

# **SELECT AREA FISHERY ENHANCEMENT PROJECT**

## **FY 2010-12 REPORT**

**October 2009 - September 2012**

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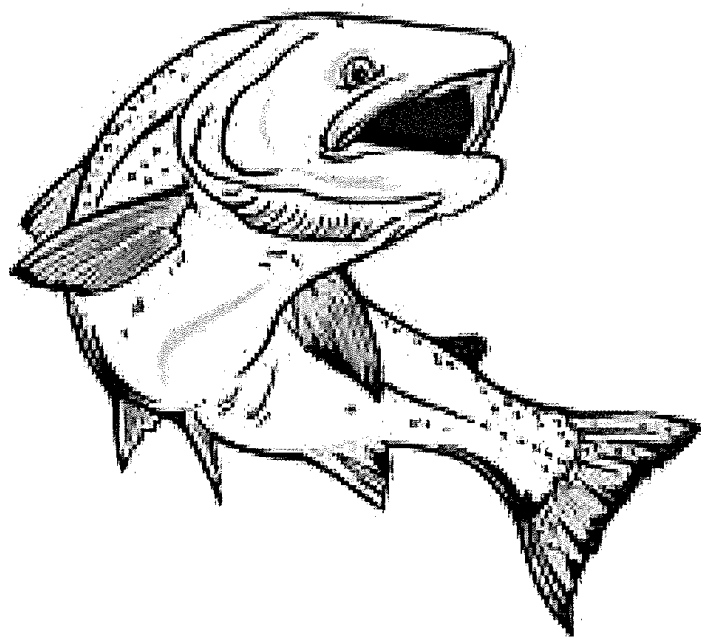
**Clatsop County Fisheries**

### **Prepared for:**

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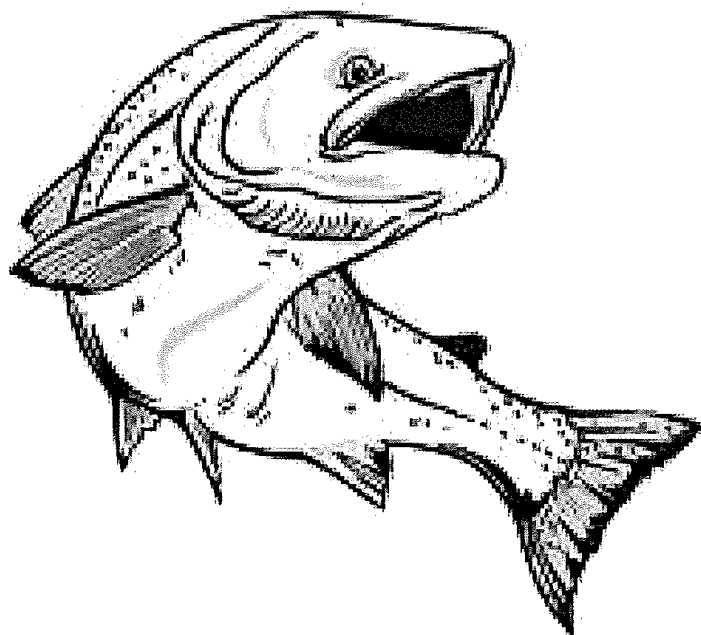
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## GLOSSARY OF ACRONYMS

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
SARs	Smolt-to-Adult Survival Rates
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

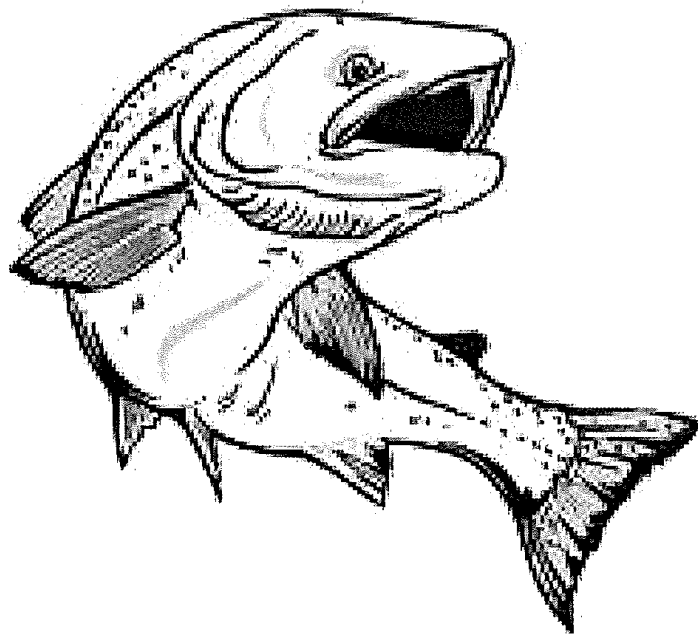


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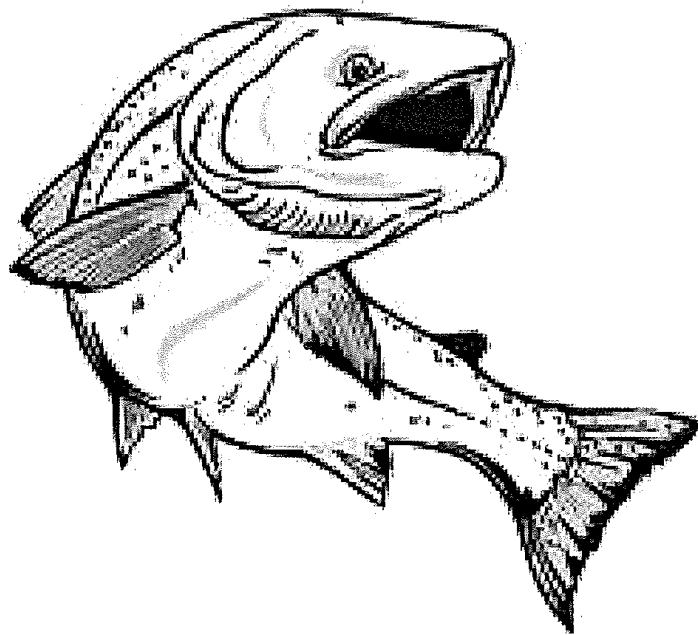
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virology lab staff

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 which maximizes the return of hatchery production into fisheries. Funding support of the project is shared by the Bonneville Power Administration, the State of Oregon, Mitchell Act, 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 2009 through summer 2012, but includes some earlier information for context and to identify trends.

Key findings and results are:

- From 2008-2012, Select Area commercial fisheries have contributed an average of 50% of spring Chinook, 77% of coho, and 33% of fall Chinook to the total non-Treaty Columbia River commercial harvest.
- Average harvest rates of 94% for spring Chinook, 99% for coho, and 98% 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, 14% of spring Chinook, 42% of SAB fall Chinook, and 31% 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 88% local stock. Fall fisheries average 90% local Chinook stocks and 80% local coho 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. Approximately 3.0 million coho, 1.5 million spring Chinook, 1.5 million SAB fall Chinook, and 2.8 million Tule fall Chinook hatchery smolts are currently reared and released from SAFE net pens and associated hatcheries annually. Commercial and recreational fisheries have expanded substantially due to improved rearing strategies, modest release increases when possible, 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. Additional sampling of local hatchery returns, recreational fisheries in the Select Areas, and spawning grounds in local tributaries provides additional coded-wire tag recovery data that is used to monitor survival, straying, and fishery contributions.

The 2010 review of the Select Area Fisheries project by the Independent Scientific Review Panel (ISRP 2010) was generally positive while identifying needs for additional information. Several sections of this report have been expanded to address the ISRP's requests.



# **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 2009 through the summer of 2012 and the fish releases from Select Area sites from spring of 2010 through summer of 2012. 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).

## **FISHING SITES AND FACILITIES**

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 providing production for these sites are South Fork Klaskanine (CCF); Big Creek, Gnat Creek, Klaskanine, Bonneville, Cascade, 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, Grays River and Klaskanine hatcheries; other hatcheries are funded by a blend of state, Mitchell Act (NOAA) and other funds.

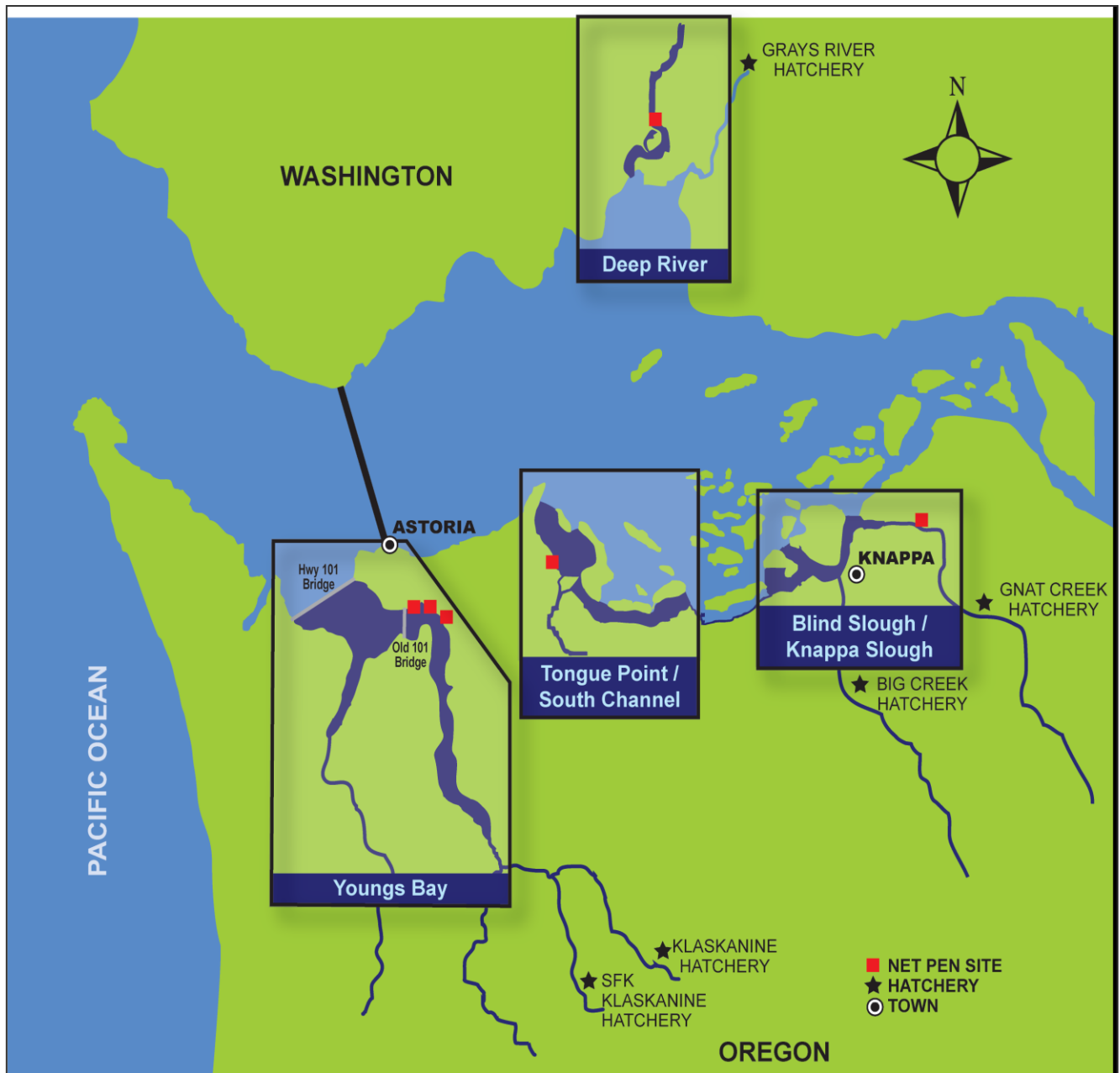


Figure 1.1. Select Area fishing locations in the lower Columbia River.

## PROJECT GOALS

As stated in the FY 2012-2016 Select Area Fisheries Enhancement (SAFE) BPA funding proposal the primary goals of this 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. These fisheries have expanded substantially due to improved rearing strategies, modest release increases when possible, and adaptive management of the fisheries. Approximately 1.5 million coho, 1.3 million spring Chinook, and 750,000 SAB fall Chinook hatchery smolts (BPA-funded) are currently reared and released from SAFE net pens and associated hatcheries annually. These existing SAFE rearing sites also allow for the additional annual production of 2 million coho, 250,000 spring Chinook, 2.8 million Tule fall Chinook, and 700,000 SAB fall Chinook smolts 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 incidence of hatchery fish on spawning grounds is being addressed through intensive harvest. Average harvest rates in the Select Areas are 91% for spring Chinook, 99% for coho, and 97% for SAB fall Chinook produced by the SAFE project. 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 is 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 PANNEL (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 every three years instead of 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 2010-2012 project report further addresses the ISRP concerns with updated data and results included in various sections.

## **2. PRODUCTION**

The species and stocks of salmonids that are currently produced in the Select Areas were chosen primarily because of their flesh quality, availability of gametes, timing of return, homing ability, and overall value to the economy. Species being reared and released from SAFE sites for this reporting period include spring Chinook (Willamette/McKenzie and Cowlitz/Lewis stocks), fall Chinook (Select Area Brights – SABs - and Tule stock), and coho (various early stocks). The SAB fall Chinook stock originated from Rogue River stock egg transfers in 1982-84, but has since been maintained by a local broodstock program which has progressed from Big Creek Hatchery to Klaskanine Hatchery and now to 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 currently released from the Oregon Select Areas originate from Big Creek, Bonneville, and Sandy hatcheries, while Grays River and North Toutle hatcheries provide the stock for the Deep River net pens on the Washington side. Annual releases of salmonids from Select Area facilities (all funding sources) from 1993-2012 have ranged from 3.5 to 9 million fish (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: they rear fish for net-pen releases and some of them also 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 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. ODFW's Cascade Hatchery 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 hatcheries, which both rear fish that are released into the Youngs Bay Select Area. Big Creek also collects 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 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 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 program.

## **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 (at about 350,000/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 recommended levels 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 – typically 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**

Willamette River stock 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.

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. In recent years, a reprogramming of 250,000 spring Chinook from the Willamette River system to the Oregon Select Areas began with the 2008 brood and has continued since, which along with modest increases at Gnat Creek Hatchery has boosted total annual spring Chinook production to over 1.5 million smolts (Figure 2.2).

## **2008 Brood Spring Chinook**

The 2008 brood spring Chinook for the Oregon net pens originated from McKenzie Hatchery, with approximately one million eggs shipped to Gnat Creek Hatchery in the fall of 2008 for final incubation. Ponding, early rearing, mass marking, and coded-wire tagging occurred while at Gnat Creek in the winter/ spring of 2009, and the fry were also vaccinated for enteric redmouth disease and vibriosis. In November of 2009, fingerlings were transferred to the net pens, with approximately 570,000 trucked to Youngs Bay and 303,000 to Blind Slough for over-winter rearing. While in the pens, losses to disease were minimal with no treatments required, and the smolts appeared healthy at release in March of 2010.

In early March, 102,000 acclimation smolts were transferred from Gnat Creek to the Tongue Point MERTS pens, held for 2½ weeks and released. Also, this was the first year of the additional 250,000 acclimation smolts being reprogrammed to the Select Areas as a result of ODFW program changes. Approximately 125,000 smolts from McKenzie Hatchery were transferred to the Youngs Bay net pens in early March, held for 2½ weeks and released, followed by a second group of 132,000 smolts which were trucked to Youngs Bay in mid-April and released at the end of the month. The transfer of this second group had been delayed due to an outbreak of bacterial kidney disease (BKD) while at Leaburg Hatchery, which required an extended treatment prior to being trucked to the net pens.

On the Washington side, Grays River Hatchery received a total of 507,000 eyed spring Chinook eggs from Cowlitz and Lewis River hatcheries for the 2008 brood. Final incubation, ponding, early rearing, mass marking, and coded-wire tagging occurred at Grays River. Despite treatment with medicated feed, this group of fish suffered moderate losses to furunculosis and bacterial cold water disease at the hatchery. The fingerlings were transferred to the Deep River net pens in October of 2009, and no significant disease outbreaks occurred while in the net pens. The pens were towed downstream to Rocky Point and the smolts were released in February of 2010.

## **2009 Brood Spring Chinook**

Oregon's SAFE-funded 2009 brood spring Chinook production was provided by ODFW's McKenzie and Willamette hatcheries, with approximately 909,000 eyed eggs (reduction due to budget constraints) shipped to Gnat Creek Hatchery in October of 2009 for final incubation and ponding. Early rearing, mass marking, and coded-wire tagging occurred at Gnat Creek in the spring of 2010, and fry were vaccinated for enteric redmouth disease and vibriosis. In the first week of November, approximately 463,000 fingerlings were transferred to the Youngs Bay net pens, with 295,000 trucked to Blind Slough. While in the pens, both over-winter groups had minimal loss to disease with no treatments required, and the Youngs Bay fish were released in early March, followed by the Blind Slough group in late March.

In early March, 100,000 acclimation smolts were transferred from Gnat Creek to the Tongue Point MERTS net pens, held for 2½ weeks and released at the end of March. Also, in the second year of the reprogrammed spring Chinook from the Willamette River system, 249,000 smolts were trucked from McKenzie Hatchery to the Youngs Bay net pens, held for 2½ weeks, and released on March 31.

In Washington, Cowlitz and Lewis River hatcheries shipped 507,000 eyed eggs to Grays River Hatchery for the 2009 brood Deep River spring Chinook production. After final incubation, fry were ponded, and early rearing, mass marking, and coded-wire tagging occurred in the spring of 2010 at Grays River. Despite treatments, high losses to bacterial cold water disease and fungus were incurred while at the hatchery, which resulted in a significant reduction in the number of fingerlings transferred to the Deep River net pens. In February of 2011, the net pens were towed to the mouth of Deep River and the smolts were released into the mainstem Columbia River.

## 2010 Brood Spring Chinook

In October of 2010, Gnat Creek Hatchery received 998,500 eyed eggs from McKenzie Hatchery for the SAFE-funded spring Chinook production. 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 2011. On October 31, 556,000 fingerlings were trucked to the Youngs Bay net pens, with 297,000 transferred to Blind Slough on November 1. The Youngs Bay over-winter group had chronic moderate losses to bacterial hemorrhagic septicemia (BHS) that eventually required treatment with 2% TM-200™ medicated feed in February before eventual release in early March. The Blind Slough fish required no treatments, and were released in late March.

In mid-March, approximately 100,000 acclimation spring Chinook smolts were trucked from Gnat Creek to the Youngs Bay net pens and held until release on March 29. As a result of a decision by SAFE project management to more equitably distribute spring Chinook production at the SAFE sites, the additional ODFW reprogrammed production of 250,000 acclimation smolts from McKenzie Hatchery was shifted to Tongue Point MERTS instead of Youngs Bay beginning with the 2010 brood.

Grays River Hatchery received green eggs from Cowlitz Hatchery and eyed eggs from Kalama Hatchery which resulted in a total of 594,200 eyed eggs for the 2010 brood spring Chinook production at Deep River. Final incubation, ponding, early rearing, mass marking, and coded-wire tagging occurred at Grays River. While at the hatchery, the fish were treated for outbreaks of bacterial gill disease and bacterial cold water disease with medicated feed, and also received formalin treatments for fungus and *Costia*, with a significant loss. Fingerlings were trucked to the Deep River net pens in the fall of 2011 and reared over-winter with no further disease outbreaks. The pens were towed downstream to Rocky Point and the smolts were released in March of 2012.

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.

There are two components of SAB fall Chinook production: SAFE-funded net pen production in Youngs Bay of up to 750,000 smolts annually, and ODFW-funded production of 700,000 smolts at the SF Klaskanine Hatchery for annual broodstock releases. Eggs for both groups are taken from returning adults at Klaskanine and SF Klaskanine hatcheries, and all incubation is done at the SF Klaskanine. 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/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 15 fish/pound. At the SF Klaskanine, 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 (LV clip) 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 25 fish/pound. See figure 2.3 for SAB releases brood years 1994 – 2011.

### **2009 Brood SAB Fall Chinook**

Broodstock for the 2009 SAB fall Chinook program were collected at both Klaskanine and the SF Klaskanine hatcheries. A total of approximately 1.16 million eggs were taken from 330 females spawned at the two sites, which was almost 500,000 eggs short of production goals. After incubation at the SF Klaskanine Hatchery, in February 720,000 fry were ponded there for the ODFW-funded broodstock program, which left 278,000 fry for the SAFE-funded net pen portion. In early April, the net pen fish were vaccinated for vibriosis and then also given a five-day treatment with 2% TM-200™ medicated feed near the start of mass marking and coded-wire tagging which began April 13 and was completed April 21. Losses to disease were minimal, and smolts were released in good health in early July. At the SF Klaskanine, mass marking and coded-wire tagging began May 4 and was completed on June 2. The fish experienced no disease problems and were released beginning July 14, with the pond emptied by July 27.

### **2010 Brood SAB Fall Chinook**

Eggs for the 2010 brood SAB fall Chinook program were again taken from adult fish collected at both the Klaskanine and SF Klaskanine hatcheries, with a total of approximately 1.8 million eggs from 584 females spawned. Eggs were again incubated at the SF Klaskanine Hatchery, and after a moderate egg/fry loss this allowed for the ponding of 698,000 fry for the ODFW-funded broodstock program and 765,000 fry for the SAFE-funded net pen production. In early April, the net pen fish were vaccinated for vibriosis and also received a five-day treatment with 2% TM-200™ during the beginning of mass marking and coded-wire tagging, which was completed on May 9. The fish were healthy with minimal losses to disease through rearing and eventual release in late June. The SF Klaskanine broodstock fish were mass marked and coded-wire tagged beginning in mid-May and continuing until June 10, and the fish remained healthy through release in mid-July.

### **2011 Brood SAB Fall Chinook**

A total of 531 adult female SAB fall Chinook were collected at Klaskanine and SF Klaskanine hatcheries to provide 1.8 million eggs for the 2011 brood. Eggs were incubated at the SF Klaskanine Hatchery, and moderate egg/fry loss reduced the number of fry ponded to just over 1.4 million, with 709,000 for the broodstock program and 729,000 for the SAFE-funded net pen production. Fry were transferred to the Youngs Bay net pens in February and March, with vaccination for vibriosis, mass marking, and coded-wire tagging beginning in April. The fish were given a five-day course of treatment with 2% TM-200™ during the start of coded-wire tagging, and were healthy through the rearing period and eventual release on June 29. The SF Klaskanine broodstock fish were mass marked and coded-wire tagged in May and June, remained healthy through the rearing period, and released on July 10. Actual release numbers, fish sizes, and release dates for all groups of SAB fall Chinook are provided in Table 2.2.

## **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/pound, and fish are generally released in May or June.

### **2009 Brood Tule Fall Chinook**

Tule fall Chinook for the 2009 brood Deep River net pens was provided by Beaver Creek Hatchery, where final incubation, ponding, early rearing, mass marking and coded-wire tagging occurred before the transfer of 745,000 fingerlings to the net pens in April of 2010. Moderate losses to furunculosis were incurred, and project staff determined that lower densities in subsequent years would be desirable. The fish reached target size and were released in late June. In Oregon, Klaskanine Hatchery received 2.1 million fingerlings from Big Creek Hatchery after mass marking and coded-wire tagging was completed in March of 2010. The fish had no disease issues, and were released in May at target size.

### **2010 Brood Tule Fall Chinook**

Beaver Creek Hatchery transferred 918,000 Washougal stock Tule fall Chinook fingerlings to the Deep River net pens for the 2010 brood production. With lower densities in the pens, the fish reared well, with minimal losses through release in June. Klaskanine Hatchery received 1.9 million fingerlings from Big Creek Hatchery and reared them until release in May, with no disease problems.

### **2011 Brood Tule Fall Chinook**

For the 2011 brood, 893,000 Washougal stock Tule fall Chinook fingerlings were transferred from Beaver Creek Hatchery to the Deep River net pens in April of 2012, reared to target size, and released in good health in June. In Oregon, just under 2 million fingerlings were trucked from Big Creek Hatchery to Klaskanine Hatchery for final rearing and eventual release in May of 2012, again with no disease issues.

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

## COHO

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 (Figure 2.4). 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. Also, 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 have brought that total to over 3 million beginning with the 2008 brood. These changes in production are described in further detail below.

### 2008 Brood Coho

The SAFE-supported portion of the 2008 brood Oregon net-pen production originated from Cascade Hatchery, where early rearing, mass marking, and coded-wire tagging occurred before transfer of approximately 540,000 fingerlings to the Tongue Point MERTS net pens in October of 2009. Mitchell Act funds are responsible for the early rearing and fin-marking of this group, BPA funds pay for coded-wire tagging only. In addition, 831,000 Mitchell Act-funded fingerlings were transferred from Oxbow Hatchery to the Youngs Bay net pens in October. Both groups of these overwinter net-pen fish received a ten-day treatment for bacterial hemorrhagic septicemia (BHS) with 2% TM-200™ medicated feed, with minimal loss to disease through final rearing and release in April of 2010. At Blind Slough, coho production was provided by Oxbow Hatchery, transferring 426,000 Sandy stock smolts from the Lower Herman Creek (LHC) ponds for acclimation in April. This was the first year that the early rearing of these Mitchell Act-funded fish was shifted from Sandy Hatchery to LHC, and unfortunately, high mortality to bacterial cold water disease occurred before and after transfer to the net pens, and treatment was not possible because of inadequate withdrawal time before release.

In addition to the net-pen coho, just under a million 2008 brood coho were released into the Youngs Bay system from Klaskanine and SF Klaskanine hatcheries in the spring of 2010. The third year of SAFE-funded coho production at Klaskanine Hatchery was provided by 720,000 eggs taken at Big Creek Hatchery. Final incubation, ponding, early rearing, mass marking, and coded-wire tagging occurred at Klaskanine, and in June of 2009 the fingerlings were transferred to Clackamas Hatchery for rearing through the summer. Losses to disease while at Clackamas were moderate, and in October 566,000 fish were trucked back to Klaskanine for over-winter rearing and eventual release in April of 2010. At the SF Klaskanine, a total of 347,000 fingerlings were reared over-winter, comprised of 195,000 ODFW propagation-funded fish coming from Salmon River Hatchery and 152,000 Mitchell Act-funded fish coming from Eagle Creek NFH. These fish were healthy through the winter, and released in April of 2010.

On the Washington side, SAFE-funded 2008 brood coho for the Deep River net pens were provided by Grays River Hatchery, where approximately 700,000 eggs were collected and incubated. Ponding, early rearing, mass marking, and coded-wire tagging occurred while at Grays River in the spring of 2009. The fry experienced an outbreak of bacterial cold water disease, and moderate losses were

incurred at the hatchery before transfer to the net pens in October. In November, an additional 311,000 Mitchell Act-funded fingerlings were trucked to the Deep River net pens, and both groups were released in May of 2010.

### **2009 Brood Coho**

Cascade Hatchery provided 538,000 fingerlings for the 2009 brood SAFE-supported coho production at Tongue Point MERTS, and Oxbow Hatchery provided 890,000 Mitchell Act-funded fingerlings for the Youngs Bay net pens. Both groups were transferred in October of 2010, received a ten-day treatment for BHS with 2% TM-200™ medicated feed after arriving at the net pens, were healthy through the net-pen rearing, and released in April of 2011. For the second year, Blind Slough coho production was provided by Oxbow Hatchery, with 391,000 Mitchell Act-funded Sandy stock acclimation smolts transferred from LHC in early April. These fish were much healthier than the previous year and experienced minimal loss through release at the end of April.

Klaskanine and South Fork hatcheries provided additional coho production for release into the Youngs Bay system in the spring of 2011. Big Creek Hatchery shipped approximately 550,000 eyed eggs to Klaskanine Hatchery for final incubation in December of 2009, and ponding, early rearing, mass marking, and coded-wire tagging occurred at Klaskanine in the winter and spring of 2010. In June, 542,000 fish were trucked to Clackamas Hatchery for the summer, and after high loss to disease, 361,000 fish were transferred back to Klaskanine in October for final over-winter rearing. To help make up for the loss at Clackamas, an additional 40,000 surplus fingerlings from Big Creek were added to this group. The SF Klaskanine Hatchery released a total of approximately 369,000 coho smolts, with 212,000 coming from Salmon River Hatchery (Big Creek stock) and 157,000 from Klaskanine Hatchery (Eagle Creek stock) in October for over-winter rearing and release. The Eagle Creek stock fish were surplus fry that became available because of production cuts at Eagle Creek NFH, and SAFE project personnel decided to utilize these fish to assess limited over-summer rearing at Klaskanine Hatchery. With successful rearing of this small group, a plan was developed to gradually increase the number of over-summer fish at Klaskanine and eventually phase out the trucking of fish to Clackamas Hatchery for the summer, improving the efficiency of this program and hopefully increasing overall survival of these fish.

Washington's North Toutle Hatchery provided 645,000 eggs for the 2009 brood Deep River net pen coho production, with incubation, early rearing, mass marking, and coded-wire tagging occurring at Grays River Hatchery. The fry experienced moderate losses to bacterial cold water disease and received treatment with medicated feed while at the hatchery before transfer to the net pens in October of 2010. An additional 352,000 Mitchell Act-funded fish were trucked from Washougal Hatchery to the Deep River net pens in November. Both groups were reared through the winter with no further disease issues, and released on May 1.

### **2010 Brood Coho**

The 2010 brood Oregon SAFE-funded coho production was provided by Cascade Hatchery, where all early rearing, mass marking, and coded-wire tagging occurred before the transfer of 543,000 fish to the Tongue Point MERTS net pens in October of 2011. Oxbow Hatchery provided 829,000 Mitchell Act-funded fingerlings for the Youngs Bay net pens. Both of these over-winter groups received a ten-day treatment for BHS with 2% TM-200™, and after low to moderate initial losses, the fish were healthy through the rearing period and released in April of 2012. At Blind Slough, production was again provided by Oxbow Hatchery, with 374,000 Mitchell Act-funded Sandy stock smolts transferred from the LHC ponds to the net pens in late March, acclimated for 2½ weeks, and released in good health.

Additional coho production for the Youngs Bay Select Area was provided by Klaskanine and SF Klaskanine hatcheries, with nearly 880,000 smolts released for the 2010 brood. Big Creek Hatchery shipped 750,000 eyed eggs to Klaskanine Hatchery for final incubation, ponding, mass marking, and coded-wire tagging. In June, 198,000 fingerlings were transferred to Clackamas Hatchery, leaving approximately 500,000 fish at Klaskanine to further evaluate over-summer rearing at the hatchery. An outbreak of columnaris required treatment with 2% TM-200™, but losses were kept to a minimum and the fish were otherwise healthy through release in April. The SF Klaskanine Hatchery received 230,000 fingerlings from Salmon River Hatchery and 169,000 fingerlings from Clackamas Hatchery in October of 2011. After gradually increasing losses to bacterial cold water disease through the winter, these fish were treated with Aquaflor™ for ten days at a rate of .15mg/kg/day in March, which reduced the loss for a period of time. Unfortunately, losses began to increase just before release in April, and no further treatment was possible because of drug withdrawal time requirements.

In Washington, low numbers of returning adult coho at North Toutle Hatchery resulted in 615,000 eggs being collected for the Grays River Hatchery/Deep River net pens, so this group was supplemented with 75,000 eggs collected at Grays River. After ponding, mass marking, and coded-wire tagging at Grays River, the fish were treated for bacterial gill disease and bacterial cold water disease with medicated feed, and also received formalin drip treatments for *Costia*, *Trichodina*, and fungus. After transfer to the Deep River net pens in the fall of 2011, the fish had minimal loss to disease, and were released in April of 2012.

Actual release numbers, fish sizes, and release dates for all groups of coho are provided in Table 2.3.

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Table 2.1. Releases of spring Chinook from Lower Columbia River Select Area facilities, 1993 -2010 brood years.

Brood Year	Release Date	Release Site	Number Released	Number of CWTs	Tag Code	Release Size fish/lb	Funding Agency and Study
1993	2/7/95	SFK	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
			<b>450,200</b>	<b>198,461</b>			
1994	1/31/96	SFK	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
			<b>892,764</b>	<b>353,604</b>			
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	SFK	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
			<b>937,072</b>	<b>385,714</b>			
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
			<b>1,015,180</b>	<b>388,178</b>			
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	24,856	63-05-11	6.8	BPA
	5/13/99	DR	14,473	14,106	63-06-52	6.4	BPA
			<b>890,380</b>	<b>232,877</b>			

continued

Table 2.1. (continued) Releases of spring Chinook from Lower Columbia River Select Area facilities, 1993-2010 brood years.

Brood Year	Release Date	Release Site	Number Released	Number of CWTs	Tag Code	Release Size fish/lb	Funding Agency 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
			<b>911,060</b>	<b>208,118</b>			
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	25,109	63-13-10	12.0	BPA / normal
	5/9/01	DR	40,032	25,485	63-13-11	11.0	BPA / dormancy
			<b>947,859</b>	<b>294,652</b>			
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	12,361	63-10-87	9.0	BPA / normal
	5/16/02	DR	12,377	12,377	63-12-88	10.0	BPA / dormancy
			<b>964,910</b>	<b>288,033</b>			

continued

Table 2.1. (continued) Releases of spring Chinook from Lower Columbia River Select Area facilities, 1993-2010 brood years.

Brood Year	Release Date	Release Site	Number Released	Number of CWTs	Tag Code	Release Size fish/lb	Funding Agency and Study
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	20,052	63-15-72	10.0	BPA / Lewis
	4/30/03	DR	108,791	20,455	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.
			<b>1,077,633</b>	<b>316,916</b>			
2002	3/31/04	SFK	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	9,867	63-21-77	11.0	BPA / Lewis
			<b>1,649,140</b>	<b>298,446</b>			
2003	3/22/05	YB	29,495	AD only		5.3	BPA/over-summer
	4/4/05	TGJ	26,955	26,226	09-39-29	12.0	BPA/JD acclim.
	3/22/05	DR	101,344	22,500	63-21-74	10.0	BPA/Cowlitz/tow
	3/23/05	DR	153,127	22,300	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	26,069	09-39-31	14.2	BPA
	4/5/05	SFK	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.
			<b>1,657,467</b>	<b>314,617</b>			

continued



Table 2.1. (continued) Releases of spring Chinook from Lower Columbia River Select Area facilities, 1993 - 2010 brood years.

Brood Year	Release Date	Release Site	Number Released	Number of CWTs	Tag Code	Release Size fish/lb	Funding Agency and Study
2004	9/26/05	SFK	566,030	27,373	09-37-22	24.5	SFK production <sup>d</sup>
	3/27/06	DR	159,300	23,841	63-22-97	13.0	BPA/Cowlitz/tow
	3/27/06	BS	287,215	23,203	09-39-33	15.7	BPA
	3/27/06	JD	25,451	24,117	09-37-06	10.8	BPA
	3/27/06	TG	57,114	24,191	09-37-08	12.5	BPA/morpholine
	3/27/06	DR	177,000	22,839	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.
			<b>1,828,126</b>	<b>326,386</b>			
2005	3/15/07	DR	263,600	55,000	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
			<b>1,057,637</b>	<b>160,181</b>			
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	47,900	63-41-90	11.8	BPA/towed
			<b>1,057,258</b>	<b>123,070</b>			
2007	2/25/09	DR	279,811	37,500	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	BPA
	3/27/09	TG	103,060	27,474	09-01-54	16.5	BPA
			<b>1,120,469</b>	<b>117,393</b>			
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	TG	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
			<b>1,535,197</b>	<b>118,157</b>			

continued

Table 2.1. (continued) Releases of spring Chinook from Lower Columbia River Select Area facilities, 1993-2010 brood years.

Brood Year	Release Date	Release Site	Number Released	Number of CWTs	Tag Code	Release Size fish/lb	Funding Agency and Study
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	TG	100,557	27,136	09-03-41	13.0	BPA
	3/31/11	YB	249,139	27,174	09-46-54	11.0	ODFW
			<b>1,290,669</b>	<b>144,688</b>			
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	TG	253,002	27,652	09-04-55	12.1	ODFW
	3/29/12	YB	99,241	279,138	09-04-53	11.5	BPA
			<b>1,529,255</b>	<b>396,995</b>			

<sup>a</sup> BS=Blind Slough, DR=Deep River, SFK=South Fork Klaskanine, SS=Steamboat Slough, TG=Tongue Pt., TGM=Tongue Pt. MERTS, TGJ=Tongue Pt. John Day, YB=Youngs Bay

<sup>b</sup> Tag codes funded by BPA representing production releases for each site that were used for year/site survival and straying analyses

<sup>c</sup> BPA-Bonneville Power Administration; NOAA-National Oceanic & Atmospheric Administration (10-day acclimation study)

<sup>d</sup> Early release due to high incidence of BKD and lack of funds to treat effectively

Table 2.2. Releases of Select Area Bright fall Chinook from Lower Columbia River Select Area facilities, 1994-2011 brood years.

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

continued

Table 2.2. (continued) Releases of Select Area Bright fall Chinook from Lower Columbia River Select Area facilities, 1994-2011 brood years.

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

continued

Table 2.2. (continued) Releases of Select Area Bright fall Chinook from Lower Columbia River Select Area facilities, 1994-2011 brood years.

Brood Year	Study Group	Release Site	Release Date	Number Released	Number of CWTs	Tag Code	Release Size #/lb	Funding Agency <sup>a</sup>
2002	SAFE	YB	7/24/03	370,942	23,832	09-38-09	17.4	BPA
	R&E	YB	8/7/03	409,372	27,833	09-38-19	22.3	R&E
	KK Broodstock	KK	7/19/03	199,640	26,938	09-38-17	42.7	R&E
	KK Broodstock	KK	8/20/03	167,486	LV only		19.3	R&E
	KK Broodstock	KK	8/27/03	167,288	LV only		17.5	R&E
	KK Broodstock	KK	8/30/03	167,804	27,348	09-38-18	16.0	R&E
				<b>1,482,532</b>	<b>105,951</b>			
2003	Broodstock	SF	7/6/04	53,963		LV only	91.3	R&E <sup>b</sup>
	R&E	YB	7/15/04	147,467	25,327	09-39-55	16.5	R&E
	Production	YB	7/15/04	372,209	25,041	09-39-54	15.5	BPA
	KK Broodstock	KK	7/23/04	50,465	LV only		33.7	R&E
	KK Broodstock	KK	7/26/04	151,316	27,075	09-39-59	33.7	R&E
	KK Broodstock	KK	8/14/04	166,900	27,523	09-39-60	20.0	R&E
	KK Broodstock	KK	8/21/04	167,179	LV only		18.9	R&E
	KK Broodstock	KK	8/28/04	143,293	LV only		14.8	R&E
				<b>1,252,792</b>	<b>104,966</b>			
2004	Broodstock, AHS	SF	7/14/05	45,247	27,822	62-02-27	31.6	R&E
	Production	YB	7/18/05	101,987	24,971	09-39-48	15.4	BPA
	R&E	YB	7/18/05	59,250	24,909	09-39-49	13.4	R&E
	KK Broodstock	KK	8/5/05	202,285	29,012	7/5/1946	31.5	R&E
	KK Broodstock	KK	8/20/05	177,836	29,420	9/21/2001	21.2	R&E
	KK Broodstock	KK	8/27/05	174,838	LV only		17.6	R&E
	KK Broodstock	KK	9/6/05	180,107	LV only		16.6	R&E
				<b>941,550</b>	<b>136,134</b>			
2005	Production	YB	7/6/06	383,723	24,942	09-43-29	15.2	BPA
	R&E	YB	7/19/06	92,774	22,017	09-44-24	10.7	R&E
	Broodstock	SF	7/22/06	628,888	50,153	09-44-29	25.0	R&E/ODFW
				<b>1,105,385</b>	<b>97,112</b>			
2006	Production	YB	6/27/07	564,641	23,163	09-45-50	16.8	BPA
	Broodstock	SF	6/28/07	708,412	28,562	09-46-04	33.5	OR/FPC
				<b>1,273,053</b>	<b>51,725</b>			
2007	Production	YB	7/1/08	574,020	23,120	9/1/2026	18.6	BPA
	Broodstock	SF	7/27/08	674,181	30,019	9/1/1942	31.5	OR/FPC
				<b>1,248,201</b>	<b>53,139</b>			
2008	Production	YB	7/2/09	702,659	25,211	090216	17.3	BPA
	Broodstock	SF	7/21/09	714,118	27,887	090243	32.8	OR/FPC
				<b>1,416,777</b>	<b>53,098</b>			
2009	Production	YB	7/8/10	229,105	27,114	094151	16.6	BPA
	Broodstock	SF	7/25/10	685,056	27,591	090337	23.6	ODFW
				<b>914,161</b>	<b>54,705</b>			

continued

Table 2.2. (continued) Releases of Select Area Bright fall Chinook from Lower Columbia River Select Area facilities, 1994-2011 brood years.

Brood Year	Study Group	Release Site	Release Date	Number Released	Number of CWTs	Tag Code	Release Size #/lb	Funding Agency <sup>a</sup>
2010	Production Broodstock	YB	6/28/10	684,030	24,762	090368	20.2	BPA
		SF	7/15/10	672,829	28,240	090441	29.2	ODFW
				<b>1,356,859</b>	<b>53,002</b>			
2011	Production Broodstock	YB	6/29/12	653,452	31,212	090584	21.1	BPA
		SF	7/10/12	704,594	31,299	090595	34.2	ODFW
				<b>1,358,046</b>	<b>62,511</b>			

<sup>a</sup> 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

<sup>b</sup> Early release due to disease

Table 2.3. Releases of Lower Columbia River early stock coho from Select Area facilities, 1993 -2010 brood years.

Brood Year	Release Date	Release Site <sup>a</sup>	Number Released	Number of CWT's	Tag Code <sup>b</sup>	Release Size (#/lb)	Funding Agency <sup>c</sup> 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	SFK	433,674	23,160	07-03-56	10.5	OR/FPC
	4/17-18/95	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
			<b>2,614,263</b>	<b>206,255</b>			
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
	4/14/96	SFK	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
	4/26/96	YB	829,600	26,933	07-09-61	9.6	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
			<b>3,533,977</b>	<b>233,297</b>			
1995	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	SFK	621,932	28,284	09-18-24	12.7	OR/FPC
			<b>2,029,244</b>	<b>133,765</b>			
1996	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
	4/23/98	DR	208,350	29,717	63-62-47	10.6	BPA / site comparison
	4/29/98	SFK	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
	5/26/98	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
			<b>2,142,978</b>	<b>290,555</b>			

continued

Table 2.3. (continued) Releases of Lower Columbia River early stock coho from Select Area facilities, 1993 - 2010 brood years.

Brood Year	Release Date	Release Site <sup>a</sup>	Number Released	Number of CWT's	Tag Code <sup>b</sup>	Release Size (#/lb)	Funding Agency <sup>c</sup> and Study
1997	4/12/99	YB	663,012	27,123	09-24-22	13.9	Mitchell
	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
	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
	4/21/99	SFK	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	272,656	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
			<b>3,558,095</b>	<b>305,156</b>			
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	DR	217,732	25,774	63-12-01	11.8	BPA / site comparison
	5/4/00	DR	213,411	29,697	63-12-02	11.3	BPA / site comparison
	4/24/00	SS	191,543	29,937	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	SFK	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
			<b>4,002,612</b>	<b>312,853</b>			
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	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
	5/7/01	SFK	344,738	26,276	09-30-13	12.5	OR/FPC
	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
			<b>3,628,096</b>	<b>303,250</b>			

continued



Table 2.3. (continued) Releases of Lower Columbia River early stock coho from Select Area facilities, 1933 - 2010 brood years.

Brood Year	Release Date	Release Site <sup>a</sup>	Number Released	Number of CWT's	Tag Code <sup>b</sup>	Release Size (#/lb)	Funding Agency <sup>c</sup> and Study
2000	5/6/02	YB	482,657	24,632	05-42-50	14.1	R&E / acclimation
	4/12/02	YB	837,201	26,545	09-30-15	13.0	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	SFK	583,248	24,285	09-33-57	11.4	OR/FPC
	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	158,598	20,585	63-07-64	12.0	BPA / site comparison
			<b>3,796,699</b>	<b>300,326</b>			
2001	5/8/03	YB	512,549	23,482	05-47-60	12.6	R&E / acclimation
	4/10/03	YB	844,653	27,009	09-19-32	11.7	Mitchell Act
	5/9/03	YB	158,476	25,201	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	161,222	26,940	09-34-61	13.0	Mitchell / acclimation
	5/7/03	BS	155,582	26,452	09-36-38	13.0	Mitchell /acclim/d.index
	4/28/03	SFK	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
			<b>3,926,852</b>	<b>310,863</b>			
2002	4/6/04	TGM	186,520	24,770	09-38-62	13.0	BPA / site comparison
	4/9/04	YB	758,997	24,155	09-37-27	11.6	Mitchell Act
	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	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	30,000	63-20-67	13.0	BPA / site comparison
			<b>3,028,984</b>	<b>226,391</b>			
2003	4/6/05	YB	723,793	28,007	09-39-44	15.4	Mitchell Act
	5/1/05	DR	144,900	20,200	63-22-94	11.0	BPA / site comparison
	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
			<b>1,803,222</b>	<b>126,631</b>			

continued

Table 2.3. (continued) Releases of Lower Columbia River early stock coho from Select Area facilities, 1993 - 2010 brood years.

Brood Year	Release Date	Release Site <sup>a</sup>	Number Released	Number of CWT's	Tag Code <sup>b</sup>	Release Size (#/lb)	Funding Agency <sup>c</sup> and Study
2004	4/10/06	YB	744,274	25,212	09-20-44	12.7	Mitchell Act
	4/21/06	TG	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	DR	201,300	28,534	63-26-97	12.3	BPA
	5/3/06	BS	305,573	24,189	09-43-06	13.8	Mitchell Act
			<b>1,826,924</b>	<b>134,975</b>			
2005	4/19/07	TG	174,547	28,031	09-43-30	12.6	BPA
	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
	5/1/07	DR	420,000	29,500	63-37-64	13.0	BPA
			<b>2,056,851</b>	<b>138,126</b>			
2006	4/15/08	TG	597,754	28,574	09-46-23	12.0	BPA
	4/28/08	SFK	115,763	27,615	09-39-34	10.6	ODFW
	4/28/08	SFK	115,763	30,185	09-45-14	10.6	ODFW
	4/28/08	SFK	50,675	3,264	09-36-26	10.6	BPA
	5/1/08	DR	368,000	33,684	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
			<b>2,559,503</b>	<b>198,280</b>			
2007	2/25/09	KK	132,659	4,810	09-01-58	13.4	BPA (BKD, forced rel.)
	4/10/09	KK	377,402	13,689	09-01-58	11.8	BPA
	4/6/09	TG	477,830	28,201	09-01-59	11.8	BPA
	4/21/09	YB	786,742	26,462	09-46-59	14.8	Mitchell Act
	4/29/09	SF	99,339	4,081	09-01-58	11.4	BPA
	4/29/09	SF	225,455	52,334	09-01-79	11.4	ODFW
	4/29/09	SF	145,341	0	NA	11.4	Mitchell Act
	5/4/09	BS	300,036	26,703	09-46-61	12.9	Mitchell Act
	5/6/09	DR	435,750	22,500	63-44-74	12.0	BPA
	5/6/09	DR	270,400	0	NA	15.0	Mitchell Act
	5/6/09	YB	227,399	0	NA	11.8	Surplus WA fish
			<b>3,478,353</b>	<b>178,780</b>			

continued

Table 2.3. (continued) Releases of Lower Columbia River early stock coho from Select Area facilities, 1993 - 2010 brood years.

Brood Year	Release Date	Release Site <sup>a</sup>	Number Released	Number of CWT's	Tag Code <sup>b</sup>	Release Size (#/lb)	Funding Agency <sup>c</sup> and Study
2008	4/9/10	TG	483,412	28,080	09-02-54	10.6	BPA
	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
	5/3/10	DR	292,000	-	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
			<b>3,340,472</b>	<b>190,946</b>			
2009	4/15/11	TG	479,365	24,760	09-03-45	11.3	BPA
	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
	5/2/11	DR	367,000	26,500	63-45-99	11.9	BPA
	5/3/11	DR	325,000	-		11.9	Mitchell Act
	5/3/11	KK	392,314	14,501	09-03-36	11.9	BPA
			<b>3,117,607</b>	<b>144,469</b>			
2010	4/16/12	BS	372,265	25,686	09-04-61	14.6	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	TG	491,330	25,058	09-04-54	14.0	BPA
	4/30/12	KK	489,060	26,275	09-46-42	11.7	BPA
	5/2/12	DR	462,000	28,650	63-57-93	14.8	BPA
	5/2/12	DR	338,000	-	NA	14.8	Mitchell Act
			<b>3,300,739</b>	<b>158,027</b>			

<sup>a</sup> BS=Blind Slough, DR=Deep River, KK=North Fork Klaskanine, SFK=South Fork Klaskanine, SS=Steamboat, Slough, TG=Tongue Pt., TGM=Tongue Point MERTS, YB=Youngs Bay

<sup>b</sup> Tag codes funded by Bonneville Power Administration representing production releases for each site that were used for year/site survival and straying analyses

<sup>c</sup> 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, 2007-2011 brood years

Brood Year	Release Site	Release Date	Number Released	Number of CWTs	Tag Code	Release Size #/lb	Funding Agency and Study
2008	DR	6/1/09	700,000	54,670	634772	78.0	Mitchell Act-reprogrammed
			<b>700,000</b>	<b>54,670</b>			
2009	KK	5/3/10	2,093,575	52,298	092047	78.2	Mitchell Act
	DR	6/24/10	700,000	83,033	635198	79.2	Mitchell Act-reprogrammed
			<b>2,793,575</b>	<b>135,331</b>			
2010	KK	5/16/11	1,932,616	53,783	092050	81.3	Mitchell Act
	DR	6/23/11	862,000	88,262	635592	82.0	Mitchell Act-reprogrammed
			<b>2,794,616</b>	<b>142,045</b>			
2011	KK	5/8/12	1,954,568	54,565	092213	77.0	Mitchell Act
	DR	6/18/12	893,000	95,304	636198	74.4	Mitchell act-reprogrammed
			<b>2,847,568</b>	<b>149,869</b>			

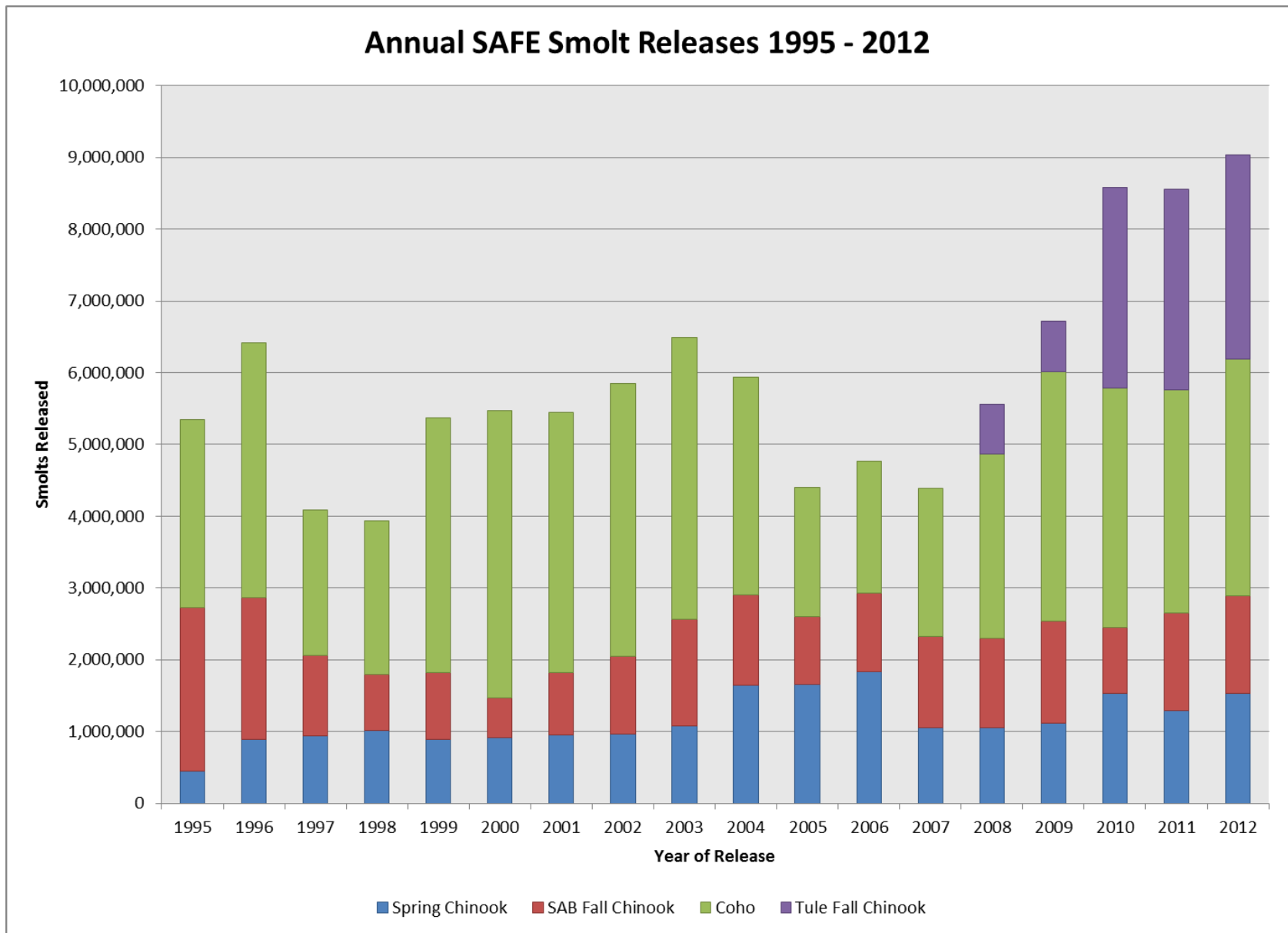


Figure 2.1. SAFE annual smolt releases, 1995 – 2012.

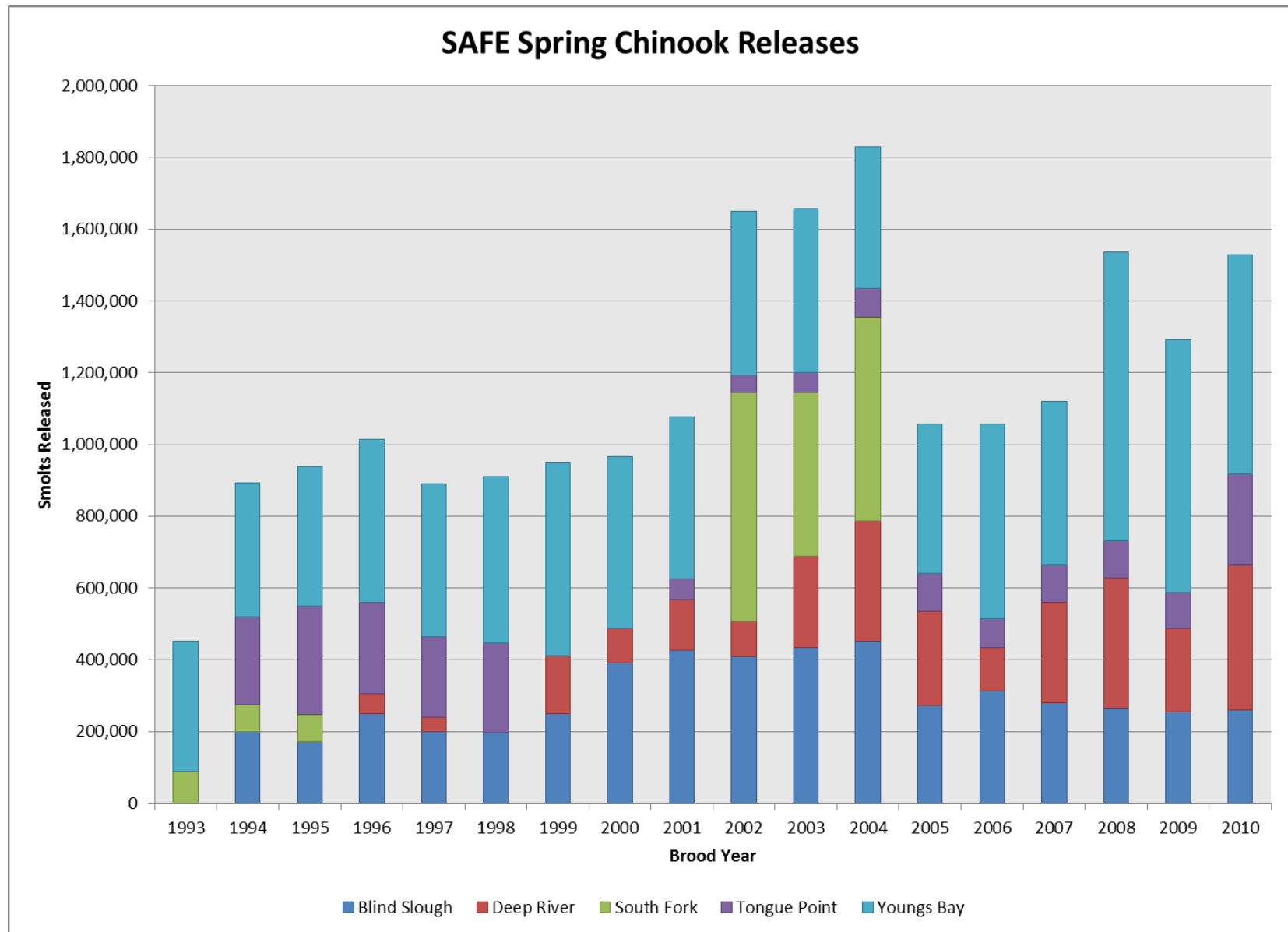


Figure 2.2. SAFE spring Chinook releases, brood years 1993-2010.

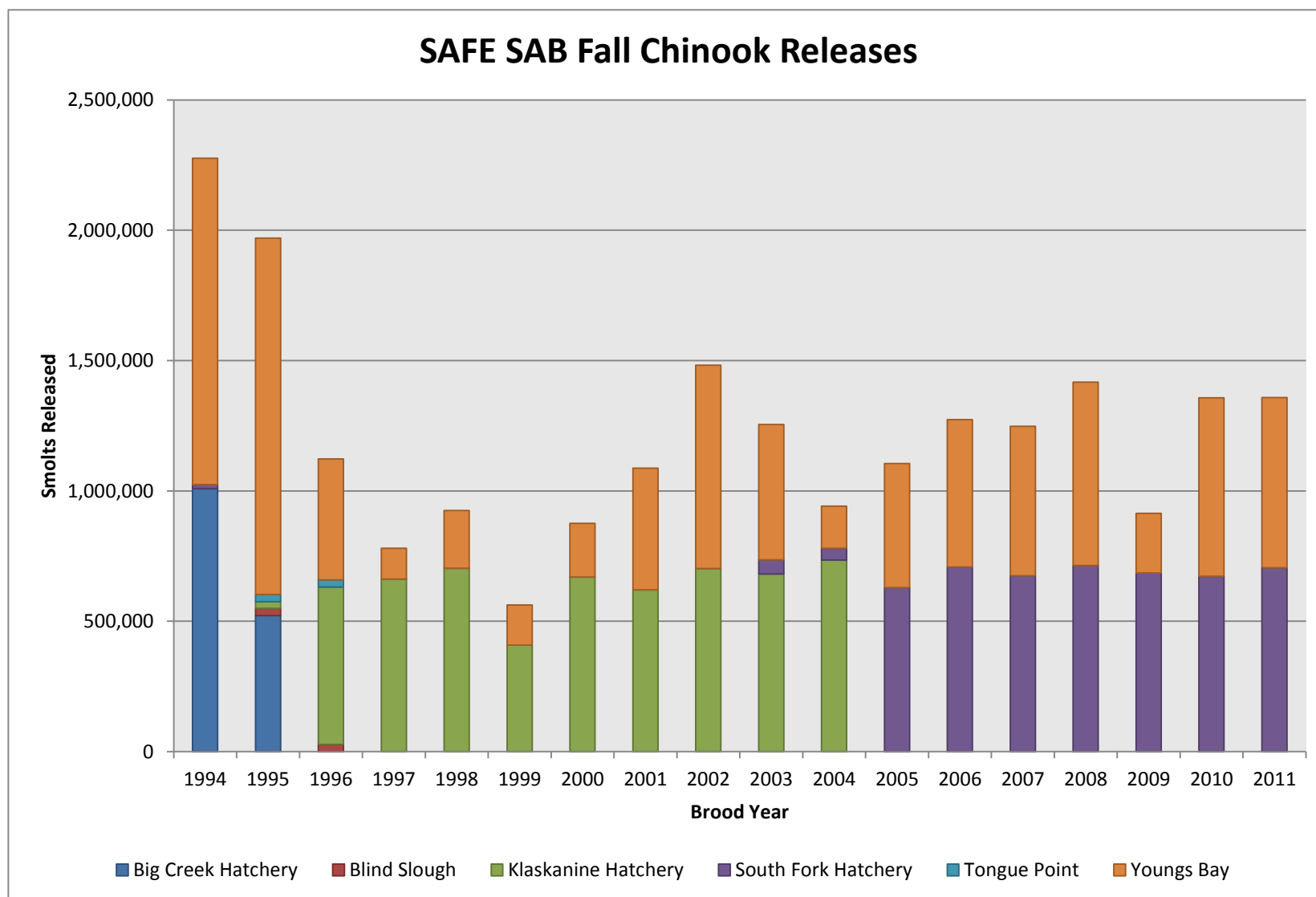


Figure 2.3. SAFE SAB fall Chinook releases, brood years 1994 – 2011.

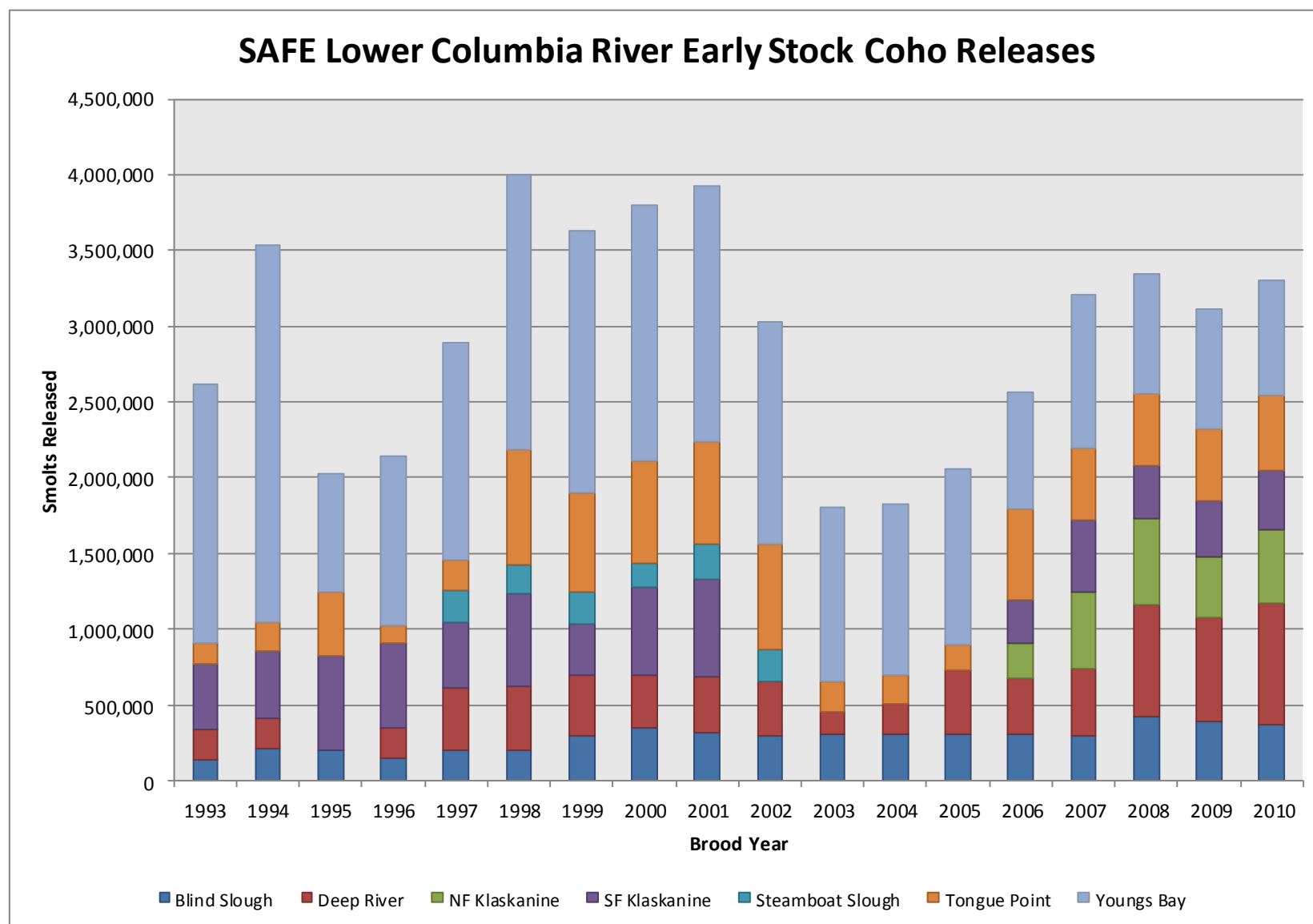


Figure 2.4. SAFE coho releases, brood years 1993 – 2010.



### **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 1996-2007 were used to develop the rates used for the 2010-2012 forecasts. Prior to 2008, the recruitment rate described above was used to predict both age-4s and -5s. 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/Knapka 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. PPMC 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 1997-2001 (2010) and 1997-2004 (2011, 2012)). This estimate is then multiplied by the average percent contribution of that age class to the total return based on return years 1995-2011 (WDFW unpublished data). Estimates for each age class are summed by release site, 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 1994-2001 (2010) and 1994-2004 (2011, 2012) 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 years 1993-2003 for 2010; 1995-2005 for 2011 and 2012) then the estimate is apportioned to fisheries based on CWT recoveries (return years 1993-2003 for 2010 and 2011; 1993-2007 for 2012). 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 2009 – summer 2012) 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 is comprised of the 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 are held in Astoria, Oregon in January of each year for spring fisheries and in June for fall fisheries. Subsequent Fact Sheets are then prepared and distributed by staff in advance of all Compact/Joint State Hearings whereby mainstem Columbia River and Select Area fisheries are set. In recent years, these 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. 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/index.asp>,

WDFW: <http://wdfw.wa.gov/fish/crc/crcindex.htm>

ODFW also maintains a telephone hotline with current fishing seasons and fishery actions: (971) 673-6000.

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 (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 not uncommon during winter/spring and fall seasons. This level of management is not necessarily needed for Select Area fisheries due to relatively minor impacts to ESA-listed stocks. However, since Select Area fisheries are managed in concert with mainstem fisheries and utilize some of the 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, present 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 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 fishery sampling is provided by BPA through the SAFE project (BPA #1993-06000) in Washington and also by the coded-wire tag recovery project (BPA Project #1982-01301) in Oregon and Washington.

### **Commercial Fisheries**

Sampling of catch from Select Area commercial fisheries is conducted by ODFW and WDFW field staff at the various buying stations at the time of landing. 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

includes species, stock, sex, length, and fin mark. The CWT and scale samples are collected at this time also. 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 entered and verified on a mainframe computer 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 2005). During 2001 – 2012, over 250,000 (31%) of all 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 is used primarily to determine survival rates and stock composition of the landed catch and not to estimate numbers of harvested fish. Average bio-sampling rates during 2008-2012 exceeded 47% for Select Area winter, spring, and summer fisheries but tend to be lower (28%) for fall fisheries due to higher volume of fish landed (TAC 2008). It is important to note that biological sampling rates associated with Select Area fisheries are generally higher than mainstem Columbia fisheries.

Stratified harvest estimates of all commercial catch in Washington and Oregon are calculated using data from fish tickets<sup>†</sup> 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 based on phone surveys of buyers and processors and made available to the public via ODFW's website at [http://www.dfw.state.or.us/fish/OSCRP/CRM/comm\\_fishery\\_updates.asp](http://www.dfw.state.or.us/fish/OSCRP/CRM/comm_fishery_updates.asp). 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 Chinook) data is analyzed to determine stock compositions 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 limited resources to carry out a statistical creel program, formal estimates of recreational catch are not possible. Recent years' estimates of recreational harvest in the Select Areas have

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<sup>†</sup> 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 to be recorded 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). Oregon Revised Statute 509.070 addresses fish quality. Washington Administrative Code 220-69-240 details fish ticket reporting (section 1) and Quick Reporting requirements (section 12, d).

been developed by using expanded punch card estimates, trends in the Select Area commercial fisheries, and comparative statistics from years with limited creel information.

## **ESA COMPLIANCE**

### **Winter and Spring Fisheries**

As mentioned, winter and spring Select Area fisheries are managed intensely in-season to ensure the allowable impact rate (currently 0.1 – 0.2 percent of the upriver spring Chinook run) is not exceeded. 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 suggests 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.

It is important to note that even though final upriver spring Chinook impact percentages are generally at or below the pre-season allotment and average 0.149% for 2002 – 2012 (Table 3.2), final numbers reflect 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 under the guidelines. 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. Because 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 of time. When mainstem fisheries are at or near allowable impact limits, the Select Area fisheries may be closed for significant periods of time. For example, in 2008 the final impact of Select Area winter and spring commercial fisheries was 0.132% of the upriver spring Chinook final run size, well under the guideline of 0.15%. However, due to the upriver run tracking below pre-season forecast and mainstem fisheries projected to exceed allowable impacts, all Select Area commercial fisheries were closed for a full week in mid-May. Therefore the final impact rate observed does not represent a full season. 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.

Summarized CWT data recoveries, fishery catch estimates, and estimated escapements for most Columbia River salmonid stocks are provided by several state and federal agencies for additional data analysis. Data analysis includes run reconstruction of all major salmonid stocks. Each stock group is represented by summing the CWTs for that group. Total returns are categorized by age and stock. Included in total returns are fishery catches, escapement estimates for hatchery and natural-spawn fish, and dam counts.

## **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 stock is removed from the catch total 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 is derived from analysis of scale samples collected during field sampling. This age data is 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 completed 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 is derived from analysis of

scale samples collected during field sampling. This age data is 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 is 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 (FALL 2009 through WINTER/SPRING/SUMMER 2012 SEASONS)**

Commercial harvest in the Select Areas contributes significantly to the overall non-Treaty Columbia River commercial salmon fishery. On average, spring Chinook catch makes up 50%, coho is 62%, and fall Chinook is 27% of 2003–2012 total harvest (Table 3.5, Figure 3.1). The importance of the SAFE project is evident when one considers that Select Area fisheries carried the commercial industry through the mid to late 1990s when little mainstream 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 2000–2011 (excluding 2005). As 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. These extended-season fisheries have been either constrained to locations in 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 height/flow during this timeframe or constrained to short ( $\leq 4$  hours) periods proximate to low tide. Although need for close monitoring is increased during the extension period, adaptive 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 800–3,500 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. 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 three spring Chinook and no summer seasons have been adopted since.

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. 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. Smolt releases increased back to pre-2000 production levels in 2012. Recently, test fishing and full-fleet commercial test fisheries have been conducted in Tongue Point/South Channel and staff is optimistic that spring season fisheries will continue to be feasible.

Spring fisheries have been conducted in Deep River since 2003 with harvest ranging between 28–415 fish annually. Experimental winter seasons have been adopted annually since 2006 and have resulted in salmonid catch ranging between 0-239 fish. Fishing periods in Deep River have generally been non-concurrent with the other Select Areas to encourage participation.

### **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 salmon 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. Fisheries targeting coho are typically initiated in late August or early September and continue through the end of October. In Youngs Bay, limited Chinook target fishing periods occur weekly from mid-June (summer season) through August to target late returning SAFE-produced spring Chinook, early returning SAB fall Chinook, and the first coho returns. In Knappa Slough, a target Tule Chinook fishery has occurred intermittently during late August when surplus fish were expected to return to Big Creek Hatchery. Recently, late-August experimental fisheries have also been adopted to target Tule Chinook returning to the Deep River Select Area program. 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.

## **2009 Fall Season Commercial Fisheries**

Select Area fisheries that occurred during the fall of 2009 were managed to harvest hatchery and net-pen reared coho and SAB fall Chinook salmon with minimal impacts to listed species. A sales/possession limit of three white sturgeon per vessel per calendar week was also adopted for fall commercial fisheries in 2009. Sale of white sturgeon in Select Areas was prohibited effective September 6, 2009 when the annual catch guideline (400 fish) for the Select Areas was met following a fall harvest of 114 fish. Total coho harvest in the four Select Area fisheries during the fall of 2009 was excellent; the 80,950 coho landed is the second highest catch in the history of the project. Chinook landings were also very good; the total catch of 11,990 fish was the third highest since 1993 and can primarily be attributed to increased returns resulting from constraints on ocean fisheries and a harvestable surplus of Big Creek Hatchery Tule fall Chinook.

### *Youngs Bay*

The fall Youngs Bay Select Area fishery began in early August with weekly 36-hour fishing periods through late August; consistent with the expanded structure first set in 2008. The fishing period during the last week of August also deviated from the normal structure (normally a 72-hour target coho period using 6-inch maximum mesh) to continue the 36-hour Chinook target fishery (8-inch maximum mesh size) for the entire month. These modifications were implemented to provide greater consistency during the early fall season and increase harvest opportunity on abundant SABs. As normal, the upper Youngs Bay fishing boundary was moved downstream from the confluence of Youngs and Klaskanine rivers to Battle Creek Slough beginning in August to ensure adequate SAB escapement. August fishing periods were intended to harvest net-pen produced SAB fall Chinook and early returning coho without jeopardizing SAB fall Chinook broodstock needs at the Klaskanine and South Fork Klaskanine hatcheries. After the August target Chinook fisheries, the fall season proceeded as normal with continuous fishing from August 31 through October 31. The season consisted of 61 consecutive days of fishing with the intent of harvesting late-returning SAB fall Chinook and hatchery-origin coho whose abundance typically peaks in mid-September. The complete fall season consisted of 65 fishing days, and resulted in a catch of 6,565 Chinook, 49,329 coho, and 72 white sturgeon. The Chinook catch was the second highest on record but was less than the preseason expectation (7,900 fish); coho harvest was the fourth highest since 1993, nearly twice the recent 5-year average, and twice than preseason expectations (24,900 fish).

### *Tongue Point/South Channel*

The Tongue Point/South Channel fishery opened prior to Labor Day, given the late timing of the holiday in 2009. The fishery began with four nightly 12-hour fishing periods per week during August 31 – September 18, which was an expansion over the early season structure used in prior years. As usual, the fishery increased to four nightly 16-hour periods each week from September 21 – October 30. The 34-night season resulted in landings of approximately 872 Chinook, 16,918 coho, one chum, and 11 white sturgeon. The coho catch was the second highest on record and more than twice the preseason expectation of 7,000 fish. Landings from the Tongue Point/South Channel area are included in mainstem Columbia River landings when the mainstem is open so catch attributed to Tongue Point/South Channel should be considered a minimum.

### *Blind Slough/Knappa Slough*

The season structure of the Blind Slough/Knappa Slough fishery was similar to the Tongue Point/South Channel fishery with the exception of a two night target Chinook fishery during the

last week of August intended to harvest an expected surplus of Tule fall Chinook returning to Big Creek Hatchery. The regular fall fishery began with four, 12-hour nightly fishing periods each week during August 31 – September 18 which, like Tongue Point/South Channel, was an expansion over the typical season structure. Beginning September 21, nightly fishing hours were expanded to 14 hours in an effort to maximize harvest of the net-pen reared coho. To access surplus returns of Tule fall Chinook destined for Big Creek Hatchery the maximum mesh size allowed in Blind Slough/Knappa Slough was increased to 9¼-inch for the entire season. The 38-night season ended October 30 and resulted in landings of 3,991 Chinook, 10,043 coho, and 20 white sturgeon. The coho catch set a new record for the site, topping the previous record set in 2008. Record harvest in back-to-back years is an encouraging sign for the Blind Slough/Knappa Slough coho program. The Chinook harvest was the second highest on record and effectively harvested Tule fall Chinook in excess of spawning needs at Big Creek Hatchery.

### *Deep River*

The structure of the Deep River fishery was similar to that used in other Select Area fishing areas with multiple nightly fishing periods occurring each week from August 31 – October 31. The fishery consisted of five 14-hour nightly periods per week during August 31 – September 12. Beginning the week of September 14, the fishery consisted of four nightly periods. The 38-night season resulted in landings of 562 Chinook, 4,660 coho, two chum, and 11 white sturgeon. The coho catch was the fourth highest on record, but was slightly less than the preseason expectation of 5,400 fish.

## **2010 Winter/Spring/Summer Season Commercial Fisheries**

### *Youngs Bay*

The 2010 winter season consisted of nine fishing periods between February 21 and March 15 (12- to 18-hour). The winter season extension consisted of one 12-hour period (March 14) set for the entire bay, followed by two 12-hour periods and one 4-hour period upstream of the old Youngs Bay Bridge between March 21 and 29. One additional 4-hour period was originally adopted for April 5 but was rescinded in-season due to higher than expected abundance of upriver spring Chinook during the previous period. Consistent with preseason planning and public input, this structure for the winter-to-spring season “bridge” period was designed to provide opportunity with the maximum area possible. This strategy of constricting the fishery by area (with in-season flexibility) when non-local stocks may be most abundant appears to be an effective alternative to closing the fishery entirely during this timeframe, although higher than expected abundance of upriver spring Chinook did necessitate additional in-season action in 2010. The 7-inch minimum mesh size regulation was in effect for all winter fishing periods. As is the case for all commercial fisheries in Youngs Bay, maximum net length was restricted to 250 fathoms, with no more than two pounds of leadline per fathom of net, except in the area upstream of the mouth of the Walluski River. The 13 fishing periods resulted in landings of 1,023 spring Chinook which is the second highest catch and three times the average harvest (333) observed since winter seasons began in 1998. Additionally, 28 white sturgeon were landed in the Youngs Bay winter season. A five white sturgeon (per vessel per week) landing limit was in place for the entirety of the winter season.

The 2010 spring season in Youngs Bay began on April 15 with periods scheduled to occur on Mondays and Thursdays nights through April 30 followed by weekly four-day periods from May 3 through June 11. Unusually high catch of upriver spring Chinook during the first two periods prompted significant in-season modification of the spring commercial fishery in Youngs Bay. The remainder of the periods in April were rescinded, the four-day period scheduled for the

week of May 4 was modified into two four-hour periods (Wednesday and Friday), and the following week's period was reduced to 2 1/2 days – delayed until 7 p.m. on Tuesday. Fisheries resumed as originally adopted starting the week of May 17. The 2010 Youngs Bay spring fishery landed 18,756 Chinook and 55 white sturgeon. Sturgeon retention in all Select Area commercial fisheries was closed effective May 18 after the catch guideline had been met. The Chinook harvest was the highest ever recorded and nearly five times the recent ten-year average Chinook harvest (3,900). Throughout the spring season, a 9¾-inch maximum mesh size restriction was in effect.

The 2010 summer season in Youngs Bay was open 6 AM Wednesday through 6 AM Friday weekly from June 16–July 30. As in the spring fishery, a 9¾-inch maximum mesh size restriction was in effect. The Youngs Bay summer fishery landed 972 Chinook, twice the ten-year (2000–2009) average Chinook harvest of 485 fish and continued the trend of increased annual harvest. The high landings were driven by a good abundance of early returning SABs fall Chinook destined for Youngs Bay (425 landed) and the exceptional return of Age-4 adults from the net pen production. No white sturgeon were harvested since sturgeon retention in all Select Area commercial fisheries was closed effective May 18 after the catch guideline had been met.

The combined Youngs Bay winter/spring/summer fishery harvest totaled 20,751 Chinook. Stock composition is based on VSI and CWT analysis with a total of 8,252 Chinook (40% of the Chinook catch) examined for fin marks and CWTs, and 432 CWTs collected. The 2010 combined winter/spring/summer catch was comprised of 85.0% spring Chinook and 2.1% SAB fall Chinook destined for Select Area sites, 6.3% upriver spring Chinook, 0.1% upper Columbia summer Chinook (after June 15), 5.9% Willamette River spring Chinook, and 0.7% spring Chinook destined for the Cowlitz, Kalama, Lewis, or Sandy rivers. Based on scale readings, which were verified with CWTs, the age composition of the catch was <1% Age-2 (all SAB jacks), 2% Age-3, 90% Age-4, 8% Age-5, and 0% Age-6 fish.

### *Blind Slough/Knappa Slough*

Similar to 2000–2009, a winter gillnet season with a 7-inch minimum mesh restriction was adopted for Blind Slough (excluding Knappa Slough) in 2010. The adopted season consisted of eleven 12-hour periods (7 PM – 7 AM) on Wednesday and Sunday nights during February 21–April 5 (except February 24 and March 31, both Wednesdays). The six periods (March 14–April 5) 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 also to meet the goal of significant and stable opportunity in 2010. During the winter fishing periods, a total of 319 spring Chinook were landed, which is the highest on record and much greater than the recent ten-year (2000–2009) average Chinook harvest (78). As described for Youngs Bay, a five white sturgeon landing limit was in place for the winter season, however no white sturgeon were landed.

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. Due to the unusually high abundance of upriver spring Chinook in the combined Select Area commercial harvest during the spring season openers, three fishing periods in late April were rescinded and two in early May were rescheduled. Fisheries resumed as originally adopted starting the week of May 17. For all periods in May and June, the lower deadline in Knappa Slough was extended further downstream to the western end of Minaker Island, as usual. 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 2010 spring fishery consisted of fourteen 12-hour (7 PM – 7 AM) fishing periods on Thursday and Monday nights between April 15 and June 11 (except that the first two Monday periods in May were rescheduled to Tuesdays). The restricted 2010 Blind Slough/Knappa Slough spring fishery landed 2,680 spring Chinook and 22 white sturgeon. The Chinook harvest was the second highest on record and was greater than the recent ten-year average (1,600).

The combined Blind Slough/Knappa Slough winter and spring fishery harvest totaled 2,999 Chinook. Stock composition is based on VSI and CWT analysis. A total of 2,140 Chinook (71% of the combined catch) were examined for fin marks and CWTs and 140 CWTs were collected. The catch was comprised of 91.9% spring Chinook destined for Select Area sites, 2.2% upriver spring Chinook, 5.8% Willamette River spring Chinook and 0.1% spring Chinook destined for the Cowlitz, Kalama, or Lewis rivers. Based on scale readings, which were verified with CWTs, the age composition of the catch was 0% Age-3, 74% Age-4, 26% Age-5, and 0% Age-6.

#### *Tongue Point/South Channel*

Efforts to reinstate a spring Chinook fishery in the Tongue Point/South Channel site continued in 2010. At the February 18 hearing, staff recommended a full-fleet experimental test fishery for the spring season. Again, 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 on Monday and Thursday nights (7 PM – 7 AM) starting on April 19 and ending on June 11. 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 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. The new lower deadline was recommended and adopted as an additional precautionary measure. This new Tongue Point deadline has been used since 2008 and is described as “a line extended from the upstream (southernmost) pier (#1) at the Tongue Point Job Corps facility through navigation marker #6 to Mott Island”. The deadline is approximately one mile upstream from the deadline used in 2003 and prior. Additionally, for the first four weeks 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 17 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 four days, encompassing the timeframe just prior to the season openers in the other sites up to the first scheduled period in Tongue Point/South Channel. All test fishing activities were conducted using live-capture methods with an ODFW technician on-board to collect data and direct activities. Sixteen drifts using 4¼-inch tangle nets were made on April 12 and 17 capturing 55 spring Chinook (44 identified via VSI as lower river stock and 11 as upriver) and two steelhead. Because the abundance of non-target fish was low relative to effort expended, the full-fleet experimental commercial fishery commenced on April 19 as scheduled.

Initially, periods were adopted for Monday and Thursday nights (7 PM – 7 AM) from April 19 through June 11. As with the spring commercial fisheries in the other Select Area sites, several

of the late-April and early May periods of the full-fleet experimental test fishery in Tongue Point/South Channel were rescinded following the initial period. The fishery reopened on May 7 and, for the most part, proceeded as originally adopted except the May 10 period was rescheduled to Tuesday May 11 and shortened to eight hours, concurrent with adjustments made in the other sites.

The 2010 full-fleet experimental test fishery in Tongue Point/South Channel consisted of twelve (8 to 12-hour) fishing periods and landings totaled 727 spring Chinook and 92 white sturgeon. Stock composition was based on VSI and CWT analysis with a total of 571 Chinook (79% of the catch) examined for fin marks and CWTs, and 56 CWTs being collected. The catch was comprised of 72.5% spring Chinook destined for Select Area sites, 10.3% upriver spring Chinook, and 17.2% Willamette River spring Chinook. Based on scale readings, verified with CWTs, the age composition of the catch was <1% Age-3, 85% Age-4, 15% Age-5, and 0% Age-6 fish.

### *Deep River*

A winter season was conducted at the Deep River site for the sixth consecutive year in 2010. The winter season was expanded to 12 fishing periods (two per week) of 12-hour duration occurring on Monday and Wednesday nights (7 PM–7AM) beginning February 22 and ending April 1 (Thursday). Two additional 12-hour periods originally set for the Monday and Wednesday nights of April 5 and April 7 were rescinded in season to reduce risk of upriver Chinook encounters. Those rescinded periods fell within the peak harvest time in Deep River, with landings of 110 Chinook the week preceding and 107 the week following the rescinded periods.

A spring fishery consisting of 17 fishing periods occurring on Sunday and Wednesday nights (7 PM–7 AM) between April 14 and June 10 was adopted at the February 18, 2010 Compact hearing. The fishery began as scheduled on April 14, but four fishing periods (April 21, 25, 28 and May 9) were rescinded due to in season concerns of the combined Select Area fisheries reaching the upriver spring Chinook impact allocation. Early May fishing periods were rescheduled to Tuesday and Thursday nights (May 5 and 7), and nine fishing periods were reinstated for Sunday and Wednesday nights from May 12 to June 9. The final spring fishery thus consisted of 13 fishing periods in Deep river in 2010. 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 93/4-inch maximum mesh size for the spring season. As in Blind Slough and Knappa Slough, 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 are 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. Concurrent with the other Select Areas, weekly white sturgeon landing limits were in place for the winter and spring season.

A total of 239 Chinook and 14 white sturgeon were landed during the winter season, and 176 Chinook and zero white sturgeon were landed during the spring season. Sturgeon retention was prohibited beginning May 18 once the harvest guideline was reached. Chinook harvest was record-setting for Deep River in both the winter and spring seasons, and the combined total of 415 spring Chinook was over three times the previous record of 122 landed in 2009.

The Deep River winter/spring fishery stock composition was based on VSI and CWT analysis with a total of 415 Chinook (100% of the catch) examined for fin marks and CWTs, and 51 CWTs being collected. The catch was comprised of 52.3% spring Chinook destined for Select Area sites, 12.5% upriver spring Chinook, 33.0% Willamette River spring Chinook, and 2.2% 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, 73% age-4, 27% age-5, and <1% age-6.

### **2010 Fall Season Commercial Fisheries**

Chinook landings were excellent in 2010; the total catch of 20,666 adult fish was the highest since 1993 and can primarily be attributed to increased returns resulting from constraints on ocean fisheries and a harvestable surplus of Big Creek Hatchery Tule fall Chinook. Total coho harvest of 58,759 in the four Select Area fisheries was the sixth highest catch on record and exceeded the recent five year average. A two white sturgeon per vessel per calendar week sales/possession limit was in place until September 12, when sales of white sturgeon in Select Areas were prohibited because the 2010 Select Areas catch guideline (300 fish) was met following a fall harvest of 116 fish.

#### *Youngs Bay*

The fall Youngs Bay Select Area fishery began in early August with four 36-hour fishing periods weekly through late August; consistent with expanded hours first set in 2008. These expanded seasons were implemented to provide greater consistency during the early fall season while providing for adequate SAB fall Chinook broodstock needs at the Klaskanine and South Fork Klaskanine hatcheries. As normal, the upper Youngs Bay fishing boundary was moved downstream from the confluence of Youngs and Klaskanine rivers to Battle Creek Slough beginning in August to ensure adequate SAB escapement. After the August target Chinook fisheries, the fall season continued with one three and a half day season from August 30 through September 3 and continuous fishing from September 6 through October 31 (56 days). The complete Youngs Bay fall season consisted of 65 fishing days, and resulted in a catch of 8,048 Chinook, 27,564 coho, and 37 white sturgeon. The Chinook catch was the second highest on record but was slightly less than the preseason expectation (8,700 fish); coho harvest was similar to the recent 5-year average and slightly higher than preseason expectations (25,300 fish).

#### *Tongue Point/South Channel*

The Tongue Point/South Channel fishery began with four nightly 12-hour fishing periods per week during August 30 – September 17, rather than three periods per week used in prior years. As usual, the fishery increased to four nightly 16-hour periods each week from September 20 – October 29. The 36-night season resulted in landings of approximately 1,402 Chinook, 6,734 coho, and 31 white sturgeon. The coho catch was well below the long-term average and the preseason expectation of 9,900 fish.

#### *Blind Slough/Knappa Slough*

The season structure of the fall Blind Slough/Knappa Slough fishery was similar to the expanded Tongue Point/South Channel fishery. The fishery began with four, 12-hour nightly fishing periods each week during August 30 – September 17 and expanded to 14 hours nightly beginning September 20. To access surplus returns of Tule fall Chinook destined for Big Creek Hatchery, the maximum mesh size allowed in Blind Slough/Knappa Slough was increased to 9¾-inch for the entire season. The 36-night season ended October 29 and resulted in landings

of 10,205 Chinook, 5,201 coho, 45 white sturgeon and one chum. The coho catch was the third highest on record and marked the third consecutive year of higher than average catches. The 2011 Chinook harvest was the highest on record and was 64% higher than the previous record catch in 2004.

### *Deep River*

The structure of the Deep River fishery was similar to that used in other Select Area fishing areas with four 14-hour nightly fishing periods occurring each week through September 17, except the season started August 16; two weeks earlier than other sites. This modification was made to maximize catches on early arriving coho and test for local Chinook abundance resulting from Tule fall Chinook net pen releases initiated in 2009. Beginning September 20, the fishery expanded to four 17-hour nightly periods per week through October 31. Landings during the experimental August 16-27 period yielded catches of 108 coho and 136 fall Chinook. Combined season landings for the 40-night season included 1,011 Chinook, 19,260 coho, 11 chum, and three white sturgeon. The coho catch was the highest on record and was more than three times larger than the preseason expectation of 5,300 fish.

## **2011 Winter/Spring/Summer Season Commercial Fisheries**

### *Youngs Bay*

Due to the relatively few allowable upriver spring Chinook impacts allocated to Select Area commercial fisheries in 2011 a conservative approach was taken during the development of winter and spring fisheries. No fishing periods during the mid-March through early-April were recommended or adopted for Youngs Bay. Also the first two periods adopted for the spring season were planned to be shorter than usual – six hours each.

The 2011 winter season consisted of twelve 18-hour fishing periods between February 13 and March 11. Two additional 6-hour periods were set for March 14 and 16 but were restricted to waters upstream of the old Youngs Bay Bridge. This strategy of constricting the fishery by area (with in-season flexibility) when non-local stocks may be most abundant appears to be an effective alternative to closing the fishery entirely during this timeframe. The 7-inch minimum mesh size regulation was in effect for all winter fishing periods. As is the case for all commercial fisheries in Youngs Bay, maximum net length was restricted to 250 fathoms with no more than two pounds of leadline per fathom of net, except in the area upstream of the mouth of the Walluski River. The fourteen fishing periods resulted in landings of 83 spring Chinook which is the fifth lowest catch and less than 25% of the average harvest (386) observed since winter seasons began in 1998. Additionally, 12 white sturgeon 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 2011 spring season in Youngs Bay was scheduled to begin with two 6-hour periods on April 18 and April 21 and continue with five 18-hour periods from April 25–May 6 followed by weekly four-day periods from May 9 through June 10. Higher than expected catch of upriver spring Chinook during the opening periods in all of the Select Area sites, likely influenced by unusually high springtime flows in the Columbia River and delayed timing of the upriver run, prompted significant in-season modification of the spring commercial fishery in Youngs Bay. The 6-hour period on April 21 and the 18-hour period on April 25 were rescinded and two other 18-hour periods on April 28 and May 1 were reduced to five hours each. Fisheries resumed as originally adopted starting on May 3. Retention of non-adipose fin-clipped spring Chinook in Youngs Bay



was disallowed during two mainstem commercial fishing periods on May 12 and 18. The 2011 Youngs Bay spring fishery landed 6,829 Chinook and 74 white sturgeon. The Chinook harvest was the second highest on record and 31% higher than the recent ten-year average Chinook harvest (5,225). Throughout the spring season, a 9¾-inch maximum mesh size restriction was in effect.

The 2011 summer season in Youngs Bay was open 6 AM Wednesday through 6 AM Friday weekly from June 15–July 29 with a 9¾-inch maximum mesh size restriction in effect. The Youngs Bay summer fishery landed 1,820 Chinook, more than three times the recent ten-year (2001–2010) average of 562 Chinook and continued the trend of increased annual harvest. The high landings were driven by an exceptional return of early returning SABs fall Chinook destined for Youngs Bay (1,062 landed) and good abundance of Age-4 adults from the net pen production. Sturgeon catch for the Youngs Bay summer fishery was 27 fish. Retention of sturgeon in all Select Area commercial fisheries was closed effective June 27 after the annual catch guideline of 200 fish had been met.

The combined Youngs Bay winter/spring/summer fishery harvest totaled 8,732 Chinook. Stock composition is based on VSI and CWT analysis with a total of 3,074 Chinook (35% of the Chinook catch) examined for fin marks and CWTs, and 182 CWTs collected. The 2011 combined winter/spring/summer catch was comprised of 75.8% spring Chinook and 12.2% SAB fall Chinook destined for Select Area sites, 2.0% upriver spring Chinook, 0.4% upper Columbia summer Chinook (after June 15), 8.4% Willamette River spring Chinook, and 1.3% 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% Age-2, 8% Age-3 (primarily SABs), 59% Age-4, 32% Age-5, and 1% Age-6 fish.

#### *Blind Slough/Knappa Slough*

Similar to 2000–2010, a winter gillnet season with a 7-inch minimum mesh restriction was adopted for Blind Slough (excluding Knappa Slough) in 2011. The adopted season consisted of thirteen 12-hour periods (7 PM – 7 AM) on Wednesday and Sunday nights during February 13–April 4 (except for two Wednesdays: March 23 and 30). The five periods (March 13–April 4) 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 also to meet the goal of significant and stable opportunity in 2011. During the winter fishing periods, a total of 124 spring Chinook were landed, which is fourth best since 2000 and 24% above the recent ten-year (2001–2010) average Chinook harvest (100). As described for Youngs Bay, a two white sturgeon weekly landing limit was in place for the winter and spring seasons, six sturgeon were landed.

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. The combination of unusually high flows in the mainstem Columbia River and the delayed timing of the upriver spring Chinook run likely contributed to higher than expected catch of upriver spring Chinook in the combined Select Area commercial harvest during the spring season openers. As a result, two Blind Slough/Knappa Slough fishing periods in late April were rescinded. Fisheries resumed as originally adopted starting on April 28. The one exception was a rescheduling of the May 12 fishing period to one day earlier to accommodate a mainstem commercial fishing period. For all periods in May and June, 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 2011 spring fishery consisted of fourteen 12-hour (7 PM – 7 AM) fishing periods on Thursday and Monday nights between April 18 and June 10 (except the one Thursday period in May which was rescheduled to Wednesday). The restricted 2011 Blind Slough/Knappa Slough spring fishery landed 1,486 spring Chinook and 23 white sturgeon. The Chinook harvest was the sixth highest on record and was less than the recent ten-year average (1,700).

The combined Blind Slough/Knappa Slough winter and spring fishery harvest totaled 1,610 Chinook. Stock composition is based on VSI and CWT analysis. A total of 1,034 Chinook (64% of the combined catch) were examined for fin marks and CWTs and 77 CWTs were collected. The catch was comprised of 87.8% spring Chinook destined for Select Area sites, 2.5% upriver spring Chinook, 8.6% Willamette River spring Chinook, and 1.1% Sandy River-origin spring Chinook. Based on scale readings, which were verified with CWTs, the age composition of the catch was 0% Age-3, 48% Age-4, 49% Age-5, and 3% Age-6.

#### *Tongue Point/South Channel*

Efforts to reinstate a spring Chinook fishery in the Tongue Point/South Channel site continued in 2011. At the February 8 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 25 and ending on June 10. 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 four weeks 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 23 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, encompassing the timeframe just prior to the season openers in the other sites up 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. A total of 16 drifts using 4¼-inch tangle nets were made on April 21, 25, and 26 capturing 14 spring Chinook (10 identified via VSI as lower river stock and 4 as upriver) and one steelhead. Ultimately, the initial full-fleet experimental commercial fishery period on April 25 was rescinded. However, this was due to higher than expected catch of upriver spring Chinook during the opening periods in the other Select Area sites and not necessarily a result of the test fishing data. The Tongue Point/South Channel fishery commenced on April 28 and proceeded as scheduled for the remainder of the spring season (with the exception of rescheduling the May 12 fishing period to one day earlier to accommodate a mainstem commercial fishing period). The catch sampling requirements were modified slightly in-season – after May 10 the

sampling station was discontinued and the requirement for fishers to call in began (earlier than originally planned).

The 2011 full-fleet experimental test fishery in Tongue Point/South Channel consisted of thirteen 12-hour fishing periods and landings totaled 659 spring Chinook and 54 white sturgeon. Stock composition was based on VSI and CWT analysis with a total of 528 Chinook (80% of the catch) examined for fin marks and CWTs, and 62 CWTs being collected. The catch was comprised of 65.0% spring Chinook destined for Select Area sites, 12.1% upriver spring Chinook, 22.3% Willamette River spring Chinook and <1% CKL-origin spring Chinook. Based on scale readings, verified with CWTs, the age composition of the catch was 5% Age-3, 54% Age-4, 40% Age-5, and 0% Age-6 fish.

### *Deep River*

The Deep River winter season was expanded to 13 fishing periods of 12-hour duration occurring on Sunday and Wednesday nights (7 PM–7AM) beginning February 13 and ending April 4 (Thursday). The first five weeks of the fishery (through March 17) included both Sunday and Wednesday night fishing periods, followed by single night periods (Sunday night to Monday morning) the last three weeks. The last two of those fishing periods (March 27-28 and April 3-4) were conducted in a reduced fishing area that extended from the Oneida Road boat ramp upstream to the Highway 4 Bridge. This excluded the lower half mile of the usual Deep River fishing area with the intent to reduce potential harvest of upriver Chinook which were expected to be most abundant in the Select Area fisheries in those weeks based on data from past seasons.

A spring season consisting of 16 twelve-hour fishing periods on Sunday and Wednesday nights (7 PM–7 AM) between April 17 and June 9 was adopted at the February 8, 2011 Compact hearing. The fishery began as scheduled on April 17, but the fishing period of April 24-25 was rescinded due to in season concerns of the combined Select Area fisheries reaching the upriver spring Chinook impact allocation. Starting the fourth week in May, fishing periods were rescheduled to Monday and Thursday nights for the final three weeks of the season, concluding on June 10. The final spring season thus consisted of 15 fishing periods in Deep River in 2011. The fishing area during most periods was restricted to the area from markers at navigation marker #16 upstream to the Highway 4 Bridge. The only exception was the two week period of reduced fishing area (excluding the lower half mile of Deep River) on the March 27-28 and April 3-4 fishing periods, as described under the winter season description above. 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 are 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 19 Chinook and 4 white sturgeon were landed during the winter season, and 81 Chinook and zero white sturgeon were landed during the spring season. The harvest of 100 total Chinook for Deep River in the combined winter and spring seasons was the fifth highest but was the lowest in the last three years, following 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 a total of 98 Chinook (98% of the catch) examined for fin marks and CWTs, and 13 CWTs

being collected. The catch was comprised of 62.0% spring Chinook destined for Select Area sites, 12.0% upriver spring Chinook, 25.0% Willamette River spring Chinook, and 1.0% 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, 45% Age-4, 55% Age-5, and 0% Age-6.

### **2011 Fall Season Commercial Fisheries**

Chinook landings were excellent in 2011; the total catch of 22,929 adult fish was the highest since 1993 and can primarily be attributed to an excellent SAB return that far exceeded the expected return. Total coho harvest of 49,513 exceeded the recent five year average. Since the annual commercial sub-allocation of 200 white sturgeon to Select Areas had already been met earlier in the year, sales of sturgeon were not allowed during the fall season. Landings and seasons are summarized in Table 3.7.

#### *Youngs Bay*

The fall season in Youngs Bay began in early August with four 36-hour periods weekly through late August. Typical 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 29 through September 2 and continuous fishing from September 5 through October 31 (57 days). The complete Youngs Bay fall season consisted of 69 fishing days and resulted in landings of 12,339 Chinook, 26,538 coho, 13 pinks, one chum, and one sockeye. The Chinook catch was the highest on record and more than twice the preseason expectation (4,800 fish); coho harvest was similar to the recent 5-year average and also higher than the preseason expectation (20,800 fish).

#### *Tongue Point/South Channel*

The Tongue Point/South Channel fishery began with four nightly 12-hour fishing periods per week during August 29 – September 16. The fishery increased to four nightly 18-hour periods each week from September 19 – October 28. The 36-night season resulted in landings of 2,527 Chinook, 6,504 coho, 19 pinks, and one chum. The coho catch was well below the long-term average but higher than the preseason expectation of 5,700 fish.

#### *Blind Slough/Knappa Slough*

The season structure of the fall 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 29 – September 16. The fishery increased to four nightly 14-hour periods each week from September 19 – October 28. To access surplus returns of Tule fall Chinook destined for Big Creek Hatchery, the maximum mesh size allowed was 9¾-inch for the entire season. The 36-night season resulted in landings of 5,768 Chinook, 1,388 coho, four pinks, and two chum. The coho catch was less than average and less than the preseason expectation (3,300 fish). In contrast, Chinook harvest was the third highest on record, mainly due to a significant harvestable surplus of fish returning to Big Creek Hatchery.

#### *Deep River*

The structure of the Deep River fishery was similar to that used in other Select Area fishing areas with four 14-hour nightly fishing periods occurring each week through September 16, except the season started August 16 with two fishing periods per week for the two weeks prior to the start for the other sites. This modification was made to maximize catches of LRH Chinook from net pen releases initiated in 2009. Beginning September 19, the fishery expanded to four 17-hour nightly periods per week through October 28. Landings during the August 15–26 period yielded catches of 189 Chinook, four coho, and one pink. Combined season landings for the 40-night season included 2,295 Chinook, 15,083 coho, 129 chum, and six pinks. Chinook catch was the highest on record and 153% of the preseason expectation (1,500 fish). The Chinook catch was comprised of roughly 40% Tule stock and 60% SABs. Coho catch was the second highest on record and 151% of the preseason expectation (10,000 fish).

## **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 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 a total of 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 comprised 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 also 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 comprised 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. A total of 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 a total of 466 Chinook (93% of the catch) examined for fin marks and CWTs, and 85 CWTs being collected. The catch was comprised 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 a total of 43 Chinook (98% of the catch) examined for fin marks and CWTs, and 4 CWTs being collected. The catch was comprised 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.

### **Commercial Harvest Ex-Vessel Value**

Table 3.8 shows the winter, spring and summer ex-vessel value of Chinook harvested in the Select Area fisheries averaged \$629,000 ranging from \$244,000 to \$1,418,000 over the seven years indicated in the tables (2006-2012). Fall harvest of Chinook has averaged \$357,000 between 2006-2012 but has exceeded the average in recent years reaching a peak in 2010 with a total value of \$632,000 (Table 3.9). The overall ex-vessel value of coho harvested in the Select Area fisheries has averaged \$580,000 between 2006 and 2012 and has ranged from \$132,000 to \$895,000 (Table 3.9). From 2008-2011 values remained high, never dropping below \$770,000, but saw a significant decrease in 2012 to \$176,000. With total ex-vessel values for the Select Areas ranging from \$764,000 to \$2.265 million between 2006-2012 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 the early 2000s, and again in 2010 and 2011, effort and harvest in Select Area recreational fisheries increased, likely due to improved adult returns which resulted in higher quality fishing opportunities. Among the Select Areas, the most popular and productive recreational spring Chinook fisheries occur in Blind Slough/Knappa Slough and Youngs Bay during March–May. The 2012 estimate of 438 harvested spring Chinook is average for recreational fisheries in the Select Areas since 1998.

### *Fall Fisheries*

The most popular areas for fall season recreational fisheries in the Select Areas are Youngs Bay tidewater and Deep River. These fisheries have an average (2002 –2011) catch of approximately 330 Chinook and 190 coho per fall season. 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.

Table 3.1. Landings and mark-sample rates of Chinook and coho catch in Oregon Select Area commercial fisheries during each management season, 2001-2012. <sup>1</sup>

Year		Winter	Spring	Summer	Fall <sup>2</sup>		Total
	<i>Species</i>	<i>Chinook</i>	<i>Chinook</i>	<i>Chinook</i>	<i>Chinook</i>	<i>Coho</i>	
2001	Landings	682	8,000	587	2,949	31,254	43,472
	# Mk Smpld	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
	# Mk Smpld	117	5,468	366	3,945	25,940	35,836
	Sample Rate	54%	51%	53%	48%	38%	40%
2003	Landings	86	7,324	279	8,961	109,244	125,894
	# Mk Smpld	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
	# Mk Smpld	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
	# Mk Smpld	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
	# Mk Smpld	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
	# Mk Smpld	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
	# Mk Smpld	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
	# Mk Smpld	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
	# Mk Smpld	622	10,074	267	4,024	10,104	25,091
	Sample Rate	46%	45%	27%	20%	26%	30%
2011	Landings	207	8,974	1,820	19,498	31,448	61,947
	# Mk Smpld	129	4,066	441	4,935	7,746	17,317
	Sample Rate	62%	45%	24%	25%	25%	28%
2012	Landings	366	7,426	2,260	22,029	11,422	43,503
	# Mk Smpld	231	4,546	1,091	6,457	3,571	15,896
	Sample Rate	63%	61%	48%	29%	31%	37%
5-yr Ave.	Landings	491	8,907	1,410	17,272	39,796	67,876
	# Mk Smpld	261	4,387	468	4,600	11,209	20,924
	Sample Rate	58%	52%	31%	27%	29%	31.7%
10-yr Ave.	Landings	580	7,428	841	12,463	46,087	67,399
	# Mk Smpld	323	3,851	276	3,493	12,025	19,968
	Sample Rate	61%	56%	31%	31%	29%	33%

<sup>1</sup> No information available from Washington sampling efforts

<sup>2</sup> Additional mark sampled salmonids caught in fall fisheries not included in this table: 1 pink in Yougs Bay, 2002; 4 pinks in Yougs Bay and 4 pinks in Blind Slough, 2003; 1 chum in Yougs Bay, 2004; 1 chum and 1 pink in Blind Slough, 2007; 1 pink in Blind Slough, 2009; 1 chum in Blind Slough, 2010; 13 pinks and 1 sockeye in Yougs Bay, 1 pink and 1 chum in Blind Slough, 5 pinks and 1 chum in Tongue Point, 2011.

Table 3.2. Final impact rates on ESA-listed upriver spring Chinook from winter and spring season Select Area commercial fisheries, 2002 – 2008.

Year	Actual Impact Rate	Management Guideline
2002	0.191%	0.20%
2003	0.210%	0.20%
2004	0.100%	0.20%
2005	0.012%	0.10%
2006	0.090%	0.10%
2007	0.054%	0.10%
2008	0.132%	0.15%
2009	0.087%	0.15%
2010	0.468%	0.15%
2011	0.137%	0.15%
2012	0.162%	0.15%
Average	0.149%	0.15%

Table 3.3. SAFE spring Chinook harvest stock composition 2000-2012 (all ages).

Year	Non-Local							Local		
	Above Bonn. Spring <sup>1</sup>	Above Bonn. Summer <sup>2</sup>	Willamette River	Sandy River	C,K,L <sup>3</sup>	OR Coast	Non-Local Total	SAFE	SAB (CHF)	Local Total
2000	0.72%	0.00%	11.56%	1.72%	1.11%	0.00%	15.11%	82.56%	2.32%	84.89%
2001	4.42%	0.26%	5.79%	0.76%	0.70%	0.46%	12.40%	82.59%	5.01%	87.60%
2002	4.81%	0.47%	16.63%	2.49%	1.47%	0.33%	26.21%	69.43%	4.36%	73.79%
2003	5.10%	0.84%	13.13%	0.73%	2.03%	0.64%	22.46%	76.13%	1.40%	77.54%
2004	1.86%	0.37%	5.73%	0.58%	1.43%	0.00%	9.96%	87.57%	2.47%	90.04%
2005	0.56%	0.12%	5.75%	0.00%	1.77%	0.00%	8.21%	89.42%	2.37%	91.79%
2006	1.58%	0.12%	3.76%	0.73%	0.64%	0.00%	6.83%	92.37%	0.80%	93.17%
2007	0.67%	0.06%	4.70%	0.00%	0.93%	0.00%	6.36%	92.29%	1.35%	93.64%
2008	5.27%	1.55%	2.24%	0.00%	2.60%	0.00%	11.66%	68.98%	19.36%	88.34%
2009	3.66%	0.53%	6.59%	3.28%	0.50%	0.00%	14.56%	67.59%	17.17%	84.76%
2010	5.93%	0.08%	8.00%	0.38%	0.30%	0.00%	14.69%	85.03%	1.71%	86.74%
2011	2.75%	0.32%	11.92%	0.19%	1.35%	0.00%	16.53%	76.78%	9.57%	86.34%
2012	3.3%	0.0%	7.02%	0.44%	0.38%	0.0%	11.12%	84.4%	4.4%	88.88%
5-yr Ave.	4.18%	0.50%	7.15%	0.86%	1.03%	0.00%	13.71%	76.57%	10.45%	87.01%
10-yr Ave.	3.07%	0.40%	6.88%	0.63%	1.19%	0.06%	12.24%	82.06%	6.06%	88.12%

<sup>1</sup> Includes Snake River summer Chinook.

<sup>2</sup> Includes only Upper Columbia summer Chinook.

<sup>3</sup> C,K,L = Cowlitz R., Kalama R., and Lewis R. (Washington Tributaries)

Table 3.4. SAFE fall Chinook harvest stock composition 2000-2012 (all ages). <sup>1</sup>

Year	Non-Local							Local		
	URB	BUB	PUB	LRW	BPH	Stray	Non-Local Total	LRH	SAB	Local Total
2000	9.84%	4.19%	1.34%	0.00%	6.21%	0.13%	21.71%	10.57%	67.72%	78.29%
2001	17.53%	0.00%	0.00%	0.00%	2.49%	0.06%	20.08%	25.40%	54.51%	79.92%
2002	10.94%	4.68%	0.26%	0.00%	7.33%	0.02%	23.23%	46.21%	30.57%	76.77%
2003	0.37%	3.30%	0.07%	0.87%	13.69%	1.45%	19.75%	34.19%	46.06%	80.25%
2004	7.93%	0.00%	0.11%	0.00%	6.26%	0.06%	14.36%	59.05%	26.59%	85.64%
2005	7.60%	0.00%	0.02%	1.87%	0.00%	0.00%	9.49%	47.32%	43.19%	90.51%
2006	1.11%	0.00%	0.00%	1.16%	0.00%	0.05%	2.31%	16.21%	81.48%	97.69%
2007	2.49%	0.00%	0.95%	0.04%	0.00%	1.15%	4.63%	0.00%	95.37%	95.37%
2008	1.05%	1.80%	1.05%	0.00%	8.99%	2.67%	15.56%	19.65%	64.80%	84.44%
2009	3.03%	2.92%	1.04%	0.00%	4.38%	0.21%	11.57%	24.63%	63.81%	88.43%
2010	0.80%	2.15%	1.46%	0.00%	5.33%	0.00%	9.75%	55.93%	34.33%	90.25%
2011	4.95%	0.00%	1.89%	0.00%	0.00%	0.00%	6.84%	39.98%	53.18%	93.16%
2012	1.29%	0.00%	0.52%	0.00%	0.81%	3.53%	6.15%	54.95%	38.90%	93.85%
5-yr Ave	2.22%	1.37%	1.19%	0.00%	3.90%	1.28%	9.97%	39.03%	51.00%	90.03%
10-yr Ave	3.06%	1.02%	0.71%	0.39%	3.95%	0.91%	10.04%	35.19%	54.77%	89.96%

<sup>1</sup> 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. Lower Columbia River non-Indian commercial landings by species and proportion contributed by Select Area fisheries 2003-2012.

**Mainstem Landings**

Species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	5-yr Ave.	10-yr Ave.
Spring Chinook	3,175	13,581	5,364	4,389	2,950	5,952	4,168	9,041	4,548	6,118	5,965	5,929
Summer Chinook	0	186	2,787	4,819	1,122	1,370	2,371	4,720	5,076	1,692	N/A	N/A
Fall Chinook	58,428	41,057	27,536	26,011	12,150	28,052	34,980	31,141	52,564	36,871	36,722	34,879
Coho	149,766	66,522	32,368	28,372	30,193	13,107	46,241	18,920	13,585	2,615	18,894	40,169

**Select Area Landings**

Species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	5-yr Ave.	10-yr Ave.
Spring Chinook	7,804	10,562	2,406	7,245	6,774	4,486	4,175	24,892	11,101	10,096	10,950	8,954
Summer Chinook	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fall Chinook	9,173	12,649	8,696	4,557	4,533	13,997	11,990	20,666	21,799	23,720	18,434	13,178
Coho	112,684	51,944	65,807	37,653	10,516	55,151	80,950	58,759	46,071	15,354	51,257	53,489

**Proportion of Non-Indian Landings Contributed by Select Area Fisheries**

Species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	5-yr Ave.	10-yr Ave.
Spring Chinook <sup>1</sup>	71.1%	43.4%	22.8%	44.0%	62.5%	38.0%	39.0%	64.4%	53.6%	56.4%	50.3%	49.5%
Summer Chinook	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fall Chinook	13.6%	23.6%	24.0%	14.9%	27.2%	33.3%	25.5%	39.9%	29.3%	39.1%	33.4%	27.0%
Coho	42.9%	43.8%	67.0%	57.0%	25.8%	80.8%	63.6%	75.6%	77.2%	85.4%	76.6%	61.9%

<sup>1</sup> Select Area landings from both spring and summer are considered spring Chinook and therefore the percentages are derived by combining spring and summer Chinook.

Table 3.6. Select Area winter, spring, and summer commercial seasons and harvest, 1992 – 2012.

Year	Fishery	Season	Dates	Days	Chinook	White Sturgeon
1992	Youngs Bay	Spring	Apr. 27 - May 26	9	296	10
			<b>Total</b>	<b>9</b>	<b>296</b>	<b>10</b>
1993	Youngs Bay	Spring	Apr. 26 – May 26	9	851	32
			<b>Total</b>	<b>9</b>	<b>851</b>	<b>32</b>
1994	Youngs Bay	Spring	Apr. 25 - May 25	9	155	31
			<b>Total</b>	<b>9</b>	<b>155</b>	<b>31</b>
1995	Youngs Bay	Spring	May 1 – Jun. 7	11	201	108
			<b>Total</b>	<b>11</b>	<b>201</b>	<b>108</b>
1996	Youngs Bay	Spring	Apr. 29 – Jun. 14	15	789	581
			<b>Total</b>	<b>15</b>	<b>789</b>	<b>581</b>
1997	Youngs Bay	Spring	Apr. 28 – Jun. 13	22	1,821	351
			<b>Total</b>	<b>22</b>	<b>1,821</b>	<b>351</b>
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
			<b>Total</b>	<b>48</b>	<b>2,258</b>	<b>355</b>
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
			<b>Total</b>	<b>68</b>	<b>1,955</b>	<b>524</b>
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
			<b>Total</b>	<b>73</b>	<b>6,496</b>	<b>535</b>
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 Slough	Spring	Apr. 2 – Apr. 10	2	238	0
	Blind/Knappa Sloughs	Spring	Apr. 16 – Jun. 14	16	1,793	27
			<b>Total</b>	<b>83</b>	<b>9,269</b>	<b>491</b>

Table 3.6. (cont.) Select Area winter, spring, and summer commercial seasons and harvest, 1992 – 2012.

Year	Fishery	Season	Dates	Days	Chinook	White Sturgeon
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
2003 <sup>a,b</sup>	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	348	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	117	24
<b>Total</b>				<b>71</b>	<b>7,806</b>	<b>251</b>
2004 <sup>a,b</sup>	Youngs Bay	Winter	Feb. 14 – Mar. 21; 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 – Mar. 21; 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
<b>Total</b>				<b>67</b>	<b>10,562</b>	<b>184</b>
2005 <sup>a,b</sup>	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
<b>Total</b>				<b>73</b>	<b>2,406</b>	<b>278</b>
2006 <sup>a</sup>	Youngs Bay	Winter	Feb. 15 – Mar. 23	10	82	5
	Youngs Bay	Winter	Mar. 27 – Apr. 13	6	510	3
	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
2007 <sup>a</sup>	Youngs Bay	Winter	Feb. 14 – Mar. 14	7	209	10
	Youngs Bay	Winter	Mar. 18 – Apr. 10	11	674	3
	Youngs Bay	Spring	Apr. 23 <sup>c</sup> – 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 <sup>c</sup> – June 15	16	1,451	49
	Deep River	Winter	Feb. 18 – Mar. 12	4	0	0
	Deep River	Spring	Apr. 23 <sup>c</sup> – Jun. 15	30	29	23
<b>Total</b>				<b>115</b>	<b>6,774</b>	<b>257</b>

Table 3.6. (cont.) Select Area winter, spring, and summer commercial seasons and harvest, 1992 – 2012.

Year	Fishery	Season	Dates	Days	Chinook	White Sturgeon
2008 <sup>a</sup>	Youngs Bay	Winter	Feb. 13 – Mar. 12	9	61	14
	Youngs Bay	Winter	Mar. 16 – Apr. 8	11	180	7
	Youngs Bay	Spring	Apr. 17 – June 13 <sup>d</sup>	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/Knapapa Sloughs	Spring	Apr. 17 – June 13 <sup>d</sup>	15	953	47
	Deep River	Winter	Feb. 18 – Mar. 11	4	0	17
	Deep River	Spring	Apr. 17 – June 13 <sup>d</sup>	15	28	22
	<b>Total</b>			<b>117</b>	<b>4,486</b>	<b>347</b>
	Youngs Bay	Winter	Mar. 15 – Apr. 6	4	106	2
	Youngs Bay	Spring	Apr. 16 – May 1	5	1,180	22
	Youngs Bay	Spring	May 18 – June 12	8	805	81
	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/Knapapa Sloughs	Spring	Apr. 16 – Apr 28; May 25 – Jun. 12	10	466	22
	Blind Slough	Spring	May 18 – May 22	2	240	10
	Deep River	Winter	Feb. 16 - Apr. 9	8	40	27
	Deep River	Spring	Apr. 15 – Jun. 11	13	82	26
	<b>Total</b>			<b>80</b>	<b>4,126</b>	<b>308</b>
2010 <sup>a</sup>	Youngs Bay <sup>e</sup>	Winter	Feb. 21 – Mar. 15	10	350	28
	Youngs Bay	Winter	Mar. 21 – Mar. 29	3	673	0
	Youngs Bay	Spring	Apr. 15 – Apr. 20	2	6,076	8
	Youngs Bay	Spring	May 5 – Jun. 11	7	12,680	47
	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/Knapapa 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
	<b>Total</b>			<b>91</b>	<b>24,892</b>	<b>211</b>
2011 <sup>a</sup>	Youngs Bay	Winter	Feb. 13 – Mar. 14	13	72	12
	Youngs Bay	Winter	Mar. 16	1	11	0
	Youngs Bay	Spring	Apr. 18 – Apr. 28	2	1,994	5
	Youngs Bay	Spring	May 1 – Jun. 10	23	4,852	69
	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/Knapapa 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
	<b>Total</b>			<b>121</b>	<b>11,118</b>	<b>201</b>



Table 3.6. (cont.) Select Area winter, spring, and summer commercial seasons and harvest, 1992 – 2012.

Year	Fishery	Season	Dates	Days	Chinook	White Sturgeon
2012 <sup>a</sup>	Youngs Bay	Winter	Feb. 12 – Mar. 16	14	88	3
	Youngs Bay	Winter	Mar. 18 – Apr. 5	6	230	3
	Youngs Bay	Spring	Apr. 19 – Apr. 30	4	1,615	4
	Youngs Bay	Spring	May 1 – Jun. 15	25	4,395	92
	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
<b>Total</b>				<b>136</b>	<b>10,096</b>	<b>225</b>

<sup>a</sup> Landings are preliminary

<sup>b</sup> Spring seasons in 2003 – 2005 were reduced significantly due to high abundance of non-local stocks (2003) and lower-than-anticipated upriver returns that increased mainstream commercial impacts (2004-2005)

<sup>c</sup> Spring season openers for all sites were rescinded via in-season action due to lower than anticipated upriver returns which increased mainstream commercial impacts

<sup>d</sup> All periods set for week 20 were rescinded via in-season action due to lower than anticipated upriver returns which increased mainstream commercial impacts

<sup>e</sup> One coho landed

Table 3.7. Select Area fall commercial seasons and harvest, 1996 – 2012.

Year	Fishery	Season	Days	Chinook	Coho	Chum	White Sturgeon
1996	Youngs Bay <sup>d</sup>	Aug. 12 - Sept. 6	10	806	1456	0	85
	Youngs Bay	Sept. 9 - Oct. 31	52	633	14,327	3	0
	Tongue Point	Sept 17 - Oct. 31	14	50	1,955	0	0
	Blind Slough <sup>b</sup>	Sept. 16 - Oct. 29	13	82	2,301	2	0
	Deep River	Sept. 16 - Oct. 29	13	35	2,240	0	0
	<b>Total</b>		<b>102</b>	<b>1,606</b>	<b>22,279</b>	<b>5</b>	<b>85</b>
1997	Youngs Bay <sup>d</sup>	Aug. 11 – Aug. 28	7	737	167	0	65
	Youngs Bay	Sept. 2 - Oct. 31	59	989	13482	2	11
	Tongue Point	Sept. 3 - Oct. 24	16	180	861	1	0
	Blind Slough <sup>c</sup>	Sept. 8 - Oct. 22	18	32	1,605	0	0
	Deep River	Sept. 8 - Oct. 22	18	149	821	1	0
	<b>Total</b>		<b>118</b>	<b>2,087</b>	<b>16,936</b>	<b>4</b>	<b>76</b>
1998	Youngs Bay <sup>d</sup>	Aug. 10 – Sept. 4	11	453	10	0	50
	Youngs Bay	Sept. 8 – Oct. 31	53	772	20,111	2	55
	Tongue Point	Sept. 10 - Oct. 29	14	421	3,398	1	67
	Blind Slough	Sept. 8 - Oct. 30	19	103	615	0	2
	<b>Total</b>		<b>97</b>	<b>1,749</b>	<b>24,134</b>	<b>3</b>	<b>174</b>
1999	Youngs Bay <sup>d</sup>	Aug. 3 – Sept. 1	5	878	721	0	41
	Youngs Bay	Sept. 7 – Oct. 31	54	711	15,190	1	58
	Tongue Point	Sept. 7 – Sept. 15	3	214	1,347	0	72
	Tongue Point/S. Channel	Sept. 20 – Oct. 28	16	125	2,312	0	50
	Blind Slough	Sept. 9 – Sept. 17	3	98	683	0	4
	Blind/Knappa Sloughs	Sept. 22 – Oct. 28	16	69	1,275	0	0
	Deep River	Sept. 9 - Oct. 28	19	48	1,426	2	0
	<b>Total</b>		<b>116</b>	<b>2,143</b>	<b>22,954</b>	<b>4</b>	<b>225</b>
2000	Youngs Bay <sup>d</sup>	Aug. 1 – Aug. 30	5	1,160	1,461	0	64
	Youngs Bay	Sept. 5 – Oct. 31	56	584	31,735	1	24
	Tongue Point	Sept. 5 – Sept. 15	6	214	7,451	0	38
	Tongue Point/S. Channel	Sept. 17 – Oct. 31	26	38	3,280	0	21
	Blind Slough	Sept. 7 – Sept. 16	6	56	995	0	1
	Blind/Knappa Sloughs	Sept. 18 – Oct. 31	26	76	2,403	0	8
	Deep River	Sept. 5 - Oct. 31	32	109	14,039	1	0
	Steamboat Slough	Sept. 7 - Oct. 28	30	78	363	0	1
	<b>Total</b>		<b>187</b>	<b>2,315</b>	<b>61,745</b>	<b>2</b>	<b>157</b>
2001	Youngs Bay <sup>d</sup>	Aug. 6 – Aug. 30	5	1,458	170	1	21
	Youngs Bay	Sept. 4 – Oct. 31	57	582	25,299	0	0
	Tongue Point	Sept. 4 – Sept. 14	7	49	774	0	0
	Tongue Point/S. Channel	Sept. 17 – Oct. 31	26	67	1,247	0	0
	Blind/Knappa Sloughs	Sept. 4 – Oct. 31	33	793	3,764	0	0
	Deep River	Sept. 4 – Oct. 31	33	149	2,491	0	0
	Steamboat Slough	Sept. 4 – Oct. 31	33	0	26	0	0
	<b>Total</b>		<b>194</b>	<b>3,098</b>	<b>33,771</b>	<b>1</b>	<b>21</b>

Table 3.7. (cont.) Select Area fall commercial seasons and harvest, 1996 – 2012.

Year	Fishery	Season	Days	Chinook	Coho	Chum	White Sturgeon
2002	Youngs Bay <sup>d</sup>	Aug. 7 – Aug. 29	4	2,039	139	0	51
	Youngs Bay	Sept. 3 – Oct. 31	58	1,735	51,720	0	45
	Tongue Point	Sept. 3 – Sept. 13	7	1,472	9,290	0	65
	Tongue Point/S. Channel	Sept. 16 – Oct. 31	27	236	6,270	0	137
	Blind/Knappa Sloughs	Aug. 26 – Aug. 29	3	2,331	5	0	27
	Blind/Knappa Sloughs	Sept. 3 – Oct. 31	34	429	1,444	0	6
	Deep River	Sept. 3 – Oct. 31	34	145	303	1	3
	Steamboat Slough	Sept. 3 – Oct. 31	34	183	105	0	0
<b>Total</b>			<b>201</b>	<b>8,570</b>	<b>69,276</b>	<b>1</b>	<b>334</b>
2003 <sup>a</sup>	Youngs Bay <sup>d</sup>	Aug. 6 – Aug. 30	5	1,703	1,576	0	13
	Youngs Bay	Sept. 2 – Oct. 31	59	2,904	88,254	0	8
	Tongue Point	Sept. 2 – Sept. 12	7	2,421	12,748	0	97
	Tongue Point/S. Channel	Sept. 15 – Oct. 31	28	30	1,850	0	0
	Blind/Knappa Sloughs	Aug. 25 – Aug. 28	3	63	0	0	9
	Blind/Knappa Sloughs	Sept. 2 – Oct. 31	35	1,840	3,861	0	19
	Deep River	Sept. 2 – Oct. 31	35	168	3,333	0	3
	Steamboat Slough	Sept. 2 – Oct. 31	35	44	107	0	0
<b>Total</b>			<b>207</b>	<b>8,837</b>	<b>114,352</b>	<b>0</b>	<b>173</b>
2004 <sup>a</sup>	Youngs Bay <sup>d</sup>	Aug. 4 – Aug. 26	4	1,530	283	0	3
	Youngs Bay	Aug. 31 – Sept. 3	3	801	3,175	0	1
	Youngs Bay	Sept. 7 – Oct. 31	55	1,559	31,155	1	19
	Tongue Point/S. Channel	Aug. 31 – Oct. 29	34	2,124	10,169	0	33
	Blind/Knappa Sloughs	Aug. 24 – Aug. 27	3	1,461	63	0	28
	Blind/Knappa Sloughs	Aug. 31 – Oct. 29	34	4,774	1,292	0	31
	Deep River	Aug. 23 – Oct. 29	40	393	5,780	0	2
	Steamboat Slough	Aug. 31 – Oct. 29	34	0	0	0	0
<b>Total</b>			<b>207</b>	<b>12,642</b>	<b>51,944</b>	<b>1</b>	<b>117</b>
2005 <sup>a</sup>	Youngs Bay <sup>d</sup>	Aug. 3 – Aug. 25	4	703	63	0	25
	Youngs Bay	Aug. 30 – Sept. 2	3	1,447	3,030	0	0
	Youngs Bay	Sept. 6 – Oct. 31	56	2,139	39,268	1	12
	Tongue Point/S. Channel	Aug. 30 – Oct. 28	34	1,919	19,083	0	29
	Blind/Knappa Sloughs	Aug. 30 – Oct. 28	34	2,124	1,777	0	0
	Deep River	Aug. 30 – Oct. 28	34	364	2,586	0	8
	Steamboat Slough	Aug. 30 – Oct. 28	34	0	0	0	0
<b>Total</b>			<b>199</b>	<b>8,696</b>	<b>65,807</b>	<b>1</b>	<b>74</b>
2006 <sup>a</sup>	Youngs Bay <sup>d</sup>	Aug. 2 – Aug. 24	4	1,334	287	0	49
	Youngs Bay	Aug. 29 – Sept. 1	3	744	1,175	0	2
	Youngs Bay	Sept. 5 – Oct. 31	56	1,800	19,505	0	26
	Tongue Point/S. Channel	Sept. 5 – Oct. 27	30	305	11,567	0	21
	Blind Slough	Sept. 5 – Sept. 15	6	40	328	0	0
	Blind/Knappa Sloughs	Sept. 18 – Oct. 27	24	150	2,556	0	3
	Deep River	Sept. 4 – Oct. 27	32	184	2,235	0	8
<b>Total</b>			<b>155</b>	<b>4,557</b>	<b>37,653</b>	<b>0</b>	<b>109</b>

Table 3.7. (cont.) Select Area fall commercial seasons and harvest, 1996 – 2012.

Year	Fishery	Season	Days	Chinook	Coho	Chum	White Sturgeon
2007 <sup>a</sup>	Youngs Bay <sup>d</sup>	Aug. 1 – Aug. 23	4	381	1	0	26
	Youngs Bay	Aug. 28 – Aug. 31	3	1,593	133	0	12
	Youngs Bay	Sept. 4 – Oct. 31	57	2,028	3,167	0	26
	Tongue Point/S. Channel	Sept. 4 – Oct. 26	30	269	2,043	0	66
	Blind Slough	Sept. 4 – Sept. 14	6	39	374	0	1
	Blind/Knappa Sloughs	Sept. 17 – Oct. 26	24	48	2,124	0	12
	Deep River	Sept. 3 – Oct. 26	32	175	2,674	0	5
<b>Total</b>			<b>156</b>	<b>4,533</b>	<b>10,516</b>	<b>0</b>	<b>148</b>
2008 <sup>a</sup>	Youngs Bay <sup>d</sup>	Aug. 6 – Aug. 28	4	6,459	438	0	34
	Youngs Bay	Sept. 2 – Oct. 31	60	4,111	26,765	0	24
	Tongue Point/S. Channel	Sept. 2 – Oct. 31	34	1,176	7,753	0	46
	Blind/Knappa Sloughs	Sept. 2 – Oct. 31	34	2,003	5,366	0	28
	Deep River	Sept. 1 – Oct. 31	36	248	14,829	0	2
<b>Total</b>			<b>177</b>	<b>13,997</b>	<b>55,151</b>	<b>1</b>	<b>134</b>
2009 <sup>a</sup>	Youngs Bay <sup>d</sup>	Aug. 5 – Aug. 27	4	1,061	1,614	0	7
	Youngs Bay	Aug. 31 – Oct. 31	61	5,504	47,715	0	65
	Tongue Point/S. Channel	Aug. 31 – Oct. 30	36	872	16,918	1	11
	Blind/Knappa Sloughs	Aug. 25 – Oct. 30	38	3,991	10,043	0	20
	Deep River	Aug. 31 – Oct. 30	38	562	4,660	2	11
<b>Total</b>			<b>177</b>	<b>11,990</b>	<b>80,950</b>	<b>3</b>	<b>114</b>
2010 <sup>a</sup>	Youngs Bay <sup>d</sup>	Aug. 4 – Aug. 26	4	2,760	700	0	33
	Youngs Bay	Aug. 30 – Oct. 31	60	5,288	26,864	0	4
	Tongue Point/S. Channel	Aug. 30 – Oct. 29	36	1,402	6,734	0	31
	Blind/Knappa Sloughs	Aug. 30 – Oct. 29	36	10,205	5,201	1	45
	Deep River	Aug. 16 – Oct. 29	40	1,011	19,260	11	3
<b>Total</b>			<b>176</b>	<b>20,666</b>	<b>58,759</b>	<b>12</b>	<b>116</b>
2011 <sup>a</sup>	Youngs Bay <sup>d</sup>	Aug. 3 – Aug. 25	4	5,098	131	0	0
	Youngs Bay (6" Max)	Aug. 29 – Oct. 31	65	7,241	26,407	1	0
	Tongue Point/S. Channel	Aug. 30 – Oct. 29	36	2,527	6,504	1	0
	Blind/Knappa Sloughs	Aug. 30 – Oct. 29	36	5,768	1,388	2	0
	Deep River	Aug. 16 – Oct. 29	40	2,295	15,083	129	0
<b>Total</b>			<b>181</b>	<b>22,929</b>	<b>49,513</b>	<b>133</b>	<b>0</b>
2012 <sup>a</sup>	Youngs Bay <sup>d</sup>	Aug. 1 – Aug. 23	4	2,117	12	0	0
	Youngs Bay (6" Max)	Aug. 27 – Oct. 31	62	14,080	5,974	3	0
	Tongue Point/S. Channel	Aug. 30 – Oct. 29	36	2,466	3,902	0	0
	Blind/Knappa Sloughs	Aug. 30 – Oct. 29	36	3,366	1,534	2	0
	Deep River	Aug. 16 – Oct. 29	36	1,691	3,932	20	0
<b>Total</b>			<b>174</b>	<b>23,720</b>	<b>15,354</b>	<b>25</b>	<b>0</b>

<sup>a</sup> Preliminary landings<sup>b</sup> Does not include Big Creek terminal CHF fishery Aug. 26-28, Sept. 3-5, and Sept. 9-11<sup>c</sup> Does not include Big Creek terminal CHF fishery Sept. 2-4 and 9-11<sup>d</sup> 8-inch to 9.75-inch maximum mesh size restriction (Chinook target fishery)

Table 3.8. Ex-vessel values of winter, spring and summer Chinook harvest landed in Select Area commercial fisheries by season and site, 2006 - 2012.

	Site	Winter			Spring			Summer			
		Landings (pounds)	Ave. price/pound	Ex-vessel value	Landings (pounds)	Ave. price/pound	Ex-vessel value	Landings (pounds)	Ave. price/pound	Ex-vessel value	Sum
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 <sup>1</sup>	0	--	\$0	362	\$4.90	\$1,774	--	--	--	\$1,774
	<b>Totals</b>	<b>9,196</b>	<b>--</b>	<b>\$54,209</b>	<b>67,737</b>	<b>--</b>	<b>\$332,446</b>	<b>6,265</b>	<b>--</b>	<b>\$17,103</b>	<b>\$403,758</b>
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 <sup>1</sup>	0	--	\$0	439	\$4.65	\$2,041	--	--	--	\$2,041
	<b>Totals</b>	<b>14,968</b>	<b>--</b>	<b>\$117,868</b>	<b>80,350</b>	<b>--</b>	<b>\$370,083</b>	<b>3,975</b>	<b>--</b>	<b>\$14,111</b>	<b>\$502,062</b>
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 <sup>1</sup>	0	--	\$0	328	\$6.06	\$1,988	--	--	--	\$1,988
	<b>Totals</b>	<b>4,204</b>	<b>--</b>	<b>\$44,268</b>	<b>38,401</b>	<b>--</b>	<b>\$242,125</b>	<b>16,484</b>	<b>--</b>	<b>\$59,178</b>	<b>\$345,571</b>
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	1408	\$8.13	\$11,447	8,641	\$4.67	\$40,353	--	--	--	\$51,801
	Tongue Point	--	--	--	1,572	\$5.00	\$7,860	--	--	--	\$7,860
	Deep River <sup>1</sup>	579	\$8.13	\$4,707	1,146	\$4.67	\$5,352	--	--	--	\$10,059
	<b>Totals</b>	<b>4,356</b>	<b>--</b>	<b>\$35,367</b>	<b>33,588</b>	<b>--</b>	<b>\$160,042</b>	<b>16,957</b>	<b>--</b>	<b>\$49,006</b>	<b>\$244,415</b>
2010	Youngs Bay	13,580	\$9.17	\$124,529	214,631	\$4.66	\$1,000,180	13,340	\$3.45	\$46,023	\$1,170,732
	Blind Slough	4548	\$8.14	\$37,021	30,262	\$4.65	\$140,718	--	--	--	\$177,739
	Tongue Point	--	--	--	8,593	\$4.14	\$35,575	--	--	--	\$35,575
	Deep River <sup>2</sup>	3206	\$6.45	\$20,679	2,126	\$6.45	\$13,713	--	--	--	\$34,391
	<b>Totals</b>	<b>21,334</b>	<b>--</b>	<b>\$182,228</b>	<b>255,612</b>	<b>--</b>	<b>\$1,190,186</b>	<b>13,340</b>	<b>--</b>	<b>\$46,023</b>	<b>\$1,418,438</b>
2011	Youngs Bay	1,353	\$8.92	\$12,069	89,857	\$5.95	\$534,649	28,220	\$3.09	\$87,200	\$633,918
	Blind Slough	1,930	\$8.50	\$16,405	20,408	\$5.93	\$121,019	--	--	--	\$137,424
	Tongue Point	--	--	--	9,057	\$6.00	\$54,342	--	--	--	\$54,342
	Deep River <sup>1</sup>	320	\$8.50	\$2,720	1,148	\$5.93	\$6,808	--	--	--	\$9,528
	<b>Totals</b>	<b>3,603</b>	<b>--</b>	<b>\$31,194</b>	<b>120,470</b>	<b>--</b>	<b>\$716,818</b>	<b>28,220</b>	<b>--</b>	<b>\$87,200</b>	<b>\$835,212</b>
2012	Youngs Bay	4,265	\$9.68	\$41,285	71,957	\$5.91	\$425,266	29,461	\$3.95	\$116,371	\$582,922
	Blind Slough	623	\$10.04	\$6,255	10,310	\$5.83	\$60,107	--	--	--	\$66,362
	Tongue Point	--	--	--	6,324	--	\$0	--	--	--	\$0
	Deep River <sup>1</sup>	89	\$10.04	\$894	464	\$5.83	\$2,705	--	--	--	\$3,599
	<b>Totals</b>	<b>4,977</b>	<b>--</b>	<b>\$48,434</b>	<b>89,055</b>	<b>--</b>	<b>\$488,078</b>	<b>29,461</b>	<b>--</b>	<b>\$116,371</b>	<b>\$652,883</b>

<sup>1</sup> Deep River spring Chinook average price per pound estimates were adapted from same year Blind Slough prices.

<sup>2</sup> Deep River spring Chinook average price per pound estimates were derived from a combined average of both winter and spring seasons.

Table 3.9. Ex-vessel values of fall season Chinook and coho harvest landed in Select Area commercial fisheries by site, 2006 – 2012.

	Site	Chinook			Coho			
		Landings (pounds)	Ave. price/pound	Ex-vessel value	Landings (pounds)	Ave. price/pound	Ex-vessel value	Sum
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
	<b>Totals</b>	<b>62,873</b>	<b>--</b>	<b>\$125,156</b>	<b>389,766</b>	<b>--</b>	<b>\$510,124</b>	\$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
	<b>Totals</b>	<b>47,137</b>	<b>--</b>	<b>\$129,640</b>	<b>88,806</b>	<b>--</b>	<b>\$131,995</b>	\$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
	<b>Totals</b>	<b>197,227</b>	<b>--</b>	<b>\$470,616</b>	<b>582,124</b>	<b>--</b>	<b>\$771,556</b>	\$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 <sup>12</sup>	7,771	\$1.63	\$12,628	38,689	\$1.08	\$41,784	\$54,412
	<b>Totals</b>	<b>192,735</b>	<b>--</b>	<b>\$274,819</b>	<b>740,769</b>	<b>--</b>	<b>\$895,311</b>	\$1,170,130
2010	Youngs Bay	104,827	\$1.98	\$207,557	283,063	\$1.36	\$384,966	\$592,523
	Blind Slough	192,165	\$0.88	\$169,105	50,832	\$1.31	\$66,590	\$235,695
	Tongue Point	18,333	\$1.39	\$25,483	68,158	\$1.41	\$96,103	\$121,586
	Deep River	11,244	\$1.82	\$20,464	193,834	\$1.34	\$259,738	\$280,202
	<b>Totals</b>	<b>326,569</b>	<b>--</b>	<b>\$422,610</b>	<b>595,887</b>	<b>--</b>	<b>\$807,396</b>	\$1,230,006
2011	Youngs Bay	169,666	\$2.44	\$413,985	255,756	\$1.63	\$416,882	\$830,867
	Blind Slough	106,812	\$0.93	\$99,335	11,511	\$1.74	\$20,029	\$119,364
	Tongue Point	36,653	\$1.58	\$57,912	59,860	\$1.73	\$103,558	\$161,470
	Deep River	33,991	\$1.80	\$61,184	140,022	\$1.64	\$229,636	\$290,820
	<b>Totals</b>	<b>347,122</b>	<b>--</b>	<b>\$632,416</b>	<b>467,149</b>	<b>--</b>	<b>\$770,105</b>	\$1,402,521
2012	Youngs Bay	190,646	\$1.72	\$327,911	45,276	\$1.59	\$71,989	\$399,900
	Blind Slough	53,249	\$0.89	\$47,392	11,137	\$1.69	\$18,822	\$66,213
	Tongue Point	31,586	\$1.25	\$39,483	27,843	\$1.57	\$43,714	\$83,196
	Deep River <sup>1</sup>	19,355	\$1.49	\$28,742	24,556	\$1.69	\$41,500	\$70,242
	<b>Totals</b>	<b>294,836</b>	<b>--</b>	<b>\$443,527</b>	<b>108,812</b>	<b>--</b>	<b>\$176,024</b>	\$619,551

<sup>1</sup> Deep River Chinook average price per pound estimates were derived from an average of same year Youngs Bay and Tongue prices.

<sup>2</sup> Deep River coho average price per pound estimates were adapted from same year Blind Slough prices.

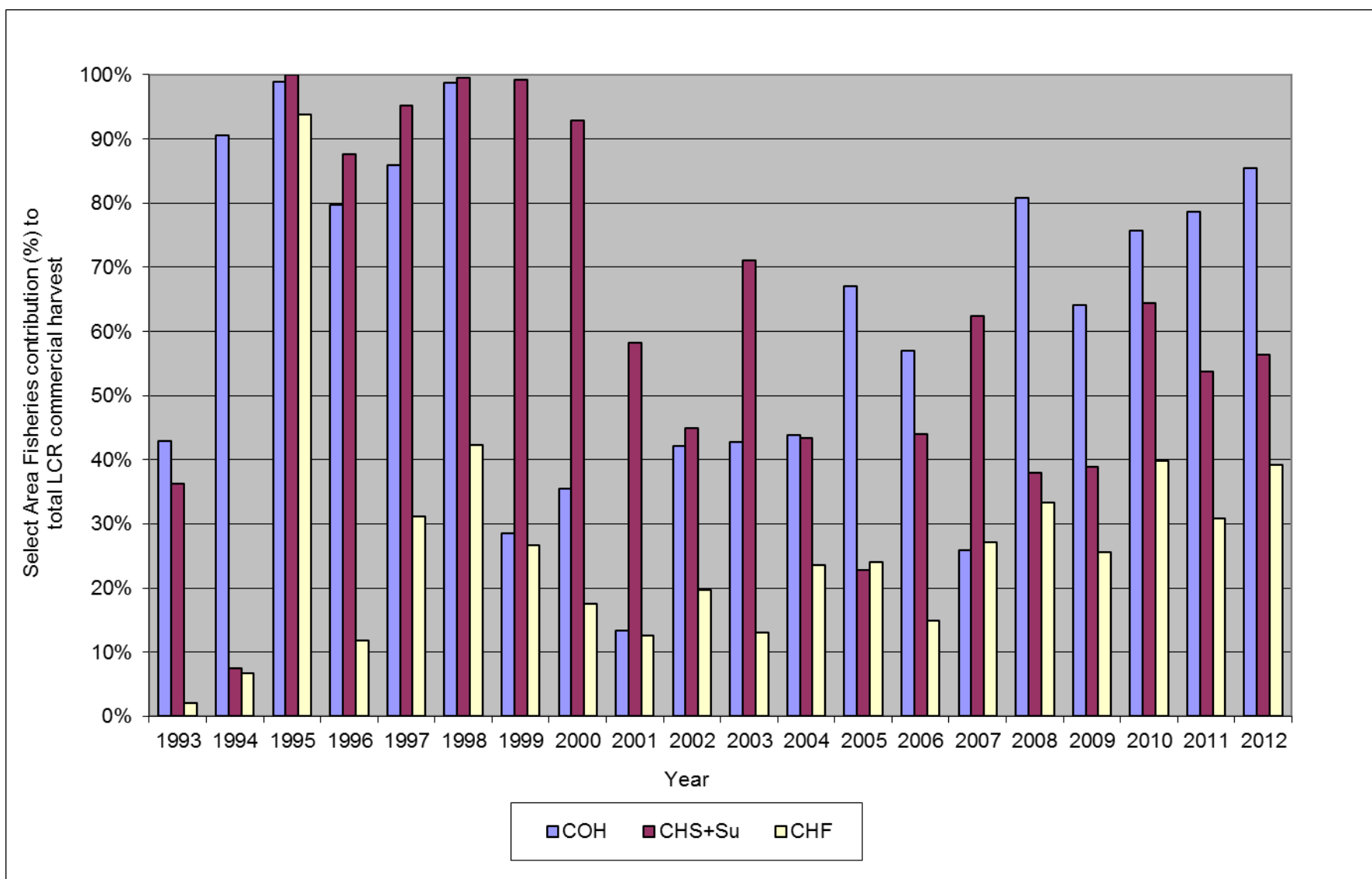
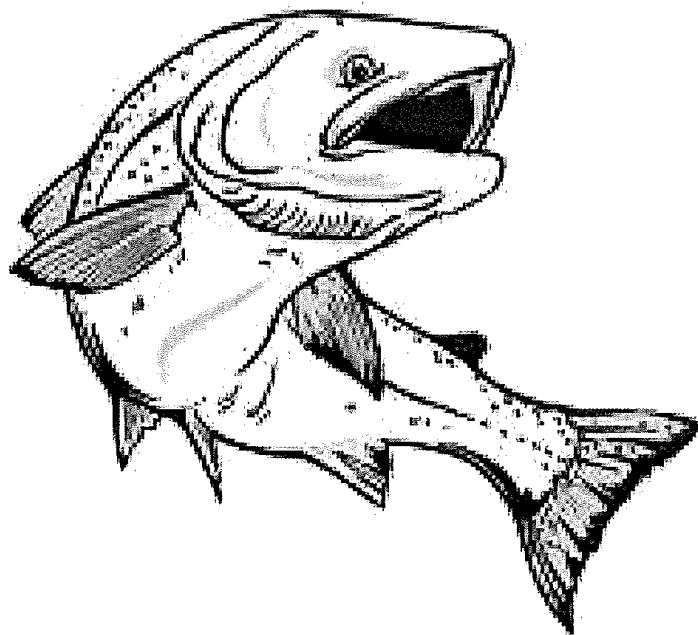


Figure 3.1. Contribution of Select Area commercial fisheries to the total Lower Columbia River (LCR) commercial harvest by species and stock, 1993-2012.





## 4. RUN RECONSTRUCTION and SMOLT-TO-ADULT SURVIVAL

Cohort reconstruction and SARs were calculated using data retrieved from the RMPC coded-wire tag database ([www.rmpec.org](http://www.rmpec.org)) managed by the PSMFC. For each relevant tag group, all CWT recoveries reported by all agencies as of April 2012 were used to calculate SARs and to determine the ultimate fate of SAFE project releases (using CWT'd fish as the proxy for the entire release group). Adult returns were categorized by type of recovery (e.g. ocean or freshwater fishery, commercial or recreational fishery, hatchery or stream escapement) to determine contribution to the various regional fisheries and escapement values. Survival rates of Chinook were calculated separately for sub-adults (jacks) and adults based on age-specific CWT recoveries. Unless otherwise noted, survival rates in this report represent smolt-to-adult rates and do not include jack survival.

The following is excerpted 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.

It is important to acknowledge that determining survival and straying is a lengthy 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 2008). In practice however, reporting agencies require a substantial amount of time to process and report finalized CWT recovery data to the RMPC. Therefore 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 SARs will provide a minimum estimate. As long as the myriad methodologies remain static, interannual comparisons of fishery contributions and SARs should be informative.

## **SPRING CHINOOK**

Results for spring Chinook included in this report are based on recoveries of 17,557 coded-wire tags recovered from 99 CWT study groups released between 1996 and 2008 (1994 – 2006 brood years) from SAFE production facilities; including 34 tag groups released from net pens in Youngs Bay, 5 tag groups from South Fork Hatchery, 22 tag groups from Blind Slough, 21 tag groups from Tongue Point, and 17 groups from Deep River. These same data are used for survival comparisons between SAFE sites; however, analysis is confounded somewhat since fish were not released from all sites in all years.

### **Smolt-to-Adult Survival Rates**

Average annual survival rates of SAFE spring Chinook fluctuated widely within and between release locations (Table 4.1), but overall averaged 0.6% for the brood years 1994 – 2006 (Equation 1). The annual average brood-specific survival rates ranged between 0.11 – 1.32 percent. Spring Chinook released from Blind Slough and Youngs Bay net pens had the highest overall survival at 0.70% and 0.78%, respectively. Survival of Deep River and Tongue Point net-pen fish were lower at 0.25% and 0.45%, respectively.

$$\text{Equation 1. Overall survival rate} = \sum CWT_{rec} / \sum CWT_{rel}$$

### **Run Reconstruction**

As intended, the vast majority (91.0%) of SAFE-produced spring Chinook were harvested in fisheries (brood years 1992 – 2006; Table 4.2, Figure 4.1). Most of these (79.4%) were landed in Select Area commercial fisheries, but they also contributed to ocean and Columbia River mainstem commercial and recreational fisheries. The high fishery contribution rates observed for SAFE-produced spring Chinook indicate that the project is meeting one of its primary goals, i.e. to maximize harvest of local stocks in order to achieve the greatest economic value of the project, while minimizing adverse impacts of the program. Only 6.1% of returning SAFE-produced spring Chinook escaped past fisheries and of these the majority returned to hatcheries.

Analysis of CWT recoveries indicates that homing of the 1992 – 2006 brood SAFE spring Chinook was generally good. The overall stray rate averaged 4.8%. Very few fish (0.2%) strayed to areas above Bonneville Dam. Strictly speaking, since all SAFE project spring Chinook are released from net pens, any recovery at a hatchery or stream could be considered “straying”, but for our purposes we define straying as a recovery at a hatchery or stream other than one in the immediate vicinity of the net-pen release site (plus all recoveries above Bonneville Dam) since, by design, the fish have imprinted on the proximate water source and it would be reasonable to expect them to go somewhere if not harvested in a fishery. Also, since spring Chinook are not endemic to the lower Columbia River estuary, and return timing is separated temporally from fall Chinook, it is thought that risk of introgression with wild stocks is not an issue.

Non-natal straying of Youngs Bay and Blind Slough net-pen releases occurred at relatively low levels (2.5% and 2.6% of adult returns, respectively). Releases from the original Tongue Point net-pen site exhibited high stray rates (averaging 22.1%); the overall SAFE stray rate reported above for all sites is likely biased high since broods with relatively poor stray rates are included. Prior to the release of the 2001 brood the Tongue Point net pens were moved to the MERTS site in an attempt to improve straying rates. Since then there has been a marked reduction in non-natal straying with an average of 8.9% (2001-2006 brood years). Non-natal straying of spring Chinook releases from the Deep River net pens appears to be relatively high (16.7%) and will be considered, along with other performance guidelines, when evaluating the quality of the projects many release groups.

## **COHO**

As is the case with all SAFE project releases, each year a representative CWT group (usually 25,000-30,000) is included at each coho release site. Additional tag groups may have been applied to study groups at various times, but the fish reared utilizing a standard set of practices agreed to by all parties were monitored through the representative CWT groups. For 1993 – 2007 brood year coho, 51,327 recovered CWTs, representing 107 tag groups, were analyzed from releases at SF Klaskanine Hatchery, and Youngs Bay, Blind Slough, Tongue Point, and Deep River net pens.

### **Smolt-to-Adult Survival Rates**

Average annual smolt-to-adult survival of the CWT'd release groups provides a reference for relative success between years. For brood years 1993 – 2007 annual survival was highly variable, ranging from 0.71% – 4.37% (Table 4.3). A protracted range of SARs is typical of coho and is presumably influenced heavily by ocean conditions. Tongue Point net-pen and SF Klaskanine Hatchery releases exhibited the highest average survival rates (2.31% and 2.04%, respectively). Youngs Bay and Deep River net-pen groups were next with 1.66% and 1.78%, respectively. Blind Slough net-pen releases consistently have the lowest survival (averaging 1.38%), although survival is improving with the top two highest SAR's since inception occurring in 2006 and 2007 brood years. Overall, SAFE-project coho had an average SAR of 1.80%.

### **Run Reconstruction**

The contribution of 1993 – 2007 brood SAFE and representative hatchery coho to fisheries and escapement is presented in Table 4.2 and also in Figure 4.2. SAFE-produced coho 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, 98.8%, are harvested in fisheries. Releases from Youngs Bay, Blind Slough, and Deep River performed similarly. For these sites, the vast majority of CWTs were recovered from a Select Area commercial fishery, range 67.0 – 76.7%, although in recent years the proportion of Blind Slough CWT recoveries coming from Select

Areas fisheries is decreasing. For Tongue Point releases, only 46.5% of adult returns were harvested in Select Area commercial fisheries; however, this statistic is a bit misleading. When mainstem Columbia River commercial fisheries are open, all landings from the Tongue Point/South Channel Select Area site are included in the mainstem harvest. Combining Select Area and Columbia River mainstem landings of Tongue Point fish shows a total commercial fishery contribution similar to the other sites (76.4%). Very few SAFE-produced fish escape harvest (1.1%) and the majority of escapement is comprised of returns to hatcheries as opposed to escapement to streams. Homing of SAFE-produced coho appears to be very good. Very few (>0.1%) stray above Bonneville Dam, and only 0.8% stray to non-natal areas.

### **SELECT AREA BRIGHT FALL CHINOOK (SAB)**

Results for SAB fall Chinook included here are based on recoveries from 50 CWT groups released between 1995 and 2008 (1994 – 2007 brood years) from Select Area net pens in Youngs Bay, and 27 CWT groups released from broodstock hatchery facilities (1996-2007 brood years). CWT recoveries from fisheries and escapement areas totaled 12,157 net-pen tags and 5,515 broodstock tags.

#### **Smolt-to-Adult Survival Rates**

Survival rates of 1994 – 2007 brood SAB fall Chinook varied substantially between release sites and year (range 0.09% - 3.14%) but overall averaged 0.82% (Table 4.4). Survival increased dramatically for the 1998 – 2000 broods but appears to have dropped back to average levels with the 2007 brood. Many factors likely affect survival including avian predation, river and ocean conditions, size at release, release timing and location, and health of released smolts. It is unclear which variable expresses the greatest influence on survival rates of SAB fall Chinook; although it appears ocean conditions may be significant. Composite average survival rates are similar for both the net-pen reared fish and the hatchery broodstock group (0.80% and 0.75%, respectively).

#### **Run Reconstruction**

SAB fall Chinook contribute substantially to a variety of regional fisheries (Table 4.2; Figures 4.3 and 4.4). As with the other SAFE-produced salmon, the vast majority of adult SABs are harvested (97.6% of net-pen releases and 82.7% of hatchery releases). Results are presented separately for the net-pen (production) releases and hatchery (broodstock) releases since management actions are in place to escape a percentage of the broodstock release past fisheries in Youngs Bay. As a result, returning adults from the hatchery releases contribute less to harvest and more escape to the hatchery. Significant harvest occurs in the Select Area commercial fishery, but a large component of both net-pen and hatchery releases are harvested in ocean commercial fisheries (18.1% and 24.4%, respectively). The balance is harvested in ocean and Columbia River recreational (majority in the Buoy 10 fishery) and mainstem commercial fisheries. Some returning SAB adults do escape fisheries and end up in streams (1.0% of net-pen fish and 2.5% of broodstock fish) and some return to hatcheries (1.4% of net-pen fish and 14.8% of broodstock fish).

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. Transferring the broodstock program from Big Creek Hatchery to Klaskanine Hatchery in 1995 and to South Fork Klaskanine Hatchery in 2006 reduced straying to minimal levels, averaging 2.2% for the brood years analyzed. No CWTs from broodstock releases have been reported from areas above Bonneville Dam. SABs from the net-pen releases are observed in non-natal areas at a lower rate (1.3%); very few (0.9%) have strayed to areas above Bonneville.

Table 4.1. Smolt-to-Adult survival of SAFE project hatchery spring Chinook, brood years 1994 - 2006. <sup>1</sup>

SAFE Project Releases						
Brood Year	South Fork Klaskanine	Youngs Bay Net Pens	Blind Slough Net Pens	Tongue Point Net Pens <sup>2</sup>	Deep River Net Pens	All Sites Annual Average
1994	0.02%	0.16%	0.11%	0.07%	--	0.11%
1995	0.04%	0.10%	0.26%	0.22%	--	0.19%
1996	--	1.48%	0.33%	0.74%	0.02%	0.64%
1997	--	1.20%	0.78%	0.94%	1.25%	1.04%
1998	--	0.92%	1.83%	1.20%	--	1.32%
1999	--	1.53%	1.62%	--	0.36%	1.17%
2000	--	0.54%	0.41%	--	1.27%	0.74%
2001	--	0.07%	0.09%	0.35%	0.18%	0.17%
2002	0.59%	1.37%	0.18%	0.61%	0.00%	0.54%
2003	0.07%	0.10%	0.19%	0.30%	0.00%	0.15%
2004	0.01%	0.45%	0.07%	0.35%	0.04%	0.23%
2005	--	0.74%	0.14%	0.32%	0.01%	0.30%
2006	--	3.32%	0.69%	0.22%	0.00%	1.06%

<sup>1</sup> Survival rates are based on CWTs collected in fisheries and escapement monitoring. Experimental release groups are not included.

<sup>2</sup> Tongue Point net pen site relocated to current MERTS location in 2002. No releases of 1999 or 2000 brood spring Chinook occurred in Tongue Point during the transition.

Table 4.2. Distribution of returning adult salmon from SAFE project releases; brood years for each stock indicated in parentheses.

		Spring Chinook (BY 1992-2006)	Coho (BY 1993-2007)	Fall Chinook - net pens <sup>1</sup> (BY 1994-2007)	Fall Chinook - Klaskanine Hatchery (BY 1996-2007)
Commercial Fisheries	Select Area	79.4%	68.4%	55.4%	31.0%
	Columbia River Mainstem	5.0%	12.6%	13.3%	8.6%
	Ocean	6.5%	10.7%	18.1%	24.3%
	<b>subtotal</b>	<b>91.0%</b>	<b>91.6%</b>	<b>86.7%</b>	<b>64.0%</b>
Recreational Fisheries	Ocean	0.8%	0.8%	4.4%	8.1%
	Freshwater <sup>2</sup>	2.1%	6.4%	5.7%	8.7%
	<b>subtotal</b>	<b>2.9%</b>	<b>7.2%</b>	<b>10.0%</b>	<b>16.8%</b>
Escapement	Hatcheries	5.0%	1.0%	1.4%	14.8%
	Streams	1.1%	0.1%	1.0%	2.5%
	<b>subtotal</b>	<b>6.1%</b>	<b>1.1%</b>	<b>2.4%</b>	<b>17.3%</b>
Miscellaneous	Ocean by-catch	0.1%	0.1%	0.9%	1.9%

<sup>1</sup> Select area bright (SAB) fall Chinook are divided into both a broodstock and net pen components and are analysed separately.

<sup>2</sup> Includes Columbia River Mainstem and Select Area sport.

Table 4.3. Smolt-to-Adult survival of SAFE project hatchery coho, brood years 1993 – 2008. <sup>1</sup>

Brood Year	SAFE Project Releases					Annual Average
	South Fork Klaskanine	Youngs Bay Net Pens	Blind Slough Net Pens	Tongue Point Net Pens <sup>2</sup>	Deep River Net Pens	
1993	0.65%	1.05%	1.95%	3.08%	1.57%	1.66%
1994	0.32%	0.52%	1.21%	0.82%	0.67%	0.71%
1995	1.67%	1.05%	0.07%	0.53%	--	0.83%
1996	0.93%	0.92%	1.55%	3.87%	1.42%	1.74%
1997	0.50%	1.65%	0.73%	1.43%	5.48%	1.96%
1998	3.88%	2.09%	2.21%	3.29%	0.60%	2.41%
1999	2.90%	1.57%	0.01%	1.80%	0.05%	1.27%
2000	7.59%	5.93%	2.34%	3.93%	2.03%	4.37%
2001	1.21%	1.95%	0.04%	2.68%	1.71%	1.52%
2002	--	2.89%	0.01%	4.07%	0.37%	1.84%
2003	--	1.27%	0.58%	3.46%	2.01%	1.83%
2004	--	0.32%	1.41%	0.65%	1.10%	0.87%
2005	--	1.03%	1.25%	0.74%	3.97%	1.75%
2006	2.42%	4.59%	4.52%	0.93%	1.48%	2.79%
2007	0.96%	0.84%	3.00%	0.29%	2.40%	1.50%

<sup>1</sup> Survival rates are based on CWTs collected in fisheries and escapement monitoring. Experimental release groups are not included.

<sup>2</sup> Tongue Point Net Pen site relocated to current MERTS location in 2002.

Table 4.4. Smolt-to-Adult survival of SAFE project Select Area Bright fall Chinook, brood years 1994 - 2007. <sup>1</sup>

Brood Year	SAFE Project Releases		Annual Average
	Youngs Bay Net Pens	Hatchery Broodstock <sup>2</sup>	
1994	0.31%	0.31%	0.31%
1995	0.41%	0.18%	0.29%
1996	0.09%	0.35%	0.22%
1997	0.27%	0.58%	0.43%
1998	2.29%	1.15%	1.72%
1999	1.43%	3.14%	2.29%
2000	1.28%	1.22%	1.25%
2001	0.89%	0.24%	0.57%
2002	0.39%	0.40%	0.40%
2003	0.13%	0.38%	0.26%
2004	1.89%	0.75%	1.32%
2005	1.73%	0.54%	1.14%
2006	0.44%	0.38%	0.41%
2007	1.05%	0.73%	0.89%

<sup>1</sup> Survival rates are based on CWTs collected in fisheries and escapement monitoring.

<sup>2</sup> Big Creek Hatchery for brood year 1994, Big Creek and Klaskanine Hatcheries in 1995, Klaskanine Hatchery from 1996 – 2007, Klaskanine and South Fork Klaskanine in 2004-2007.

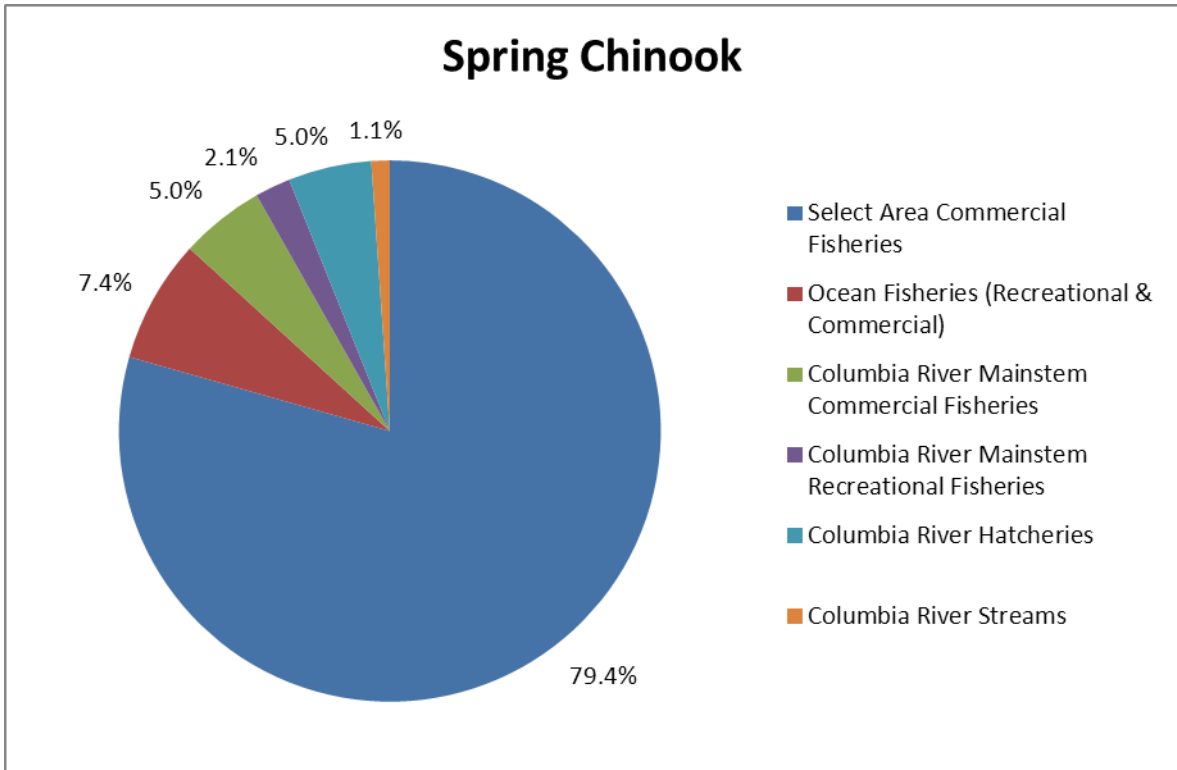


Figure 4.1. Distribution of returning adult spring Chinook from SAFE project releases; brood years 1992 – 2006.

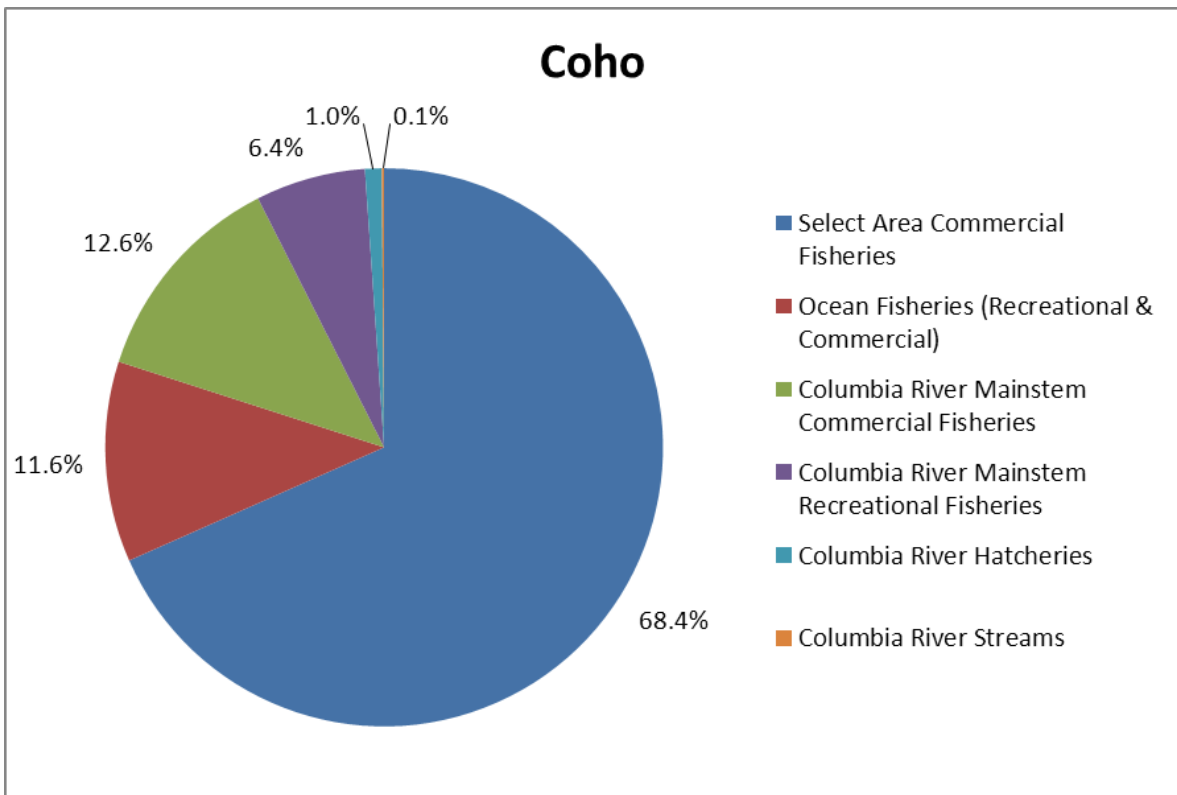


Figure 4.2. Distribution of returning adult coho from SAFE project releases; brood years 1993 – 2007.

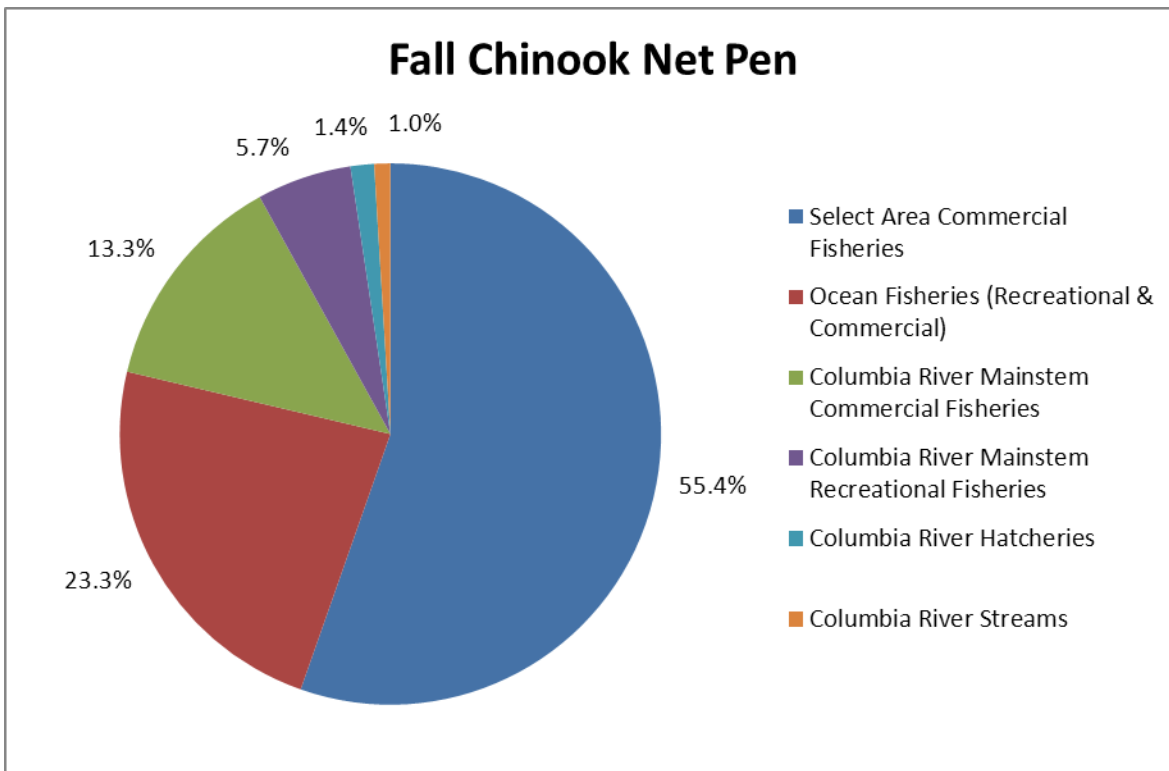


Figure 4.3. Return distribution of net-pen reared Select Area Bright fall Chinook; brood years 1994 – 2007.

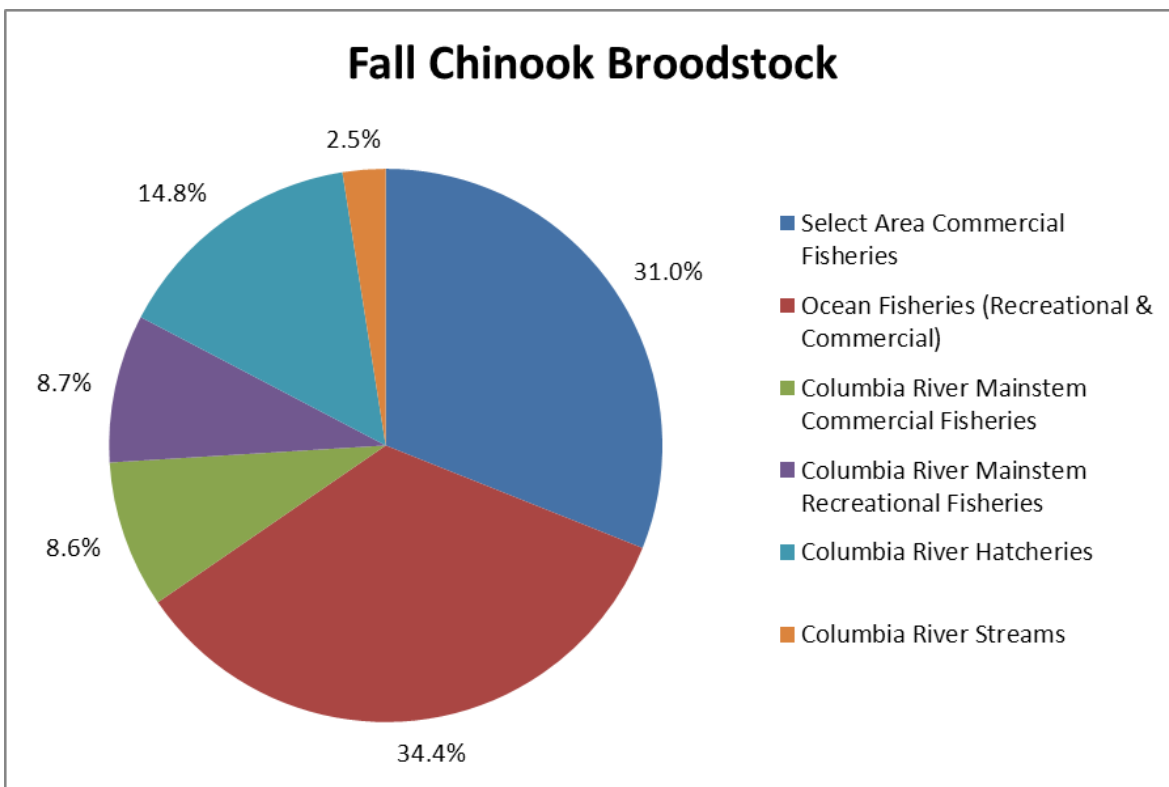


Figure 4.4. Return distribution of broodstock (Klaskanine Hatchery) Select Area Bright fall Chinook; brood years 1996 – 2007.



## 5. ESCAPEMENT

### SPAWNING GROUND SURVEYS

Spawning ground surveys for fall Chinook and coho are conducted annually on many LCR tributaries by ODFW and WDFW staff. Surveys are conducted by SAFE project staff (2009-2010 for ODFW), as well as staff from other programs including: BPA-funded CWT Recovery project (project #198201301), WDFW's Intensively Monitored Watershed (IMW) program, Fish In Fish Out (FIFO) monitoring program, Grays-Elochoman adult weir and surveys project, and ODFW's Oregon Adult Salmonid Inventory and Sampling project (OASIS).

Each of these programs has unique project goals and survey protocols; however, all available carcasses are examined for the presence of fin marks and CWTs. Taken together, these projects provide a wide range of spawning ground survey coverage on LCR tributaries that may be susceptible to straying of SAFE-produced fish. For the purposes of this report, tributaries that are most likely to be affected by SAFE production including Youngs Bay, Big Creek and Clatskanie River basins, will be the focus of the discussion. Data from these surveys, along with SAFE-project surveys, are used to assess escapement of SAFE-produced fish into streams. To account for the proportion of SAFE fish on local spawning grounds, recoveries from various spawning ground survey projects are separated into three local watershed groups: Youngs Bay, Big Creek and Clatskanie. Methods for characterizing presence of SAFE-produced fish vary depending on data available for each species. For coho and spring Chinook coded wire tags are used to determine the origin of any Select Area hatchery releases although we couldn't rely on recovery information without proper sample rate expansion information and project specific labels for each recovery. For fall Chinook, left ventral fin marks, specific to the Select Area Bright (SAB) stock (releases are 100% fin-marked with an LV clip), are used to differentiate local from non-local stocks on spawning grounds. The advantage of using fin-marks rather than CWT's is two-fold. Firstly, project specific labels and sample rate expansions are not necessary and secondly estimates are not subject to expansion rate errors that often result in over- or under-estimates.

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 data collected consists of counts of live (adults and jacks) and dead fish by species, redd counts, and biological data collected from carcasses. The biological data collected from salmon carcasses consists of fork length, scales (occasionally, no scales are collected from adipose-clipped coho), the presence of any fin marks and/or tags, and spawn success. Tails are removed from all carcasses after sampling to prevent duplicate sampling. Water conditions (visibility and stream flow) are recorded during each survey. Spawning ground survey data is used to estimate spawning escapement, stock composition, and age composition to assist with run reconstruction and run forecasting and to estimate stray rates.

#### **ODFW Surveys**

##### *Fall Chinook*

Surveys targeting naturally-spawning fall Chinook are conducted in tributaries of the LCR from Youngs Bay to the Sandy River during September and October. Results from these surveys are reported via an annual ODFW whitepaper series (see Takata 2010 and Takata 2011); refer to these documents for specific survey and analytical methodology. Only results pertinent to the

evaluation of the SAFE project are discussed here. A total of 9.8 miles of stream are surveyed in the Youngs Bay basin and another 13.2 miles are surveyed in the Big Creek and Clatskanie basin between Astoria and Clatskanie (Table 5.1).

During the 2009 fall Chinook surveys in Youngs Bay basin 46 fish were mark sampled for fin marks and CWT's (Table 5.2). The majority of the mark sampled fish (73.9%) had a LV fin-clip indicating that they were SAB stock. Surveys in the Big Creek basin totaled a fall Chinook peak count of 1,209 fish; surveyors examined 1,486 (72.3%) fish for fin marks and CWTs. Based on fin marks, none of these fish were SAB's. A total of 894 Chinook were mark sampled with a peak count of 1,250 in the Clatskanie basin, none of which had an LV fin-clip.

During the 2010 fall Chinook surveys in Youngs Bay basin 37 fish were mark sampled for fin marks and CWT's (Table 5.2). The majority of the mark sampled fish (73.0%) had a LV fin-clip indicating that they were SAB stock. Surveys in the Big Creek basin totaled a fall Chinook peak count of 3,952 fish; surveyors examined 1,720 (25.5%) of these for fin marks and CWTs. Based on fin marks, one fish (.06%) was found with an LV clip indicating it was a SAB. In 2010 surveyors mark sampled 2,461 Chinook with a peak count of 2,019 in the Clatskanie basin. None had an LV fin-clip.

During the 2011 fall Chinook surveys in Youngs Bay basin 348 fish were mark sampled for fin marks and CWT's (Table 5.2). Slightly less than half of the mark sampled fish (48.6%) had a LV fin-clip indicating that they were SAB stock. The surveyors in the Big Creek basin examined 1,514 (51.4%) fish for fin marks and CWTs. Based on fin marks, none of these fish were SABs. In 2011 no SABs were observed in the Clatskanie basin out of 2,314 mark sampled fish. A total peak count of 1,959 fish was recorded.

Table 5.1. ODFW Lower Columbia River tributary fall Chinook spawner survey areas in 2011. Adapted from Takata (2011).

Basin	Stream	Survey Description	Miles Surveyed
Youngs Bay	NF Klaskanine River	Fish hatchery to confluence with SFK	1.5
	SF Klaskanine River	Clatsop County fish hatchery to confluence with NFK	3.5
	Youngs River	Falls to tidewater	0.3
	Lewis and Clark River	400 line bridge (aka Crown Zellerbach bridge) to tidewater	4.5
<i>Subtotal</i>			<i>9.8</i>
Big Creek	Gnat Creek	Falls to tidewater	3.5
	Bear Creek	Falls to tidewater	3
	Big Creek	Hatchery to tidewater	3
<i>Subtotal</i>			<i>9.5</i>
Clatskanie	Plympton Creek	Falls to tidewater	1.7
	Clatskanie River	Mouth of Keystone Cr. To tidewater	2
<i>Subtotal</i>			<i>3.7</i>

Table 5.2. Summary of fall Chinook spawning ground surveys from Youngs Bay, Big Creek and Clatskanie River basins. Including peak counts, number mark sampled and number of left ventral clip, and proportion of SAB's. <sup>1</sup>

**Youngs Bay Population**

*SAB Chinook (Fin Marks 4 or 24)*

Year	# of Mark 4 or 24 <sup>2</sup>	Total Mark Sampled <sup>3</sup>	Peak count	% SABS
2001	54	56	166	96.43%
2002	1	14	411	7.14%
2003	156	239	583	65.27%
2004	36	43	650	83.72%
2005	56	57	322	98.25%
2006	120	123	344	97.56%
2007	17	30	345	56.67%
2008	97	107	357	90.65%
2009	34	46	674	73.91%
2010	27	37	438	72.97%
2011	169	348	1070	48.56%
3-yr Ave.	77	144	727	65.15%
5-yr Ave.	69	114	577	60.56%
10-yr Ave.	71	104	519	68.30%

**Big Creek Population**

*SAB Chinook (Fin Marks 4 or 24)*

Year	# of Mark 4 or 24 <sup>2</sup>	Total Mark Sampled <sup>3</sup>	Peak Count	% SABS
2001	4	3662	4389	0.11%
2002	0	6148	6963	0.00%
2003	0	7371	11492	0.00%
2004	0	2057	3560	0.00%
2005	0	2164	2516	0.00%
2006	0	56	92	0.00%
2007	0	80	179	0.00%
2008	0	888	2868	0.00%
2009	0	1486	1209	0.00%
2010	1	1720	3952	0.06%
2011	0	1514	1729	0.00%
3-yr Ave.	0	1573	2297	0.02%
5-yr Ave.	0	1138	1987	0.02%
10-yr Ave.	0	2348	3456	0.00%

**Clatskanie Population**

*SAB Chinook (Fin Marks 4 or 24)*

Year	# of Mark 4 or 24 <sup>2</sup>	Total Mark Sampled <sup>3</sup>	Peak Count	% SABS
2001	1	2124	2299	0.05%
2002	0	4949	5970	0.00%
2003	0	4640	5593	0.00%
2004	0	2391	2982	0.00%
2005	0	1195	1553	0.00%
2006	0	145	234	0.00%
2007	0	141	265	0.00%
2008	0	58	654	0.00%
2009	0	894	1250	0.00%
2010	0	2461	2019	0.00%
2011	0	2314	1959	0.00%
3-yr Ave.	0	1889	1743	0.00%
5-yr Ave.	0	1174	1229	0.00%
10-yr Ave.	0	1919	2248	0.00%

<sup>1</sup> Derived from ODFW Columbia River Management (CRM) spawning ground surveys for 2001-2011.

<sup>2</sup> "Mark 4" is a left ventral fin clip which designates the fish as Select Area Bright stock.

"Mark 24" designates a Select Area Bright stock that contains a coded wire tag.

<sup>3</sup> "Mark Sampled" represents how many fish have been examined for fin marks.

## *Coho*

Since 2002, ODFW has conducted an intensive monitoring program focused on the Oregon portion of the LCR coho ESU. This project, known as OASIS, is administered from the Corvallis Research Lab and is not affiliated with the SAFE project. We have been working with OASIS project staff to obtain survey data to assist with the evaluation of SAFE project goals; also, their CWT recoveries are reported to RMIS and can be used for these purposes. Sample rate information is not included, which precludes any attempts to accurately extrapolate numbers of CWT's recovered by basin. It is therefore not possible to correlate CWT recoveries with basin level estimates of spawning populations. Details on the OASIS project survey methodology and analyses can be found in Suring et al. (2006). 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 complex level, which includes six subsets of the ESU defined during the ODFW status review (Chilcote 1999). Two of those subsets, the Astoria (including Youngs Bay and Big Creek populations) and Clatskanie drainages are most likely to be affected by SAFE project fish and are the focus of discussion in this report. Astoria is defined as all Columbia tributaries from the mouth upstream to Gnat Creek. Clatskanie is defined as all Columbia tributaries upstream of Gnat Creek to, and including, the Clatskanie River basin. 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 2009, 2010 and 2011 the OASIS project summaries indicate that the majority of the coho observed in the tributaries of Youngs Bay and Big Creek area were of hatchery origin, where Clatskanie River contained mostly wild spawners (Table 5.3). 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 skew data to overestimate presence of SAFE hatchery fish. To account for this 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.

Table 5.3. Estimated coho spawner abundance in the Oregon portion of the Lower Columbia ESU, 2002-2011. <sup>1</sup>

Year	Youngs Bay Pop. Est.		Big Creek Pop. Est.		Clatskanie Pop. Est.	
	Hatchery	Wild	Hatchery	Wild	Hatchery	Wild
2002 <sup>2</sup>	2,506	364	866	52	No est.	104
2003 <sup>2</sup>	714	45	291	122	No est.	563
2004	886	149	265	112	0	398
2005	242	79	124	219	7	494
2006	394	74	0	225	46	421
2007	14	21	216	212	543	583
2008	23	82	66	360	0	995
2009 <sup>2</sup>	302	0	936	305	186	1,070
2010	106	48	122	10	165	1,609
2011	315	145	173	15	47	1,506
3-yr. ave.	241	64	410	110	133	1,395
5-yr. ave.	152	59	303	180	188	1,153
10-yr. ave.	550	101	306	163	124	774

<sup>1</sup> Derived from ODFW Corvallis OASIS project spawning ground surveys for 2001-2012.

<sup>2</sup> Estimates do not include hatchery and wier collections.

Table 5.4 Expanded coded wire tag recoveries of SAFE origin fish on spawning grounds by basin. <sup>1</sup>

Year	Youngs Bay	Big Creek	Clatskanie
2001	0	20	20
2002	83	16	0
2003	336	8	0
2004	81	0	0
2005	0	0	0
2006	1	8	0
2007	0	0	0
2008	0	0	0
2009	38	0	0
2010	24	11	0
2011	0	0	0
3-yr. ave.	21	4	0
5-yr. ave.	12	2	0
10-yr. ave.	56	4	0

<sup>1</sup> Coded wire tag recoveries were expanded for individual tag rates and may have been recovered by multiple survey projects with various sample rates.

## WDFW Surveys

### *Fall Chinook*

WDFW implemented a Conservation and Sustainable Fisheries Plan in 2008 to guide the management and recovery of salmon populations while continuing to provide commercial and recreational harvest opportunity. This plan identified specific spawning populations by species and ESU to be sanctuary populations (largely free from genetic and ecological influences of hatchery programs), and included fall Chinook in the Grays River. Grays River fall Chinook were designated a primary population by the Lower Columbia Fish Recovery Board in 2004, meaning the recovery of the population is critical for the recovery of the ESU as a whole. In 2010 that population was re-designated to the lesser category of contributing population. Nevertheless, the management intent remains to prevent escapement of hatchery Chinook of any stock into the spawning population to the maximum extent practicable.

To address this concern, a weir was installed in the lower Grays River during the fall Chinook adult migration period in 2008 to remove adult migrants of hatchery-origin (designated by the presence of a fin clip) and to improve spawning escapement estimates within the basin. In 2009, a second weir was put into operation on the Elochoman River, with similar management goals to manage hatchery escapement and improve escapement estimates. The weirs operate from September through October, depending on flow levels. Chinook totals handled at the Grays weir do not represent total fall Chinook escapement to Grays River, as some fish passed the weir prior to installation and during high flow events that submerged the weir panels, while the Elochoman weir provides a census count except in extreme high flow years.

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. 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 naturally spawn 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 generate estimates, utilizing area under the curve (AUC) and mark-recapture methodologies, to more accurately estimate the number of spawning salmonids. Because refinements to the mark-recapture methodology are still in development on the Grays, AUC methods using live counts of Chinook spawners have been used to estimate natural spawn escapement values for the Grays Chinook since 2008. More methodology and results on the Grays River weir and spawning ground surveys can be found in Wilson et al. (2013, in prep.).

WDFW staff surveyed over 120 miles of habitat on more than 30 streams from the Lower Columbia estuary to upstream of Vancouver during fall spawning ground surveys in 2009 through 2010 (Table 5.5).

Table 5.5. Lower Columbia River (estuary to Washougal) streams included in WDFW spawning ground surveys during fall spawning seasons from 2009 through 2011.

Basin/Group	Streams Surveyed	Miles Surveyed
Columbia Estuary, small tributaries	Megler Bridge Creek, Coon Canyon, Sisson Creek, Crooked Creek, Jim Crow Creek, Alger Creek	7.7
Deep River	Deep River, Person Creek	1.7
Grays River	Grays River, Hull Creek, Fossil Creek, West Fork Grays River, Crazy Johnson Creek	8.3
Skamokawa Creek	Skamokawa Creek, Wilson Creek, Falk Creek, LF Skamokawa Creek	8.2
Elochoman River	Elochoman River, Beaver Creek, Duck Creek	8.8
West Cowlitz County tributaries	Mill Creek, Abernathy Creek, Germany Creek, Coal Creek	11.6
Cowlitz River	Cowlitz River, Coweeman River, South Fork Toutle River, Green River	56.5
Kalama to Washougal tributaries	Kalama River, East Fork Lewis River, North Fork Lewis River, Washougal River	19.4

Resultant escapement estimates for Grays River, Skamokawa Creek and Elochoman River are presented in Table 5.6. At the writing of this report, estimates were not yet available for 2010 or 2011 for Skamokawa Creek or for 2011 for Grays River. The 2010 estimate for the Grays River is preliminary, and subject to change as further analyses are conducted to provide the best estimate.

As has previously been reported (Hulett et al. 2010; Wilson et al. 2013, in prep.), the most striking factor of these data is the high proportion of SAB Chinook in the spawning escapement of the Grays River fall Chinook. The SAB stock comprises about 50% of the 2009 and 2010 spawning population in the Grays, and averaged 39% over the last 10 years of data (Table 5.6). This is in stark contrast to the generally low and infrequent incidence of SAB spawners in the Elochoman River or in Skamokawa Creek. Spring Chinook from the SAFE release sites are also found only infrequently on the spawning grounds for these three populations.

The SAB component of the Grays Chinook population is greater still prior to the removal of the fish captured at the weir. Of the Chinook captured in the weir, SABs comprised 60% to 80% of the adults trapped from 2008 to 2011 (Table 5.7). While those SABs are all removed from the population, the eventual escapement to the spawning population remains high because the weir has not been effective at removing the majority of the hatchery strays. The high flow that typically occurs in late September or October overwhelms the weir structure, sinking the floating weir panels and allowing fish to pass upstream untrapped. Increasing the effectiveness of the Grays River weir remains a high priority for that program.

Table 5.6 Annual Chinook natural spawning escapement estimates and proportion of SAFE origin fish detected in spawning ground surveys on Grays and Elochoman Rivers and Skamokawa Creek, 1995-2011.

**Grays River<sup>1</sup>**

Year	Escapement Estimate	% Select Area	% SAFE Spring Chinook
1995	29	0%	0%
1996	365	4%	0%
1997	14	0%	0%
1998	93	40%	0%
1999	303	6%	0%
2000	97	4%	0%
2001	251	32%	0%
2002	82	0%	0%
2003	387	10%	7%
2004	745	10%	0%
2005	149	34%	0%
2006	390	21%	0%
2007	104	39%	0%
2008	80	43%	14%
2009	355	57%	6%
2010	42	45%	0%
2009-10 Ave.	199	51%	3%
10-yr. Ave.	259	29%	3%

**Skamokawa Creek<sup>2</sup>**

Year	Escapement Estimate	% Select Area	% SAFE Spring Chinook
1995	184	0%	0%
1996	42	0%	0%
1997	264	0%	0%
1998	145	0%	0%
1999	251	0.8%	0%
2000	27	0%	0%
2001	536	0.4%	0%
2002	372	0%	0%
2003	588	0%	0%
2004	2109	0%	0%
2005	529	0%	0%
2006	7	0%	0%
2007	3	0%	0%
2008	482	0%	0%
2009	3	0%	0%
10-yr. Ave.	466	0.0%	0.0%

**Elochoman River<sup>3</sup>**

Year	Escapement Estimate	% Select Area	% SAFE Spring Chinook
1995	156	40%	0%
1996	553	8%	0%
1997	1875	0%	0%
1998	228	37%	0%
1999	718	0.6%	0%
2000	196	0%	0%
2001	2354	0%	0%
2002	7581	0%	0.1%
2003	6820	0%	0.2%
2004	4796	0%	0.1%
2005	2204	0%	1.5%
2006	332	0%	0%
2007	230	0%	0%
2008	884	0%	0%
2009	1539	0%	0%
2010	1017	0%	0%
2011	723	0%	0%
2009-11 Ave.	1093	0.0%	0.0%
10-yr. Ave.	2613	0.0%	0.2%

<sup>1</sup> Grays River: 1995-2007, peak count expansion (3.58 expansion factor); 2008-2010 area under the curve.

<sup>2</sup> Skamokawa Creek: 1995-2009, peak count expansion (1.67 expansion factor).

<sup>3</sup> Elochoman River: 1995-2008, peak count expansion (2.00 expansion factor); 2009-2011 weir census.



Table 5.7. Number of Chinook handled at Grays River and Elochoman River weirs and percentage of SAFE-produced fish, 2008-2011.

Year	Grays River Weir <sup>1</sup>				Elochoman River Weir			
	Chinook Trapped <sup>2</sup>	SABs	Tules	SAFE Spring Chinook	Chinook Trapped <sup>3</sup>	SABs <sup>4</sup>	Tules	SAFE Spring Chinook
2008	86	77.9%	20.9%	1.2%	N/A	N/A	N/A	N/A
2009	183	77.6%	22.4%	0.0%	3871	0.1%	99.9%	0.0%
2010	59	76.3%	23.7%	0.0%	4617	0.3%	99.7%	0.0%
2011	119	59.6%	40.4%	0.0%	2119	2.4%	97.6%	0.0%

<sup>1</sup> 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 spring Chinook.

<sup>2</sup> The number of Chinook handled at the Grays River weir does not represent total escapement to the weir.

<sup>3</sup> The number of Chinook handled at the Elochoman River weir does represent total escapement to the weir.

<sup>4</sup> All SABs (represented by a left ventral clip) were removed at Elochoman 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. 2013, in prep). Estimates for 2010 and 2011 are provided in Table 5.8 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).

Table 5.8. Estimated coho spawner abundance in Lower Columbia River basins in Washington 2010-2011.

Year	Grays River		Skamokawa-Elochoman		Mill-Abernathy-Germany	
	Hatchery	Wild	Hatchery	Wild	Hatchery	Wild
2010	188	54	576	207	231	1,640
2011	729	25	297	222	209	790

## HATCHERY ESCAPEMENT

### Escapement Goals

Several Select Area fall commercial and sport fisheries are managed around escapement goals. While Tule 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 escapement goal for North and South Fork Klaskanine Hatchery is 550 females (Table 5.9). For return years 2009-2011, N. and S Fork Klaskanine hatcheries fell short of their escapement goal on only one year,

2009. Spawning and adult collection for Tule fall Chinook is conducted at Big Creek Hatchery. Typically, there are no shortages of broodstock collected at Big Creek.

Table 5.9. Fall Chinook adult escapement goals and hatchery returns from North and South Fork Klaskanine and Big Creek hatcheries, 2009-2011.

Year	Hatchery	Stock	Hatchery Adult	Adult Hatchery Returns			Goal Obtained (yes or no)
			Escapement Goals (Females only)	Females	Males	Total	
2009	Big Creek	Tule	1655	2790	2144	4934	yes
2010	Big Creek	Tule	1655	3769	3886	7655	yes
2011	Big Creek	Tule	1655	4188	3211	7399	yes
2009	N. and S Fk. Klaskanine	SAB <sup>1</sup>	550	430	251	681	no
2010	N. and S Fk. Klaskanine	SAB <sup>1</sup>	550	652	495	1147	yes
2011	N. and S Fk. Klaskanine	SAB <sup>1</sup>	550	685	515	1200	yes

<sup>1</sup> Select Area Bright stock.

### 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 consists of fork length, sex, scales, fin marks, and the presence of a CWT.

It is important to note that while every salmonid returning to these hatcheries is examined for the presence of a CWT, SAFE-funded staff may not always be present to sub-sample for biological data such as scale samples for age analysis (Table 5.10).

Based on coded-wire tags collected during broodstock collection and spawning activities, 99% of the Chinook returning to North and South Fork Klaskanine Hatchery from 2009-2011 were SABs of the hatchery broodstock production groups, less than 1% were SABs from the Youngs Bay net-pen releases.

Table 5.10. ODFW Sampling summary for Select Area Bright stock fall Chinook from North and South Fork Klaskanine Hatcheries, 2009-2011. <sup>1</sup>

Year	Hatchery	Hatchery Escapement	Number Mark Sampled	Number Biological Sampled	CWTs Collected	Percent Biological Sampled
2009	N. Fk. Klaskanine	274	196	97	9	49%
2010	N. Fk. Klaskanine	514	442	86	7	19%
2011	N. Fk. Klaskanine	453	399	78	11	20%
2009	S. Fk. Klaskanine	493	382	116	10	30%
2010	S. Fk. Klaskanine	816	728	120	35	16%
2011	S. Fk. Klaskanine	913	908	149	20	16%

<sup>1</sup> Represents sampling done by ODFW staff, additional CWT sampling may have been done by CCF hatchery staff.

## 6. ENVIRONMENTAL COMPLIANCE

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

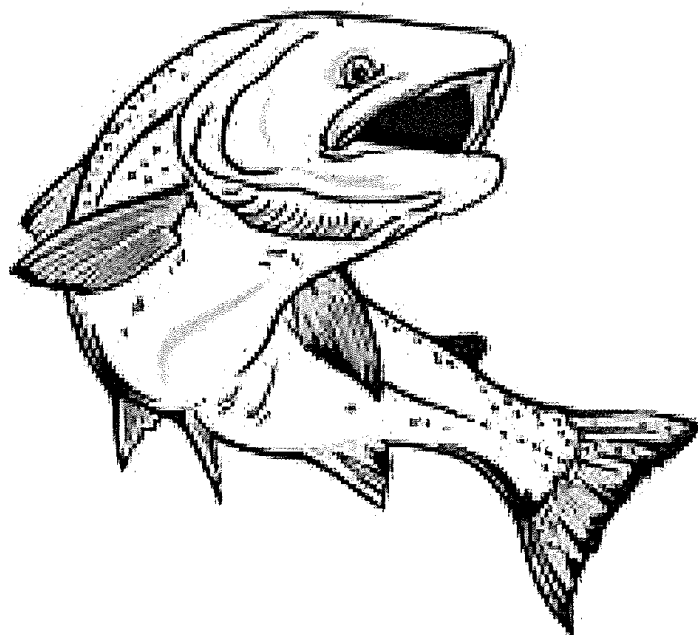
All SAFE production facilities are currently operating under the 1998 NMFS/NOAA Biological Opinion (NMFS 1998). This BO was a formal ESA consultation completed in December 1998. The final ESA response was that the proposed actions were not likely to jeopardize the continued existence of listed Chinook or sockeye salmon 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 (2011) and can be accessed online at:

<https://pisces.bpa.gov/release/documents/DocumentViewer.aspx?doc=P125974&session=7cdf515f-9334-448e-aab7-2d20c2b53f63>

Consolidation of Washington SAFE net-pen rearing from three sites to the current single net-pen site in Deep River in 2007 brought production at that site up to levels requiring an NPDES permit. While a permit application was submitted to WDOE in the summer of 2007, it was never processed, due to staffing changes at both the WDFW SAFE project and Ecology after the application was submitted. WDFW submitted a revised application in 2013, and WDOE anticipates processing of the permit by early 2014. When completed, the permit will specify any required protocols for environmental sampling (water or benthic) that will need to be initiated at the pen 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**

#### **Kelt Reconditioning Studies**

In 2009 and 2010, the Select Area project collaborated on a steelhead kelt reconditioning project led by the Yakama Nation. The Select Area project provided net pens in Youngs Bay that Yakama Nation staff used to temporarily hold 20 spawned kelts from late-May to mid-June each year to determine if the estuarine environment would improve the success of reconditioning (survival to re-maturation) over that achieved in the Yakima basin. Unfortunately, the brackish water in Youngs Bay did not prove to be beneficial to the kelts, and because of poor survival rates while in the net pens, this component of the reconditioning project was discontinued after the second year. Details of this study can be found online at:

<http://www.critfc.org/wp-content/uploads/2012/12/Steelhead-Kelt-Reconditioning-and-Reproductive-Success-2010-Annual-Report2.pdf>

#### **Alternative Selective Gear Studies**

The Select Area project has allowed the short-term use of empty net-pen frames for evaluation of a floating fish trap and for post-handling survival studies of fish captured by experimental seines and tangle nets.

## **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 February of 2012 we said farewell to Toni Miethe, Clatsop County's Staff Assistant of nearly 30 years, as she moved on to well-deserved retirement. Toni began with the project in March of 1983 and played a vital role in the progress and transition of the project from the initial research and evaluation phase to the current enhancement production focus. Andrea (Andy) Neys took over as Staff Assistant in March of 2012, after two years in a similar position with the Clatsop County Planning Department. Prior to her employment with Clatsop County, Andy had worked in the accounting department at a community college in Bend for 10 years.

In the spring of 2011, Klaskanine Hatchery Senior Technician Shaun Montgomery made the move to the same position at ODFW's Round Butte Hatchery. Along with staff from Big Creek Hatchery, Shaun put in several years of hard work with his crew at Klaskanine Hatchery to make necessary repairs and upgrades to the facility to allow for re-instating coho production at the site. In June of 2011, Josh Rist took over as Senior Technician at Klaskanine, coming over from his Fish Technician position at Big Creek Hatchery. Josh and his crew, along with Big Creek staff, have continued to work toward restoring Klaskanine Hatchery to allow for increased coho, Tule, and SAB fall Chinook production at the facility.

Cameron Duff began working with the Select Area project as a Natural Resource Specialist 2 in September of 2010. He will be responsible for providing oversight and enhancing monitoring and evaluation of the Select Area project.

Jeremy Wilson, the WDFW SAFE Biologist 2 promoted to a Biologist 3 on another project in February of 2011. Claire Landry joined the project as a temporary Biologist 1 from March 2011 through March 2012, until Josh Laeder permanently filled the Biologist 2 position beginning in late February 2012.

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