Creek stock in Oregon and various stocks in Washington. The SAB fall Chinook stock originated from egg transfers of Rogue River stock in 1982-84, but has since been maintained by a local broodstock program. This program has been relocated several times and is now operated out of CCF's South Fork (SF) Klaskanine Hatchery (beginning with the 2005 brood). The tule fall Chinook that are currently released in the Select Areas are Big Creek stock in Oregon and Washougal stock in Washington. Early stock Coho released during this reporting period originated from Big Creek, Bonneville, and Sandy hatcheries for the Oregon Select Areas and Grays River and North Toutle hatcheries provided the Coho stock for the Deep River net-pens on the Washington side. Annual releases of salmonids from Select Area facilities (all funding sources) and all affiliated release sites have ranged from 10 to 17.3 million fish (brood years 2000-2014, Figure 2.1).

HATCHERIES

ODFW and WDFW hatcheries are an integral part of the SAFE project. Collection of returning broodstock, spawning, incubation, early rearing, and mass marking are conducted at and primarily funded by the various contributing hatcheries before fish are transferred to the net-pens or released on site. The role of hatcheries within the SAFE project is two-fold: to rear fish for net-pen releases and to release fish directly into Select Area sites. The spring Chinook and Coho smolts released from the SAFE net-pens require initial rearing of almost a year in a hatchery setting (more than a year in the case of acclimation smolts). The SAFE project provides nearly full funding for operation of three hatcheries: Gnat Creek and Klaskanine hatcheries in Oregon, and Grays River Hatchery in Washington. Because of federal and state budget cuts in past years, these facilities would likely not be operational today without BPA SAFE project funding. Gnat Creek Hatchery rears all of the SAFE-funded spring Chinook fingerlings for the Oregon net-pens, and Klaskanine Hatchery rears and releases Coho, SAB fall Chinook, and tule fall Chinook into the Youngs Bay Select Area and serves as a collection and holding site for adult SAB fall Chinook broodstock. Grays River Hatchery rears both spring Chinook and Coho fingerlings for the Deep River net-pens and the spring Chinook fingerlings for the Cathlamet Channel net-pens. ODFW's Cascade Hatchery intermittently receives some SAFE project funds to apply coded-wire tags to Coho fingerlings for the Tongue Point Marine and Environmental Research and Training Station (MERTS) net-pens. Several other hatcheries that provide fish for the net-pens are either state or Mitchell Act-funded: ODFW's Big Creek Hatchery provides the Coho eggs for Klaskanine and Salmon River/SF Klaskanine hatcheries, where fish are reared for eventual release into the Youngs Bay Select Area. Big Creek Hatchery also serves as a collection site for tule fall Chinook eggs and provides the early rearing for the Klaskanine Hatchery acclimation and release portion of that program. ODFW's Bonneville and Sandy hatcheries provide Coho eggs for the Cascade and Oxbow hatchery programs that produce Coho fingerlings for the net-pens. Spring Chinook eggs for the Oregon SAFE production have been collected at various hatcheries in the Willamette system, including Willamette, McKenzie, Leaburg, Marion Forks, South Santiam, and Clackamas. In Washington, Cowlitz and Lewis River hatcheries have been the source of spring Chinook eggs for Grays River Hatchery/Deep River net-pen production, while North Toutle,

Kalama, and Washougal hatcheries have provided Coho eggs. Washougal Hatchery has also provided the tule fall Chinook eggs for the Beaver Creek Hatchery/Deep River net-pen program. SAB fall Chinook eggs are collected from returning adults at both Klaskanine and SF Klaskanine hatcheries, with a cooperative effort between staff of Big Creek, Klaskanine, Gnat Creek, and SF Klaskanine hatcheries. The SF Klaskanine Hatchery provides the SAB fall Chinook fry for the Youngs Bay net-pens, as well as for the broodstock portion of that program. The recent addition of ODFW-funded SAB fall Chinook production at Klaskanine Hatchery has resulted in the incubation of eggs and full-term rearing of these fish at that site, beginning with the 2012 brood.

NET-PENS

There are three basic rearing strategies employed at the Select Area net-pen sites: For Coho and spring Chinook, overwinter rearing of fingerlings until release as smolts in the spring (from October to March or April) or short-term acclimation and release of smolts in the spring (March and April), and in the case of the SAB fall Chinook, full-term rearing from fry to smolt (from February to July). With the overwinter fish, known numbers of fingerlings are transferred from source hatcheries by tanker truck and piped directly into the pens at the various sites. The trucks routinely haul 50,000-60,000 fish per load, so after the fish are received at each pen site, approximately half of each load is hand-dipped into an adjacent pen to achieve target density (usually 0.75 pound/cubic foot at release). With the short-term (2-3 weeks) acclimation fish, each truck carries about 25,000-30,000 smolts, so no additional handling is required after delivery. In the case of full-term rearing of SAB fall Chinook, fry are transferred by pick-up truck from the SF Klaskanine in 32-gallon plastic containers equipped with airstones and emptied directly into small-mesh starter net-pens in Youngs Bay. These fry are held in two net-pens (up to 350,000 fish per pen) until coded-wire tagging and mass-marking begins in April. At that time, fry are distributed into the required number of net-pens at approximately 30,000-32,000 fish per pen, using appropriately larger mesh size nets as the fish increase in size. For all rearing strategies, fry and fingerlings are fed the recommended size and rations of pelletized feed throughout the rearing period and released as smolts according to schedules developed during the research phase of this project (FYs 1993–2006). During the time the fish are in the pens, growth is monitored bi-weekly to determine feed rations, and any mortalities are recorded and removed daily. If significant loss to disease occurs, ODFW or WDFW pathology staff is called in to diagnose the cause and recommend treatment, which is usually medicated feed. In the case of large losses, mortalities are removed, counted, and disposed of in a facility dumpster. Other losses during net-pen rearing (e.g. predation or holes in nets) are estimated based on feed conversions and feeding response, as fish are not typically inventoried prior to release. Predation of net-pen fish by river otters continues to be a significant problem at all sites despite numerous attempts with a variety of deterrence methods, including electric barriers, high frequency audio devices, sewing of the bird covers to the nets, and permitted trapping. This ongoing problem most often results in release numbers that are below targeted production goals, especially in the case of the overwinter fish. Detailed descriptions of rearing activities by species and brood year are provided in the following sections.

SPRING CHINOOK

Various Willamette River basin stocks of spring Chinook have been released from the Youngs Bay net-pens since 1989 (1988 brood), and have continued annually at this site with the exception of 1993

when rearing strategies shifted from sub-yearling (0+) to yearling (1+) release patterns. Initiation of the SAFE project provided opportunities to expand the program, and releases from the Youngs Bay net-pens were increased in 1995. Releases for site evaluation at Tongue Point and Blind Slough began in 1996 (1994 brood), and in Washington, releases of Cowlitz River stock from the Deep River net-pens began with the 1996 brood, with the addition of Lewis River stock beginning with the 2001 brood. Spring Chinook releases at Deep River continued through the 2011 brood, but because of consistently poor returns, that program was cut from the SAFE project contract. Under alternative funding, a portion of that production was shifted to a new net-pen site further upstream in the Columbia River near the town of Cathlamet, in Cathlamet Channel, beginning with the 2012 brood.

In an effort to further increase production, experimental releases of spring Chinook from CCF's SF Klaskanine site occurred with the 2002-2004 broods, but were discontinued because of chronic disease problems and hatchery water rights issues. Beginning with the 2008 brood, ODFW production of 250,000 acclimation spring Chinook from the Willamette River system was reprogrammed to the Oregon Select Areas and has continued since, which along with modest increases at Gnat Creek Hatchery, boosted the total annual spring Chinook production goal to over 1.5 million smolts for release years 2010-2012. More recently, the Lower Columbia River Fisheries Management Reform initiated by former governor Kitzhaber resulted in the shift of another 500,000 spring Chinook to the Select Areas beginning with the 2011 brood, bringing the total annual release goal to 2.2 million fish for release years 2013-2016 (Table 2.1, Figure 2.2).

2011 Brood Spring Chinook

The 2011 brood spring Chinook for the SAFE-funded Oregon net-pen production originated from McKenzie Hatchery, with a million eyed eggs transferred to Gnat Creek Hatchery in October of 2011. Final incubation, ponding, early rearing, mass-marking, and coded-wire tagging occurred while at Gnat Creek, and the fry were vaccinated for enteric redmouth disease and vibriosis in the spring of 2012. At the end of October, 635,220 fingerlings were transferred to the Youngs Bay net-pens and 188,100 fingerlings were transferred to the Blind Slough net-pens for over-winter rearing at both sites. After some initial moderate post-transfer loss in the Youngs Bay fish, both groups experienced minimal losses to disease, with no treatments required, and smolts were released in early March of 2013.

For the second year, ODFW- reprogrammed acclimation spring Chinook smolts from McKenzie Hatchery were transferred to the Tongue Point MERTS net-pens (instead of Youngs Bay), with 246,904 fish received in early March, reared for 2 ½ weeks and released in good health on March 21. In addition, as a result of Lower Columbia River Fisheries Management Reform, three groups of additional acclimation smolts (totaling 236,649 fish) were transferred to the Tongue Point MERTS net-pens in late March of 2013. One group of 135,298 Sandy stock spring Chinook was transferred on March 25, and two groups (approximately 50,000 fish each) of Clackamas stock spring Chinook that were reared at Leaburg Hatchery were transferred on March 26. These three groups had minimal mortality and were released after two weeks of acclimation on April 8. In addition, as part of the fisheries management reform, 153,985 South Santiam stock acclimation spring Chinook were transferred from South Santiam Hatchery to the Blind Slough net-pens in mid-March and released on March 28.

Direct release of spring Chinook smolts from Gnat Creek Hatchery was initiated with the 2011 brood to compare survival rates with the Blind Slough net-pen fish. Gnat Creek flows directly into Blind Slough just upstream of the net-pens, so those fish released from the hatchery would migrate through

the net-pen area on their way out of Blind Slough. Approximately 100,000 fish of the 2011 brood were retained at the hatchery for over-winter rearing and released from the hatchery in early March of 2013.

In Washington, Cowlitz Hatchery provided the eggs for the 2011 brood spring Chinook production for the Deep River net-pens, with final incubation, early rearing, mass-marking, and coded-wire tagging conducted at Grays River Hatchery. Some moderate losses to chronic disease problems occurred at the hatchery before transfer to the net-pens in the fall for over-winter rearing. After transfer, this group of ~320,000 fish had no major disease outbreaks and the fish were released in the spring of 2013.

2012 Brood Spring Chinook

Oregon's SAFE-funded spring Chinook production for the 2012 brood was provided by McKenzie Hatchery (928,000 eggs) and South Santiam Hatchery (72,000 eggs), transferred to Gnat Creek Hatchery in October of 2012 for final incubation. Ponding, early rearing, mass marking and coded-wire tagging occurred at Gnat Creek, and the fry were vaccinated for enteric redmouth disease and vibriosis in the spring of 2013. After rearing through the summer, the fingerlings were transferred to the net-pens during the first week of November, with 648,152 fish going to Youngs Bay and 150,500 to Blind Slough. Even though the fingerlings had been vaccinated, shortly after transfer, the Youngs Bay fish suffered a major outbreak of vibriosis, and despite treatment with 2% TM-200™ incorporated into the feed, a loss estimated at ~100,000 fish was incurred. The loss was confined to only eight of the twenty-six pens, and the remaining fish in those affected pens were released early as there was virtually no feeding response. Fish in the remainder of the pens responded to the medication, and additional loss was avoided. To replace the loss, Leaburg Hatchery provided 187,512 pre-smolts in January of 2014, and all of the Youngs Bay fish subsequently remained healthy through release in mid-March. The Blind Slough fish had no disease problems but did have some loss to chronic river otter predation before release in early March of 2014.

The ODFW-reprogrammed acclimation spring Chinook smolts for the 2012 brood again came from McKenzie Hatchery, with 272,885 fish trucked to the Tongue Point MERTS net-pens on March 4, reared for two weeks and released on March 18, 2014. Two additional acclimation groups for the MERTS site were provided by ODFW to help meet fisheries reform goals. One group of 173,126 Sandy stock spring Chinook smolts came from Marion Forks Hatchery on March 25, held for a little over two weeks and released on April 10, 2014. Another 49,031 McKenzie stock spring Chinook smolts were trucked from McKenzie Hatchery on April 9 and released two weeks later on April 23, 2014. The Blind Slough portion of the fisheries reform spring Chinook smolts came from Leaburg Hatchery (98,817 fish) and Marion Forks Hatchery (143,119 fish), which arrived at Blind Slough in mid-March and were released after two weeks on March 27, 2014. There were no apparent disease problems with any of the acclimation fish, and losses were minimal

A group of ~150,000 fingerlings was retained at Gnat Creek for over-winter rearing, and these fish were released directly from the hatchery in March of 2014.

On the Washington side, approximately 250,000 Cowlitz stock spring Chinook were reared at Grays River Hatchery, where mass-marking and coded-wire tagging occurred in the spring of 2013. After some loss to disease at the hatchery, the fingerlings were transferred to the new acclimation site in Cathlamet Channel in the fall of 2013, reared over-winter and released on March 28, 2014.

2013 Brood Spring Chinook

In October of 2013, Gnat Creek Hatchery received 976,000 eyed-eggs from McKenzie Hatchery for Oregon's SAFE-funded spring Chinook production. Final incubation, ponding, early rearing, mass marking, and coded-wire tagging activities were again conducted at Gnat Creek, and the fry were vaccinated for enteric redmouth disease and vibriosis in April of 2014. In the fall of 2014, Gnat Creek shipped out 608,224 fingerlings to the Youngs Bay net-pens and 145,906 fingerlings to the Blind Slough net-pens. The Youngs Bay fish experienced minimal mortality and did not require any treatment for disease, but a higher than normal incidence of "dropouts" or "pinheads" was observed for some unknown reason. These fish were released in mid-March. The Blind Slough fish had no disease problems, but chronic predation by river otters again reduced the number of fish released in early March.

In early March of 2015, the ODFW-reprogrammed group of 260,410 acclimation spring Chinook smolts was transferred from Marion Forks Hatchery (Marion Forks stock) to the Tongue Point MERTS net-pens. These fish were held for approximately two weeks and released on March 19. Also, as a result of the fisheries reform, two other groups of 2013 brood spring Chinook acclimation fish were transferred to the Select Areas from Marion Forks Hatchery (again, Marion Forks stock). 307,159 smolts were trucked to the Blind Slough net-pens in early March and acclimated for two weeks before release on March 26, and 205,419 smolts were put into the pens at Tongue Point MERTS on March 23, held for two weeks, and released in early April.

Approximately 150,000 of the 2013 brood fingerlings were retained at Gnat Creek Hatchery for over-winter rearing and direct release from the hatchery in March of 2015.

In Washington, a combination of Cowlitz and Lewis stock spring Chinook were utilized for the 2013 brood Cathlamet Channel net-pen production. Initial rearing was again provided by Grays River Hatchery, where mass marking and coded-wire tagging occurred before transfer to the net-pens in the fall of 2014. Losses to disease while at the hatchery again resulted in a significant reduction in the number of fish, which were released on February 11, 2015.

2014 Brood Spring Chinook

Gnat Creek Hatchery received 971,200 eyed-eggs from South Santiam and McKenzie hatcheries in October of 2014 to rear for Oregon's SAFE-funded spring Chinook production. Final incubation, early rearing, mass marking, and coded-wire tagging occurred at Gnat Creek, and in April of 2015, the fry were vaccinated for vibriosis and enteric redmouth disease. In November of 2015, Gnat Creek shipped out 383,380 fingerlings to Youngs Bay and 142,000 fingerlings to Blind Slough for over-winter rearing, with Gnat Creek retaining an extra 250,000 fingerlings to boost their on-site release to nearly 400,000 smolts. The Youngs Bay production was supplemented with a total of 268,377 Clackamas stock fingerlings consisting of two equal tag groups provided by Bonneville Hatchery to help attain the release goal of 650,000 SAFE-funded smolts at that site. These over-winter groups required no treatments for disease through release in late February, but again, actual release numbers were reduced because of chronic predation from river otters.

In February of 2016, an acclimation group of 199,058 Marion Forks stock smolts was transferred from Gnat Creek Hatchery to the Tongue Point MERTS net-pens, held for two weeks, and released on February 23. These fisheries reform fish had earlier been transferred from Marion Forks Hatchery to Gnat Creek Hatchery because of water issues at Marion Forks. The original ODFW-reprogrammed group of 250,000 smolts was transferred from Marion Forks to the Tongue Point MERTS net-pens in

early March, acclimated for two weeks, and released on March 23. The fisheries reform group of 300,000 acclimation smolts that had previously been released from Blind Slough was shifted to Youngs Bay because of the increase in the number of smolts released directly from Gnat Creek Hatchery into the Blind Slough area. Because these fish were experiencing significant loss to BKD at the time of transfer from Leaburg Hatchery, ODFW propagation managers decided to transfer the smolts to a raceway at Klaskanine Hatchery in small groups over a period of several days so that post-transfer mortalities could be more easily removed (in comparison to removal from the net-pens in Youngs Bay). After a short acclimation, approximately 275,000 smolts were released from Klaskanine Hatchery into the Youngs Bay system by the end of February.

As mentioned above, Gnat Creek Hatchery increased their direct release goal to 400,000 smolts beginning with the 2014 brood, resulting in the release of approximately 380,000 SAFE-funded smolts into the Blind Slough system on March 14, 2016.

In Washington, Cowlitz Hatchery provided the 2014 brood spring Chinook eggs for the Cathlamet Channel net-pen production. Early rearing, mass marking, and coded-wire tagging occurred at Grays River Hatchery before transfer of approximately 230,000 to Lewis River Hatchery for summer and fall rearing. These fish suffered significant loss to disease while at Lewis River before transfer to the net-pens in January of 2016, which resulted in the release of only 107,856 smolts on March 1.

Actual release numbers, fish sizes, and release dates for all groups of spring Chinook are provided in Table 2.1.

SAB FALL CHINOOK

The SAB fall Chinook stock used in the Select Areas originated from Rogue River stock egg transfers to Big Creek and SF Klaskanine hatcheries in the early 1980s. This stock was chosen because of its high quality flesh and south-turning migration pattern, which makes it available for harvest to all Oregon coast commercial and sport fisheries as well as in lower Columbia River and Youngs Bay fisheries. An additional benefit of this stock is the protracted timing of return, which provides harvest opportunity from late spring through summer, when few other fall Chinook are present in Youngs Bay and its tributaries.

Broodstock releases were maintained at Big Creek Hatchery through 1995, transitioned to Klaskanine Hatchery beginning with the 1996 brood, and finally to the SF Klaskanine Hatchery with the 2005 brood. Fishery enhancement efforts in Youngs Bay began with releases from the SF Klaskanine Hatchery in 1983 and expanded to include net-pen releases beginning in 1989 and continuing annually since. With the exception of the 1986-1989 broods, all SAB fall Chinook released from Select Areas have been marked with a left ventral (LV) fin clip to facilitate external identification.

For the brood years included in this report, there are three components of SAB fall Chinook production: SAFE-funded net-pen production in Youngs Bay of up to 750,000 smolts annually, and ODFW-funded broodstock production of 700,000 smolts at the SF Klaskanine Hatchery, and beginning with the 2012 brood, 500,000 smolts at Klaskanine Hatchery. Eggs for all groups are collected from returning adults at Klaskanine and SF Klaskanine hatcheries, and incubated at the SF Klaskanine, Klaskanine, and/or Big Creek hatcheries.

Fry for the SAFE-funded net-pen production are generally ponded at the SF Klaskanine in small raceways and started on feed for at least a week before transfer to the Youngs Bay net-pens in February or March. This strategy has significantly reduced the number of “pinheads” or “dropouts” in

the net-pens. Beginning in April, the fish are vaccinated for vibriosis, mass marked with an LV clip, coded-wire tagged, and distributed into the net-pens at approximately 30,000 fish per pen. The fish are fed recommended levels of starter and pelletized feed and reared until release in late June or early July at a target release size of 20 fish per pound. At the SF Klaskanine Hatchery, the ODFW-funded broodstock fry are ponded directly into a raceway inside of the large earthen pond, started on feed, and reared until mass marking and coded-wire tagging occurs beginning in May. At this time, the fish are piped into the large pond and reared until release in July at a target size of 30 fish per pound. At Klaskanine Hatchery, fry are ponded into raceways in February and March, mass-marked and coded-wire tagged in May, and reared until release in July at a target size of 30 fish per pound. See figure 2.3 for SAB releases brood years 1994 – 2015.

2012 Brood SAB Fall Chinook

Adult SAB fall Chinook for the 2012 brood returned to both Klaskanine and SF Klaskanine hatcheries, and a total of almost 2 million eggs were collected in October of 2012. Approximately 500,000 eggs were incubated at Big Creek Hatchery for the new Klaskanine Hatchery production, and the balance was incubated at the SF Klaskanine Hatchery. Ponding occurred in February and March of 2013, with 708,947 fry going into the early rearing pond at the South Fork for ODFW-funded broodstock program and 755,000 transferred to the Youngs Bay net-pens for SAFE-funded rearing. The net-pen fry were vaccinated for vibriosis in early April, and also given a five-day treatment with 2% TM-200™ during handling associated with mass marking and coded-wire tagging, which began in mid-April and was completed in early May. Loss to disease in the net-pens was minimal, and fish remained healthy through release on July 1. At the SF Klaskanine, mass marking and coded-wire tagging was completed by early June, and the fish were healthy through release on July 19.

Fry for the new ODFW-funded Klaskanine Hatchery SAB fall Chinook production were ponded at Big Creek Hatchery, where early rearing, mass marking, and coded-wire tagging occurred before transfer to Klaskanine Hatchery in May of 2013 for final rearing and eventual release on July 15.

2013 Brood SAB Fall Chinook

Over 2.5 million eggs for the 2013 brood SAB fall Chinook production were collected from returning adult salmon at both Klaskanine (over 800,000 eggs) and SF Klaskanine (over 1.7 million eggs) in the fall of 2013. After incubation, in February and March, ~710,000 fry were ponded at the SF Klaskanine for the ODFW-funded broodstock program and ~750,000 fry were transferred to the Youngs Bay net-pens for the SAFE-funded portion of the production. The net-pen fish were vaccinated for vibriosis and also received a five-day treatment with 2%-TM-200™ to minimize the risk of an outbreak during mass marking and coded-wire tagging, which was conducted from mid-April to early May. Losses to disease were negligible, and the net-pen fish were released on June 23. At the SF Klaskanine, mass marking and coded-wire tagging occurred from early May through mid-June, and fish were released in mid-July.

At Klaskanine Hatchery, 813,606 fry were ponded in February and March. Mass marking and coded-wire tagging was conducted in May, and the fish were released in mid-July, with no disease problems.

2014 Brood SAB Fall Chinook

For the 2014 SAB fall Chinook brood, eggs were again collected from adult salmon returning to both Klaskanine (over 600,000 eggs) and SF Klaskanine (~1.2 million eggs). At the SF Klaskanine, ~700,000 fry were ponded for the ODFW-funded broodstock program, which resulted in only

~500,000 fry transferred to the Youngs Bay net-pens for the SAFE-funded production. The net-pen fry were vaccinated for vibriosis in early April and given a five-day treatment with 2% TM-200™ medicated feed during the onset of mass marking and coded-wire tagging to help reduce the risk of a disease outbreak during handling. Losses to disease were again negligible during rearing, and the fish were released in early June. The broodstock fish at the SF Klaskanine Hatchery were mass marked and coded-wire tagged in May and released on June 27.

At Klaskanine Hatchery, 543,104 fry were ponded in February, mass marking and coded-wire tagging occurred in May, and the fish were released in late July.

2015 Brood SAB Fall Chinook

Eggs for the 2015 SAB fall Chinook brood were collected from adult salmon returning to both Klaskanine and SF Klaskanine hatcheries, however relatively low numbers of spawners resulted in a total take of only ~700,000 eggs between the two facilities. The decision was made by propagation managers to retain all fish at their respective hatcheries for broodstock release purposes, which resulted in no fish for the SAFE-funded Youngs Bay net-pen production. At Klaskanine, 510,825 fry were ponded in February of 2016, mass marked and coded-wire tagged in May, and released in July. At the SF Klaskanine, 164,343 fry were ponded in February, mass marked and coded-wire tagged in late April, and released at the end of June. Fish at both sites were healthy throughout rearing with no significant losses to disease.

Release numbers, fish sizes, and release dates for all groups of SAB fall Chinook are provided in Table 2.2 and release numbers by release site and brood year are shown in Figure 2.3.

COHO

Historically, early run hatchery Coho have been released in the Youngs Bay system for decades, with Klaskanine Hatchery providing up to 1.6 million smolts annually by 1962. In 1977, CCF began an effort to enhance the existing commercial fishery by developing other freshwater rearing ponds, gradually adding from 50,000 (1977) to 400,000 (1986) Coho smolts to the hatchery releases in Youngs Bay. The first experimental net-pen releases of Coho occurred in 1989 in Youngs Bay, and with increased BPA funding and the expansion to new sites, annual releases climbed to just over 4 million smolts by 2000. With the loss of federally-funded acclimation smolts from Eagle Creek NFH, and production at the SF Klaskanine Hatchery transitioning to SAB fall Chinook, annual releases of Coho smolts in the Select Areas dropped to around 2 million from 2005-2007, prompting project staff and ODFW propagation managers to seek new sources of Coho production. The FY07-09 SAFE funding included money to re-initiate Coho production at Klaskanine Hatchery, and ODFW found space at Salmon River Hatchery and provided the funding to rear additional fish for release at the SF Klaskanine Hatchery. In addition, Eagle Creek NFH briefly resumed participation in brood years 2006-2009, with limited numbers of fingerlings produced for release at the SF Klaskanine site. These changes enabled annual Coho releases to climb back up to over 2.5 million fish beginning with the 2006 brood, and additional increases at the Deep River net-pens brought that total to over 3 million fish beginning with the 2008 brood. More recently, the Lower Columbia River fishery reform (initiated by former Oregon governor Kitzhaber) resulted in an additional annual production of ~600,000 acclimation Coho smolts for the Oregon net-pen sites, beginning with the 2011 brood, bringing the current total Select Area Coho production goal to 4.88 million fish.

2011 Brood Coho

The 2011 brood Oregon SAFE-funded Coho production was provided by Cascade Hatchery, where all early rearing, mass marking, and coded-wire tagging was conducted before the October transfer of 524,655 fingerlings for over-winter rearing at the Tongue Point MERTS net-pens. Oxbow Hatchery provided 830,063 Mitchell Act-funded fingerlings for over-winter rearing at the Youngs Bay net-pens. Both of these groups received a 10-day treatment for BHS with 2% TM-200™ shortly after transfer to the pens, and after minimal initial loss, these fish remained healthy through release in April of 2013, although final release numbers were lessened by chronic river otter predation at both sites. The Blind Slough net-pen production was again provided by Oxbow Hatchery, with 397,077 Mitchell Act-funded acclimation smolts transferred from the Lower Herman Creek ponds in early April of 2013. These fish experienced a significant initial mortality after transfer (for unknown reasons), but were released in apparent good health after acclimating for a little over two weeks.

As a result of Lower Columbia River fisheries reform, 200,935 additional smolts were transferred from Bonneville Hatchery to the Blind Slough net-pens in late April, held for two weeks, and released in early May. In addition, 376,673 smolts were transferred from the Upper Herman Creek ponds at Oxbow Hatchery to the Tongue Point MERTS net-pens in late April. After moderate post-transfer losses, these fish were acclimated for two weeks and released on May 7.

Additional Coho production for the Youngs Bay Select Area was provided by Klaskanine and SF Klaskanine hatcheries, with nearly one million smolts released for the 2011 brood. Big Creek Hatchery provided the eggs for all of this production, shipping eyed eggs to Klaskanine and Salmon River hatcheries for final incubation, ponding, early rearing, mass marking, and coded-wire tagging. After marking, Klaskanine Hatchery retained approximately 625,000 fingerlings on site and transferred 180,620 fingerlings to Clackamas Hatchery for over-summer rearing and eventual transfer to the SF Klaskanine Hatchery. In October of 2012, SF Klaskanine received 399,441 fingerlings from Salmon River and Clackamas hatcheries for over-winter rearing. Losses to bacterial cold water disease (BCWD) in these fish prompted a 10-day treatment with Aquaflor™ in early March, before eventual release in early April. The SAFE-funded Coho fry at Klaskanine Hatchery were treated for BCWD with Aquaflor™ before marking, and an outbreak of Columnaris in the summer required a 10-day treatment with 2% TM-200™, but losses were kept to a minimum and the fish required no further treatment through release in late April of 2013.

In Washington, a mixture of Lewis River and North Toutle River broodstock was utilized for the 2011 brood Deep River net-pen production, with transfer of eyed eggs to Grays River Hatchery. Final incubation, early rearing, mass marking, and coded-wire tagging occurred while at Grays River. Aside from moderate losses to BCWD shortly after ponding, these fish reared well and were transferred to the Deep River pens in the fall of 2012 for over-winter rearing, with eventual release of ~600,000 smolts on May 1, 2013 (Table 2.3). The majority of this release group was funded by the SAFE project; the remainder were funded through the Mitchell Act.

2012 Brood Coho

SAFE-funded Coho for the Oregon 2012 brood net-pen production was provided by fish that originated from ODFW's Cascade Hatchery, where early rearing, mass marking, and coded-wire tagging occurred before transfer to Clackamas Hatchery for over-summer rearing. The fingerlings were transferred to the Tongue Point MERTS net-pens for over-winter rearing in the fall of 2013, with 563,053 fish being trucked on October 14 and 15. After losses began increasing in early November,

these fish received a 10-day treatment for BHS with 2% TM-200™, after which losses were minimal. Oxbow Hatchery provided 846,167 Mitchell Act-funded fingerlings for over-winter rearing at the Youngs Bay net-pens, which were trucked from the Upper Herman Creek pond in late October. These fish were also given a 10-day treatment for BHS with 2% TM-200™, and loss to disease was minimal. Both of these groups remained healthy through release in April of 2014, but once again, predation by river otters reduced the final release numbers. The Blind Slough net-pen production was also provided by Oxbow Hatchery, with 408,512 Mitchell Act-funded acclimation smolts trucked from the Lower Herman Creek ponds in early April of 2014. Moderate post-transfer losses were incurred, but otherwise these fish remained healthy through the two-week acclimation and release on April 18.

Additional Coho acclimation smolts were again provided through the LCR fisheries reform; in late April, the Blind Slough net-pens received 222,027 smolts from Sandy Hatchery and the Tongue Point MERTS net-pens received 431,033 smolts from the Upper Herman Creek pond. Both of these groups were acclimated for approximately two weeks and released in May, with minimal loss.

The Youngs Bay Select Area again received additional Coho production from both Klaskanine and SF Klaskanine hatcheries, with ~one million fish released between the two facilities. Klaskanine Hatchery received ~750,000 eyed-eggs from Big Creek Hatchery and ponded over 735,000 fry in February of 2013. This SAFE-funded group was reared full-term at Klaskanine, where early rearing, mass marking, and coded-wire tagging occurred. After the usual outbreaks of BCWD shortly after ponding and Columnaris during the summer, these fish reared well through the winter and were released in late April of 2014. Bonneville Hatchery provided an additional 28,000 surplus fish for rearing at Klaskanine, which were also released in late April. The SF Klaskanine Hatchery received 337,047 fingerlings for over-winter rearing from Bonneville and Salmon River hatcheries, and these fish were healthy through release on April 24, 2014.

In Washington, North Toutle River Hatchery again provided the eyed eggs for Deep River net-pen program, shipping them to Grays River Hatchery in the fall of 2013. Final incubation, early rearing, mass marking, and coded-wire tagging occurred at Grays River. The fish experienced the usual outbreak of BCWD shortly after ponding, but otherwise were relatively healthy through the summer before transfer to the net-pens in the fall of 2014. After over-winter rearing in the net-pens, about 725,000 smolts were released on May 1, 2015 (Table 2.3). The majority of this release group was funded by the SAFE project; the remainder were funded through the Mitchell Act.

2013 Brood Coho

Coho for the 2013 brood SAFE-funded production at Tongue Point MERTS again originated from Cascade Hatchery, where early rearing, mass marking, and coded-wire tagging occurred in the spring of 2014 before transfer to Clackamas Hatchery for over-summer rearing. In October, 534,089 fingerlings were trucked to the net-pens where they were given a 10-day treatment with 2% TM-200™ for BHS and then reared over-winter with minimal loss to disease. Oxbow Hatchery provided 803,425 Mitchell Act-funded fingerlings for over-winter rearing in the Youngs Bay net-pens. For unknown reasons some of these fish did not haul well and significant numbers were dead on arrival when trucked from the Upper Herman Creek pond in October. After removing ~30,000 mortalities after the first day of trucking, the ODFW fish liberation coordinator decided to load the trucks at half the normal density, and the remainder of the fish had minimal transfer losses. These fish also received a 10-day treatment for BHS with 2% TM-200™ and loss to disease was minimal, but again, predation by river otters further reduced the number of smolts in both of these over-winter groups when released in mid-April of 2015. At Blind Slough, base Coho production was again provided by Mitchell Act-funded

acclimation smolts transferred from Oxbow Hatchery's Lower Herman Creek ponds at the end of March in 2015. These fish experienced minimal loss after transfer, and were released after two weeks of acclimation on April 15.

Two additional groups of Coho acclimation fish were again provided by the LCR fisheries reform. In the third week of April, 443,346 smolts were trucked to the Tongue Point MERTS net-pens from the Upper Herman Creek pond at Oxbow Hatchery, and 163,110 smolts were transferred from Sandy Hatchery to the Blind Slough net-pens. Both of these groups were released in early May with minimal losses during the two-week acclimation period.

Again, additional Coho production in the Youngs Bay Select Area was provided by Klaskanine and SF Klaskanine hatcheries. Big Creek Hatchery transferred 786,200 eyed-eggs to Klaskanine Hatchery in the fall of 2013 for SAFE-funded rearing. After ponding 777,534 fry in February, early rearing, mass marking, and coded-wire tagging occurred at Klaskanine, and again these fish received treatments for both BCWD in the spring and Columnaris in the summer. The fish were healthy through the winter and released in mid-April. Sandy Hatchery provided an additional 154,147 surplus fish for rearing at Klaskanine, which were also released in mid-April. At the SF Klaskanine Hatchery, 278,656 fingerlings were received from Salmon River and Bonneville hatcheries in the fall of 2014 for over-winter rearing. One of the truckloads of these fish experienced a significant loss upon arrival for unknown reasons, and ~16,000 mortalities were removed the day after transfer. Also, after being reared through the winter, losses to BCWD began to increase just prior to release, but limited time and the required withdrawal period for Aquaflor™ eliminated the option of treatment, and the fish were released beginning on April 10.

For the 2013 brood Deep River net-pen Coho production, Grays River Hatchery received eyed eggs from Kalama, Lewis River, and North Toutle hatcheries. Shortly after ponding, these fry were treated for BCWD, but otherwise were healthy through early rearing, mass marking, and coded-wire tagging. After transfer to the net-pens in the fall of 2014, the fish were reared over-winter, and 654,000 smolts were released in April of 2015 (Table 2.3). The majority of this release group was funded by the SAFE project; the remainder were funded through the Mitchell Act.

2014 Brood Coho

Coho for the SAFE-funded 2014 brood Tongue Point-MERTS production originated from Cascade Hatchery, where all early rearing, mass marking, and coded-wire tagging occurred in the spring of 2015 before transfer to Clackamas Hatchery for rearing through the summer. In October, 455,223 fingerlings were transferred to the net-pens where they received a ten-day treatment for BHS with 2% TM-200™ shortly after arrival to the pens. Subsequent to treatment, losses to disease were minimal, and the fish reared well through release in April of 2016. For the Youngs Bay net-pen production, Oxbow Hatchery again provided Mitchell Act-funded fish, with 846,309 fingerlings transferred in October of 2015. These fish also received a ten-day treatment for BHS with 2% TM-200™ upon arrival to the pens, and losses to disease were kept to a minimum through release in April of 2016. Both of these net-pen groups did experience significant predation by river otters while in the pens, which resulted in final release numbers that were short of program goals. At the Blind Slough net-pens, base Coho production was again provided by Mitchell Act-funded acclimation smolts from the Lower Herman Creek ponds at Oxbow Hatchery, with 421,260 smolts trucked to the net-pens in early April, held for two weeks, and released in mid-April. These fish experienced low to moderate post-transfer losses probably due to chronic BCWD and possibly BKD; however, they did not receive any treatment due to the short period of acclimation.

Again, two additional groups of net-pen acclimation Coho were provided by the LCR Fisheries Management Reform. One group of 446,588 smolts was trucked from the Upper Herman Creek pond at Oxbow Hatchery to the Tongue Point MERTS net-pens on April 18, and another group of 168,962 smolts was transferred from Sandy Hatchery to the Blind Slough net-pens on April 19. Both of these groups were held for approximately two weeks and released in early May. Losses were minimal in the Tongue Point MERTS fish, but the Blind Slough fish experienced significant post-transfer loss for unknown reasons.

Additional 2014 brood Coho production for the Youngs Bay select area was again provided by Klaskanine and SF Klaskanine hatcheries. At Klaskanine Hatchery, a combination of Mitchell Act and fisheries reform dollars were utilized to fund the rearing of over 800,000 fingerlings in the lake (over 500,000 from Oxbow's Upper Herman Creek pond and almost 300,000 from Big Creek Hatchery). This was in addition to the ~750,000 SAFE-funded production in the hatchery raceways, which resulted in a total release of over 1.5 million smolts for this facility. At the SF Klaskanine Hatchery, a little over 200,000 fingerlings were received from Salmon River Hatchery for over-winter rearing in October of 2015. The fish in all of these groups were relatively healthy through release in mid-April of 2016.

In Washington, a disturbance in water flow at Grays River Hatchery during an extreme high water event resulted in the tragic loss of all Coho alevins in the incubators. Fortunately, some surplus Coho eggs and fry were available on the Oregon side, so Coho for the Grays River Hatchery portion of the Deep River net-pen production were provided by a combination of 90,000 eyed-eggs from Cascade Hatchery and 550,000 fry from Eagle Creek NFH. These fish were reared at Grays River until transfer to the net-pens in the fall of 2015, along with another 350,000 fingerlings provided by Lewis River Hatchery. These groups of fish reared well until early May, when the net-pens were towed to Rocky Point in Grays Bay and 920,000 smolts were released (Table 2.3). A portion of this release group was funded by the SAFE project; the remainder were funded through the Mitchell Act.

Actual release numbers, fish sizes, and release dates for all groups of Coho are provided in Table 2.3 and release numbers by release site and brood year are shown in Figure 2.4.

TULE FALL CHINOOK

Tule fall Chinook releases into the Select Areas are not funded by BPA nor are activities associated with the tule program covered by our contracts. Discussion of this program is included solely to provide a complete picture of the Program's fish releases and to illustrate an additional conservation benefit of the project. Beginning with the 2008 brood in Washington and the 2009 brood in Oregon, Mitchell Act program changes resulted in the release of tule stock fall Chinook in the Select Areas. Rearing and release of this stock in the Columbia River basin is mandated by the Pacific Salmon Treaty, and as recent recovery planning strategies have developed, fishery managers have realized a potential benefit in releasing a portion of these tule fall Chinook into areas where they can be harvested at higher levels, resulting in fewer hatchery fish on the spawning grounds. In Washington, Beaver Creek Hatchery has provided the initial rearing of up to one million Washougal stock fall Chinook annually, before transferring them to the Deep River net-pens for acclimation and release. On the Oregon side, Big Creek Hatchery has shifted approximately 2 million of their annual tule fall Chinook production to Klaskanine Hatchery for acclimation and release. Target release size for all tule fall Chinook production is 80 fish per pound, and fish are generally released in May or June.

2012 Brood Tule Fall Chinook

In Washington, the 2012 brood tule fall Chinook production consisted of Kalama, Washougal, and Elochoman stock, which were reared at Beaver Creek Hatchery. Mass marking and coded-wire tagging occurred while at Beaver Creek, before the transfer of multiple groups of fish (totaling over 2.6 million) to the Deep River net-pens in the spring of 2013 for final rearing and release. Losses due to Furunculosis began to increase as the water temperature reached the 60°F mark just before the time of release in late-May through June.

In Oregon, Klaskanine Hatchery received just under 2 million tule fall Chinook fingerlings from Big Creek Hatchery on April 1 for final rearing and release at the end of April. These fish were mass marked and coded-wire tagged while at Big Creek before transfer to Klaskanine.

2013 Brood Tule Fall Chinook

Beaver Creek Hatchery transferred 930,000 Washougal stock tule fall Chinook fingerlings to the Deep River net-pens for the 2013 brood production. These fish reared well until just before release, when again, losses to Furunculosis began to increase with warmer water temperatures.

Klaskanine Hatchery received ~800,000 tule fall Chinook fingerlings from Big Creek Hatchery on April 2, and reared them until release on April 26. Due to a shift of Mitchell Act-funded tule fall Chinook production in Washington, and additional 840,000 fingerlings were transferred from Washougal Hatchery to Klaskanine Hatchery in early April and released on April 26.

2014 Brood Tule Fall Chinook

Beaver Creek Hatchery provided 975,000 tule fall Chinook fingerlings for the 2014 brood Deep River net-pen production. These fish reared well until just before release at the end of May, when losses to Furunculosis began to increase.

Klaskanine Hatchery received just over 2 million tule fall Chinook fingerlings from Big Creek Hatchery in April for final rearing, and released them on May 1. In addition, a little over 2 million fingerlings were transferred from Washougal Hatchery to Klaskanine Hatchery in May for final rearing and release on June 3.

2015 Brood Tule Fall Chinook

Beaver Creek Hatchery transferred 875,000 Washougal stock tule fall Chinook fingerlings to the Deep River net-pens for the 2015 brood production. These fish reared well until the water temperature warmed just prior to release in early June, increasing the loss to Furunculosis.

Klaskanine Hatchery received just over 1.8 million 2015 brood tule fall Chinook fingerlings from Big Creek Hatchery in April and reared them until release on May 2.

Actual release numbers, fish sizes, and release dates for all groups of tule fall Chinook are provided in Table 2.4.

Table 2.1. Releases of spring Chinook from Lower Columbia River Select Area facilities, 1993-2014 brood years.

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size fish/lb	Funding Agency [b] and Study
1993	2/7/95	SF	86,978	52,251	07-03-51	14.4	BPA
	2/9/95	YB	79,336	39,840	07-03-45	12.1	BPA / Feb release
	3/7/95	YB	156,519	52,872	07-03-43	8.1	BPA / Mar release
	3/30/95	YB	127,367	53,498	07-03-44	7.4	BPA / Apr release
			450,200	**198,461**			
1994	1/31/96	SF	76,618	52,431	07-11-19	14.7	BPA
	2/5/96	TG	100,138	52,563	07-12-38	10.1	BPA / Feb release
	2/29/96	TG	142,181	48,635	07-12-36	10.8	BPA / Mar release
	2/29/96	BS	199,389	53,257	07-12-37	9.9	BPA / Mar release
	2/5/96	YB	142,976	53,896	07-11-21	11.9	BPA / Feb release
	2/29/96	YB	133,517	51,737	07-11-22	10.7	BPA / Mar release
	3/21/96	YB	97,945	41,085	07-11-20	10.0	BPA / Apr release
			892,764	**353,604**			
1995	2/1/97	YB	100,680	50,127	09-17-37	18.1	BPA / Feb release
	3/5/97	YB	96,540	49,341	09-17-38	15.2	BPA / Mar release
	4/4/97	YB	95,396	50,562	09-17-39	14.6	BPA / normal
	4/4/97	YB	94,612	50,339	09-17-40	12.7	BPA / dormancy
	3/4/97	SF	76,821	25,149	07-13-37	15.9	BPA
	3/5/97	BS	171,229	58,220	09-17-16	15.2	BPA / Mar release
	3/5/97	TG	151,905	51,667	09-17-17	16.6	BPA / Mar release
	4/4/97	TG	149,889	50,309	09-17-18	14.6	BPA / Apr release
			937,072	**385,714**			
1996	3/3/98	YB	149,878	50,865	09-22-16	11.6	BPA / Mar release
	4/1/98	YB	153,265	47,495	09-22-14	12.0	BPA / dormancy
	4/1/98	YB	153,139	49,392	09-22-15	9.6	BPA / normal
	3/3/98	TG	128,314	46,710	09-22-18	13.8	BPA / Mar release
	4/1/98	TG	125,456	43,987	09-22-19	13.6	BPA / dormancy
	3/3/98	BS	198,034	45,510	09-22-17	12.6	BPA / Mar release
	4/1/98	BS	25,284	24,203	09-20-35	9.6	BPA /acc/normal
	4/1/98	BS	25,396	23,602	09-20-36	11.6	BPA / acc/dorm.
	4/22/98	DR	56,414	56,414	63-61-15	5.1	BPA
			1,015,180	**388,178**			
1997	3/4/99	YB	165,298	24,415	09-25-34	13.2	BPA / Mar release
	4/1/99	YB	158,574	24,437	09-25-33	11.9	BPA / dormancy
	4/1/99	YB	102,546	23,611	09-25-36	8.2	BPA / normal
	3/3/99	TG	118,291	23,969	09-25-32	10.0	BPA / Mar release
	4/1/99	TG	105,986	21,637	09-25-35	8.9	BPA / dormancy
	3/3/99	BS	148,881	24,742	09-25-30	14.0	BPA / Mar release
	4/1/99	BS	25,553	25,544	09-25-31	11.0	BPA / acc/dorm.
	4/1/99	BS	25,573	25,560	09-25-37	10.0	BPA /acc/normal
	5/13/99	DR	25,205	24,960	63-05-11	6.8	BPA
	5/13/99	DR	14,473	14,114	63-06-52	6.4	BPA
			890,380	**232,989**			

continued

Table 2.1. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size fish/lb	Funding Agency [b] and Study
1998	3/1/00	YB	128,656	27,420	09-28-47	15.9	BPA / Mar release
	4/4/00	YB	180,695	24,873	09-28-46	18.7	BPA / dormancy
	4/4/00	YB	155,299	26,740	09-28-48	14.4	BPA / normal
	3/1/00	TG	132,484	29,028	09-28-50	12.6	BPA / Mar release
	4/4/00	TG	117,525	23,515	09-28-49	9.8	BPA / dormancy
	3/1/00	BS	143,507	25,703	09-28-45	17.7	BPA / Mar release
	4/4/00	BS	26,393	25,442	09-28-43	13.8	BPA / acc/ dorm.
	4/4/00	BS	26,501	25,397	09-28-44	11.9	BPA /acc/normal
			911,060	**208,118**			
1999	3/2/01	YB	101,516	24,520	09-31-23	15.1	BPA / Mar release
	3/29/01	YB	27,310	25,950	09-31-33	13.8	BPA / 2-wk acc.
	3/29/01	YB	96,839	17,226	09-31-27	14.2	BPA / Mar release
	4/3/01	YB	146,346	25,883	09-31-26	16.2	BPA / dormancy
	4/3/01	YB	138,491	24,519	09-31-24	15.8	BPA / normal
	4/12/01	YB	27,396	23,849	09-31-29	12.3	BPA / 4-wk acc.
	3/2/01	BS	139,319	25,501	09-31-28	16.4	BPA / Mar release
	3/29/01	BS	25,384	24,707	09-31-25	12.8	BPA /acc/normal
	3/29/01	BS	27,467	23,705	09-31-32	14.4	BPA / acc/ dorm.
	4/3/01	BS	27,897	13,470	09-31-31	13.4	BPA / normal
	4/3/01	BS	30,329	14,728	09-31-30	16.3	BPA / dormancy
	5/9/01	DR	119,533	24,806	63-13-10	12.0	BPA / normal
	5/9/01	DR	40,032	25,179	63-13-11	11.0	BPA / dormancy
			947,859	**294,043**			
2000	3/29/02	YB	212,214	24,593	09-33-30	10.4	BPA / normal
	3/29/02	YB	213,069	24,924	09-33-31	12.6	BPA / dormancy
	3/29/02	YB	26,973	25,516	09-33-32	13.4	BPA / 2-wk acc.
	4/12/02	YB	25,806	24,595	09-33-29	9.9	BPA / 4-wk acc.
	3/28/02	BS	67,981	20,790	09-33-33	12.3	BPA / subsurface
	3/28/02	BS	177,625	20,175	09-33-34	11.7	BPA / normal fed
	4/10/02	BS	24,887	21,174	09-01-20	14.8	NOAA / acclim.
	4/19/02	BS	23,871	20,090	09-01-19	13.6	NOAA / acclim.
	4/30/02	BS	24,164	20,002	09-01-21	13.7	NOAA / acclim.
	5/10/02	BS	24,441	20,992	09-01-22	13.0	NOAA / acclim.
	5/20/02	BS	23,536	19,646	09-01-23	15.7	NOAA / acclim.
	5/30/02	BS	24,403	20,798	09-01-24	13.0	NOAA / acclim.
	5/16/02	DR	83,563	12,331	63-10-87	9.0	BPA / normal
	5/16/02	DR	12,377	12,326	63-12-88	10.0	BPA / dormancy
			964,910	**287,952**			
2001	3/27/03	BS	302,934	25,097	09-36-01	11.5	BPA
	3/27/03	TGM	30,385	25,514	09-35-61	11.9	BPA/morpholine
	3/27/03	TGJ	27,412	26,601	09-36-02	11.4	BPA/JD acclim.
	3/28/03	YB	188,956	26,219	09-35-62	9.0	BPA / normal
	3/28/03	YB	187,097	26,342	09-35-63	12.7	BPA / dormancy
	3/28/03	YB	75,570	25,513	09-35-60	11.4	BPA / subsurface
	4/9/03	BS	18,508	17,941	09-36-19	16.6	NOAA / acclim.
	4/18/03	BS	22,353	21,958	09-36-22	15.5	NOAA / acclim.
	4/28/03	BS	21,236	20,982	09-36-20	15.6	NOAA / acclim.
	4/30/03	DR	33,113	19,129	63-15-72	10.0	BPA / Lewis
	4/30/03	DR	108,791	20,089	63-15-73	11.4	BPA / Cowlitz
	5/7/03	BS	20,801	20,395	09-36-23	16.5	NOAA / acclim.
	5/16/03	BS	20,158	19,922	09-36-21	16.6	NOAA / acclim.
	5/27/03	BS	20,319	19,925	09-36-24	14.7	NOAA / acclim.
			1,077,633	**315,627**			

continued

Table 2.1. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size fish/lb	Funding Agency [b] and Study
2002	3/31/04	SF	639,446	22,382	09-37-23	13.7	SFK production
	4/5/04	BS	261,840	26,763	09-39-01	12.1	BPA
	4/6/04	TGM	20,913	20,407	09-36-61	11.1	BPA/morpholine
	4/6/04	TGJ	27,143	26,794	09-36-63	10.4	BPA/JD acclim.
	4/8/04	BS	16,185	15,195	09-39-06	12.8	NOAA / acclim.
	4/8/04	YB	455,825	25,934	09-36-62	12.8	BPA
	4/16/04	BS	27,359	26,498	09-39-03	12.5	NOAA / acclim.
	4/26/04	BS	27,644	26,658	09-39-07	11.7	NOAA / acclim.
	5/6/04	BS	27,471	26,795	09-39-04	13.1	NOAA / acclim.
	5/17/04	BS	24,488	24,123	09-39-08	11.4	NOAA / acclim.
	5/20/04	BS	23,508	22,942	09-39-05	12.5	NOAA / acclim.
	5/1/04	DR	31,095	24,088	63-21-76	12.0	BPA / Cowlitz
	5/1/04	DR	66,223	9,653	63-21-77	11.0	BPA / Lewis
			1,649,140	**298,232**			
2003	3/22/05	YB	29,495	AD only		5.3	BPA/over-summer
	4/4/05	TGM	26,955	26,226	09-39-29	12.0	BPA/JD acclim.
	3/22/05	DR	101,344	21,780	63-21-74	10.0	BPA/Cowlitz/tow
	3/23/05	DR	153,127	22,032	63-21-73	10.0	BPA/Lewis/tow
	4/4/05	TGM	26,344	25,632	09-39-30	13.0	BPA/morpholine
	4/4/05	BS	285,959	26,396	09-39-32	13.2	BPA
	4/5/05	YB	428,499	26,139	09-39-31	14.2	BPA
	4/5/05	SF	458,659	24,264	09-37-36	12.1	SFK production
	4/6/05	BS	25,646	23,807	09-40-55	15.8	NOAA / acclim.
	4/15/05	BS	25,344	23,964	09-40-56	14.2	NOAA / acclim.
	4/25/05	BS	25,182	23,786	09-40-57	16.0	NOAA / acclim.
	5/4/05	BS	24,747	24,259	09-40-58	14.0	NOAA / acclim.
	5/13/05	BS	23,051	22,898	09-40-60	13.6	NOAA / acclim.
	5/23/05	BS	23,115	22,516	09-40-59	13.7	NOAA / acclim.
			1,657,467	**313,699**			
2004	9/26/05	SF	566,030	27,373	09-37-22	24.5	SFK production
	3/27/06	DR	159,300	23,841	63-22-97	13.0	BPA/Cowlitz/tow
	3/27/06	BS	287,215	22,839	09-39-33	15.7	BPA
	3/27/06	JD	25,451	24,117	09-37-06	10.8	BPA
	3/27/06	TGM	57,114	24,191	09-37-08	12.5	BPA/morpholine
	3/27/06	DR	177,000	22,623	63-31-81	14.0	BPA/Lewis/tow
	3/28/06	YB	391,843	21,876	09-37-07	11.6	BPA
	4/6/06	BS	28,099	27,117	09-42-54	17.2	NOAA / acclim.
	4/17/06	BS	27,440	26,952	09-42-53	17.5	NOAA / acclim.
	4/27/06	BS	27,459	26,256	09-42-58	15.5	NOAA / acclim.
	5/5/06	BS	27,831	27,107	09-42-55	14.3	NOAA / acclim.
	5/16/06	BS	27,493	26,857	09-42-56	16.9	NOAA / acclim.
	5/24/06	BS	25,851	24,657	09-42-57	16.0	NOAA / acclim.
			1,828,126	**325,806**			
2005	3/15/07	DR	263,600	54,760	63-29-85	14.0	BPA/towed
	3/28/07	BS	272,226	26,944	09-44-32	11.0	BPA
	3/29/07	TGM	76,877	25,295	09-44-33	10.4	BPA
	3/29/07	TGJ	27,272	26,650	09-44-35	10.1	BPA
	3/30/07	YB	417,662	26,292	09-44-34	11.2	BPA
			1,057,637	**159,941**			

continued

Table 2.1. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size fish/lb	Funding Agency [b] and Study
2006	3/25/08	BS	312,612	23,043	09-46-06	11.7	BPA
	3/25/08	TGM	79,343	26,137	09-46-07	14.2	BPA
	3/27/08	YB	543,803	25,990	09-46-08	9.4	BPA/1st year oxy. supp.
	4/3/08	DR	121,500	47,147	63-41-90	11.8	BPA/towed
			1,057,258	**122,317**			
2007	2/25/09	DR	279,811	37,262	63-43-81	14.0	BPA
	3/23/09	YB	457,161	27,464	09-01-52	13.6	BPA/2nd year oxy. supp.
	3/27/09	BS	280,437	24,955	09-01-53	15.1	
	3/27/09	TGM	103,060	27,474	09-01-54	16.5	
			1,120,469	**117,155**			
2008	2/25/10	DR	363,000	18,000	63-34-97	10.0	BPA
	3/4/10	YB	549,220	27,041	09-02-55	10.7	BPA
	3/25/10	BS	265,832	24,044	09-02-56	13.5	BPA
	3/25/10	TGM	101,700	27,716	09-02-57	12.2	BPA
	3/26/10	YB	124,874	BW	BW	9.6	ODFW
	4/26/10	YB	130,571	21,356	09-02-51	10.3	ODFW
			1,535,197	**118,157**			
2009	3/3/11	DR	234,000	39,184	63-58-94	12.0	BPA
	3/4/11	YB	453,470	27,256	09-03-39	12.4	BPA
	3/29/11	BS	253,503	23,938	09-03-40	11.9	BPA
	3/30/11	TGM	100,557	27,136	09-03-41	13.0	BPA
	3/31/11	YB	249,139	27,174	09-46-54	11.0	ODFW
			1,290,669	**144,688**			
2010	3/7/12	DR	405,000	41,328	63-58-71	11.7	BPA
	3/8/12	YB	513,089	25,210	09-04-51	12.5	BPA
	3/20/12	BS	258,923	23,667	09-04-52	14.6	BPA
	3/22/12	TGM	253,002	27,652	09-04-55	12.1	ODFW
	3/29/12	YB	99,241	27,938	09-04-53	11.5	BPA
			1,529,255	**145,795**			
2011	2/4/13	DR	320,000	48,892	63-61-86	14.2	Mitchell Act
	3/5/13	GC	99,190	26,509	09-41-49	14.6	BPA
	3/11/13	YB	601,862	24,577	09-42-02	11.7	BPA
	3/7/13	BS	172,816	24,022	09-41-57	13.9	BPA
	3/21/13	TGM	246,370	33,092	09-04-65	12.5	2013 Reallocation
	3/28/13	BS	153,674	N/A	N/A	9.4	2013 Reallocation
	4/8/13	TGM	133,990	N/A	N/A	10.1	2013 Reallocation
	4/8/13	TGM	50,630	32,687	09-20-53	11.8	2013 Reallocation
	4/8/13	TGM	50,630	18,871	09-05-89	11.8	2013 Reallocation
			1,829,162	**208,650**			

continued

Table 2.1. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size fish/lb	Funding Agency [b] and Study
2012	11/27/13	YB	47,750	N/A	N/A	20.6	Emerg. Rls d/t disease
	3/7/14	BS	130,326	22,040	09-06-20	13.6	BPA
	3/14/14	YB	187,395	31,857	09-07-40	11.0	Rplcmnts for disease loss
	3/14/14	YB	443,518	28,892	09-06-19	12.0	BPA
	3/17/14	GC	150,834	27,278	09-06-21	13.9	BPA
	3/18/14	TGM	320,605	105,984	09-07-21	13.0	2014 Reallocation
	3/27/14	BS	97,948	N/A	N/A	9.9	2014 Reallocation
	3/27/14	BS	142,584	N/A	N/A	12.7	2014 Reallocation
	3/28/14	CC	200,000	200,000	63-64-92	13.1	Mitchell Act
	4/10/14	TGM	172,612	46,127	09-07-26	11.5	2014 Reallocation
			1,893,572	**462,178**			
2013	2/11/15	CC	140,864	140,864	63-66-77	12.8	Mitchell Act
	3/5/15	BS	130,750	22,227	09-07-47	11.2	BPA
	3/13/15	GC	142,959	25,550	09-07-48	10.1	BPA
	3/18/15	YB	560,520	21,300	09-07-46	11.1	BPA
	3/19/15	TGM	260,093	26,086	09-08-39	15.0	2015 Reallocation
	3/26/15	BS	306,833	25,560	09-08-38	15.1	2015 Reallocation
	4/9/15	TGM	205,327	26,136	09-08-40	15.0	2015 Reallocation
			1,747,346	**287,723**			
2014	2/22/16	YB	130,193	25,570	09-01-64	11.8	BPA
	2/22/16	YB	130,193	27,616	09-08-90	11.8	BPA
	2/22/16	YB	367,471	23,915	09-08-32	11.0	BPA
	2/23/16	TGM	192,314	29,170	09-08-95	14.3	2016 Reallocation
	2/24/16	BS	128,700	22,999	09-08-33	11.3	BPA
	2/29/16	KK	275,973	23,549	09-08-94	13.1	2016 Reallocation
	3/1/16	CC	107,856	106,540	63-68-34	14.2	Mitchell Act
	3/14/16	GC	380,848	26,234	09-08-34	10.8	BPA
	3/23/16	TGM	245,271	24,014	09-08-93	14.8	2016 Reallocation
			1,958,819	**309,607**			

[a] *BS=Blind Slough, CC=Cathlamet Channel, DR=Deep River, SF=South Fork Klaskanine, SS=Steamboat Slough, TG=Tongue Pt., TGM=Tongue Pt. MERTS, TGJ=Tongue Pt. John Day, YB=Youngs Bay, GR= Grays River.*

[b] *BPA-Bonneville Power Administration; NOAA-National Oceanic & Atmospheric Administration (10-day acclimation study).*

Table 2.2. Releases of Select Area Bright fall Chinook from Lower Columbia River Select Area facilities, 1994-2015 brood years.

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size (fish/lb)	Funding Agency [b]	Study Group
1994	6/27/95	YB	107,892	50,068	07-07-42	18.2	BPA	July 15 or 65º
	7/17/95	YB	77,100	49,898	07-09-28	13.6	BPA	Aug 1 or 70º
	7/17/95	YB	116,030	43,729	07-09-29	10.9	BPA	0.25 #/ft^3 density
	7/17/95	YB	127,936	44,337	07-09-30	11.8	BPA	0.56 #/ft^3 density
	7/17/95	YB	115,702	43,062	07-09-31	13.8	BPA	0.66 #/ft^3 density
	7/17/95	YB	707,127	19,954	07-14-21	36.5	R&E	R&E
	8/15/95	SF	15,758	LV only		37.0	OR/FPC	SFK Raceways
	8/11/95	BC	83,386	13,392	07-05-41	20.2	R&E	BC Broodstock
	8/11/95	BC	83,302	13,281	07-05-40	20.4	R&E	BC Broodstock
	8/11/95	BC	83,201	13,264	07-05-40	20.6	R&E	BC Broodstock
	8/11/95	BC	83,321	13,376	07-05-41	20.7	R&E	BC Broodstock
	8/29/95	BC	175,032	27,446	07-05-42	15.4	R&E	BC Broodstock
	8/30/95	BC	500,356	26,916	07-05-43	15.6	R&E	BC Broodstock
			2,276,143	**358,723**				
1995	7/16/96	YB	64,679	58,060	07-13-42	13.1	BPA	0.25 #/ft^3 density
	7/16/96	YB	154,593	46,336	07-13-41	14.5	BPA	0.67 #/ft^3 density
	7/15/96	TG	26,792	26,500	07-13-50	22.0	R&E	R&E
	7/17/96	YB	329,976	27,243	07-13-54	31.8	PSMFC	PSMFC
	7/15/96	BS	27,380	27,330	07-13-51	19.9	R&E	R&E
	7/16/96	YB	389,320	LV only		16.3	R&E	R&E
	7/17/96	YB	428,405	LV only		37.5	PSMFC	PSMFC
	7/31/96	KK	26,178	25,988	07-13-53	22.2	R&E	KK Broodstock
	8/26/96	KK	521,952	27,041	07-13-52	14.2	R&E	KK Broodstock
			1,969,275	**238,498**				
1996	6/17/97	YB	53,442	52,956	07-13-39	38.0	BPA	July 15 or 65º
	7/17/97	YB	50,868	50,371	07-13-38	18.1	BPA	Aug 1 or 70º
	7/17/97	YB	116,680	52,468	09-21-36	21.4	BPA	0.14 #/ft^3 density
	7/17/97	YB	188,948	51,392	09-21-35	17.9	BPA	0.33 #/ft^3 density
	7/17/97	YB	53,765	52,618	07-13-40	18.4	BPA	0.46 #/ft^3 density
	7/17/97	TG	27,482	27,482	09-21-46	24.1	R&E	R&E
	7/17/97	BS	27,413	27,413	09-21-45	31.6	R&E	R&E
	10/31/97	KK	195,247	9,593	09-21-43	13.8	R&E	KK Broodstock
			408,713	27,327	09-21-44	13.8	R&E	
			1,122,558	**351,620**				
1997	7/1/98	YB	25,201	24,853	09-24-54	19.8	BPA	July 15 or 65º
	7/20/98	YB	25,019	24,958	09-24-53	16.0	BPA	Aug 1 or 70º
	7/20/98	YB	25,035	24,803	09-24-56	14.5	BPA	0.27 #/ft^3 density
	7/20/98	YB	17,303	16,891	09-24-57	15.8	BPA	0.34 #/ft^3 density
	7/20/98	YB	25,024	24,962	09-24-55	16.5	BPA	0.47 #/ft^3 density
	9/23/98	KK	52,677	LV only		19.4	R&E	KK Broodstock
	9/25/98	KK	54,752	13,405	09-25-17	17.0	R&E	KK Broodstock
	9/28/98	KK	54,472	LV only		17.2	R&E	KK Broodstock
	9/30/98	KK	54,734	13,402	09-25-17	16.9	R&E	KK Broodstock
	11/4/98	KK	445,342	26,862	09-25-18	16.1	R&E	KK Broodstock
			779,559	**170,136**				

continued

Table 2.2. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size (fish/lb)	Funding Agency [b]	Study Group
1998	7/12/99	YB	25,811	25,467	09-27-54	17.1	BPA	July 15 or 65º
	8/2/99	YB	26,000	25,446	09-27-53	12.5	BPA	Aug 1 or 70º
	7/12/99	YB	25,992	25,746	09-27-57	16.6	BPA	0.24 #/ft^3 density
	7/12/99	YB	25,921	25,106	09-27-56	18.1	BPA	0.45 #/ft^3 density
	7/12/99	YB	32,410	25,570	09-27-55	17.8	BPA	0.57 #/ft^3 density
	7/12/99	YB	85,837	26,794	09-27-58	30.6	R&E	R&E
	9/27/99	KK	52,546	6,676	09-27-60	16.4	R&E	KK Broodstock
	9/27/99	KK	52,547	6,676	09-27-60	16.6	R&E	KK Broodstock
	9/28/99	KK	51,659	6,563	09-27-60	16.6	R&E	KK Broodstock
	9/28/99	KK	51,480	6,541	09-27-60	16.5	R&E	KK Broodstock
	11/3/99	KK	494,968	26,402	09-27-59	13.9	R&E	KK Broodstock
			925,171	**206,987**				
1999	7/5/00	YB	24,944	24,559	09-30-39	17.1	BPA	0.46#/ft^3, surface
	7/5/00	YB	25,079	23,825	09-30-40	17.0	BPA	0.46#/ft^3, subsurf.
	7/5/00	YB	24,909	24,332	09-30-41	16.7	BPA	0.23#/ft^3, subsurf.
	7/5/00	YB	24,983	24,442	09-30-42	14.3	BPA	0.27#/ft^3, surface
	7/5/00	YB	24,738	22,269	09-30-43	15.7	R&E	R&E
	7/5/00	YB	29,275	LV only		15.7	R&E	R&E
	8/21/00	KK	50,409	13,787	09-30-48	20.4	R&E	KK Broodstock
	8/21/00	KK	50,650	13,853	09-30-48	17.2	R&E	KK Broodstock
	8/24/00	KK	51,600	LV only		21.2	R&E	KK Broodstock
	8/24/00	KK	50,124	LV only		18.8	R&E	KK Broodstock
	9/25/00	KK	51,040	LV only		15.7	R&E	KK Broodstock
	9/25/00	KK	51,274	LV only		15.7	R&E	KK Broodstock
	9/26/00	KK	51,832	LV only		15.7	R&E	KK Broodstock
	9/26/00	KK	51,563	27,277	09-30-49	15.7	R&E	KK Broodstock
			562,420	**174,344**				
2000	7/4/01	YB	25,263	25,263	09-32-58	26.9	BPA	0.50#/ft^3, surface
	7/4/01	YB	24,658	24,466	09-32-59	26.5	BPA	0.50#/ft^3, subsurf.
	7/4/01	YB	25,235	24,922	09-32-60	22.2	BPA	0.25#/ft^3, subsurf.
	7/4/01	YB	25,221	24,809	09-32-61	20.2	BPA	0.25#/ft^3, surface
	7/4/01	YB	104,768	23,987	09-32-62	24.4	R&E	0.50#/ft^3, density
	8/23/01	KK	49,309	26,898	09-33-12	19.3	R&E	KK Broodstock
	8/23/01	KK	49,259	LV only		18.3	R&E	KK Broodstock
	8/24/01	KK	49,890	LV only		18.7	R&E	KK Broodstock
	8/24/01	KK	49,850	LV only		19.3	R&E	KK Broodstock
	9/20/01	KK	471,605	27,000	09-33-13	16.9	R&E	KK Broodstock
			875,058	**177,345**				
2001	7/2/02	YB	125,607	24,211	09-35-09	22.1	BPA	0.50#/ft^3, surface
	7/2/02	YB	25,065	24,577	09-35-10	26.2	BPA	0.50#/ft^3, subsurf.
	7/2/02	YB	24,775	24,225	09-35-11	22.9	BPA	0.25#/ft^3, subsurf.
	7/2/02	YB	126,448	24,853	09-35-12	22.8	BPA	0.25#/ft^3, surface
	7/2/02	YB	165,161	24,602	09-35-13	27.0	R&E	R&E
	8/1/02	KK	203,853	26,608	09-35-33	36.8	R&E	KK Broodstock
	8/22/02	KK	416,674	21,587	09-35-32	23.1	R&E	KK Broodstock
			1,087,583	**170,663**				

continued

Table 2.2. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size (fish/lb)	Funding Agency [b]	Study Group
2002	7/24/03	YB	370,942	23,832	09-38-09	17.4	BPA	SAFE
	8/7/03	YB	409,372	27,833	09-38-19	22.3	R&E	R&E
	7/19/03	KK	199,640	26,938	09-38-17	42.7	R&E	KK Broodstock
	8/20/03	KK	167,486	LV only		19.3	R&E	KK Broodstock
	8/27/03	KK	167,288	LV only		17.5	R&E	KK Broodstock
	8/30/03	KK	167,804	27,348	09-38-18	16.0	R&E	KK Broodstock
			1,482,532	**105,951**				
2003	7/6/04	SF	53,963	LV only		91.3	R&E	Broodstock
	7/15/04	YB	147,467	25,327	09-39-55	16.5	R&E	R&E
	7/15/04	YB	372,209	25,041	09-39-54	15.5	BPA	Production
	7/23/04	KK	50,468	LV only		33.7	R&E	KK Broodstock
	7/26/04	KK	151,316	27,075	09-39-59	33.7	R&E	KK Broodstock
	8/14/04	KK	166,900	27,523	09-39-60	20.0	R&E	KK Broodstock
	8/21/04	KK	169,178	LV only		18.9	R&E	KK Broodstock
	8/28/04	KK	143,293	LV only		14.8	R&E	KK Broodstock
			1,254,794	**104,966**				
2004	7/14/05	SF	45,247	27,822	62-02-27	31.6	R&E	Broodstock, AHS
	7/18/05	YB	101,987	24,971	09-39-48	15.4	BPA	Production
	7/18/05	YB	59,250	24,909	09-39-49	13.4	R&E	R&E
	8/5/05	KK	202,285	29,012	07-05-46	31.5	R&E	KK Broodstock
	8/20/05	KK	177,836	29,420	09-21-01	21.2	R&E	KK Broodstock
	8/27/05	KK	174,838	LV only		17.6	R&E	KK Broodstock
	9/6/05	KK	180,107	LV only		16.6	R&E	KK Broodstock
			941,550	**136,134**				
2005	7/6/06	YB	383,723	24,942	09-43-29	15.2	BPA	Production
	7/19/06	YB	92,774	22,017	09-44-24	10.7	R&E	R&E
	7/22/06	SF	628,888	50,153	09-44-29	25.0	R&E/ODFW	Broodstock
			1,105,385	**97,112**				
2006	6/27/07	YB	564,641	23,163	09-45-50	16.8	BPA	Production
	6/28/07	SF	708,412	28,562	09-46-04	33.5	OR/FPC	Broodstock
			1,273,053	**51,725**				
2007	7/1/08	YB	574,020	23,120	09-01-26	18.6	BPA	Production
	7/27/08	SF	674,181	30,019	09-01-42	31.5	OR/FPC	Broodstock
			1,248,201	**53,139**				
2008	7/2/09	YB	702,659	25,211	09-02-16	17.3	BPA	Production
	7/21/09	SF	714,118	27,887	09-02-43	32.8	OR/FPC	Broodstock
			1,416,777	**53,098**				
2009	7/8/10	YB	229,105	27,114	09-41-51	16.6	BPA	Production
	7/25/10	SF	685,056	27,591	09-03-37	23.6	ODFW	Broodstock
			914,161	**54,705**				
2010	6/28/10	YB	684,030	24,762	09-03-68	20.2	BPA	Production
	7/15/10	SF	672,829	28,240	09-04-41	29.2	ODFW	Broodstock
			1,356,859	**53,002**				

continued

Table 2.2. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size (fish/lb)	Funding Agency [b]	Study Group
2011	6/29/12	YB	653,452	31,212	09-05-84	21.1	BPA	Production
	7/10/12	SF	704,594	31,299	09-05-95	34.2	ODFW	Broodstock
			1,358,046	**62,511**				
2012	7/1/13	YB	687,801	25,189	09-07-11	16.1	BPA	Production
	7/16/13	KK	481,663	31,652	09-07-10	33.5	ODFW	KK Broodstock
	7/19/13	SF	680,806	30,495	09-07-16	27.4	ODFW	Broodstock
			1,850,270	**87,336**				
2013	6/23/14	YB	706,795	27,203	07-12-44	19.5	BPA	Production
	7/14/14	KK	822,825	24,497	07-12-50	34.5	ODFW	KK Broodstock
	7/17/14	SF	697,554	28,816	09-08-21	32.1	ODFW	Broodstock
			1,404,349	**80,516**				
2014	6/5/15	YB	472,678	26,620	09-41-55	20.3	BPA	Production
	6/26/15	KK	525,600	26,887	09-41-62	45.0	ODFW	KK Broodstock
	6/27/15	SF	672,387	27,092	09-08-85	29.8	ODFW	Broodstock
			1,670,665	**80,599**				
2015	6/28/16	SF	160,487	27,726	09-10-07	22.8	ODFW	Broodstock
	7/11/16	KK	461,441	25,468	09-10-06	34.7	ODFW	KK Broodstock
			621,928	**53,194**				

[a] *BS=Blind Slough, CC=Cathlamet Channel, DR=Deep River, SF=South Fork Klaskanine, SS=Steamboat Slough, TG=Tongue Pt., TGM=Tongue Pt. MERTS, TGJ=Tongue Pt. John Day, YB=Youngs Bay, GR= Grays River*

[b] *BPA-Bonneville Power Administration; OR/FPC-Oregon Department of Fish and Wildlife (ODFW) and Fishermen Poundage Contributions; R&E-ODFW; PSMFC-Pacific States Marine Fisheries Commission; AHS-Astoria High School cooperative marking*

Table 2.3. Releases of Lower Columbia River Coho from Select Area facilities, 1993-2014 brood years.

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size (fish/lb)	Funding Agency [b] and Study
1993	5/11/95	YB	138,371	29,172	07-15-44	7.8	BPA / site comparison
	5/12/95	BS	140,267	26,258	07-15-45	8.9	BPA / site comparison
	5/12/95	TG	130,623	26,426	07-53-29	8.7	BPA / site comparison
	5/12/95	DR	201,200	30,751	63-54-44	8.1	BPA / site comparison
	4/10/95	SF	433,674	23,160	07-03-56	10.5	OR/FPC
	4/17/95	YB	822,185	25,886	07-07-58	9.7	Mitchell Act
	5/1-8/95	YB	467,531	22,545	07-07-43	12.6	R&E / acclimation
	5/15/95	YB	280,412	22,057	07-07-44	12.6	R&E / acclimation
			2,614,263	**206,255**			
1994	5/7/96	YB	216,187	26,274	07-12-22	9.5	BPA / site comparison
	5/6/96	BS	209,761	24,942	07-59-01	9.0	BPA / site comparison
	5/6/96	TG	190,032	23,942	07-12-41	8.4	BPA / site comparison
	5/7/96	DR	200,100	28,406	63-57-39	9.7	BPA / site comparison
	4/1/96	KK	837,355	24,974	07-54-15	10.3	Mitchell Act
	4/14/96	SF	443,183	25,979	07-09-25	10.7	OR/FPC
	4/15/96	YB	808,263	28,299	07-12-42	11.7	Mitchell Act
	4/16/96	GR	163,000	28,237	63-59-17	12.0	Mitchell Act
	4/26/96	YB	829,600	26,933	07-09-61	9.6	Mitchell Act
	5/6/96	BC	141,056	28,165	07-09-58	14.3	Mitchell Act
	5/20/96	YB	341,339	22,104	07-12-23	11.3	R&E / acclimation
	5/28/96	YB	295,512	26,418	07-11-36	11.2	Mitchell Act
	6/5/96	BC	402,510	27,957	07-09-59	12.5	Mitchell Act
			5,077,898	**342,630**			
1995	4/30/97	BC	146,067	27,589	07-08-42	13.0	Mitchell Act
	5/5/97	YB	146,818	27,360	07-09-42	13.2	BPA / site comparison
	5/5/97	BS	196,963	25,195	09-18-18	14.4	BPA / site comparison
	5/5/97	TG	430,221	26,223	07-13-36	13.9	BPA / site comparison
	5/12/97	YB	633,310	26,703	07-13-35	14.5	Mitchell Act
	5/12/97	SF	621,932	28,284	09-18-24	12.7	OR/FPC
	5/30/97	BC	389,635	27,762	07-09-46	12.2	Mitchell Act
			2,564,946	**189,116**			
1996	4/24/98	BC	146,064	24,952	09-22-54	12.6	Mitchell Act
	5/1/98	YB	133,373	26,677	09-23-02	10.4	BPA / site comparison
	5/1/98	BS	144,958	25,570	09-23-05	11.4	BPA / site comparison
	5/1/98	TG	119,611	18,641	09-23-06	11.2	BPA / site comparison
	4/22/98	GR	158,045	29,907	63-62-48	10.8	Mitchell Act
	4/23/98	DR	208,350	29,713	63-62-47	10.6	BPA / site comparison
	4/29/98	SF	550,427	27,321	09-23-21	16.8	OR/FPC
	5/1/98	YB	268,870	52,510	05-37-32	12.2	R&E / acclimation
	5/1/98	YB	261,654	50,604	05-37-33	12.2	R&E / acclimation
	5/28/98	BC	355,130	26,632	09-22-55	11.8	Mitchell Act
	5/26/98	YB	425,634	29,525	09-23-36	13.3	Mitchell / acclimation
	5/26/98	YB	30,101	29,990	09-23-38	13.3	Mitchell /acclim/d.index
			2,802,217	**372,042**			

continued

Table 2.3. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size (fish/lb)	Funding Agency [b] and Study
1997	4/12/99	YB	663,012	26,786	09-24-22	13.9	Mitchell Act
	4/26/99	BC	142,730	26,478	09-24-20	11.9	Mitchell Act
	4/28/99	YB	158,203	28,809	09-23-34	11.9	BPA / site comparison
	4/28/99	BS	197,089	26,256	09-25-28	11.3	BPA / site comparison
	5/12/99	GR	213,696	29,339	63-08-30	11.0	Mitchell Act
	4/28/99	TG	204,143	26,431	09-25-29	11.4	BPA / site comparison
	5/13/99	DR	203,284	25,003	63-05-30	11.4	BPA / site comparison
	5/13/99	DR	210,824	24,563	63-05-31	13.0	BPA / site comparison
	5/5/99	SS	210,530	24,248	63-05-32	10.4	BPA / site comparison
	5/25/99	BC	382,612	26,349	09-24-19	11.8	Mitchell Act
	4/21/99	SF	429,652	19,730	09-24-28	13.3	OR/FPC
	5/5/99	YB	502,146	24,963	05-39-47	12.5	R&E / acclimation
	5/19/99	YB	479,662	24,974	05-39-46	11.8	R&E / acclim/d.index
	6/1/99	YB	272,647	26,215	09-26-43	13.4	Mitchell / acclimation
	6/1/99	YB	26,894	26,841	09-26-56	13.4	Mitchell /acclim/d.index
			4,297,124	**386,985**			
1998	5/4/00	YB	206,377	24,490	09-29-14	11.9	BPA / site comparison
	5/4/00	BS	195,645	24,624	09-29-12	11.5	BPA / site comparison
	5/4/00	TG	228,290	24,774	09-29-13	10.8	BPA / site comparison
	5/3/00	GR	148,563	28,774	63-11-63	10.9	Mitchell Act
	5/3/00	DR	217,732	25,725	63-12-01	11.8	BPA / site comparison
	5/4/00	DR	213,411	29,690	63-12-02	11.3	BPA / site comparison
	5/15/00	BC	398,106	25,995	09-24-31	11.7	Mitchell Act
	4/15/00	BC	145,353	26,285	09-24-34	12.3	Mitchell Act
	4/24/00	SS	191,543	31,929	63-11-17	11.2	BPA / site comparison
	4/12/00	YB	836,845	26,244	09-27-16	15.7	Mitchell Act
	5/1-8/00	SF	610,658	25,514	09-27-30	12.8	OR/FPC
	5/11/00	TG	525,833	26,176	09-27-49	13.5	Mitchell Act
	5/25/00	YB	27,138	27,086	09-25-40	13.6	Mitchell /acclim/d.index
	5/25/00	YB	272,992	26,806	09-27-29	13.6	Mitchell / acclimation
	5/31/00	YB	476,148	21,731	05-39-48	15.9	R&E / acclimation
			4,694,634	**395,843**			
1999	5/14/01	YB	502,077	22,577	05-01-91	14.2	R&E / acclimation
	4/10/01	YB	808,735	26,482	09-30-06	15.6	Mitchell Act
	4/16/01	BC	145,147	27,026	09-27-31	12.3	Mitchell Act
	4/16/01	YB	234,032	26,011	09-31-61	14.0	BPA / control
	4/17/01	YB	179,187	26,592	09-31-59	14.7	BPA / towed
	4/30/01	GR	160,549	28,835	63-03-70	13.0	Mitchell Act
	5/7/01	SF	344,738	26,276	09-30-13	12.5	OR/FPC
	5/15/01	BC	392,038	27,067	09-27-32	12.4	Mitchell Act
	5/24/01	BS	274,257	26,969	09-32-20	15.5	Mitchell / acclimation
	5/24/01	BS	25,154	25,104	09-32-22	15.5	Mitchell /acclim/d.index
	5/31/01	TG	482,414	25,055	05-49-08	15.3	R&E / acclimation
	4/16/01	TG	173,199	21,854	09-31-60	13.2	BPA / site comparison
	5/9/01	DR	166,087	22,468	63-03-75	12.0	BPA / site comparison
	5/9/01	DR	229,250	24,062	63-03-76	12.0	BPA / site comparison
	5/1/01	SS	208,966	29,800	63-03-69	12.0	BPA / site comparison
			4,325,830	**386,178**			

continued

Table 2.3. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size (fish/lb)	Funding Agency [b] and Study
2000	5/6/02	YB	482,657	24,632	05-42-50	14.1	R&E / acclimation
	4/1/02	BC	144,690	26,833	09-32-42	12.8	Mitchell Act
	4/12/02	YB	837,201	26,545	09-30-15	13.0	Mitchell Act
	5/1/02	BC	396,208	27,141	09-32-43	12.3	Mitchell Act
	5/5/02	YB	177,730	24,555	09-33-39	11.9	BPA / towed
	5/3/02	YB	191,108	22,937	09-33-40	12.0	BPA / control
	5/7/02	BS	315,988	26,896	09-33-52	13.8	Mitchell / acclimation
	5/7/02	BS	27,854	27,798	09-33-56	13.8	Mitchell /acclim/d.index
	5/7/02	SF	583,248	24,285	09-33-57	11.4	OR/FPC
	5/15/02	GR	154,107	29,971	63-10-97	10.5	Mitchell Act
	5/16/02	TG	488,866	28,068	05-42-54	14.4	R&E / acclimation
	4/25/02	TG	178,892	23,726	09-33-41	14.6	BPA / site comparison
	5/16/02	DR	229,501	24,940	63-06-64	12.0	BPA / site comparison
	5/16/02	DR	125,056	25,359	63-10-82	9.4	BPA / site comparison
	5/1/02	SS	273,108	41,716	63-07-64	12.0	BPA / site comparison
			4,606,214	**405,402**			
2001	5/8/03	YB	512,549	23,482	05-47-60	12.6	R&E / acclimation
	4/1/03	BC	143,574	27,165	09-19-29	12.9	Mitchell Act
	4/10/03	YB	844,653	27,009	09-19-32	11.7	Mitchell Act
	5/1/03	BC	393,511	27,052	09-19-30	12.3	Mitchell Act
	5/1/03	GR	153,000	26,059	63-15-69	12.0	Mitchell Act
	5/9/03	YB	158,476	25,249	09-36-10	10.4	BPA / control
	5/10/03	YB	171,033	27,004	09-36-11	10.3	BPA / towed
	5/7/03	BS	288,931	27,775	09-34-61	13.0	Mitchell / acclimation
	5/7/03	BS	27,873	27,824	09-36-38	13.0	Mitchell /acclim/d.index
	4/28/03	SF	641,555	26,035	09-34-60	12.0	OR/FPC
	5/22/03	TG	477,918	23,396	05-47-59	12.8	R&E / acclimation
	4/24/03	TG	197,794	25,439	09-36-12	10.0	BPA / site comparison
	4/30/03	DR	129,545	24,506	63-15-19	12.0	BPA / site comparison
	4/30/03	DR	236,890	25,652	63-15-20	12.0	BPA / site comparison
	5/5/03	SS	239,635	29,747	63-11-74	12.0	BPA / site comparison
			4,616,937	**393,394**			
2002	4/6/04	TGM	186,520	24,770	09-38-62	13.0	BPA / site comparison
	4/1/04	BC	144,839	26,959	09-37-24	11.8	Mitchell Act
	4/9/04	YB	758,997	24,155	09-37-27	11.6	Mitchell Act
		SF	131,185	0	NA		
	4/28/04	YB	361,078	23,546	09-38-63	11.4	BPA / towed
	4/28/04	BS	298,748	26,809	09-37-32	14.4	Mitchell Act
	4/28/04	TGM	511,002	24,747	05-37-25	13.7	R&E / acclimation
	4/29/04	YB	350,839	22,364	05-37-24	12.4	R&E / acclimation
	5/1/04	GR	157,000	29,200	63-20-76	10.0	Mitchell Act
	5/1/04	BC	372,103	26,803	09-37-25	11.6	Mitchell Act
	5/1/04	DR	152,780	24,900	63-20-72	14.0	BPA / site comparison
	5/1/04	DR	204,420	25,100	63-20-77	13.0	BPA / site comparison
	4/26/04	SS	204,600	29,460	63-20-67	13.0	BPA / site comparison
			3,834,111	**308,813**			

continued

Table 2.3. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size (fish/lb)	Funding Agency [b] and Study
2003	4/6/05	YB	723,793	28,007	09-39-44	15.4	Mitchell Act
	4/1/05	BC	142,898	26,158	09-41-25	12.1	Mitchell Act
	5/1/05	BC	363,274	27,134	09-41-26	11.8	Mitchell Act
	5/1/05	DR	144,900	19,816	63-22-94	11.0	BPA / site comparison
	5/1/05	GR	146,000	25,688	63-22-93	11.8	Mitchell Act
	5/2/05	YB	422,275	26,855	09-39-46	15.2	BPA / towed
	5/3/05	BS	309,527	26,390	09-41-14	14.5	Mitchell Act
	5/4/05	TGM	202,727	25,179	09-39-45	15.9	BPA / site comparison
			2,455,394	**205,227**			
2004	4/10/06	YB	744,274	25,212	09-20-44	12.7	Mitchell Act
	4/1/06	BC	142,120	28,588	09-37-03	12.6	Mitchell Act
	4/21/06	TGM	194,442	28,948	09-42-41	9.1	BPA
	4/24/06	YB	381,335	28,092	09-42-42	10.5	BPA
	5/1/06	BC	385,511	27,283	09-37-04	11.8	Mitchell Act
	5/1/06	GR	156,302	28,009	63-26-98	12.0	Mitchell Act
	5/1/06	DR	201,300	28,369	63-26-97	12.3	BPA
	5/3/06	BS	305,573	24,189	09-43-06	13.8	Mitchell Act
			2,510,857	**218,690**			
2005	4/19/07	TGM	174,547	28,031	09-43-30	12.6	BPA
	4/15/07	BC	144,007	26,817	09-44-31	11.9	Mitchell Act
	4/23/07	YB	385,825	28,566	09-43-31	12.0	BPA
	4/25/07	YB	771,921	25,960	09-44-55	12.0	Mitchell Act
	4/26/07	BS	304,558	26,069	09-45-01	15.1	Mitchell Act
	5/8/07	BC	385,690	26,539	09-44-30	12.3	Mitchell Act
	5/1/07	DR	29,200	29,200	63-36-98	13.0	Mitchell Act
	5/1/07	GR	157,500	28,716	63-36-99	12.0	Mitchell Act
	5/1/07	DR	420,000	29,500	63-37-64	13.0	BPA
			2,773,248	**249,398**			
2006	4/15/08	TGM	597,754	28,574	09-46-23	12.0	BPA
	4/15/08	BC	141,789	26,147	09-45-55	11.8	Mitchell Act
	4/28/08	SF	139,472	27,615	09-39-34	10.6	ODFW
	4/28/08	SF	139,472	30,185	09-45-14	10.6	ODFW
	5/1/08	GR	132,188	33,758	63-41-77	11.5	Mitchell Act
	5/1/08	BC	417,928	25,969	09-45-54	12.0	Mitchell Act
	5/1/08	DR	368,000	32,982	63-41-78	15.5	BPA
	5/1/08	BS	310,133	27,851	09-46-35	13.9	Mitchell Act
	5/7/08	YB	768,960	27,365	09-46-31	13.0	Mitchell Act
	5/10/08	KK	232,455	19,742	09-36-26	12.0	BPA
			3,248,151	**280,188**			
2007	02/25/09	KK	132,659	4,810	09-01-58	13.4	BPA (BKD, forced release)
	04/10/09	KK	377,402	13,689	09-01-58	11.8	BPA
	04/06/09	TGM	477,830	28,201	09-01-59	11.8	BPA
	04/15/09	BC	145,738	27,130	09-46-48	12.2	Mitchell Act
	04/21/09	YB	786,742	26,462	09-46-59	14.8	Mitchell Act
	04/29/09	SF	99,339	4,081	09-01-58	11.4	BPA
	04/29/09	SF	225,455	52,334	09-01-79	11.4	ODFW
	04/29/09	SF	145,341	0	NA	11.4	Mitchell Act
	05/02/09	BC	394,431	27,149	09-45-30	12.3	Mitchell Act
	05/04/09	GR	158,000	30,000	63-44-75	12.8	Mitchell Act
	05/04/09	BS	300,036	26,783	09-46-61	12.9	Mitchell Act
	05/06/09	DR	435,750	22,419	63-44-74	12.0	BPA
	05/06/09	DR	270,400	0	NA	15.0	Mitchell Act
	05/06/09	YB	227,399	0	NA	11.8	Surplus, hatchery closure
			4,176,522	**263,058**			

continued

Table 2.3. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size (fish/lb)	Funding Agency [b] and Study
2008	4/9/10	TGM	483,412	28,080	09-02-54	10.6	BPA
	4/1/10	BC	144,188	25,478	09-02-52	12	Mitchell Act
	4/20/10	BS	417,506	27,470	09-02-58	13.6	Mitchell Act
	4/24/10	SF	195,348	33,604	09-02-72	9.8	ODFW
	4/24/10	SF	152,146	24,678	05-43-70	9.8	ODFW
	4/26/10	YB	783,092	27,358	09-46-55	11.8	Mitchell Act
	4/27/10	BC	372,018	25,180	09-02-53	12.1	Mitchell Act
	5/3/10	GR	153,000	27,726	63-48-80	11	Mitchell Act
	5/3/10	DR	292,000	0	NA	11.0	Mitchell Act
	5/3/10	DR	455,000	25,948	63-48-81	11.0	BPA
	5/7/10	KK	561,968	23,808	09-02-29	11.9	BPA
			4,009,678	**269,330**			
2009	4/15/11	TGM	479,365	24,760	09-03-45	11.3	BPA
	4/12/11	BC	160,512	27,077	09-41-31	11.4	Mitchell Act
	4/26/11	BS	388,505	27,184	09-03-60	14.7	Mitchell Act
	4/27/11	SF	368,980	26,571	09-03-44	10.4	ODFW
	4/27/11	YB	796,443	24,953	09-02-50	11.8	Mitchell Act
	4/30/11	BC	377,890	27,446	09-41-30	11.5	Mitchell Act
	5/3/11	GR	155,000	25,000	63-27-68	11.5	Mitchell Act
	5/2/11	DR	367,000	26,500	63-45-99	11.9	BPA
	5/3/11	DR	325,000	0		11.9	Mitchell Act
	5/3/11	KK	392,314	14,501	09-03-36	11.9	BPA
			3,811,009	**223,992**			
2010	4/16/12	BS	372,265	25,686	09-04-61	14.6	Mitchell Act
	4/13/12	BC	148,082	27,247	09-42-03	12.7	Mitchell Act
	4/17/12	YB	757,474	25,754	09-04-60	14.2	Mitchell Act
	4/18/12	SF	390,610	26,604	09-04-50	12.6	ODFW
	4/20/12	TGM	491,330	25,058	09-04-54	14.0	BPA
	4/30/12	BC	384,000	27,264	09-42-04	12.0	Mitchell Act
	4/30/12	KK	489,060	26,275	09-46-42	11.7	BPA
	5/1/12	GR	163,000	28,884	63-57-95	11.8	Mitchell Act
	5/2/12	DR	462,000	28,650	63-57-93	14.8	BPA
	5/2/12	DR	338,000	0	NA	14.8	Mitchell Act
			3,995,821	**241,422**			
2011	4/7/13	SF	386,668	24,846	09-42-01	11.6	ODFW & Assessment
	3/27/13	BC	166,100	28,071	09-43-11	15.1	Mitchell Act
	4/18/13	TGM	475,019	23,192	09-42-05	12.2	BPA
	4/18/13	BS	385,814	26,802	07-01-50	14.1	Mitchell Act
	4/22/13	YB	769,971	26,744	09-39-19	12.7	Mitchell Act
	4/23/13	BC	405,516	28,035	09-43-10	14.1	Mitchell Act
	4/24/13	KK	607,824	24,869	09-42-36	14.0	BPA
	5/1/13	GR	165,000	30,500	63-59-81	15.7	Mitchell Act
	5/1/13	DR	600,000	29,949	63-59-80	14.0	BPA/Mitchell Act
	5/6/13	BS	200,463	23,641	09-39-02	14.8	2013 Reallocation
	5/7/13	TGM	374,362	N/A	N/A	14.8	2013 Reallocation
			4,536,737	**266,649**			

continued

Table 2.3. (continued)

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size (fish/lb)	Funding Agency [b] and Study
2012	4/18/14	BS	402,187	51,535	09-07-28	15.2	Mitchell Act
	4/23/14	TGM	498,856	22,794	09-06-22	13.7	BPA
	4/24/14	BC	537,811	26,811	09-03-69	13.6	Mitchell Act
	4/24/14	YB	774,533	25,382	09-06-23	12.6	Mitchell Act
	4/25/14	KK	732,994	27,132	09-04-62	13.6	ODFW
	4/25/14	SF	336,856	27,035	09-06-18	11.7	ODFW & Assessment
	5/1/14	GR	155,000	29,940	63-65-48	17	Mitchell Act
	5/1/14	DR	445,000	29,940	63-65-49	16.8	BPA
	5/1/14	DR	280,000	N/A	N/A	15.8	Mitchell Act
	5/8/14	BS	221,462	N/A	N/A	13.0	2014 Reallocation
	5/12/14	TGM	429,733	56,483	09-07-27	14.9	2014 Reallocation
			4,814,432	**297,052**			
2013	4/10/15	SF	260,289	29,673	09-07-45	10.8	ODFW & Assessment
	4/13/15	KK	154,147	N/A	N/A	13.3	ODFW
	4/13/15	BC	537,661	25,679	09-02-70	15	Mitchell Act
	4/14/15	KK	748,972	24,910	09-06-17	14	BPA
	4/14/15	TGM	493,359	24,668	09-07-49	15.1	BPA
	4/15/15	BS	407,545	27,713	09-06-24	15.1	Mitchell Act
	4/16/15	YB	684,306	21,898	09-06-25	13.2	Mitchell Act
	4/23/15	DR	654,000	30,000	63-66-86	11.5	BPA/Mitchell Act
	4/27/15	GR	165,000	29,940	63-69-93	15.5	Mitchell Act
	5/12/15	BS	162,376	22,408	09-07-50	13.8	2015 Reallocation
	5/13/15	TGM	441,664	54,766	09-08-50	15.3	2015 Reallocation
			4,709,319	**291,655**			
2014	4/13/16	TGM	396,447	18,055	09-08-36	11.5	BPA
	4/13/16	KK	1,047,816	25,577	09-07-43	15.4	ODFW
	4/13/16	KK	504,642	32,482	09-08-42	15.1	BPA
	4/13/16	BC	568,328	26,542	09-04-56	15.2	Mitchell Act
	4/14/16	BS	417,874	26,863	09-07-51	15.6	Mitchell Act
	4/15/16	SF	209,923	25,978	09-08-35	10.9	ODFW & Assessment
	4/18/16	YB	766,193	23,697	09-08-92	12.0	Mitchell Act
	4/26/16	GR	156,000	39,916	63-68-45	15.3	Mitchell Act
	5/2/16	DR	600,000	42,000	63-68-46	16.0	Mitchell Act
	5/2/16	DR	320,000	44,000	63-68-41	16.0	BPA
	5/4/16	BS	156,369	18,475	09-08-31	14.5	2016 Reallocation
	5/5/16	TGM	445,864	26,201	09-07-42	15.9	2016 Reallocation
			5,589,456	**349,786**			

[a] *BS=Blind Slough, DR=Deep River, KK=North Fork Klaskanine, SF=South Fork Klaskanine, SS=Steamboat, Slough, TG=Tongue Pt., TGM=Tongue Point MERTS, YB=Youngs Bay, GR=Gray River.*

[b] *BPA-Bonneville Power Administration; OR/FPC-Oregon Department of Fish and Wildlife (ODFW) and Fishermen Poundage Contributions; R&E-ODFW Restoration and Enhancement Program; Mitchell-Mitchell Act Funds. Double index (d.index).*

Table 2.4. Releases of tule fall Chinook from Lower Columbia River Select Area facilities, 2008-2015 brood years.

Brood Year	Release Date	Release Site [a]	Number Released	Number of CWTs	Tag Code	Release Size (fish/lb)	Funding Agency and Study
2008	6/1/09	DR	700,000	54,670	63-47-72	78.0	Mitchell Act-reprogrammed
	5/20/09	BC	5,666,218	225,552	09-01-99	77.2	Mitchell Act
			6,366,218	**280,222**			
2009	5/3/10	KK	2,093,575	52,298	09-20-47	78.2	Mitchell Act
	5/13/10	BC	3,598,214	225,945	09-03-23	80.3	Mitchell Act
	6/24/10	DR	700,000	83,033	63-51-98	79.2	Mitchell Act-reprogrammed
			6,391,789	**361,276**			
2010	5/16/11	KK	1,932,616	53,783	09-20-50	81.3	Mitchell Act
	5/16/11	BC	389,606	229,840	09-03-66	80.3	Mitchell Act
	5/17/11	BC	2,865,514	229,462	09-04-37	80.3	Mitchell Act
	6/23/11	DR	862,000	88,262	63-55-92	82.0	Mitchell Act-reprogrammed
			6,049,736	**601,347**			
2011	5/8/12	KK	1,954,732	54,729	09-22-13	77.0	Mitchell Act
	5/7/12	BC	339,958	226,519	09-05-66	82.5	Mitchell Act
	5/7/12	BC	2,527,817	221,574	09-05-82	82.5	Mitchell Act
	5/7/12	BC	346,015	220,822	09-05-83	82.5	Mitchell Act
	5/7/12	BC	400,957	224,969	09-05-67	82.5	Mitchell Act
	6/18/12	DR	893,000	95,309	63-61-98	74.4	Mitchell act-reprogrammed
			6,462,479	**1,043,922**			
2012	4/29/13	KK	1,986,471	53,037	09-03-67	77.6	Mitchell Act
	5/15/13	BC	227,524	225,678	09-03-77	80.9	Mitchell Act
	5/15/13	BC	2,728,544	209,170	09-07-02	80.9	Mitchell Act
	5/24/13	DR	550,000	N/A	N/A	77.9	Mitchell Act
	6/13/13	DR	430,000	87,939	63-64-71	76.8	Mitchell Act
	6/13/13	DR	1,035,000	N/A	N/A	82.8	Mitchell Act
	6/25/13	DR	605,000	N/A	N/A	98.0	Mitchell Act
			7,562,539	**575,824**			
2013	4/26/14	KK	805,247	53,629	09-07-15	79.1	Mitchell Act
	4/26/14	KK	839,727	N/A	N/A	81.1	Mitchell Act
	5/16/14	BC	213,423	212,081	09-04-49	74.0	Mitchell Act
	5/16/14	BC	2,624,478	212,422	09-07-12	74.0	Mitchell Act
	6/10/14	DR	930,000	93,000	63-64-73	86.0	Mitchell Act
			5,412,875	**571,132**			
2014	5/1/15	KK	2,047,136	51,476	09-08-22	83.5	Mitchell Act
	5/11/15	BC	3,120,715	220,563	09-09-23	78.4	Mitchell Act
	5/28/15	DR	975,000	104,790	63-67-97	85.0	Mitchell Act
	6/26/15	KK	2,071,656	95,296	63-67-96	82.8	Mitchell Act
			8,214,507	**472,125**			
2015	5/2/16	KK	1,839,769	55,009	09-05-96	78.5	Mitchell Act
	5/31/16	KK	963,212	96,129	63-69-22	92.8	Mitchell Act
	5/11/16	BC	3,090,605	224,466	09-08-24	75.5	Mitchell Act
	6/6/16	DR	875,000	79,840	63-67-87	81.8	Mitchell Act
			6,768,586	**455,444**			

[a] *BS=Blind Slough, DR=Deep River, KK=North Fork Klaskanine, SF=South Fork Klaskanine, SS=Steamboat, Slough, TG=Tongue Pt., TGM=Tongue Point MERTS, YB=Youngs Bay, GR= Grays River*

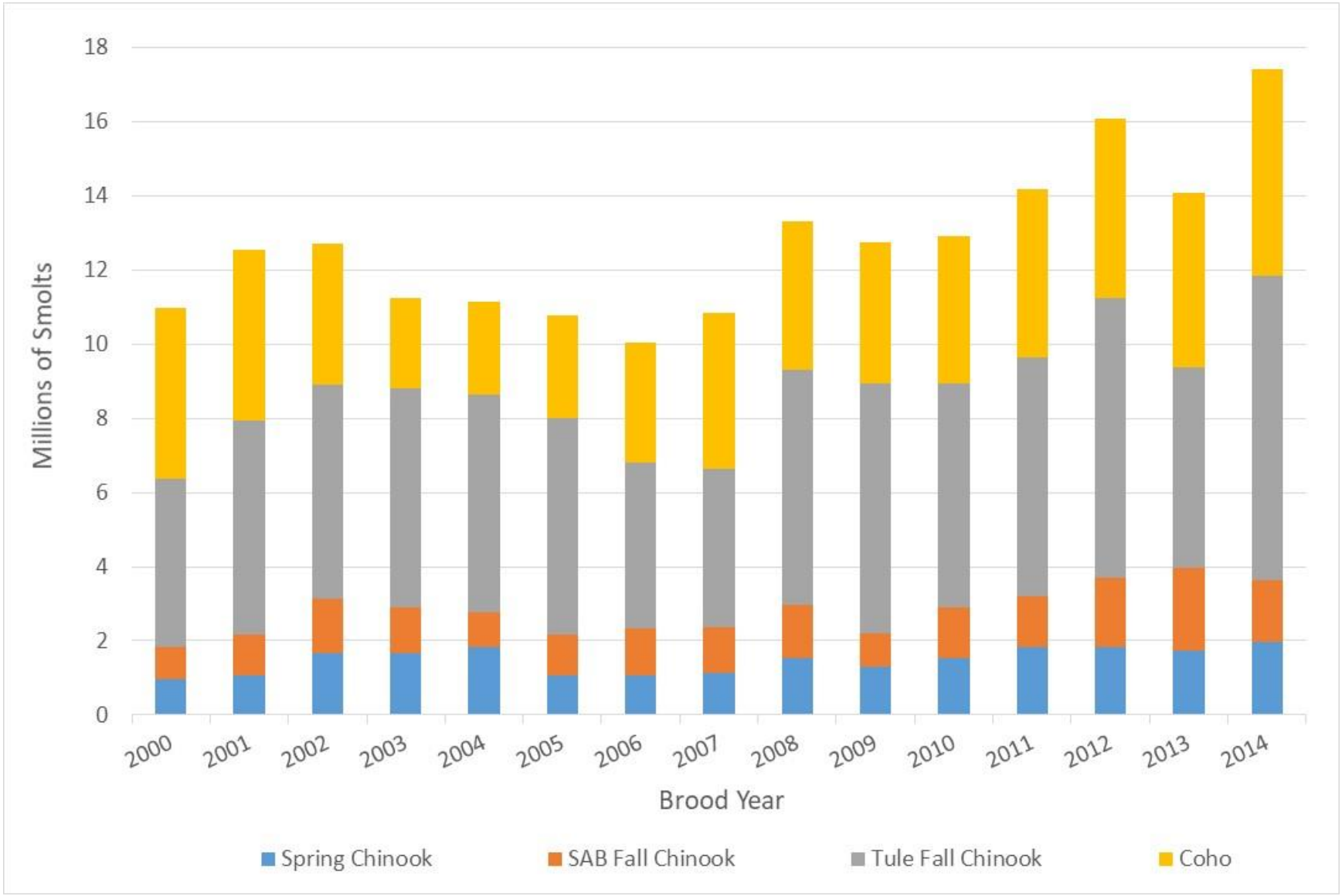


Figure 2.1. Number of smolts released from SAFE Affiliated net-pens and Hatcheries by species/stock, brood years 2000-2014.

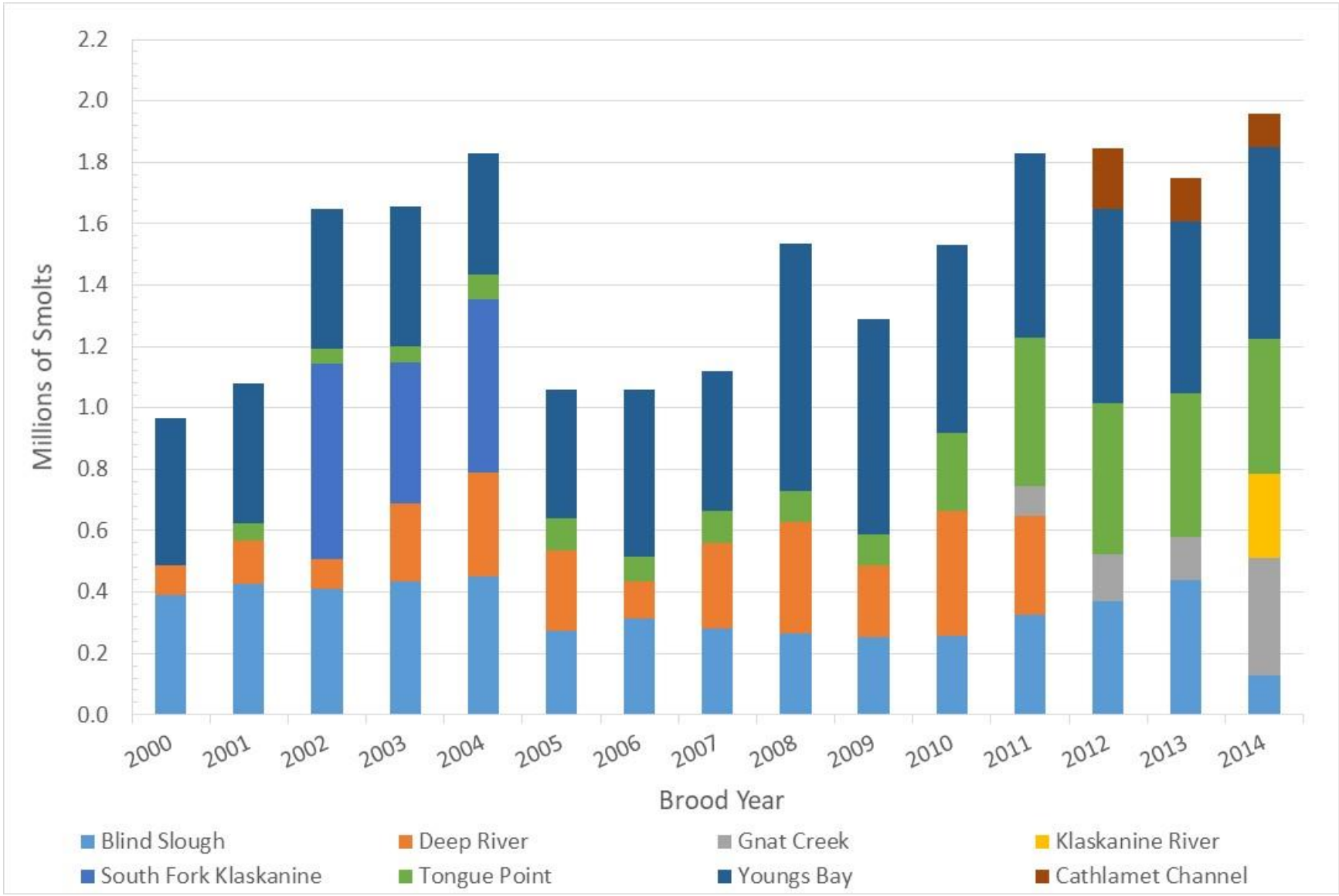


Figure 2.2. Number of SAFE spring Chinook smolts released by release site, brood years 2000-2014.

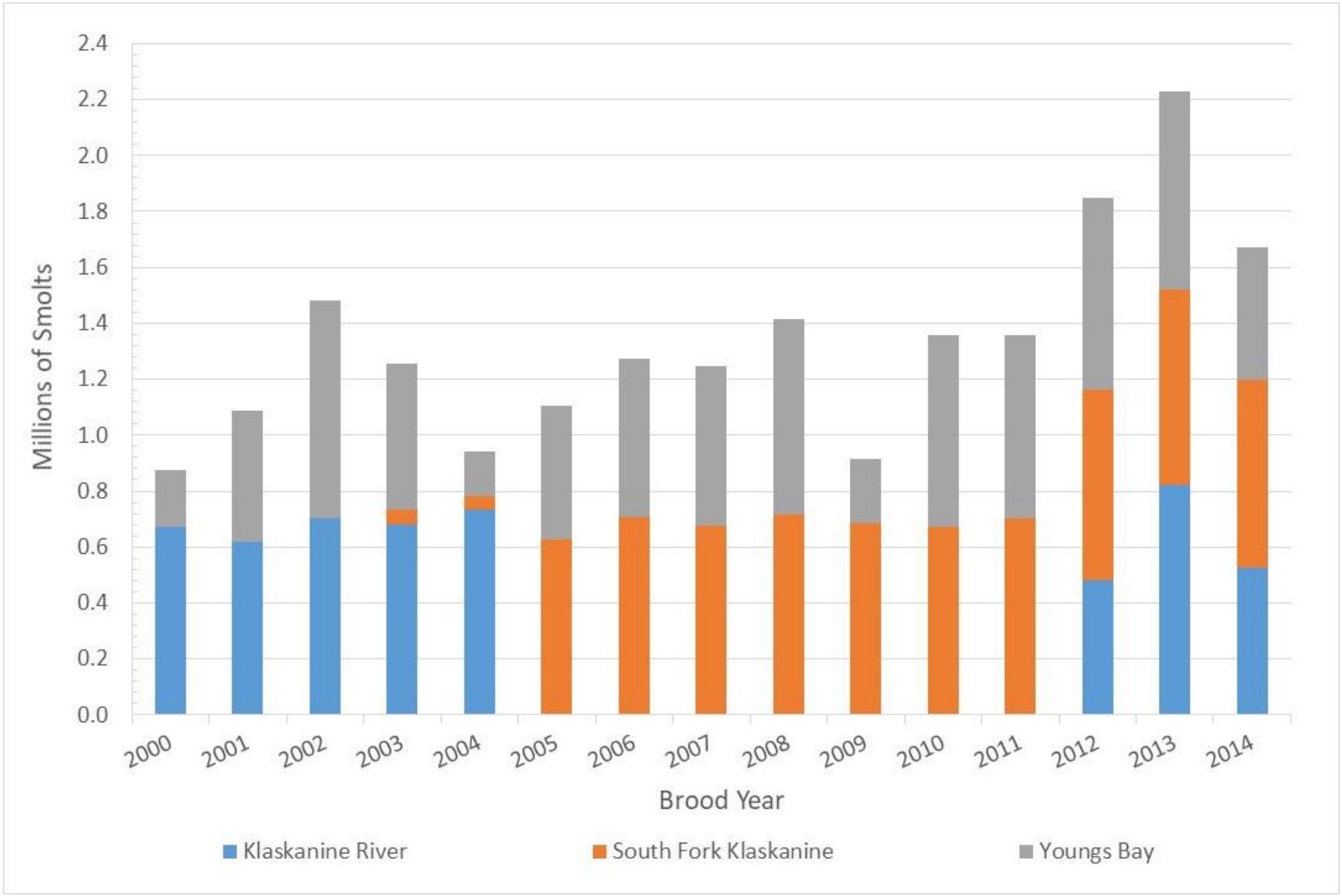


Figure 2.3. Number of SAB fall Chinook smolts released by release site, brood years 2000-2014.

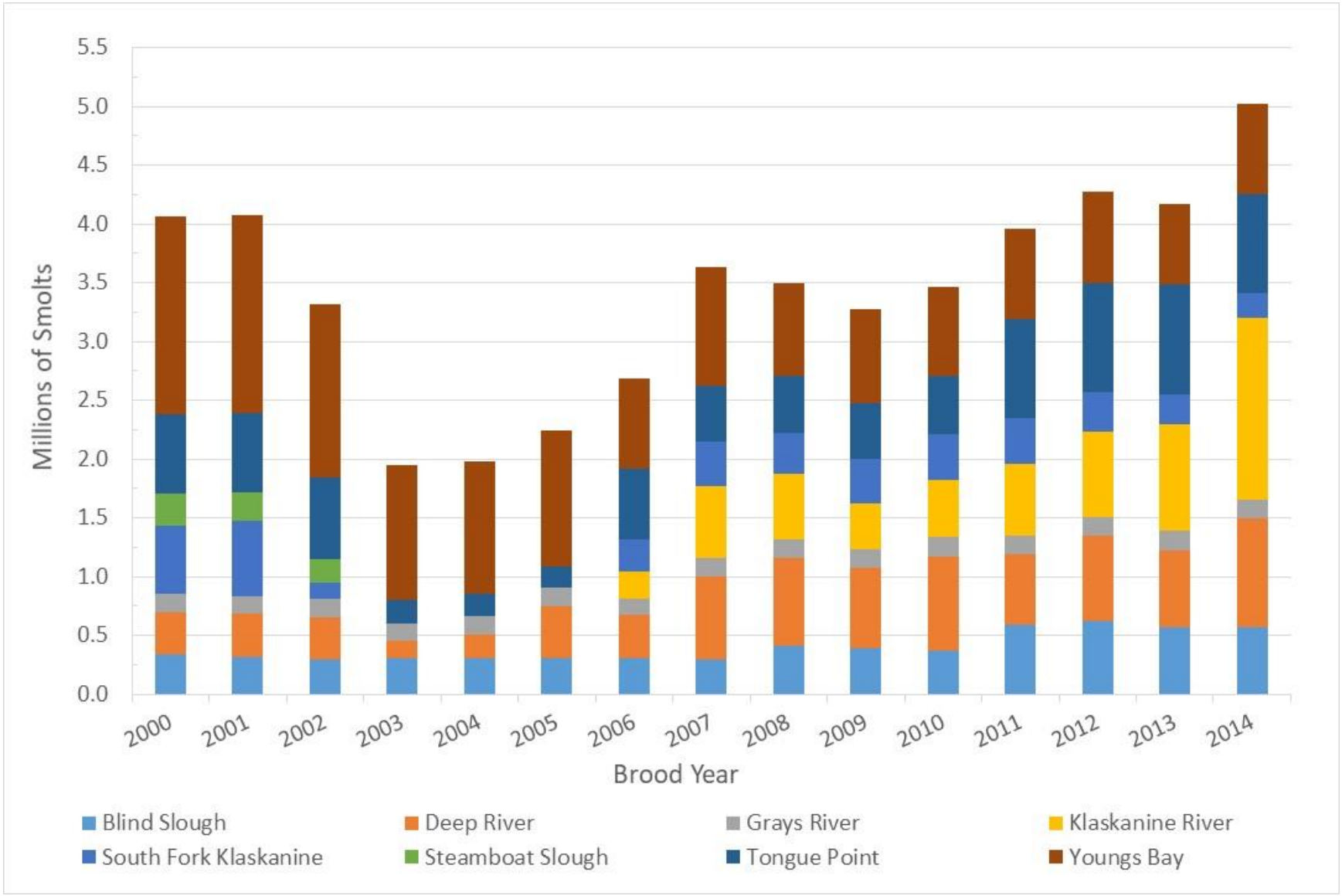


Figure 2.4. Number of Coho (early and late stock) smolts released from SAFE affiliated net-pens and hatcheries, brood years 2000-2014.

3. HARVEST: FISHERIES AND SEASONS

RUN-SIZE FORECASTS

During December through February each year, ODFW, WDFW, and the Technical Advisory Committee (TAC) collaborate to produce formal forecasts for the expected return of salmonid stocks to the Columbia River. These run-size predictions are incorporated into regional pre-season fishery planning processes and used to estimate in-season fishery impacts to ESA-listed stocks based on catch estimates for each stock. Return forecasts of SAFE-produced salmon are developed independently by project staff and then incorporated into the Columbia River estimate. TAC will update Columbia River run sizes in-season to ensure proper management of ESA-listed stocks, but returns to Select Areas are not formally updated in-season.

Methodology used to forecast adult returns of SAFE-project salmon has been refined as the dataset of smolt-to-adult survival, Cohort reconstruction, and fishery contribution increases. This report describes methods used since 2007 to predict the adult abundance of SAFE-produced salmon. For run-size forecasting methods used prior to 2007, refer to North et al. (2006).

Spring Chinook

Two estimates relating to spring Chinook are produced in January of each year; the number of SAFE-origin spring Chinook returning to Select Area fishing sites and total expected harvest of Chinook in Select Area winter/spring/summer commercial fisheries. The latter estimate includes harvest of non-local stocks. The harvest estimate and a range are provided to fishery managers for use in Columbia River fisheries planning.

For each release site, the number of 4-year-old and 5 year-old returning adults is estimated based on the smolt release for the appropriate brood year multiplied by a recruitment rate. The recruitment rate is an average of the specific release site Cohort reconstruction return/harvest rate by age; brood years 1996-2011 were used to develop the rates used for the 2013-2016 forecasts. Prior to 2008, the recruitment rate described above was used to predict 4 and 5 year-old adults. Currently, only the 4-year old Select Area harvest estimate uses the method listed above while the 5-year old rate is predicted using various year-specific regression models comparing 4- year old and 5-year old recruitment rates. The age-4 and -5 harvest prediction is summed by Select Area location to produce fishery specific estimates and summed further for a total SAFE-stock Select Area harvest prediction.

The second estimate made annually, the site-specific Select Area commercial fishery harvest estimate, is based on the return prediction described above, expanded to account for average expected harvest of non-local stocks. The years selected for the average non-local harvest varied depending on trends identified for recent years. Typically, averages do not include years prior to 2004 because there appears to be a significant change in the proportion of non-local stocks (likely due to adaptive management and increased knowledge of the fisheries) since 2003 (e.g. 2000-2003 Youngs Bay harvest averaged 25.7% non-local stocks). The same shift has been observed in the Blind Slough/Knappa Slough commercial fishery (2000-2003 averaged 10.5% non-local). The harvest estimate is presented as a point estimate and range. The point estimate is the harvest estimate as described above, the lower bound of the range is the SAFE-stock only forecast and the upper bound is an estimation of the maximum number of non-local stocks expected (Willamette and upriver spring Chinook based on allowable impact rates, others based on historical averages).

Select Area Bright Fall Chinook

Since SABs and Coho from SAFE releases are subject to ocean fisheries, the ocean abundance of returning adults from these stocks is estimated and provided to fishery managers for use in regional fisheries management processes (e.g. PFMC Ocean Salmon Management Process, North of Falcon public meetings). Essentially three estimates are made annually: ocean abundance, Columbia River mouth return, and return to Select Area commercial fisheries. Ocean abundance for three adult age classes (3,4,5) of returning SABs is estimated, since these three age classes make up a vast majority of the SAB return (based on 1995-2011 returns, WDFW unpublished data).

Release-site-specific (net-pen and broodstock hatchery) estimates for each of the three major adult age classes are made by multiplying the number of smolts released by stratified average smolt-to-adult survival rates (using brood years 1997-2007 (2013, 2014, 2015) and 2005-2009 (2016). This estimate is then multiplied by the average percent contribution of that age class to the total return based on return years 1995-2014 (WDFW unpublished data). Estimates for each age class are summed by release site, and then summed again to obtain total ocean abundance of returning adults for the given return year. To estimate Columbia River mouth return, site-specific estimates are apportioned to categories of final destination (harvest and escapement) based on 1994-2007 (2013, 2014, and 2015) and 1996-2009 (2016) CWT recoveries (see Run Reconstruction chapter for detail). Expected ocean harvest is subtracted out to develop the Columbia River mouth estimate. The same apportioning process used to estimate ocean contribution is used to estimate the total return to Select Area commercial fisheries.

Coho

The adult return forecast of SAFE-origin Coho is estimated much like the SAB forecast. Three estimates are produced; ocean abundance and Columbia River mouth estimates are provided for regional fisheries management purposes. Coho estimation is simpler than SAB since only one age class of returning adults is predominant. Release-site-specific smolt releases are multiplied by the average SARs (brood year range 1993-2005 for return year 2013 and 2014 forecasts; 1993-2007 for 2015; 2003-2010 for 2016) then the estimate is apportioned to fisheries based on CWT recoveries (brood year range 1993-2007 for return year 2013-2015 forecasts; 2003 - 2010 for 2016). The fishery and escapement specific estimates are used to estimate Columbia River mouth return (by subtracting estimated ocean harvest) and Select Area commercial harvest (by subtracting mainstem Columbia River harvest and escapement).

FISHERY MANAGEMENT: SEASON SETTING AND IN-SEASON MANAGEMENT

All fisheries in the Columbia River are established within the guidelines and constraints of the current U.S. v Oregon Management Agreement, the ESA, and other management agreements or accords negotiated between the parties to U.S. v. Oregon or management entities. Initial season design and management guidelines for Columbia River non-Treaty fisheries, including Select Areas, are established through the Biological Assessment/Opinion and Compact/Joint State hearing processes in accordance with the aforementioned agreements and ESA requirements.

Biological Assessments are prepared by the TAC in advance of intended fisheries and submitted to NOAA Fisheries for review. These documents outline predicted harvest impacts on federally-listed species and measures that will be taken to minimize these impacts. A Biological Opinion (BO) is then issued by NOAA with a determination regarding the likelihood that the proposed fisheries will jeopardize recovery of listed stocks. The BO outlines management guidelines for the proposed fisheries including "take" limitations and other management concerns the states should address while executing the fisheries. Fisheries reported on in this document (fall 2012 – fall 2016) are authorized under the 2008-2017 U.S. v Oregon Management Agreement. Consultation with NOAA Fisheries regarding the 2008-2017 U.S. v Oregon Management Agreement resulted in a BO dated May 5, 2008 (NMFS 2008) with a finding of no significant impact (FONSI) for all activities described in the Management Agreement (including Select Area fisheries and test fishing research).

The Columbia River Compact is an agreement ratified by the U.S. Congress in 1918 covering concurrent jurisdiction of Columbia River commercial fisheries. The Compact comprises Washington Fish and Wildlife Commission (WFWC) of WDFW and the Oregon Fish and Wildlife Commission (OFWC) of ODFW. In recent years, the two commissions have delegated Compact decision-making authority to the agency's director or the director's designee. Seasons for concurrent waters, of which some Select Area fisheries are included, are established by the Compact. Select Area commercial seasons occurring in state waters and all recreational seasons and regulations are established by the regulating state.

When addressing commercial seasons for Columbia River fisheries, the Compact must consider the effect of the commercial fishery on escapement, treaty rights, and the impact on species listed under the ESA. Working together under the Compact, the states have the responsibility to address the allocation of limited resources between recreational, commercial, and treaty Indian fishers. This responsibility has become increasingly demanding in recent years. The states maintain a conservative management approach when considering Columbia River fisheries that will affect species listed under the ESA.

Each year, pertinent management constraints and information on historic and predicted run sizes and past and projected fisheries are summarized by agency staff and distributed to management agencies, TAC, tribes, and the public. These Joint Staff Reports are distributed three times each year in advance of anticipated seasons. One report is dedicated to sturgeon and smelt, one to spring and summer runs and fisheries, and one for fall runs and fisheries. For Select Area fisheries, annual public meetings to solicit community input regarding commercial and recreational season recommendations have been held in Astoria, Oregon in January of each year for spring fisheries and in June for fall fisheries. The June public meeting for fall fisheries was discontinued in 2016 due to very limited attendance in prior years. Constituents were encouraged to contact fisheries managers directly with any input for fall Select Area season planning. Major Compact hearings have occurred in December, January/February, and July; however, hearings are held multiple times throughout the year to make in-season modifications to various Columbia River fisheries. Fact Sheets are prepared and distributed by staff in advance of all Compact/Joint State Hearings. The Fact Sheets detail specific season recommendations and regulations based on fishery objectives, management guidelines and agreements, and public and industry input. Agency staff presents the information from the Fact Sheets at the Compact/Joint State hearings. Public testimony (often including Treaty, recreational, and commercial fishers) regarding the recommended seasons is taken along with input from treaty and non-treaty tribes, NOAA, USFWS, Idaho Fish and Game (IFG), and the TAC. The Compact representatives use this testimony and information from the Fact Sheets to weigh the risks and benefits of the proposed seasons and make final rulings based on their joint decision. Adopted

seasons and regulations are announced in a Compact, Joint State, or State Action notice following each hearing and distributed via the Agency websites, email and fax distribution lists, and telephone hotlines. Joint Staff Reports, Compact Fact Sheets, and Compact Action Notices are available on both agencies' websites:

ODFW: http://www.dfw.state.or.us/fish/OSCRP/CRM

WDFW: http://wdfw.wa.gov/fish/crc

To ensure impacts to ESA-listed stocks resulting from Select Area fisheries remain within management guidelines, fish run sizes and stock specific harvest are tracked in-season and regulations and fishing periods are adjusted, if necessary. Run-size estimates for mainstem Columbia River stocks are updated by the TAC regularly throughout the adult run based on passage updates at Bonneville Dam and other data. In-season landings for Select Area fisheries are estimated immediately following each fishing period through phone surveys and online reports (see Fishery Monitoring, In-Season section for details). Impact rates are tracked continuously by staff as new information becomes available. Whenever additional fishing opportunity is considered or in-season management action is required to reduce impacts to listed stocks, a Compact or Joint State hearing is scheduled and an associated Fact Sheet is prepared summarizing any new information and suggested management actions. The entire process is extremely intensive and responsive with over 50 Compact/Joint State hearings occurring annually in recent years, and multiple hearings weekly are common during winter/spring and fall seasons. Select Area fisheries are managed conjointly with mainstem fisheries and utilize non-Treaty allowable impacts; they have been subject to frequent review and management action as needed to account for results of mainstem fisheries.

Project staff and fishery managers try to be flexible in-season about taking advantage of opportunity to add additional time or area (within existing Select Area boundaries) when possible and requested by fishers. Staff weighs the risks associated with any modification, presents recommendations (if appropriate) at a scheduled Compact hearing and a decision is made based on the risk and public testimony.

FISHERY MONITORING: ESTIMATION OF HARVEST AND STOCK & AGE COMPOSITION

In-Season Monitoring

Select Area fisheries are monitored extensively to ensure adequate representation of the catch and to determine impacts to non-local stocks based on in-season updates of mainstem salmon and steelhead (*Oncorhynchus mykiss*) returns. The ODFW and the WDFW are responsible for both sampling to collect biological data and for analyzing data to estimate harvest in their respective Select Area fisheries. The catch from all Select Area fisheries is sampled for the recovery of CWTs using electronic detection and for additional biological information. Each Select Area fishing site is monitored independently to account for variability in total catch, species, stock, and age composition within each fishery. Funding for sampling of the Select Area fisheries is provided by BPA through the SAFE project (BPA #1993-06000) in Washington and by the State of Oregon and the Mitchell Act funded coded-wire tag recovery project in Oregon.

Commercial Fisheries

Salmon harvested in Select Area commercial fisheries is sampled by ODFW and WDFW field staff at commercial seafood processing plants and associated buying stations. A two-part sampling strategy is employed to collect the data necessary for managing the fisheries in-season and analyzing the fisheries post-season. A subset of the catch is sampled for presence of fin marks and CWTs (mark-sampling); a subset of the mark-sampled population is randomly sampled for biological data (bio-sampling). Data collected from mark-sampled fish exhibiting a fin mark or CWT include species, stock, sex, length, and fin mark. The CWT and scale samples are collected at this time. The same data are collected on bio-sampled fish with the addition of the individual fish's weight (in pounds). All snouts potentially containing CWTs are delivered to the tag recovery lab in Clackamas, Oregon where the CWT is extracted and decoded. The resulting tag code is verified and entered into centralized data management server at ODFW headquarters in Salem where it is accessible to fisheries management staff.

Minimum target mark sampling rates are 20% of the landed catch by species, area, and season; however, sampling rates are usually significantly higher. Twenty percent is the minimum needed to determine stock composition in fisheries (PSC 2017). During 2007 – 2016, over 210,000 (31%) salmon harvested in Select Area fisheries were examined for fin marks (see Table 3.1 for season and year specific mark sampling rates). Coded-wire tag data are used primarily to determine survival rates and stock composition of the landed catch and not to estimate numbers of harvested fish. Average mark-sampling rates during 2012-2016 were 59%, 51%, and 40% for Select Area winter, spring, and summer fisheries, respectively. The sample rate for fall fisheries during the same period was 31% and 27% for Chinook and Coho, respectively. Sample rates are generally lower for fall fisheries due to higher numbers of fish landed when compared to winter, spring, and summer fisheries (TAC 2008). It is important to note that mark-sampling rates associated with Select Area fisheries are generally higher than mainstem Columbia fisheries.

Harvest estimates of all commercial catch in Washington and Oregon are calculated using data from fish tickets[1] completed at the time of sale and data from the biological sampling described above. All licensed fish buyers report total landings in pounds (round weight) stratified by species, fishing period, and fishing zone. For purposes of in-season management, ODFW staff conducts phone surveys of key buyers within hours of the close of a fishing period (or weekly for extended seasons such as fall); WDFW relies on reporting by buyers via their "Quick Report" system. Average weights from bio-sampling are applied to the total landings poundage to estimate total number of fish landed. This method of harvest estimation is used in mainstem Columbia River commercial fisheries as well as Select Area fisheries therefore we are confident that the method is appropriate.

Preliminary landings are summarized in-season by statistical week and made available to the public via ODFW's website at http://www.dfw.state.or.us/fish/OSCRP/CRM/comm_fishery_updates.asp. Preliminary landings are based on phone surveys and online reporting of buyers and processors. Landings are confirmed and refined as necessary when copies of fish tickets are available. For purposes of in-season management, coded-wire tag and visual stock identification (VSI; spring

[1] Fish tickets are legal documents required by the States to document the landing and sale of fish. Every landing must be recorded on a fish ticket; information required on the fish ticket includes fisher name, commercial license number, a unique ticket number, gear type, the catch area, and the number and pounds landed by species. For further information on fish tickets, landing, and transportation refer to Oregon Administrative Rules 635-006-0210/0212 (fish tickets), 635-006-0165 (transportation). Washington Administrative Code 220-69-240 details fish ticket reporting and Quick Reporting requirements.

Chinook) data are analyzed to determine stock composition of fish landed in each Select Area fishery. Stock compositions are then applied to total landing estimates to produce stock-specific catch estimates. Stock-specific catch estimates for fisheries are monitored in conjunction with in-season run size updates to maintain fisheries within ESA guidelines.

Recreational Fisheries

Due to resource limitations, a creel program is not currently in place for the Select Area spring Chinook recreational fisheries. Recreational harvest estimates have been made using expanded harvest cards ("punch cards") from 2008 through 2015. The harvest card estimate is based on reported catch from angler harvest cards that are turned in voluntarily and are expanded by an estimated reporting rate. Harvest card data are not available for at least one year so preliminary estimates are made for annual reporting purposes by correlating trends in previous year harvest cards, Select Area commercial landings, and spring Chinook run size.

ESA COMPLIANCE

Winter and Spring Fisheries

Winter and spring Select Area fisheries are managed intensely in-season to ensure that the impacts to upriver spring Chinook stay within the allowable impact guideline (0.15 percent of the upriver spring Chinook run). For these fisheries, VSI from the sampled catch is used to estimate the rough-scale stock composition (upriver vs. lower river origin) of the total catch for each statistical week. Total upriver spring Chinook harvest rate is used as a surrogate to track impacts to listed upriver spring Chinook, since few of those fish are coded-wire tagged. Physical characteristics used to classify stock are readily discernible on dead fish and samplers can be easily trained to determine the stock visually with a high degree of accuracy. Coded-wire tags recovered during sampling of the landed catch are decoded periodically in-season and used to verify and, if needed, correct VSI calls to calculate the frequency of upriver spring Chinook in the sample by week. In most cases, the correction factor is minor since the samplers are highly proficient at classifying stock based on visual cues. The adjusted rate is then applied to the total weekly landed catch to calculate weekly impacts to upriver spring Chinook. Weekly and cumulative season totals are divided by the current estimated run size to determine the impact rate. If the data suggest that impacts will exceed management guidelines, adopted seasons are modified through the Compact hearing process. Beginning in 2008, the number of upriver fish impacted is calculated weekly. Prior to 2008, the season to-date rate was applied to total season landings to calculate the number of upriver spring Chinook harvested in Select Area commercial fisheries.

Impact rates of upriver spring Chinook have averaged 0.16% (range 0.01% .47%) for the Select Areas in 2002 – 2016 (Table 3.2). Since all LCR non-Treaty fisheries operate under the same BO from NOAA, if one fishery accrues (or is projected to accrue) a higher than planned impact, any on-going fisheries must be modified so the combined allowable impact rate is not exceeded. Select Area fisheries harvest few upriver spring Chinook, they accrue impacts at a much slower rate than mainstem fisheries, providing the ability to run for much longer periods. When mainstem fisheries are at or near allowable impact limits, the Select Area fisheries may be closed for significant periods. Alternatively, remaining commercial impacts may be transferred from the mainstem Columbia River to the Select Areas if they are not utilized. Annual fluctuations in the final Select Area impacts illustrates the effects of in-season uncertainty in upriver spring Chinook run size, the interrelated nature of LCR fisheries management, and any management actions enacted to stay within the combined guidelines.

To meet the project goal of providing stable and meaningful fisheries, it is imperative that Select Area fisheries be allotted sufficient upriver impacts to run with minimal disruption.

Fall Fisheries

The following excerpt from TAC's Biological Assessment for 2008-2017 fisheries (TAC 2008) describes how fall fisheries are monitored for ESA compliance:

> *CWTs are utilized for in-season management of fall Chinook fisheries to a much greater extent than for any other in-river fishery. In contrast with some other Chinook stocks, high CWT rates for hatchery fall Chinook allow for sufficient recoveries of CWTs for these purposes. Recovered CWTs are delivered to tag recovery labs in Clackamas, Oregon or Olympia, Washington, where the CWT is extracted and decoded. The resulting tag code is entered and verified on a mainframe computer. Associated fishery/recovery and biological data, collected when snouts are recovered, are uploaded to the mainframe computer and merged with previously entered CWT recovery data. Based on fishery-specific sampling rates, individual tag recoveries are increased by an expansion factor to estimate the total number of that particular tag present in a given fishery. CWT recovery data are summarized to estimate the number of CWTs recovered for each tag code for each sampling program. Throughout this process, the data are diligently checked and corrected to ensure data quality.*

Estimates of CWT recoveries, harvest, dam passage, and hatchery or spawning ground escapements for most Columbia River salmonid stocks are produced though cooperative efforts by several state and federal agencies.

Reporting

Impacts to listed stocks are summarized and reported via technical reports, Joint Staff Reports, and Fact Sheets. Additionally, TAC develops annual summary reports to serve as a reporting mechanism to assess compliance with limits established under the ESA (TAC 2008).

POST-SEASON ANALYSES

Age and stock composition of the commercial harvest for Select Area fisheries is developed separately for winter, spring, summer, and fall seasons. Methodology for determining the age and stock composition is identical for winter, spring, and summer fisheries. First, a season-specific expansion factor (may be further subdivided if appropriate) is calculated based on the number of fish mark-sampled divided by the total landings (mark-sample rate). SAB fall Chinook are removed from the catch based on their positive identification via the LV fin mark to determine the total number of spring Chinook in the estimate. This number is split into upriver or lower river stock (winter and spring season only) based on CWT-corrected VSI calls. Season- and stock-specific age data are derived from analysis of scale samples collected during field sampling. These age data are applied directly to the upriver spring Chinook and SAB fall Chinook catch estimates. Lower river origin (including SAFE-produced) spring Chinook are further partitioned by watershed of origin (or SAFE release site) using CWT recoveries which have been expanded once for mark sample rate, expanded again for tag rate, and forced to fit the age-at-return matrix derived from scale aging (Table 3.3).

Age and stock composition of fall Select Area fisheries is estimated by WDFW as part of the larger analysis of all Columbia River fall fisheries. The methodology for determining the age and stock composition for fall fisheries is slightly different from that of the winter, spring, and summer fisheries.

First a season-specific expansion factor (may be further subdivided if appropriate) is calculated based on the number of fish mark sampled, divided by the total landings (mark sample rate). Season- and stock-specific age data are derived from analysis of scale samples collected during field sampling. These age data are applied to fall Chinook catch estimates. Fall Chinook are further partitioned by watershed of origin (or SAFE release site) using CWT recoveries that have been expanded once for mark sample rate, expanded again for tag rate, and forced to fit the age-at-return matrix derived from scale aging (Table 3.4).

In-season harvest estimates are finalized post-season once final fish ticket data are available from each agency. ODFW is responsible for finalizing Select Area landings from each state. To finalize fish ticket data a final check occurs post-season and ODFW staff works with WDFW staff to take care of any unresolved issues from in-season estimates. Once the final run size is determined and final harvest numbers (including final stock composition) are complete, the final impact rates can be determined (Table 3.2).

FISHERIES (2012 THROUGH 2016)

Commercial harvest in the Select Areas is a substantial portion of the total non-Treaty Columbia River commercial salmon fishery. On average, Select Area fisheries has contributed an average of 54%, 75%, and 27% to the total Lower Columbia River commercial landings of spring Chinook, Coho, and fall Chinook, respectively during 2007–2016 (Table 3.5, Figure 3.1). The importance of the SAFE project is evident when considering that Select Area fisheries carried the commercial industry through the mid to late 1990s when little mainstem fishing opportunity was available.

Winter/Spring/Summer Season Select Area Commercial Fisheries

Spring Chinook commercial fisheries in the Select Areas were initiated in Youngs Bay in 1992. Initially, Youngs Bay fisheries were restricted to the spring season, with open periods occurring primarily from late April through early June. Through 1996, fishing time was limited to less than 15 days annually and landings ranged from 155–851 spring Chinook. Commercial landings of spring Chinook in Youngs Bay have increased significantly from 1,821 Chinook in 1997 to a range of 3,100–20,800 during the years 2000–2016 (excluding 2005). As hatchery production increased, winter and summer seasons were added in an attempt to harvest all returning hatchery adults. Winter seasons during late February through early March were initiated in 1998 to harvest early returning Age-5 spring Chinook. Beginning in 1999, summer seasons during mid-June through July were adopted to increase harvest of late returning 4-year old spring Chinook and early returning SAB fall Chinook. Winter, spring, and summer season commercial catch in all Select Areas since 1992 can be found in Table 3.6.

Starting in 2006, the Youngs Bay winter season has been extended into the mid-March through early-April timeframe as allowed by in-season evaluation of management criteria. Initially, these extended-season fisheries were either constrained to upstream areas of Youngs Bay to reduce harvest of non-local Chinook that are known to “dip in” to lower portions of Youngs Bay in response to tidal fluctuations and river conditions or constrained to short (≤4 hours) periods proximate to low tide. In recent years, only the short-period approach has been utilized to manage the extended winter periods but reducing area is still an important management option. Although the need for close monitoring is increased during the extension period, adaptive in-season management has provided for important additional opportunity.

Commercial fisheries for spring Chinook in Blind Slough began in 1998 with spring seasons only until 2000, when the first winter season was established. Weeknight fishing periods have been consistently adopted to minimize interactions with recreational boaters. Annual winter/spring season landings have ranged from 450–3,500 Chinook since 2000. In most years, fishing periods have opened concurrent with Youngs Bay and other Select Area sites to minimize congestion. Since 2006, the winter season has been expanded into the late-March/early-April timeframe with minimal increase in impacts to ESA-listed upriver stocks. Beginning in 2013, the winter season expanded to include Knappa Slough. The spring season fishing area was initially limited to Blind Slough but was expanded downstream to include the waters of Knappa Slough in 1999 as returns increased. A one-year trial summer season was adopted in Blind and Knappa sloughs in 1999, but resulted in a harvest of only eight spring Chinook. Extensions of the Blind/Knappa Slough fishery into the summer timeframe occurred in 2015 and 2016 and resulted in landings of over 330 and 860 Chinook, respectively.

Spring commercial fisheries in Tongue Point were initiated in 1998 and continued through 2003, with experimental winter seasons occurring in 2000 and 2001. In most years, seasons and open hours were concurrent with Blind/Knappa Slough and Youngs Bay except in recent years the opening spring period has been delayed 3–7 days relative to the rest of the sites. The spring season fishing area was expanded to include the South Channel in 1999 to reduce congestion during peak fishing periods. Annual Chinook harvest increased dramatically with landings peaking in 2002, when 3,003 fish were landed. High abundance of upriver spring Chinook in this area during the 2003 spring fishery resulted in the cancellation of the season after one period. Production-level releases of spring Chinook at Tongue Point were discontinued in 2000; however, experimental releases were maintained from 2003 through 2011 at the relocated MERTS net-pen site. In 2008, test fishing and full fleet commercial test fisheries, with a more restrictive lower boundary and delayed spring season opening dates, were initiated to evaluate the feasibility of reestablishing the Tongue Point fishery. In addition to the fishery modifications, mandatory check-in station and call-in programs were established to provide more precise stock composition information to aid in-season management. Promising results from the 2008-2011 test fisheries resulted in restoring smolt releases to pre-2000 production levels in 2013. An evaluation of the 2008-2013 test fisheries supported the feasibility of reinstating a fishery and the spring Chinook fishery at Tongue Point/South Channel was reestablished in 2014; additionally, experimental winter fisheries began in 2013 and were conducted again in 2014.

Spring fisheries have been conducted in Deep River since 2003 with harvest ranging between 28–415 fish annually. Winter seasons were adopted in 2006 and have resulted in catch ranging between 0-239 Chinook. Winter and spring fishing periods in Deep River have occurred regularly since 2006 and have resulted in total catch ranging from 21-415 Chinook. Releases of spring Chinook from the Deep River nets pens were discontinued in 2014. Winter and spring Commercial periods have continued in Deep River through 2016 in order to utilize any returning fish from the 2013 release and to provide Select Area fishing opportunity for spring Chinook on the Washington shores of the Columbia River.

Fall Season Select Area Commercial Fisheries

Select Area commercial fisheries during the fall season target Coho and Chinook returning from net-pen and hatchery releases at these sites. These fisheries were initiated in 1962 with the adoption of Coho seasons in Youngs Bay (Weiss 1966). Initially, Youngs Bay fall fisheries were concurrent with the late fall mainstem gillnet season. Since 1977, the Youngs Bay season has been separated from mainstem seasons and has increased in importance with the involvement of the Clatsop County

Fisheries Project that pioneered the successful net-pen acclimation program, which is now a cornerstone of the SAFE project.

Fall Select Area fisheries primarily target hatchery Coho; however, SAB fall Chinook are also produced and harvested in Youngs Bay. Fall fisheries in the Select Areas primarily target hatchery Coho returning to these release sites; however, SAB and LRH fall Chinook are also produced and harvested in Youngs Bay and LRH fall Chinook from BCH are targeted in the Blind Slough/Knappa Slough fishery when a harvestable surplus is expected. Coho and Chinook produced for Select Areas also contribute to the Columbia River recreational and commercial fisheries, as well as ocean recreational, ocean commercial, and tribal fisheries. Coho fisheries typically start in late August or early September and continue through the end of October. In Youngs Bay, weekly periods occur throughout August to target Chinook and the first Coho returns. Late-August periods have also been adopted to target tule Chinook returning to the Deep River Select Area. Fall season commercial catch in all Select Areas since 1996 can be found in Table 3.7.

Fall fisheries have occurred in Youngs Bay since 1962, Tongue Point/South Channel, Blind Slough/Knappa Slough, and Deep River since 1996, and Steamboat Slough during 2000-2005. All non-Indian fisheries are managed in accordance with predetermined harvest impact rates or catch guidelines; however, Select Area fall fishery impacts on listed fish are negligible and in-season modifications are seldom necessary.

2012 Winter/Spring/Summer Season Commercial Fisheries

Youngs Bay

The 2012 winter season consisted of twelve 18-hour fishing periods between February 12 and March 9. Two additional 6-hour periods and six 4-hour periods (two periods weekly, scheduled near low tide) were adopted for the mid-March – early-April timeframe (March 11 through April 5). This strategy of constricting the fishery by time (with in-season adaptive management) when non-local stocks may be most abundant appears to be an effective alternative to closing the fishery entirely during this timeframe. The entire Youngs Bay fishing area was open with a 7-inch minimum mesh size regulation during all winter season periods. As is the case for all commercial fisheries in Youngs Bay, maximum net length was restricted to 250 fathoms; no more than two pounds of leadline per fathom of net are allowed, except in the area upstream of the mouth of the Walluski River. The twenty fishing periods resulted in landings of 318 spring Chinook, which is slightly less than the average harvest (364), observed since winter seasons began in 1998. Additionally, six White Sturgeon (*Acipenser transmontanus*) were landed in the Youngs Bay winter season. A two White Sturgeon (per vessel per week) landing limit was in place during the winter, spring, and summer seasons for all Select Areas.

The 2012 spring season in Youngs Bay began with one 5-hour period on April 19, two 12-hour periods on April 24-25 and 26-27 and continued with six 18-hour periods from April 29–May 11 followed by weekly four-day periods from May 14 through June 15. The 2012 Youngs Bay spring fishery landed 5,971 Chinook and 96 White Sturgeon. The Chinook harvest was the third highest on record and greater than the recent ten-year average of 5,536 fish. Throughout the spring season, a 9¾-inch maximum mesh size restriction was in effect.

The 2012 summer season in Youngs Bay was open 6 AM Wednesday through 6 AM Friday weekly from June 20–July 27 with a 9¾-inch maximum mesh size restriction in effect. The Youngs Bay summer fishery landed 2,260 Chinook, more than three times the recent ten-year (2002–2011)

average of 685 Chinook, and continued the trend of increased annual harvest. The high landings were driven by later returning age-4 Select Area spring Chinook adults and early returning SABs fall Chinook destined for Youngs Bay (441 landed). Sturgeon catch for the Youngs Bay summer fishery was 32 fish. Retention of sturgeon in all Select Area commercial fisheries was closed effective July 2 after the annual catch guideline of 200 fish had been met.

The combined Youngs Bay winter/spring/summer fishery harvest totaled 8,549 Chinook. Stock composition is based on VSI and CWT analysis with 4,674 Chinook (55% of the Chinook catch) examined for fin marks and CWTs, and 453 CWTs collected. The 2012 combined winter/spring/summer catch was composed of 84.19% spring Chinook and 5.2% SAB fall Chinook destined for Select Area sites, 3.4% upriver spring Chinook, 0.01% upper Columbia summer Chinook (after June 15), 6.3% Willamette River spring Chinook, 0.5% Sandy River-origin spring Chinook, and 0.4% spring Chinook destined for the Cowlitz, Kalama, or Lewis rivers (CKL). Based on scale readings, which were verified with CWTs, the age composition of the catch was 0.2% Age-2, 4.2% Age-3 (primarily SABs), 72.6% Age-4, 23.0% Age-5, and 0.0% Age-6 fish.

Blind Slough/Knappa Slough

Similar to 2000–2011, a winter gillnet season with a 7-inch minimum mesh restriction was adopted for Blind Slough (excluding Knappa Slough) in 2012. The adopted season consisted of thirteen 12-hour periods (7 PM – 7 AM) on Wednesday and Sunday nights during February 12 –April 2 (except for two Wednesdays: March 21 and 28). The five periods (March 11–April 2) held after the normal end of the winter season represent ongoing efforts to apply adaptive management techniques to allow prudent expansion of the fishery and to meet the goal of significant and stable opportunity in 2012. During the winter fishing periods, a total of 48 spring Chinook were landed, which was less than half the recent ten-year (2002–2011) average Chinook harvest (121). As described for Youngs Bay, a two White Sturgeon weekly landing limit was in place for the winter and spring seasons; however no sturgeon were landed during the winter season.

During the spring fishery, the Blind Slough Select Area site expanded to include Knappa Slough down to the east end of Minaker Island, to increase fishing area and maximize the opportunity to harvest local Select Area-origin spring Chinook. For periods between April 30 and June 15, the lower deadline in Knappa Slough was extended further downstream to the western end of Minaker Island. This strategy of area expansion has been successfully employed for several years. A 9¾-inch maximum mesh size restriction was adopted to target Chinook. For both the winter and spring fisheries in Blind/Knappa sloughs, net length was limited to 100-fathoms with no weight restrictions on the leadline, including allowed use of additional weights and anchors. The 2012 spring fishery consisted of seventeen 12-hour (7 PM – 7 AM) fishing periods on Thursday and Monday nights between April 19 and June 15 (except the second period of the season which was scheduled for a Tuesday night to allow time for management action if necessary after spring opener). The 2012 Blind Slough/Knappa Slough spring fishery landed 913 spring Chinook and 35 White Sturgeon. The Chinook harvest was approximately half of the recent ten-year average (1,700).

The combined Blind Slough/Knappa Slough winter and spring fishery harvest totaled 961 Chinook. Stock composition is based on VSI and CWT analysis. A total of 728 Chinook (76% of the combined catch) were examined for fin marks and CWTs and 50 CWTs were collected. The catch was composed of 95.94% spring Chinook destined for Select Area sites, 0.42% upriver spring Chinook, and 3.64% Willamette River spring Chinook. Based on scale readings, which were verified with CWTs, the age composition of the catch was 0.2% Age-3, 70.6% Age-4, 29.2% Age-5, and 0.0% Age-6.

Tongue Point/South Channel

Efforts to reinstate a spring Chinook fishery in the Tongue Point/South Channel site continued in 2012. At the January 26 hearing, staff recommended a full-fleet experimental test fishery for the spring season. As in past years, test-fishing activities were planned to precede the first scheduled period. Results of test fishing would provide data on presence of non-local stocks during this timeframe and would be used to evaluate the risk of proceeding with the full-fleet fishery. The Compact adopted a full-fleet commercial test fishery in the Tongue Point/South Channel site for Monday and Thursday nights (7 PM – 7 AM) starting on April 26 and ending on June 15. The initial period was scheduled for the week following the spring season opener in all of the other sites to reduce the likelihood of encountering ESA-listed upriver spring Chinook. A 9¾-inch maximum mesh restriction was in place. In Tongue Point, nets were restricted to a maximum length of 250 fathoms with standard weight restrictions while nets in South Channel were limited to a maximum length of 100 fathoms and no weight restrictions were in place. Additionally, for the first five periods, all catch had to be sampled by ODFW staff before being transported out of the fishing area; a sampling station was set up at the MERTS dock for this purpose. Beginning May 14 and continuing through the end of the spring season, fishers were required to call ODFW's sampling staff with details on catch and time/location of sale to facilitate sampling efforts.

One commercial fisher was contracted to make four drifts per day for a maximum of four days during the week prior to the first scheduled period in Tongue Point/South Channel. All test-fishing activities were conducted using live-capture methods with an ODFW employee on-board to collect data and direct activities. 16 drifts using 4¼-inch tangle nets were made on April 20, 22, 23, and 24 capturing 4 spring Chinook (all identified via VSI as lower river stock). The Tongue Point/South Channel fishery commenced on April 26 and proceeded as scheduled for the entirety of the spring season.

The 2012 full-fleet experimental test fishery in Tongue Point/South Channel consisted of fifteen 12-hour fishing periods and landings totaled 503 spring Chinook and 55 White Sturgeon. Stock composition was based on VSI and CWT analysis with 466 Chinook (93% of the catch) examined for fin marks and CWTs, and 85 CWTs being collected. The catch was composed of 68.0% spring Chinook destined for Select Area sites, 5.4% upriver spring Chinook, and 26.6% Willamette River spring Chinook. Based on scale readings, verified with CWTs, the age composition of the catch was 0.0% Age-3, 62.2% Age-4, 36.8% Age-5, and 0.0% Age-6 fish.

Deep River

Similar to recent years, the expanded Deep River winter season consisted of thirteen 12-hour fishing periods occurring on Sunday and Thursday nights (7 PM–7AM) beginning February 12 (Sunday) and ending April 2 (Monday). The first five weeks of the fishery (through March 16) included both Sunday and Thursday night fishing periods, followed by single nightly periods (Sunday night to Monday morning) the last three weeks.

A spring season consisting of 17 twelve-hour fishing periods on Monday (with one exception) and Thursday nights (7 PM–7 AM) from April 19 through June 15 was adopted at the January 26, 2012 Compact hearing. The exception was that instead of Monday there was a Tuesday night fishing period on April 24, to maintain consistency with Oregon Select Area fisheries.

The fishing area during all periods was restricted to the area from markers at navigation marker #16 upstream to the Highway 4 Bridge. Gear regulations included a 100-fathom maximum net length, a 7-inch minimum mesh size for the winter season, and a 9¾-inch maximum mesh size for the spring season. The use of additional weights or anchors was allowed. As has been the case since the inception of the Deep River spring fishery in 2003, fishers were required to submit all landed catch for biological sampling before being transported out of the fishing area. A WDFW sampling station was set up in the area for this purpose. Consistent with the other Select Areas, weekly White Sturgeon landing limits were in place for the winter and spring season.

A total of 6 Chinook and 1 White Sturgeon were landed during the winter season, and 37 Chinook and zero White Sturgeon were landed during the spring season. The harvest of 43 Chinook from Deep River in the combined winter and spring seasons was less than half of that in 2011 (100 Chinook) and was the lowest since 2008 (28 Chinook). It was particularly disappointing compared to more favorable landings of 122 in 2009 and 415 in 2010.

The Deep River winter/spring fishery stock composition was based on VSI and CWT analysis with 43 Chinook (98% of the catch) examined for fin marks and CWTs, and 4 CWTs being collected. The catch was composed of 84.1% spring Chinook destined for Select Area sites, 13.6% upriver spring Chinook, 0% Willamette River spring Chinook, and 2.3% spring Chinook destined for the Cowlitz, Kalama, or Lewis rivers. Based on scale readings, verified with CWTs, the age composition of the catch was 0% Age-3, 55% Age-4, 45% Age-5, and 0% Age-6.

2012 Fall Season Commercial Fisheries

Chinook landings were excellent in 2012; the total catch of 23,720 fish was the highest since 1993 and can be attributed to an excellent SAB return that again exceeded the pre-season expectations and the first year of age-3 adult tule fall Chinook from releases at Klaskanine Hatchery. Total Coho harvest of 15,354 was about half of the pre-season expectation and 26% of the recent ten-year average. Since the annual commercial sub-allocation of 200 White Sturgeon to Select Areas had been met earlier in the year, sales of sturgeon were not allowed during the fall season.

Youngs Bay

The fall season in Youngs Bay began in early August with four 36-hour periods weekly through late August. Standard for the fall season, the upper fishing boundary was moved downstream from the confluence of Youngs and Klaskanine rivers to Battle Creek Slough to ensure adequate SAB escapement. After the August target-Chinook fisheries were complete, the fall season continued with one 3½-day period from August 27–31 and continuous fishing from September 3 through October 31 (59 days). The complete Youngs Bay fall season consisted of 69 fishing days and resulted in landings of 16,197 Chinook, 5,986 Coho, and three Chum Salmon (*Oncorhynchus keta*, hereafter Chum). The Chinook catch was the highest on record and 2½ times the preseason expectation (6,500 fish); Coho harvest was the second lowest on record and approximately one third of the preseason expectation (20,800 fish).

Blind Slough/Knappa Slough

The season structure of the Blind Slough/Knappa Slough fishery was similar to the Tongue Point/South Channel fishery. The fishery began with four nightly 12-hour fishing periods per week during August 27 – September 14. The fishery increased to four nightly 14-hour periods each week from September 17 – October 26. The season began earlier than normal – during the last week of August, to provide access to the harvestable surplus of Big Creek Hatchery tule fall Chinook, and the

maximum mesh size allowed was 9¾-inch for the entire season. The 36-night season resulted in landings of 3,366 Chinook, 1,534 Coho, and two Chum. The Coho catch was less than average and less than the preseason expectation (2,500 fish). Chinook harvest was similar to the recent ten-year average.

Tongue Point/South Channel

The Tongue Point/South Channel fishery began with four nightly 12-hour fishing periods per week during August 27 – September 14. The fishery increased to four nightly 18-hour periods each week from September 17 – October 26. The 36-night season resulted in landings of 2,466 Chinook, and 3,902 Coho. The Coho catch was well below the recent ten-year average and less than the preseason expectation of 5,100 fish. The season began earlier than normal – during the last week of August, to provide access to the harvestable surplus of Big Creek Hatchery tule fall Chinook.

Deep River

The structure of the Deep River fishery was similar to that used in the Tongue Point/South Channel and Blind Slough/Knappa Slough fishing areas, except that fishing began two weeks earlier in Deep River. The fishery began with two 14-hour nightly fishing periods in each of the two weeks from August 13 to 23. These early fishing periods were intended to maximize harvest of LRH Chinook from net-pen releases initiated in 2009. Four 14-hour nightly fishing periods per week were fished from August 27 to September 14. Beginning September 17, the fishery expanded to four 17-hour nightly periods per week and continued through the end of the season on October 19. The Deep River season ended a week earlier than the Tongue Point and Blind Slough sites to avoid potential interception of Chum returning to the Grays River. Landings during the August 13–23 period yielded catches of 45 Chinook and 10 Coho. Combined season landings for the 36-night season included 1,691 Chinook, 3,932 Coho, and 20 Chum. Chinook catch was the second highest on record, but only 63% of the preseason expectation (2,700 fish). The Chinook catch was composed of 43% tule stock, 55% SABs and 2% non-SAB brights based on visual inspection of clips and skin coloration. Coho catch was the lowest of the past five years and 47% of the preseason expectation (8,300 fish). The total of 20 Chum harvested was much less than the 129 Chum harvested in 2011, which reflects the intended benefit of ending the season a week earlier in 2012 (88% of the Chum harvested in 2011 were caught during the last week in October).

2013 Winter/Spring/Summer Season Commercial Fisheries

Youngs Bay

At the request of industry, the 2013 Youngs Bay seasons were set to maximize fishing opportunity during daylight hours rather than typical overnight seasons. The 2013 winter season consisted of twelve 12–18 hour fishing periods between February 11 and March 7. Three additional 6-hour periods and three 4-hour periods (two periods weekly, scheduled near low tide) were adopted for the mid to late-March timeframe (March 11 through March 25). This strategy of constricting the fishery by time (with in-season adaptive management) when non-local stocks may be most abundant appears to be an effective alternative to reducing the fishing area or closing the fishery entirely during this timeframe. The entire Youngs Bay fishing area was open with a 7-inch minimum mesh size regulation during all winter season periods. As is the case for all commercial fisheries in Youngs Bay, maximum net length was restricted to 250 fathoms; no more than two pounds of leadline per fathom of net are allowed, except in the area upstream of the mouth of the Walluski River. The eighteen fishing periods

resulted in landings of 331 spring Chinook, which is slightly less than the average harvest (361), observed since winter seasons began in 1998. Additionally, five White Sturgeon were landed in the Youngs Bay winter season. A four White Sturgeon (per vessel per week) landing limit was in place during the winter seasons and was reduced to two fish for spring, and summer seasons for all Select Areas.

The 2013 spring season in Youngs Bay began with one 6-hour period on April 18, two 12-hour periods on April 23 and 25–26 and continued with six 12–18 hour periods from April 29–May 10 followed by weekly four-day periods from May 13 through June 14. The 2013 Youngs Bay spring fishery landed 4,306 Chinook and 62 White Sturgeon. The Chinook harvest was below expectations and was 23% lower than the recent 10-yearaverage of 5,562 fish. Throughout the spring season, a 9¾-inch maximum mesh size restriction was in effect.

The 2013 summer season in Youngs Bay was open 6 AM Wednesday through 6 AM Friday weekly from June 19–July 28 with a 9¾-inch maximum mesh size restriction in effect. The Youngs Bay summer fishery landed 1,992 Chinook, which is more than double the recent 10-year (2003–2013) average of 842 Chinook, and continued the trend of increased annual harvest. The high landings were driven by later returning age-4 Select Area spring Chinook adults and early returning SABs fall Chinook destined for Youngs Bay (1,368 landed). Sturgeon catch for the Youngs Bay summer fishery was 25 fish.

The combined Youngs Bay winter/spring/summer fishery harvest totaled 6,629 Chinook. Stock composition is based on VSI and CWT analysis with 3,809 Chinook (57% of the Chinook catch) examined for fin marks and CWTs, and 350 CWTs collected. The 2013 combined winter/spring/summer catch was composed of 60.0% spring Chinook and 21.0% SAB fall Chinook destined for Select Area sites, 3.2% upriver spring Chinook, 0.2% upper Columbia summer Chinook (after June 15), 14.5% Willamette River spring Chinook, and 1.1% spring Chinook destined for the Cowlitz, Kalama or Lewis rivers (CKL). Based on scale readings, which were verified with CWTs, the age composition of the catch was 0.1% Age-2, 8.2% Age-3 (primarily SABs), 50.3% Age-4, 40.4% Age-5, and 1.0% Age-6 fish.

Blind Slough/Knappa Slough

Similar to 2000–2012, a winter gillnet season with a 7-inch minimum mesh restriction was adopted for Blind Slough in 2013. To assess the feasibility of increasing harvest opportunity, the area was expanded to include Knappa Slough for a portion of the winter season beginning in 2013. The adopted season consisted of fifteen 12-hour periods (7 PM – 7 AM) on Monday and Thursday nights during February 11–April 2 (except Knappa Slough was closed March 14–April 2). The seven periods (March 11–April 2) held after the normal end of the winter season represent ongoing efforts to apply adaptive management techniques to allow prudent expansion of the fishery and to meet the goal of significant and stable opportunity in 2013. During the winter fishing periods, 157 spring Chinook were landed, which was 28% higher than the recent 10-year (2003–2012) average Chinook harvest (123). As described for Youngs Bay, a four White Sturgeon weekly landing limit was in place for the winter season and was reduced to two fish for spring season. Four White Sturgeon were landed during the winter season.

Similar to the winter season, the spring Blind Slough fishery included Knappa Slough down to the east end of Minaker Island, to increase fishing area and maximize the opportunity to harvest local Select Area-origin spring Chinook. For periods between March 2 and June 15, the lower deadline in Knappa Slough was extended further downstream to the western end of Minaker Island. This strategy of area

expansion has been successfully employed for several years. A 9¾-inch maximum mesh size restriction was adopted to target Chinook. For both the winter and spring fisheries in Blind and Knappa sloughs, net length was limited to 100-fathoms with no weight restrictions on the leadline, including allowed use of additional weights and anchors. The 2013 spring fishery consisted of seventeen 12-hour (7 PM – 7 AM) fishing periods on Thursday and Monday nights between April 18 and June 14 (except the second period of the season which was scheduled for a Tuesday night to allow time for management action if necessary after spring opener). The 2013 Blind Slough/Knappa Slough spring fishery landed 780 spring Chinook and 31 White Sturgeon. The Chinook harvest was less than half of the recent 10-yearaverage (1,600).

The combined Blind Slough/Knappa Slough winter and spring fishery harvest totaled 937 Chinook. Stock composition is based on VSI and CWT analysis. A total of 739 Chinook (79% of the combined catch) were examined for fin marks and CWTs and 87 CWTs were collected. The catch was composed of 88.3% spring Chinook destined for Select Area sites, 0.9% upriver spring Chinook, and 10.8% Willamette River spring Chinook. Based on scale readings, which were verified with CWTs, the age composition of the catch was 0.2% Age-3, 40.7% Age-4, 55.4% Age-5, and 3.7% Age-6.

Tongue Point/South Channel

To assess the feasibility of expanding harvest opportunity in the Select Areas, an abbreviated winter season was adopted for the Tongue Point/South Channel site in 2013. A 7-inch minimum mesh restriction was in effect for these periods. The adopted season consisted of nine 12-hour periods (7 PM – 7 AM) on Monday and Thursday nights during February 11–April 2. During the winter fishing periods, 70 spring Chinook were landed. As described for the other sites, a weekly landing limit of four White Sturgeon was in place for the winter season and was reduced to two fish for spring season. Six White Sturgeon were landed during the winter season.

Efforts to reinstate a spring Chinook fishery in the Tongue Point/South Channel site continued in 2013. As in past years, test-fishing activities were planned to precede the first scheduled period. Results of test fishing provide data on presence of non-local stocks during this timeframe and are used to evaluate the risk of proceeding with the full-fleet fishery. Full-fleet commercial test fisheries were adopted in the Tongue Point/South Channel site for Monday and Thursday nights (7 PM – 7 AM) starting on April 25 and ending on June 14. The initial period was scheduled for the week following the spring season opener in all of the other sites to reduce the likelihood of encountering ESA-listed upriver spring Chinook. A 9¾-inch maximum mesh restriction was in place. In Tongue Point, nets were restricted to a maximum length of 250 fathoms with standard weight restrictions while nets in South Channel were limited to a maximum length of 100 fathoms and no weight restrictions were in place. Additionally, fishers were required to call ODFW's sampling staff with details on catch and time/location of sale to facilitate sampling efforts.

One commercial fisher was contracted to make four drifts per day for several days during the week prior to the first scheduled period in Tongue Point/South Channel. All test-fishing activities were conducted using live-capture methods with an ODFW employee on-board to collect data and direct activities. Very few fish were caught but all were identified as lower river stock. 2013 was the final year of the feasibility study Tongue Point/South Channel.

The 2013 winter and spring full-fleet experimental test fishery in Tongue Point/South Channel consisted of fifteen 12-hour fishing periods and landings totaled 374 spring Chinook and 120 White Sturgeon. Stock composition was based on VSI and CWT analysis with 326 Chinook (87% of the catch) examined for fin marks and CWTs, and 77 CWTs being collected. The catch was composed of

58.2% spring Chinook destined for Select Area sites, 8.6% upriver spring Chinook, 30.5% Willamette River spring Chinook and 2.7% spring Chinook destined for the Cowlitz, Kalama, or Lewis rivers (CKL). Based on scale readings, verified with CWTs, the age composition of the catch was 1.3% Age-3, 49.5% Age-4, 48.9% Age-5, and 0.3% Age-6 fish.

Deep River

The expanded Deep River winter 2013 season consisted of fifteen 12-hour fishing periods, which was two more nights of fishing than in recent years. Fishing occurred on Monday and Thursday nights (7 PM – 7 AM) beginning Monday night February 11 and ending Tuesday morning April 2. The two additional Thursday nights (March 21 and 28) were added by in-season Compact Action because the increased harvest opportunity posed little risk of upriver impacts.

A spring season consisting of 17 twelve-hour fishing periods on Monday (with one exception) and Thursday nights (7 PM – 7 AM) from April 18 through June 14 was adopted at the January 30, 2013 Compact hearing. The exception was that instead of Monday there was a Tuesday night fishing period on April 23, to maintain consistency with Oregon Select Area fisheries.

The fishing area during all periods was restricted to the area from markers at navigation marker #16 upstream to the Highway 4 Bridge. Gear regulations included a 100-fathom maximum net length, a 7-inch minimum mesh size for the winter season, and a 9¾-inch maximum mesh size for the spring season. The use of additional weights or anchors was allowed. As has been the case since the inception of the Deep River spring fishery in 2003, fishers were required to submit all landed catch for biological sampling before being transported out of the fishing area. A WDFW sampling station was set up in the area for this purpose. Consistent with the other Select Areas, weekly White Sturgeon landing limits were in place for the winter and spring season.

A total of 72 Chinook and 3 White Sturgeon were landed during the winter season, and 52 Chinook and 5 White Sturgeon were landed during the spring season. The harvest of 124 Chinook from Deep River in the combined winter and spring seasons was slightly higher than the average of the previous 10 years (106 Chinook). While the Chinook harvest in 2013 was the second highest Deep River winter-spring harvest (by a small margin), it was still only about 30% of the highest number harvested (415 Chinook in 2010).

The Deep River winter/spring fishery stock composition for 2013 was based on VSI and CWT analysis with 121 Chinook (98% of the catch) examined for fin marks and CWTs, and 16 CWTs being collected. The catch was composed of 33.1% spring Chinook destined for Select Area sites, 4.0% upriver spring Chinook, 49.2% Willamette River spring Chinook, and 13.7% spring Chinook destined for the Cowlitz, Kalama, or Lewis rivers. Based on scale readings, verified with CWTs, the age composition of the catch was 0% Age-3, 50% Age-4, 50% Age-5, and 0% Age-6.

2013 Fall Season Commercial Fisheries

Chinook landings totaled 24,134 fish, which was the second highest since 1993 and can be attributed to a strong SAB return that again exceeded the pre-season expectations and the first return of age-3 and age-4 adult tule fall Chinook from releases at Klaskanine Hatchery. Total Coho harvest of 42,295 was about 19% higher than the pre-season expectation (35,600) although was only 86% of the recent five-year average. Since the annual commercial sub-allocation of 400 White Sturgeon to Select Areas was not met earlier in the year, sturgeon sales were allowed all fall season with total landings of 102 White Sturgeon.

Youngs Bay

The fall season in Youngs Bay began in early August with four 36-hour periods weekly through late August. Standard for the fall season, the upper fishing boundary was moved downstream from the confluence of Youngs and Klaskanine rivers to Battle Creek Slough to ensure adequate SAB escapement. After these August target-Chinook periods were complete, the fall season continued as a target Coho fishery, starting with one 3½-day period from August 26–30, and then continuous fishing from September 2 through October 31 (59 days). The complete Youngs Bay fall season consisted of 71 fishing days and resulted in landings of 14,359 Chinook, 14,254 Coho, and three Pink Salmon (*Oncorhynchus gorbuscha*, hereafter Pink). The Chinook catch was the second highest on record and over 1.5 times the preseason expectation (9,000 fish); Coho harvest was the fourth lowest on record and was 21% below preseason expectation (18,000 fish).

Tongue Point/South Channel

The Tongue Point/South Channel fishery began with four nightly 12-hour fishing periods per week during August 26 – September 13. The fishery increased to four nightly 18-hour periods each week from September 16 – October 31. The 36-night season resulted in landings of 5,821 Chinook, and 14,157 Coho and five Pinks. The Coho catch was the fifth highest on record and was nearly three times the preseason expectation of 5,300 fish. The season began during the last week of August, earlier than normal, to provide access to the harvestable surplus of Big Creek Hatchery tule fall Chinook.

Blind Slough/Knappa Slough

The season structure of the Blind Slough/Knappa Slough fishery was similar to the Tongue Point/South Channel fishery. The fishery began with four nightly 12-hour fishing periods per week during August 26 – September 13. The fishery increased to four nightly 14-hour periods each week from September 16 – October 31. As with Tongue Point/South Channel, this season also began earlier than normal to provide access to the surplus Big Creek Hatchery tules. The maximum mesh size allowed was 9¾-inch for the entire season. The 36-night season resulted in landings of 2,362 Chinook, 3,882 Coho, and two Pinks. The Coho catch was slightly above average and was 61% higher than the preseason expectation (2,400 fish). Chinook harvest was well below the recent ten-year average.

Deep River

The structure of the Deep River fishery was generally similar to that used in the Tongue Point/South Channel and Blind Slough/Knappa Slough fishing sites. However, some adjustments were made to the fishery schedule in an attempt to get more even distribution of catch along the narrow fishing channel and among the days of the week. One was limiting the fishing periods to 12-hour intervals (7am-7pm) throughout the season to give fish more time to redistribute and replenish their numbers in the fishing area between nightly fishing periods. The other was to add an additional night of fishing during each of the last two full weeks in September, which are typically the peak Coho harvest weeks in Deep River. This reduced the weekend break in fishing by one day and helped keep the abundance and harvest at more manageable levels for the weekly openers for those weeks. The last change was to eliminate fishing periods in the second and third weeks of August, and to reduce the days of fishing in the third week of October from 4 days to 2 days. Those fishing periods were eliminated because in recent years they resulted in low catches and low participation. The resulting fishery began with two 12-hour nighttime fishing periods on Monday August 26 and Tuesday August 29 and continued with four fishing periods per week on Monday through Thursday nights from

September 2 to September 13. From September 15 to September 27, the fishery increased to five 12-hour periods per week (Sunday through Thursday nights). Four nightly 12-hour periods per week resumed for two weeks from September 30 through October 11. The season concluded with two 12-hour nighttime periods on October 14 and October 18. Combined season landings for the 30-night season included 1,592 Chinook, 10,002 Coho, and 5 Pinks. Chinook catch was the third highest on record, but was slightly lower than preseason expectation (1,700 fish). The Chinook catch was composed of roughly 45% tule stock, 53% SABs and 2% non-SAB brights based on visual inspection of fin clips and skin coloration of 732 sampled fish. The Coho catch ranked fourth among the past six years and exceeded the preseason expectation of 9,800 fish.

2014 Winter/Spring/Summer Season Commercial Fisheries

Youngs Bay

At the request of industry, the 2014 Youngs Bay seasons were set to maximize fishing opportunity during daylight hours rather than typical overnight seasons. The 2014 winter season consisted of twelve 12–18 hour fishing periods between February 10 and March 7. Additional 4–6 hour periods were added in 2013 for the mid to late-March time-frame. Several of these fishing periods were extended in 2014 resulting in four 18-hour periods, two 12-hour periods, and two 4-hour periods during March 10–26. This strategy of constricting the fishery by time when non-local stocks may be most abundant appears to be an effective alternative to reducing the fishing area or closing the fishery entirely during this timeframe. The entire Youngs Bay fishing area was open with a 7-inch minimum mesh size regulation during all winter season periods. As is the case for all commercial fisheries in Youngs Bay, maximum net length was restricted to 250 fathoms; no more than two pounds of leadline per fathom of net are allowed, except in the area upstream of the mouth of the Walluski River. The twenty fishing periods resulted in landings of 245 spring Chinook, which is less than the average harvest (359) since winter seasons began in 1998.

The 2014 spring season in Youngs Bay began with one 6-hour period on April 17. In order to stay within preseason impact guidelines, six periods scheduled during April 22 – May 7 were rescinded and the periods on May 1 and May 8 were shortened. The weekly four-day periods from May 12 through June 13 continued as originally scheduled. The 2014 Youngs Bay spring fishery landed 1,952 Chinook. The Chinook harvest was below expectations and was 64% lower than the recent 10-year average of 5,498 fish. Throughout the spring season, a 9¾-inch maximum mesh size restriction was in effect.

The 2014 summer season in Youngs Bay was open noon Monday through noon Friday weekly from June 16 – July 4, noon Monday July 7 through noon Thursday July 10, and noon Tuesday through noon Thursday from July 15 to July 31. Weekly summer periods were extended relative to past years to enhance fishing opportunity and harvest in Youngs Bay. A 9¾-inch maximum mesh size restriction was in effect. The Youngs Bay summer fishery landed 1,842 Chinook ranking it as the third highest summer season landings in Youngs Bay since inception.

The combined Youngs Bay winter/spring/summer fishery harvest totaled 4,039 Chinook. Stock composition is based on VSI and CWT analysis with 1,440 Chinook (36% of the Chinook catch) examined for fin marks and CWTs, and 151 CWTs collected. The 2014 combined winter/spring/summer catch included an estimated 47.5% spring Chinook and 33.9% SAB fall Chinook originating from Select Area sites, 5.1% upriver spring and summer Chinook (caught before June 15), 1.2% upper Columbia summer Chinook (after June 15), 11.4% Willamette River spring Chinook, and

0.9% spring Chinook from the Cowlitz, Kalama, Lewis (CKL), and Sandy Rivers. Based on scale readings and CWT correction, the estimated age composition of the catch was 10.0% Age-3 (primarily SABs), 68.9% Age-4, 20.5% Age-5, and 0.6% Age-6 fish.

Blind Slough/Knappa Slough

Similar to 2000–2013, a winter gillnet season with a 7-inch minimum mesh restriction was adopted for Blind Slough in 2014. In an effort to assess the feasibility of increasing harvest opportunity, the area was expanded to include Knappa Slough for a portion of the winter season beginning in 2013 and again in 2014. The adopted season consisted of fifteen 12-hour periods (7 PM – 7 AM) on Monday and Thursday nights during February 10 – April 1 (except Knappa Slough was closed March 17 – April 1). The seven periods (March 10 – April 1) held after the normal end of the winter season represent ongoing efforts to apply adaptive management techniques to allow prudent expansion of the fishery and to meet the goal of significant and stable opportunity in 2014. During the winter fishing periods, a total of 172 spring Chinook were landed, which was 20% higher than the recent 10-year (2003–2013) average Chinook harvest (138) and ranks as the third highest winter season in Blind Slough/Knappa Slough.

Similar to the winter season, the spring Blind Slough season included Knappa Slough down to the east end of Minaker Island, to increase fishing area and maximize the opportunity to harvest local Select Area-origin spring Chinook. As in previous years, the lower deadline in Knappa Slough was extended further downstream to the western end of Minaker Island. The lower deadline extension normally occurs in the beginning of May but was delayed until May 8 via in-season action in an effort to remain within preseason impact guidelines. This strategy of area expansion has been successfully employed for several years. A 9¾-inch maximum mesh size restriction was adopted to target Chinook. For both the winter and spring fisheries in Blind and Knappa sloughs, net length was limited to 100-fathoms with no weight restrictions on the leadline, including allowed use of additional weights and anchors. The 2014 spring fishery consisted of fourteen 12-hour (7 PM – 7 AM) fishing periods on Thursday and Monday nights between April 17 and June 13 (except the second period of the season which was scheduled for a Tuesday night to allow time for management action if necessary after spring opener). In order to stay within preseason impact guidelines three of the planned fishing periods in late April and early May were rescinded. During the 2014 Blind Slough/Knappa Slough spring fishery, 295 spring Chinook were landed which was second lowest on record and significantly lower than the recent 10-year average of 1,500.

The combined Blind Slough/Knappa Slough winter and spring season harvest totaled 467 Chinook. Stock composition is based on VSI and CWT analysis. A total of 245 Chinook (52% of the combined catch) were examined for fin marks and CWTs and 31 CWTs were collected. The catch included an estimated 63.0% Select Area-origin spring Chinook, 9.0% upriver spring Chinook, 19.7% Willamette River spring Chinook, and 8.4% CKL-origin fish. Based on scale readings and CWT correction, the estimated age composition of the catch was 2.1% Age-3, 49.5% Age-4, 48.0% Age-5, and 0.4% age 6.

Tongue Point/South Channel

To assess the feasibility of expanding harvest opportunity in the Select Areas, a winter season was adopted for the Tongue Point/South Channel site again in 2014. The 2014 season consisted of ten 12-hour periods (7 PM – 7 AM) on Monday and Thursday nights during February 10 to March 14 with a 7-inch minimum mesh restriction in effect. A total of 33 spring Chinook were landed in the winter season, which was less than half of the catch in 2013.

Initially, the opening spring period in Tongue Point/South Channel was scheduled for April 24, a week following the other Select Area sites to reduce the likelihood of encountering ESA-listed upriver spring Chinook, but was rescinded in-season due to higher than expected impacts incurred during the week prior. Similar to the other Select Area fisheries, additional periods were rescinded and two periods were shortened in order to stay within preseason impact guidelines. The remaining Tongue Point South Channel spring season included two modified periods on Thursday nights from May 1 to May 8 and ten 12-hour fishing periods on Monday and Thursday nights (7 PM – 7 AM) starting on May 12 and ending on June 13. A 9¾-inch maximum mesh restriction was in place. In Tongue Point, nets were restricted to a maximum length of 250 fathoms with standard weight restrictions while nets in South Channel were limited to a maximum length of 100 fathoms and no weight restrictions were in place. During the 2014 Tongue Point/South Channel spring fishery 39 spring Chinook were landed. This is the lowest Chinook harvest during the spring season since the fishery reinstatement evaluation began in 2008.

The 2014 winter and spring fishery in Tongue Point/South Channel harvested 72 spring Chinook. Stock composition was based on VSI and CWT analysis with 31 Chinook (43% of the catch) examined for fin marks and CWTs; 6 CWTs were detected and recovered. The catch included an estimated 0.0% spring Chinook released from Select Area sites, 6.9% upriver spring Chinook, and 93.1% Willamette River spring Chinook. Based on scale readings and CWT correction the estimated age composition of the catch was 34.7% Age-4 and 65.3% Age-5 fish.

Deep River

The Deep River winter 2014 season consisted of fifteen 12-hour fishing periods, which (like 2013) was two more nights of fishing than in recent previous years. Fishing occurred on Monday and Thursday nights (7 PM – 7 AM) from February 10 through April 1.

The spring season consisting of seventeen 12-hour fishing periods on Monday (with one exception) and Thursday nights (7 PM – 7 AM) from April 17 through June 13 was adopted at the January 29, 2014 Compact hearing. The exception was that instead of Monday there was a Tuesday night fishing period on April 22, to maintain consistency with Oregon Select Area fisheries.

The fishing area during all periods was restricted to the area from markers at navigation marker #16 upstream to the Highway 4 Bridge. Gear regulations included a 100-fathom maximum net length, a 7-inch minimum mesh size for the winter season, and a 9¾-inch maximum mesh size for the spring season. The use of additional weights or anchors was allowed. As has been the case since the inception of the Deep River spring fishery in 2003, fishers were required to submit all landed catch for biological sampling before being transported out of the fishing area. A WDFW sampling station was set up in the area for this purpose.

A total of 39 Chinook were landed during the winter season, and 26 Chinook were landed during the spring season. The harvest of 65 Chinook from Deep River in the combined winter and spring seasons was well below the average of the previous ten years (107 Chinook).

The Deep River winter/spring fishery stock composition for 2014 was based on VSI and CWT analysis with 64 Chinook (98% of the catch) examined for fin marks and CWTs, and 7 CWTs being collected. The catch was composed of 35.4% spring Chinook destined for Select Area sites, 12.3% upriver spring Chinook, 52.3% Willamette River spring Chinook, and 0.0% spring Chinook destined for the

Cowlitz, Kalama, or Lewis rivers. Based on scale readings, verified with CWTs, the age composition of the catch was 4.6% Age-3, 92.3% Age-4, 3.1% Age-5, and 0.0% Age-6.

2014 Fall Season Commercial Fisheries

Chinook landings for all Select Areas combined totaled 24,198 fish, which was the highest since project inception and surpassed the 2013 record of 24,134. These record landings can be attributed to strong SAB returns and the returns of adult tule fall Chinook from releases at Klaskanine Hatchery initiated in 2010. Total Coho harvest of 168,497 was almost 2½ times higher than the pre-season expectation (48,900) and was the highest on record. Sturgeon retention was prohibited in Columbia River commercial and recreational fisheries beginning in January of 2014.

Youngs Bay

The fall season in Youngs Bay began in early August with three 36-hour periods weekly through late August with the upper fishing boundary moved downstream from the confluence of Youngs and Klaskanine rivers to Battle Creek Slough to ensure adequate SAB escapement. After these August target-Chinook periods were complete, the fall season continued as a target Coho fishery, starting with one 3½-day period from August 25–29, and then continuous fishing from September 1 through October 31 (60 days). The complete Youngs Bay fall season consisted of 68 fishing days and resulted in landings of 11,829 Chinook, 65,917 Coho, and 1 Pink salmon. The Chinook catch was the fourth highest on record behind 2012, 2013, and 2011; Coho harvest was the second highest on record and was over 2½ times the preseason expectation (23,900 fish).

Tongue Point/South Channel

The Tongue Point/South Channel fishery began with four nightly 12-hour fishing periods per week during August 25 – September 12. The fishery increased to four nightly 18-hour periods each week from September 15 – September 19 and then five nightly 18-hour periods each week from September 21 – October 31. The 46-night season resulted in landings of 5,460 Chinook, and 50,752 Coho. The Chinook catch was the second highest on record only behind 2013; the Coho catch was the highest on record and was nearly three times the preseason expectation of 11,300 fish. The season began during the last week of August, earlier than normal, to provide access to the harvestable surplus of Big Creek Hatchery tule fall Chinook.

Blind Slough/Knappa Slough

The season structure of the Blind Slough/Knappa Slough fishery was similar to the Tongue Point/South Channel fishery. The fishery began with four nightly 12-hour fishing periods per week during August 25 – September 12. The fishery increased to four nightly 14-hour periods each week from September 15 – September 19 and then five nightly 16-hour periods each week from September 21 – October 31. As with Tongue Point/South Channel, this season also began earlier than normal to provide access to the surplus Big Creek Hatchery tules. The maximum mesh size allowed was 9¾-inch for the entire season. The 46-night season resulted in landings of 4,661 Chinook and 24,573 Coho. The Chinook catch was above the 10-year average and the fourth highest on record. The Coho catch was the highest on record and was five times the preseason expectation (4,700 fish).

Deep River

The structure of the Deep River fishery was generally similar to that for the Tongue Point/South Channel and Blind Slough/Knappa Slough fishing sites. The fishery began with two 12-hour nightly

fishing periods per week from August 18-29, expanding to four nightly periods from September 1-12, then five nightly periods September 15-27 (peak abundance), and back to four nightly periods September 29 - October 17. The season concluded with two nightly periods on October 20 and 23. The fishing periods were expanded to 15 hours from September 19 to the end of the season. Total season landings for the 36-night season included 2,248 Chinook, 27,255 Coho, and 1 Pink salmon. Chinook catches nearly matched the record high (2,295 in 2011) and Coho catches were the highest recorded for Deep River, surpassing the 19,260 landed in 2010. The Chinook stock composition was nearly identical to that from 2013: roughly 46% tule stock, 52% SABs and 2% non-SAB brights, based on visual inspection of fin clips and skin coloration of 1,096 sampled fish.

2015 Winter/Spring/Summer Season Commercial Fisheries

Youngs Bay

At the request of industry, the 2015 Youngs Bay seasons were set to maximize fishing opportunity during daylight hours rather than typical overnight seasons. The 2015 winter season consisted of the standard twelve 12–18 hour fishing periods between February 9 and March 6. Additional periods for the mid to late-March timeframe were adopted preseason: one 18-hour period, two 8-hour periods, and seven 4-hour periods during March 9–30. Due to higher than expected upriver impacts the final three 4-hour periods from March 25 to March 30 were rescinded via in-season action. Focusing fishery timeframes around low tide when non-local stocks may be most abundant appears to be an effective alternative to reducing the fishing area or closing the fishery entirely during this timeframe although reducing area is still an important management option. The entire Youngs Bay fishing area was open with a 7-inch minimum mesh size regulation during all winter season periods. As is the case for all commercial fisheries in Youngs Bay, maximum net length was restricted to 250 fathoms; no more than two pounds of leadline per fathom of net are allowed, except in the area upstream of the mouth of the Walluski River. The nineteen fishing periods resulted in landings of 116 spring Chinook, which is less than half of the average harvest (353) since winter seasons began in 1998.

The 2015 spring season in Youngs Bay was scheduled to begin with one 4-hour period on April 21, which was several days later than the typical starting date, with the intent to reduce abundant upriver spring Chinook typically encountered in mid-April. Due to higher than expected upriver impacts during the winter season the 4-hour and 6-hour periods scheduled on April 21 and April 24 and an 18-hour period scheduled for May 4 were rescinded. In addition, four periods scheduled during April 28 – May 8 were modified. The weekly four-day periods from May 11 through June 12 continued as originally scheduled. The 2015 Youngs Bay spring fishery landed 6,693 Chinook. The Chinook harvest was above expectations and was 30% higher than the recent 10-year average of 5,131 fish. Throughout the spring season, a 9¾-inch maximum mesh size restriction was in effect.

The 2015 summer season in Youngs Bay was open noon Monday through noon Friday weekly from June 16 – July 3, noon Monday July 6 through noon Thursday July 9, and noon Tuesday through noon Thursday from July 14 to July 30. Weekly summer periods were extended beginning in 2014 to enhance fishing opportunity and harvest in Youngs Bay. A 9¾-inch maximum mesh size restriction was in effect. The Youngs Bay summer fishery landed 1,779 Chinook ranking it as the fifth highest summer season landings in Youngs Bay since inception.

The combined Youngs Bay winter/spring/summer fishery harvest totaled 9,083 Chinook. Stock composition is based on VSI and CWT analysis with 3,405 Chinook (37% of the Chinook catch) examined for fin marks and CWTs, and 270 CWTs collected. The 2015 combined

winter/spring/summer catch included an estimated 81.3% spring Chinook and 0.7% SAB fall Chinook originating from Select Area sites, 6.9% upriver spring and summer Chinook (caught before June 15), 1.6% upper Columbia summer Chinook (after June 15), 7.3% Willamette River spring Chinook, and 2.2% spring Chinook from the Cowlitz, Kalama, Lewis, and Sandy Rivers (CKLS). Based on scale readings and CWT correction, the estimated age composition of the catch was 1.2% Age-3, 87.4% Age-4, 9.9%% Age-5, and 1.4% Age-6 fish.

Blind Slough/Knappa Slough

Similar to 2000–2014, a winter gillnet season with a 7-inch minimum mesh restriction was adopted for Blind Slough in 2015. In an effort to assess the feasibility of increasing harvest opportunity, the area was expanded to include Knappa Slough for a portion of the winter season, as has been done since 2013. The adopted season consisted of fifteen 12-hour periods (7 PM – 7 AM) on Monday and Thursday nights during February 9 – March 30 (except Knappa Slough was closed March 13 – March 30). The seven periods (March 9 – March 30) held after the normal end of the winter season represent ongoing efforts to expand the fishery. During the winter fishing periods, 116 spring Chinook were landed, which was 92% of the recent 10-year (2003–2014) average Chinook harvest (126) in Blind Slough/Knappa Slough.

Similar to the winter season, the spring Blind Slough season included Knappa Slough down to the east end of Minaker Island, to increase fishing area and maximize the opportunity to harvest local Select Area-origin spring Chinook. As in previous years, the lower deadline in Knappa Slough was extended further downstream to the western end of Minaker Island. The lower deadline extension normally occurs in the beginning of May but was delayed until May 5 via in-season action in an effort to remain within preseason impact guidelines. This strategy of area expansion has been successfully employed for several years. A 9¾-inch maximum mesh size restriction was adopted to target Chinook. For both the winter and spring fisheries in Blind and Knappa sloughs, net length was limited to 100-fathoms with no weight restrictions on the leadline, including allowed use of additional weights and anchors. The 2015 spring fishery consisted of fourteen 12-hour (7 PM – 7 AM) fishing periods on Thursday and Monday nights between April 28 and June 12 (except the May 5 period which was modified to occur on a Tuesday night to allow time for management action if necessary after spring opener). Similar to other sites the two 12-hour season opening periods scheduled for April 21 and April 24 and another 12-hour period scheduled for May 4 were rescinded due to higher than expected upriver impacts during the winter season. During the 2015 Blind Slough/Knappa Slough spring fishery 2,666 spring Chinook were landed which was third highest on record and was more than double the recent 10-year average of 1,185. Due to high harvest and low upriver impacts during late spring season in 2015, five periods were set during the summer season timeframe from June 16 to July 3 resulting in a harvest of 336 Chinook.

The combined Blind Slough/Knappa Slough winter, spring and summer season harvest totaled 3,118 Chinook the second highest on record since the site was initiated. Stock composition is based on VSI and CWT analysis. A total of 1,794 Chinook (58% of the combined catch) were examined for fin marks and CWTs and 172 CWTs were collected. The catch included an estimated 91.4% Select Area-origin spring Chinook, 0.8 % upriver spring Chinook, 6.7% Willamette River spring Chinook, and 1.1% CKL-origin fish. Based on scale readings and CWT correction, the estimated age composition of the catch was 0.6% Age-3, 90.9% Age-4, 8.5% Age-5, and 0.0% age 6.

Tongue Point/South Channel

To assess the feasibility of expanding harvest opportunity in the Select Areas, the winter season initially adopted for the Tongue Point/South Channel site in 2013 was continued in 2015. The 2015 season consisted of ten 12-hour periods (7 PM – 7 AM) on Monday and Thursday nights during February 9 to March 13 with a 7-inch minimum mesh restriction in effect. A total of 70 spring Chinook were landed in the winter season which was more than double the catch in 2014 (33 fish) and equivalent to 2013 (70 fish).

The opening spring period in Tongue Point/South Channel was scheduled for April 21, but the first two periods were rescinded via in-season action due to higher than expected impacts incurred during the winter season. Similar to the other Select Area fisheries, two periods during the last week of April were shortened in order to stay within preseason impact guidelines. The remaining Tongue Point South Channel spring season included a rescheduled period the night of May 5, a 12-hour period on the night of May 7, and ten 12-hour fishing periods on Monday and Thursday nights (7 PM – 7 AM) starting on May 11 and ending on June 12. A 9¾-inch maximum mesh restriction was in place. In Tongue Point, nets were restricted to a maximum length of 250 fathoms with standard weight restrictions while nets in South Channel were limited to a maximum length of 100 fathoms and no weight restrictions were in place. During the 2015 Tongue Point/South Channel spring fishery 1,192 spring Chinook were landed. This is the third highest Chinook harvest during the spring season behind 2001 and 2002.

The 2015 winter and spring fishery in Tongue Point/South Channel harvested 1,262 spring Chinook. Stock composition was based on VSI and CWT analysis with 574 Chinook (45% of the catch) examined for fin marks and CWTs; 54 CWTs were detected and recovered. The catch included an estimated 62.6% spring Chinook released from Select Area sites, 10.3% upriver spring Chinook, and 23.8% Willamette River spring Chinook and 3.3% CKL-origin fish. Based on scale readings and CWT correction the estimated age composition of the catch was 0.2% Age-3, 81.0% Age-4, and 18.8% Age-5 fish.

Deep River

The 2015 winter season in Deep River consisted of fifteen 12-hour fishing periods, which (like 2013 and 2014) was two more nights of fishing than in recent previous years. Fishing occurred on Monday and Thursday nights (7 PM – 7 AM) from February 9 through March 31.

The spring season consisted of fifteen 12-hour fishing periods (7 PM – 7 AM) on Thursday night April 17, Tuesday and Thursday nights from April 28 to May 8, and Monday and Thursday nights from May 11 through June 12. Two fishing periods (Tuesday night April 21 and Thursday night April 23) that were initially adopted at the January 28, 2015 Compact hearing were rescinded by Compact action on April 20, 2015 to reduce potential impacts to upriver stocks.

The fishing area during all periods was restricted to the area from markers at navigation marker #16 upstream to the Highway 4 Bridge. Gear regulations included a 100-fathom maximum net length, a 7-inch minimum mesh size for the winter season, and a 9¾-inch maximum mesh size for the spring season. The use of additional weights or anchors was allowed. As has been the case since the inception of the Deep River spring fishery in 2003, fishers were required to submit all landed catch for biological sampling before being transported out of the fishing area. A WDFW sampling station was set up in the area for this purpose.

A total of 94 Chinook were landed during the winter season and 110 Chinook were landed during the spring season. The harvest of 204 Chinook from Deep River in the combined winter and spring seasons was second only to the exceptional harvest of 415 in 2010 and twice the average of 102 for the previous ten years.

The Deep River winter/spring fishery stock composition for 2015 was based on VSI and CWT analysis with 202 Chinook (99% of the catch) examined for fin marks and CWTs, and 15 CWTs being collected. The catch was composed of 49.5% spring Chinook destined for Select Area sites (41.2% Youngs Bay, 2.9% Blind Slough, 5.4% Deep River), 8.8% upriver spring Chinook, 41.7% Willamette River spring Chinook, and 0.0% spring Chinook destined for the Cowlitz, Kalama, or Lewis rivers. Based on scale readings, verified with CWTs, the age composition of the catch was 0% Age-3, 81.4% Age-4, 18.6% Age-5, and 0.0% Age-6.

2015 Fall Season Commercial Fisheries

Chinook landings for all Select Areas combined totaled 18,087 fish in 2015, which was the fifth highest since project inception but fell below the recent 5-year average of 23,100 (2010-2014). Total Coho harvest of 27,401 was well below the pre-season expectation (64,700 Coho) and was less than the recent 5-year average (2010-2014) of 66,900 fish. Sturgeon retention was prohibited in Columbia River commercial and recreational fisheries beginning in January of 2014.

Youngs Bay

The fall season in Youngs Bay began in early August with three 36-hour periods weekly through late August with the upper fishing boundary moved downstream from the confluence of Youngs and Klaskanine rivers to Battle Creek Slough to ensure adequate SAB escapement. After these August target Chinook periods were complete, the fall season continued as a target Coho fishery, starting with two twelve-hour periods from August 24 – 27 then one 3½-day period from August 31 through September 5. The season was open continuously from September 7 through October 30 (54 days). Due to concerns regarding SAB broodstock returns, Youngs Bay commercial fishing hours were lowered during late August through early September and the maximum allowable mesh size was reduced to reduce SAB harvest. The complete Youngs Bay fall season consisted of 67 fishing days and resulted in landings of 6,765 Chinook, and 11,463 Coho. The Chinook catch was well below the recent 5-year average of 12,600; Coho harvest was the third lowest on record and was only 37% of the preseason expectation (31,400 fish).

Tongue Point/South Channel

The Tongue Point/South Channel fishery began with four nightly 12-hour fishing periods per week during August 24 – September 11. The fishery increased to four nightly 18-hour periods each week from September 14 – September 18 and then 5 nightly 18-hour periods each week from September 20 – October 30. The 46-night season resulted in landings of 3,614 Chinook, and 9,721 Coho and 1 Pink salmon. The Chinook catch was the third highest on record behind 2013 and 2014; the Coho catch was well below average and was only 74% the preseason expectation of 13,100 fish. In order to provide access to the harvestable surplus of Big Creek Hatchery tule fall Chinook the season began during the last week of August. The season was extended to include five nights per week in late September to access additional harvest of Coho for the second consecutive year.

Blind Slough/Knappa Slough

The season structure of the Blind Slough/Knappa Slough fishery was similar to the Tongue Point/South Channel fishery. The fishery began with four nightly 12-hour fishing periods per week

during August 24 – September 11 to access surplus Big Creek Hatchery tules. The fishery increased to four nightly 14-hour periods each week from September 14 – September 18 and then five nightly 16-hour periods each week from September 20 – October 30 to access harvestable Coho. The maximum mesh size allowed was 9¾-inch for the entire season. The 46-night season resulted in landings of 3,405 Chinook and 1,698 Coho and 1 Pink salmon. The Chinook catch was well below the 5-year average but was very similar to the recent 10-year average of 3,500 (2005-2014). Coho harvest was well below average and the preseason expectation of 7,500 fish.

Deep River

The structure of the Deep River fishery was generally similar to that for the Tongue Point/South Channel and Blind Slough/Knappa Slough fishing sites. The fishery began with two 12-hour nightly fishing periods per week from August 17-28, expanding to four nightly periods from August 31 – September 4, then five nightly periods September 7-26 (peak abundance). The season schedule returned to four nightly periods per week from September 28 – October 16. The season concluded with one period on October 20. The fishing periods were expanded to 15 hours from September 14 to the end of the season. Total season landings for the 38-night season included 4,303 Chinook, 4,519 Coho and 1 Pink salmon. The Chinook catch was the highest on record and was almost two and a half times the recent 5-year average of 1,800 (2010-2014). Coho catches were less than a third of the recent 5-year average of 15,100 (2010-2014) and was much lower than the preseason expectation of 12,700. The Chinook stock composition was approximately 62% tule stock, 35% SABs and 3% non-SAB brights, based on visual inspection of fin clips and skin coloration of 651 sampled fish.

2016 Winter/Spring/Summer Season Commercial Fisheries

Youngs Bay

At the request of industry, the 2016 Youngs Bay seasons again were again set to maximize fishing opportunity during daylight hours, rather than the more typical overnight seasons. The 2016 winter season consisted of twelve 12–24 hour fishing periods on Mondays and Thursday nights, and Wednesdays between February 9 and March 4. The eight periods that occurred on Mondays and Thursday nights were extended to 24 hours in 2016, from 18 hours in previous years. Additional extended periods were adopted preseason for the mid to late-March timeframe, including: one 18-hour period, two 12-hour periods, and seven 4-hour periods during March 7–28, the last of which was limited to the fishing area above the Walluski power lines to limit impacts to non-local fish. Due to lower than expected upriver impacts, four additional 4-hour periods were adopted in-season from April 6–17, but were also limited to the fishing area above the Walluski power lines. The final two in-season periods were rescinded to avoid further upriver impacts during the winter season. Focusing fishery timeframes around low tide, when non-local stocks may be most abundant, appears to be an effective alternative to reducing the fishing area or closing the fishery entirely during mid to late-March, but reducing area was deemed necessary to stabilize impacts and provide consistent fishery opportunity into early to mid-April. The entire Youngs Bay fishing area was open with a 7-inch minimum mesh size regulation during all winter season periods. As is the case for all commercial fisheries in Youngs Bay, maximum net length was restricted to 250 fathoms; no more than two pounds of leadline per fathom of net are allowed, except in the area upstream of the mouth of the Walluski River. The twenty-six fishing periods resulted in landings of 1,064 spring Chinook, which was almost three times the average harvest (367) since winter seasons began in 1998.

The 2016 spring season in Youngs Bay was scheduled to begin with one 4-hour period on April 21, which for the second year was set several days later than the typical starting date in mid-April, with

the intent to reduce abundant upriver spring Chinook typically encountered in that timeframe. Due to higher than expected upriver impacts during the late-winter season, the 4-hour hour period scheduled on April 21, and two 12-hour periods scheduled on the nights of April 26 and 28, were rescinded. In addition, the eighteen-hour period scheduled during May 2 was shortened to six hours. The weekly four-day periods from May 9 through June 15 continued as originally scheduled. The 2016 Youngs Bay spring fishery landed 3,794 Chinook. The Chinook harvest was below expectations and was only 66% of the recent 10-year average of 5,727 fish. Throughout the spring season, a 9¾-inch maximum mesh size restriction was in effect.

The 2016 summer season in Youngs Bay was open noon Monday through noon Friday weekly from June 16 – July 1, noon Monday July 4 through noon Thursday July 7, and noon Tuesday through noon Thursday from July 12 to July 28. Weekly summer periods were extended beginning in 2014 to enhance fishing opportunity and harvest in Youngs Bay. A 9¾-inch maximum mesh size restriction was in effect. The Youngs Bay summer fishery landed 1,836 Chinook, ranking it as the fifth highest summer season landings in Youngs Bay since inception in 1999.

The combined Youngs Bay winter/spring/summer fishery harvest totaled 6,649 Chinook (Table 6). Stock composition is based on VSI and CWT analysis with 2,416 Chinook (36% of the Chinook catch) examined for fin marks and CWTs, and 213 CWTs collected. The 2016 combined winter/spring/summer Youngs Bay catch included an estimated 79.8% spring Chinook and 3.9% SAB fall Chinook originating from Select Area sites, 3.4% upriver spring and summer Chinook (caught before June 15), 1.3% upper Columbia summer Chinook (after June 15), 5.8% Willamette River spring Chinook, and 5.8% spring Chinook from the Cowlitz, Kalama, Lewis, and Sandy Rivers (CKLS). Based on scale readings and CWT correction, the estimated age composition of the spring Chinook catch was 0.9% Age-3, 45.4% Age-4, 53.7% Age-5, and 0.1% Age-6 fish.

Blind Slough/Knappa Slough

Similar to 2000–2015, a winter gillnet season with a 7-inch minimum mesh restriction was adopted for Blind Slough in 2016. In an effort to assess the feasibility of increasing harvest opportunity, the area was expanded to include Knappa Slough for a portion of the winter season, as has been done since 2013. Beginning in 2016, Wednesday night fisheries were added to provide more harvest opportunity in the winter season. The adopted season consisted of twenty 12-hour periods (7 PM–7 AM) on Monday, Wednesday, and Thursday nights during February 9–March 29 (except Knappa Slough was closed March 14–March 29). The addition of Wednesday night fisheries during the winter period represents ongoing efforts to expand the fishery. During the winter fishing periods, 140 spring Chinook were landed, which was 105% of the recent 10-year (2006–2015) average Chinook harvest (133) in Blind Slough/Knappa Slough.

Similar to the winter season, the spring Blind Slough season included Knappa Slough downstream to the east end of Minaker Island to increase fishing area and maximize the opportunity to harvest local Select Area-origin spring Chinook. As in previous years, the lower deadline in Knappa Slough was extended further downstream to the western end of Minaker Island in early May after encounters of upriver fish have subsided. Similar to most years, the lower deadline extension occurred on May 2. This strategy of area expansion has been successfully employed for several years. A 9¾-inch maximum mesh size restriction was adopted to target Chinook. For both the winter and spring fisheries in Blind and Knappa sloughs, net length was limited to 100-fathoms with no weight restrictions on the leadline, including allowed use of additional weights and anchors. The 2016 spring fishery was originally scheduled to include sixteen 12-hour (7 PM – 7 AM) fishing periods on Monday and Thursday nights between April 21 and June 14 (except the April 26 period, which was modified to

occur on a Tuesday night to allow time for management action if necessary after spring opener). Similar to other sites, the two 12-hour season opening periods scheduled for April 21 and April 26 were rescinded due to higher than expected upriver impacts from Youngs Bay during the late winter season periods. During the 2016 Blind Slough/Knappa Slough spring fishery, 1,619 spring Chinook were landed, which was the third highest on record, and was 23% higher than the recent 10-year average of 1,318. For the second year, due to high harvest and low upriver impacts during the late spring season in 2016, three additional periods were set during the 2016 summer season timeframe from June 16 to June 24, resulting in a harvest of 858 Chinook.

The combined Blind Slough/Knappa Slough winter, spring, and summer season harvest totaled 2,617 Chinook and was the fourth highest on record since the site was initiated, due in part to the extended summer season (Table 6). Stock composition is based on VSI and CWT analysis. A total of 919 Chinook (35% of the combined catch) were examined for fin marks and CWTs, and 86 CWTs were collected. The catch included an estimated 94.6% Select Area-origin spring Chinook, 1.2% upriver spring Chinook, 2.7% Willamette River spring Chinook, and 1.4% CKL-origin fish. Based on scale readings and CWT correction, the estimated age composition of the spring Chinook catch was 0.8% Age-3, 37.2% Age-4, 61.3% Age-5, and 0.6% age-6.

Tongue Point/South Channel

As part of the ongoing effort to expand fishery opportunities in the Select Areas, the winter season initially adopted for the Tongue Point/South Channel site in 2013 was continued in 2016. The 2016 winter season consisted of ten 12-hour periods (7 PM–7 AM) on Monday and Thursday nights during February 8 to March 11, with a 7-inch minimum mesh restriction in effect. A total of 109 spring Chinook were landed in the winter season, which was 56% higher than in 2015 (70 fish), and was the highest catch since the winter fishery was reinitiated in 2013.

The spring season in Tongue Point/South Channel was scheduled to include sixteen periods from April 21–June 14, but the first two periods were rescinded, and the following two periods was shortened via in-season action due to higher than expected impacts incurred from Youngs Bay during the late winter season periods. The remaining Tongue Point Point/South Channel spring season included twelve 12-hour periods on Monday and Thursday nights (7 PM – 7 AM), starting on May 5 and ending on June 14. During the 2016 Tongue Point/South Channel spring fishery, 628 spring Chinook were landed. This is above the recent 5-year average of 539 Chinook, but was only 53% of the 2015 catch of 1,192 Chinook. For the first time in 2016, due to high harvest and low upriver impacts during late spring season, two additional periods were set during the summer season timeframe from June 16 to June 21, resulting in a harvest of 369 Chinook. A 9¾-inch maximum mesh restriction was in place for fisheries during the entirety of the spring and summer timeframe fisheries. In Tongue Point, nets were restricted to a maximum length of 250 fathoms, with standard weight restrictions, while nets in South Channel were limited to a maximum length of 100 fathoms, and no weight restrictions were in place.

The 2016 winter, spring, and summer season fishery in Tongue Point/South Channel harvested 1,106 spring Chinook (Table 6). Stock composition was based on VSI and CWT analysis with 385 Chinook (35% of the catch) examined for fin marks and CWTs; 56 CWTs were detected and recovered. The catch included an estimated 79.1% spring Chinook and 0.5% SAB fall Chinook originating from Select Area sites, 7.9% upriver spring Chinook, and 6.7% Willamette River spring Chinook, and 5.3% CKL-origin fish. Based on scale readings and CWT correction, the estimated age composition of the spring Chinook catch was 4.2% Age-3, 44.4% Age-4 and 50.5% Age-5 fish and 0.9% age-6.

Deep River

The 2016 winter season in Deep River consisted of twenty 12-hour fishing periods (7 PM – 7 AM), which was five more nights of fishing than in the past few years. A Wednesday night period was added to each week in February and to the first two weeks of March. Fishing occurred on Monday, Wednesday, and Thursday nights from February 8 through March 11, and Monday and Thursday nights from March 14-31.

The spring season consisted of fifteen nightly 12-hour fishing periods (7 PM–7 AM) on Tuesday April 19 and Thursday April 28, and on Monday and Thursday nights from May 2 through June 14. Two fishing periods (Thursday night April 21 and Tuesday night April 26) were rescinded by Compact action on April 20, 2016 to reduce potential impacts to upriver stocks.

The fishing area during all periods was restricted to the area from markers at navigation marker #16 upstream to the Highway 4 Bridge. Gear regulations included a 100-fathom maximum net length, a 7-inch minimum mesh size for the winter season, and a 9¾-inch maximum mesh size for the spring season. The use of additional weights or anchors was allowed. As has been the case since the inception of the Deep River spring fishery in 2003, fishers were required to submit all landed catch for biological sampling before being transported out of the fishing area. A WDFW sampling station was set up in the area for this purpose.

A total of 71 Chinook were landed during the winter season, and just 8 Chinook were landed during the spring season. The harvest of 79 Chinook from Deep River in the combined winter and spring seasons was below the average of 116 for the previous ten years, and ranked 8th among the 14 spring chinook fishing seasons at Deep River (2003-2016; Table 6).

The Deep River winter/spring fishery stock composition for 2016 was based on VSI and CWT analysis, with 79 Chinook (100% of the catch) examined for fin marks and CWTs, and 5 CWTs being collected. Uncharacteristically in 2016, none of the catch was composed of spring Chinook released from Select Area sites, which on average have accounted for half (53.6%) of the Deep River spring harvest for the 2009-2015 seasons. Instead, the 2016 Deep River harvest was made up of 35.4 % Willamette River stocks and 64.6% Cowlitz River stocks. Based on scale readings, verified with CWTs, the age composition of the catch was 0% Age-3, 35.4% Age-4, 64.6% Age-5, and 0.0% Age-6.

2016 Fall Season Commercial Fisheries

Chinook landings for all fall Select Area fisheries totaled 12,431 fish, which was the ninth highest since project inception, but fell below the recent 5-year average (22,600; 2011-2015). Landings of Coho totaled 34,723, which was slightly higher than the pre-season expectation (29,200; all Select Area fisheries), but was much lower than the recent 5-year average (60,612; 2011-2015). Since January 2014, retention of White Sturgeon has been prohibited in Columbia River commercial and recreational fisheries.

Youngs Bay

The fall season in Youngs Bay opened with one 36-hour period per week (4 periods total) through late August. The upper fishery boundary during the fall season is moved downstream from the confluence of Youngs and Klaskanine rivers to Battle Creek Slough to ensure adequate SAB escapement. After the August target Chinook periods were complete, the fall season continued as a target Coho fishery, starting with three twelve-hour periods from August 29 through September 1. The fishery was open continuously from September 5 through October 31 (56 days). As in previous years, the maximum allowable mesh size was reduced from 9 ¾ to 6-inches in late August to moderate harvest of SAB fall

Chinook. Due to additional concerns, regarding SAB broodstock returns (similar to 2015), commercial fishing hours were reduced in late August from the pre-2105 schedule. The Youngs Bay fall season consisted of 64 days and resulted in landings of 6,398 Chinook and 15,784 Coho. The Chinook catch was well below the recent 5-year average (12,300; 2011-2015). Coho harvest was slightly better than 2015 and proximate to the preseason expectation (11,900), but was still well below the recent 5-year average (24,800; 2011-2015).

Blind Slough/Knappa Slough

The Blind Slough/Knappa Slough fall season began with one 12-hour period on August 24 and three periods during August 29 – September 1. The season continued with four nightly 12-hour fishing periods during September 5 – September 9 and four nightly 16-hour periods per week during September 12 – October 28. The total number of fishing periods were reduced from previous years due to concerns over broodstock collection of both tule fall Chinook and Coho. The maximum mesh size allowed was 9¾-inch for the entire season. The Joint States met in-season and rescinded all Knappa Slough commercial fishing periods in October in response to mounting concerns over broodstock collection. In addition, the recreational angling deadline in Big Creek was extended down to the railroad trestle at the mouth of Big Creek. The fall Blind Slough/Knappa Slough season consisted of 36 fishing periods (20 for Knappa Slough) and landings of 2,027 Chinook and 1,493 Coho. The Chinook catch was well below the recent 5-year average (3,900). Coho harvest was below average (6,600) and the preseason expectation (4,300).

Tongue Point/South Channel

The season structure of the Tongue Point/South Channel fall fishery was very similar to the Blind Slough fishery in order to maintain concurrency between the two fishing sites. The only difference being four nightly 18-hour periods per week from September 12 through October 28. The season consisted of 36 periods, resulting in landings of 2,007 Chinook and 11,284 Coho. The Chinook catch was below the recent 5-year average (4,000). Coho landings were also below the recent 5-year average (17,000), but were higher than the preseason expectation of 5,600 fish.

Deep River

The Deep River fall fishery was expanded in 2016 with additional periods added in August to maximize harvest of hatchery fall Chinook and reduce potential SAB strays to Grays River. The fishery began with two nightly 12-hour fishing periods per week from August 1 through August 12, expanding to four nightly periods during August 15 – September 2, and then five nightly periods during September 5 – September 10. Fishing extended to five nightly 15-hour periods September 12 – October 19; during this timeframe, the maximum mesh size was reduced to 6-inches to diminish handle of Chum and maximize harvest of Coho. The Deep River fall commercial season consisted of 45 periods resulting in landings of 1,999 Chinook and 6,162 Coho. The Chinook catch was higher than the recent 10-year average (1,400; 2006-2015), but less than half of the record-year catch in 2015 (4,303). Coho catch was about half the recent 5-year average (12,200) and lower than the preseason expectation of 7,400.

Commercial Harvest Ex-Vessel Value

Ex-vessel values, landings in pounds, and average price per pound for Chinook harvested in winter, spring, and summer Select Area fisheries is listed in Table 3.8. Average ex-vessel value for years 2006 to 2012 is $673,000 ranging from $244,000 to $1,424,000. Fall harvest of Chinook has averaged $404,000 (range $125,000 – $782,000) during the same period (Table 3.9). The ex-vessel

value of Coho harvested in the Select Area fisheries has averaged $636,000 between 2006 and 2016 and has ranged from $132,000 to $1,623,000, peaking in 2014 (Table 3.9). With total ex-vessel values for the Select Areas ranging from $764,000 to $2.6 million from 2006 to 2016 the impact on the local economy is significant, especially considering that ex-vessel value is a minimum economic value prior to the expansion that occurs as the money is expended throughout the community. Environmental variables such as ocean conditions and estuary smolt predation, as well as regional fisheries management greatly affect the realized economic returns from the Select Area fisheries.

Select Area Recreational Fisheries

Beginning in 1998, year-round recreational seasons were opened for Chinook and adipose fin-clipped Coho in Youngs Bay, Tongue Point, and Blind Slough. Similar regulations were adopted for South Channel and Knappa Slough in 1999 and for Deep River in 2000. In 2003, regulations were adopted to allow year-round angling for adipose fin-clipped steelhead in all Oregon Select Areas. To maintain consistency with mainstem fisheries, mark-selective regulations were permanently adopted for Select Area spring Chinook recreational fisheries effective January 1, 2004. Also in 2004, classification of Tongue Point and South Channel as Select Area recreational fishing sites was rescinded due to discontinuation of production-level spring Chinook releases and because these areas are already open to angling concurrent with the mainstem Columbia River. Brief springtime recreational fishing closures were enacted in the Select Areas during 2004, 2005, and 2010 when the potential for additional impacts to upriver spring Chinook also forced closure of Select Area commercial fisheries.

As per permanent regulations, Youngs Bay, Blind Slough/Knappa Slough, and Deep River Select Areas are open the entire year for retention of Chinook and adipose fin-clipped Coho with a daily bag limit of either two adult salmonids in any combination. Chinook retained during January 1 – July 31 must be fin-clipped (either adipose or ventral clips) in Youngs Bay and associated tributaries, and adipose fin-clipped in other Select Areas and tributaries.

Spring Fisheries

Despite the fact that most Select Area sites have been open year-round for recreational fishing, participation has expanded slowly, at least partially due to limited adult returns early in the program's history. In 2003, 2004, 2010, and 2015, effort and harvest in Select Area recreational fisheries increased due to productive fishing opportunities resulting from improved adult returns. Among the Select Areas, the most popular and productive recreational spring Chinook fisheries occur in Blind Slough/Knappa Slough, Big Creek, Gnat Creek, and Youngs Bay during March–May. The 2016 recreational harvest estimate for spring Chinook in all Select Area sites is 975 adult fish, which is comparable to the recent 5-year (2011–15) average of just over 1,000 fish.

Fall Fisheries

The most popular areas for fall season recreational fisheries in the Select Areas are Youngs Bay tidewater, tributaries to Youngs Bay, and Deep River. As with the spring recreational fisheries, no formal creel surveys are conducted during fall fisheries to estimate harvest. Instead, catch of fall Chinook and Coho is estimated using punch cards returned by anglers. Recreational catch in the Oregon Select Areas is approximated from expanded harvest cards turned in voluntarily by anglers and are not available until the following calendar year. Estimated catch in 2015 was about 600 Chinook and 430 Coho in Oregon Select Areas and associated tributaries.

Table 3.1. Landings, number of fish sampled for CWTs (marks), and mark-sample rates of Chinook and Coho in Oregon Select Area commercial fisheries, 2001-2016.

Year		Winter	Spring	Summer	Fall		Total
		Chinook	*Chinook*	*Chinook*	*Chinook*	*Coho*	
2001	Landings	682	8,000	587	2,949	31,254	43,472
	# Sampled	341	2,896	316	915	10,729	15,197
	Sample Rate	50%	36%	54%	31%	34%	35%
2002	Landings	218	10,786	695	8,242	68,868	88,809
	# Sampled	117	5,468	366	3,945	25,940	35,836
	Sample Rate	54%	51%	53%	48%	38%	40%
2003	Landings	86	7,321	279	8,961	109,227	125,874
	# Sampled	56	3,667	49	1,506	18,808	24,086
	Sample Rate	65%	50%	18%	17%	17%	19%
2004	Landings	1,341	8,851	255	12,249	46,164	68,860
	# Sampled	619	3,913	60	3,526	13,494	21,612
	Sample Rate	46%	44%	24%	29%	29%	31%
2005	Landings	190	2,061	95	8,332	63,221	73,899
	# Sampled	167	1,520	38	3,029	16,736	21,490
	Sample Rate	88%	74%	40%	36%	26%	29%
2006	Landings	759	5,982	476	4,373	35,418	47,008
	# Sampled	424	3,980	178	1,505	12,097	18,184
	Sample Rate	56%	67%	37%	34%	34%	39%
2007	Landings	968	5,521	256	4,358	7,842	18,945
	# Sampled	656	3,501	94	2,360	3,071	9,682
	Sample Rate	68%	63%	37%	54%	39%	51%
2008	Landings	292	3,149	1,017	13,749	40,322	58,529
	# Sampled	179	1,814	284	4,678	14,671	21,626
	Sample Rate	61%	58%	28%	34%	36%	37%
2009	Landings	246	2,824	983	11,428	76,290	91,771
	# Sampled	143	1,433	258	2,905	19,952	24,691
	Sample Rate	58%	51%	26%	25%	26%	27%
2010	Landings	1,342	22,163	972	19,655	39,499	83,631
	# Sampled	622	10,074	267	4,024	10,104	25,091
	Sample Rate	46%	45%	27%	20%	26%	30%
2011	Landings	207	8,989	1,822	20,634	34,430	66,082
	# Sampled	129	4,066	441	4,935	7,746	17,317
	Sample Rate	62%	45%	24%	24%	22%	26%
2012	Landings	366	7,426	2,260	22,029	11,422	43,503
	# Sampled	231	4,546	1,091	6,457	3,571	15,896
	Sample Rate	63%	61%	48%	29%	31%	37%
2013	Landings	559	5,377	2,022	22,542	32,293	62,793
	# Sampled	329	3,138	1,222	7,321	6,613	18,623
	Sample Rate	59%	58%	60%	32%	20%	30%
2014	Landings	450	2,286	1,842	21,950	141,242	167,770
	# Sampled	244	929	543	7,564	30,854	40,134
	Sample Rate	54%	41%	29%	34%	22%	24%
2015	Landings	797	10,889	1,779	13,784	22,880	50,129
	# Sampled	497	4,679	597	5,870	9,679	21,322
	Sample Rate	62%	43%	34%	43%	42%	43%
2016	Landings	1,313	7,268	1,836	10,432	28,561	49,410
	# Sampled	762	3,532	471	3,368	11,340	19,473
	Sample Rate	58%	49%	26%	32%	40%	39%
5-yr Ave.	Landings	697	6,649	1,948	18,147	47,280	74,721
	# Sampled	413	3,365	785	6,116	12,411	23,090
	Sample Rate	59%	51%	40%	34%	26%	31%
10-yr Ave.	Landings	654	7,589	1,479	16,056	43,478	69,256
	# Sampled	379	3,771	527	4,948	11,760	21,386
	Sample Rate	58%	50%	36%	31%	27%	31%

Table 3.2. Impact rates on ESA-listed upriver spring Chinook in winter and spring Select Area commercial fisheries, 2002–2016.

Year	Actual Impact Rate	Management Guideline
2002	0.19%	0.20%
2003	0.21%	0.20%
2004	0.10%	0.20%
2005	0.01%	0.10%
2006	0.09%	0.10%
2007	0.05%	0.10%
2008	0.13%	0.15%
2009	0.09%	0.15%
2010	0.47%	0.15%
2011	0.14%	0.15%
2012	0.16%	0.15%
2013	0.21%	0.15%
2014	0.11%	0.15%
2015	0.28%	0.15%
2016	0.19%	0.15%
Average	0.16%	0.15%

Table 3.3. Stock composition of Chinook in winter/spring/summer Select Area commercial fisheries, 2000-2016.

	Non-Local							**Local**		
Year	Above Bonn. Spring [1]	Above Bonn. Summer [2]	Willamette R.	Sandy R.	C,K,L [3]	OR Coast	Non-Local Total	SAFE	SAB (CHF) [4]	Local Total
2000	0.7%	0.0%	11.6%	1.7%	1.1%	0.0%	15.1%	82.6%	2.3%	84.9%
2001	4.4%	0.3%	5.8%	0.8%	0.7%	0.5%	12.4%	82.6%	5.0%	87.6%
2002	4.8%	0.5%	16.6%	2.5%	1.5%	0.3%	26.2%	69.4%	4.4%	73.8%
2003	5.1%	0.8%	13.1%	0.7%	2.0%	0.6%	22.5%	76.1%	1.4%	77.5%
2004	1.9%	0.4%	5.7%	0.6%	1.4%	0.0%	10.0%	87.6%	2.5%	90.0%
2005	0.6%	0.1%	5.8%	0.0%	1.8%	0.0%	8.2%	89.4%	2.4%	91.8%
2006	1.6%	0.1%	3.8%	0.7%	0.6%	0.0%	6.8%	92.4%	0.8%	93.2%
2007	0.7%	0.1%	4.7%	0.0%	0.9%	0.0%	6.4%	92.3%	1.3%	93.6%
2008	5.3%	1.5%	2.2%	0.0%	2.6%	0.0%	11.7%	69.0%	19.4%	88.3%
2009	3.7%	0.7%	6.6%	3.3%	0.5%	0.0%	14.8%	68.0%	17.2%	85.2%
2010	6.1%	0.1%	6.7%	0.3%	0.2%	0.0%	13.4%	84.9%	1.7%	86.6%
2011	2.7%	0.3%	9.4%	0.2%	1.1%	0.0%	13.7%	76.8%	9.6%	86.3%
2012	3.3%	0.0%	7.0%	0.4%	0.4%	0.0%	11.1%	84.4%	4.4%	88.9%
2013	3.2%	0.1%	15.3%	0.0%	1.2%	0.0%	19.9%	62.8%	17.3%	80.1%
2014	5.6%	1.0%	14.1%	0.5%	1.1%	0.0%	22.3%	48.2%	29.5%	77.7%
2015	5.9%	1.1%	9.2%	0.0%	2.0%	0.0%	18.2%	81.4%	0.5%	81.8%
2016	3.3%	0.9%	5.3%	0.0%	5.1%	0.0%	14.6%	82.8%	2.5%	85.4%
5-yr Avg	4.3%	0.6%	10.2%	0.2%	2.0%	0.0%	17.2%	71.9%	10.8%	82.8%
10-yr Avg	4.0%	0.6%	8.1%	0.5%	1.5%	0.0%	14.6%	75.1%	10.3%	85.4%

[1] Includes Snake River summer Chinook.

[2] Includes only Upper Columbia summer Chinook.

[3] C,K,L = Cowlitz R., Kalama R., and Lewis R. (Washington Tributaries)

[4] SAB = Select Area Bright

Table 3.4. Stock composition of Chinook harvested in Fall Select Area commercial fisheries, 2000-2016.

	Non-Local							Local		
Year	URB	BUB	PUB	LRW	BPH	Stray	Non-Local Total	LRH	SAB	Local Total
2000	9.8%	4.2%	1.3%	0.0%	6.2%	0.1%	21.7%	10.6%	67.7%	78.3%
2001	17.5%	0.0%	0.0%	0.0%	2.5%	0.1%	20.1%	25.4%	54.5%	79.9%
2002	10.9%	4.7%	0.3%	0.0%	7.3%	0.0%	23.2%	46.2%	30.6%	76.8%
2003	0.4%	3.3%	0.1%	0.9%	13.7%	1.4%	19.8%	34.2%	46.1%	80.2%
2004	7.9%	0.0%	0.1%	0.0%	6.3%	0.1%	14.4%	59.1%	26.6%	85.6%
2005	7.6%	0.0%	0.0%	1.9%	0.0%	0.0%	9.5%	47.3%	43.2%	90.5%
2006	1.1%	0.0%	0.0%	1.2%	0.0%	0.1%	2.3%	16.2%	81.5%	97.7%
2007	2.5%	0.0%	0.9%	0.0%	0.0%	1.1%	4.6%	0.0%	95.4%	95.4%
2008	1.0%	1.8%	1.1%	0.0%	9.0%	2.7%	15.6%	19.6%	64.8%	84.4%
2009	3.0%	2.9%	1.0%	0.0%	4.4%	0.2%	11.6%	24.6%	63.8%	88.4%
2010	0.8%	2.1%	1.5%	0.0%	5.3%	0.0%	9.7%	55.9%	34.3%	90.3%
2011	4.9%	0.0%	1.9%	0.0%	0.0%	0.0%	6.8%	40.0%	53.2%	93.2%
2012	1.3%	0.0%	0.5%	0.0%	0.8%	3.5%	6.2%	55.0%	38.9%	93.8%
2013	7.4%	0.5%	2.0%	0.0%	1.1%	0.1%	11.2%	31.2%	57.6%	88.8%
2014	7.3%	0.3%	2.4%	0.0%	5.9%	0.5%	16.3%	38.1%	45.6%	83.7%
2015	2.8%	0.0%	1.1%	0.0%	1.6%	0.4%	5.9%	51.8%	42.3%	94.1%
2016	7.2%	2.4%	0.7%	0.0%	0.2%	0.3%	10.8%	47.2%	42.0%	89.2%
5-yr Avg	5.2%	0.7%	1.4%	0.0%	1.9%	1.0%	10.1%	44.6%	45.3%	89.9%
10-yr Avg	3.8%	1.0%	1.3%	0.0%	2.8%	0.9%	9.9%	36.3%	53.8%	90.1%

URB = Upriver Bright; Bonneville Upriver Bright; PUB = Pool Upriver Bright; LRW = Lower River Wild; BPH = Bonneville Pool Hatchery, LRH = Lower River Hatchery; SAB = Select Area Bright.

Table 3.5. Landings of Select Area and Lower Columbia River Non-Indian Commercial Fisheries, 2003-2016.

	Spring & Summer Chinook				Fall Chinook				Coho			
Year	LCR Mainstem	SAFE	Total	SAFE % of Total	LCR Mainstem	SAFE	Total	SAFE % of Total	LCR Mainstem	SAFE	Total	SAFE % of Total
2003	3,175	7,804	10,979	71%	58,428	9,173	67,601	14%	149,766	112,497	262,263	43%
2004	13,767	10,562	24,329	43%	41,057	12,642	53,699	24%	66,522	51,944	118,466	44%
2005	8,151	2,406	10,557	23%	27,536	8,696	36,232	24%	32,368	65,807	98,175	67%
2006	9,208	7,245	16,453	44%	26,011	4,557	30,568	15%	28,372	37,653	66,025	57%
2007	4,072	6,774	10,846	62%	12,150	4,533	16,683	27%	30,193	10,516	40,709	26%
2008	7,322	4,486	11,808	38%	28,052	13,997	42,049	33%	13,107	55,151	68,258	81%
2009	6,539	4,175	10,714	39%	34,980	11,990	46,970	26%	45,241	80,951	126,192	64%
2010	13,761	24,892	38,653	64%	31,141	20,666	51,807	40%	18,920	58,759	77,679	76%
2011	9,549	11,118	20,667	54%	51,419	22,929	74,348	31%	13,482	49,513	62,995	79%
2012	7,810	10,096	17,906	56%	36,871	23,720	60,591	39%	2,615	15,354	17,969	85%
2013	4,053	8,082	12,135	67%	84,906	24,134	109,040	22%	9,766	42,295	52,061	81%
2014	6,743	4,643	11,386	41%	101,755	24,198	125,953	19%	70,446	168,498	238,944	71%
2015	11,175	13,669	24,844	55%	84,238	18,087	102,325	18%	4,479	27,399	31,878	86%
2016	6,603	10,496	17,099	61%	59,055	12,431	71,486	17%	1,269	34,723	35,992	96%
5-yr Ave.	7,277	9,397	16,674	56%	73,365	20,514	93,879	23%	17,715	57,654	75,369	84%
10-yr Ave.	7,763	9,843	17,606	54%	52,457	17,669	70,125	27%	20,952	54,316	75,268	74%

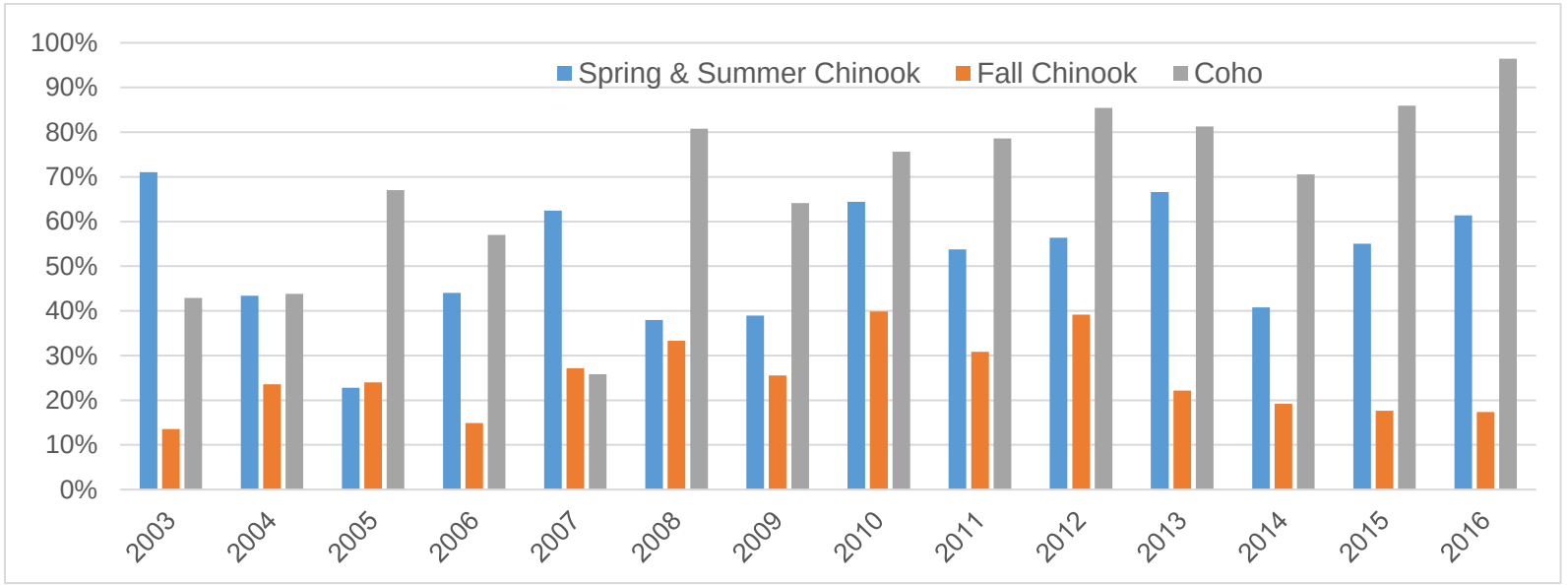


Figure 3.1. Contribution of Select Area commercial fisheries to the total Lower Columbia River (LCR) commercial harvest by species and stock, 2003-2016.

Table 3.6. Season dates and harvest of SAFE commercial fisheries, 1992–2016.

Year	Area	Season	Dates	Days	Chinook	White Sturgeon
1992	Youngs Bay	Spring	Apr. 27 - May 26	9	296	10
1993	Youngs Bay	Spring	Apr. 26 – May 26	9	851	32
1994	Youngs Bay	Spring	Apr. 25 - May 25	9	155	31
1995	Youngs Bay	Spring	May 1 – Jun. 7	11	201	108
1996	Youngs Bay	Spring	Apr. 29 – Jun. 14	15	789	581
1997	Youngs Bay	Spring	Apr. 28 – Jun. 13	22	1,821	351
1998	Youngs Bay	Winter	Feb. 25 – Mar. 11	3	74	6
	Youngs Bay	Spring	Apr. 23 – Jun. 12	23	2,093	251
	Tongue Point	Spring	Apr. 29 – May 27	9	31	79
	Blind Slough	Spring	Apr. 29 – Jun. 12	13	60	19
	Total			**48**	**2,258**	**355**
1999	Youngs Bay	Winter	Feb. 24 – Mar. 11	3	4	1
	Youngs Bay	Spring	Apr. 22 – Jun. 11	26	936	84
	Youngs Bay	Summer	Jun. 14 – Jul. 28	10	358	85
	Tongue Point/S. Channel	Spring	Apr. 28 – Jun. 9	13	199	260
	Blind/Knappa Sloughs	Spring	Apr. 28 – Jun. 11	13	450	94
	Blind/Knappa Sloughs	Summer	Jun. 24 – Jul. 2	3	8	0
	Total			**68**	**1,955**	**524**
2000	Youngs Bay	Winter	Feb. 23 – Mar. 9	3	33	6
	Youngs Bay	Spring	Apr. 19 – Jun. 9	23	4,494	182
	Youngs Bay	Summer	Jun. 12 – Jul. 26	11	204	78
	Tongue Point	Winter	Feb. 29 – Mar. 14	3	10	5
	Tongue Point/S. Channel	Spring	Apr. 24 – Jun. 15	15	937	220
	Blind Slough	Winter	Feb. 27 – Mar. 13	3	8	0
	Blind/Knappa Sloughs	Spring	Apr. 23 – Jun. 14	15	810	44
	Total			**73**	**6,496**	**535**
2001	Youngs Bay	Winter	Feb. 21 – Mar. 9	3	544	14
	Youngs Bay	Spring	Apr. 18 – Jun. 14	32	4,462	122
	Youngs Bay	Summer	Jun. 18 – Jul. 31	9	587	181
	Tongue Point	Winter	Feb. 20 – Mar. 7	3	124	2
	Tongue Point/S. Channel	Spring	Apr. 17 – Jun. 13	15	1,507	145
	Blind Slough	Winter	Feb. 19 – Mar. 6	3	14	0
	Blind/Knappa Sloughs	Spring	Apr. 2 – Jun. 14	18	2,031	27
	Total			**83**	**9,269**	**491**
2002	Youngs Bay	Winter	Feb. 20 – Mar. 8	6	199	3
	Youngs Bay	Spring	Apr. 17 – Jun. 13	30	5,749	135
	Youngs Bay	Summer	Jun. 19 – Aug. 1	9	695	103
	Tongue Point/S. Channel	Spring	Apr. 18 – Jun. 12	15	3,003	354
	Blind Slough	Winter	Feb. 18 – Mar. 5	3	19	1
	Blind/Knappa Sloughs	Spring	Apr. 18 – Jun. 12	15	2,034	48
	Total			**78**	**11,699**	**644**
2003	Youngs Bay	Winter	Feb. 18 – Feb. 25	3	74	1
	Youngs Bay	Spring	Apr. 16 – Jun. 12	22	4,947	81
	Youngs Bay	Summer	Jun. 18 – Jul. 31	9	279	102
	Tongue Point	Spring	Apr. 17 – Apr. 18	1	345	11
	Blind Slough	Winter	Feb. 15 – Mar. 2	3	12	0
	Blind/Knappa Sloughs	Spring	Apr. 17 – Jun. 13	13	2,029	32
	Deep River	Spring	Apr. 17 – Jun. 13	20	118	24
	Total			**71**	**7,804**	**251**

continued

Table 3.6. (continued)

Year	Area	Season	Dates	Days	Chinook	White Sturgeon
2004	Youngs Bay	Winter	Feb. 14 - Apr. 12	10	1,050	8
	Youngs Bay	Spring	Apr. 22 – Jun. 18	18	5,611	92
	Youngs Bay	Summer	Jun. 23 – Jul. 29	8	255	19
	Blind Slough	Winter	Feb. 14 - Apr. 12	7	291	1
	Blind/Knappa Sloughs	Spring	Apr. 22 – Jun. 18	12	3,240	59
	Deep River	Spring	Apr. 22 – Jun. 18	12	115	5
	Total			**67**	**10,562**	**184**
2005	Youngs Bay	Winter	Feb. 16 – Mar. 17	9	144	6
	Youngs Bay	Spring	May 5 – Jun. 17	21	730	137
	Youngs Bay	Summer	Jun. 22 – July 28	8	95	67
	Blind Slough	Winter	Feb. 16 – Mar. 17	9	46	3
	Blind/Knappa Sloughs	Spring	May 5 – Jun. 17	13	1,331	57
	Deep River	Spring	May 5 – Jun. 17	13	60	8
	Total			**73**	**2,406**	**278**
2006	Youngs Bay	Winter	Feb. 15 – Apr. 13	16	592	8
	Youngs Bay	Spring	Apr. 17 – Jun. 16	29	4,730	242
	Youngs Bay	Summer	Jun. 21 – July 27	8	476	32
	Blind Slough	Winter	Feb. 22 – Apr. 13	14	167	1
	Blind/Knappa Sloughs	Spring	Apr. 20 – Jun. 16	17	1,252	25
	Deep River	Winter	Feb. 20 – Mar. 14	4	0	0
	Deep River	Spring	Apr. 20 – Jun. 16	17	28	9
	Total			**105**	**7,245**	**317**
2007	Youngs Bay	Winter	Feb. 14 – Apr. 10	18	883	13
	Youngs Bay	Spring	Apr. 23 – June 15	27	4,070	161
	Youngs Bay	Summer	June 20 – July 27	12	256	10
	Blind Slough	Winter	Feb. 21 – Mar. 26	8	85	1
	Blind/Knappa Sloughs	Spring	Apr. 23 – June 15	16	1,451	49
	Deep River	Winter	Feb. 18 – Mar. 12	4	0	0
	Deep River	Spring	Apr. 23 – Jun. 15	30	29	23
	Total			**115**	**6,774**	**257**
2008	Youngs Bay	Winter	Feb. 13 – Apr. 8	20	241	21
	Youngs Bay	Spring	Apr. 17 – June 13	24	1,937	35
	Youngs Bay	Summer	June 18 – July 31	14	1,017	0
	Tongue Point/S. Channel	Spring	Apr. 28 – June 13	12	259	204
	Blind Slough	Winter	Feb. 20 – Apr. 7	13	51	1
	Blind/Knappa Sloughs	Spring	Apr. 17 – June 13	15	953	47
	Deep River	Winter	Feb. 18 – Mar. 11	4	0	17
	Deep River	Spring	Apr. 17 – June 13	15	28	22
	Total			**117**	**4,486**	**347**
2009	Youngs Bay	Winter	Feb. 15 – Apr. 6	12	155	5
	Youngs Bay	Spring	Apr. 16 – June 12	13	1,985	103
	Youngs Bay	Summer	Jun. 17 – Jul 31	14	983	106
	Tongue Point/S. Channel	Spring	Apr. 20 – Apr. 28	3	133	11
	Blind Slough	Winter	Feb. 18 – Apr. 6	13	91	1
	Blind/Knappa Sloughs	Spring	Apr. 16 – Jun. 12	12	706	32
	Deep River	Winter	Feb. 16 - Apr. 9	8	40	27
	Deep River	Spring	Apr. 15 – Jun. 11	13	82	26
	Total			**88**	**4,175**	**311**

continued

Table 3.6. (continued)

Year	Area	Season	Dates	Days	Chinook	White Sturgeon
2010	Youngs Bay	Winter	Feb. 21 – Mar. 29	13	1,023	28
	Youngs Bay	Spring	Apr. 15 – Jun. 11	9	18,756	55
	Youngs Bay	Summer	Jun. 16 – Jun. 30	7	972	0
	Tongue Point/S. Channel	Spring	Apr. 19 – Jun. 11	12	727	92
	Blind Slough	Winter	Feb. 21 – Apr. 5	11	319	0
	Blind/Knappa Sloughs	Spring	Apr. 15 – Jun. 11	14	2,680	22
	Deep River	Winter	Feb. 22 – Apr. 1	12	239	14
	Deep River	Spring	Apr. 14 – Jun. 10	13	176	0
	Total			**91**	**24,892**	**211**
2011	Youngs Bay	Winter	Feb. 13 – Mar. 16	14	83	12
	Youngs Bay	Spring	Apr. 18 – Jun. 10	25	6,846	74
	Youngs Bay	Summer	Jun. 15 – Jul. 29	14	1,822	27
	Tongue Point/S. Channel	Spring	Apr. 28 – Jun. 10	13	656	54
	Blind Slough	Winter	Feb. 13 – Apr. 4	13	124	6
	Blind/Knappa Sloughs	Spring	Apr. 18 – Jun. 10	14	1,487	24
	Deep River	Winter	Feb. 13– Apr. 4	13	19	4
	Deep River	Spring	Apr. 17 – Jun. 10	15	81	0
	Total			**121**	**11,118**	**201**
2012	Youngs Bay	Winter	Feb. 12 – Apr. 5	20	318	6
	Youngs Bay	Spring	Apr. 19 – Jun. 15	29	6,010	96
	Youngs Bay	Summer	Jun. 16 – Jul. 27	12	2,260	32
	Tongue Point/S. Channel	Spring	Apr. 26 – Jun. 15	15	503	55
	Blind Slough	Winter	Feb. 12 – Apr. 2	13	48	0
	Blind/Knappa Sloughs	Spring	Apr. 19 – Jun. 15	17	913	35
	Deep River	Winter	Feb. 12 – Apr. 2	13	6	1
	Deep River	Spring	Apr. 19 – Jun. 15	17	38	0
	Total			**136**	**10,096**	**225**
2013	Youngs Bay	Winter	Feb. 11 – Mar. 25	18	332	5
	Youngs Bay	Spring	Apr. 18 – Jun. 14	29	4,294	63
	Youngs Bay	Summer	Jun. 19 – Jul. 26	12	2,022	25
	Tongue Point/S. Channel	Winter	Feb. 11 – Mar. 11	9	70	6
	Tongue Point/S. Channel	Spring	Apr. 25 – Jun. 14	15	304	114
	Blind/Knappa Sloughs	Winter	Feb. 11 – Apr. 2	15	157	3
	Blind/Knappa Sloughs	Spring	Apr. 18 – Jun. 14	17	779	31
	Deep River	Winter	Feb. 11 – Apr. 2	15	72	3
	Deep River	Spring	Apr. 18 – Jun. 14	17	52	5
	Total			**147**	**8,082**	**255**
2014	Youngs Bay	Winter	Feb. 10 – Mar. 26	20	245	0
	Youngs Bay	Spring	Apr. 17 – Jun. 13	23	1,952	0
	Youngs Bay	Summer	Jun. 16 – Jul. 31	21	1,837	0
	Tongue Point/S. Channel	Winter	Feb. 10 – Mar. 13	10	33	0
	Tongue Point/S. Channel	Spring	May 1 – Jun. 13	12	39	0
	Blind/Knappa Sloughs	Winter	Feb. 10 – Apr. 1	15	172	0
	Blind/Knappa Sloughs	Spring	Apr. 17 – Jun. 13	14	295	0
	Deep River	Winter	Feb. 10 – Apr. 1	15	39	0
	Deep River	Spring	Apr. 17 – Jun. 13	17	26	0
	Total			**147**	**4,638**	**0**

continued

Table 3.6. (continued)

Year	Area	Season	Dates	Days	Chinook	White Sturgeon
2015	Youngs Bay	Winter	Feb. 9 – Mar. 30	19	611	0
	Youngs Bay	Spring	Apr. 28 – Jun. 12	24	6,693	0
	Youngs Bay	Summer	Jun. 16 – Jul. 30	21	1,779	0
	Tongue Point/S. Channel	Winter	Feb. 9 – Mar. 13	10	70	0
	Tongue Point/S. Channel	Spring	Apr. 21 – Jun. 12	14	1,192	0
	Blind/Knappa Sloughs	Winter	Feb. 9 – Mar. 31	15	116	0
	Blind/Knappa Sloughs	Spring	Apr. 28 – Jun. 12	14	2,668	0
	Blind/Knappa Sloughs	Summer	Jun. 16 – Jul. 3	5	336	0
	Deep River	Winter	Feb. 9 – Mar. 31	15	94	0
	Deep River	Spring	Apr. 16 – Jun. 12	15	110	0
	Total			**152**	**13,669**	**0**
2016[a]	Youngs Bay	Winter	Feb. 8 – April 10	24	1,064	0
	Youngs Bay	Spring	Apr. 28 – Jun. 15	26	3,794	0
	Youngs Bay	Summer	Jun. 16 – Jul. 28	18	1,836	0
	Tongue Point/S. Channel	Winter	Feb. 8 – Mar. 11	10	109	0
	Tongue Point/S. Channel	Spring	Apr. 28 – Jun. 14	14	628	0
	Tongue Point/S. Channel	Summer	Jun. 16 – Jun. 19	10	369	0
	Blind/Knappa Sloughs	Winter	Feb. 8 – Mar. 29	20	140	0
	Blind/Knappa Sloughs	Spring	Apr. 28 – Jun. 14	14	1,619	0
	Blind/Knappa Sloughs	Summer	Jun. 16 – Jun. 19	10	858	0
	Deep River	Winter	Feb. 8 – Mar. 29	20	71	0
	Deep River	Spring	Apr. 19 – Jun. 14	15	8	0
	Total			**181**	**10,496**	**0**

[a] Landings are preliminary

Table 3.7. Season dates and harvest of SAFE fall commercial fisheries, 1996–2016.

Year	Area	Dates	Days	Chinook	Coho	White Sturgeon
1996	Youngs Bay	Aug. 12 - Oct. 31	62	1,439	15,783	85
	Tongue Point	Sept 17 - Oct. 31	14	50	1,955	0
	Blind Slough	Sept. 16 - Oct. 29	13	82	2,301	0
	Deep River	Sept. 16 - Oct. 29	13	35	2,240	0
	Total		**102**	**1,606**	**22,279**	**85**
1997	Youngs Bay	Aug. 11 – Oct. 31	66	1,726	13,649	76
	Tongue Point	Sept. 3 - Oct. 24	16	180	861	0
	Blind Slough	Sept. 8 - Oct. 22	18	32	1,605	0
	Deep River	Sept. 8 - Oct. 22	18	149	821	0
	Total		**118**	**2,087**	**16,936**	**76**
1998	Youngs Bay	Aug. 10 – Oct. 31	64	1,225	20,121	105
	Tongue Point	Sept. 10 - Oct. 29	14	421	3,398	67
	Blind Slough	Sept. 8 - Oct. 30	19	103	615	2
	Total		**97**	**1,749**	**24,134**	**174**
1999	Youngs Bay	Aug. 3 – Oct. 31	59	1,589	15,911	99
	Tongue Point/S. Channel	Sept. 7 – Oct. 28	19	339	3,659	122
	Blind/Knappa Sloughs	Sept. 9 – Oct. 28	19	167	1,958	4
	Deep River	Sept. 9 - Oct. 28	19	48	1,426	0
	Total		**116**	**2,143**	**22,954**	**225**
2000	Youngs Bay	Aug. 1 – Oct. 31	61	1,744	33,214	88
	Tongue Point	Sept. 5 – Oct. 31	32	252	10,731	59
	Blind/Knappa Sloughs	Sept. 7 – Oct. 31	32	132	3,398	9
	Deep River	Sept. 5 - Oct. 31	32	109	14,039	0
	Steamboat Slough	Sept. 7 - Oct. 28	30	78	363	1
	Total		**187**	**2,315**	**61,745**	**157**
2001	Youngs Bay	Aug. 6 – Oct. 31	62	2,040	25,469	21
	Tongue Point/S. Channel	Sept. 4 – Oct. 31	33	116	2,021	0
	Blind/Knappa Sloughs	Sept. 4 – Oct. 31	33	793	3,764	0
	Deep River	Sept. 4 – Oct. 31	33	149	2,491	0
	Steamboat Slough	Sept. 4 – Oct. 31	33	0	26	0
	Total		**194**	**3,098**	**33,771**	**21**
2002	Youngs Bay	Aug. 7 – Oct. 31	62	3,774	51,859	96
	Tongue Point/S. Channel	Sept. 3 – Oct. 31	34	1,708	15,560	202
	Blind/Knappa Sloughs	Aug. 26 – Oct. 31	37	2,760	1,449	33
	Deep River	Sept. 3 – Oct. 31	34	145	303	3
	Steamboat Slough	Sept. 3 – Oct. 31	34	183	105	0
	Total		**201**	**8,570**	**69,276**	**334**
2003	Youngs Bay	Aug. 6 – Oct. 31	64	4,607	89,830	21
	Tongue Point/S. Channel	Sept. 2 – Oct. 31	35	2,451	15,409	97
	Blind/Knappa Sloughs	Aug. 25 – Oct. 31	38	1,903	3,988	28
	Deep River	Sept. 2 – Oct. 31	35	168	3,163	3
	Steamboat Slough	Sept. 2 – Oct. 31	35	44	107	0
	Total		**207**	**9,173**	**112,497**	**149**
2004	Youngs Bay	Aug. 4 – Oct. 31	62	3,890	34,613	23
	Tongue Point/S. Channel	Aug. 31 – Oct. 29	34	2,124	10,196	33
	Blind/Knappa Sloughs	Aug. 24 – Oct. 29	37	6,235	1,355	59
	Deep River	Aug. 23 – Oct. 29	40	393	5,780	2
	Steamboat Slough	Aug. 31 – Oct. 29	34	0	0	0
	Total		**207**	**12,642**	**51,944**	**117**

continued

Table 3.7. (continued)

Year	Area	Dates	Days	Chinook	Coho	White Sturgeon
2005	Youngs Bay	Aug. 3 – Oct. 31	63	4,289	42,361	37
	Tongue Point/S. Channel	Aug. 30 – Oct. 28	34	1,919	19,083	29
	Blind/Knappa Sloughs	Aug. 30 – Oct. 28	34	2,124	1,777	0
	Deep River	Aug. 30 – Oct. 28	34	364	2,586	8
	Steamboat Slough	Aug. 30 – Oct. 28	34	0	0	0
	Total		**199**	**8,696**	**65,807**	**74**
2006	Youngs Bay	Aug. 2 – Oct. 31	63	3,878	20,967	77
	Tongue Point/S. Channel	Sept. 5 – Oct. 27	30	305	11,567	21
	Blind/Knappa Sloughs	Sept. 5 – Oct. 27	30	190	2,884	3
	Deep River	Sept. 4 – Oct. 27	32	184	2,235	8
	Total		**155**	**4,557**	**37,653**	**109**
2007	Youngs Bay	Aug. 1 – Oct. 31	64	4,002	3,301	64
	Tongue Point/S. Channel	Sept. 4 – Oct. 26	30	269	2,043	66
	Blind/Knappa Sloughs	Sept. 4 – Oct. 31	30	87	2,498	13
	Deep River	Sept. 3 – Oct. 26	32	175	2,674	5
	Total		**156**	**4,533**	**10,516**	**148**
2008	Youngs Bay	Aug. 6 – Oct. 31	64	10,570	27,203	58
	Tongue Point/S. Channel	Sept. 2 – Oct. 31	34	1,176	7,753	46
	Blind/Knappa Sloughs	Sept. 2 – Oct. 31	34	2,003	5,366	28
	Deep River	Sept. 1 – Oct. 31	36	248	14,829	2
	Total		**168**	**13,997**	**55,151**	**134**
2009	Youngs Bay	Aug. 5 – Oct. 31	65	6,565	49,329	72
	Tongue Point/S. Channel	Aug. 31 – Oct. 30	36	872	16,918	11
	Blind/Knappa Sloughs	Aug. 25 – Oct. 30	38	3,991	10,043	20
	Deep River	Aug. 31 – Oct. 30	38	562	4,660	11
	Total		**177**	**11,990**	**80,950**	**114**
2010	Youngs Bay	Aug. 4 – Oct. 31	64	8,048	27,564	37
	Tongue Point/S. Channel	Aug. 30 – Oct. 29	36	1,402	6,734	31
	Blind/Knappa Sloughs	Aug. 30 – Oct. 29	36	10,205	5,201	45
	Deep River	Aug. 16 – Oct. 29	40	1,011	19,260	3
	Total		**176**	**20,666**	**58,759**	**116**
2011	Youngs Bay	Aug. 3 – Oct. 31	69	12,339	26,538	0
	Tongue Point/S. Channel	Aug. 30 – Oct. 29	36	2,527	6,504	0
	Blind/Knappa Sloughs	Aug. 30 – Oct. 29	36	5,768	1,388	0
	Deep River	Aug. 16 – Oct. 29	40	2,295	15,083	0
	Total		**181**	**22,929**	**49,513**	**0**
2012	Youngs Bay	Aug. 1 – Oct. 31	68	16,197	5,986	0
	Tongue Point/S. Channel	Aug. 30 – Oct. 29	36	2,466	3,902	0
	Blind/Knappa Sloughs	Aug. 30 – Oct. 29	36	3,366	1,534	0
	Deep River	Aug. 16 – Oct. 29	36	1,691	3,932	0
	Total		**176**	**23,720**	**15,354**	**0**
2013	Youngs Bay	Jul. 31 – Oct. 31	69	14,359	14,254	38
	Tongue Point/S. Channel	Aug. 26 – Oct. 31	39	5,821	14,157	42
	Blind/Knappa Sloughs	Aug. 26 – Oct. 31	39	2,362	3,882	14
	Deep River	Aug. 26 – Oct. 18	30	1,592	10,002	8
	Total		**177**	**24,134**	**42,295**	**102**

continued

Table 3.7. (continued)

Year	Area	Dates	Days	Chinook	Coho	White Sturgeon
	Youngs Bay	Aug. 5 – Oct. 31	68	11,829	65,917	0
	Tongue Point/S. Channel	Aug. 25 – Oct. 31	46	5,460	50,752	0
2014	Blind/Knappa Sloughs	Aug. 25 – Oct. 31	46	4,661	24,573	0
	Deep River	Aug. 18 – Oct. 24	37	2,248	27,255	0
	Total		**197**	**24,198**	**168,497**	**0**
	Youngs Bay	Aug. 4 – Oct. 30	63	6,765	11,461	0
	Tongue Point/S. Channel	Aug. 24 – Oct. 30	46	3,614	9,721	0
2015	Blind/Knappa Sloughs	Aug. 24 – Oct. 30	46	3,405	1,698	0
	Deep River	Aug. 17 – Oct. 20	36	4,303	4,519	0
	Total		**191**	**18,087**	**27,399**	**0**
	Youngs Bay	Aug. 2 – Oct. 31	65	6,398	15,784	0
	Tongue Point/S. Channel	Aug. 24 – Oct. 28	36	2,007	11,284	0
2016[a]	Blind/Knappa Sloughs	Aug. 24 – Oct. 28	40	2,027	1,493	0
	Deep River	Aug. 1 – Oct. 19	45	1,999	6,162	0
	Total		**186**	**12,431**	**34,723**	**0**

[a] Preliminary landings

Table 3.8. Ex-vessel values of Chinook landings in winter, spring, and summer Select Area commercial fisheries, 2006-2016.

Year	Site	Winter			Spring			Summer			Total
		Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	
2006	Youngs Bay	6,920	$5.88	$40,690	53,411	$4.91	$262,248	6,265	$2.73	$17,103	$320,041
	Blind Slough	2,276	$5.94	$13,519	13,964	$4.90	$68,424				$81,943
	Tongue Point										$0
	Deep River	0		$0	362	*$4.90*	$1,774				$1,774
	Totals	***9,196***	***$5.89***	***$54,209***	***67,737***	***$4.91***	***$332,446***	***6,265***	***$2.73***	***$17,103***	***$403,758***
2007	Youngs Bay	13,582	$7.97	$108,249	59,079	$4.59	$271,173	3,975	$3.55	$14,111	$393,533
	Blind Slough	1,386	$6.94	$9,619	20,832	$4.65	$96,869				$106,488
	Tongue Point										$0
	Deep River	0		$0	439	*$4.65*	$2,041				$2,041
	Totals	***14,968***	***$7.87***	***$117,868***	***80,350***	***$4.61***	***$370,083***	***3,975***	***$3.55***	***$14,111***	***$502,062***
2008	Youngs Bay	3,425	$10.63	$36,408	23,460	$6.45	$151,317	16,484	$3.59	$59,178	$246,903
	Blind Slough	779	$10.09	$7,860	11,290	$6.06	$68,417				$76,277
	Tongue Point				3,323	$6.14	$20,403				$20,403
	Deep River	0		$0	328	*$6.06*	$1,988				$1,988
	Totals	***4,204***	***$10.53***	***$44,268***	***38,401***	***$6.31***	***$242,125***	***16,484***	***$3.59***	***$59,178***	***$345,571***
2009	Youngs Bay	2,369	$8.11	$19,213	22,229	$4.79	$106,477	16,957	$2.89	$49,006	$174,695
	Blind Slough	1,408	$8.13	$11,447	8,641	$4.67	$40,353				$51,801
	Tongue Point				1,572	$5.00	$7,860				$7,860
	Deep River	579	*$8.13*	$4,707	1,146	*$4.67*	$5,352				$10,059
	Totals	***4,356***	***$8.12***	***$35,367***	***33,588***	***$4.76***	***$160,042***	***16,957***	***$2.89***	***$49,006***	***$244,415***
2010	Youngs Bay	13,580	$9.17	$124,523	214,631	$4.66	$1,000,558	13,340	$3.45	$45,993	$1,171,074
	Blind Slough	4,548	$8.42	$38,302	30,262	$4.65	$140,801	0		$0	$179,103
	Tongue Point	0		$0	8,593	$4.16	$35,737	0		$0	$35,737
	Deep River	3,206	$7.68	$24,608	2,126	$6.25	$13,283	0		$0	$37,890
	Totals	***21,334***	***$8.79***	***$187,433***	***255,612***	***$4.66***	***$1,190,379***	***13,340***	***$3.45***	***$45,993***	***$1,423,804***
2011	Youngs Bay	1,353	$9.45	$12,780	89,857	$5.95	$534,384	28,220	$3.09	$87,220	$634,383
	Blind Slough	1,930	$8.50	$16,399	20,408	$5.93	$121,031	0		$0	$137,429
	Tongue Point	0		$0	9,057	$6.00	$54,347	0		$0	$54,347
	Deep River	320	$8.97	$2,871	1,148	$6.34	$7,284	0		$0	$10,155
	Totals	***3,603***	***$8.90***	***$32,049***	***120,470***	***$5.95***	***$717,045***	***28,220***	***$3.09***	***$87,220***	***$836,314***
2012	Youngs Bay	4,265	$9.68	$41,292	72,001	$5.91	$425,342	29,319	$3.94	$115,603	$582,238
	Blind Slough	623	$10.04	$6,256	10,310	$5.83	$60,059	0		$0	$66,315
	Tongue Point	0		$0	6,324	$5.77	$36,492	0		$0	$36,492
	Deep River	89	$10.12	$901	464	$5.67	$2,633	0		$0	$3,534
	Totals	***4,977***	***$9.73***	***$48,449***	***89,099***	***$5.89***	***$524,526***	***29,319***	***$3.94***	***$115,603***	***$688,579***

Table 3.8. (continued)

Year	Site	Winter			Spring			Summer			Total
		Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	
2013	Youngs Bay	4,828	$11.29	$54,486	55,423	$7.20	$399,200	33,364	$4.21	$140,296	$593,981
	Blind Slough	2,220	$11.07	$24,577	9,840	$7.25	$71,381	0		$0	$95,957
	Tongue Point	1,035	$12.18	$12,605	3,941	$7.25	$28,556	0		$0	$41,161
	Deep River	1,042	$10.02	$10,446	696	$8.24	$5,736	0		$0	$16,182
	Totals	***9,125***	***$11.19***	***$102,113***	***69,900***	***$7.22***	***$504,872***	***33,364***	***$4.21***	***$140,296***	***$747,280***
2014	Youngs Bay	3,393	$13.02	$44,170	25,064	$5.59	$140,136	29,377	$3.44	$100,963	$285,270
	Blind Slough	2,391	$12.24	$29,262	3,567	$5.86	$20,890	0		$0	$50,152
	Tongue Point	493	$14.73	$7,260	489	$5.73	$2,804	0		$0	$10,064
	Deep River	543	$11.50	$6,242	287	$6.65	$1,908	0		$0	$8,150
	Totals	***6,820***	***$12.75***	***$86,934***	***29,407***	***$5.64***	***$165,738***	***29,377***	***$3.44***	***$100,963***	***$353,635***
2015	Youngs Bay	8,016	$10.03	$80,399	73,382	$6.12	$449,240	21,464	$3.43	$73,540	$603,178
	Blind Slough	1,436	$9.97	$14,322	28,411	$6.50	$184,698	4,083	$3.62	$14,785	$213,805
	Tongue Point	964	$10.96	$10,561	13,343	$5.75	$76,761	0		$0	$87,322
	Deep River	1,264	$10.21	$12,901	1,249	$7.69	$9,609	0		$0	$22,510
	Totals	***11,680***	***$10.12***	***$118,182***	***116,385***	***$6.19***	***$720,308***	***25,547***	***$3.46***	***$88,325***	***$926,815***
2016	Youngs Bay	14,665	$11.48	$168,395	44,865	$7.41	$332,444	23,726	$4.75	$112,743	$613,582
	Blind Slough	1,937	$11.25	$21,784	19,436	$7.31	$142,070	10,727	$4.74	$50,837	$214,690
	Tongue Point	1,538	$10.95	$16,847	7,222	$7.28	$52,611	4,480	$4.85	$21,725	$91,183
	Deep River	915	$10.00	$9,153	100	$6.58	$658	0		$0	$9,811
	Totals	***19,055***	***$11.34***	***$216,179***	***71,623***	***$7.37***	***$527,782***	***38,933***	***$4.76***	***$185,305***	***$929,266***

Table 3.9. Ex-vessel values of fall season Chinook and Coho landings in Select Area commercial fisheries by site, 2006–2016.

Year	Site	Chinook			Coho			Total
		Landings (pounds)	Ave. price ($/lb.) [a]	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.) [b]	Ex-vessel value	
2006	Youngs Bay	52,370	$2.10	$109,977	218,567	$1.31	$286,323	$396,300
	Blind Slough	3,543	$0.61	$2,161	29,603	$1.31	$38,780	$40,941
	Tongue Point	4,470	$1.62	$7,241	118,130	$1.31	$154,750	$161,992
	Deep River	2,490	$2.32	$5,777	23,466	$1.29	$30,271	$36,048
	Totals	***62,873***	***$1.99***	***$125,156***	***389,766***	***$1.31***	***$510,124***	***$635,281***
2007	Youngs Bay	41,640	$2.90	$120,756	28,020	$1.45	$40,629	$161,385
	Blind Slough	1,143	$0.80	$914	20,042	$1.50	$30,063	$30,977
	Tongue Point	2,520	$2.10	$5,292	18,034	$1.46	$26,330	$31,622
	Deep River	1,834	$1.46	$2,678	22,710	$1.54	$34,973	$37,651
	Totals	***47,137***	***$2.75***	***$129,640***	***88,806***	***$1.49***	***$131,995***	***$261,635***
2008	Youngs Bay	138,072	$2.74	$378,317	284,773	$1.28	$364,509	$742,827
	Blind Slough	37,794	$1.34	$50,644	45,287	$1.38	$62,496	$113,140
	Tongue Point	17,905	$1.84	$32,945	77,756	$1.36	$105,748	$138,693
	Deep River	3,456	$2.52	$8,709	174,308	$1.37	$238,802	$247,511
	Totals	***197,227***	***$2.39***	***$470,616***	***582,124***	***$1.33***	***$771,556***	***$1,242,171***
2009	Youngs Bay	97,439	$1.85	$180,262	459,102	$1.24	$569,286	$749,549
	Blind Slough	76,615	$0.87	$66,655	87,092	$1.08	$94,059	$160,714
	Tongue Point	10,910	$1.40	$15,274	155,886	$1.22	$190,181	$205,455
	Deep River [12]	7,771	$1.63	$12,628	38,689	$1.08	$41,784	$54,412
	Totals	***192,735***	***$1.43***	***$274,819***	***740,769***	***$1.21***	***$895,311***	***$1,170,130***
2010	Youngs Bay	104,827	$1.98	$207,203	283,102	$1.36	$384,489	$591,692
	Blind Slough	192,148	$0.88	$168,788	50,832	$1.31	$66,794	$235,582
	Tongue Point	18,333	$1.39	$25,535	68,158	$1.41	$95,878	$121,413
	Deep River	11,244	$1.50	$16,882	193,834	$1.23	$239,118	$256,001
	Totals	***326,552***	***$1.28***	***$418,408***	***595,926***	***$1.32***	***$786,279***	***$1,204,688***
2011	Youngs Bay	169,666	$2.44	$413,962	255,795	$1.63	$417,795	$831,757
	Blind Slough	106,812	$0.93	$99,404	11,511	$1.74	$20,066	$119,470
	Tongue Point	36,653	$1.58	$58,001	59,860	$1.73	$103,428	$161,429
	Deep River	34,030	$1.48	$50,211	140,006	$1.53	$213,829	$264,040
	Totals	***347,161***	***$1.79***	***$621,578***	***467,172***	***$1.62***	***$755,117***	***$1,376,696***
2012	Youngs Bay	190,858	$1.72	$327,964	45,335	$1.59	$72,060	$400,024
	Blind Slough	53,249	$0.89	$47,393	11,137	$1.69	$18,768	$66,161
	Tongue Point	31,586	$1.25	$39,520	27,843	$1.57	$43,831	$83,351
	Deep River	19,355	$1.37	$26,531	24,556	$1.58	$38,834	$65,365
	Totals	***295,048***	***$1.50***	***$441,408***	***108,871***	***$1.59***	***$173,493***	***$614,901***

Table 3.9. (continued)

Year	Site	Chinook			Coho			Total
		Landings (pounds)	Ave. price ($/lb.) [a]	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.) [b]	Ex-vessel value	
2013	Youngs Bay	198,365	$2.66	$526,932	112,696	$1.90	$213,856	$740,788
	Blind Slough	33,724	$1.56	$52,480	27,164	$1.68	$45,551	$98,031
	Tongue Point	76,660	$2.18	$167,471	104,655	$1.83	$191,613	$359,084
	Deep River	19,296	$1.80	$34,680	70,902	$1.80	$127,894	$162,574
	Totals	***328,045***	***$2.38***	***$781,563***	***315,417***	***$1.84***	***$578,914***	***$1,360,477***
2014	Youngs Bay	153,929	$1.84	$282,531	595,572	$1.15	$683,291	$965,822
	Blind Slough	68,055	$1.25	$85,193	179,407	$1.17	$209,531	$294,724
	Tongue Point	65,760	$1.43	$94,266	436,516	$1.15	$504,035	$598,301
	Deep River	24,532	$1.43	$35,018	226,281	$1.00	$225,800	$260,818
	Totals	***312,276***	***$1.59***	***$497,008***	***1,437,776***	***$1.13***	***$1,622,657***	***$2,119,665***
2015	Youngs Bay	76,886	$1.95	$150,174	80,069	$1.46	$116,786	$266,960
	Blind Slough	43,903	$1.49	$65,328	11,346	$1.63	$18,458	$83,786
	Tongue Point	43,234	$1.84	$79,589	67,032	$1.54	$103,449	$183,037
	Deep River	48,290	$1.77	$85,610	29,900	$1.63	$48,856	$134,465
	Totals	***212,313***	***$1.79***	***$380,700***	***188,347***	***$1.53***	***$287,548***	***$668,248***
2016	Youngs Bay	61,558	$2.58	$159,069	119,795	$1.79	$215,007	$374,076
	Blind Slough	25,731	$1.80	$46,239	11,794	$1.94	$22,858	$69,097
	Tongue Point	20,133	$2.22	$44,756	81,952	$1.90	$155,881	$200,637
	Deep River	22,880	$2.46	$56,335	47,343	$1.86	$88,147	$144,482
	Totals	***130,302***	***$2.35***	***$306,399***	***260,884***	***$1.85***	***$481,893***	***$788,292***

[a] Deep River Chinook average price estimates were derived from an average of same year Youngs Bay and Tongue Point prices.
[b] Deep River Coho average price estimates were adapted from same year Blind Slough prices.

4. RUN RECONSTRUCTION and SMOLT-TO-ADULT SURVIVAL

Cohort reconstruction and rates of smolt-to-adult survival (SAS) are calculated using data retrieved from the Regional Mark Processing Center (RMPC) coded-wire tag database (www.rmpc.org). For each relevant tag group, all CWT recoveries reported as of May 2017 were used to calculate SAS and rates of return to for salmon released from the SAFE project. CWT groups are used as a surrogate for associated non-tagged release groups. Survival rates are calculated separately for sub-adults (jacks) and adults based on age-specific CWT recoveries. Survival rates in this report represent smolt-to-adult rates and do not include jack survival. Adult returns are categorized by type of recovery (e.g., ocean or freshwater fishery, commercial or recreational fishery, hatchery or stream escapement) to determine a rate of return (or contribution) to regional fisheries and escapement.

The following is excerpt from the Regional Overview of Coded-Wire Tagging of Anadromous Salmonid and Steelhead in Northwest America (Johnson, update from 1989 to 2004) to provide detail regarding methods used for expansion of CWT recoveries.

Recovery Estimation Equations

The total number of fish from a particular release group that are caught in a particular area (or landed at a particular port) during a particular time period can be estimated in a two-step process. The first step is to estimate the number of tagged fish in the fishery sample for that area (or port) and time:

$$R_T = aR_O;$$

R_T = the estimated total recoveries of tags bearing the release group's code;
R_O = the observed number of tags of the appropriate code;
a = a sampling expansion factor: (total catch)/(sampled catch).

The second step is to account for the fraction of the release group that was tagged:

$$C = bR_T;$$

C = the total estimated contribution of the release group to the fishery in that area at that time;
b = a marking expansion factor: (total fish released)/(total fish marked).

These are the simplest forms of the recovery expansion equations. Typically, the sampling expansion factor is adjusted to account for biases introduced by snouts with no tags, snouts sampled but not taken, lost snouts, and lost tags.

Reporting

Upon completion of this process, the recovery agency forwards the observed and estimated tag recovery data and associated catch and sample data on magnetic tape to the Mark Center. The Mark Center checks the data for errors and works with the recovery agency to resolve discrepancies. Once validated, the CWT data (preliminary or final) are combined with those of other recovery agencies in the online CWT database.

For the purposes of the SAFE project, estimates of SAS are calculated using Equation 1 below. Survival of fish from an individual brood year is treated as independent even and is unweighted by release size when considering multiple years.

Equation 1:

$$\overline{SAS} = \frac{1}{\sum i} \times \sum_{i=m}^{n} (R_i / M_i)$$

Where:

$$R_i = The\ number\ of\ CWTs\ recovered\ from\ brood\ year\ i$$

$$M_i = Number\ of\ CWTs\ (marks)\ released\ in\ brood\ year\ i$$

$$m = lower\ bound\ brood\ year$$

$$n = upper\ bound\ brood\ year$$

Estimating rates of survival and straying is an extensive process for various reasons. The life history patterns of salmon introduce inherent delays into the process; it takes six years for a complete spring Chinook Cohort to return. Preliminary tag recovery, catch sampling, and fishery effort data should be reported to the RMPC by January 31 of the year following the run year (PSC 2017). In practice however, reporting agencies require a substantial amount of time to process and report finalized CWT recovery data to the RMPC. The RMPC database is continually updated as new information becomes available from the individual reporting agencies. As a result, final recoveries of all age classes of a study group may not be accessible for up to eight years post-release.

As described in Johnson (2004), each sampling agency employs slightly different sampling programs, yet strives for a mark-sample rate of 20% of landed catch. In some instances (e.g. Prince William Sound, Alaska), no sampling for CWTs is conducted. Because of the variation in sampling programs, stratification, and expansion methodology, the use of CWT recoveries to estimate survival will provide a minimum estimate. As long as the myriad of methodologies remain similar, inter-annual comparisons of fishery contributions and survival should be informative.

SPRING CHINOOK

Run reconstruction and survival for spring Chinook included in this report are based on recoveries of 20,713 CWT from 135 tag-groups released between 1998 and 2012 (brood years 1996 – 2010) from SAFE production facilities. This includes tag groups released from net-pens in Youngs Bay (34 groups), Blind Slough (56), Tongue Point (21), and Deep River (21) and from South Fork Hatchery (3 tag groups). These data are used for survival comparisons between SAFE sites for all brood years within the range although fish were not released from all sites in all years.

Smolt-to-Adult Survival Rates

Survival of SAFE spring Chinook is variable between years and release sites by an order of magnitude. However, there appears to be some correlation among sites in years when survival is particularly high or particularly low. This may suggest that a common factor is affecting survival after the fish are reared and released, such as prevailing estuarine and ocean conditions. Average survival (unweighted by year) for all release sites was 0.58% for brood years 1996 – 2010 (Table 4.1). The average brood-specific survival rates ranged between 0.07 – 1.33%. Spring Chinook released from Youngs Bay net-pens had the highest average survival (0.92%) among the release sites for the brood years considered. Survival of fish released from Blind Slough and Tongue Point averaged 0.52% and 0.51%, respectively. Deep River survival averaged 0.23% with no indication of survival for the last four brood years considered.

Run Reconstruction

Table 4.2 and Figure 4.2 depict the average (unweighted by year) distribution rates of SAFE releases to fisheries and return areas for brood years 1996 – 2010. The majority (94.2%) of SAFE-produced spring Chinook were recovered in fisheries with a large portion (77.6%) harvested in Select Area commercial fisheries specifically. SAFE spring Chinook also contributed to commercial and recreational fisheries in the ocean and Columbia River mainstem. The high rates of return to fisheries observed for SAFE spring Chinook upholds one of the SAFE projects primary goals, maximize harvest of local stocks in order to achieve the greatest economic value of the project, while minimizing adverse impacts of the program.

The high rates of harvest of SAFE spring Chinook contributes to low rates of escapement; only 5.7% of returning SAFE-produced spring Chinook escaped past fisheries. Escapement is split into non-natal and natal returns and categorized as returns to hatcheries or spawning grounds. For the purposes of the SAFE program, we consider escapement as natal if the tags are recovered in the Select Area basins (i.e., tributaries and hatcheries in Youngs Bay, Blind Slough, Tongue Point, and Deep River basins) and non-natal (stray) if recovered anywhere else in the Columbia and Willamette River watershed. In addition, returns to Oregon SAFE area from Washington and vice versa are considered strays. For spring Chinook releases from brood years 1996 – 2010, the average non-natal stray rate was 3.1% with very limited (0.04%) straying above Bonneville Dam. More recent recoveries (2001-2010 broods) indicate that stray rates have decreased further still with a stray rate of 0.7%, with zero escapement recoveries above Bonneville dam, and 0.1% escaping to the upper Willamette River (above Willamette Falls).

Analysis of returns by release site suggests that Youngs Bay and Blind Slough releases performed the best with stray rates of 1.80% and 0.98%, respectively (brood years 1996 – 2010). Releases from Tongue Point strayed at a higher rate (7.98%) and Deep River releases strayed the most (12.33%). Again, considering more recent recoveries (2001-2010 broods), stray rates have declined for all sites with rates for Blind Slough, Youngs Bay, Tongue Point, and Deep River estimated at 0.23%, 0.37%, 3.63%, and 3.62%, respectively.

COHO

Run reconstruction and survival for Coho included in this report are based on estimated recoveries of 57,236 CWTs from 120 tag-groups released between 1998 and 2012 (1996 – 2010 brood years) from SAFE production facilities. The CWT groups include 42 tag groups released from net-pens in Youngs Bay, 13 from South Fork Hatchery, 5 from Klaskanine Hatchery, 18 from Blind Slough net-pens, 20

from Tongue Point net-pens, and 22 tag groups from Deep River net-pens. These data are used for comparisons of survival between SAFE sites for all brood years within the range but fish were not released from all sites every year.

Smolt-to-Adult Survival Rates

Survival of SAFE Coho is variable between years and release sites. As with spring Chinook, trends in survival were similar for many years across most sites. Survival of Deep River releases often trended conversely with survival of releases at the other SAFE sites. Average survival (unweighted by year) for all release sites, brood years 1996 – 2010, was 1.68% (range 0.44 – 4.33%, Table 4.1). Coho released from South Fork Klaskanine Hatchery, Tongue Point, and Youngs Bay net-pens exhibited the highest survival rates at 1.99%, 1.98%, and 1.87%, respectively. Deep River releases averaged 1.74% survival and Blind Slough and North Fork Klaskanine releases survived at the lowest rate rates, 1.14%, and 1.12%, respectively. However, North Fork Klaskanine Coho were released in a limited number of years (2006 to 2010 brood years) within the range.

Run Reconstruction

Coho produced by the SAFE program exhibit the highest rate of contribution to fisheries of all SAFE stocks and likely of any salmonid hatchery program in the region. Nearly all returning adults (96.7%) are harvested in fisheries and the majority (72%) are harvest in the Select Area commercial fisheries (1996-2010, brood years). Releases from Youngs Bay, Blind Slough, and Deep River performed similarly with return rates to Select Area fisheries of 78.6%, 73.9%, and 69.8%, respectively. South Fork Klaskanine, North Fork Klaskanine, and Tongue Point releases contributed at slightly lower rates of 63.9%, 61.1%, and 62.5%, respectively. Blind Slough and Tongue Point releases also contributed to mainstem Columbia River commercial fisheries at significant (14.1% and 15.1%, respectively) rates. As with Spring Chinook, the high rates of return to fisheries of SAFE-produced Coho indicate that the project is achieving its primary goals.

Analysis of CWT recoveries indicates that escapement rates of SAFE-produced Coho are very low (3.2%) and consist almost entirely of recoveries at hatcheries (3.1%). From brood years 1996 – 2010, the average non-natal stray rate was 0.6% with zero evidence straying above Bonneville Dam. More recent recovery data indicate that stray rates have decreased further to 0.27% from brood years 2001-2010.

Analysis of returns by origin suggests that Youngs Bay performed well with non-natal stray rates of 0.32% (brood years 1996 – 2010). Deep River, Blind Slough, and South Fork Klaskanine releases strayed at rates of 0.57%, 0.56%, and 0.68, respectively. Stray rates from Tongue Point releases were highest at 0.97%. Releases from North Fork Klaskanine showed no evidence of straying although this is from a limited number of brood years (2006 – 2010).

SELECT AREA BRIGHT FALL CHINOOK (SAB)

Run reconstruction and estimates of survival for SAB fall Chinook included in this report are based on 17,852 recoveries from 769 CWT groups released between 1997 and 2011 (1996 – 2010 brood years) from SAFE production facilities. The tagged groups include 44 groups released from net-pens in Youngs Bay, 7 from South Fork Klaskanine Hatchery, and 18 from Klaskanine Hatchery. Releases from Klaskanine Hatchery and South Fork Klaskanine Hatcheries are intended to supply the

broodstock for the SAB Fall Chinook program and occurred from brood years 1996 to 2004 and brood years 2004 to 2010, respectively.

Smolt-to-Adult Survival Rates

Survival of SAB fall Chinook varies annually but there appears to be a similar effect of brood year among release sites. This suggests that there may be a common factor (e.g., estuarine and ocean conditions) affecting survival after rearing and release. Average survival (unweighted by year) for all release sites was 1.02% (range 0.11 – 2.32%, brood years 1996 – 2010, Table 4.4). Survival for releases from net-pens and hatcheries is 1.12% and 9.96%, respectively.

Run Reconstruction

SAB fall Chinook contribute substantially to a variety of fisheries (Table 4.2; Figure 4.2). As with the other SAFE-produced salmon, the vast majority (87.8%) of adult SABs are harvested. Significant harvest (45.4% of adults) occurs in the Select Area commercial fishery, but a large share are also harvested in ocean commercial fisheries (20.9%). The rest of the return is harvested in ocean commercial fisheries and mainstem Columbia River recreational (majority in the Buoy 10 fishery) and commercial fisheries. Some SAB adults do escape fisheries, end up in streams (2.1%), or return to hatcheries (10.1%).

As reported in North et al. (2006), straying of SAB fall Chinook into Oregon-side tributaries of the Columbia River estuary has been an issue in the past. Moving the broodstock program from Big Creek Hatchery in 1995 reduced straying from 11.53% (1991 to 1995 broods) to the most recent average of 1.89% (all release sites, 1996-2010 brood years). Comparison of stray rates between release strategies for suggests that Youngs Bay net-pens perform the best with an average stray rate of 0.96% (1996-2010 brood years). Releases from the hatcheries strayed at a rate of 3.09% for the same time broods. Direct comparison between South Fork Klaskanine and Klaskanine Hatcheries is confounded because of different release years between sites. However, the stray rate for releases from South Fork Klaskanine releases was 5.35% and that of Klaskanine Hatchery was 0.98% (broods 1996 to 2004 for South Fork and 2004 to 2010 for Klaskanine).

Table 4.1. Smolt-to-adult survival of SAFE spring Chinook by release site, brood years 1996-2010.

Brood Year	Survival Rates By Release Site[1]					All Sites Annual Average [2]
	South Fork Klaskanine	Youngs Bay Net-pens	Blind Slough Net-pens	Tongue Point Net-pens	Deep River Net-pens	
1996		1.48%	0.33%	0.74%	0.02%	0.82%
1997		1.20%	0.78%	0.94%	1.25%	1.02%
1998		0.92%	1.83%	1.20%		1.33%
1999		1.53%	1.19%		0.36%	1.21%
2000		0.54%	1.32%		1.27%	1.05%
2001		0.07%	0.04%	0.35%	0.18%	0.12%
2002	0.59%	1.37%	0.18%	0.61%	0.00%	0.36%
2003	0.07%	0.10%	0.07%	0.30%	0.00%	0.10%
2004	0.01%	0.45%	0.40%	0.35%	0.04%	0.31%
2005		0.75%	0.15%	0.33%	0.01%	0.26%
2006		3.34%	0.69%	0.20%	0.02%	0.89%
2007		0.63%	0.18%	0.19%	0.00%	0.23%
2008		1.14%	0.38%	1.16%	0.00%	0.82%
2009		0.18%	0.11%	0.24%	0.00%	0.13%
2010 [3]		0.16%	0.07%	0.03%	0.00%	0.07%
Average [4]	*0.22%*	*0.92%*	*0.52%*	*0.51%*	*0.23%*	*0.58%*
SD [5]	*0.32%*	*0.84%*	*0.54%*	*0.38%*	*0.45%*	*0.45%*

[1] Survival rates are based on expanded CWT recoveries of all release groups from each area.
[2] Average of all release sites.
[3] Preliminary Results
[4] Unweighted average of survival rate.
[5] Standard Deviation of survival rate.

Table 4.2. Distribution of returning adult salmon from SAFE project releases.

		Spring Chinook (BY 1996-2010)	Coho (BY 1996-2010)	SAB Fall Chinook (BY 1996-2010)
Commercial Fisheries	Select Area	77.6%	72.0%	45.4%
	Columbia River Mainstem	5.1%	8.3%	6.8%
	Ocean	7.7%	1.0%	20.9%
	subtotal	***90.4%***	***81.2%***	***73.1%***
Recreational Fisheries	Ocean	1.1%	11.1%	8.8%
	Freshwater [1]	2.8%	4.4%	5.9%
	subtotal	***3.8%***	***15.5%***	***14.7%***
Escapement	Hatcheries	4.4%	3.1%	10.1%
	Streams	1.3%	0.1%	2.1%
	subtotal	***5.7%***	***3.2%***	***12.2%***
Miscellaneous	Other Recoveries[2]	0.1%	0.1%	0.0%

[1] Includes Columbia River Mainstem, Select Areas, and Columbia River tributaries.

[2] Includes recoveries in ocean surveys and coastal tributaries.

Table 4.3. Smolt-to-Adult survival of SAFE project Coho, brood years 1996-2010.

Brood Year	Survival Rates By Release Site[1]						All Sites Average [2]
	South Fork Klaskanine	North Fork Klaskanine	Youngs Bay Net-pens	Blind Slough Net-pens	Tongue Point Net-pens	Deep River Net-pens	
1996	0.93%		0.92%	1.55%	3.87%	1.42%	1.22%
1997	0.50%		1.65%	0.73%	1.43%	5.48%	2.14%
1998	3.88%		2.09%	2.21%	3.29%	0.60%	2.19%
1999	2.90%		1.96%	0.00%	1.80%	0.05%	1.33%
2000	7.59%		5.93%	2.34%	3.93%	2.03%	4.30%
2001	1.21%		1.95%	0.04%	2.68%	1.71%	1.60%
2002			3.04%	0.01%	4.07%	0.37%	2.21%
2003			1.26%	0.54%	3.29%	2.17%	1.66%
2004			0.31%	1.41%	0.66%	1.11%	0.75%
2005			1.04%	1.24%	0.74%	3.47%	1.87%
2006	2.42%	1.83%	4.59%	4.52%	0.93%	1.51%	2.59%
2007	0.96%	0.30%	0.85%	1.30%	0.32%	3.19%	1.09%
2008	0.57%	1.42%	1.23%	0.00%	0.53%	1.40%	0.80%
2009	0.61%	0.96%	0.47%	0.27%	0.20%	0.37%	0.44%
2010 [3]	0.32%	1.08%	0.74%	0.91%	2.02%	1.18%	1.04%
Average [4]	*1.99%*	*1.12%*	*1.87%*	*1.14%*	*1.98%*	*1.74%*	*1.68%*
SD [5]	*2.18%*	*0.57%*	*1.57%*	*1.22%*	*1.42%*	*1.42%*	*0.96%*

[1] Survival rates are based on expanded CWT recoveries of all release groups from each area.
[2] Average of all release sites.
[3] Preliminary Results
[4] Unweighted average of survival rate.
[5] Standard Deviation of survival rate.

Table 4.4. Smolt-to-Adult survival of SAFE project Select Area Bright fall Chinook, brood years 1996-2010.

Brood Year	Survival Rates By Release Site[1]			All Sites Average[2]
	Youngs Bay Net-pens	South Fork Klaskanine	North Fork Klaskanine	
1996	0.07%		0.39%	0.11%
1997	0.26%		0.57%	0.36%
1998	1.82%		0.87%	1.58%
1999	1.43%		3.13%	1.97%
2000	1.28%		1.22%	1.26%
2001	0.88%		0.23%	0.69%
2002	0.39%		0.38%	0.38%
2003	0.12%		0.39%	0.26%
2004	1.90%	0.49%	0.89%	1.18%
2005	1.73%	0.53%		1.11%
2006	0.43%	0.37%		0.40%
2007	1.06%	0.81%		0.92%
2008	1.04%	0.63%		0.82%
2009	1.96%	1.92%		1.94%
2010 [3]	2.41%	2.23%		2.32%
Average [4]	*1.12%*	*1.00%*	*0.90%*	*1.02%*
SD [5]	*0.75%*	*0.76%*	*0.89%*	*0.69%*

[1] Survival rates are based on expanded CWT recoveries of all release groups from each area.
[2] Average of all release sites.
[3] Preliminary Results
[4] Unweighted average of survival rate.
[5] Standard Deviation of survival rate.

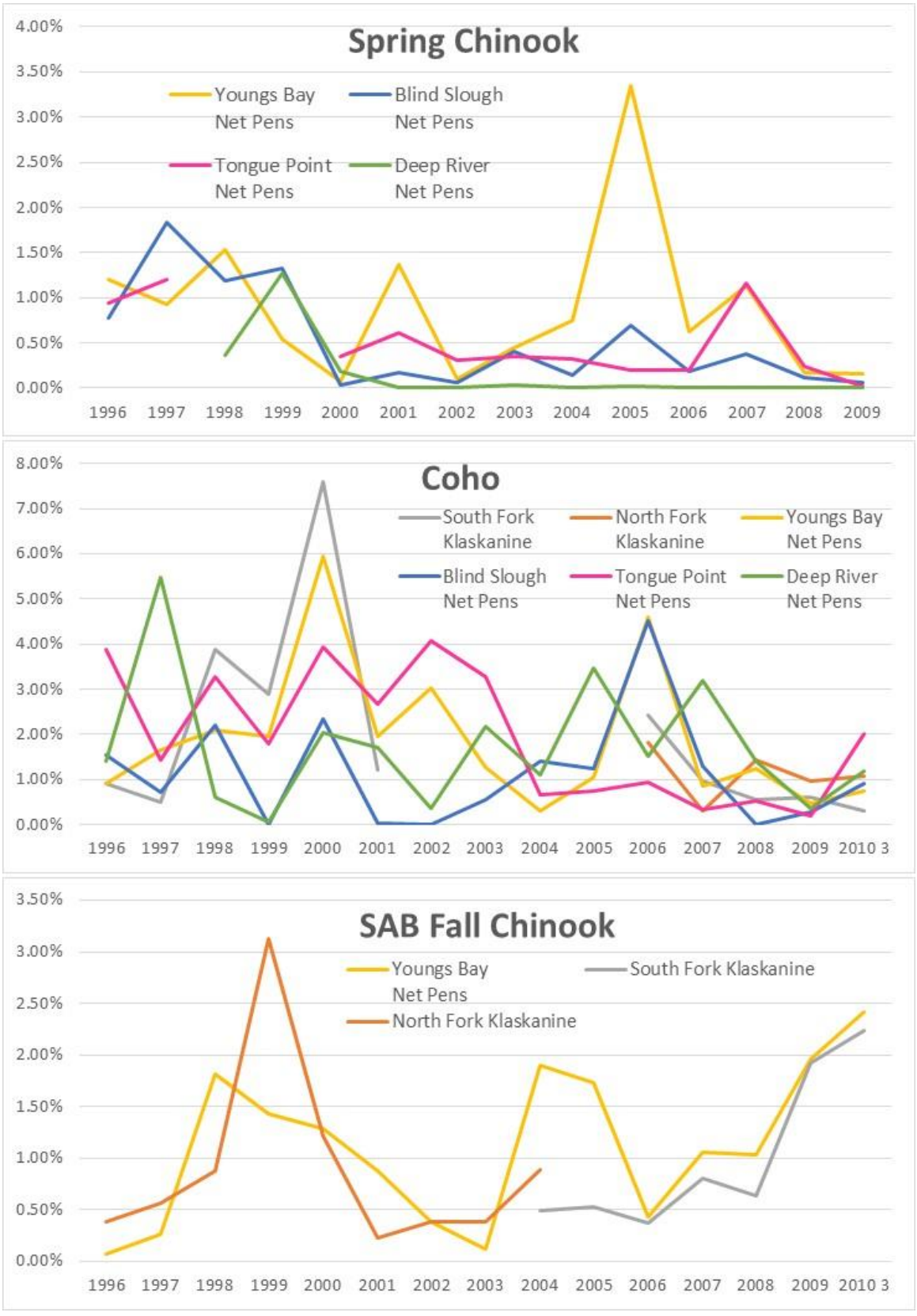
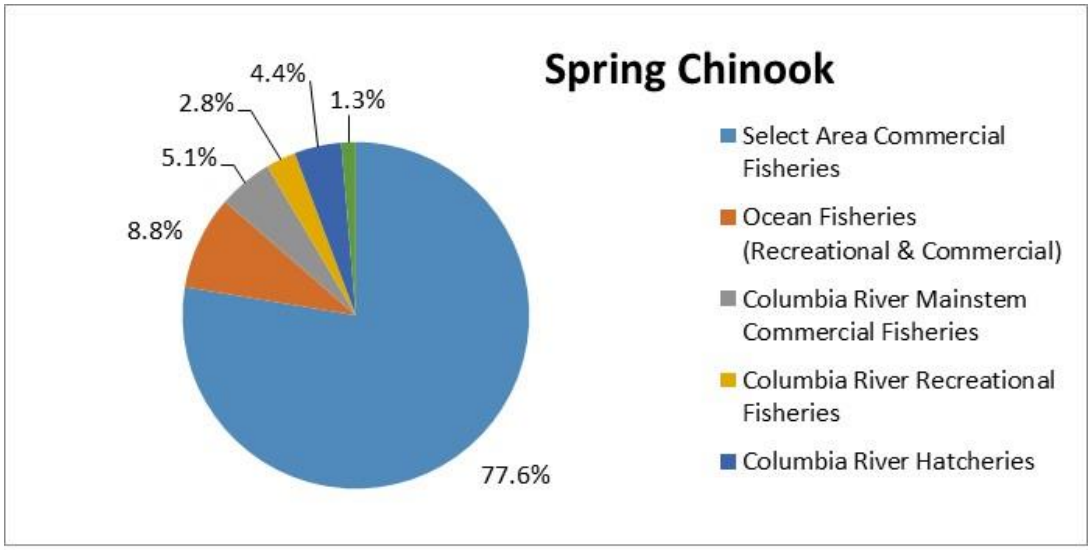
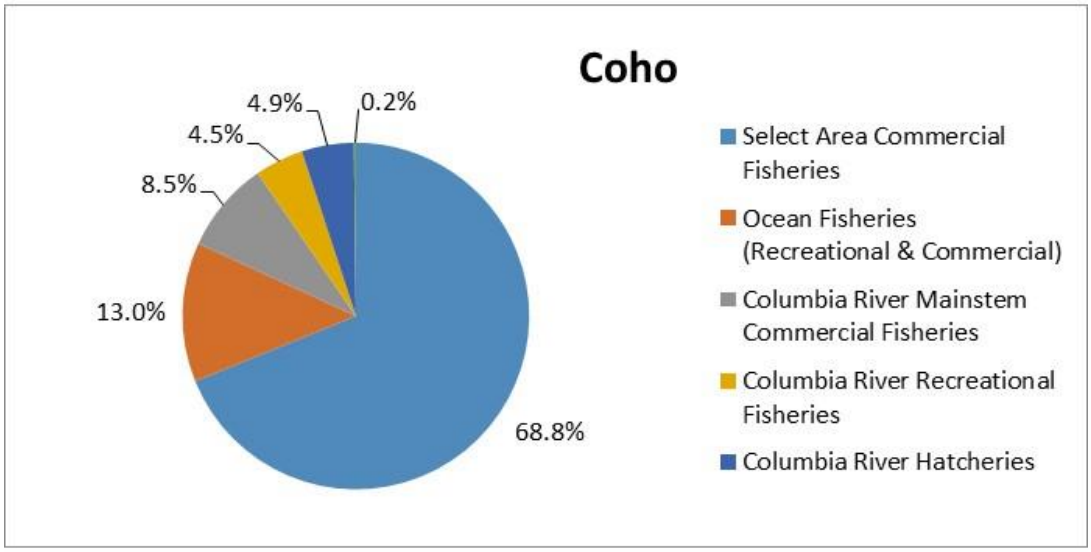


Figure 4.1. Smolt to adult survival of SAFE-produced spring Chinook, Coho, and SAB fall Chinook, brood years 1996-2010.





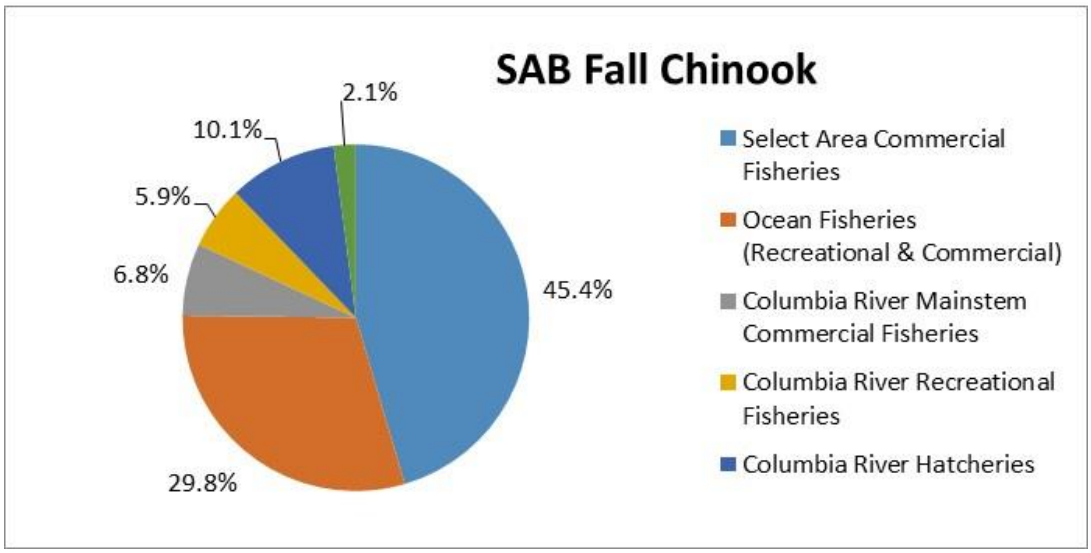


Figure 4.2. Distribution of returning adult salmon from SAFE project releases, brood years 1996-2010.

5. ESCAPEMENT

SPAWNING GROUND SURVEYS

Spawning Ground Surveys (SGS) for fall Chinook and Coho are conducted annually on many LCR tributaries by ODFW and WDFW staff. Surveys are funded through several programs, including the BPA funded CWT Recovery project in Washington, WDFW's Intensively Monitored Watershed (IMW) program, Fish In Fish Out (FIFO) monitoring program, Grays-Elochoman adult weir and surveys project, and by ODFW's Oregon Adult Salmonid Inventory and Sampling project (OASIS). These projects provide a wide range of coverage on LCR tributaries that may be susceptible to escapement and straying of SAFE-produced fish. Salmon in the LCR are partitioned into Major Populations Groups (MPGs) and into individual populations. The populations considered in this report are in the Coast MPG and specifically include the following populations: Youngs Bay, Big Creek, and Clatskanie populations in Oregon and Grays/Chinook, and Elochoman/Skamokawa populations in Washington.

Each of the regional SGS program has unique project goals and survey protocols; however, all programs examine carcasses for the presence of fin marks and CWTs. Adipose fin-clips are used to provide estimates of percent Hatchery Origin Spawners (pHOS) and other fin marks, if present, can be used to identify presence of fish from specific programs. In the case of the SAFE program, all of the spring Chinook are marked with an adipose fin-clip and all of the SAB fall Chinook are marked with a left ventral (LV) fin-clip. For fall Chinook SGS in the Coast MPG, left ventral fin-clips can be used to differentiate SABs from other fall Chinook (tules) on spawning grounds. CWT recoveries can also be used to identify presence/absence of individual release groups on spawning grounds but the data cannot be used to estimate pHOS of an individual stock because mark-sample rates are often unreported or unreliable for SGS. Assumptions are often made as to the origin of hatchery fish on spawning grounds by considering the proximity of hatchery programs to the survey areas.

In general, surveys are conducted throughout the spawning period, which is typically mid-September through early November, depending on the species and stock. A minimum of three surveys are conducted on each stream. These surveys are done by jet boat, cataraft, and/or on foot. Typical metrics include counts of live (adults and jacks) and dead fish by species, redd counts, and biological data/samples collected from carcasses. The biological data/samples collected from salmon carcasses consist of fork length, scales, the presence of any fin marks and/or tags, and spawning success. Tails are removed from all carcasses after sampling to prevent duplicate sampling. Water conditions (visibility and stream flow) are recorded during each survey. Survey data are used to estimate escapement, stock composition, and age composition of fish on spawning grounds. These estimates are used to assist with run reconstruction, run forecasting, and assessment of local and regional pHOS.

ODFW Surveys

Fall Chinook

The Oregon portion of the Lower Columbia River fall Chinook Evolutionary Significant Unit (ESU) extends from the mouth of the Columbia River to the Sandy River. Surveys for fall Chinook are conducted in tributaries of the LCR during September and October. ODFW OASIS program has conducted an intensive monitoring program for Coho (see Coho section) for many years and in recent years (since 2012) has taken over the fall Chinook SGS program. Methodologies and reports from

these surveys can be found online at http://odfw.forestry.oregonstate.edu/spawn/. Number of surveys and miles surveyed vary on an annual basis depending on river conditions. Surveys and distances are present for 2016 in Table 5.1. A total of 4 miles of stream were surveyed in 2016 in the Youngs Bay and another 10 miles are surveyed in the Big Creek and Clatskanie populations.

Results from SGSs pertinent to the evaluation of the SAFE project are discussed in this report for years 2012 through 2016. Percent SABs on spawning grounds in Youngs Bay, Big Creek, and Clatskanie populations are presented in Table 5.2.

During the 2012-2016 fall Chinook surveys in Youngs Bay basin 4,335 fish were mark sampled for fin marks and CWT's. Of the sampled fish an average of 867 (39%) had a LV fin-clip indicating that they were SAB stock. During the same period, surveys in the Big Creek mark-sampled 2,160 fall Chinook detecting 12 (3.2%)LV clips and surveys in the Clatskanie detected 11 (0.3%) SABs out of 5,247 mark sampled fish.

Coho

Since 2002, the ODFW OASIS program has conducted an intensive monitoring program focused on the Oregon portion of the LCR Coho ESU. OASIS data are used in evaluation of SAFE project goals. Details on the OASIS Coho survey methodology and analyses can be found online at http://odfw.forestry.oregonstate.edu/spawn/. The population estimation technique relies on a random sample of available Coho spawning habitat and is supplemented with standard surveys.

The Oregon portion of the Lower Columbia River ESU extends from the mouth of the Columbia River to Hood River. Analysis is conducted at the population level, similar to fall Chinook. The Youngs Bay and Big Creek and Clatskanie populations are most likely to be affected by SAFE project releases and are the focus of discussion in this report. Table 5.3 provides estimated Coho spawner abundance, by population. Due to lack of adequate sample rate information, recoveries are not expanded to correspond with basin wide population estimates, but instead attempt to characterize presence of SAFE fish into each respective basin.

In return-years prior to 2013, OASIS project summaries indicated that the majority (70%, 10-year average, Table 5.3) of the Coho observed in the tributaries of Youngs Bay and Big Creek area were of hatchery origin. As a result, SGSs have been discontinued in those areas. Surveys in the Clatskanie River have observed very few hatchery origin fish (4%, 10-year average). Coded wire tag recovery information from the OASIS project surveys may be biased on a given run year if a stream segment downstream from a hatchery was selected as part of the random E-map protocol. If such a segment is selected it could represent an entire stream (and a representative proportion of the basin) and potentially overestimate presence of SAFE hatchery fish. To account for the potential year specific overestimate a multiple year approach should be taken for evaluating presence of SAFE produced fish. Based on the inability to expand recoveries for sampling rate, Table 5.4 shows coded wire tag recoveries, expanded for tag rate only, of SAFE origin fish found on spawning ground surveys by basin. While comparing partially expanded CWT recoveries to basin-wide population estimates is an unbalanced approach it does provide a tool for characterizing escapement of SAFE-produced fish.

WDFW Surveys

Fall Chinook

WDFW staff surveyed roughly 2,700 miles of habitat annually, used by thirteen fall Chinook populations or subpopulations, in Lower Columbia River tributaries from the mouth to Bonneville Dam

in 2012 through 2016 (Table 5.5). Grays River, Elochoman River, and Skamokawa Creek stand out as important fall Chinook producing basins in the Coastal stratum on the Washington side of the Lower Columbia River (LCFRB 2010). WDFW implemented a Conservation and Sustainable Fisheries Plan in 2017 to guide the management and recovery of salmon populations while continuing to provide commercial and recreational harvest opportunity. The Grays River fall Chinook population was originally designated as a primary population in 2004, and re-designated in 2010 as a contributing population. The Elochoman/Skamokawa fall Chinook population was designated as a primary population; meaning recovery is critical to the ESU.

Spawning ground surveys were done in conjunction with weir operations to assess efficiency of the weir as a tool to prevent upstream migration of hatchery Chinook. Chinook totals handled at the WDFW weirs do not represent total fall Chinook escapement, as some fish passed the weir prior to installation and during high flow events that submerged the weir panels on the Grays, while the Elochoman weir provides a census count except in extreme high flow years. Spawning escapement can be estimated by a variety of methodologies including: peak count expansion, mark-recapture, and area under the curve (Rawding et al. 2006). Estimates of the escapement of fall Chinook to spawning grounds in the Grays River basin prior to 2005 were generated using a peak fish count (live and dead) methodology with an expansion factor of 3.58. Recent data suggest that Grays River fall Chinook spawn timing has become more protracted, likely resulting in inaccuracies of the peak count expansion method. Beginning in 2005, more-intensive surveys have been conducted to improve estimates of salmonid spawning, utilizing area under the curve (AUC) and mark-recapture methodologies. Refinements to the mark-recapture methodology are still in development on the Grays. Therefore, AUC methods using live counts of Chinook spawners have been used to estimate natural spawn escapement values for that population since 2008. More methodology and results on the Grays River weir and spawning ground surveys can be found in Rawding et al. (2014). In addition, weirs have been used to remove hatchery salmon to progress toward meeting pHOS targets for salmon recovery.

Annual estimates of fall Chinook spawner escapement and pHOS are provided in Table 5.6 for populations surveyed on the Grays River, Skamokawa Creek, and the Elochoman River from 2001 to 2016. Since hatchery fall Chinook are not released into those basins, any hatchery fish (including SABs and tules) found on the surveys are strays from hatchery programs in other basins. The 5-year average (2012-2016) pHOS for the Grays, Elochoman, and Skamokawa was 74%, 34%, and 90% (Table 5.6). In the Grays River, SAB fall Chinook comprised between 9 and 81% of the spawning population based on carcass recoveries sampled and averaged 44% over the last 10 years. In contrast to the Grays, the occurrence of SABs found on the spawning grounds of Skamokawa Creek and the Elochoman River was very low: usually zero, and not more than 2.1%. Although more SABs returned to the Elochoman River than Skamokawa Creek in recent years, the weir on the Elochoman removed all SABs while Skamokawa Creek does not have a weir.

Coho

Surveys of sufficient rigor to provide natural escapement estimates of Coho in Washington's Lower Columbia tributaries have only been conducted since 2010 (Rawding et al. 2014). In 2012-2016 WDFW staff annually surveyed roughly 2,400 miles of habitat used by thirteen Coho populations or subpopulations, in Lower Columbia River tributaries from the mouth to Bonneville Dam (Table 5.8). Spawner estimates are provided in Table 5.9 for Coho of natural and hatchery origin that spawned in

the basins most proximate to the SAFE release sites: Grays River; Skamokawa Creek and Elochoman River (combined); and Mill, Abernathy and Germany Creeks (combined) for 2010 to 2015.

In comparison to fall Chinook, natural origin Coho spawners are much more plentiful in Washington's Lower Columbia River tributaries. The average pHOS decreases in populations further from the Lower Columbia River estuary where the SAFE Coho release sites are located: 63% for Grays River, 47% for Skamokawa-Elochoman, and 11% for the Mill-Abernathy-Germany population. There is no apparent pattern or trend across the years. Weir operations are generally not very effective at reducing pHOS for Coho because most weirs do not operate long enough into the fall to remove large numbers of hatchery Coho, due to the high frequency of rain events that compromise the weirs during the Coho migration season.

HATCHERY ESCAPEMENT

Escapement Goals

Several Select Area fall commercial and sport fisheries are managed around hatchery broodstock escapement goals. While fall Chinook are not specifically funded by the SAFE project they do represent an important resource in the Select Area fisheries. Escapement of these fish directly affects timing, area, and duration of fisheries in the Select Areas. The SAB fall Chinook broodstock goal for South Fork Klaskanine and Klaskanine Hatcheries combined was increased from 550 females to 740 in 2012 and to 835 females in 2013 in an effort to ramp up production of SAB fall Chinook (Table 5.10). In 2012 and 2013, hatchery escapement exceeded broodstock goals but fell short in 2014 and has continued to decline since. This has decreased smolt production dramatically (see Section 2, Production) and may limit the continued production of this stock in the future unless returns improve. Adult collection and spawning of LCR tule fall Chinook is conducted primarily at Big Creek Hatchery (adults are collected at Klaskanine and South Fork Klaskanine hatcheries in some years). Big Creek has also received eggs and fry from other Columbia River hatcheries in order to meet production but the ability to do this will be restricted in the future due a recent review of Mitchell Act funded hatcheries. Meeting Broodstock goals and escapement at Big Creek will become a higher priority in the near future.

ODFW Hatchery Sampling

Sampling of returning SAB fall Chinook is conducted annually during October through November, concurrent with spawning activities at ODFW's Klaskanine Hatchery and CCF's SF Klaskanine Hatchery. Sampling goals are to collect CWTs and biological data. Hatchery sampling provides information on run timing, data for CWT analysis, and information for run reconstruction and run forecasts. Sampling rates are determined based on the run size and number of scale samples needed for statistical validity of the age composition. Data collected include of fork length, sex, scales, fin marks, and the presence of a CWT.

Every salmonid returning to these hatcheries is examined for the presence of a CWT, however, SAFE-funded staff may not always be present to sub-sample for biological data such as scale samples for age analysis (Table 5.11).

Table 5.1. ODFW Spawning ground surveys for Chinook salmon in select Oregon populations in the Lower Columbia River, run year 2016.

Major Population Group	Population	Number of Surveys	Miles
Coast MPG	Youngs Bay	4	4
	Big Creek	4	4
	Clatskanie River	4	4
	(Plympton Creek[1)]	2	2
	Scappoose River	0	0
Total		**14**	**14**
Cascade MPG	Clackamas River	11	20
	Sandy River	17	17
Total		**28**	**37**

[1] Plympton Creek is part of the Clatskanie Population but is considered separately.

Table 5.2. Summary of fall Chinook spawning ground survey data from Youngs Bay, Big Creek, and Clatskanie River Populations.

Youngs Bay Population

Year	Number of SABs[2]	Total Mark Sampled [3]	Peak count	% SABS
2001	54	56	166	96%
2002	1	14	411	7%
2003	156	239	583	65%
2004	36	43	650	84%
2005	56	57	322	98%
2006	120	123	344	98%
2007	17	30	345	57%
2008	97	107	357	91%
2009	34	46	674	74%
2010	27	37	438	73%
2011	169	348	1,070	49%
2012	183	1,971	1,734	9%
2013	652	905	797	72%
2014	291	385	1,225	76%
2015	119	863	831	14%
2016	50	211	360	24%
3-yr Ave.	153	486	805	38%
5-yr Ave.	259	867	989	39%
10-yr Ave.	164	490	783	54%

Table 5.2. (continued)

Big Creek Population

Year	Number of SABs[2]	Total Mark Sampled [3]	Peak Count	% SABS
2001	4	3,662	4,389	0.1%
2002	0	6,148	6,963	0.0%
2003	0	7,371	11,492	0.0%
2004	0	2,057	3,560	0.0%
2005	0	2,164	2,516	0.0%
2006	0	56	92	0.0%
2007	0	80	179	0.0%
2008	0	888	2,868	0.0%
2009	0	1,486	1,209	0.0%
2010	1	1,720	3,952	0.1%
2011	0	1,514	1,729	0.0%
2012	0	847	930	0.0%
2013	10	64	578	15.6%
2014	2	412	1,234	0.5%
2015	0	722	487	0.0%
2016	0	115	147	0.0%
3-yr Ave.	1	416	623	0.2%
5-yr Ave.	2	432	675	3.2%
10-yr Ave.	1	785	1,331	1.6%

Clatskanie Population

Year	Number of SABs[2]	Total Mark Sampled [3]	Peak Count	% SABS
2001	1	2,124	2,299	0.0%
2002	0	4,949	5,970	0.0%
2003	0	4,640	5,593	0.0%
2004	0	2,391	2,982	0.0%
2005	0	1,195	1,553	0.0%
2006	0	145	234	0.0%
2007	0	141	265	0.0%
2008	0	58	654	0.0%
2009	0	894	1,250	0.0%
2010	0	2,461	2,019	0.0%
2011	0	2,314	1,959	0.0%
2012	1	1,118	1,076	0.1%
2013	9	680	945	1.3%
2014	1	1,766	1,619	0.1%
2015	0	1,367	1,227	0.0%
2016	0	316	526	0.0%
3-yr Ave.	0	1,150	1,124	0.0%
5-yr Ave.	2	1,049	1,079	0.3%
10-yr Ave.	1	1,112	1,154	0.1%

[1] Derived from ODFW Columbia River Management (CRM) and Oregon Adult Salmonid Inventory Survey (OASIS) spawning ground surveys for 2001-2016.

[2] Select Area Brights (SABs) are identified by the presence of a left ventral fin clip.

[3] Mark Sampled represents how many fish have been examined for fin marks.

Table 5.3. Estimated Coho spawner abundance in select Oregon populations of the Lower Columbia ESU, 2002-2016.

	Youngs Bay Population		Big Creek Population		Clatskanie Population	
Year	Hatchery	Wild	Hatchery	Wild	Hatchery	Wild
2002	2,506	411	866	98	48	167
2003	714	113	291	435	0	563
2004	886	149	265	112	0	398
2005	242	79	124	219	7	494
2006	394	74	N/A	225	46	421
2007	14	21	216	212	41	927
2008	23	82	66	360	0	995
2009	302	26	936	792	11	1,195
2010	106	68	122	279	48	1,686
2011	315	161	173	160	7	1,546
2012	112	129	112	409	77	619
2013 [2]	N/A	10	N/A	223	74	611
2014 [2]	N/A	57	N/A	606	151	3,246
2015 [2]	N/A	7	N/A	88	9	240
2016 [2]	N/A	16	N/A	198	27	464
3-yr. ave.	N/A	27	N/A	297	62	1,317
5-yr. ave.	112	44	112	305	68	1,036
10-yr. ave.	145	58	271	333	45	1,153

[1] Derived from ODFW Corvallis OASIS project spawning ground surveys for 2002-2016.

[2] Spawning ground surveys were discontinued for Youngs Bay and Big Creek populations starting in 2013. Estimates of wild Coho are from fish passed above Klaskanine (Young Bay) and Big Creek Hatcheries.

Table 5.4. Expanded recoveries of coded wire tags of SAFE origin fish on spawning grounds.

Year	Youngs Bay	Big Creek	Clatskanie
2001	0	20	20
2002	90	16	0
2003	343	8	0
2004	81	0	0
2005	0	0	0
2006	7	8	0
2007	0	0	0
2008	0	0	0
2009	38	0	0
2010	24	11	0
2011	0	0	0
2012	19	0	0
2013	29	45	0
2014	0	0	0
2015	0	20	0
2016	36	0	0
3-yr. ave.	12	7	0
5-yr. ave.	17	13	0
10-yr. ave.	15	8	0

[1] Coded wire tag recoveries were expanded for individual tag rates and may have been recovered by multiple survey projects with various sample rates.

Table 5.5. WDFW spawning ground survey effort for Lower Columbia River (estuary to Washougal) fall Chinook populations or sub-populations for each year, 2012-2016. Includes typical number and length of unique reaches surveyed, and total miles surveyed (represents multiple surveys of unique reaches within a year).

Population or Sub-population	# of Unique Reaches Surveyed	Total Length of Unique Survey Reaches (Miles)	Total Miles Surveyed Annually
Coweeman River	48	37.5	295.5
East Fork Lewis River	7	18.2	163.6
Elochoman River, Skamokawa Creek	22	24.2	240.7
Grays River, Chinook River	38	26.2	256.6
Kalama River	6	9.5	133.7
Lower Cowlitz River	22	31.5	372.8
Lower Gorge creeks	14	4.3	27.5
Mill, Abernathy, Germany, Coal creeks	47	54.6	644.5
North Fork Lewis River	8	16.2	97.3
North Fork Toutle River	13	22.7	81.5
Salmon Creek	1	0.1	0.4
SF Toutle River	10	25.2	117.1
Washougal River	16	25.9	324.3
Total	252	295.9	2,755.5

Table 5.6. Annual fall Chinook natural spawning escapement estimates and proportions of SAFE-origin Select Area Brights (SABs) and mixed-origin hatchery tules detected in spawning ground surveys on Grays and Elochoman Rivers and Skamokawa Creek, 2001-2016. Hatchery origin tules were not distinguished prior to 2008 or 2009, depending on the location.

Grays River[1]		pHOS		
Year	All Spawners	SABs	Tules	Total
2001	241	32%		
2002	78	0%		
2003	373	10%		
2004	726	10%		
2005	122	34%		
2006	383	21%		
2007	96	39%		
2008	95	38%	27%	65%
2009	555	52%	11%	62%
2010	156	43%	12%	55%
2011	405	69%	14%	83%
2012	205	40%	39%	79%
2013	2,033	81%	9%	91%
2014	729	36%	20%	56%
2015	1,026	9%	76%	85%
2016	510	32%	26%	59%
3-yr. Ave.	755	26%	41%	66%
5-yr. Ave.	901	40%	34%	74%
10-yr. Ave.	581	44%	26%	70%

Table 5.6. (continued)

Skamokawa Creek[2]		pHOS		
Year	All Spawners	SABs	Tules	Total
2001	536	0.4%		
2002	372	0%		
2003	588	0%		
2004	2,109	0%		
2005	529	0%		
2006	7	0%		
2007	3	0%		
2008	482	0%		
2009	3	0%		
2010	530	0%	93%	93%
2011	492	0%	94%	94%
2012	96	0%	91%	91%
2013	284	0%	79%	79%
2014	680	0.9%	96%	97%
2015	714	2.1%	89%	92%
2016	307	0%	92%	92%
3-yr. Ave.	567	1.0%	92%	93%
5-yr. Ave.	416	0.6%	89%	90%
10-yr. Ave.	359	0.3%		

Elochoman River[3]		pHOS		
Year	All Spawners	SABs	Tules	Total
2001	2,281	0%		
2002	7,531	0%		
2003	6,765	0%		
2004	4,781	0%		
2005	2,173	0%		
2006	317	0%		
2007	165	0%		
2008	841	0%		
2009	1,464	0%		
2010	788	0%	85%	85%
2011	635	0%	95%	95%
2012	141	0%	61%	61%
2013	353	0%	64%	64%
2014	189	0%	11%	11%
2015	264	0%	4%	4%
2016	137	0%	31%	31%
3-yr. Ave.	197	0%	15%	15%
5-yr. Ave.	217	0%	34%	34%
10-yr. Ave.	498	0%		

[1] Grays River: 2001-2007 estimates from peak count expansion (3.58 expansion factor); 2008-2016 estimates from area under the curve (AUC) methods.
[2] Skamokawa Creek: 2001-2009 estimates from peak count expansion (1.67 expansion factor); 2010-2016 estimates from AUC methods.
[3] Elochoman River: 2001-2008 estimates from peak count expansion (2.00 expansion factor); 2009-2016 from weir census, AUC, or Lincoln-Petersen estimate.

Table 5.7. Number and percentage of Fall Chinook handled at Grays River and Elochoman River weirs by fin mark groups, 2008-2016.

Year	Grays River Weir [1]							Elochoman River Weir						
	Chinook	Unmarked		SABs		Tules		Chinook	Unmarked		SABs [3]		Tules	
	Trapped [2]	No.	%	No.	%	No.	%	Trapped [2]	No.	%	No.	%	No.	%
2008	85	18	21%	67	79%	0	0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2009	183	37	20%	142	78%	4	2%	3864	414	11%	3	0.1%	3438	89%
2010	59	3	5%	45	76%	11	19%	4597	153	3%	13	0.3%	4431	96%
2011	116	14	12%	69	59%	33	28%	2120	78	4%	50	2%	1992	94%
2012	64	14	22%	28	44%	22	34%	318	33	10%	15	5%	270	85%
2013	542	40	7%	467	86%	35	6%	249	37	15%	17	7%	195	78%
2014	378	37	10%	243	64%	98	26%	1223	197	16%	67	5%	959	78%
2015	693	97	14%	283	41%	313	45%	1746	243	14%	31	2%	1472	84%
2016	274	53	19%	146	53%	75	27%	415	64	15%	1	0.2%	350	84%

[1] All out-of-basin stray Chinook (represented by an adipose and/or left ventral clip) handled at the Grays River weir were removed, including SAFE-produced Select Area Brights and tule fall Chinook.

[2] The number of Chinook handled at the Grays River and Elochoman River weirs do not represent total escapement to the weir.

[3] All SABs (identified by a left ventral clip) were removed at the Elochoman weir.

Table 5.8. Annual Coho stream survey effort summary. Number and length of unique reaches surveyed and total miles surveyed (represents multiple surveys of unique reaches), 2012-2016.

Population or Sub-population	# of Unique Reaches Surveyed	Total Length of Unique Survey Reaches (Miles)	Total Miles Surveyed Annually
Coweeman River	36	23.8	167.5
East Fork Lewis River	6	13.7	107.4
Elochoman River, Skamokawa Creek	21	24.0	240.5
Grays River, Chinook River	37	25.1	245.3
Kalama River	6	9.5	133.7
Lower Cowlitz River	22	31.5	372.8
Lower Gorge creeks	14	4.3	27.5
Mill, Abernathy, Germany, Coal creeks	47	54.6	644.5
North Fork Lewis River	2	4.5	55.6
North Fork Toutle River	5	6.3	65.2
Salmon Creek	1	0.1	0.4
SF Toutle River	9	23.0	84.5
Washougal River	13	20.8	250.3
Total	219	241.1	2,395.1

Table 5.9. Estimated Coho spawner abundance and % hatchery-origin spawners (% H) in Lower Columbia River basins in Washington, 2010-2015.

Year	Grays River			Skamokawa-Elochoman			Mill-Abernathy-Germany		
	Hatchery	% H	Wild	Hatchery	% H	Wild	Hatchery	% H	Wild
2010	1,617	81%	388	2,259	73%	834	232	12%	1,671
2011	4,620	97%	152	1,095	56%	851	216	21%	807
2012	228	22%	795	202	29%	505	11	2%	585
2013	2,203	65%	1,212	541	43%	721	55	8%	634
2014	1,769	32%	3,700	2,162	34%	4,158	312	12%	2,239
2015	344	80%	86	168	50%	168			
Ave:	1,797	63%	1,056	1,071	47%	1,206	165	11%	1,187

Table 5.10. Broodstock goals and hatchery escapement fall Chinook to North and South Fork Klaskanine and Big Creek hatcheries, 2009-2016.

Year	Hatchery	Stock[1]	Broodstock Goals[2]	Adult Hatchery Escapement		
			(Females only)	Females	Males	Total
2009	Big Creek	Tule	1,650	2,790	2,144	4,934
2010	Big Creek	Tule	1,650	3,769	3,886	7,655
2011	Big Creek	Tule	1,650	4,188	3,211	7,399
2012	Big Creek	Tule	1,550	2,836	2,580	5,416
2013	Big Creek	Tule	1,550	1,092	928	2,020
2014	Big Creek	Tule	1,550	2,673	3,207	5,880
2015	Big Creek	Tule	1,550	2,807	2,400	5,207
2016	Big Creek	Tule	1,700	1,122	1,338	2,460
2009	N. and S Fk. Klaskanine	SAB	550	430	251	681
2010	N. and S Fk. Klaskanine	SAB	550	652	495	1,147
2011	N. and S Fk. Klaskanine	SAB	550	685	515	1,200
2012	N. and S Fk. Klaskanine	SAB	740	789	742	1,531
2013	N. and S Fk. Klaskanine	SAB	835	997	837	1,834
2014	N. and S Fk. Klaskanine	SAB	835	730	369	1,099
2015	N. and S Fk. Klaskanine	SAB	835	266	194	460
2016	N. and S Fk. Klaskanine	SAB	835	461	422	883

[1] SAB = Select Area Bright stock.

[2] Broodstock goals are number of spawned females needed to meet egg take goal.

Table 5.11. Sampling of Select Area Bright (SAB) fall Chinook at Klaskanine (NFK) and South Fork Klaskanine (SFK) Hatcheries, 2009-2016.

Year	Hatchery	Hatchery Escapement	Number Mark Sampled[1]	CWTs Collected	Number Biological Sampled[2]	Percent of Escapement Biologically Sampled
2009	NFK	274	196	11	97	35%
2009	SFK	493	382	13	116	24%
2010	NFK	514	442	10	86	17%
2010	SFK	816	728	38	120	15%
2011	NFK	453	399	16	78	17%
2011	SFK	913	908	20	149	16%
2012	NFK	666	345	74	82	12%
2012	SFK	1,377	1,426	41	254	18%
2013	NFK	642	373	31	73	11%
2013	SFK	1,222	1,036	50	188	15%
2014	NFK	696	404	34	106	15%
2014	SFK	877	541	32	146	17%
2015	NFK	524	524	21	129	25%
2015	SFK	170	170	3	118	69%
2016	NFK	601	399	34	399	66%
2016	SFK	316	247	8	247	78%

[1] Represents sampling done by ODFW fishery management staff, generally the entire escapement is mark sampled for CWTs by ODFW and CCF hatchery staff.

[2] Biological sampling consists of recording length measurements, fin marks, sex, and collecting scale samples.

6. ENVIRONMENTAL COMPLIANCE

This report gives a brief accounting and update of project environmental compliance components. For detail regarding environmental permitting compliance, see Whisler et al. (2009).

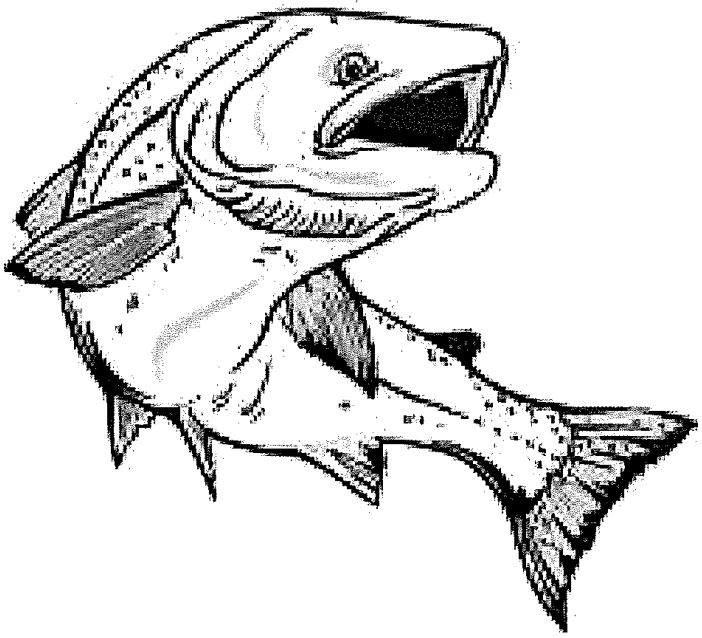
All SAFE production facilities are currently operating under the 1998 NMFS/NOAA Biological Opinion (NMFS 1998). This BO was a formal ESA consultation completed in December 1998. The final ESA response was that the proposed actions were not likely to jeopardize the continued existence of listed Chinook or Sockeye Salmon (*Oncorhynchus nerka*) or steelhead, nor result in the destruction or adverse modification of their critical habitat. In addition, species proposed for listing were also considered in this evaluation.

The Oregon hatcheries also operate under 300-J National Pollutant Discharge Elimination Systems (NPDES) permits issued by the Oregon Department of Environmental Quality (DEQ). Water samples from the rearing areas are taken each week during the month of highest production of each quarter at intake and outlet to determine whether water quality parameters are within the limits established for the permit. Washington hatcheries operate under similar National Pollutant Discharge Elimination Systems (NPDES) permits issued by the Washington Department of Ecology (WDOE).

Of the Oregon Select Area net-pen facilities, only the Youngs Bay site has a production level that requires an NPDES permit (No. 101767) issued by the Oregon DEQ. Samples of sediment and benthic macro-invertebrates are collected and analyzed to ensure that any environmental impacts are within the limits established for the permit. Sampling is conducted at the end of the growing season (summer) every other year, as directed by the permit. Results of the most recent sampling were reported by Litton (2017) and can be accessed online at:

http://www.co.clatsop.or.us/fisheries

WDFW is in the process of acquiring a new permit for the Deep River net-pens through the Washington Department of Ecology and determining whether additional monitoring is needed at the site.



7. COLLABORATION AND COMMUNITY OUTREACH

Inter-agency coordination among Select Area project sponsors and collaboration by project staff with other regional fish projects, as well as involvement in community outreach efforts, increases the productivity and efficiency of the overall project and provides significant added-value to the project beyond specified project objectives and deliverables. A brief accounting of these collaborative efforts during the current reporting period are given here.

PROJECT COORDINATION

Select Area project staff from ODFW, CCF, and WDFW continue to meet regularly (bi-monthly) to discuss and plan for successful achievement of overall project operations, goals, objectives, and deliverables, as well as future project directions and opportunities for inter-agency cooperation. The combined staffs also hold supplemental meetings to discuss specific topics as needed, such as annual report preparation and planning for project review and proposal development. Additionally, ODFW and CCF staff conduct production work group meetings to plan and coordinate fish production for Oregon Select Area releases.

Staff from all three agencies also collaborate to plan and conduct two public meetings each year to make recommendations and take public input on the spring and fall Select Area commercial fisheries. Additional interagency coordination with significant involvement of project-affiliated staff enables responsive in-season management of the commercial fisheries to achieve optimal harvest benefit while minimizing impacts to protected, non-target stocks.

COLLABORATIVE PROJECTS

Coho Tangle Net Mortality Study

In 2015 and 2016, the Select Area project collaborated on a Coho Tangle Net Mortality Study project led by the Oregon Department of Fish and Wildlife. The Select Area project provided net-pens in the Tongue Point Select Area fishing site that ODFW staff used to evaluate the short-term survival of adult Coho salmon captured in commercial fishing gear.

Post-handling Sturgeon Survival Study

The project also provided net-pen space at the Tongue Point-MERTS site for an ODFW evaluation of survival of sturgeon post-handling from gillnet tagging operations.

COMMUNITY OUTREACH AND EDUCATION

The Select Area project has a history of outreach to the local community and actively supports educational programs at all levels. Project staff provide tours to elementary, high school, and college programs on a regular basis. Project staff are also active with local watershed councils. These activities provide constructive opportunities to educate and inform the public.

CCF, Astoria and Warrenton High Schools

CCF, in coordination with ODFW's Salmon and Trout Enhancement Program, provides salmon eggs, fry and technical assistance with fish culture activities to aquatic science programs at Warrenton and Astoria high schools. Field trips to local hatcheries and net-pen sites are annual events. Students also visit periodically as part of their respective class assignments and expand their learning experience doing hands-on work with fisheries staff, especially during the fall spawning season at Klaskanine and South Fork Klaskanine hatcheries.

PROJECT STAFF CHANGES

In the spring of 2015, Klaskanine Hatchery Senior Technician Josh Rist made the move to ODFW's Cedar Creek Hatchery as the new Hatchery Manager. Josh was only on site for a few years but he was instrumental in continuing the upgrades to the site to accommodate the increased production with the new Lower River Columbia Fisheries Reform program. Since 2015, the Senior Technician positon at Klaskanine has been in transition with several staff members from Big Creek and Cedar Creek hatchery filling in on a six-month job rotation with the Big Creek Hatchery Manager overseeing the operations. The new Senior Technician position is scheduled to be filled in November of 2017.

Jeff Whisler left the position as project leader for Select Area and Estuary Fisheries in August of 2013 to assume the role of fisheries analyst for ODFW Columbia River Management. Cameron Duff filled the vacant position as part of a job rotation immediately and assumed the role in an official capacity effective January 2014. Tony Siniscal was hired as the Assistant Project Leader for Select Area Fisheries in June of 2014.

Josh Laeder left his WDFW Fish Biologist 2 position as the lead for Deep River fishery sampling in June of 2012 to pursue a new career. Claire Landry was hired to fill the vacant Biologist 2 position in July 2012. Other permanent staff that assisted with Deep River sampling during this report period and have since moved on include: Bryan Nelson, Leif Rinearson, Sean Toomey, and Susanne Ranseen. For 2017, Claire Landry was slated to leave the SAFE project and focus completely on adult and juvenile fish population monitoring (no SAFE funding), and Pat Hulett assumed the lead role for Deep River sampling. Non-permanent technician staff hired primarily to conduct weir and spawner survey work in the fall will continue to assist with Deep River sampling (on partial SAFE funding) as in past years.

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