SELECT AREA FISHERY ENHANCEMENT PROJECT

Fiscal Year 2017-2019 REPORT

October 2016 – September 2019

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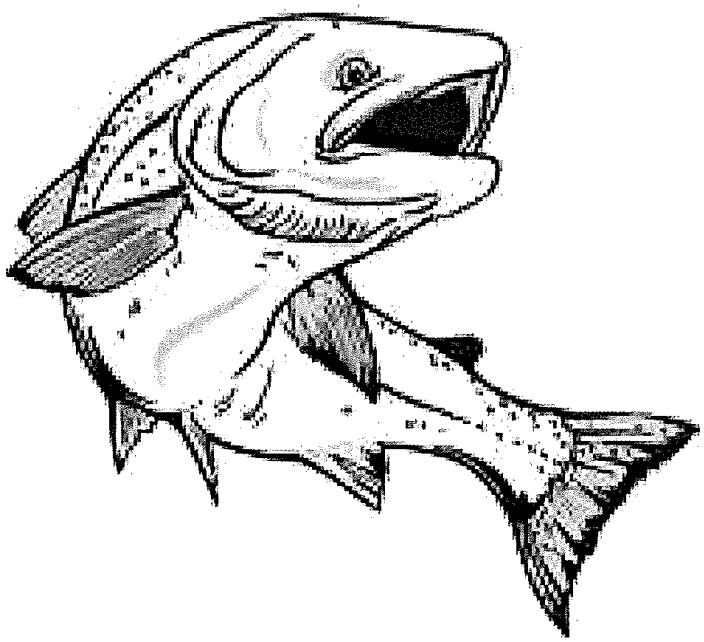
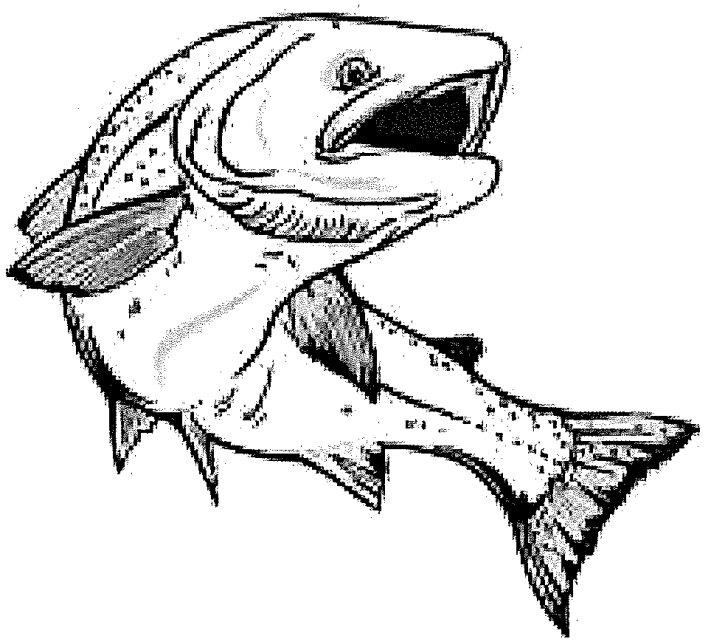


GLOSSARY OF ACRONYMS

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



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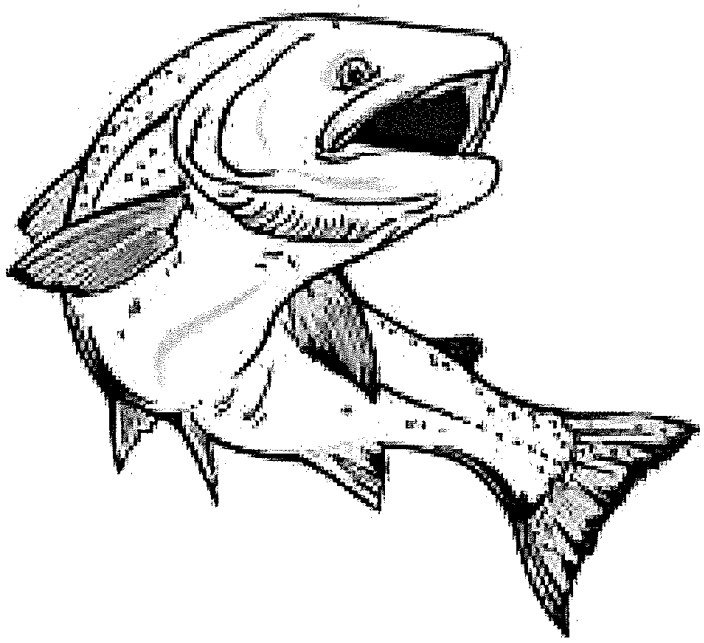


ACKNOWLEDGEMENTS

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

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

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

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

- Bonneville Power Administration
  - COTR: Tracy Hauser

- Clatsop County
  - Public Works Director: Ted Mclean
  - CCF staff: Dan Dunn, Christina Ketcham, Rod Litton, Keith Warren (Retired), Jason Stephens, Andrea Neys (retired), Erica Keyser

- Oregon Department of Fish and Wildlife
  - Fishery Managers: John North, Jeff Whisler, Chris Kern, Tucker Jones
  - Fish Propagation: Scott Patterson, Gabe Garza, Shari Beals, Muhammad Latif, Micky Varney, Guy Chilton (retired)
  - Commercial Fisheries Team: Bret Morgan, Andrea Johnson, Sarah Sapienza, Doug Case (retired) Sue Engwall (retired)
  - Northwest Region Hatchery Coordinators: Ryan Couture, Manny Farinas (retired), Bill Otto (retired)
  - Big Creek Hatchery staff: Rob Dietrichs, Ross McDorman, Tanner Baumgartner, Nick McConnell, Dustin Manwaring, Travis Axtell, Anthony Pedro, Jessica McClean (former staff), Pat Eilertsen (former staff) and Mike Posey (retired)
  - Gnat Creek Hatchery staff: Garth Gale, Michael Hazen, Samuel Welch
  - Klaskanine Hatchery staff: Ryan Fenwick, Marc Cohen, Kyle Wilson, Devin Volenec and Whitney Crowell (former staff)
  - Other hatcheries: Bonneville, Cascade, Clackamas, Leaburg, McKenzie, Marion Forks, Oxbow, Salmon River, South Santiam, Willamette
  - Fishery samplers: Devin Volenec, Chris Rodriguez, Natalie Scheibel, Adam Fleming (former staff), and many seasonal samplers
  - Fish ID: Trevor Clark, Bill Haugen, Larry Funston, Linda Fulop and other fish marking staff
  - Coded-wire tag data coordinator: Gabe Garza

- Fish Health/Pathology: Jerry Jones, Aimee Reed, Carolyn Richards, Melissa White, Craig Banner (retired)
- Fish Liberation: Pat Traxler, Todd Hansen (retired), and several liberation truck drivers

❖ Washington Department of Fish and Wildlife
- Fishery Managers: Bryce Glaser, William Tweit, Cindy LeFleur, Lisa Harlan, , Tim Sippel, Charlene Hurst, Ryan Lothrop, Quinten Daugherty, Josua Holowatz, Robin Ehlke (former staff) Patrick Frazier (retired),Ron Roler (retired)
- Grays River/Beaver Creek Hatchery staff: Shane McEneny, Karl Mahlum, Mike Queener, Aaron Roberts, Sam Gibbons, Cody Davis, Josh Osborn, and Adam Combs
- Other hatcheries: Cowlitz, Lewis, North Toutle, and Washougal
- Fishery samplers: Claire Landry, Jenna Hymas, Josh Harwager, Jennifer Eberle, Cody Dieterle, Laura Lloyd, Tom Herman, Jacob Crawford, Nick Howe, Chris Algera and Sean Toomey.
- Weir and Survey Data Management: Jeremy Wilson, Elise Olk, Kari Dammerman
- Fish ID: Mark Kimble, Dan Thompson, and other fish marking staff
- Fish Health/Pathology: Elysa Ray, Joan Thomas, Sean Roon, Trace Peterson and other virology lab staff

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

EXECUTIVE SUMMARY

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

This report summarizes activities and findings of the SAFE project during winter 2017 through fall 2019, but includes some earlier information for context.

Key findings and results are:

- During 2017-2019, Select Area commercial fisheries contributed all of the spring Chinook and White Sturgeon, and an average of 95% Coho and 38% fall Chinook to the total harvest in non-Treaty Columbia River commercial fisheries.
- Average harvest rates of 94% for spring Chinook, 97% for Coho, and 90% for SAB fall Chinook produced by the SAFE project (brood years 1996-2014) 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, 17% of spring Chinook, 45% of SAB fall Chinook, and 27% of Coho production from the SAFE project were harvested in other regional recreational and commercial fisheries.
- Due to spatial separation, Select Area fisheries have far less impact on non-target stocks than do mixed-stock commercial and recreational fisheries occurring in the mainstem Columbia River, even when those fisheries utilize mark-selective harvest methods.
- Salmon harvested in Select Area commercial fisheries are composed primarily of returning adults from program releases. Over the last ten years (2010-2019), stock composition has averaged 85% local Chinook stocks in winter, spring, and summer fisheries and 90% local Chinook stocks in fall fisheries.

Several goals and objectives of the project are being realized with continued funding support from BPA; one being to maximize Select Area production and fisheries. Hatchery release goals from SAFE net-pens and associated hatcheries for 2019 included about 5.2 million Coho, 2 million spring Chinook, 1 million SAB fall Chinook, and 4.7 million tule fall Chinook. Commercial and recreational fisheries have expanded substantially due to improved rearing strategies, increases in production, and adaptive management of the fisheries.

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

Another goal, to minimize impact of Select Area production, is being met through the development of successful net-pen rearing strategies that facilitate rapid out-migration, reduced incidence of disease, and maintaining water quality through monitoring efforts. All associated hatcheries operate under their own permits and are held to standards, which are extensively monitored and reported on. Each facility develops and submits hatchery operating plans and hatchery genetic management plans that

undergo rigorous processes for review, renewal, monitoring, and reporting. Sampling of local hatchery returns and spawning grounds in local tributaries provides additional coded-wire tag recovery data that are used to monitor survival, straying, and fishery contributions.

1. INTRODUCTION

BACKGROUND

In 1993, Bonneville Power Administration (BPA) funded the project, “Columbia River Terminal Fisheries Research Project” (previous name of BPA project 1993-060-00, Select Area Fishery Enhancement, SAFE), under the guidance of Northwest Power and Conservation Council’s (NPCC) “Strategy for Salmon.” The Strategy included the objective of evaluating potential terminal fishery sites in Youngs Bay and other sites in Oregon and Washington (NPCC 1992a). The goal was to reduce impacts to ESA-listed salmon in mixed-stock fisheries while increasing opportunities to harvest stronger stocks (NPCC 1992b). Specifically, Vol. II, section 5.3C of the Strategy for Salmon called for the study to 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."

The project’s approach was to rear juvenile salmon in off-channel areas using existing hatchery facilities and experimental, low-cost earthen rearing ponds and net pens for greater abundance of salmon to harvest by local commercial fishers, thereby providing a boost to the local economy.

Terminal fisheries in the lower Columbia River and on the Oregon Coast were a part of the commercial fishing industry until regulations from the 1930s to 1960s imposed limitations. In the early 20th century, commercial fishing took place in Youngs Bay, near Astoria, in the lower Columbia River; this terminal fishery was closed in 1931 and re-opened in 1962 (Weiss 1966). Except for the Columbia River and Tillamook Bay, Oregon’s terminal commercial salmon fisheries in coastal rivers ended by 1960 (Mullen 1981). With increasing concerns of ESA-listed salmon caught in mainstem Columbia River, non-selective commercial fisheries, and continued declining runs of salmon, terminal sites in the lower river mixed-stock fishery gained appeal for continuation of legacy commercial fisheries and provide support to local economies while minimizing impacts to listed stocks.

Youngs Bay was a natural choice for the SAFE project because of the history and management objectives of this terminal fishery. When the fishery was re-established in the early 1960s, the management objective was to harvest surplus Coho returning to the Klaskanine Hatchery (Weiss 1966). A community project to augment hatchery production, driven by research conducted on enhancing this fishery (Vreeland et al. 1975, Vreeland and Wahle 1983), with support from Oregon Department of Fish and Wildlife (ODFW), was firmly in place. A subsequent BPA-funded project to evaluate the low-cost salmon-production facility operated by the community organization was completed, which further provided guidance for the future project (BPA project 1983-364-00, Hill and Olson 1989).

In 1975, amid the faltering fishing industry, a local group of business leaders and community members formed the Clatsop Economic Development Council’s subcommittee on fisheries (CEDC Fisheries Project, now Clatsop Fisheries Program) to revitalize the local economy and community by expanding the Youngs Bay terminal fishery (Bennett 2007, Hill and Olson 1989). In 1977, the CEDC, in partnership with ODFW, began rearing Coho in earthen ponds in the Youngs Bay watershed to augment returning salmon, adding fall Chinook to production in 1978. In 1987, they started rearing salmon in net-pens in Youngs Bay (Hill and Olson 1989).

With the newly funded BPA project that began in 1993, sponsorship grew to include Washington Department of Fish and Wildlife (WDFW) as well at the original collaborators, Clatsop County Fisheries Project (CCF, formerly CEDC) and ODFW. In 1998, the project was renamed, "Select Area Fishery Evaluation" (SAFE), and renamed again in 2007 to "Select Area Fishery Enhancement" signaling the transition from research to production (See Whistler et al. 2009 for a detailed history). Through the years, this project has been molded by diverse staff and collaborators, at least two generations of industry fishers, various reviews (scientific and economic), changing policies (hatchery and harvest reforms), and results that are used adaptively to drive project priorities and implementation, while simultaneously being constrained by assorted ESA-listed stocks that may change in prominence upon any given year affecting how the fishery is managed.

Eight annual reports were written during this project:

- Hirose, et al. 1996. Columbia River: Terminal Fisheries Research Project 1994 Annual Report
- Hirose et al. 1998. Columbia River: Select Area Fishery Evaluation Project, 1995 – 1996 Annual Report
- North et al. 2006. Select Area Fishery Evaluation Report, 1993 – 2005, Final Project Completion Report
- Whistler et al. 2006. Select Area Fishery Evaluation Project, 2006 Annual Report
- Whistler et al. 2009. Select Area Fishery Enhancement Project, 2007 – 2008 Annual Report
- Hulett et al. 2010. Select Area Fishery Enhancement Project, 2009 Annual Report
- Duff et al. 2013. Select Area Fishery Enhancement Project, 2010 – 2012 Annual Report
- Siniscal et al. 2017. Select Area Fishery Enhancement Project, 2013 – 2016 Annual Report

The current report covers SAFE project work completed in 2017, 2018, and 2019

PROJECT GOALS

The primary goals of the SAFE project are to mitigate for lost fishing opportunities in the Columbia River, maximize harvest of program fish, limit impacts of the program on ESA-listed species, and limit ecosystem effects on the local environment. These goals are accomplished by the following:

1. Mitigation is accomplished by maximizing production of salmon that will return for harvest in the Lower Columbia River commercial and sports fisheries and in the Pacific Northwest coastal zones. Spring Chinook, fall Chinook, and Coho are released to return for harvest in Select Areas. From 2017 through 2019, our target release was 14.6 million salmon smolts, including additional releases in the Select Areas provided through hatchery re-programming efforts and cost shares. The SAFE project provides an outlet for basin-wide re-programming of hatchery production, such as spring Chinook from the Willamette Basin, which are funded by other sources (ODFW, WDFE, USFWS, Mitchell Act) and create a large cost-share base for the SAFE program. Salmon are raised on-site from eggs collected from returning broodstock at SAFE hatcheries, including Big Creek, Klaskanine, Gnat Creek, and South Fork Klaskanine hatcheries. Salmon are also reared and released from egg transfers from other ODFW, WDFW and U.S. Fish and Wildlife Service hatcheries to SAFE facilities. There are also transfers of pre-smolts from non-SAFE hatcheries for acclimation in net pens for release at SAFE sites. Production schedules are planned years in advance for each species and

stock, by receiving facility (hatcheries and net pens) and source hatcheries. All smolts are adipose clipped and approximately 15% to 20% are implanted with coded-wire tags.

2. Harvest of program fish is maximized through rigorous planning and in-season fisheries monitoring and management to keep ESA impacts below the level allowed for each fishery and to meet catch-share allocations and escapement goals. SAFE fisheries provide for year-round sport fisheries and commercial harvest opportunities in winter, spring, summer, and fall seasons. Allowable ESA impacts are derived by comparison of forecasted returns of spring, summer, and fall Chinook and Coho salmon with levels of ESA impacts allowed under the *US v. Oregon* management agreement. Harvest impacts on ESA-listed salmon are closely monitored through fisheries sampling to minimize interception of non-target salmon. Fish produced from this program can be identified from ESA-listed stocks through fin-clips, coded-wire tags (CWTs), and visual stock identification (VSI) during fisheries sampling by SAFE personnel. Experience managing SAFE fisheries has allowed project leaders to refine gear restrictions, fishing periods and area boundaries open for fishing within Select Areas to minimize impacts. This results in a more efficient use of hatchery fish for harvest, decreasing surplus of hatchery returns, and minimized incidence of hatchery fish on spawning grounds. Each SAFE hatchery has escapement goals identified in Hatchery Program Management Plans. Hatchery and net-pen rearing strategies are monitored and adjusted to promote homing of returning adults to program areas so that straying is minimized.

3. Select Area production is managed to minimize negative environmental and biological effects on other juvenile salmon through best practices in rearing strategies.
Environmental effects of SAFE production are minimized though hatchery and net-pen rearing strategies that reduce incidence of disease, facilitate rapid out-migration, and limit nutrient and sediment loads to receiving waters. Program facilities operate under required permits and are carefully monitored under rigorous criteria so that limits are not exceeded. Environmental monitoring at rearing sites is accomplished by measuring water-quality parameters and collection and analysis of benthic invertebrates and sediment with reports submitted to Oregon Department of Environmental Quality (DEQ).

Environmental effects of SAFE production are minimized though hatchery and net-pen rearing strategies that reduce incidence of disease, facilitate rapid out-migration, and limit nutrient and sediment loads to effluents. Program facilities operate under required permits and are monitored extensively. Environmental monitoring at rearing sites is accomplished by collection and analysis of benthic invertebrates and sediment with reports submitted to Oregon Department of Environmental Quality (DEQ).

POLICY FRAMEWORK AND ADAPTIVE MANAGEMENT

The SAFE program operates within policy framework set by: 1) the Endangered Species Act of 1973 under which 13 distinct populations of salmon and steelhead are listed in the Columbia Basin (https://www.fisheries.noaa.gov/species-directory/); 2) *US v. Oregon* 2018 – 2027 Management Agreement, and associated Environmental Impact Statement/Record of Decision and Biological Opinion, governs fish harvest in the Columbia River and sets ESA-listed salmon and steelhead impacts (https://archive.fisheries.noaa.gov/wcr/fisheries/salmon_steelhead/united_states_v_oregon.html); 3)

Oregon and WA salmon recovery plans (ODFW 2010, LCRFRB and WDFW 2015); 4) the Columbia River Hatchery Scientific Review (HSRG 2009), and; 5) the 2012 Columbia River Harvest Management Policy, aimed at removing the commercial gillnet fleet to off-channel areas and transitioning use of alternate gear to the mainstem (Columbia River Fishery Management Working Group, 2012). Given the aforementioned policies, the SAFE program strives to strike a balance between providing commercial and recreational harvest opportunities, conserving local, naturally occurring populations and other upstream ESA-listed populations.

This selective fishery targets off-channel areas to maximize harvest of salmon returning to SAFE hatcheries and net pens while minimizing impact to wild salmon. Allowable impact rates are set for each stock by the US v. Oregon Management Agreement based on pre-season forecasts and adjusted when in-season run size is updated. Careful in-season management of the fishery further ensures impacts to upriver salmon are reduced. Listed salmon that dictate management of the fishery tend to be upriver bright spring Chinook during the winter-spring-summer season, although Lower Columbia River (LCR) spring Chinook that spawn in the Cowlitz, Kalama, and Lewis rivers can affect management if forecasted returns are low. In fall, fisheries may be impact limited by wild summer steelhead (A-Index and B Index), LCR natural-origin tule fall Chinook, and LCR natural-origin Coho. Impacts are tracked weekly which may cause subsequent fishing periods to be rescinded. Fishing can be paused or open areas altered to accommodate the peak of listed fish to pass the lower river.

FISHING SITES AND FACILITES

The four current Select Area net-pen rearing, hatchery, and fishing sites are located in the lower Columbia River between river miles 10 and 28 (Figure 1.1). Fishing sites include Youngs Bay, Tongue Point and South Slough, Blind and Knappa sloughs in Oregon and Deep River in Washington. The Youngs Bay fishing zone is bounded by Highway 101 Bridge on the downstream end and extends upstream into Lewis and Clark, Walluski, Klaskanine, and South Fork Klaskanine rivers. The Tongue Point fishery is immediately upstream of the peninsula, known as Tongue Point, in the boat basin at the Job Corp down to the mouth of the John Day River. A sub-area of this fishery is South Slough Channel that runs from the mouth of the John Day River to the eastern tip of Burnside Island, which enters Prairie Channel. Knappa Slough enters Prairie Channel about two miles upstream from South Channel. Big Creek and Blind Slough, from which Gnat Creek enters, flows into Knappa Slough. On the north shore of the Columbia River, directly opposite of the upstream end of South Channel, is Deep River. The Deep River fishery extends upstream to Highway 4 Bridge. Each Select Area site provides commercial and recreational fishing opportunities, although season structure and target species differ depending on current production goals and management objectives. Hatcheries that contributed to production for SAFE sites are South Fork Klaskanine (CCF); Big Creek, Gnat Creek, Klaskanine, Bonneville, Cascade, Cedar Creek, Clackamas, Leaburg, McKenzie, Marion Forks, Oxbow, Salmon River, South Santiam, and Willamette (all ODFW); Beaver Creek, Cowlitz, Elochoman, Grays River, Lewis River, and North Toutle (all WDFW), and Eagle Creek National Fish Hatchery (United States Fish and Wildlife Service, USFWS).

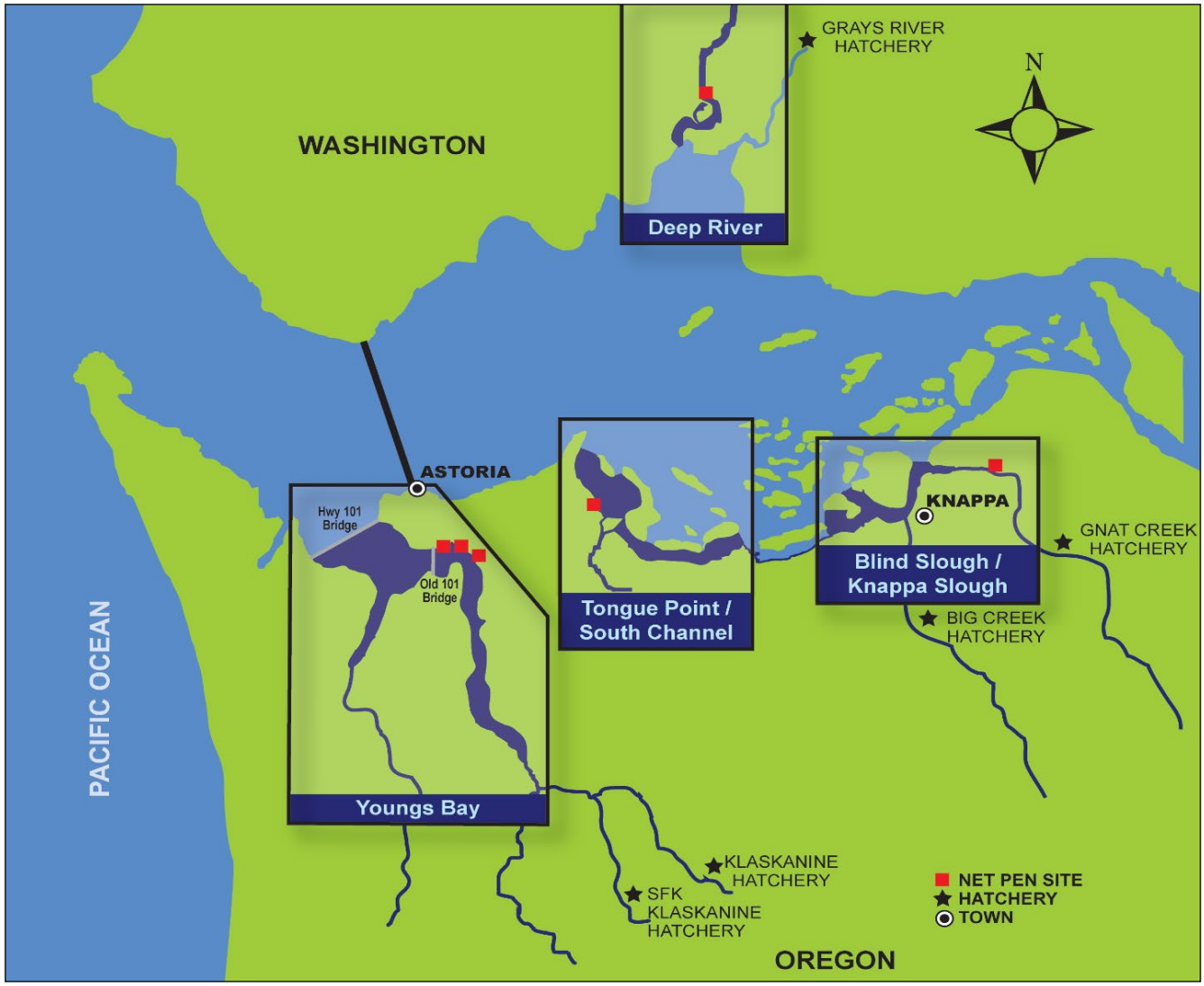


Figure 1.1. Select Area fishing locations and rearing/release sites in the lower Columbia River.

2. PRODUCTION

The species and stocks of salmon reared and released under the SAFE program were chosen primarily because of their flesh quality/market value, availability of gametes, timing of return, homing ability, and overall value to the economy. Salmon produced for the SAFE program consist of Chinook Salmon (*Oncorhynchus tshawytscha*, hereafter Chinook) and Coho Salmon (*Oncorhynchus kisutch*, hereafter Coho). For this reporting period, various Willamette River spring Chinook stocks were used, along with Cowlitz and Lewis River stocks. Fall Chinook consisted of Select Area Bright (SAB) and tule stocks. Coho consisted of Big Creek and Tanner Creek stocks in Oregon and Toutle and Washougal early and late stocks in Washington. The SAB fall Chinook stock originated from egg transfers of Rogue River stock in 1982-84, but has since been maintained by a local brood stock program. This program has been modified several times through-out the program's history; currently SAB fall chinook are reared at ODFW's Klaskanine Hatchery and are released from Klaskanine Hatchery and Youngs Bay net-pens. Tule fall Chinook are provided by Big Creek Hatchery in Oregon and Washougal Hatchery in Washington. Annual releases of salmonids from Select Area facilities (all funding sources) and all affiliated release sites have ranged from 10 to 17.3 million fish (brood years 2000-2017) with between 11.2 and 14.1 million released annually for this reporting period (Table 2.1, Figure 2.1, Appendix A).

HATCHERIES

ODFW and WDFW hatcheries are an integral part of the SAFE project. Collection of returning brood stock, spawning, incubation, early rearing and mass marking are conducted at various contributing hatcheries before fish are transferred to net-pens, one of the SAFE area hatcheries, or raised full-term at Big Creek, Klaskanine, or Gnat Creek hatcheries. Big Creek and Gnat Creek hatcheries rear Willamette Basin spring Chinook fingerlings which are released from Gnat Creek Hatchery or transferred for release from Clatsop County Fishery net-pens. Klaskanine Hatchery rears and releases Coho, SAB fall Chinook, and tule fall Chinook—and for the first time in 2019, spring Chinook—into the Youngs Bay Select Area. It also serves as a collection and holding site for adult Coho, SAB and tule fall Chinook brood stock. Grays River Hatchery rears both spring Chinook and Coho fingerlings for the Deep River net-pens. In Oregon, Coho eggs have been provided by Big Creek, Sandy, and Bonneville hatcheries (Tanner Creek stock), though after this reporting period Coho eggs will be required to be exclusively of Big Creek origin. Tules released into the Oregon SAFE areas are also Big Creek stock which are collected at Big Creek and Klaskanine hatcheries. Spring Chinook eggs for Oregon SAFE production have been collected at various hatcheries in the Willamette system including Willamette, McKenzie, Marion Forks, South Santiam and Clackamas. In Washington, Cowlitz and Lewis River hatcheries have been the source of spring Chinook eggs for Grays River Hatchery/Deep River net-pen production while North Toutle, Kalama, and Washougal hatcheries have provided Coho eggs. Washougal Hatchery has also provided the tule fall Chinook eggs for the Beaver Creek Hatchery/Deep River net-pen program. SAB fall Chinook eggs are collected from returning adults at both Klaskanine and South Fork Klaskanine hatcheries, with a cooperative effort between staff of Big Creek, Klaskanine, Gnat Creek, and South Fork Klaskanine hatcheries. Historically SAB fall Chinook were released from Klaskanine and South Fork Klaskanine hatcheries and from the Youngs Bay net-pens. Due to policy changes, they are now released exclusively from ODFW's Klaskanine Hatchery. If a cap of 500,000 smolts is reached at Klaskanine Hatchery an additional 500,000 are allowed to be released from the Youngs Bay net-pens, though that has not been possible as the mandatory production change has corresponded with a precipitous

decline in SAB adult returns. Funding for all hatchery operations is provided by ODFW through Mitchell Act and General Funds, WDFW and BPA.

NET-PENS

There are two basic rearing strategies employed at the Select Area net-pen sites: overwinter-rearing of Coho and spring Chinook fingerlings until release as smolts in the spring (from October to March or April), and acclimation and release of Coho and spring Chinook smolts in the spring (March, April or May).

For the overwinter-rearing scenario, fingerlings are transferred from hatcheries by tanker truck to pens at the various sites. After the fish are received at each 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). For short-term acclimation, pre-smolts arrive in March or April, are held for 2-3 weeks (longer if conditions allow) and are released after they have had a chance to finish the smolting process.

For all rearing strategies, fry and fingerlings are fed the recommended size and rations of pelletized feed throughout the rearing period. During the time fish are in the pens, growth is monitored monthly to determine feed rations, and any mortalities are recorded and removed daily. If significant loss due to disease occurs, ODFW or WDFW pathology staff examine the fish in order to diagnose the cause and recommend treatment, which is usually medicated feed. 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 fish in the net-pens by river otters continues to be a significant problem at all sites despite attempting to curtail the problem with a variety of deterrence methods, including electric barriers, high frequency audio devices, sewing of the bird covers to the nets, and trapping by permit. This on- going problem most often results in release numbers that are below production goals, especially in the case of overwinter fish. Detailed descriptions of rearing activities by species and brood year are provided in the following sections.

SPRING CHINOOK

Various Willamette River basin stocks of spring Chinook have been released from the Youngs Bay net-pens since 1989 (1988 brood), and have continued annually at this site with the exception of 1993 when rearing strategies shifted from a sub-yearling (0+) to yearling (1+) release strategy. Initiation of the SAFE project provided opportunities to expand the program, and releases from the Youngs Bay net-pens were increased in 1995. Releases for site evaluation at Tongue Point and Blind Slough began in 1996 (1994 brood), and in Washington, releases of Cowlitz River stock from the Deep River net-pens began with the 1996 brood, with the addition of Lewis River stock beginning with the 2001 brood. Spring Chinook releases at Deep River continued through the 2011 brood, but because of consistently poor returns, that program was cut from the SAFE project contract. Under alternative funding, a portion of that production was shifted to a new net-pen site further upstream in the Columbia River near the town of Cathlamet, in Cathlamet Channel, beginning with the 2012 brood. In an effort to further increase production, experimental releases of spring Chinook from CCF's South Fork Klaskanine site occurred with the 2002-2004 broods, but were discontinued because of chronic disease problems and hatchery water rights issues. Beginning with the 2008 brood, ODFW production of 250,000 acclimation spring Chinook from the Willamette River system was reprogrammed to the Oregon Select Areas and has continued since, which along with modest increases at Gnat Creek Hatchery boosted the total annual spring Chinook production goal to over 1.5 million smolts for release years 2010-2012. The Lower Columbia River Fisheries Management

Reform, initiated by former governor Kitzhaber, resulted in a series of increased release goals of spring Chinook from the 1.5 million smolts released in 2012 to 2 million from 2013 through 2016; 2.2 million in 2017 and 2018; 2.45 million in 2019, and 3.7 million in 2020. Between 2017 and 2019, 1.93 to 2.65 million spring Chinook smolts were released from SAFE sites, meeting release goals 88% to 117% (Figure 2.2).

2015 Brood Year Spring Chinook

Smolts released from Gnat Creek Hatchery and Blind Slough net-pens are meant for harvest in the Blind Slough/Knappa Slough commercial fishery. Smolts for BY 2015 release were produced from eggs provided by McKenzie and South Santiam hatcheries to Gnat Creek Hatchery in January and February of 2016 (note: the lot number for the eggs from South Santiam was changed from 24 to 23 on arrival to Gnat Creek). Mass-marking, coded-wire tagging and vaccination for *vibriosis* and enteric red-mouth for both groups was done at Gnat Creek Hatchery. In November, a group (CWT# 090976) was sent to Blind Slough for over-winter rearing. The remainder of the fish (CWT# 090977) remained at Gnat Creek for the duration. Both groups were released in mid-late March for a total of 495,767 smolts released into the fishery.

Three acclimation groups were released from the Tongue Point net-pens to contribute to the Tongue Point/South Channel fishery. The first group was program excess from Willamette Hatchery and was not coded-wire tagged. The eggs for this group were taken at South Santiam Hatchery and shipped to Willamette as eyed eggs. They were reared there until June, at which time they were transferred for rearing at McKenzie Hatchery until they were transferred to the Tongue Point net-pens in January where they were acclimated for 27 days without incident. The second group (CWT# 091020) was raised for the duration of their production at McKenzie Hatchery until they were transferred to Tongue Point net-pens where they were acclimated for 50 days. The final group (CWT# 091031) was acclimated for 15 days and released in early April. They were provided by Marion Forks Hatchery, where they were raised from eggs until their transfer to Tongue Point. A total of 399,714 smolts were released from the Tongue Point net-pens.

Two overwinter groups and one acclimation group were released for the Youngs Bay Fishery. Big Creek Hatchery initially reared the first group (CWT#091035) from eyed eggs they received from Clackamas Hatchery. These fish were mass-marked, coded-wire tagged and vaccinated for *vibriosis* and enteric red-mouth at Big Creek and transferred to the Youngs Bay net-pens in November for over-winter rearing until their release in early March. The other over-winter group (CWT# 090975) was reared at Gnat Creek Hatchery from eyed eggs they received from McKenzie Hatchery These fish were mass-marked, coded-wire tagged and vaccinated for *vibriosis* and enteric red-mouth at Gnat Creek and transferred to the Youngs Bay net-pens in November for over-winter rearing until their release in early March. These two over-winter groups of fish were released a couple of weeks earlier than ideal to make space for an acclimation group (CWT# 091032) produced by Marion Forks Hatchery. This acclimation group was reared at Marion Forks hatchery until its transfer to the Youngs Bay net-pens where it was acclimated for 20 days. A total of 910,343 smolts were released from the Youngs Bay net-pens.

One group of spring Chinook (CWT# 636962) was released in Cathlamet Chanel in Washington. It was of Cowlitz River origin and totaled 119,944 fish.

2016 Brood Year Spring Chinook

Eggs for the production of smolts released into the Blind Slough/Knappa Slough area were transferred to Gnat Creek Hatchery from McKenzie and South Santiam Hatcheries as eyed eggs in January and February (note: the lot number for the eggs from South Santiam was changed from 24 to 23 on arrival to Gnat Creek). Both groups were mass marked, coded-wire tagged and vaccinated for *vibriosis* and enteric red-mouth at Gnat Creek. The group marked CWT# 090980 was reared from eyed egg to release as smolts at Gnat Creek Hatchery. The other (CWT# 090979) was reared from eyed egg until November when it was transferred to the Blind Slough net-pens, then released in mid-March. A total of 515,393 smolts were released from the Blind Slough net-pens and Gnat Creek Hatchery.

Two acclimation groups were released from the Tongue Point net-pens. Both were reared from spawning through transfer to the net-pen site at Marion Forks Hatchery. The first (CWT# 091154) was acclimated for 15 days prior to release. The second (CWT# 091156) was acclimated for 24 days prior to release. It would have been preferable to acclimated the first group for at least another week, but they had to be released to make space for the second group. The second group was transferred to the net-pens smaller than desired, and as a result had to be released at a small size and not fully smolted. A total of 459,832 smolts were acclimated and released from the Tongue Point net-pens.

For the Youngs Bay fishery, two overwinter groups and one acclimation group were released. Big Creek Hatchery did the initial rearing of the first group (CWT#091143) from eyed eggs they received from Clackamas Hatchery. These fish were mass-marked, coded-wire tagged and vaccinated for *vibriosis* and enteric red-mouth at Big Creek and transferred to the Youngs Bay net-pens in November for over-winter rearing until their release in early March. The other over-winter group (CWT# 090978) was reared at Gnat Creek Hatchery from eyed eggs they received from McKenzie Hatchery. These fish were mass-marked, coded-wire tagged and vaccinated for *vibriosis* and enteric red-mouth at Gnat Creek Hatchery and transferred to the Youngs Bay net-pens in November for over-winter rearing until their release in early March. These two over-winter groups of fish were released earlier than ideal to make space for an acclimation group (CWT# 091155) produced by Marion Forks Hatchery. These were reared at Marion Forks hatchery until their transfer to the Youngs Bay net-pens where they were acclimated for 20 days. A total of 1,159,890 smolts were released from the Youngs Bay net-pens.

One group of spring Chinook (CWT# 637190) was released in Cathlamet Chanel in Washington. It was of Cowlitz River origin and totaled 260,000 fish.

2017 Brood Year Spring Chinook

Fish released from the Blind Slough net-pens originated at South Santiam Hatchery and were distributed as eyed eggs for rearing at Oxbow and Gnat Creek hatcheries, as well as the Blind Slough net-pens. Mass-marking, coded-wire tagging and vaccination for *vibriosis* and enteric red-mouth was done at Gnat Creek and Oxbow hatcheries. One of the groups released from Gnat Creek Hatchery (CWT# 091024) was transferred to Gnat Creek as eyed eggs from South Santiam Hatchery, while the other (CWT# 091195) was transferred to Oxbow Hatchery as eyed eggs, reared there until mid-November and then shipped to Gnat Creek Hatchery for final rearing and release. The group released from the Blind Slough net-pens (CWT# 091023) was shipped to Gnat Creek Hatchery from South Santiam Hatchery as eyed eggs, reared at Gnat Creek Hatchery until mid-November and overwintered in the Blind Slough net-pens where they experienced minimal loss due to disease, though loss from predation was substantial. The fish were released slightly smaller than preferred due to cold temperatures during February and March that limited the appetite and growth of the fish.

At release a majority of the fish were showing visual signs of smolting. A total of 777,325 smolts were released from the Blind Slough net-pens and Gnat Creek Hatchery.

Fish released from the Tongue Point net-pens originated at Marion Forks Hatchery and rearing occurred at Marion Forks until acclimation in the Tongue Point net-pens. Mass-marking, coded-wire tagging and vaccination for *vibriosis* and enteric red-mouth was done at Marion Forks Hatchery. The first acclimation group (CWT# 091207) was delivered to the net-pens between February 19 and March 6 due to icy road conditions, causing a portion of the fish to be acclimated for only a week. These fish were received and released smaller than preferred, and not very well smolted. There was not the option of holding them longer because room had to be made for the second acclimation group (CWT# 091209), which were released in good condition. A total of 419,608 fish were released from the Tongue Point net-pens.

Eggs for the fish that were reared over-winter and released from the Youngs Bay net-pens were taken at South Santiam Hatchery and were transferred to Big Creek and Gnat Creek hatcheries as eyed eggs. These fish were reared at Big Creek (CWT# 091203) and Gnat Creek hatcheries (CWT# 091022), where they were mass-marked, coded-wire tagged and vaccinated for *vibriosis* and enteric red-mouth until their transfer to the Youngs Bay net-pens in November. These fish were reared at the net-pens without incident and were released in optimal weather and water conditions in late February. They were slightly undersized due to cold temperatures during January and February that limited the appetite and growth of the fish. At release a majority of the fish were showing visual signs of smolting. A group of fish that was transferred to the Youngs Bay net-pens from Willamette Hatchery that was program excess for that facility and were delivered AD-clipped but not coded-wire tag to supplement SAFE release numbers. They were in good health prior to release and were released earlier than the other groups of fish because they arrived at the net-pens at a large size for the time of year and were smolted by late December. Another group (CWT# 091208) was acclimated in the Youngs Bay net-pens in March after being reared at Marion Forks and Big Creek Hatcheries. Eggs for these fish were taken at Marion Forks Hatchery and the fish were reared there until November when they were transferred to Big Creek Hatchery. During their time at Big Creek, these fish were treated for BKD and were suffering low, chronic loss at the time of their transfer to Youngs Bay. After an acclimation period of 37 days they were released in fair condition but were still suffering low-level, chronic loss. A group of fish that was program excess from Marion Forks Hatchery was over-wintered at Klaskanine Hatchery from November through March. They were Ad-clipped but had no coded-wire tag. A total of 1,085,899 smolts were released into the Youngs Bay fishery.

Two groups of Cowlitz-stock spring Chinook were acclimated in the Deep River net-pens in November and December of 2018. The total for both groups (CWT#'s 637366 and 637256) was 170,000 fish.

2018 Brood Year Spring Chinook

Three groups of Cowlitz-stock spring Chinook were released from the Deep River net-pens in 2019. The first (CWT# 637518) was released as fry in April. The second two (CWT#'s 637519 and 637531) were released in December. The total number of spring Chinook released from the Deep River net-pens was 262,000 fish.

SAB FALL CHINOOK

The SAB fall Chinook released in the Select Areas originated from Rogue River fall Chinook eggs transferred to Big Creek and South Fork Klaskanine hatcheries in the early 1980's. This stock was chosen for 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 into fall when few other fall Chinook are present in Youngs Bay and its tributaries.

Releases meant to maintain brood stock occurred from Big Creek Hatchery through 1995, transitioned to Klaskanine Hatchery beginning in 1996, and finally to the South Fork Klaskanine Hatchery in 2005. Fishery enhancement efforts in Youngs Bay began with releases from the South Fork 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 brood years, all SAB fall Chinook released from Select Areas have been marked with a left ventral (LV) fin clip to facilitate external identification.

Starting in the fall of 2015, adults were collected for brood stock at the North and South Fork Klaskanine hatcheries and fry were reared at and released from Klaskanine Hatchery on the North Fork Klaskanine River. From 2017 to 2019, 300,000 to 600,000 SAB fall Chinook were released (Figure 2.3). Funding of SAB fall Chinook production shifted from BPA to ODFW in 2016/17.

2016 Brood SAB Fall Chinook

Select Area Bright eggs (SAB) were collected at South Fork and Klaskanine hatcheries. All eggs collected at South Fork Hatchery were transferred to Klaskanine Hatchery as eyed eggs, and fish were LV clipped, coded-wire tagged and released from there. There were 599,463 SAB presmolts released in late June.

2017 Brood SAB Fall Chinook

Select Area Bright eggs (SAB) were collected at South Fork and Klaskanine hatcheries. All eggs collected at South Fork Hatchery were transferred to Klaskanine Hatchery as eyed eggs, and fish were LV clipped, coded-wire tagged and released from there. A total of 300,460 SAB presmolts were released in early July.

2018 Brood SAB Fall Chinook

Select Area Bright eggs (SAB) were collected at South Fork and Klaskanine hatcheries. All eggs collected at South Fork Hatchery were transferred to Klaskanine Hatchery as eyed eggs, and fish were LV clipped, coded-wire tagged and released from there. There were a total of 391,347 SAB presmolts released, the majority in mid-July with a group of 63,361 held until late August in the hopes of better smolt-to-adult survival.

COHO

Historically, early run hatchery Coho have been released in the Youngs Bay system, 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. With increased BPA funding and the expansion to new sites, annual releases climbed to just over 4 million smolts by 2000. With the loss of federally-funded acclimation smolts from Eagle Creek NFH, and production at the SF Klaskanine Hatchery transitioning to SAB fall Chinook, annual releases of Coho smolts in the Select Areas dropped to around 2 million from 2005-2007, prompting project staff and ODFW propagation managers to seek new sources of Coho production. In FY07-09 SAFE money was allocated to re-initiate Coho production at Klaskanine Hatchery, and ODFW found space at Salmon

River Hatchery and provided the funding to rear additional fish for release at the SF Klaskanine Hatchery. In addition, Eagle Creek NFH resumed participation in brood years 2006-2009 and provided limited numbers of fingerlings 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. Additional increases at the Deep River net-pens brought that total to over 3 million fish beginning with the 2008 brood. After the Lower Columbia River fishery reforms, annual production of Coho release goals were increased to 4.17 million for release years 2010-12; 4.97 million 2013-16; 5.97 million in 2017, then lowered to 5.9 million in 2018, 5.3 million in 2019, and 5.18 million in 2020. From 2017 to 2019, between 4.7 and 5.7 million Coho were released, meeting release goals by 80% to 98% (Figure 2.4).

2015 Brood Year Coho

Coho for the enhancement of sport and commercial fisheries in the Blind Slough/Knappa Slough SAFE area are released from Big Creek Hatchery and the Blind Slough net-pens and are fully funded by ODFW. Coho released from Big Creek (CWT# 090605) were reared on site from adult return through spawning and egg development up until release. For the fish acclimated at Blind Slough (CWT# 091021), eggs were taken at Bonneville Hatchery and immediately transferred to Cascade Hatchery as green eggs. At Cascade Hatchery they were reared through mass-marking and coded-wire tagging, then transferred to Upper Herman Creek ponds at Oxbow Hatchery for rearing until April when they were transferred to the Blind Slough net-pens. The group was acclimated for 22 days and was smaller than the target size at the time of release. A total of 885,300 Coho were released from Big Creek Hatchery and the Blind Slough net-pens.

Two over-winter and one acclimation group were released from the Tongue Point net-pens. The first over-winter group (CWT# 091029) originated at Bonneville Hatchery and was reared there through mass-marking and coded-wire tagging. They were then transferred to Clackamas Hatchery in July and held until their transfer to the Tongue Point net-pens in October. The second group (CWT# 090841) was released as stock 14 but was originally in the system as stock 11 from Sandy Hatchery. It was reported to RMPC as stock 11 since CWT# 090841 was put into the fish prior to the lot conversion to 14. They were transferred to Clackamas Hatchery from Sandy Hatchery post-marking in July and to Tongue Point in October. Both groups were released in robust condition in April. The acclimation group (CWT# 091027) was received from Upper Herman Creek ponds in April and was released in early May after 13 days. These were a mixture of Tanner Creek and Sandy River stocks; the Sandy River stock having had their lot number changed from 11 to 14. They were cumulatively reared at Cascade, Sandy, Oxbow, Herman Creek Ponds and the Tongue Point net-pens. A total of 747,057 smolts were released from the Tongue Point net-pens.

Smolts released to contribute to the Youngs Bay fishery were released from three sites: Youngs Bay net-pens, CCF's South Fork Hatchery located on the South Fork Klaskanine River and Klaskanine Hatchery located on the North Fork Klaskanine River and operated by ODFW. Klaskanine Hatchery released three groups of Coho: The first (CWT# 090616) was provided as eyed eggs by Big Creek Hatchery. The second (CWT# 091025) also originated at Big Creek hatchery, but was sent to Salmon River Hatchery as eyed eggs, then transferred to Klaskanine Hatchery in late October. The final group (CWT# 091036) released from Klaskanine Hatchery was Tanner Creek stock from Bonneville Hatchery, reared at Cascade and Oxbow hatcheries, then transferred to Klaskanine Hatchery on the first of November. All three groups were released concurrently in late April. Fish released from Clatsop County's South Fork Klaskanine Hatchery (CWT# 091030) were originally sent from Sandy Hatchery to Oxbow Hatchery as eyed eggs. They were reared at Oxbow until October, they transferred to South Fork and held until their released in April. Finally, smolts were released from the

Youngs Bay net pens (CWT# 091028. They originated at Bonneville Hatchery and were transferred to Cascade Hatchery as green eggs. Mass-marking and coded-wire tagging was done at Cascaded Hatchery, then they were shipped to Herman Creek ponds and raised until October, when they were transferred to Youngs Bay. A total of 2,247,169 Coho smolts were released into the Youngs Bay system.

Two groups were released from the Deep River net-pens on the Washington side of the Lower Columbia River. The first (CWT# 637055) was early fall run Lewis River stock, and the second (CWT# 637076) was early fall run Toutle River stock. Another group (CWT# 637077) was released from Grays River Hatchery. All three groups were released on May 1, totaling 908,000 fish released into the SAFE area on the Washington side.

2016 Brood Year Coho

Two groups were acclimated and released from the Blind Slough net-pens. The first (CWT# 091146) originated at Big Creek Hatchery and was shipped to Cascade and Oxbow hatcheries as eyed eggs. They remained at those facilities where they were mass-marked and coded-wire tagged, then were transferred to Herman Creek ponds in June. They were raised there until their 23-day acclimation at the Blind Slough net-pens in April. On their release, a second group (CWT# 091149) arrived from Sandy Hatchery for acclimation. They originated at Klaskanine Hatchery, were transferred to Sandy as eyed eggs and were reared there until their 19-day acclimation at the Blind Slough net pens from late April into May. Smolts released from Big Creek Hatchery (CWT# 090908) were spawned, incubated, reared and released on site. A total of 1,076,629 smolts were released into the Blind Slough/Knappa Slough area. One over-winter and one acclimation group were released from the Tongue Point net-pens. The over-winter group (CWT# 091158) was Tanner Creek stock taken at Bonneville Hatchery and shipped to Cascade Hatchery as green eggs. Incubation, rearing, mass marking and coded-wire tagging occurred at Cascade Hatchery, and in June fish were transferred to Clackamas where they were held until their final transfer to the Tongue Point net-pens in October. They were released in good condition in April. Big Creek Hatchery provided eggs for the acclimation group (CWT# 091147). They were transferred to Cascade and Oxbow hatcheries as eyed eggs, reared at those facilities until June and held until their acclimation at Herman Creek Ponds. They were transferred to Tongue Point for acclimation in late April and were held for 27 days before their release in May. A total of 922,455 fish were released from the Tongue Point net-pens.

The majority of the smolts released from the Youngs Bay net-pens (CWT# 091151) originated as eggs from Big Creek Hatchery, with supplemental eggs provided by Bonneville and Klaskanine hatcheries. Rearing occurred at Cascade and Oxbow hatcheries until June when the fish were transferred to Herman Creek Ponds. In October they were transferred to Youngs Bay and were held in good condition until their release in April. Klaskanine Hatchery released three groups originating from Klaskanine, Big Creek and Bonneville hatcheries. The first group (CWT# 091144) was spawned at Klaskanine and reared full term on-site until its release. It was supplemented by a small number of fish transferred from Big Creek Hatchery in May (the lot number for these fish was converted from 13 to 15 upon transfer). A second group of fish (CWT# 091153) was spawned at Klaskanine Hatchery and transferred to Salmon River Hatchery for incubation and rearing from February through the end of October. At this time, they were transferred back to Klaskanine Hatchery and held until release. The third group (CWT# 091017) was Tanner Creek stock spawned at Bonneville Hatchery and transferred immediately to Cascade Hatchery as green eggs. The fish were reared at Cascade Hatchery and Lower Herman Creek ponds until November when they were transferred to Klaskanine Hatchery. All three groups were released simultaneously in April and were showing signs of bacterial cold-water

disease. Three groups were also released from South Fork Klaskanine Hatchery; two (CWT# 091158, 091017) were of Tanner Creek stock and one (CWT# 091145) originated at Big Creek Hatchery. These fish were incubated at Big Creek and Cascade hatcheries, reared at Cascade Hatchery through mass-marking and coded-wire tagging, then transferred to Oxbow, Clackamas and Herman Creek ponds in June. They remained at these hatcheries until October, when they were transferred to South Fork Klaskanine Hatchery. They remained in good health for the duration of their time at South Fork. However, during release there was an error in manipulating the rearing pond's water supply and approximately 10,000 of the fish were lost due to suffocation. The rest of the fish were well, and the release goal was still exceeded because excess fish were delivered in October. A total of 2,942,905 smolts were delivered into the Youngs Bay system.

One group (CWT# 636995) of late fall-run Lewis River run Coho, totaling 723,000 fish, was released from the Deep River net-pens on the Washington side of the Lower Columbia River.

2017 Brood Year Coho

Coho released from Big Creek (CWT# 090909) were reared on site from adult return through spawning and egg development up until release. For the fish acclimated at the Blind Slough net-pens (CWT# 091193), eggs were taken at Bonneville Hatchery and immediately transferred to Cascade Hatchery as green eggs. At Cascade Hatchery they were reared through mass-marking and coded-wire tagging, then transferred to Upper Herman Creek ponds at Oxbow Hatchery for rearing until April when they were transferred to the Blind Slough net-pens. The group was acclimated for 33 days and the fish were slightly undersized at the time of release. A total of 1,160,472 Coho were released from Big Creek hatchery and the Blind Slough net-pens.

One group of fish (CWT# 091201) was released from the Tongue Point net-pens from this brood year. They were transferred to Clackamas Hatchery from Big Creek Hatchery as eyed eggs, and reared at Clackamas until their transfer to Tongue Point in October. The production goal was not met for this group and no acclimation group was released this year because of egg loss that occurred at Clackamas Hatchery as they were working to develop a new water source. There were 424,659 fish released from the Tongue Point net-pens in April.

Fish released from the Youngs Bay net-pens (CWT# 091198) were collected as eggs at Bonneville Hatchery. Incubation and initial rearing occurred at Bonneville and Oxbow hatcheries, then continued at Upper Herman Creek ponds. They were transferred to the Youngs Bay net-pens in October and held until their release in April. Klaskanine Hatchery released three groups of Coho. The first (CWT# 091192) remained at Klaskanine Hatchery from adult collection through incubation and rearing until release. Eggs for the second (CWT# 091204) were collected at Big Creek Hatchery. They were transferred as eyed eggs to Cedar Creek Hatchery and reared there until April, when they were transferred to Salmon River Hatchery. They were finally transferred to Klaskanine Hatchery in October, overwintered and released in April. The final group (CWT# 091199) released from Klaskanine Hatchery originated at Big Creek Hatchery, was transferred to Lower Herman Creek ponds in May, and to Klaskanine Hatchery in October. All three groups were released simultaneously in April. Smolts released from South Fork Klaskanine Hatchery (CWT# 091194) originated at Bonneville Hatchery and were transferred to Upper Herman Creek ponds in July, then to South Fork Klaskanine Hatchery in October. The fish over-wintered at South Fork Klaskanine Hatchery with no issues and were released in good health in April. Water conditions were ideal for out-migration. A total of 2,333,880 fish were released into the Youngs Bay system.

One group of late-run fall Lewis River run Coho (CWT# 637453) totaling 700,000 fish was released from the Deep River net-pens on the Washington side of the Lower Columbia River.

TULE FALL CHINOOK

Tule fall Chinook releases into the Select Areas are not funded by BPA nor are activities associated with the tule program covered by our contracts. Discussion of this program is included solely to provide a complete picture of the Program's fish releases and to illustrate an additional conservation benefit of the project. Beginning with the 2008 brood in Washington and the 2009 brood in Oregon, Mitchell Act program changes resulted in the release of tule stock fall Chinook in the Select Areas. Rearing and release of this stock in the Columbia River basin is mandated by the Pacific Salmon Treaty and as recent recovery planning strategies have developed fishery managers have realized a potential benefit in releasing a portion of these tule fall Chinook into areas where they can be harvested at higher levels, resulting in fewer hatchery fish on the spawning grounds. In Washington, Beaver Creek Hatchery has provided the initial rearing of up to one million Washougal stock fall Chinook annually, before transferring them to the Deep River net pens for acclimation and release. On the Oregon side, Big Creek Hatchery has shifted approximately 2 million of their annual tule fall Chinook production to Klaskanine Hatchery for acclimation and release. Target release size for all tule fall Chinook production is 80 fish per pound, and fish are generally released in May or June. From 2017 to 2019, 3.2 to 4.3 million tule fall Chinook were released.

2016 Brood Tule Fall Chinook

On the Oregon side of the lower Columbia River, tule fall Chinook are typically released from Big Creek and Klaskanine Hatcheries, but due to low adult returns insufficient brood stock was available. No fish were released from Klaskanine Hatchery for this brood year. There were 2,312,352 tule smolts released into Big Creek in May.

In Washington, 910,000 Washougal-stock tule fall Chinook were reared released from the Deep River net-pens in June.

2017 Brood Tule Fall Chinook

Eggs for tule fall Chinook released on the Oregon side were incubated at Big Creek Hatchery and rearing and mass-marking took place there. Big Creek released 2,250,280 smolts in mid-May, and 1,686,542 fish were sent from Big Creek to Klaskanine Hatchery for acclimation and release.

2018 Brood Tule Fall Chinook

Incubation occurred at Big Creek Hatchery where rearing and mass-marking took place. Big Creek released 1,848,665 smolts in mid-May, and 2,447,240 fish were sent from Big Creek to Klaskanine Hatchery for acclimation and release.

Table 2.1. Smolt releases at Select Area fisheries sites, brood years 2000–2017.

		Release Sites										
		Youngs Bay			Blind Slough			Tongue Point	Deep River			
Brood Year	Species[1]	South Fork Klaskanine Hatchery	Klaskanine Hatchery	Youngs Bay Net Pens	Big Creek Hatchery	Blind Slough Net Pens	Gnat Creek Hatchery	Tongue Point Net Pens	Deep River Net Pens	Grays River Hatchery	Cathlamet Channel	Steamboat Slough
2000	CHS	---	---	478,062	---	390,908	---	---	95,940	---	---	---
	SAB	---	669,913	205,145	---	---	---	---	---	---	---	---
	CHF	---	---	---	4,537,448	---	---	---	---	---	---	---
	COH	583,248	---	1,688,696	540,898	343,842	---	667,758	354,557	154,107	---	273,108
2001	CHS	---	---	451,623	---	426,309	---	57,797	141,904	---	---	---
	SAB	---	620,527	467,056	---	---	---	---	---	---	---	---
	CHF	---	---	---	5,765,933	---	---	---	---	---	---	---
	COH	641,555	---	1,686,711	537,085	316,804	---	675,712	366,435	153,000	---	239,635
2002	CHS	639,446	---	455,825	---	408,495	---	48,056	97,318	---	---	---
	SAB	---	702,218	780,314	---	---	---	---	---	---	---	---
	CHF	---	---	---	5,764,833	---	---	---	---	---	---	---
	COH	131,185	---	1,740,914	516,942	298,748	---	697,522	357,200	157,000	---	204,600
2003	CHS	458,659	---	457,994	---	433,044	---	53,299	254,471	---	---	---
	SAB	53,963	681,155	519,676	---	---	---	---	---	---	---	---
	CHF	---	---	---	5,887,836	---	---	---	---	---	---	---
	COH	---	---	1,146,068	506,172	309,527	---	202,727	144,900	146,000	---	---
2004	CHS	566,030	---	391,843	---	451,388	---	82,565	336,300	---	---	---
	SAB	45,247	735,066	161,237	---	---		---	---	---	---	---
	CHF	---	----	---	5,865,175	---	---	---	---	---	---	---
	COH	---	---	1,125,609	527,631	305,573	---	194,442	201,300	156,302	---	---
2005	CHS	---	---	417,662	---	272,226	---	104,149	263,600	---	---	---
	SAB	628,888	---	476,497	---	---	---	---	---	---	---	---
	CHF	---	---	---	5,850,219	---	---	---	---	---	---	---
	COH	---	---	1,157,746	5,29,697	304,558	---	174,547	449,200	157,500	---	---

[1]CHS=Spring Chinook, CHF=Fall Chinook (tule stock unless noted), SAB=Select Area Bright Fall Chinook, CO = Coho

Table 2 (continued).

		Release Sites										
		Youngs Bay			Blind Slough			Tongue Point	Deep River			
Brood Year	Species[1]	South Fork Klaskanine Hatchery	Klaskanine Hatchery	Youngs Bay Net Pens	Big Creek Hatchery	Blind Slough Net Pens	Gnat Creek Hatchery	Tongue Point Net Pens	Deep River Net Pens	Grays River Hatchery	Cathlamet Channel	Steamboat Slough
2006	CHS	---	---	543,803	---	312,612	---	79,343	121,500	---	---	---
	SAB	708,412	---	564,641	---	---	---	---	---	---	---	---
	CHF	---	---	---	4,467,016	---	---	---	---	---	---	---
	COH	278,944	232,455	768,960	559,717	310,133	---	597,754	368,000	132,188	---	---
2007	CHS	---	---	457,161	---	280,437	---	103,060	279,811	---	---	---
	SAB	674,181	---	574,020	---	---	---	---	---	---	---	---
	CHF	---	---	---	4,286,153	---	---	---	---	---	---	---
	COH	470,135	510,061	1,014,141	540,169	300,036	---	477,830	706,150	158,000	---	---
2008	CHS	---	---	804,665	---	265,832	---	101,700	363,000	---	---	---
	SAB	714,118	---	702,659	---	---	---	---	---	---	---	---
	CHF	---	---	---	5,666,218	---	---	---	700,000	---	---	---
	COH	347,494	561,968	783,092	516,206	417,506	---	483,412	747,000	153,000	---	---
2009	CHS	---	---	702,609	---	253,503	---	100,557	234,000	---	---	---
	SAB	685,056	---	229,105	---	---	---	---	---	---	---	---
	CHF	---	2,093,575	---	3,598,214	---	---	---	700,000	---	---	---
	COH	368,980	392,314	796,443	538,402	388,505	---	479,365	692,000	155,000	---	---
2010	CHS	---	---	612,330	---	258,923	---	253,002	405,000	---	---	---
	SAB	672,829	---	684,030	---	---	---	---	---	---	---	---
	CHF	---	1,932,616	---	3,255,120	---	---	---	862,000	---	---	---
	COH	390,610	489,060	757,474	532,082	372,265		491,330	800,000	163,000		
2011	CHS	---	---	601,862	---	326,490	99,190	481,620	320,000	---	---	---
	SAB	704,594	---	653,452	---	---	---	---	---	---	---	---
	CHF	---	1,954,732	---	3,614,747	---	---	---	893,000	---	---	---
	COH	386,668	607,824	769,971	571,616	586,277	---	849,381	600,000	165,000	---	---

[1]CHS=Spring Chinook, CHF=Fall Chinook (tule stock unless noted), SAB=Select Area Bright Fall Chinook, CO = Coho

Table 2 (continued).

Brood Year	Species[1]	Release Sites										
		Youngs Bay			Blind Slough			Tongue Point	Deep River			
		South Fork Klaskanine Hatchery	Klaskanine Hatchery	Youngs Bay Net Pens	Big Creek Hatchery	Blind Slough Net Pens	Gnat Creek Hatchery	Tongue Point Net Pens	Deep River Net Pens	Grays River Hatchery	Cathlamet Channel	Steamboat Slough
2012	CHS	---	---	679,087	---	370,858	150,834	493,595	---	---	200,000	---
	SAB	680,806	481,663	687,801	---	---	---	---	---	---	---	---
	CHF	---	1,986,471	---	2,956,068	---	---	---	2,620,000	---	---	---
	COH	336,856	732,994	774,533	537,811	623,649	---	928,589	725,000	155,000	---	---
2013	CHS	---	---	560,520	---	437,583	142,959	465,420	---	---	140,864	---
	SAB	697,554	822,825	706,974	---	---	---	---	---	---	---	---
	CHF	---	1,644,974	---	2,837,901	---	---	---	930,000	---	---	---
	COH	260,289	903,119	684,306	537,661	569,921	---	935,023	654,000	165,000	---	---
2014	CHS	---	275,973	627,857	---	128,700	380,848	437,585	---	---	107,856	---
	SAB	672,387	525,600	472,678	---	---	---	---	---	---	---	---
	CHF	---	4,118,792	---	3,120,715	---	---	---	975,000	---	---	---
	COH	209,923	1,552,458	766,193	568,328	574,243	---	842,311	920,000	156,000	---	---
2015	CHS	---	---	910,343	---	116,114	379,653	399,714	---	---	119,944	---
	SAB	160,487	461,441	---	---	---	---	---	---	---	---	---
	CHF	---	2,802,981	---	3,090,605	---	---	---	875,000	---	---	---
	COH	209,745	1,4873,62	550,062	536,144	349,156	---	747,057	632,500	---	---	---
2016	CHS	---	---	1,159,890	---	129,830	385,563	459,832	---	---	260,000	---
	SAB	---	599,463	---	---	---	---	---	---	---	---	---
	CHF	---	---	---	2,312,352	---	---	---	910,000	---	---	---
	COH	487,415	1,693,979	761,511	567,394	509,235	---	922,455	723,000	---	---	---
2017[2]	CHS	---	117,495	968,404	---	130,489	646,836	419,608	170,000	---		---
	SAB	---	300,460	---	---	---	---	---	---	---	---	---
	CHF	---	1,686,452	---	2,2502,80	---	---	---	---	---	---	---
	COH	384,452	1,317,407	632,021	733,835	426,637	---	424,569	700,000	---	---	---

[1]CHS=Spring Chinook, CHF=Fall Chinook (tule stock unless noted), SAB=Select Area Bright Fall Chinook, CO = Coho.
[2]Release numbers are preliminary and subject to change

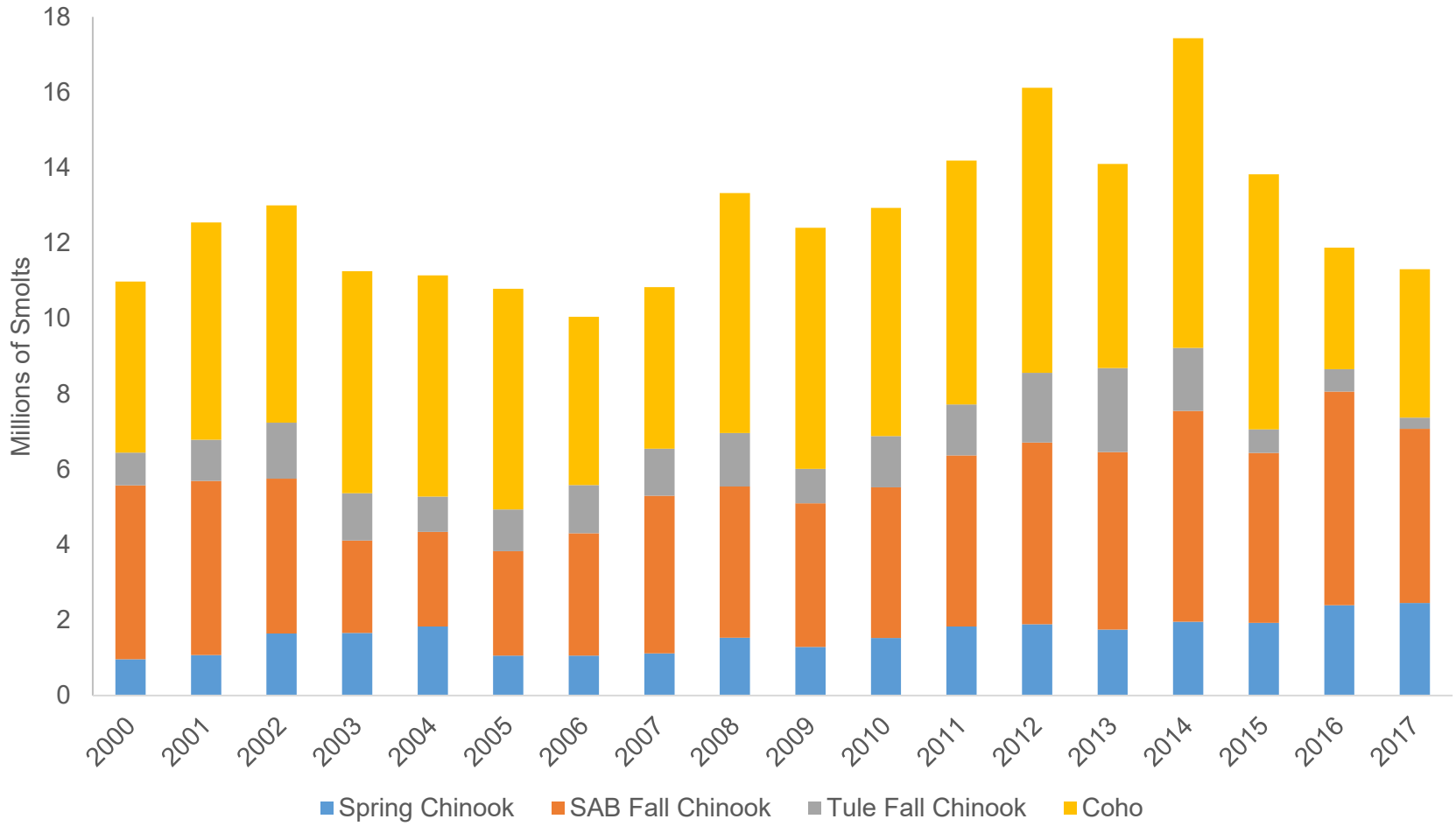


Figure 2.1. Number of smolts released from SAFE Affiliated net-pens and Hatcheries by species/stock, brood years 2000-2017.

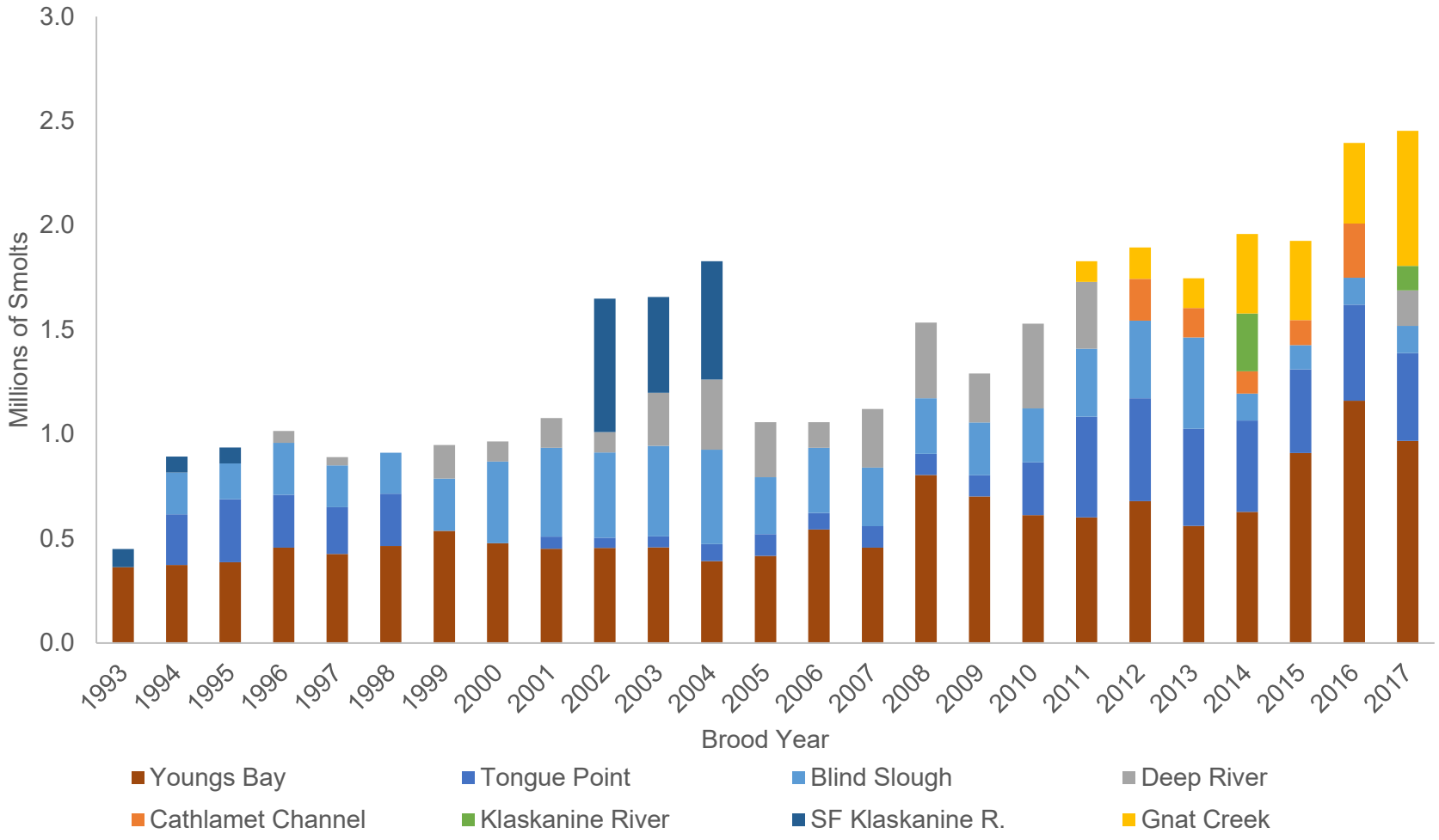


Figure 2.2. Number of SAFE spring Chinook smolts released by release site, brood years 2000-2017.

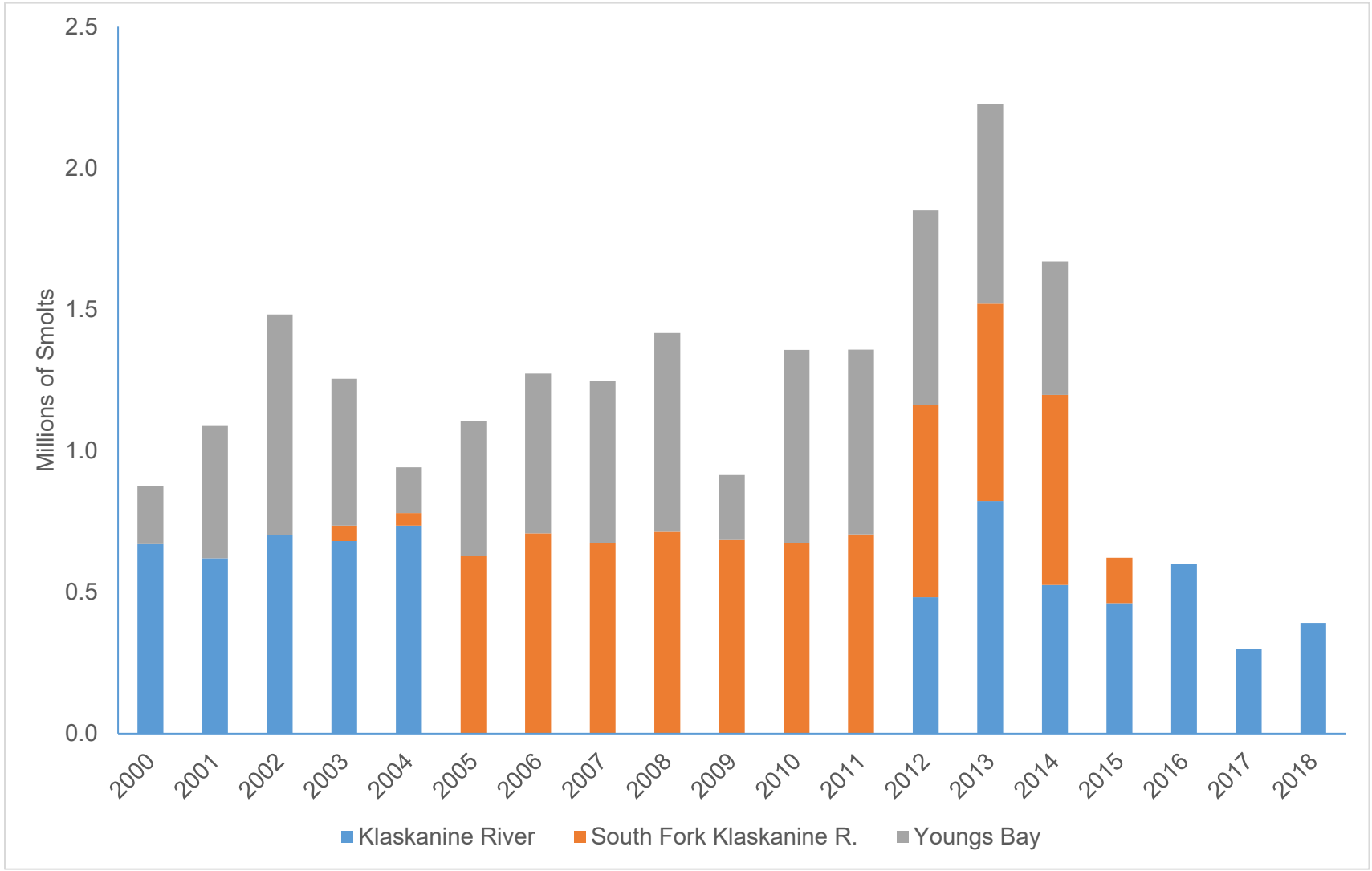


Figure 2.3. Number of SAB fall Chinook smolts released by release site, brood years 2000-2018.

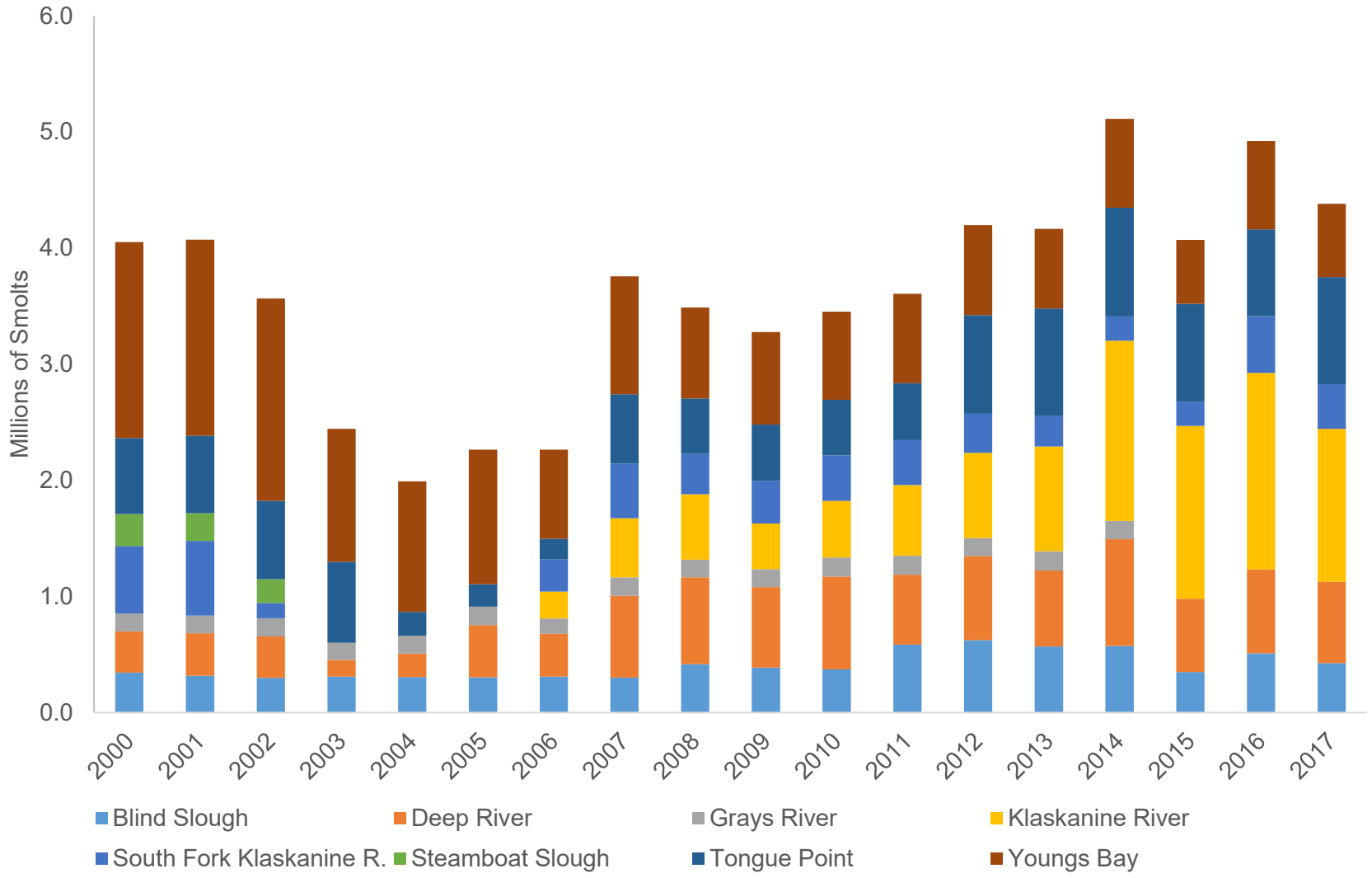


Figure 2.4. Number of Coho (early and late stock) smolts released from SAFE affiliated net-pens and hatcheries, brood years 2000-2017.

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 updates 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.

The first annual estimate is a site-specific harvest prediction for SAFE origin fish caught in Select Area fisheries in the following winter, spring and summer seasons. Specifically, it estimates age-4 and -5 Select Area recruitment rates are calculated using the number of smolts released from a given brood year divided by the number of adults that returned from that brood. These rates were used to predict 4- and 5-year old returning adults prior to 2008, and 4 year-old adults thereafter. After 2008, the number of 5-year-old fish were predicted using various brood year specific regression models comparing returns of 4- vs. 5-year old fish. The age-4 and -5 harvest predictions are area specific and are summed by Select Area location and further for a total SAFE-stock Select Area prediction.

The second estimate predicts the harvest of non-local stocks of spring Chinook and also Select Area Bright (SAB) stock fall Chinook for the following winter, spring and summer seasons. The estimate is based on the average proportion of non-local and SAB fall Chinook harvest in each of the Select Area sites. 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 was observed in the Blind Slough/Knappa Slough commercial fishery (2000-2003 averaged 10.5% non-local). The harvest estimate is presented as a point estimate and range. This non-local estimate combines with the Select Area origin estimate described above to provide an overall SAFE winter, spring and summer harvest prediction. The point estimate is the full harvest estimate as described above, the lower bound of the range is the SAFE-stock only forecast and the upper bound is an estimation of the maximum number of non-local stocks

expected (Willamette and upriver spring Chinook based on allowable impact rates, others based on historical averages).

Select Area Bright Fall Chinook

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

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

Coho

The adult return forecast of SAFE-origin Coho is estimated much like the SAB forecast. Three estimates are produced; ocean abundance and Columbia River mouth estimates are provided for regional fisheries management purposes. Site-specific smolt releases are multiplied by the average SARs (brood year range 1993-2005 for return year 2013 and 2014 forecasts; 1993-2007 for 2015; 2003-2010 for 2016) then the estimate is apportioned to fisheries based on past CWT recoveries (brood year range 1993-2007 for return year 2013-2015 forecasts; 2003 - 2010 for 2016). The fishery and escapement specific estimates are used to estimate Columbia River mouth return (by subtracting estimated ocean harvest) and Select Area commercial harvest (by subtracting ocean and 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 (BA) are prepared by 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 2017 – fall 2019) are authorized under the 2018-2027 U.S. v Oregon Management Agreement. Consultation with NOAA Fisheries regarding the 2018-2027 U.S. v Oregon Management Agreement resulted in a BO dated February 23, 2018 (NMFS 2018) with a finding of no significant impact (FONSI) for all activities described in the Management Agreement (including Select Area fisheries and test fishing research).

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

When addressing commercial periods 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, an annual public meeting to solicit community input regarding commercial and recreational season recommendations have been held in Astoria, Oregon in January of each year. A second annual public meeting for fall fisheries was discontinued in 2016 due to very limited attendance in prior years. Constituents were encouraged to contact fisheries managers directly with any input for fall Select Area season planning. Compact hearings are held almost weekly throughout the year to make in-season modifications to various Columbia River fisheries; however, larger Compact hearings generally occur in January/February to set winter, spring and summer fisheries, and July for fall fisheries. Fact Sheets are prepared and distributed by staff in advance of all Compact/Joint State Hearings. The Fact Sheets detail specific fishery 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 (IDFG), and TAC. The Compact representatives use this testimony and information from the Fact Sheets to weigh the risks and benefits of the proposed seasons and make final rulings based on their

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

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

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

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

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

FISHERY MONITORING: ESTIMATION OF HARVEST AND STOCK & AGE COMPOSITION

In-Season Monitoring

Select Area fisheries are monitored extensively to ensure adequate representation of the catch and to determine impacts to non-local stocks based on in-season updates of mainstem salmon and steelhead (*Oncorhynchus mykiss*) returns. The ODFW and the WDFW are responsible for both sampling to collect biological data and for analyzing data to estimate harvest in their respective Select Area fisheries. The catch from all Select Area fisheries is sampled for the recovery of CWTs using electronic detection and for additional biological information. Each Select Area fishing site is monitored independently to account for variability in total catch, species, stock, and age composition within each fishery. Funding for sampling of the Select Area fisheries is provided by BPA through the SAFE project (BPA #1993-060-00) in Washington and by the State of Oregon and the Mitchell Act funded coded-wire tag recovery project in Oregon.

Commercial Fisheries

Salmon harvested in Select Area commercial fisheries is sampled by ODFW and WDFW field staff at commercial seafood processing plants and associated buying stations. A two-part sampling strategy is employed to collect data necessary for managing the fisheries in-season and analyzing the fisheries post-season: 1) a subset of the catch is sampled for presence of fin marks and CWTs (mark-sampling), and 2) a subset of the mark-sampled population is randomly sampled for biological data (bio-sampling). Data collected from mark-sampled fish exhibiting a fin mark or CWT include species, stock, sex, length, and fin mark. The CWT and scale samples are collected at this time. The same data are collected on bio-sampled fish with the addition of the individual fish's weight (in pounds). All snouts potentially containing CWTs are delivered to the tag recovery lab in Clackamas, Oregon where the CWT is extracted and decoded. The resulting tag code is verified and entered into centralized data management server at ODFW headquarters in Salem where it is accessible to fisheries management staff.

Minimum target mark-sampling rates are 20% of the landed catch by species, area, and season; however, sampling rates are usually significantly higher. Twenty percent is the minimum needed to determine stock composition in fisheries (PSC 2017). During 2007 – 2019, over 270,000 (33%) 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 were used primarily to determine survival rates and stock composition of the landed catch and not to estimate numbers of harvested fish. Average mark-sampling rates during 2017-2019 were 64%, 51%, and 43% for Select Area winter, spring, and summer fisheries, respectively. The sample rate for fall fisheries during the same period was 45% and 44% for Chinook and Coho, respectively. Sample rates are generally lower for fall fisheries due to higher numbers of fish landed when compared to winter, spring, and summer fisheries (TAC 2008). It is important to note that mark-sampling rates associated with Select Area fisheries are generally higher than mainstem Columbia fisheries.

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

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

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

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

Recreational Fisheries

Due to resource limitations, a creel program is not currently in place for the Select Area spring Chinook recreational fisheries. Recreational harvest estimates have been made using expanded harvest cards ("punch cards") from 2008 through 2019. The harvest card estimate is based on reported catch from angler harvest cards that are turned in voluntarily and are expanded by an estimated reporting rate. Harvest card data are not available for at least one year so preliminary estimates are made for annual reporting purposes by correlating trends in previous year harvest cards, Select Area commercial landings, and spring Chinook run size.

ESA COMPLIANCE

Winter and Spring Fisheries

Winter and spring Select Area fisheries are managed intensely in-season to ensure that the impacts to upriver spring Chinook stay within the allowable impact guideline (2017-2019 ESA allocation was 0.30 to 0.34 percent of the upriver spring Chinook run). For these fisheries, VSI from the sampled catch is used to estimate the rough-scale stock composition (upriver vs. lower river origin) of the total catch for each statistical week. Total upriver spring Chinook harvest rate is used as a surrogate to track impacts to listed upriver spring Chinook, since few of those fish are coded-wire tagged. Physical characteristics used to classify stock are readily discernible on dead fish and samplers can be easily trained to determine the stock visually with a high degree of accuracy. Coded-wire tags recovered during sampling of the landed catch are decoded periodically in-season and used to verify and, if needed, correct VSI calls to calculate the frequency of upriver spring Chinook in the sample by week. In most cases, the correction factor is minor since the samplers are highly proficient at classifying stock based on visual cues. The adjusted rate is then applied to the total weekly landed catch to calculate weekly impacts to upriver spring Chinook. Weekly and cumulative season totals are divided by the current estimated run size to determine the impact rate. If the data suggest that impacts will exceed management guidelines, adopted seasons are modified through the Compact hearing process. Beginning in 2008, the number of upriver fish impacted is calculated weekly. Prior to 2008, the season to-date rate was applied to total season landings to calculate the number of upriver spring Chinook harvested in Select Area commercial fisheries.

Impact rates of upriver spring Chinook have averaged 0.18% (range 0.01% .47%) for the Select Areas in 2002 – 2019 (Table 3.2). Since all LCR non-Treaty fisheries operate under the same BO from NOAA, if one fishery accrues (or is projected to accrue) a higher than planned impact, any on-going fisheries must be modified so the combined allowable impact rate is not exceeded. Select Area fisheries harvest few upriver spring Chinook, they accrue impacts at a much slower rate than mainstem fisheries, providing the ability to run for much longer periods. When mainstem fisheries are at or near allowable impact limits, the Select Area fisheries may be closed for significant periods. Alternatively, remaining commercial impacts may be transferred from the mainstem Columbia River to the Select Areas if they are not utilized. Annual fluctuations in the final Select Area impacts illustrates the effects of in-season uncertainty in upriver spring Chinook run size, the interrelated nature of LCR fisheries management, and any management actions enacted to stay within the combined guidelines.

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

Fall Fisheries

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

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

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

Reporting

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

POST-SEASON ANALYSES

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

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

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

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

FISHERIES (2017 THROUGH 2019)

Commercial harvest in the Select Areas is a substantial portion of the total non-Treaty Columbia River commercial salmon fishery. On average, Select Area fisheries have contributed 64%, 79%, and 29% to the total Lower Columbia River commercial landings of spring Chinook, Coho, and fall Chinook, respectively during 2007–2019 (Table 3.5, Figure 3.1). The importance of the SAFE project is evident when considering that Select Area fisheries carried the commercial industry through the mid to late 1990s when little mainstem fishing opportunity was available. White Sturgeon retention was prohibited in Columbia River commercial and recreational fisheries beginning in January of 2014 due to declining abundance. In 2017, a commercial harvest guideline of 1,245 was set for White Sturgeon and annual harvest has been allowed since.

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 2,100–20,800 during the years 2000–2019 (excluding 2005 when it was 969). As hatchery production increased, winter and summer seasons were added in an attempt to harvest all returning hatchery adults. Winter seasons during late February through early March were initiated in 1998 to harvest early returning Age-5 spring Chinook. Beginning in 1999, summer seasons during mid-June through July were adopted to increase harvest of late returning 4-year old spring Chinook and early returning SAB fall Chinook. Winter, spring, and summer season commercial catch in all Select Areas since 1992 can be found in Table 3.6.

Starting in 2006, the Youngs Bay winter season was extended into the mid-March through early-April timeframe as allowed by in-season evaluation of management criteria. Initially, these extended-season fisheries were either constrained to upstream areas of Youngs Bay to reduce harvest of non-local Chinook that are known to “dip in” to lower portions of Youngs Bay in response to tidal fluctuations and river conditions or constrained to short (≤4 hours) periods proximate to low tide. In recent years, only the short-period approach has been utilized to manage the extended winter periods

but reducing area is still an important management option. Although the need for close monitoring is increased during the extension period, adaptive in-season management has provided for important additional opportunity.

Commercial fisheries for spring Chinook in Blind Slough began in 1998 with spring seasons only until 2000, when the first winter season was established. Weeknight fishing periods have been consistently adopted to minimize interactions with recreational boaters. Annual winter/spring season landings have ranged from 450–3,500 Chinook since 2000. In most years, fishing periods have opened concurrent with Youngs Bay and other Select Area sites to minimize congestion. Since 2006, the winter season has been expanded into the late-March/early-April timeframe with minimal increase in impacts to ESA-listed upriver stocks. Beginning in 2013, the winter season expanded to include Knappa Slough. The spring season fishing area was initially limited to Blind Slough but was expanded downstream to include the waters of Knappa Slough in 1999 as returns increased. A one-year trial summer season was adopted in Blind and Knappa sloughs in 1999, but resulted in a harvest of only eight spring Chinook. Extensions of the Blind/Knappa Slough fishery into the summer timeframe occurred in 2015 and 2016 and resulted in landings of over 330 and 860 Chinook, respectively. During the current report period, landings in 2017 and 2018 were well above the 2000-2016 average of 1,725 but 2019 was 30% below average.

Spring commercial fisheries in Tongue Point were initiated in 1998 and continued through 2003, with experimental winter seasons occurring in 2000 and 2001. In most years, seasons and open hours were concurrent with Blind/Knappa Slough and Youngs Bay except in recent years the opening spring period has been delayed 3–7 days relative to the rest of the sites. The spring season fishing area was expanded to include the South Channel in 1999 to reduce congestion during peak fishing periods. Annual Chinook harvest increased dramatically with landings peaking in 2002, when 3,003 fish were landed. High abundance of upriver spring Chinook in this area during the 2003 spring fishery resulted in the cancellation of the season after one period. Production-level releases of spring Chinook at Tongue Point were discontinued in 2000; however, experimental releases were maintained from 2003 through 2011 at the relocated MERTS net-pen site. Releases have continued through 2019. In 2008, test fishing and full fleet commercial test fisheries, with a more restrictive lower boundary and delayed spring season opening dates, were initiated to evaluate the feasibility of reestablishing the Tongue Point fishery. In addition to the fishery modifications, mandatory check-in station and call-in programs were established to provide more precise stock composition information to aid in-season management. Promising results from the 2008-2011 test fisheries resulted in restoring smolt releases to pre-2000 production levels in 2013. An evaluation of the 2008-2013 test fisheries supported the feasibility of reinstating a fishery and the spring Chinook fishery at Tongue Point/South Channel was reestablished in 2014; additionally, experimental winter fisheries began in 2013 and were conducted again in 2014. Landings in 2017 and 2018 were, respectively, 6 times and 3 times above the 2008-2016 average of 566 Chinook, while 2019 landings were near the average.

Spring fisheries have been conducted in Deep River since 2003 with harvest averaging 109 Chinook between 2003 and 2016 and ranging between 28–415 fish annually. Winter seasons were adopted in 2006 and have resulted in catch ranging between 0-239 Chinook. Winter and spring fishing periods in Deep River have occurred regularly since 2006 and have resulted in total catch ranging from 21-415 Chinook. Releases of spring Chinook from the Deep River nets pens were discontinued in 2014. Winter and spring Commercial periods have continued in Deep River through 2017 in order to utilize any returning fish from the 2013 release and to provide Select Area fishing opportunity for spring Chinook on the Washington shores of the Columbia River. Deep River spring Chinook landings in 2017 were 81% below average and none of the catch originated from Deep River releases.

Fall Season Select Area Commercial Fisheries

Select Area commercial fisheries during the fall season target Coho and Chinook returning from net-pen and hatchery releases at these sites. These fisheries were initiated in 1962 with the adoption of Coho seasons in Youngs Bay (Weiss 1966). Initially, Youngs Bay fall fisheries were concurrent with the late fall mainstem gillnet season. Since 1977, the Youngs Bay season has been separated from mainstem seasons and has increased in importance with the involvement of the Clatsop County Fisheries Project that pioneered the successful net-pen acclimation program, which is now a cornerstone of the SAFE project.

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

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

2017 Winter/Spring/Summer Season Commercial Fisheries

Youngs Bay

The 2017 winter season consisted of eight 24-hour periods, six 12-hour periods, one 18-hour period between February 6 and March 9 (scheduled near low tide), thirteen 4-hour periods and two 3-hour periods between March 13 and April 17. 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. Six short fishing periods March 30 through April 17 were added in-season and only the upper zone, above the alternate Highway 101 Bridge was open, to allow more fishing opportunity. 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 was allowed, except in the area upstream of the mouth of the Walluski River. The thirty fishing periods resulted in landings of 630 spring Chinook, which is 1.5 times the 1998-2016 average of 404. This was the fifth largest since winter seasons began in 1998. No White Sturgeon (*Acipenser transmontanus*) were landed in the Youngs Bay winter season as retention and sales were prohibited.

The 2017 spring season in Youngs Bay began with one 12-hour period on April 25-26 but an Oregon State Action on May 25, and another on June 1, rescinded adopted fishing periods. Originally, periods were adopted as large blocks of time, but due to potential impacts on upriver spring Chinook,

much shorter periods were adopted, including one 6-hour period May 1, twenty-two 4-hour periods from April 27-May 31, and an eighteen-hour period June 1 and 2. The previously set period from noon to noon June 12-15 was fished. The 2017 Youngs Bay spring fishery landed 7,346 Chinook. Retention and sales of White Sturgeon was prohibited. The Chinook harvest was the second highest on record and 30% greater than the recent (2007-2016) ten-year average of 5,636 fish. Throughout the spring season, a 9¾-inch maximum mesh size restriction was in effect.

The 2017 summer season in Youngs Bay was open noon Monday through noon Friday weekly from June 19–June 30 and noon Monday through noon Thursday July-3-30. The 9¾-inch maximum mesh size restriction was in effect. The Youngs Bay summer fishery landed 2,823 Chinook was almost twice the 2007-2016 average of 1,480 Chinook and continued a trend of increased annual harvest since 2005. The high landings were driven by later returning age-4 and age-5 (60%/40%) Select Area spring Chinook adults and 47 early returning SABs fall Chinook destined for Youngs Bay were recorded by CWT returns. White Sturgeon catch for the Youngs Bay summer fishery was 31 fish. A limit of five White Sturgeon per vessel per week was in effect.

The combined Youngs Bay winter/spring/summer fishery harvest totaled 10,799 Chinook (Table 3.6). Stock composition is based on visual stock identification (VSI) and coded-wire tag (CWT) analysis with 5,891 Chinook (55% of the Chinook catch) examined for fin marks and CWTs, and 413 CWTs were collected. Combined catch was composed of 83.8% spring Chinook and 0.2% SAB fall Chinook destined for Select Area sites, 3.4% upriver spring Chinook, 0.3% upper Columbia summer Chinook (after June 15), 10.8% Willamette River spring Chinook, 0.1% Sandy River-origin spring Chinook, and 1.4% 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% Age-2, 1.4% Age-3, 59.6% Age-4, 38.0% Age-5, and 1.0% Age-6 fish.

Blind Slough/Knappa Slough

In 2017, winter season began in Blind and Knappa sloughs with 15 periods Monday, Wednesday, Thursday from 7PM to 7AM February 7 through March 10, then it was reduced to Monday/Thursday, 7PM to 7AM, for 11 periods from March 13 to April 18. However, during March 27-28 and April 3-7, 13-14, and 17-18 only Blind Slough was open and from April 10-11, Blind Slough was open with a modified lower boundary to the railroad bridge. Minimum mesh size during winter was 7-inches. During the 25 winter fishing periods, a total of 136 spring Chinook were landed, which just above the recent ten-year (2007–2016) average Chinook harvest (130). As described for Youngs Bay, White Sturgeon weekly retention and sales were prohibited during winter.

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 May 5 (first Friday in May) and June 15 (end of spring season), 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 2017 spring fishery consisted of sixteen 12-hour (7 PM – 7 AM) fishing periods beginning Monday and Thursday nights between April 19 through June 12. The exceptions were a 12-hour period that began Tuesday night, rather than Monday, on May 25 (both Blind and Knappa sloughs) and limited hours for Blind Slough (11PM-7AM) on May 22/23 and 25/26 but not Knappa Slough (7PM-7AM). During these 16 periods, the 2017 Blind Slough/Knappa Slough spring fishery landed 1,964 spring Chinook. The

Chinook harvest was 45% greater than the recent (2007-2016) ten-year average of 1,355. Retention and sales of White Sturgeon was prohibited.

Seven fishing periods during summer in Blind Slough/Knappa Slough were added in-season. This was decided because mostly local-origin fish were being caught during spring and ex-vessel prices remained high. Twelve-hour (7PM-7AM) fishing periods began June 19, Mondays and Thursdays, except the period on Fourth of July was shifted one day earlier. This was the first summer season in Blind Slough/Knappa Slough that White Sturgeon retention was allowed. The fishing boundary in Knappa Slough extended to the western end of Minaker Island. The 9¾-inch maximum mesh size for nets remained. During the 12 multi-day periods in summer, 1,161 Chinook and 32 White Sturgeon were landed. Except for 1999, summer season in Blind Slough/Knappa Slough has only been open since 2015 and landings have increased by approximately 400 Chinook per year.

The combined Blind Slough/Knappa Slough winter, spring, and summer fishery harvest totaled 3,261 Chinook. Stock composition was based on VSI and CWT analysis. A total of 2,164 Chinook (66% of the combined catch) were examined for fin marks and CWTs and 319 CWTs were collected. The catch was composed of 96.7% spring Chinook and 0.1% SAB fall Chinook destined for Select Area sites, 0.5% upriver spring Chinook, 1.9% Willamette River spring Chinook, and 1.4% 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 0.9% Age-3, 62.2% Age-4, 36.1% Age-5, and 0.8% Age-6.

Tongue Point/South Channel

As part of the ongoing effort to expand fishery opportunities in the Select Areas, the winter season initially adopted for the Tongue Point/South Channel site in 2013 was continued in 2017. The 2017 winter season consisted of ten 12-hour periods (7PM–7AM) on Monday and Thursday nights during February 6 to March 10, then three 4-hour periods March 13, 22, and 30. These shorter periods are designed to allow fishing so that SAFE-origin spring Chinook are harvested while minimizing impacts to upriver spring Chinook which increase in late-March. Gear requirements in winter are use of a 7-inch minimum mesh net. A total of 82 Chinook were landed in the winter season, which was 15% higher than the 2013-2016 average of 71.

The spring season in Tongue Point/South Channel began with a 4-hour period on March 20, coinciding with a low tide. This was followed by thirteen 12-hour periods (7PM–7AM) beginning April 25 and continuing through June 13 on Mondays and Thursdays, except for the first period starting on a Tuesday (April 25) and the two periods being rescinded the week of May 22 by compact action on May 18. A 9¾-inch maximum mesh restriction was in place for fisheries during the spring and summer fisheries. During the 2017 Tongue Point/South Channel spring fishery, 1,952 Chinook were landed. This was the greatest catch since the fishery reopened in 2008, and 4 times the 2008-2016 average of 493.

Summer fishing periods began June 19, resuming 12-hour fishing periods (7PM-7AM) beginning Monday and Thursday nights through July 28, except for one period that began on Monday June 2, ending June 3, to avoid the July 4th holiday. All of these fishing periods were added in-season by compact action on June 14. During the 12 multi-day periods in summer, 1,483 Chinook were landed. Only since 2016 did a summer fishery occur in Tongue Point/South Channel when 369 Chinook were caught so, 2017 catch was 4 times that of 2016. White Sturgeon retention was allowed during summer and 203 were caught. Vessels were allowed to keep five White Sturgeon per week. 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 2017 winter, spring, and summer season fishery in Tongue Point/South Channel harvested 3,517 Chinook. This was, by far, the highest catch since the fishery resumed in 2008, with the next highest catch in 2015 at 1,262 Chinook. Catch in 2017 was 6.2 times the 2008-2016 average of 566. Stock composition was based on VSI and CWT analysis with 2,124 Chinook (60% of the catch) examined for fin marks and CWTs; 326 CWTs were detected and recovered. The catch included an estimated 90.1% spring Chinook and 0.1% SAB fall Chinook originating from Select Area sites, 2.3% upriver spring Chinook, 0.4% upper Columbia summer Chinook (after June 15), 2.6% Willamette River spring Chinook, 0.1% Sandy River spring Chinook, and 4.5% CKL-origin fish. Based on scale readings and CWT correction, the estimated age composition of the spring Chinook catch was 1.0% Age-3, 53.2% Age-4 and 45.0% Age-5 fish and 0.8% age-6.

Deep River

In 2017, fishing periods during winter and spring fishing were adopted for Deep River by compact action on January 31. 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.

The winter season consisted of sixteen 12-hour periods (7PM–7AM) on Monday and Thursday nights during February 6 to March 30. The period March 30 was added post season. Eight Chinook were landed. This was 7.3 times below the 2007-2016 average of 58 Chinook.

The spring season consisted of nine 12-hour periods (7PM–7AM) beginning April 25 and continuing through May 18 on Mondays and Thursdays, except for the first period starting on a Tuesday (May 25). Seven subsequent 12-hour fishing periods were rescinded by compact action on May 18 to reduce potential impacts to upriver stocks. Thirteen Chinook were caught, which was 4.8 times below the 2007-2016 average of 63 Chinook.

The Deep River winter/spring fishery stock composition for 2017 was based on VSI and CWT analysis, with 16 out of 21 Chinook (76% of the catch) examined for fin marks and CWTs, and one CWT was collected. Deep River harvest was comprised of 90.5 % Select Area spring Chinook (all from Tongue Point) and 9.5% upriver spring Chinook. Based on scale readings, verified with CWTs, the age composition of the catch was 0% Age-3, 33.3% Age-4, 61.9% Age-5, and 4.8% Age-6.

2017 Fall Season Commercial Fisheries

The total catch of fall Chinook in 2017 was 12,443, which was 30% below the recent ten-year (2007-2016) average of 17,677. This is down from the recent five-year period (2010-2014) when landings exceeded 20,000, with the peak in 2013 at 24,162. Catch was dominated by lower river hatchery (tule) fall Chinook (63%) and SAB fall Chinook (24%). Total Coho harvest of 37,979 was also about 30% of the recent ten-year average 54,326. By late-September, White Sturgeon catch was nearing the 1,245 commercial White Sturgeon harvest guideline. On September 27, a compact action prohibited possession and sales of White Sturgeon on October 1. Catch of White Sturgeon during fall was 237. Retention of White Sturgeon disallowed in 2011, 2012 and from 2014 to 2016 due to

declining abundance. The most recent 10-year average (2002-2010, 2013) was 140 so 2017 catch was 1.7 times average.

Youngs Bay

The fall season in Youngs Bay began in early August with four 36-hour periods the first four weeks of August followed by three 12-hour (7PM-7A) periods on Monday, Wednesday, and Thursday during the last week of the month. Beginning Monday September 4 at 7PM, the fishery was open until noon Tuesday October 31. Standard for the fall season, the upper fishing boundary was moved downstream from the confluence of Youngs and Klaskanine rivers to Battle Creek Slough to ensure adequate SAB escapement. The complete Youngs Bay fall season consisted of 65 fishing days and resulted in landings of 6,277 Chinook, 13,603 Coho, and 115 White Sturgeon. Chinook catch was 35% below the recent 10-year average (2007-2016, 9718). The Chinook catch was composed of 29% tule stock, 54% SABs and 17% non-SAB brights based on visual inspection of clips and skin coloration. Coho catch was 45% below the ten-year average of 24,738. White Sturgeon catch was over twice the recent (2002-2010, 2013) ten-year average of 52.

Blind Slough/Knappa Slough

The Blind Slough/Knappa Slough fishery began with two overnight periods (7PM-7AM), Monday and Wednesday, the week of August 28 followed by 8 weeks of Monday-Thursday periods from September 4 through October 27. Fishing periods began from 7PM-7AM the week of September 4th then increased to 16-hour periods (6PM-10AM) on September 11th for the remainder of the fishery. The season began during the last week of August to provide access to the harvestable surplus of Big Creek Hatchery tule fall Chinook. The maximum mesh size allowed was 9¾-inch for the entire season. The 34-night season resulted in landings of 1,636 Chinook, 2,460 Coho, and nine White Sturgeon. Chinook harvest was 57% below the recent ten-year (2007-2016) average of 3,787. The Chinook catch was composed of 85% tule stock, 7% SABs and 8% non-SAB brights based on visual inspection of clips and skin coloration. Coho catch was also 57% less than the ten-year average of 5,772. The most recent (2002-2010, 2013) 10-year average for White Sturgeon harvest (2002-2010, 2013) was 24, so 2017 harvest was about one-third.

Tongue Point/South Channel

The Tongue Point/South Channel fishery began with six nightly 12-hour fishing periods from August 28-September 7, the same periods as Blind Slough/Knappa Slough. Beginning on September 11, fishing periods increased to 16 hours, from 4PM to 10AM Monday through Thursday through October 27. The 34-night season resulted in landings of 2,251 Chinook, 12,534 Coho, and 82 White Sturgeon. Both Chinook and Coho catch were slightly below the recent ten-year (2007-2016) averages of 2,561 (-12%) and 12,977 (-3%), respectively. The Chinook catch was composed of 38% tule stock, 39% SABs and 22% non-SAB brights based on visual inspection of clips and skin coloration. This is the only Select Area that exceeded the pre-season forecast of Coho, which was 7,067. White Sturgeon harvest was 42% higher than the most recent (2002-2010, 2013) 10-year average of 58.

Deep River

The Deep River fishery began a week earlier than the Tongue Point/South Channel and Blind Slough/Knappa Slough fishing areas, on August 21. During the last two weeks of August four 12-hour periods per week were open 7PM-7AM Monday through Thursday. These early fishing periods were intended to maximize harvest of LRH Chinook from Deep River net-pen releases initiated in 2009. On September 4, fishing periods were increased to five days per week, Monday through Friday 6PM-

9AM. Fishing periods remained 15-hours but were reduced to Monday through Thursday the week of September 25, through October 13. The Deep River season ended a week earlier than the Tongue Point and Blind Slough sites to avoid potential interception of Chum returning to the Grays River. No chum were caught any of the Select Area fisheries in 2017. Landings during the August 21–31 period yielded catches of 169 Chinook and 29 Coho. Combined season landings for the 35-night season included 1,870 Chinook, 9,382 Coho, and 31 White Sturgeon. Chinook catch was the 16% above the recent (2007-2016) ten-year average of 1,606. The Chinook catch was composed of 63% tule stock, 23% SABs and 15% non-SAB brights based on visual inspection of clips and skin coloration. Coho catch 13% below the recent ten-year average of 10,834. White Sturgeon harvest the highest on record at Deep River during fall, 5.8 times the most recent (2002-2010, 2013) 10-year average of 5.3.

2018 Winter/Spring/Summer Season Commercial Fisheries

Youngs Bay

The 2018 winter season began with 24-hour (6AM-6AM) overnight fishing periods beginning Monday and Thursday interspersed with a 12-hour daytime (6AM-6PM) period on Wednesdays from February 5 through March 1. The week of March 5, fishing periods changed to 12 hours (6AM-6PM) Monday, Wednesday and Thursday then were reduced to 4-hour periods March 12 to the end of winter season. The ten 4-hour periods corresponded with low tides typically on Mondays and Thursdays, except for Wednesday March 21 and Tuesday April 3. The last six 4-hour periods were added in season and, of those, the last four were restricted to the upper bay subarea. The strategy of maximizing fishing periods during times when upriver spring Chinook impacts were expected to be minimal and reducing fishing by time (shorter periods) and space (zone restrictions) when upriver impacts were more likely resulted in more fishing opportunities targeting local stocks for the commercial fleet throughout the winter season. The entire Youngs Bay fishing area had a gear restriction of 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 were allowed, except in the area upstream of the mouth of the Walluski River. The twenty-eight fishing periods resulted in landings of 737 spring Chinook, which was 57% above the recent (2008-2017) ten-year average of 471. Retention of White Sturgeon during winter 2018 was prohibited.

The 2018 spring season in Youngs Bay began with ten 4-hour periods from April 19 through May 10 that included the entire Youngs Bay fishing area, then was increased to weekly four-day periods Monday through Friday (noon to noon) from May 14 through June 15. Thirty days of spring fishing in Youngs Bay landed 4,796 Chinook and 52 White Sturgeon. The Chinook harvest was 19.6% below the recent ten-year average of 5,964. Spring Chinook harvest for SAFE fishers in 2018 was 19.5% below the pre-season forecast. This was the first spring harvest of White Sturgeon in five years, which was about half of the most recent (2004-2013) average of 106. During spring and summer seasons, there was a weekly limit of two White Sturgeon per vessel. Throughout the spring season, a 9¾-inch maximum mesh size restriction was in effect.

The 2018 summer season in Youngs Bay was open four days per week, noon Monday through noon Friday, the last two weeks of June. The first week of July, it was open for three days (noon to noon Monday through Thursday. For the last three weeks of the summer season beginning July 10, the fishery was open for two days (noon to noon Tuesday through Thursday). In the 17 days of fishing, there were 1,400 Chinook landed and 14 White Sturgeon. Similar to spring, summer harvest of Chinook was 19.4% below the recent ten-year average of 1,737. White Sturgeon harvest during summer has been intermittent during the decade due to low numbers and retention restrictions in

2008 and 2014-2016. White Sturgeon harvest in summer 2018 was 60% below the most recent (2004-2007, 2009-2013, 2017) average of 35.

The combined Youngs Bay winter/spring/summer fishery in 2018 harvested 6,933 Chinook and 66 White Sturgeon. Landings were 15% below recent 10-year average of 8,171 for Chinook and about half of the most recent (2005-2013, 2017) ten-year average of 140 for White Sturgeon. This was Stock composition was based on VSI and CWT analysis with 3,301 Chinook (48% of the Chinook catch) examined for fin marks and CWTs, and 265 CWTs collected. Catch was composed of 89.9% spring Chinook and 0.2% SAB fall Chinook destined for Select Area sites, 3.2% upriver spring Chinook, 0.4% upper Columbia summer Chinook (after June 15), 3.8% Willamette River spring Chinook, 0.6% Sandy River spring Chinook, and 2.1% spring Chinook destined for the Cowlitz, Kalama or Lewis rivers (CKL). Based on scale readings verified with CWTs, the age composition of the catch was 0% Age-2, 0.9% Age-3, 48.2% Age-4, 50.8% Age-5, and 0.2% Age-6 fish.

Blind Slough/Knappa Slough

Blind Slough fishery during winter included Knappa Slough down to the east end of Minaker Island, to increase fishing area and maximize the opportunity to harvest local Select Area-origin spring Chinook. The adopted season consisted of twenty-one 12-hour periods (7PM – 7AM) on Monday, Wednesday, and Thursday nights during February 5–March 23. Originally, three four-hour periods March 26, 29, and April 3 would have ended winter season but in season modifications extended March 29 and April 3 periods to 12-hours (7 PM – 7 AM) and four more 12-hour periods (7PM – 7AM) were added for Blind Slough only on April 5, 9, 12, and 16. This expansion demonstrates ongoing efforts to apply adaptive management techniques to allow prudent expansion of the fishery and to meet the goal of significant and stable opportunity in 2018. The 28 periods resulted in catch of 175 spring Chinook were landed, which was 29% higher than the recent 10-year (2008–2017) average Chinook harvest of 135. Retention of White Sturgeon during winter 2018 was prohibited. Gear restrictions during winter included a 7-inch minimum mesh for gillnets.

The spring season began with the Blind Slough fishery including Knappa Slough down to the east end of Minaker Island. After April 30, the lower deadline in Knappa Slough was extended further downstream to the western end of Minaker Island. A 9¾-inch maximum mesh size restriction was adopted to target Chinook. For both the winter and spring fisheries in Blind and Knappa sloughs, net length was limited to 100-fathoms with no weight restrictions on the leadline, including allowed use of additional weights and anchors. The 2018 spring fishery consisted of twenty-four 12-hour (7 PM – 7 AM) fishing periods on Monday, Wednesday, and Thursday nights except for the week of April 23 when periods began Tuesday April 23 and Thursday April 26. The season ended June 15. Seven Wednesday fishing periods were new in 2018. The 2018 Blind Slough/Knappa Slough spring fishery landed 1,964 spring Chinook and 43 White Sturgeon. The Chinook harvest was 46% greater than the recent 10-year average of 1,344. After a 5-year pause in White Sturgeon retention, catch was 13% greater than the most recent (2004-2013) ten-year average of 38. During spring and summer seasons, there was a weekly limit of two White Sturgeon per vessel.

The summer fishery consisted of twelve 12-hour periods (7PM-7AM) beginning Monday and Thursday evenings June 18 through July 27. Catch included 457 Chinook and 12 White Sturgeon. Chinook landings were 42% below the 2015-2017 average of 785. Except for 1999, Chinook seasons in Blind Slough/Knappa Slough were only adopted during summer since 2015. This was only the second opportunity for White Sturgeon retention with 2017 being the first when 32 were caught. Summer White Sturgeon catch was a little more than one-third than that landed in 2017.

The combined Blind Slough/Knappa Slough 2018 winter/spring/summer fishery harvest was 2,164 Chinook and 55 White Sturgeon. This was 22% above the ten-year (2008-2017) average Chinook landings of 1777 and 49% greater than the most recent (2005-2013, 2017) ten-year average of 37 White Sturgeon. Stock composition was based on VSI and CWT analysis. A total of 1,215 Chinook (56% of the combined catch) were examined for fin marks and CWTs and 152 CWTs were collected. The catch was composed of 95.2% spring Chinook destined for Select Area sites, 1.3% upriver spring Chinook, and 3.0% Willamette River spring Chinook, 0.1% Sandy River spring Chinook, and 0.6% spring Chinook destined for the Cowlitz, Kalama or Lewis rivers (CKL). Based on scale readings, which were verified with CWTs, the age composition of the catch was 0.1% Age-3, 35.8% Age-4, 63.7% Age-5, and 0.9% Age-6.

Tongue Point/South Channel

The winter season at Tongue Point/South Channel included twelve 12-hour periods (7PM-7AM) from February 5 through March 9, then periods were reduced to four-hour periods on March 12, 16, and 19. During this mid-March timeframe, two 12-hour periods were reduced to four hours. Beginning March 22, the fishing area was restricted to South Channel only to reduce impacts of ESA-listed upriver spring Chinook while provide fishing opportunities. From March 22 to the end of the season, there were two 12-hour periods on March 23 and 27, and six 4-hour periods from March 29 through April 16, all of which were either new in 2018 or added in-season as mangers continued to carefully increase fishing opportunities. Retention of White Sturgeon during winter 2018 was prohibited. Nets were restricted to 7-inch minimum mesh and maximum length of 250 fathoms and weight on leadline not to exceed two pounds in any one fathom. There were 177 Chinook catch during winter. Except for 2000 and 2001, winter seasons were open in Tongue Point/South Channel since 2013. The catch in 2018 was 43% above the most recent five-year (2013-2017) average of 73 Chinook.

Spring season in Tongue Point/South Channel began with three 4-hour periods April 19 through 26, then were expanded to 12-hour periods (7PM-7AM) Monday and Thursdays from April 30 to the end of spring season, June 15. In the 17 periods, spring Chinook catch was 1,327 and 81 White Sturgeon were caught. Chinook catch was over two times the recent 10-year average of 640 and White Sturgeon catch was 36% below the most recent ten-year (2001-2003, 2008-2013) average of 126. During spring and summer seasons, there was a weekly limit of two White Sturgeon per vessel. 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.

This was the third year that summer fishing occurred in Tongue Point/South Channel and the first year that periods were set pre-season. There were twelve 12-hour periods (7PM-7AM) Monday and Thursday evenings from June 18 through June 27. Of these, the first four were set pre-season and the remaining eight were added in season. There were 380 Chinook and 94 White Sturgeon landed. Compared to previous landings, Chinook landings were 369 in 2016 and 1,483 in 2017, while there were 203 White Sturgeon landed in 2017.

The 2018 winter/spring/summer landings totaled 1,884 spring Chinook and 175 White Sturgeon. Based on the ten-year (2008-2017) average, 2018 combine Chinook catch for all sites (10,981), three seasons, was near the average of 10,809. Landings of White Sturgeon at all sites during winter/spring/summer (296) was 18% of the most recent ten-year (2005-2013, 2017) of 251. Stock composition was based on VSI and CWT analysis with 1,207 Chinook (61% of the catch) examined for fin marks and CWTs, and 134 CWTs being collected. The catch was composed of 87.4% spring Chinook and 0.2% SAB fall Chinook destined for Select Area sites, 3.3% upriver spring Chinook,

7.0% Willamette River spring Chinook, 2.0% spring Chinook destined for the Cowlitz, Kalama, or Lewis rivers (CKL), and 0.1% Sandy River stock. Based on scale readings, verified with CWTs, the age composition of the catch was 0.2% Age-3, 33.1% Age-4, 66.3% Age-5, and 0.5% Age-6 fish.

2018 Fall Season Commercial Fisheries

All landings during fall were below recent ten-year averages. There were 6,604 Chinook landed (2,394 bright [of these 1,411 SAB], 4,210 tule fall Chinook), which was about one-third of the 2008-2017 average of 18,426. Coho landings of 12,111 were 79% below the ten-year average of 57,072. Landings of White Sturgeon during fall, 117, were just 10% below the most recent (2003-2010, 2013, 2017) of 130. Expectations from pre-season forecasts for Coho and SAB Chinook were 63% and 38% of respective recent 10- year average landings and tule fall Chinook escapement at Big Creek Hatchery was not expected to meet goals. The harvest guideline of 1,230 for White Sturgeon in Select Areas was only 22% met by the end of the summer season so, weekly per vessel allowable catch was raised from two to four.

Youngs Bay

The fall season in Youngs Bay began August 1 with four 36-hour periods weekly followed by two 12-hour (7PM-7AM) periods during the last week of August on Monday and Thursday. Youngs Bay fall fishing begins earlier than the other three Select Area sites to allow SAB fall Chinook, which return earlier than other Chinook stocks and Coho, to be caught in Youngs Bay where they are released. When caught at other sites, SAB fall Chinook are considered strays. A 58-day period that was scheduled for 7 PM Monday September 3 to Noon Wednesday October 31, was rescinded noon September 13 because returns of Snake River wild (SRW) and upriver bright (URB) fall Chinook were below expectations and impacts were high. By September 12, harvest rates of SRW/URB, were projected to exceed the allowed rate outlined in the 2018-2027 US v OR Management Agreement. On September 18, a 38-day season, beginning 6PM Sunday September 23 through noon October 31, was adopted to allow the fall fishery in Youngs Bay to continue. Nine days were rescinded. The amended Youngs Bay fall season consisted of 53 fishing days and resulted in landings of 2,945 Chinook, 4,229 Coho, and 52 White Sturgeon. Composition of the Chinook catch included 44% tule stock, 43% SABs and 14% non-SAB brights based on visual inspection of clips and skin coloration. The Chinook catch was 30% of the ten-year (2008-2017) average of 9,946; Coho harvest was 84% below the ten-year average of 25,769, and White Sturgeon harvest was slightly below the most-recent (2003-2010, 2013, 2017) ten-year average of 54. Gillnets with a 9¾-inch maximum mesh size restriction through August 23 and a 6-inch maximum mesh size restriction thereafter.

Tongue Point/South Channel

The Tongue Point/South Channel fishery began with two nightly 12-hour (7PM-7AM) Monday and Wednesday during the last week of August. The fishery increased to four nightly 12-hour periods the first week of September, Monday through Thursday, then again increased to 16-hour periods, but the remainder of the fishing periods were rescinded after the third period that week on September 13. As with Youngs Bay, the fishery resumed October 1 when sixteen 18-hour periods from 4PM-10AM through October 26. Eight of the originally planned fishing periods were rescinded. The sixteen-night season resulted in landings of 1,035 Chinook, 3,682 Coho, and 32 White Sturgeon. Chinook catch was composed of 62% tule stock, 11% SABs and 27% non-SAB brights based on visual inspection of clips and skin coloration. Chinook and Coho catch were 63% and 74% the recent ten-year averages of 2,763 and 14,026, respectively. White Sturgeon landings were 70% of the most recent (2003-2010, 2013, 2017) ten-year average of 46. A 6-inch maximum mesh restriction is part of the permanent

rules for the fall fishery. Net restricted to maximum length of 250 fathoms and weight on leadline not to exceed two pounds in any one fathom in Tongue Point. There was no restriction on weights or anchoring of nets in South Channel.

Blind Slough/Knappa Slough

The season structure of the Blind Slough/Knappa Slough fishery was similar to the Tongue Point/South Channel fishery. The fishery began with two nightly 12-hour fishing periods per week of August 26 on Monday and Wednesday. The fishery increased to four nightly 12-hour periods September 3-7 then to 16-hour (6PM-10AM) periods September 10 but was cut short on September 13 when periods were rescinded. Only three of the four fishing periods were executed that week. Fishing resumed August 23 with twenty-one 16-hour fishing periods through October 26. Five days were rescinded and one was added post season. The twenty-one nights of fishing resulted in landings of 1,401 Chinook, 1,477 Coho, and 23 White Sturgeon. Chinook catch was composed of 91% tule stock, 3% SABs and 6% non-SAB brights based on visual inspection of clips and skin coloration. Chinook and Coho landings were one-third and one-quarter recent ten-year averages of 3,942 and 5,768, respectively. Catch of White Sturgeon was slightly above the most-recent (2003-2010, 2013, 2017) ten-year average of 22.

Deep River

The structure of the Deep River fishery was generally similar to that used in the Tongue Point/South Channel and Blind Slough/Knappa Slough fishing sites, although there are some difference for specific reasons. Deep River fall season included fishing periods on Saturdays in September but the season ended sooner in October than other sites. Saturday fishing periods in were meant to provide greater fishing opportunity for harvest of Coho when the run typically peaks in Deep River. The early season closure was because of in low catches and low participation in the past. The season began the last week of August when there were two 12-hour periods (7PM-7AM) beginning Monday and Wednesday. The maximum mesh size for nets were 9.75-inches. Periods increased to 15 hours (6PM-9AM) beginning Monday through Friday evenings on September 3. Fishing periods were rescinded September 13 and reopened with the first 15-hour period beginning Sunday August 23, which was an in-season addition with the following 12 reinstated. In October, fishing periods were reduced to beginning Monday through Thursday evenings, ending October 12. Seven periods were rescinded, one added in season, and fishers participated in 23 fishing periods. Landings during fall season in Deep River included 1,223 Chinook, 2,723 Coho, and 10 White Sturgeon. Chinook catch was 31% below the recent (2008-2017) average of 1,775. Chinook catch was composed of 67% tule stock, 14% SABs and 19% non-SAB brights based on visual inspection of clips and skin coloration. Coho catch was 76% below the ten-year average of 11,509 but White Sturgeon catch was above average by 23%. The most recent (2003-2010, 2013, 2017) White Sturgeon average was 8.

2019 Winter/Spring/Summer Season Commercial Fisheries

Youngs Bay

Winter fishing periods in Youngs Bay began February 4 with 24-hour (6AM-6AM) periods on Mondays and Thursdays with 12-hour (6AM-6PM) periods on Wednesdays through February. In March, the same fishing days were open but periods were reduced to four hours, based on low tides, through April 8. From March 28 onward, fishing was restricted to the upper bay. The last day of winter season, April 11, was rescinded because of high catch of ESA-listed upriver bright spring Chinook on April 8 when 53 were caught in Youngs Bay. 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. Landings during the 26 periods included 445 Chinook and 14 White Sturgeon. Chinook catch was 86% of the recent (2009-2018) ten-year average of 520. White Sturgeon retention had last been open during winter in Youngs Bay in 2013. In 2019, the White Sturgeon season was set later than normal, an April 1 start date, with a harvest guideline the same as 2018, 1,230. Allowed was a maximum of four White Sturgeon with a fork length of 44-50 inches per vessel per week. The 2019 winter White Sturgeon catch in Youngs Bay was 25% above the most (2004-2013) recent ten-year average of 11, 2019.

The first five four-hour periods spring season 2019 in Youngs Bay were rescinded; the last, on April 30, being replaced by a daytime 4-hour period April 29. Managers held back fishing so that upriver spring Chinook bound for the upper Columbia River Basin could pass, thus ensuring the fishery could continue without risk of impacts to listed stocks and maximize fishing opportunity later in the season. The pre-season scheduled periods resumed with six 4-hour periods May 1 through May 10, then opened up to four days per week, noon Monday through noon Friday through the end of the season on June 14. The 27 days of fishing in spring resulted in landings of 1,418 Chinook and 127 White Sturgeon. Chinook catch was only 23% of the recent ten-year average of 6,250 and White Sturgeon landings were 25% greater than the most recent (2005-2013, 2018) ten-year average of 102. Throughout the spring season, a 9¾-inch maximum mesh size restriction was in effect.

The 2019 summer season in Youngs Bay was open four days per week, noon Monday through noon Friday, weekly from June 17 – June 28, three days during the week of July 1-4, then reduced to 2 days per week, noon to noon Tuesday through Thursday, except for the last week, noon to noon Monday through noon Wednesday, July 31. The 19-day fishing season landed 260 Chinook and 21 White Sturgeon. Chinook catch during summer was 85% below the ten-year average of 1,775 and White Sturgeon landings were 39% below the most recent (2005-2013, 2017-18) ten-year average of 34.

The combined Youngs Bay winter/spring/summer fishery harvest totaled 3,168 Chinook and 487 White Sturgeon. Stock composition, based on VSI and CWT analysis, indicated 1,093 Chinook (52% of the Chinook catch) examined for fin marks and CWTs, and 130 CWTs collected. The 2019 combined winter/spring/summer catch included an estimated 83.4% spring Chinook and 0.6% SAB fall Chinook originating from Select Area sites, 7.7% upriver spring and summer Chinook (caught before June 15), 0.7% upper Columbia summer Chinook (after June 15), 6.9% Willamette River spring Chinook, and 0.8% spring Chinook from the Cowlitz, Kalama, Lewis (CKL). Based on scale readings and CWT correction, the estimated age composition of the catch was 0.9% Age-3, 49.6% Age-4, 46.2% Age-5, and 3.2% Age-6 fish.

Blind Slough/Knappa Slough

The winter gillnet season in Blind Slough/Knappa Slough began February 4 with seven weeks of 12-hour (7PM-7AM) fishing periods thee days per week, beginning Mondays, Wednesdays and Thursdays through March 22. There were two 4-hour periods, coincident with low tides, during the last week of March as numbers of returning ESA-listed upriver spring Chinook typically increase. In April, rather than limiting both subareas to 4-hour fishing periods, fisheries managers allowed 12-hour (7PM-7AM) fishing periods in Blind Slough during periods when Knappa Slough was limited to 4-hour periods. This was done to lessen impacts on returning ESA-listed upriver spring Chinook, known to be higher in Knappa Slough than Blind Slough, while allowing greater fishing opportunities. This new

approach was taken in season for the previously set 4-hour period on April 1 for both sub-areas, when time was expanded to 12-hour for Blind Slough. During this in-season action, three previously adopted 4-hour periods for Blind Slough only were changed to allow 4-hour periods for Knappa Slough and 12-hour periods in Blind Slough that began April 4, 8 and 11. A 7-inch minimum mesh restriction was in effect. For both the winter and spring fisheries in Blind and Knappa sloughs, net length was limited to 100-fathoms with no weight restrictions on the leadline, including allowed use of additional weights and anchors. The subarea included Knappa Slough down to the east end of Minaker Island. The twenty-seven fishing periods during winter resulted in harvest of 102 spring Chinook and 1 White Sturgeon. Chinook catch was 31% below the recent (2009-2018) ten-year average of 148. White Sturgeon retention in Blind Slough/Knappa Slough had last been open in 2013 due to conservative measures put in place to address declining abundance. With the late opening of White Sturgeon retention, April 1, a comparison with the average may be unfair but the most recent (2004-2013) ten-year average was 1.7.

Spring season began with modifications to the first three fishing periods for Knappa Slough in which the previously set 12-hour periods were reduced to 4-hour periods on the same days as Blind Slough. Knappa Slough resumed 12-hour (7PM-7AM) periods on April 29. Blind Slough fishers began harvest on April 18. Two 12-hour periods began in Blind Slough on the second week, on Tuesday April 23 and Thursday April 25 then, both Blind Slough and Knappa Slough had concurrent 12-hour (7PM-7AM) periods Mondays, Wednesdays and Fridays from April 29 through the end of the season, June 14. The spring Blind Slough season included Knappa Slough down to the east end of Minaker Island, to increase fishing area and maximize the opportunity to harvest local Select Area-origin spring Chinook. The lower deadline in Knappa Slough was extended further downstream to the western end of Minaker Island on May 6. A 9¾-inch maximum mesh size restriction was adopted to target Chinook. Twenty-four periods of the 2019 Blind Slough/Knappa Slough spring fishery landed 367 spring Chinook and 44 White Sturgeon. Chinook landings were 75% below the recent ten-year average of 1,464 and White Sturgeon was 21% higher than the most-recent (2005-2013, 2018) average of 37.

Summer season in Blind Slough/Knappa Slough consisted of four periods from June 17 through June 28. There were two 12-hour (7PM-7AM) fishing periods per week, beginning Mondays and Thursdays. The fishing boundary in Knappa Slough extended to the western end of Minaker Island. The 9¾-inch maximum mesh size for nets remained. Thirty-one Chinook and two White Sturgeon were landed. Chinook harvest was only 4% of the 2015-2018 average of 785. Except for 1999, summer season in Blind Slough/Knappa Slough has only been open since 2015 and summer White Sturgeon fishing has only been open since 2017. The previous two summer White Sturgeon landings were 32 and 12.

The combined Blind Slough/Knappa Slough winter/spring and summer season harvest totaled 3,168 Chinook and 487 White Sturgeon. Among both subareas for the three seasons in 2019, Chinook landings of 500 were 26% of the ten-year (2009-2018) average of 1,893 and White Sturgeon catch of 47 was 29% above the average for the most recent (2006-2013, 2017-2018) ten years of 37. Stock composition was based on VSI and CWT analysis. Ninety-seven Chinook (19% of the combined catch) were examined for fin marks and CWTs and 15 CWTs were collected. The catch was composed of an estimated 88.8% Select Area-origin spring Chinook, 3.2% upriver spring Chinook, and 8.0% Willamette River spring Chinook. Based on scale readings and CWT correction, the estimated age composition of the catch was 0% Age-3, 35.0% Age-4, 60.6% Age-5, and 4.4% age 6.

Tongue Point/South Channel

Harvest opportunity continued to be expanded winter season 2019 in Tongue Point/South Channel with 12-hour (7PM-7AM) periods added Wednesdays in February to the typical Monday/Thursday periods. Beginning February 4, three 12-hour periods per week were open in both Tongue Point and South Channel through February. In March, time periods and areas were gradually restricted. This structure was designed to allow as much fishing as possible early in the season when Chinook prices were high and risk of impacts to ESA-listed upriver spring Chinook were low. As the risk of impacts increases, approaching April, periods were reduced to 4-hours and area restricted to South Channel only. During winter, a 7-inch minimum mesh restriction was in effect. There were two 12-hour periods open to both subareas the first week of March, followed by a 4-hour period overnight Monday March 11, then three 12-hour periods open in South Channel, and six 4-hour periods (new in 2019, set pre-season) through the end of the season. In all, there were 24 periods during winter that resulted in landings of 154 Chinook and five White Sturgeon. This was the first winter period that harvest of White Sturgeon was permitted in Tongue Point/South Channel since 2013. White Sturgeon catch for the previous three winter seasons (2000, 2001, and 2013) ranged from two to six. Winter landings of Chinook in 2019 was 71% higher than the recent (2013-2018) average of 90. There was a pause in winter fishing from 2000 and 2001 until fishing resumed winter 2013.

Spring began with three 4-hour fishing periods that were modified to restrict the area to South Channel to limit additional impacts on ESA-listed upriver spring Chinook that reached 48% of allowed by the end of winter season and provide fishing opportunity for each site later in April. These periods were April 18, 23 (overnight), and 26 timed to occur with low tides. From April 29 through the end of the season, on June 14, fourteen 12-hour (7PM-7AM) periods, twice per week on Mondays and Thursdays, were adopted. A 9¾-inch maximum mesh restriction was in place. In Tongue Point, nets were restricted to a maximum length of 250 fathoms with standard weight restrictions while nets in South Channel were limited to a maximum length of 100 fathoms and no weight restrictions were in place. During the 2019 Tongue Point/South Channel spring fishery, 386 Chinook and 217 White Sturgeon were landed. Chinook landings were less than half of the 2009-2018 average of 746 and White Sturgeon landings were nearly twice the most recent (2001-2003, 2008-2013, 2018) ten-year average of 112.

Summer season in Tongue Point/South Channel consisted of four periods from June 17 through June 28. There were two 12-hour (7PM-7AM) fishing periods per week, beginning Mondays and Thursdays. The 9¾-inch maximum mesh size for nets remained. Five Chinook and 56 White Sturgeon were landed. Chinook harvest was less than 1% of the 2016-2018 average of 744. Summer season in Tongue Point/South Channel has only been open since 2016 and summer White Sturgeon fishing has only been open since 2017. The previous two summer White Sturgeon landings were 203 and 94.

The 2019 winter/spring/summer fishery in Tongue Point/South Channel harvested 545 Chinook and 278 White Sturgeon. Stock composition was based on VSI and CWT analysis with 332 Chinook (61% of the catch) examined for fin marks and CWTs; 47 CWTs were detected and recovered. The catch included an estimated 67.9% spring Chinook released from Select Area sites, 4.7% upriver spring Chinook, and 27.0% Willamette River spring Chinook, and 0.4% Sandy River spring Chinook. Based on scale readings and CWT correction the estimated age composition of the catch was 0.8% Age-3, 56.8% Age-4, 37.9% Age-5, and 4.5% Age-6 fish.

2019 Fall Season Commercial Fisheries

Regulations and season structure for 2019 in Blind/Knappa Slough, Tongue Point/South Channel, and Youngs Bay were similar to recent years. Deep River regulations were modified to provide additional opportunity to target late season Coho. Chinook and Coho salmon landings fall 2019 were below pre-season forecasts while White Sturgeon landings met the quota in early October. Chinook landings for all Select Areas combined totaled 3,371 fish, which was the lowest in 19 years and only 19% of the recent (2009-2018) average of 17,687 Chinook. Of these, 11.3% (380) were SAB fall Chinook, 18.5% (622) were non-SAB upriver bright fall Chinook, and 70.3% were tule fall Chinook. The pre-season forecast for SAB harvest in SAFE fisheries was 1,600. Total Coho harvest of 19,291 was also far below (-63%) the ten-year average of 52,768. The pre-season forecast for SAFE fisheries was 88,700. White Sturgeon catch at all SAFE sites in fall 2019 was 212, which was 67% above the most recent (2004-2013, 2017, 2018) average of 127. The White Sturgeon harvest guideline for commercial fisheries below Bonneville dam was 1,230, which is typically split 50/50 between SAFE and mainstem Columbia River fishers. The unofficial sub-allocation of 615 White Sturgeon for all SAFE sites, all seasons, drove an early closure on October 6.

Youngs Bay

The fall season in Youngs Bay began August 6 with three 36-hour periods weekly, beginning Tuesdays at 7PM ending Thursdays at 7AM. The upper fishing boundary was moved downstream from the confluence of Youngs and Klaskanine rivers to Battle Creek Slough to ensure adequate SAB escapement. Gillnets were required to have a with a maximum mesh size of 9¾-inch through August 22 and a 6-inch maximum thereafter. During the last week of August, there were two 12-hour (7PM-7AM) periods on Monday and Wednesday. After Labor Day, a 58-day period began from 7PM September 2 through noon October 31. The complete Youngs Bay fall season consisted of 69 fishing days and resulted in landings of 853 Chinook, 3,589 Coho, and 88 White Sturgeon. The Chinook catch was only 9% of the ten-year (2009-2018) average of 9,183 and landings of Coho were only 15% of the ten-year average of 23,471. The 88 White Sturgeon caught was 53% above the most recent (2004-2010, 2013, 2017) average of 57. Chinook catch included 25.8% SAB fall Chinook, 22.9% non-SAB URB fall Chinook, and 51.3% tule fall Chinook based on visual inspection of fin clips and skin coloration of 415 sampled fish (49% of catch).

Blind Slough/Knappa Slough

Fall fishing in Blind Slough/Knappa Slough began August 26 with two 12-hour (7PM-7AM) periods on Monday and Thursday. This was increased to four 12-hour nights per week, Monday through Friday on September 2 then, to four nightly 16-hour periods (6PM-10AM) each week from September 9 through the end of fall season, October 25. Gillnets with a maximum mesh size restriction of 9¾-inch through September 6, and a 6-inch maximum thereafter. The 34-night season resulted in landings of 953 Chinook, 7,269 Coho, and four White Sturgeon. Chinook catch was 75% below the ten-year average of 3,882 but Coho landings were 35% above average (10-yr=5,378). White Sturgeon landings were 21% of the most-recent ten-year average of 22. Chinook landings were composed of 0.5% SAB fall Chinook, 7.4% non-SAB upriver bright fall Chinook, and 92.1% tule fall Chinook based on visual inspection of fin clips and skin coloration of 380 sampled fish (40% of catch).

Tongue Point/South Channel

The Tongue Point/South Channel fishery began with four nightly 12-hour (7PM-7AM) fishing periods per week, Monday through Thursday, beginning September 2. The fishery increased to four nightly 18-hour periods (4PM-10AM) each week from September 9 through the end of fall season, October

25. A gear restriction of 6-inch maximum mesh for gillnets was in effect throughout the fishery. The 34-night season resulted in landings of 879 Chinook, 7,229 Coho, and 106 White Sturgeon. Chinook and Coho landings were 68% and 47% below their respective ten-year averages of 2,749 and 13,619. White Sturgeon landings were 2.7 times the most recent ten-year average of 39. Stock composition of Chinook caught were 5.3% SAB fall Chinook, 39.9% non-SAB upriver bright, and 55.4% tule fall Chinook based on visual inspection of fin clips and skin coloration of 399 sampled fish (45% of catch).

Deep River

The structure of the Deep River fishery was generally similar to that for the Tongue Point/South Channel and Blind Slough/Knappa Slough fishing sites, except for occasional Saturday periods and the season lasting through November. The fishery began August 26 with two 12-hour (7PM-7AM) nightly fishing periods Monday and Wednesday. Except for the week of September 30 when there were just two nightly periods, fishing in Deep River expanded to four or five 15-hour (6PM-9AM) nightly periods from September 2 through November 29. The 28 periods from September 21 onward were newly added, pre-season in 2019. In all, there were 59 fishing periods during fall in Deep River. There were 686 Chinook landed during fall. This was 63% below the ten-year average of 1,873. Stock composition was 14.7% SAB fall Chinook, 4.3% non-SAB upriver bright fall Chinook, and 81% tule fall Chinook based on visual inspection of fin clips and skin coloration of 279 sampled fish (41% of catch). Despite the extra time late in the season to target Coho, there were only 1,204 caught, which was 12% of the ten-year average of 10,299. Fourteen White Sturgeon were landed, which was about 1.5 times the most recent ten-year average of 9.

Commercial Harvest Ex-Vessel Value

Ex-vessel values, landings in pounds, and average price per pound for Chinook harvested in winter, spring, and summer Select Area fisheries is listed in Table 3.8. Average ex-vessel value for Chinook harvested in winter, spring, and summer from 2006 to 2019 was $764,982 and ranged from $244,415 in 2009 to $1,463,743 in 2010. Fall harvest of Chinook averaged $359,573 during the same period, ranging from $63,357 in 2019 to $781,563 in 2013 (Table 3.9). The ex-vessel value of Coho harvested in the Select Area fisheries has averaged $568,237 between 2006 and 2019 and has ranged from $131,995 in 2007 to $1,622,657 in 2014 (Table 3.9).

From 2006 to 2019, total ex-vessel values of Chinook and Coho landed in Select Areas fisheries ranged from $717,000 to $2.6 million. The impact of this revenue on the local economy is significant, especially considering that ex-vessel value is a minimum economic value prior to the expansion that occurs as the money is expended throughout the community. Environmental variables such as ocean conditions and estuary smolt predation, as well as regional fisheries management greatly affect the realized economic returns from the Select Area fisheries.

Select Area Recreational Fisheries

Beginning in 1998, year-round recreational seasons were opened for Chinook and adipose fin-clipped Coho in Youngs Bay, Tongue Point, and Blind Slough. Similar regulations were adopted for South Channel and Knappa Slough in 1999 and for Deep River in 2000. In 2003, regulations were adopted to allow year-round angling for adipose fin-clipped steelhead in all Oregon Select Areas. To maintain consistency with mainstem fisheries, mark-selective regulations were permanently adopted for Select Area spring Chinook recreational fisheries effective January 1, 2004. Also in 2004, classification of Tongue Point and South Channel as Select Area recreational fishing sites was rescinded due to discontinuation of production-level spring Chinook releases and because these areas are already

open to angling concurrent with the mainstem Columbia River. Brief springtime recreational fishing closures were enacted in the Select Areas during 2004, 2005, and 2010 when the potential for additional impacts to upriver spring Chinook also forced closure of Select Area commercial fisheries.

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

Spring Fisheries

Despite the fact that most Select Area sites have been open year-round for recreational fishing, participation has expanded slowly, at least partially due to limited adult returns early in the program's history. In 2003, 2004, 2010, and 2015, effort and harvest in Select Area recreational fisheries increased due to productive fishing opportunities resulting from improved adult returns. Among the Select Areas, the most popular and productive recreational spring Chinook fisheries occurred in Blind Slough/Knappa Slough, Big Creek, Gnat Creek, and Youngs Bay during March–May. Landings for recreational spring Chinook included: 1,781 in 2017, 918 in 2018, and 136 in 2019 (provisional estimate). The recent (2007-2016) ten-year average was 1,038 spring Chinook.

Fall Fisheries

The most popular areas for fall season recreational fisheries in the Select Areas are Youngs Bay tidewater, tributaries to Youngs Bay, and Deep River. As with the spring recreational fisheries, no formal creel surveys were conducted during fall fisheries to estimate harvest. Instead, catch of fall Chinook and Coho was estimated using punch cards returned by anglers. Recreational catch in the Oregon Select Areas was approximated from expanded harvest cards turned in voluntarily by anglers. Harvest cards are unavailable until the following calendar year so only 2017 and 2018 are reported. Fishery locations include Big Creek, Gnat Creek, John Day River, Knappa and Blind Slough, Klaskanine River, including north and south forks, Lewis and Clark River, and Youngs River and Bay. Expanded catch from August through December were summed. Estimated catch in 2017 was 614 Chinook and 226 Coho in Oregon Select Areas and associated tributaries. Estimated catch in 2018 for the same areas was 785 Chinook and 152 Coho.

Table 3.1. Landings, number of fish sampled for CWTs (marks), and mark-sample rates of Chinook and Coho in Oregon Select Area commercial fisheries, 2001-2019.

Year		Winter	Spring	Summer	Fall		Total
		Chinook	*Chinook*	*Chinook*	*Chinook*	*Coho*	
2001	Landings	682	8,000	587	2,949	31,254	43,472
	# Sampled	341	2,896	316	915	10,729	15,197
	Sample Rate	50%	36%	54%	31%	34%	35%
2002	Landings	218	10,786	695	8,242	68,868	88,809
	# Sampled	117	5,468	366	3,945	25,940	35,836
	Sample Rate	54%	51%	53%	48%	38%	40%
2003	Landings	86	7,321	279	8,961	109,227	125,874
	# Sampled	56	3,667	49	1,506	18,808	24,086
	Sample Rate	65%	50%	18%	17%	17%	19%
2004	Landings	1,341	8,851	255	12,249	46,164	68,860
	# Sampled	619	3,913	60	3,526	13,494	21,612
	Sample Rate	46%	44%	24%	29%	29%	31%
2005	Landings	190	2,061	95	8,332	63,221	73,899
	# Sampled	167	1,520	38	3,029	16,736	21,490
	Sample Rate	88%	74%	40%	36%	26%	29%
2006	Landings	759	5,982	476	4,373	35,418	47,008
	# Sampled	424	3,980	178	1,505	12,097	18,184
	Sample Rate	56%	67%	37%	34%	34%	39%
2007	Landings	968	5,521	256	4,358	7,842	18,945
	# Sampled	656	3,501	94	2,360	3,071	9,682
	Sample Rate	68%	63%	37%	54%	39%	51%
2008	Landings	292	3,149	1,017	13,749	40,322	58,529
	# Sampled	179	1,814	284	4,678	14,671	21,626
	Sample Rate	61%	58%	28%	34%	36%	37%
2009	Landings	246	2,824	983	11,428	76,290	91,771
	# Sampled	143	1,433	258	2,905	19,952	24,691
	Sample Rate	58%	51%	26%	25%	26%	27%
2010	Landings	1,342	22,163	972	19,655	39,499	83,631
	# Sampled	622	10,074	267	4,024	10,104	25,091
	Sample Rate	46%	45%	27%	20%	26%	30%
2011	Landings	207	8,989	1,822	20,634	34,430	66,082
	# Sampled	129	4,066	441	4,935	7,746	17,317
	Sample Rate	62%	45%	24%	24%	22%	26%
2012	Landings	366	7,426	2,260	22,029	11,422	43,503
	# Sampled	231	4,546	1,091	6,457	3,571	15,896
	Sample Rate	63%	61%	48%	29%	31%	37%
2013	Landings	559	5,377	2,022	22,542	32,293	62,793
	# Sampled	329	3,138	1,222	7,321	6,613	18,623
	Sample Rate	59%	58%	60%	32%	20%	30%
2014	Landings	450	2,286	1,842	21,950	141,242	167,770
	# Sampled	244	929	543	7,564	30,854	40,134
	Sample Rate	54%	41%	29%	34%	22%	24%
2015	Landings	797	10,889	1,779	13,784	22,880	50,129
	# Sampled	497	4,679	597	5,870	9,679	21,322
	Sample Rate	62%	43%	34%	43%	42%	43%
2016	Landings	1,313	7,268	1,836	10,432	28,561	49,410
	# Sampled	762	3,532	471	3,368	11,340	19,473
	Sample Rate	58%	49%	26%	32%	40%	39%
2017	Landings	856	11,275	5,467	12,304	37,979	67,611
	# Sampled	521	5,584	2,964	5,036	14,555	28,660
	Sample Rate	61%	50%	54%	42%	38%	42%
2018	Landings	1,089	7,655	2,237	6,699	12,169	29,849
	# Sampled	667	4,192	873	3,061	5,426	14,219
	Sample Rate	61%	55%	39%	46%	45%	48%

Table 3.1 (cont.). Landings, number of fish sampled for CWTs (marks), and mark-sample rates of Chinook and Coho in Oregon Select Area commercial fisheries, 2001-2019.

Year		Winter	Spring	Summer	Fall		Total
		Chinook	*Chinook*	*Chinook*	*Chinook*	*Coho*	
2019	Landings	701	2,171	296	3,371	19,291	25,830
	# Sampled	499	1,067	106	1,633	9,733	13,038
	Sample Rate	71%	49%	36%	48%	50%	50%
5-yr Ave.	Landings	951	7,852	2,323	9,318	24,176	44,566
	# Sampled	589	3,811	1,002	3,794	10,147	19,342
	Sample Rate	62%	49%	43%	41%	42%	43%
10-yr Ave.	Landings	768	8,550	2,053	15,340	37,977	64,661
	# Sampled	450	4,181	858	4,927	10,962	21,377
	Sample Rate	59%	49%	42%	32%	29%	33%

Table 3.2. Impact rates on ESA-listed upriver spring Chinook in winter and spring Select Area commercial fisheries, 2002–2019.

Year	Actual Impact Rate	Management Guideline	% Above (+)/Below (-) Guideline	Upriver Run Size
2002	0.19%	0.20%	-5%	331,303
2003	0.21%	0.20%	+6%	208,400
2004	0.10%	0.20%	-50%	193,377
2005	0.01%	0.10%	-88%	106,800
2006	0.09%	0.10%	-10%	132,220
2007	0.05%	0.10%	-46%	86,107
2008	0.13%	0.15%	-12%	178,482
2009	0.09%	0.15%	-42%	169,988
2010	0.47%	0.15%	+214%	315,140
2011	0.14%	0.15%	-8%	221,283
2012	0.16%	0.15%	+8%	203,063
2013	0.21%	0.15%	+41%	123,100
2014	0.11%	0.15%	-29%	242,577
2015	0.28%	0.15%	+86%	288,994
2016	0.19%	0.15%	+23%	187,816
2017	0.38%	0.30%	+28%	115,821
2018	0.27%	0.34%	-21%	115,081
2019	0.28%	0.30%	-7%	73,101
Average	0.19%	0.18%	+5%	182,925

Table 3.3. Stock composition of Chinook in winter/spring/summer Select Area commercial fisheries, 2000-2019.

	Non-Local							Local		
Year	Above Bonn. Spring [1]	Above Bonn. Summer [2]	Willamette R.	Sandy R.	C,K,L [3]	OR Coast	Non-Local Total	SAFE	SAB (CHF) [4]	Local Total
2000	0.7%	0.0%	11.6%	1.7%	1.1%	0.0%	15.1%	82.6%	2.3%	84.9%
2001	4.4%	0.3%	5.8%	0.8%	0.7%	0.5%	12.4%	82.6%	5.0%	87.6%
2002	4.8%	0.5%	16.6%	2.5%	1.5%	0.3%	26.2%	69.4%	4.4%	73.8%
2003	5.1%	0.8%	13.1%	0.7%	2.0%	0.6%	22.5%	76.1%	1.4%	77.5%
2004	1.9%	0.4%	5.7%	0.6%	1.4%	0.0%	10.0%	87.6%	2.5%	90.0%
2005	0.6%	0.1%	5.8%	0.0%	1.8%	0.0%	8.2%	89.4%	2.4%	91.8%
2006	1.6%	0.1%	3.8%	0.7%	0.6%	0.0%	6.8%	92.4%	0.8%	93.2%
2007	0.7%	0.1%	4.7%	0.0%	0.9%	0.0%	6.4%	92.3%	1.3%	93.6%
2008	5.3%	1.5%	2.2%	0.0%	2.6%	0.0%	11.7%	69.0%	19.4%	88.3%
2009	3.7%	0.7%	6.6%	3.3%	0.5%	0.0%	14.8%	68.0%	17.2%	85.2%
2010	6.1%	0.1%	6.7%	0.3%	0.2%	0.0%	13.4%	84.9%	1.7%	86.6%
2011	2.7%	0.3%	9.4%	0.2%	1.1%	0.0%	13.7%	76.8%	9.6%	86.3%
2012	3.3%	0.0%	7.0%	0.4%	0.4%	0.0%	11.1%	84.4%	4.4%	88.9%
2013	3.2%	0.1%	15.3%	0.0%	1.2%	0.0%	19.9%	62.8%	17.3%	80.1%
2014	5.6%	1.0%	14.1%	0.5%	1.1%	0.0%	22.3%	48.2%	29.5%	77.7%
2015	5.9%	1.1%	9.2%	0.0%	2.0%	0.0%	18.2%	81.4%	0.5%	81.8%
2016	3.3%	0.9%	5.3%	0.0%	5.1%	0.0%	14.6%	82.8%	2.5%	85.4%
2017	2.7%	0.3%	7.5%	0.1%	1.9%	0.0%	12.4%	87.5%	0.1%	87.6%
2018	2.8%	0.2%	4.2%	0.4%	1.8%	0.0%	9.4%	90.5%	0.1%	90.6%
2019	5.7%	0.4%	10.6%	0.1%	0.5%	0.0%	17.3%	82.3%	0.4%	82.7%
5-yr Avg	4.1%	0.6%	7.4%	0.1%	2.3%	0.0%	14.4%	84.9%	0.7%	85.6%
10-yr Avg	4.1%	0.4%	8.9%	0.2%	1.5%	0.0%	15.2%	78.2%	6.6%	84.8%

[1] Includes Snake River summer Chinook.

[2] Includes only Upper Columbia summer Chinook.

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

[4] SAB = Select Area Bright

Table 3.4. Stock composition of adult Chinook harvested in Fall Select Area commercial fisheries, 2000-2019.

Year	Non-Local							Local		
	URB	BUB	PUB	LRW	BPH	Stray	Non-Local Total	LRH	SAB	Local Total
2000	9.8%	4.2%	1.3%	0.0%	6.2%	0.1%	21.7%	10.6%	67.7%	78.3%
2001	17.5%	0.0%	0.0%	0.0%	2.5%	0.1%	20.1%	25.4%	54.5%	79.9%
2002	10.9%	4.7%	0.3%	0.0%	7.3%	0.0%	23.2%	46.2%	30.6%	76.8%
2003	0.4%	3.3%	0.1%	0.9%	13.7%	1.4%	19.8%	34.2%	46.1%	80.2%
2004	7.9%	0.0%	0.1%	0.0%	6.3%	0.1%	14.4%	59.1%	26.6%	85.6%
2005	7.6%	0.0%	0.0%	1.9%	0.0%	0.0%	9.5%	47.3%	43.2%	90.5%
2006	1.1%	0.0%	0.0%	1.2%	0.0%	0.1%	2.3%	16.2%	81.5%	97.7%
2007	2.5%	0.0%	0.9%	0.0%	0.0%	1.1%	4.6%	0.0%	95.4%	95.4%
2008	1.0%	1.8%	1.1%	0.0%	9.0%	2.7%	15.6%	19.6%	64.8%	84.4%
2009	3.0%	2.9%	1.0%	0.0%	4.4%	0.2%	11.6%	24.6%	63.8%	88.4%
2010	0.8%	2.1%	1.5%	0.0%	5.3%	0.0%	9.7%	55.9%	34.3%	90.3%
2011	4.9%	0.0%	1.9%	0.0%	0.0%	0.0%	6.8%	40.0%	53.2%	93.2%
2012	1.3%	0.0%	0.5%	0.0%	0.8%	3.5%	6.2%	55.0%	38.9%	93.8%
2013	7.4%	0.5%	2.0%	0.0%	1.1%	0.1%	11.2%	31.2%	57.6%	88.8%
2014	7.3%	0.3%	2.4%	0.0%	5.9%	0.5%	16.3%	38.1%	45.6%	83.7%
2015	2.8%	0.0%	1.1%	0.0%	1.6%	0.4%	5.9%	51.8%	42.3%	94.1%
2016	7.2%	2.4%	0.7%	0.0%	0.2%	0.3%	10.8%	47.2%	42.0%	89.2%
2017	7.3%	0.0%	0.2%	0.0%	3.0%	2.4%	12.9%	63.2%	23.9%	87.1%
2018	1.0%	0.0%	0.2%	0.0%	2.3%	0.0%	3.5%	68.5%	28.0%	96.5%
2019	3.1%	0.0%	4.2%	0.0%	5.3%	0.0%	12.6%	78.5%	8.9%	87.4%
5-yr Avg	4.3%	0.5%	1.3%	0.0	2.5%	0.6%	9.1%	61.8%	29.0%	90.9%
10-yr Avg	4.3%	0.5%	1.5%	0.0%	2.5%	0.7%	9.6%	52.9%	37.5%	90.4%

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

Table 3.5. Landings of Select Area and Lower Columbia River Non-Indian Commercial Fisheries, 2003-2019.

	Spring & Summer Chinook				Fall Chinook				Coho			
Year	LCR Mainstem	SAFE	Total	SAFE % of	LCR Mainstem	SAFE	Total	SAFE % of	LCR Mainstem	SAFE	Total	SAFE % of
2003	3,175	7,804	10,979	71%	58,428	9,173	67,601	14%	149,766	112,684	262,450	43%
2004	13,767	10,562	24,329	43%	41,057	12,649	53,706	24%	66,522	51,944	118,466	44%
2005	8,151	2,406	10,557	23%	27,536	8,696	36,232	24%	32,368	65,807	98,175	67%
2006	9,208	7,245	16,453	44%	26,011	4,557	30,568	15%	28,372	37,653	66,025	57%
2007	4,072	6,774	10,846	62%	12,150	4,533	16,683	27%	30,193	10,516	40,709	26%
2008	7,322	4,486	11,808	38%	28,052	13,997	42,049	33%	13,107	55,151	68,258	81%
2009	6,539	4,175	10,714	39%	34,980	11,990	46,970	26%	45,241	80,950	126,191	64%
2010	13,777	24,875	38,652	64%	31,078	20,678	51,756	40%	18,896	58,747	77,643	76%
2011	9,547	11,119	20,666	54%	51,434	22,913	74,347	31%	13,485	49,492	62,977	79%
2012	7,843	10,082	17,925	56%	36,834	23,729	60,563	39%	2,648	15,348	17,996	85%
2013	4,094	8,087	12,181	66%	84,919	24,162	109,081	22%	9,764	43,303	53,067	82%
2014	6,860	4,642	11,502	40%	101,852	24,156	126,008	19%	70,838	168,570	239,408	70%
2015	11,175	13,703	24,878	55%	84,238	18,179	102,417	18%	4,479	27,445	31,924	86%
2016	6,603	10,496	17,099	61%	59,055	12,443	71,498	17%	1,269	34,723	35,992	96%
2017	-	17,598	17,598	100%	19,398	12,034	31,432	38%	931	37,979	38,910	98%
2018	-	10,981	10,981	100%	8,320	6,604	14,924	44%	380	12,111	12,491	97%
2019	-	3,168	3,168	100%	8,824	3,371	12,195	28%	2712	19,291	22,003	88%
5-yr Ave.	3,556	11,189	14,745	83%	35,967	10,526	46,493	29%	1,954	26,310	28,264	93%
10-yr Ave.	5,990	11,475	17,465	70%	48,595	16,827	65,422	30%	12,540	46,701	59,241	86%

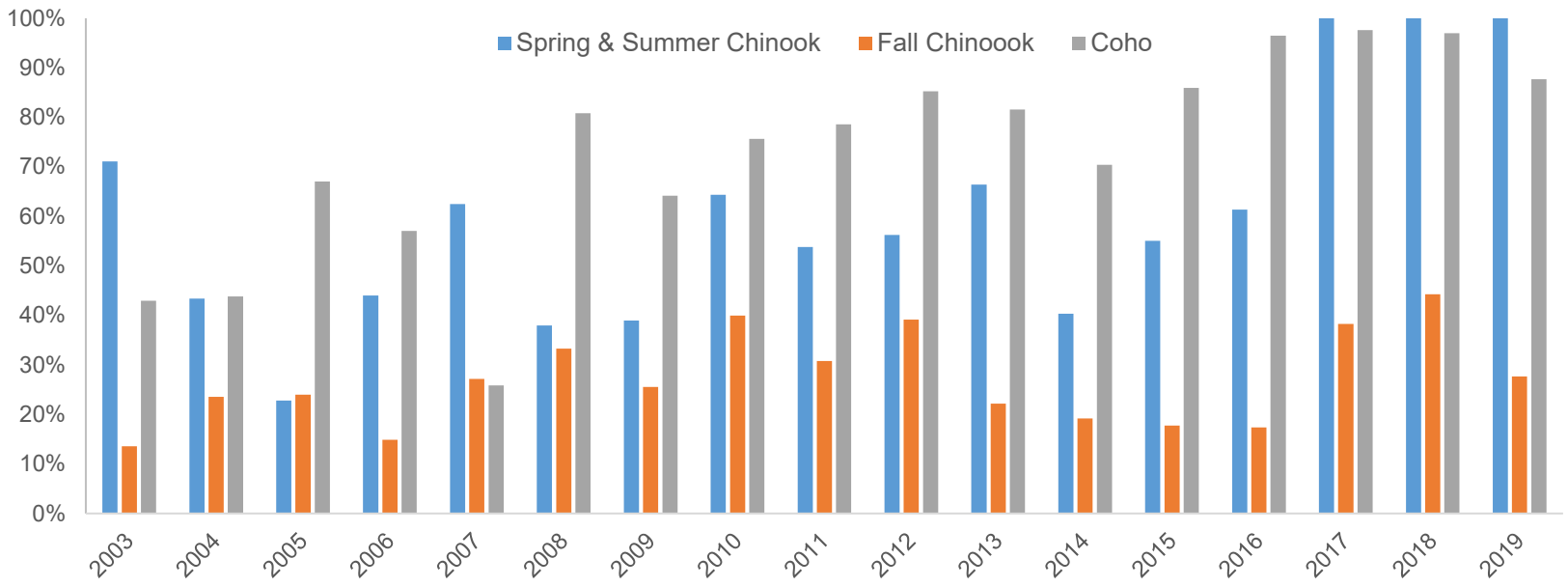


Figure 3.1. Contribution of Select Area commercial fisheries to the total Lower Columbia River (LCR) commercial harvest by species and stock, 2003-2019.

Table 3.6. Season dates and harvest of SAFE commercial fisheries, 1992–2019.

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

continued

Table 3.6. (continued)

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

continued

Table 3.6. (continued)

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

continued

Table 3.6. (continued)

Year	Area	Season	Dates	Days	Chinook	White Sturgeon
2015	Youngs Bay	Winter	Feb. 9 – Mar. 30	19	611	0
	Youngs Bay	Spring	Apr. 28 – Jun. 12	24	6,693	0
	Youngs Bay	Summer	Jun. 16 – Jul. 30	21	1,779	0
	Tongue Point/S. Channel	Winter	Feb. 9 – Mar. 13	10	70	0
	Tongue Point/S. Channel	Spring	Apr. 21 – Jun. 12	14	1,192	0
	Blind/Knappa Sloughs	Winter	Feb. 9 – Mar. 31	15	116	0
	Blind/Knappa Sloughs	Spring	Apr. 28 – Jun. 12	14	2,668	0
	Blind/Knappa Sloughs	Summer	Jun. 16 – Jul. 3	5	336	0
	Deep River	Winter	Feb. 9 – Mar. 31	15	94	0
	Deep River	Spring	Apr. 16 – Jun. 12	15	110	0
	Total			**152**	**13,669**	**0**
2016	Youngs Bay	Winter	Feb. 8 – Apr. 10	24	1,064	0
	Youngs Bay	Spring	Apr. 28 – Jun. 15	26	3,794	0
	Youngs Bay	Summer	Jun. 16 – Jul. 28	18	1,836	0
	Tongue Point/S. Channel	Winter	Feb. 8 – Mar. 11	10	109	0
	Tongue Point/S. Channel	Spring	Apr. 28 – Jun. 14	14	628	0
	Tongue Point/S. Channel	Summer	Jun. 16 – Jul. 19	10	369	0
	Blind/Knappa Sloughs	Winter	Feb. 8 – Mar. 29	20	140	0
	Blind/Knappa Sloughs	Spring	Apr. 28 – Jun. 14	14	1,619	0
	Blind/Knappa Sloughs	Summer	Jun. 16 – Jul. 19	10	858	0
	Deep River	Winter	Feb. 8 – Mar. 29	20	71	0
	Deep River	Spring	Apr. 19 – Jun. 14	15	8	0
	Total			**181**	**10,496**	**0**
2017	Youngs Bay	Winter	Feb. 6 – Apr. 17	28	630	0
	Youngs Bay	Spring	Apr. 20 – Jun. 15	27	7,346	0
	Youngs Bay	Summer	Jun. 19 – Jul. 27	17	2,823	31
	Tongue Point/S. Channel	Winter	Feb. 6 – Mar. 30	13	82	0
	Tongue Point/S. Channel	Spring	Apr. 20 – Jun. 13	14	1,952	0
	Tongue Point/S. Channel	Summer	Jun. 19 – Jul. 28	12	1,483	203
	Blind/Knappa Sloughs	Winter	Feb. 6 – Apr. 17	26	136	0
	Blind/Knappa Sloughs	Spring	Apr. 20 – Jun. 13	16	1,964	0
	Blind/Knappa Sloughs	Summer	Jun. 19 – Jul. 28	12	1,161	32
	Deep River	Winter	Feb. 6 – Mar. 31	16	8	0
	Deep River	Spring	Apr. 20 – May 19	9	13	0
	Total			**190**	**17,598**	**266**
2018	Youngs Bay	Winter	Feb. 5 – Apr. 16	28	737	0
	Youngs Bay	Spring	Apr. 19 – Jun. 15	30	4,796	52
	Youngs Bay	Summer	Jun. 18 – July 26	17	1,400	14
	Tongue Point/S. Channel	Winter	Feb. 5 – Apr. 16	28	177	0
	Tongue Point/S. Channel	Spring	Apr. 19 – Jun. 15	16	1,327	81
	Tongue Point/S. Channel	Summer	Jun. 18 – July 27	12	380	94
	Blind/Knappa Sloughs	Winter	Feb. 5 – Apr. 17	21	175	0
	Blind/Knappa Sloughs	Spring	Apr. 19 – Jun. 15	24	1,532	43
	Blind/Knappa Sloughs	Summer	Jun. 18 – July 27	12	457	12
	Total			**188**	**10,981**	**296**

Table 3.6. (continued)

Year	Area	Season	Dates	Days	Chinook	White Sturgeon
2019	Youngs Bay	Winter	Feb 4 – Apr. 8	27	445	14
	Youngs Bay	Spring	Apr. 29 – Jun. 14	27	1,418	127
	Youngs Bay	Summer	Jun. 17 -	19	260	21
	Tongue Point/S. Channel	Winter	Feb 4 – Apr. 12	24	154	5
	Tongue Point/S. Channel	Spring	Apr. 18 – Jun. 14	24	386	217
	Tongue Point/S. Channel	Summer	Jun. 17 – Jun. 28	4	5	56
	Blind/Knappa Sloughs	Winter	Feb 4 – Apr. 12	27	102	1
	Blind/Knappa Sloughs	Spring	Apr. 18 – Jun. 14	17	367	44
	Blind/Knappa Sloughs	Summer	Jun. 17 – Jun. 28	4	31	2
	Total			**173**	**3,168**	**487**

Table 3.7. Season dates and harvest of SAFE fall commercial fisheries, 1996–2019.

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

continued

Table 3.7. (continued)

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

continued

Table 3.7. (continued)

Year	Area	Dates	Days	Chinook	Coho	White Sturgeon
	Youngs Bay	Aug. 5 – Oct. 31	68	11,829	65,917	0
	Tongue Point/S. Channel	Aug. 25 – Oct. 31	46	5,460	50,752	0
2014	Blind/Knappa Sloughs	Aug. 25 – Oct. 31	46	4,661	24,573	0
	Deep River	Aug. 18 – Oct. 24	37	2,248	27,255	0
	Total		**197**	**24,198**	**168,497**	**0**
	Youngs Bay	Aug. 4 – Oct. 30	63	6,765	11,461	0
	Tongue Point/S. Channel	Aug. 24 – Oct. 30	46	3,614	9,721	0
2015	Blind/Knappa Sloughs	Aug. 24 – Oct. 30	46	3,405	1,698	0
	Deep River	Aug. 17 – Oct. 20	36	4,303	4,519	0
	Total		**191**	**18,087**	**27,399**	**0**
	Youngs Bay	Aug. 2 – Oct. 31	65	6,398	15,784	0
	Tongue Point/S. Channel	Aug. 24 – Oct. 28	36	2,007	11,284	0
2016	Blind/Knappa Sloughs	Aug. 24 – Oct. 28	40	2,027	1,493	0
	Deep River	Aug. 1 – Oct. 19	45	1,999	6,162	0
	Total		**186**	**12,431**	**34,723**	**0**
	Youngs Bay	Aug. 1 – Oct. 31	68	6,277	13,603	115
	Tongue Point/S. Channel	Aug. 28 – Oct. 27	34	2,251	12,534	82
2017	Blind/Knappa Sloughs	Aug. 28 – Oct. 27	34	1,636	2,460	9
	Deep River	Aug. 21 – Oct. 13	35	1,870	9,382	31
	Total		**171**	**12,034**	**37,979**	**237**
	Youngs Bay	Aug. 1 – Oct. 31	57	2,945	4,229	52
	Tongue Point/S. Channel	Aug. 27 – Oct. 26	29	1,035	3,682	32
2018	Blind/Knappa Sloughs	Aug. 27 – Oct. 26	34	1,401	1,477	23
	Deep River	Aug. 27 – Oct. 12	23	1,223	2,723	10
	Total		**143**	**6,604**	**12,111**	**117**
	Youngs Bay	Aug. 6 – Oct. 31	67	853	3589	88
	Tongue Point/S. Channel	Aug. 26 – Oct. 25	34	879	7229	106
2019	Blind/Knappa Sloughs	Aug. 26 – Oct. 25	34	953	7269	4
	Deep River	Aug 26 – Nov 29	60	686	1204	14
	Total		**195**	**3,371**	**19,291**	**212**

Table 3.8. Ex-vessel values of Chinook landings in winter, spring, and summer Select Area commercial fisheries, 2006-2019.

Year	Site	Winter			Spring			Summer			Total
		Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	
2006	Youngs Bay	6,920	$5.88	$40,690	53,411	$4.91	$262,248	6,265	$2.73	$17,103	$320,041
	Blind Slough	2,276	$5.94	$13,519	13,964	$4.90	$68,424	0			$81,943
	Tongue Point	0						0			$0
	Deep River	0			362	*$4.90*	$1,774	0			$1,774
	Totals	***9,196***	***$5.89***	***$54,209***	***67,737***	***$4.91***	***$332,446***	***6,265***	***$2.73***	***$17,103***	***$403,758***
2007	Youngs Bay	13,582	$7.97	$108,249	59,079	$4.59	$271,173	3,975	$3.55	$14,111	$393,533
	Blind Slough	1,386	$6.94	$9,619	20,832	$4.65	$96,869	0			$106,488
	Tongue Point	0						0			$0
	Deep River	0			439	*$4.65*	$2,041	0			$2,041
	Totals	***14,968***	***$7.87***	***$117,868***	***80,350***	***$4.61***	***$370,083***	***3,975***	***$3.55***	***$14,111***	***$502,062***
2008	Youngs Bay	3,425	$10.63	$36,408	23,460	$6.45	$151,317	16,484	$3.59	$59,178	$246,903
	Blind Slough	779	$10.09	$7,860	11,290	$6.06	$68,417	0			$76,277
	Tongue Point	0			3,323	$6.14	$20,403	0			$20,403
	Deep River	0			328	*$6.06*	$1,988	0			$1,988
	Totals	***4,204***	***$10.53***	***$44,268***	***38,401***	***$6.31***	***$242,125***	***16,484***	***$3.59***	***$59,178***	***$345,571***
2009	Youngs Bay	2,369	$8.11	$19,213	22,229	$4.79	$106,477	16,957	$2.89	$49,006	$174,695
	Blind Slough	1,408	$8.13	$11,447	8,641	$4.67	$40,353	0			$51,801
	Tongue Point	0			1,572	$5.00	$7,860	0			$7,860
	Deep River	579	*$8.13*	$4,707	1,146	*$4.67*	$5,352	0			$10,059
	Totals	***4,356***	***$8.12***	***$35,367***	***33,588***	***$4.76***	***$160,042***	***16,957***	***$2.89***	***$49,006***	***$244,415***
2010	Youngs Bay	13,580	$9.17	$124,523	214,631	$4.66	$1,000,558	13,340	$3.45	$45,993	$1,171,074
	Blind Slough	4,548	$8.42	$38,302	30,262	$4.65	$140,801	0			$179,103
	Tongue Point	0			8,593	$4.16	$35,743	0			$35,743
	Deep River	3,206	$7.68	$24,608	2,126	$6.25	$13,283	0			$37,890
	Totals	***21,334***	***$8.79***	***$187,433***	***255,612***	***$4.66***	***$1,190,379***	***13,340***	***$3.45***	***$45,993***	***$1,423,810***
2011	Youngs Bay	1,353	$9.45	$12,780	89,857	$5.95	$534,384	28,220	$3.09	$87,220	$634,383
	Blind Slough	1,930	$8.50	$16,399	20,408	$5.93	$121,031	0			$137,429
	Tongue Point	0			9,057	$6.00	$54,347	0			$54,347
	Deep River	320	$8.97	$2,871	1,148	$6.34	$7,284	0			$10,155
	Totals	***3,603***	***$8.90***	***$32,049***	***120,470***	***$5.95***	***$717,045***	***28,220***	***$3.09***	***$87,220***	***$836,314***
2012	Youngs Bay	4,265	$9.68	$41,292	72,001	$5.91	$425,342	29,319	$3.94	$115,603	$582,238
	Blind Slough	623	$10.04	$6,256	10,310	$5.83	$60,059	0			$66,315
	Tongue Point	0			6,324	$5.77	$36,492	0			$36,492
	Deep River	89	$10.12	$901	464	$5.67	$2,633	0			$3,534
	Totals	***4,977***	***$9.73***	***$48,449***	***89,099***	***$5.89***	***$524,526***	***29,319***	***$3.94***	***$115,603***	***$688,579***

Table 3.8. (continued)

Year	Site	Winter			Spring			Summer			Total
		Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.)	Ex-vessel value	
2013	Youngs Bay	4,828	$11.29	$54,486	55,423	$7.20	$399,200	33,364	$4.21	$140,296	$593,981
	Blind Slough	2,220	$11.07	$24,577	9,840	$7.25	$71,381	0			$95,957
	Tongue Point	1,035	$12.18	$12,605	3,941	$7.25	$28,556	0			$41,161
	Deep River	1,042	$10.02	$10,446	696	$8.24	$5,736	0			$16,182
	Totals	***9,125***	***$11.19***	***$102,113***	***69,900***	***$7.22***	***$504,872***	***33,364***	***$4.21***	***$140,296***	***$747,280***
2014	Youngs Bay	3,393	$13.02	$44,170	25,064	$5.59	$140,136	29,454	$3.43	$101,152	$285,459
	Blind Slough	2,391	$12.24	$29,262	3,567	$5.86	$20,890	0			$50,152
	Tongue Point	493	$14.73	$7,260	489	$5.73	$2,804	0			$10,064
	Deep River	543	$11.50	$6,242	287	$6.65	$1,908	0			$8,150
	Totals	***6,820***	***$12.75***	***$86,934***	***29,407***	***$5.64***	***$165,738***	***29,377***	***$3.44***	***$100,963***	***$353,824***
2015	Youngs Bay	8,016	$10.03	$80,399	73,382	$6.12	$449,240	21,464	$3.43	$73,540	$603,178
	Blind Slough	1,436	$9.97	$14,322	28,411	$6.50	$184,698	4,083	$3.62	$14,785	$213,805
	Tongue Point	964	$10.96	$10,561	13,343	$5.75	$76,761	0			$87,322
	Deep River	1,264	$10.21	$12,901	1,249	$7.69	$9,609	0			$22,510
	Totals	***11,680***	***$10.12***	***$118,182***	***116,385***	***$6.19***	***$720,308***	***25,547***	***$3.46***	***$88,325***	***$926,815***
2016	Youngs Bay	14,665	$11.48	$168,395	44,865	$7.41	$332,444	23,726	$4.75	$112,743	$613,582
	Blind Slough	1,937	$11.25	$21,784	19,436	$7.31	$142,070	10,727	$4.74	$50,837	$214,690
	Tongue Point	1,538	$10.95	$16,847	7,222	$7.28	$52,611	4,480	$4.85	$21,725	$91,183
	Deep River	915	$10.00	$9,153	100	$6.58	$658	0			$9,811
	Totals	***19,055***	***$11.34***	***$216,179***	***71,623***	***$7.37***	***$527,782***	***38,933***	***$4.76***	***$185,305***	***$929,266***
2017	Youngs Bay	7,752	$12.21	$94,657	79,216	$8.28	$655,909	31,889	$5.30	$169,053	$919,619
	Blind Slough	1,696	$12.25	$20,784	21,231	$8.42	$178,731	13,786	$4.71	$64,937	$264,452
	Tongue Point	1,162	$14,37	$16,700	21,477	$8.60	$184,668	17,095	$4.38	$74,838	$276,206
	Deep River	132	$14.70	$1,940	173	$8.82	$1,526	0			$3,465
	Totals	***10,742***	***$13.90***	***$134,081***	***122,097***	***$8.53***	***$1,020,834***	***62,770***	***$4.80***	***$308,828***	***$1,463,743***
2018	Youngs Bay	9,287	$15.26	$141,674	55,993	$10.95	$613,019	16,945	$6.06	$102,638	$857,331
	Blind Slough	2,290	$15.50	$34,327	19,420	$10.95	$212,578	5,898	$5.74	$33,841	$280,746
	Tongue Point	2,299	$14.99	$35,636	16,931	$11.54	$195,361	5,060	$5.39	$27,285	$258,282
	Deep River	0			0			0		$0	$0
	Totals	***13,876***	***$15.25***	***$211,637***	***92,344***	***$11.14***	***$1,020,958***	***27,903***	***$5.73***	***$163,764***	***1,396,359***
2019	Youngs Bay	5,813	$15.65	$90,969	17,149	$9.97	$171,001	3,425	$5.55	$19,011	$280,981
	Blind Slough	1,356	$15.81	$21,433	4,640	$11.66	$54,085	446	$5.71	$2,548	$78,066
	Tongue Point	1,990	$16.98	$33,797	4,594	$11.92	$54,764	67	$5.15	$345	$88,906
	Deep River	0			0			0			$0
	Totals	***9,159***	***$16.15***	***$146,199***	***26,383***	***$11.18***	***$279,850***	***3,938***	***$5.47***	***$21,904***	***$447,953***

Table 3.9. Ex-vessel values of fall season Chinook and Coho landings in Select Area commercial fisheries by site, 2006–2019.

Year	Site	Chinook			Coho			Total
		Landings (pounds)	Ave. price ($/lb.) [1]	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.) [2]	Ex-vessel value	
2006	Youngs Bay	52,370	$2.10	$109,977	218,567	$1.31	$286,323	$396,300
	Blind Slough	3,543	$0.61	$2,161	29,603	$1.31	$38,780	$40,941
	Tongue Point	4,470	$1.62	$7,241	118,130	$1.31	$154,750	$161,992
	Deep River	2,490	$2.32	$5,777	23,466	$1.29	$30,271	$36,048
	Totals	***62,873***	***$1.99***	***$125,156***	***389,766***	***$1.31***	***$510,124***	***$635,281***
2007	Youngs Bay	41,640	$2.90	$120,756	28,020	$1.45	$40,629	$161,385
	Blind Slough	1,143	$0.80	$914	20,042	$1.50	$30,063	$30,977
	Tongue Point	2,520	$2.10	$5,292	18,034	$1.46	$26,330	$31,622
	Deep River	1,834	$1.46	$2,678	22,710	$1.54	$34,973	$37,651
	Totals	***47,137***	***$2.75***	***$129,640***	***88,806***	***$1.49***	***$131,995***	***$261,635***
2008	Youngs Bay	138,072	$2.74	$378,317	284,773	$1.28	$364,509	$742,827
	Blind Slough	37,794	$1.34	$50,644	45,287	$1.38	$62,496	$113,140
	Tongue Point	17,905	$1.84	$32,945	77,756	$1.36	$105,748	$138,693
	Deep River	3,456	$2.52	$8,709	174,308	$1.37	$238,802	$247,511
	Totals	***197,227***	***$2.39***	***$470,616***	***582,124***	***$1.33***	***$771,556***	***$1,242,171***
2009	Youngs Bay	97,439	$1.85	$180,262	459,102	$1.24	$569,286	$749,549
	Blind Slough	76,615	$0.87	$66,655	87,092	$1.08	$94,059	$160,714
	Tongue Point	10,910	$1.40	$15,274	155,886	$1.22	$190,181	$205,455
	Deep River [12]	7,771	$1.63	$12,628	38,689	$1.08	$41,784	$54,412
	Totals	***192,735***	***$1.43***	***$274,819***	***740,769***	***$1.21***	***$895,311***	***$1,170,130***
2010	Youngs Bay	104,827	$1.98	$207,203	283,063	$1.36	$384,500	$591,703
	Blind Slough	192,148	$0.88	$168,788	50,832	$1.31	$66,794	$235,582
	Tongue Point	18,333	$1.39	$25,535	68,158	$1.41	$95,878	$121,413
	Deep River	11,244	$1.50	$16,827	193,834	$1.23	$239,118	$255,912
	Totals	***326,552***	***$1.28***	***$418,353***	***595,887***	***$1.32***	***$786,257***	***$1,204,611***
2011	Youngs Bay	169,666	$2.44	$413,962	255,795	$1.63	$417,795	$831,757
	Blind Slough	106,812	$0.93	$99,404	11,511	$1.74	$20,066	$119,470
	Tongue Point	36,653	$1.58	$58,001	59,860	$1.73	$103,428	$161,429
	Deep River	34,030	$1.48	$50,211	140,006	$1.53	$213,829	$264,040
	Totals	***347,161***	***$1.79***	***$621,578***	***467,172***	***$1.62***	***$755,117***	***$1,376,696***
2012	Youngs Bay	190,858	$1.72	$327,964	45,335	$1.59	$72,060	$400,024
	Blind Slough	53,249	$0.89	$47,393	11,137	$1.69	$18,768	$66,161
	Tongue Point	31,586	$1.25	$39,520	27,843	$1.57	$43,831	$83,351
	Deep River	19,355	$1.37	$26,531	24,556	$1.58	$38,834	$65,365
	Totals	***295,048***	***$1.50***	***$441,408***	***108,871***	***$1.59***	***$173,493***	***$614,901***

Table 3.9. (continued)

Year	Site	Chinook			Coho			Total
		Landings (pounds)	Ave. price ($/lb.) [1]	Ex-vessel value	Landings (pounds)	Ave. price ($/lb.) [2]	Ex-vessel value	
2013	Youngs Bay	198,365	$2.66	$526,932	112,696	$1.90	$213,856	$740,788
	Blind Slough	33,724	$1.56	$52,480	27,164	$1.68	$45,551	$98,031
	Tongue Point	76,660	$2.18	$167,471	104,655	$1.83	$191,613	$359,084
	Deep River	19,296	$1.80	$34,680	70,902	$1.80	$127,894	$162,574
	Totals	***328,045***	***$2.38***	***$781,563***	***315,417***	***$1.84***	***$578,914***	***$1,360,477***
2014	Youngs Bay	153,929	$1.84	$282,531	595,572	$1.15	$683,291	$965,822
	Blind Slough	68,055	$1.25	$85,193	179,407	$1.17	$209,531	$294,724
	Tongue Point	65,760	$1.43	$94,266	436,516	$1.15	$504,035	$598,301
	Deep River	24,532	$1.43	$35,018	226,281	$1.00	$225,800	$260,818
	Totals	***312,276***	***$1.59***	***$497,008***	***1,437,776***	***$1.13***	***$1,622,657***	***$2,119,665***
2015	Youngs Bay	76,886	$1.95	$150,174	80,069	$1.46	$116,786	$266,960
	Blind Slough	43,903	$1.49	$65,328	11,346	$1.63	$18,458	$83,786
	Tongue Point	43,234	$1.84	$79,589	67,032	$1.54	$103,449	$183,037
	Deep River	48,290	$1.77	$85,610	29,900	$1.63	$48,856	$134,465
	Totals	***212,313***	***$1.79***	***$380,700***	***188,347***	***$1.53***	***$287,548***	***$668,248***
2016	Youngs Bay	61,558	$2.58	$159,069	119,795	$1.79	$215,007	$374,076
	Blind Slough	25,731	$1.80	$46,239	11,794	$1.94	$22,858	$69,097
	Tongue Point	20,133	$2.22	$44,756	81,952	$1.90	$155,881	$200,637
	Deep River	22,880	$2.46	$56,335	47,343	$1.86	$88,147	$144,482
	Totals	***130,302***	***$2.35***	***$306,399***	***260,884***	***$1.85***	***$481,893***	***$788,292***
2017	Youngs Bay	65,507	$2.63	$172,422	104,747	$2.01	$210,228	$382,650
	Blind Slough	19,941	$1.86	$37,122	18,093	$2.07	$37,441	$74,563
	Tongue Point	24,170	$2.60	$69,942	93,169	$2.08	$193,546	$256,488
	Deep River	18,863	$2.69	$50,768	68,779	$2.04	$140,434	$191,202
	Totals	***128,481***	***$2.45***	***$323,253***	***284,788***	***$2.05***	***$581,649***	***$904,902***
2018	Youngs Bay	31,926	$2.94	$94,001	33,769	$2.01	$67,859	$161,860
	Blind Slough	17,609	$2.26	$39,762	10,422	$1.94	$20,201	$59,963
	Tongue Point	11.970	$2.84	$33,968	24,679	$1.94	$47,947	$81,915
	Deep River	13,199	$2.46	$32,448	20,398	$1.83	$37,395	$69,842
	Totals	***74,704***	***$2.62***	***$200,179***	***89,268***	***$1.93***	***$173,401***	***$373,580***
2019	Youngs Bay	9,755	$1.95	$19,008	22,877	$1.66	$37,971	$56,979
	Blind Slough	11,432	$1.34	$15,319	44,402	$1.67	$74,068	$89,387
	Tongue Point	9,096	$1.82	$16,555	45,423	$1.74	$79,063	$95,618
	Deep River	7,658	$1.63	$7,658	7,358	$1.94	$14,302	$26,777
	Totals	***37,941***	***$1.68***	***$63,357***	***120,060***	***$1.75***	***205,404***	***$268,761***

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

4. RUN RECONSTRUCTION and SMOLT-TO-ADULT SURVIVAL

cohort reconstruction and rates of smolt-to-adult survival (SAS) was calculated using data retrieved from the Regional Mark Processing Center (RMPC) coded-wire tag database (www.rmpc.org). For each relevant tag group, all CWT recoveries reported as of April 2020 were used to calculate SAS and rates of return to for salmon released from the SAFE project. CWT groups were used as a surrogate for associated non-tagged release groups. Survival rates were calculated separately for sub-adults (jacks) and adults based on age-specific CWT recoveries. Survival rates in this report represent smolt-to-adult rates and do not include jack survival. Adult returns are categorized by type of recovery (e.g., ocean or freshwater fishery, commercial or recreational fishery, hatchery or stream escapement) to determine a rate of return (or contribution) to regional fisheries and escapement.

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

Recovery Estimation Equations

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

$$R_T = aR_O;$$

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

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

$$C = bR_T;$$

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

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

Reporting

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

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

Equation 1:

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

Where:

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

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

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

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

Estimating rates of survival and straying is an extensive process for various reasons. The life history patterns of salmon introduce inherent delays into the process; it takes six years for a complete spring Chinook cohort to return. Preliminary tag recovery, catch sampling, and fishery effort data should be reported to the RMPC by January 31 of the year following the run year (PSC 2017). In practice however, reporting agencies require a substantial amount of time to process and report finalized CWT recovery data to the RMPC. The RMPC database is continually updated as new information becomes available from the individual reporting agencies. As a result, final recoveries of all age classes of a study group may not be accessible for up to eight years post-release. In this report, smolt-to-adult survival and run reconstruction for spring Chinook, SAB and tule fall Chinook are reported through brood year 2014 and Coho reported through brood year 2015 with the caveat that recoveries reported for the last brood year are provisional. There may be additional recoveries reported either from older age classes of adults returning (i.e., sixth year Chinook) or delayed reporting, which could change results.

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

SPRING CHINOOK

Run reconstruction and survival for spring Chinook included in this report were based on recoveries of 25,430 CWT (adults) from 165 tag-groups released between 1998 and 2016 (brood years 1996 – 2014) from SAFE production facilities. This includes tag groups released from net-pens in Youngs

Bay (41 groups), Blind Slough (65), Tongue Point (30), and Deep River (22), South Fork Klaskanine Hatchery (3 tag groups), North Fork Klaskanine Hatchery (1), and Cathlamet Channel net pens (3). These data were used for survival comparisons between SAFE sites for all brood years within the range although fish were not released from all sites in all years.

Smolt-to-Adult Survival Rates

Survival of SAFE spring Chinook was variable between years and release sites by an order of magnitude. However, there appears to be some correlation among sites in years when survival was particularly high or particularly low. This may suggest that a common factor affected survival after the fish were reared and released, such as prevailing estuarine and ocean conditions. Average survival (unweighted by year) for all release sites was 0.58% for brood years 1996 – 2014 (Table 4.1). The average brood-specific survival rates ranged between 0.07 – 1.33%. Spring Chinook released from Youngs Bay net-pens had the highest average survival (0.96%) among the release sites for the brood years considered. Survival of fish released from Blind Slough and Tongue Point averaged 0.55% and 0.49%, respectively. Deep River survival averaged 0.21% (1996 – 2011 when releases of yearling spring Chinook were discontinued) with no indication of survival for the last five brood years considered.

Run Reconstruction

Table 4.2 and Figure 4.2 depict the average (unweighted by year) distribution rates of SAFE releases to fisheries and return areas for brood years 1996 – 2014. The majority (94.0%) of SAFE-produced spring Chinook were recovered in fisheries with a large portion (77.5%) harvested in Select Area commercial fisheries specifically. SAFE spring Chinook also contributed to commercial and recreational fisheries in the ocean and Columbia River mainstem. The high rates of return to fisheries observed for SAFE spring Chinook upholds one of the SAFE projects primary goals, maximize harvest of local stocks in order to achieve the greatest economic value of the project, while minimizing adverse impacts of the program.

The high rates of harvest of SAFE spring Chinook contributed to a low escapement rate; only 6.0% of returning SAFE-produced spring Chinook avoided catch in fisheries and were recovered at hatcheries or spawning grounds. Escapement is split into non-natal and natal returns and categorized as returns to hatcheries or spawning grounds. For the purposes of the SAFE program, we consider escapement as natal if the tags are recovered in the Select Area basins (i.e., tributaries and hatcheries in Youngs Bay, Blind Slough, Tongue Point, and Deep River basins) and non-natal (stray) if recovered anywhere else in the Columbia and Willamette River watershed. Spring Chinook stray rates averaged 3.1% for brood years 1996-2014, with very limited (0.13%) straying above Bonneville Dam. Spring Chinook stray rates varied annually but, patterns can be described by periods: early years of the program (BY1996-2001) were marked by high stray rates ranging from 5.3%-11.3%; low stray rates (0.04%-1.86%) characterized BY 2002 and 2011; increased stray rates were observed in BY 2012 and 2013, 5.0% and 4.1%, respectively, and; the stray rate in BY 2014 was back down to 1.9% (although BY 2014 should be regarded as a provisional estimate). Recoveries of CWT spring Chinook to non-natal hatcheries below Bonneville Dam comprise the majority of the straying (225 recoveries, 1996-2014), while only five tagged spring Chinook in hatcheries upstream of Bonneville Dam were recovered. Most commonly, strays were reported from Cowlitz or Clackamas hatcheries.

Analysis of returns by release site suggests that Youngs Bay and Blind Slough releases performed the best with stray rates of 1.81% and 0.90%, respectively (brood years 1996 – 2014). Releases from Tongue Point strayed at a higher rate (8.39%) and Deep River releases strayed the most (11.21%).

Recent recoveries since the last report (2011-2014 broods) indicated stray rates decreased for spring Chinook released from Blind Slough (0.61%) and increased slightly for releases at Youngs Bay and Tongue Point, 1.83 and 9.73%, respectively. Brood 2011 was the last year that yearling spring Chinook were released at Deep River. No strays reported from the seven estimated adults that returned to Deep River from BY 2011. The program was paused at Deep River between BY 2012 and 2016 due to poor returns (1996-2011 average SAS 0.29%). Releases of sub-yearling spring Chinook began at Deep River in 2017.

COHO

Run reconstruction and survival for Coho included in this report were based on estimated recoveries of 73,154 CWTs from 163 tag-groups released between 1998 and 2017 (1996 – 2015 brood years) from SAFE production facilities. The CWT groups include 47 tag groups released from net-pens in Youngs Bay, 18 from South Fork Hatchery, 13 from Klaskanine Hatchery, 26 from Blind Slough net-pens, 30 from Tongue Point net-pens, and 29 tag groups from Deep River net-pens. These data were used for comparisons of survival between SAFE sites for all brood years within the range but fish were not released from all sites every year.

Smolt-to-Adult Survival Rates

Survival of SAFE Coho was variable between years and release sites. As with spring Chinook, trends in survival were similar for many years across most sites (Figure 4.1). Average survival (unweighted by year) for all release sites, brood years 1996 – 2015, was 1.63% (range 0.43 – 4.32%, Table 4.3). Coho released from Tongue Point and Youngs Bay net pens had the highest average survival rates (2.14% and 1.92%, respectively) followed by South Fork Klaskanine Hatchery (1.70%), Deep River net pens (1.63%), North Fork Klaskanine (1.35%), and Blind Slough (1.05%). Except for South and North Fork Klaskanine, releases were continuous since 1996. Releases began from North Fork Klaskanine in 2006 and there was a period of no releases from South Fork Klaskanine from 2002 through 2005, resuming in 2006.

Run Reconstruction

Coho produced by the SAFE program mad the greatest contribution to fisheries of all SAFE stocks and likely of any salmonid hatchery program in the region. Nearly all returning adults (96.6%) were harvested in fisheries and the majority (69.2%) were harvest in the Select Area commercial fisheries (1996-2015, brood years). Releases from Youngs Bay, Blind Slough, and Deep River performed similarly with return rates to Select Area fisheries of 75.4%, 70.7%, and 68.6%, respectively. Tongue Point, South Fork Klaskanine, and North Fork Klaskanine, releases contributed at slightly lower rates of 62.4%, 58.3%, and 55.6%, respectively. Tongue Point and Blind Slough releases also contributed to mainstem Columbia River commercial fisheries at significant rates (14.7% and 11.3%, respectively). As with Spring Chinook, the high rates of return to fisheries of SAFE-produced Coho indicate that the project is achieving its primary goals.

Analysis of CWT recoveries from brood years 1996 – 2015 indicated that average escapement rates of SAFE-produced Coho were very low (3.4%) and consisted almost entirely of recoveries at hatcheries (3.3%, spawning ground escapement 0.1%). Average non-natal stray rate in streams and hatcheries was 0.46% with no evidence straying above Bonneville Dam. Recent stray rates for Coho since last reported was 0.17% for BY 2011-2015.

Analysis of returns by origin suggests that straying of Coho released from North Fork Klaskanine Hatchery had the least straying (0.23%) but was limited to 2006-2015 brood years. Youngs Bay

releases performed well with non-natal stray rates of 0.24% (brood years 1996 – 2015). Deep River, South Fork, and Blind Slough releases strayed at rates of 0.44%, 0.47%, and 0.61%, respectively. Stray rates from Tongue Point releases were highest at 0.81%.

SELECT AREA BRIGHT FALL CHINOOK (SAB)

Run reconstruction and estimates of survival for SAB fall Chinook included in this report (1996 – 2014 brood years) were based on 19,532 recoveries from 80 CWT groups released between 1997 and 2016 from SAFE production facilities. Broodstock for the SAB Fall Chinook program were produced at Big Creek (BY 1991-2005), Klaskanine (BY 1995-2004, 2012-present), and South Fork Klaskanine (BY 2004-2015) hatcheries for releases in Youngs Bay net pens and Klaskanine and South Fork Klaskanine hatcheries. Tagged groups included 48 released from net-pens in Youngs Bay, 11 from South Fork Klaskanine Hatchery, and 21 from Klaskanine Hatchery.

Smolt-to-Adult Survival Rates

Survival of SAB fall Chinook varied annually but there appears to be a similar effect of brood year among release sites. This suggests that there may be a common factor (e.g., estuarine and ocean conditions) affecting survival after rearing and release. Average survival (unweighted by year) for all release sites was 0.92% (range 0.11 – 2.32%, brood years 1996 – 2014, Table 4.4). Average adult smolt-to-adult survival for releases from net-pens and hatcheries was 0.91% and 0.67%, respectively. For the more recent period since the last report, average survival was 0.54% for BY 2011-2014.

Run Reconstruction

SAB fall Chinook contribute substantially to a variety of fisheries (Table 4.2; Figure 4.2). As with the other SAFE-produced salmon, the majority of adult SABs for brood years 1996 – 2014 were harvested (89.5%). Significant harvest occurred in the Select Area commercial fishery (44.9% of adults), but a large share was also harvested in ocean commercial fisheries (18.8%). The rest of the return was harvested in ocean and mainstem Columbia River recreational (20.2%, majority of this in the Buoy 10 fishery) and commercial fisheries (5.6%). Some SAB adults escaped fisheries and were recovered in streams (1.8%) and hatcheries (8.8%). Because SAB fall Chinook are spawned and reared at SAFE hatcheries, returns to the facilities are necessary. Broodstock return rates to SAFE hatcheries was 14.5% and net-pen reared SABs returns to SAFE hatcheries was 1.4%. More recently, BY 2011-2014 brood years averaged higher harvest rates than the long-term average, 96.3% compared to 89.5%, and escapement was down to 3.7%. For BY 2011-2014, 38.4% was harvested in SAFE fisheries, 39.2% by ocean and Columbia River sport fisheries, and 18.6% by ocean and non-SAFE mainstem Columbia River commercial fisheries.

Straying of SAB fall Chinook includes recoveries from non-SAFE hatcheries and spawning grounds in Oregon and Washington. The SAFE program has managed stray rates by changing production and release sites. In 1991, SAB fall Chinook production began at Big Creek Hatchery. Releases from Big Creek Hatchery ended in 1995 due to high stray rates (13.8% for BY 1991-1995) and then were released from Youngs Bay net pens (BY 1996-2004); SAB production at Big Creek was discontinued in 2006 when it was shifted to Klaskanine Hatchery, beginning with 2005 brood (North et al. 2006). This was a very successful decision resulting in a 12.2% decrease in straying to a rate of 1.6% for 1996 to 2014 brood years for releases from Youngs Bay net pens and Klaskanine and South Fork Klaskanine hatcheries. Klaskanine Hatchery had been rearing SAB fall Chinook before Big Creek production was shifted and contributed fish to the SAB program from 1996 to 2004 brood years and

2012 to present. South Fork Klaskanine began raising SAB fall Chinook with 2004 broodstock but discontinued production after 2015 brood because the majority (94%) of strays entered Washington hatcheries and streams. Of the estimated 305 adult SAB strays initially released from South Fork Klaskanine Hatchery, BY 2004-2015, 78.2% were recovered in Washington rivers and 15.8% in Washington hatcheries. Washington tributaries in the Lower Columbia River Estuary received most SAB strays (68.1%), predominated by Grays River (50.4%); the remaining 10.2% were recovered upstream of Bonneville Dam in Wind and White Salmon rivers (7.0% and 3.2%, respectively). Washington hatcheries that received the most strays were Cowlitz, Grays River and Elochoman hatcheries, 6.5%, 3.7%, and 3.7%, respectively.

Comparison of stray rates between release strategies suggests that Youngs Bay net-pens performed the best with an average stray rate of 0.78% (1996-2014 brood years) compared with releases from the hatcheries, which strayed at a rate of 2.75% for the same brood years. Direct comparison between South Fork Klaskanine and Klaskanine Hatcheries is confounded because of different release years between sites. However, the stray rate for releases from South Fork Klaskanine releases was 3.97% (BY 2004-2014) and that of Klaskanine Hatchery was 1.10% (BY 1996-2004, 2012-2014).

Table 4.1. Smolt-to-adult survival of SAFE spring Chinook by release site, brood years 1996-2014.

	Survival Rates By Release Site[1]						
Brood Year	South Fork Klaskanine	North Fork Klaskanine	Youngs Bay Net-pens	Blind Slough Net-pens	Tongue Point Net-pens	Deep River Net-pens	All Sites Annual Average [2]
1996			1.48%	0.33%	0.74%	0.02%	0.82%
1997			1.20%	0.78%	0.94%	1.25%	1.02%
1998			0.92%	1.83%	1.20%		1.33%
1999			1.53%	1.19%		0.36%	1.21%
2000			0.54%	1.32%		1.27%	1.05%
2001			0.07%	0.04%	0.35%	0.18%	0.12%
2002	0.59%		1.37%	0.18%	0.61%	0.00%	0.36%
2003	0.07%		0.10%	0.07%	0.30%	0.00%	0.10%
2004	0.01%		0.45%	0.40%	0.35%	0.04%	0.31%
2005			0.75%	0.15%	0.33%	0.01%	0.26%
2006			3.34%	0.69%	0.20%	0.02%	0.89%
2007			0.63%	0.18%	0.20%	0.00%	0.23%
2008			1.14%	0.38%	1.16%	0.00%	0.82%
2009			0.18%	0.11%	0.25%	0.00%	0.13%
2010			0.16%	0.07%	0.03%	0.00%	0.07%
2011			1.89%	1.27%	0.07%	0.00%	0.56%
2012			0.90%	0.20%	0.63%		0.61%
2013			1.10%	0.82%	0.87%		0.88%
2014[3]		0.13%	0.47%	0.35%	0.12%		0.31%
Average [4]	*0.22%*	*0.13%*	*0.96%*	*0.55%*	*0.49%*	*0.21%*	*0.59%*
SD [5]	*0.32%*		*0.79%*	*0.52%*	*0.38%*	*0.44%*	*0.41%*

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

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

		Spring Chinook (BY 1996-2014)	Coho (BY 1996-2015)	SAB Fall Chinook (BY 1996-2014)
Commercial Fisheries	Select Area	77.5%	69.2%	44.9%
	Columbia River Mainstem	4.3%	6.4%	5.6%
	Ocean	8.3%	0.8%	18.8%
	subtotal	***90.1%***	***76.4%***	***69.3%***
Recreational Fisheries	Ocean	1.0%	13.5%	9.4%
	Freshwater [1]	2.8%	6.6%	10.8%
	subtotal	***3.8%***	***20.1%***	***20.2%***
Escapement	Hatcheries	4.8%	3.3%	8.8%
	Streams	1.2%	0.1%	1.7%
	subtotal	***6.0%***	***3.4%***	***10.5%***
Miscellaneous	Other Recoveries[2]	0.1%	0.1%	0.0%

[1] Includes Columbia River Mainstem, Select Areas, and Columbia River tributaries
[2] Includes recoveries in ocean surveys and coastal tributaries.

Table 4.3. Smolt-to-Adult survival of SAFE project Coho, brood years 1996-2015.

Brood Year	Survival Rates By Release Site[1]						All Sites Average [2]
	South Fork Klaskanine	North Fork Klaskanine	Youngs Bay Net-pens	Blind Slough Net-pens	Tongue Point Net-pens	Deep River Net-pens	
1996	0.93%		0.92%	1.55%	3.87%	1.42%	1.22%
1997	0.50%		1.65%	0.73%	1.43%	5.48%	2.14%
1998	3.88%		2.09%	2.21%	3.29%	0.60%	2.19%
1999	2.90%		1.96%	0.00%	1.80%	0.05%	1.33%
2000	7.59%		5.93%	2.34%	3.93%	2.03%	4.30%
2001	1.21%		1.95%	0.04%	2.68%	1.71%	1.60%
2002			3.04%	0.01%	4.07%	0.37%	2.21%
2003			1.26%	0.54%	3.29%	2.17%	1.66%
2004			0.31%	1.41%	0.66%	1.11%	0.75%
2005			1.04%	1.24%	0.74%	3.47%	1.87%
2006	2.42%	1.83%	4.59%	4.52%	0.93%	1.51%	2.59%
2007	0.96%	0.30%	0.85%	1.30%	0.32%	3.19%	1.09%
2008	0.57%	1.42%	1.23%	0.00%	0.53%	1.40%	0.80%
2009	0.61%	0.96%	0.47%	0.27%	0.20%	0.37%	0.44%
2010	0.32%	1.07%	0.74%	0.91%	2.02%	1.18%	1.04%
2011	2.12%	5.45%	3.86%	3.20%	8.67%	4.15%	4.32%
2012	1.16%	1.20%	2.10%	0.34%	1.52%	0.22%	1.09%
2013	0.42%	0.71%	1.63%	0%	0.80%	0.34%	0.59%
2014	1.58%	0.49%	2.05%	0.17%	1.30%	1.11%	0.98%
2015[3]	0.10%	0.09%	0.70%	0.13%	0.74%	0.64%	0.43%
Average [4]	*1.70%*	*1.35%*	*1.92%*	*1.05%*	*2.14%*	*1.63%*	*1.63%*
SD [5]	*1.89%*	*1.53%*	*1.45%*	*1.23%*	*2.00%*	*1.45%*	*1.11%*

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

Table 4.4. Smolt-to-Adult survival of SAFE project Select Area Bright fall Chinook, brood years 1996-2014.

Brood Year	Survival Rates By Release Site[1] Youngs Bay Net-pens	South Fork Klaskanine	North Fork Klaskanine	All Sites Average[2]
1996	0.07%		0.34%	0.11%
1997	0.27%		0.57%	0.36%
1998	1.82%		0.87%	1.58%
1999	1.44%		3.13%	1.97%
2000	1.28%		1.22%	1.26%
2001	0.88%		0.22%	0.69%
2002	0.38%		0.38%	0.38%
2003	0.12%		0.39%	0.26%
2004	1.90%	0.49%	0.89%	1.18%
2005	1.73%	0.53%		1.11%
2006	0.43%	0.37%		0.40%
2007	1.06%	0.81%		0.92%
2008	1.04%	0.64%		0.83%
2009	1.96%	1.92%		1.94%
2010	2.41%	2.23%		2.32%
2011	1.36%	0.30%		0.83%
2012	0.71%	0.49%	0.17%	0.44%
2013	0.43%	0.32%	0.16%	0.31%
2014[3]	1.65%	0.11%	0.01%	0.58%
Average [4]	*1.01%*	*0.75%*	*0.70%*	*0.92%*
SD [5]	*0.70%*	*0.69%*	*0.84%*	*0.64%*

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

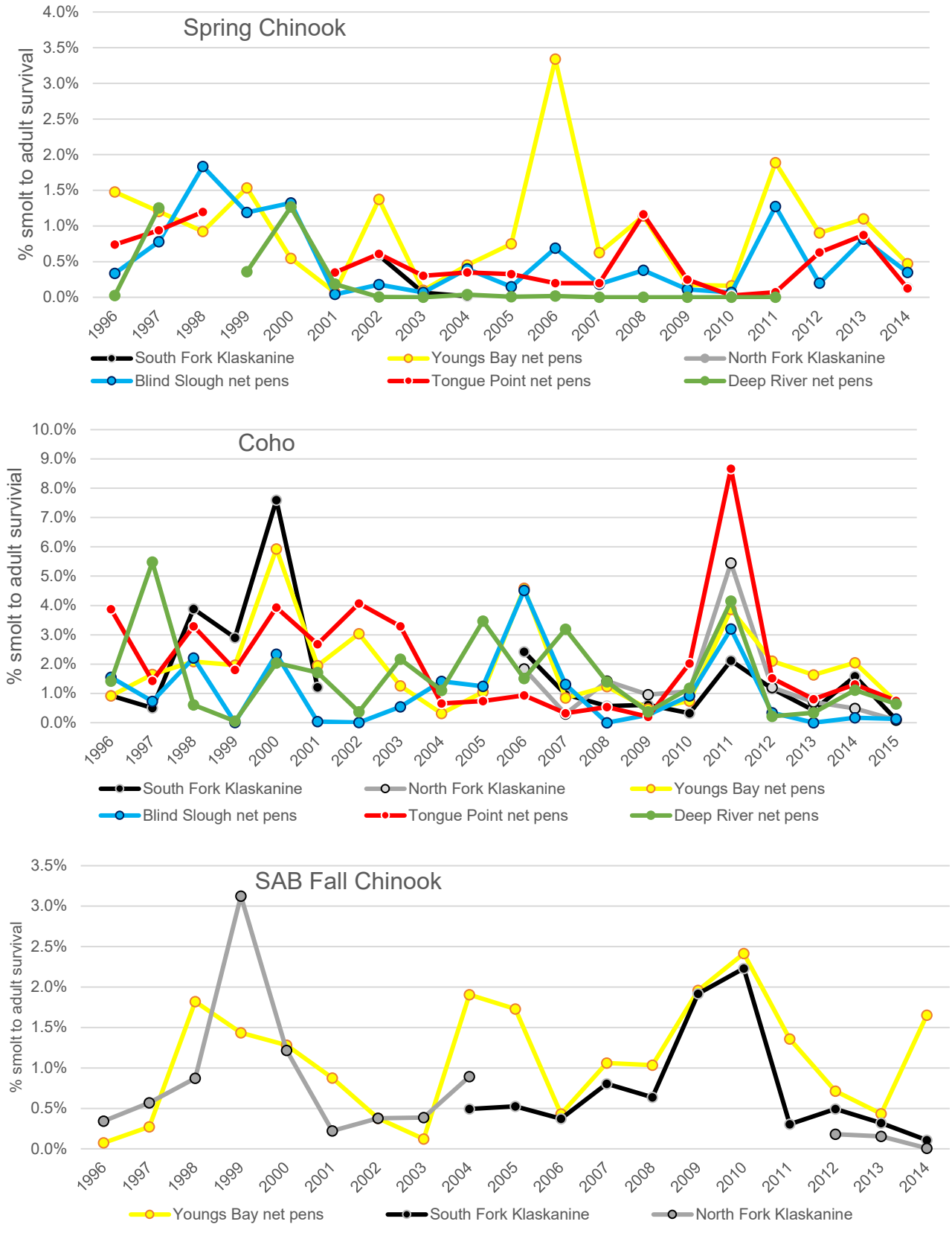


Figure 4.1. Smolt to adult survival of SAFE-produced spring Chinook, Coho, and SAB fall Chinook, brood years 1996-2014 Chinook and 1996-2015 Coho.

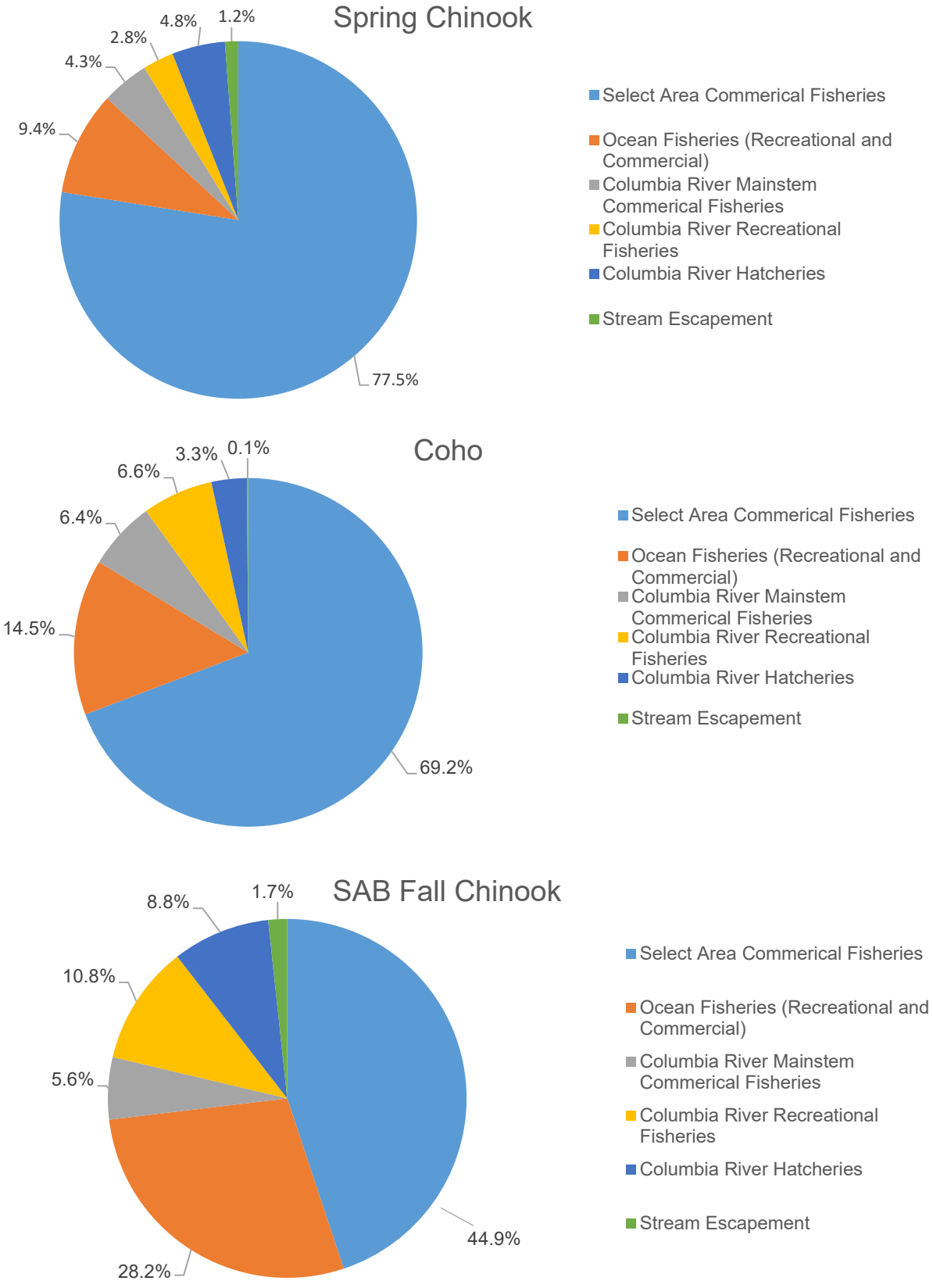


Figure 4.2. Distribution of returning adult salmon from SAFE project releases, brood years 1996-2014 Chinook and 1996-2015 Coho.

5. ESCAPEMENT

SPAWNING GROUND SURVEYS

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

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

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

ODFW Surveys

Fall Chinook

The Oregon portion of the Lower Columbia River fall Chinook Evolutionary Significant Unit (ESU) extends from the mouth of the Columbia River to the Sandy River. Surveys for fall Chinook are conducted in tributaries of the LCR from September through November collaboratively by ODFW CRM and OASIS programs. The CRM program has standard index reaches (Table 5.1) that uses peak redd counts to estimate fall Chinook abundance, then fin marks to determine proportion of lower river hatchery and wild tules and SAB fall Chinook from the estimate. The OASIS program monitors status and trends of naturally produced Oregon coastal and lower Columbia salmonid stocks with

random site-selection and rotating panel methodologies (http://odfw.forestry.oregonstate.edu/spawn/). Survey reaches for fall Chinook in CRM index reaches that fall outside of OASIS survey selections are completed by CRM staff.

Results from SGSs pertinent to the evaluation of the SAFE project are discussed in this report for years 2017 through 2019. Percent SABs on spawning grounds in Youngs Bay, Big Creek, and Clatskanie populations are presented in Table 5.2. During the 2017-2019 fall Chinook surveys in Youngs Bay basin 949 fish were mark sampled for fin marks and CWT's. Of the sampled fish, an average of 39 (4%) had a LV fin-clip indicating that they were SAB stock. During the same period, surveys in the Big Creek mark-sampled 2,158 fall Chinook detecting 1 (<1%) LV clip and surveys in the Clatskanie mark-sampled 1,370 fall Chinook and detected 1 (<1%) SAB fall Chinook.

Coho

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

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

In return-years prior to 2013, OASIS project summaries indicated that the majority (70%, 10-year average, Table 5.3) of the Coho observed in the tributaries of Youngs Bay and Big Creek area were of hatchery origin. As a result, SGSs were discontinued in those areas. Surveys in the Clatskanie River have observed few hatchery-origin Coho (5%, 2009-2018 average). Coded wire tag recovery information from the OASIS project surveys may be biased on a given run year if a stream segment downstream from a hatchery was selected as part of the random E-map protocol. If such a segment is selected it could represent an entire stream (and a representative proportion of the basin) and potentially overestimate presence of SAFE hatchery fish. To account for the potential year specific overestimate a multiple year approach should be taken for evaluating presence of SAFE produced fish. Based on the inability to expand recoveries for sampling rate, Table 5.4 shows coded wire tag recoveries, expanded for tag rate only, of SAFE origin fish found on spawning ground surveys by basin. While comparing partially expanded CWT recoveries to basin-wide population estimates is an unbalanced approach it does provide a tool for characterizing escapement of SAFE-produced fish.

WDFW Surveys

Fall Chinook

WDFW staff surveyed over 2700 miles of streams annually, used by thirteen fall Chinook populations or subpopulations, in Lower Columbia River tributaries from the mouth to Bonneville Dam in 2012 through 2016 (Table 5.5). Similar levels of effort and geographical coverage have since been used to conduct surveys from 2017 to 2019. Grays River, Elochoman River, and Skamokawa Creek stand out as important fall Chinook producing basins in the Coastal stratum on the Washington side of the

Lower Columbia River (LCFRB 2010). WDFW implemented a Conservation and Sustainable Fisheries Plan in 2017 to guide the management and recovery of salmon populations while continuing to provide commercial and recreational harvest opportunity. The Grays River fall Chinook population was originally designated as a primary population in 2004, and re-designated in 2010 as a contributing population. The Elochoman/Skamokawa fall Chinook population was designated as a primary population, signifying that the population's vitality is critical for recovery of the ESU.

Spawning ground surveys were done in conjunction with weir operations to assess efficiency of the weir as a tool to prevent upstream migration of hatchery Chinook. Chinook totals handled at the WDFW weirs do not represent total fall Chinook escapement, as some fish passed the weir prior to installation and during high flow events that submerged the weir panels on the Grays, while the Elochoman weir provides a census count except in extreme high flow years. Spawning escapement can be estimated by a variety of methodologies including: peak count expansion, mark-recapture, and area under the curve (Rawding et al. 2006). Estimates of the escapement of fall Chinook to spawning grounds in the Grays River basin prior to 2005 were generated using a peak fish count (live and dead) methodology with an expansion factor of 3.58. Recent data suggest that Grays River fall Chinook spawn timing has become more protracted, likely resulting in inaccuracies of the peak count expansion method. Beginning in 2005, more-intensive surveys have been conducted to improve estimates of salmonid spawning, utilizing area under the curve (AUC) and mark-recapture methodologies. Refinements to the mark-recapture methodology are still in development on the Grays. Therefore, AUC methods using live counts of Chinook spawners have been used to estimate natural spawn escapement values for that population since 2008. More methodology and results on the Grays River weir and spawning ground surveys can be found in Rawding et al. (2014) and in Wilson et al. (2020) for other weir sites. Importantly, weirs have also been used to remove hatchery salmon from wild spawning habitat to progress toward meeting pHOS targets for salmon recovery.

Annual estimates of fall Chinook spawner escapement and pHOS are provided in Table 5.6 for populations surveyed on the Grays River, Skamokawa Creek, and the Elochoman River from 2001 to 2019. During the current reporting period (2017-2019) the abundance of SABs on the spawning grounds in Grays River was notably lower than in previous years, down to 16% for the 3-year average (Table 5.6). Tule presence was variable but relatively unchanged with a 3-year average of 24%. As in past years, tules were the predominant hatchery stock on the spawning grounds of Skamokawa Creek and the Elochoman River, the three year averages comprising 92% and 41%, respectively of the spawning populations (Table 5.6). The higher pHOS in Skamokawa Creek than in the Elochoman River can be partly attributed to removal of large numbers of tules at the Elochoman weir (Table 5.7).

Coho

Rigorous surveys to provide estimates of natural escapement of Coho in Washington's Lower Columbia tributaries have been conducted since 2010 (Rawding et al. 2014; Brown et al. 2020). In 2012-2016 WDFW staff annually surveyed roughly 2,400 miles of habitat used by thirteen Coho populations or subpopulations, in Lower Columbia River tributaries from the mouth to Bonneville Dam (Table 5.8). Spawner estimates are provided in Table 5.9 for Coho of natural and hatchery origin that spawned in the basins most proximate to the SAFE release sites: Grays River; Skamokawa Creek and Elochoman River (combined).

In comparison to fall Chinook, natural origin Coho spawners are much more plentiful in Washington's Lower Columbia River tributaries. The average pHOS decreases in populations further from the Lower Columbia River estuary where the SAFE Coho release sites are located: 68% for the Grays River-Chinook population and 42% for Skamokawa-Elochoman population. There is no apparent pattern or

trend across the years. Weir operations are generally not very effective at reducing pHOS for Coho because most weirs do not operate long enough into the fall to remove large numbers of hatchery Coho before rain events compromise the weirs during the Coho migration season.

HATCHERY ESCAPEMENT

Escapement Goals

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

ODFW Hatchery Sampling

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

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

Table 5.1. Columbia River Management (ODFW) index spawning-ground survey streams for Chinook salmon in select Oregon Coast Major Population Groups in the Lower Columbia River, 2017 – 2019.

Populations	Stream	Survey Description	Miles
Youngs Bay	Youngs River	Falls to tidewater	0.3
	N. Fk. Klaskanine R.	Hatchery to tidewater	1.5
	S. Fk. Klaskanine R.	CEDC rearing ponds to tidewater	3.5
	Lewis and Clark	Crown Zellerbach bridge to tidewater	4.5
	Youngs Bay Total Miles =		*9.8*
Big Creek	Big Creek	Hatchery to tidewater	3.0
	Gnat Creek	Falls to tidewater	3.5
	Bear Creek	Falls to tidewater	3.0
	Big Creek Basin Total Miles =		*9.5*
Clatskanie River	Clatskanie River	Mouth of Keystone Cr. to tidewater	2.0
	Plympton Creek	Falls to tidewater	1.7
	Clatskanie River Basin Total Miles =		*3.7*

Table 5.2. Summary of fall Chinook spawning ground survey data from Youngs Bay, Big Creek, and Clatskanie River Populations1.

Youngs Bay Population

Year	Number of SABs[2]	Total Mark Sampled [3]	Peak count	% SABS
2001	54	56	166	96%
2002	1	14	411	7%
2003	156	239	583	65%
2004	36	43	650	84%
2005	56	57	322	98%
2006	120	123	344	98%
2007	17	30	345	57%
2008	97	107	357	91%
2009	34	46	674	74%
2010	27	37	438	73%
2011	169	348	1,070	49%
2012	183	1,971	1,734	9%
2013	652	905	797	72%
2014	291	385	1,225	76%
2015	119	863	831	14%
2016	50	211	360	24%
2017	2	301	531	1%
2018	37	622	638	6%
2019	0	26	183	0%
3-yr Ave.	13	316	451	2%
5-yr Ave.	42	405	509	9%
10-yr Ave.	153	567	781	32%

[1] Derived from ODFW Columbia River Management (CRM) and Oregon Adult Salmonid Inventory Survey (OASIS) spawning ground surveys for 2001-2019.

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

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

Table 5.2. (continued)

Big Creek Population

Year	Number of SABs[2]	Total Mark Sampled [3]	Peak Count	% SABS
2001	4	3,662	4,389	0.1%
2002	0	6,148	6,963	0.0%
2003	0	7,371	11,492	0.0%
2004	0	2,057	3,560	0.0%
2005	0	2,164	2,516	0.0%
2006	0	56	92	0.0%
2007	0	80	179	0.0%
2008	0	888	2,868	0.0%
2009	0	1,486	1,209	0.0%
2010	1	1,720	3,952	0.1%
2011	0	1,514	1,729	0.0%
2012	0	847	930	0.0%
2013	10	64	578	15.6%
2014	2	412	1,234	0.5%
2015	0	722	487	0.0%
2016	0	115	147	0.0%
2017	1	493	739	0.2%
2018	0	1,316	2,824	0%
2019	0	349	665	0%
3-yr Ave.	1	719	1,409	0.1%
5-yr Ave.	0	599	972	0%
10-yr Ave.	0	755	1,329	1.6%

[1] Derived from ODFW Columbia River Management (CRM) and Oregon Adult Salmonid Inventory Survey (OASIS) spawning ground surveys for 2001-2019.
[2] Select Area Brights (SABs) are identified by the presence of a left ventral fin clip.
[3] Mark Sampled represents how many fish have been examined for fin marks.

Table 5.2. (continued)

Clatskanie Population

Year	Number of SABs[2]	Total Mark Sampled [3]	Peak Count	% SABS
2001	1	2,124	2,299	0.0%
2002	0	4,949	5,970	0.0%
2003	0	4,640	5,593	0.0%
2004	0	2,391	2,982	0.0%
2005	0	1,195	1,553	0.0%
2006	0	145	234	0.0%
2007	0	141	265	0.0%
2008	0	58	654	0.0%
2009	0	894	1,250	0.0%
2010	0	2,461	2,019	0.0%
2011	0	2,314	1,959	0.0%
2012	1	1,118	1,076	0.1%
2013	9	680	945	1.3%
2014	1	1,766	1,619	0.1%
2015	0	1,367	1,227	0.0%
2016	0	316	526	0.0%
2017	0	656	687	0.0%
2018	1	422	595	0.0%
2019	0	292	476	0.0%
3-yr Ave.	0	457	586	0.0%
5-yr Ave.	0	611	702	0.0%
10-yr Ave.	1	1,139	1,113	0.0%

[1] Derived from ODFW Columbia River Management (CRM) and Oregon Adult Salmonid Inventory Survey (OASIS) spawning ground surveys for 2001-2019.

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

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

Table 5.3. Estimated Coho spawner abundance in select Oregon populations1 of the Lower Columbia ESU, 2002-2019.

	Youngs Bay Population		Big Creek Population		Clatskanie Population	
Year	Hatchery	Wild	Hatchery	Wild	Hatchery	Wild
2002	2,506	411	866	98	48	167
2003	714	113	291	435	0	563
2004	886	149	265	112	0	398
2005	242	79	124	219	7	494
2006	394	74	N/A	225	46	421
2007	14	21	216	212	41	927
2008	23	82	66	360	0	995
2009	302	26	936	792	11	1,195
2010	106	68	122	279	48	1,686
2011	315	161	173	160	7	1,546
2012	112	129	112	409	77	619
2013[2]	N/A	10	N/A	223	74	611
2014[2]	N/A	57	N/A	606	151	3,246
2015[2]	N/A	7	N/A	88	9	240
2016[2]	N/A	16	N/A	198	27	464
2017[2]	N/A	29	N/A	263	135	566
2018[2]	N/A	9	N/A	49	53	25
2019[2]	N/A	17	N/A	441	data unavail.	138
3-yr. ave.	N/A	18	N/A	251	94[4]	243
5-yr. ave.	N/A	16	N/A	208	56[4]	287
10-yr. ave.	N/A	NA[3]	N/A	272	65[4]	914

[1]Derived from ODFW Corvallis OASIS project spawning ground surveys for 2002-2019.

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

[3]10-year comparison not applicable since weir only data since 2013.

[4]2019 data unavailable so averages do not include

Table 5.4. Expanded recoveries of SAFE-origin Coho released in Oregon on Oregon spawning grounds, 2001 - 20181.

Recovery Year	Youngs Bay	Big Creek	Clatskanie
2001	0	20	20
2002	90	16	0
2003	343	8	0
2004	81	0	0
2005	0	0	0
2006	7	8	0
2007	0	0	28
2008	0	0	0
2009	38	1	0
2010	24	56	0
2011	0	15	0
2012	19	0	0
2013	29	45	0
2014	0	6	58
2015	0	20	0
2016	72	0	0
2017	0	8	0
2018	21	0	0
3-yr. ave.	31.0	2.7	0
5-yr. ave.	18.6	6.8	11.6
10-yr. ave.	20.3	15.1	5.8

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

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

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

Table 5.6. Estimated fall Chinook spawning escapement and proportions of hatchery origin spawners (pHOS) by stock origin (SAB[1] or tule[2] stock) detected in spawning ground surveys on Grays and Elochoman Rivers and Skamokawa Creek, 2001-2019. Hatchery origin tules were not marked by adipose fin clips and were thus not distinguishable from unmarked wild fish prior to 2008 or 2009 depending on the location.

Grays River[1]		pHOS		
Year	All Spawners	SABs	Tules	Total
2001	241	32%		
2002	78	0%		
2003	373	10%		
2004	726	10%		
2005	122	34%		
2006	383	21%		
2007	96	39%		
2008	95	38%	27%	65%
2009	555	52%	11%	62%
2010	156	43%	12%	55%
2011	405	69%	14%	83%
2012	205	40%	39%	79%
2013	2,033	81%	9%	91%
2014	729	36%	20%	56%
2015	1,026	9%	76%	85%
2016	510	32%	26%	59%
2017	565	18%	30%	48%
2018	734	14%	16%	30%
2019	591	16%	25%	41%
3-yr. Ave.	630	16%	24%	40%
5-yr. Ave.	685	18%	35%	53%
10-yr. Ave.	695	36%	27%	63%

Table 5.6. (continued)

Skamokawa Creek[2]		pHOS		
Year	All Spawners	SABs	Tules	Total
2001	536	0.4%		
2002	372	0%		
2003	588	0%		
2004	2,109	0%		
2005	529	0%		
2006	7	0%		
2007	3	0%		
2008	482	0%		
2009	3	0%		
2010	530	0%	93%	93%
2011	492	0%	94%	94%
2012	96	0%	91%	91%
2013	284	0%	79%	79%
2014	680	0.9%	96%	97%
2015	714	2.1%	89%	92%
2016	307	0%	92%	92%
2017	N/A	N/A	N/A	N/A
2018	17	24%	47%	71%
2019	98	3%	85%	58%
3-yr. Ave.	141	9%	92%	93%
5-yr. Ave.	363	6%	89%	90%
10-yr. Ave.	322	3%	85%	85%

Table 5.6. (continued)

Elochoman River[3]		pHOS		
Year	All Spawners	SABs	Tules	Total
2001	2,281	0%		
2002	7,531	0%		
2003	6,765	0%		
2004	4,781	0%		
2005	2,173	0%		
2006	317	0%		
2007	165	0%		
2008	841	0%		
2009	1,464	0%		
2010	788	0%	85%	85%
2011	635	0%	95%	95%
2012	141	0%	61%	61%
2013	353	0%	64%	64%
2014	189	0%	11%	11%
2015	264	0%	4%	4%
2016	137	0%	31%	31%
2017	89	2%	20%	22%
2018	59	19%	46%	64%
2019	65	2%	57%	58%
3-yr. Ave.	71	8%	41%	48%
5-yr. Ave.	123	5%	32%	36%
10-yr. Ave.	272	2%	47%	50%

[1] Grays River: 2001-2007 estimates from peak count expansion (3.58 expansion factor); 2008-2016 estimates from area under the curve (AUC) methods.
[2] Skamokawa Creek: 2001-2009 estimates from peak count expansion (1.67 expansion factor); 2010-2019 estimates from AUC methods.
[3] Elochoman River: 2001-2008 estimates from peak count expansion (2.00 expansion factor); 2009-2019 from weir census, AUC, or Lincoln-Petersen estimate.

Table 5.7. Number and percentage of Fall Chinook handled at Grays River and Elochoman River weirs by fin mark groups, 2008-2019.

Year	Grays River Weir [1]							Elochoman River Weir						
	Chinook	Unmarked		SABs		Tules		Chinook	Unmarked		SABs [3]		Tules	
	Trapped [2]	No.	%	No.	%	No.	%	Trapped[2]	No.	%	No.	%	No.	%
2008	85	18	21%	67	79%	0	0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2009	183	37	20%	142	78%	4	2%	3864	414	11%	3	0.1%	3438	89%
2010	59	3	5%	45	76%	11	19%	4597	153	3%	13	0.3%	4431	96%
2011	116	14	12%	69	59%	33	28%	2120	78	4%	50	2%	1992	94%
2012	64	14	22%	28	44%	22	34%	318	33	10%	15	5%	270	85%
2013	542	40	7%	467	86%	35	6%	249	37	15%	17	7%	195	78%
2014	378	37	10%	243	64%	98	26%	1223	197	16%	67	5%	959	78%
2015	693	97	14%	283	41%	313	45%	1746	243	14%	31	2%	1472	84%
2016	274	53	19%	146	53%	75	27%	415	64	15%	1	0.2%	350	84%
2017[4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	252	83	33%	5	2%	164	65%
2018	143	30	21%	35	24%	78	55%	103	26	25%	2	2%	75	73%
2019	112	12	11%	12	11%	88	79%	197	42	21%	0	0%	155	79%

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

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

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

[4] The Grays River weir was not installed in 2017.

Table 5.8. Summary of WDFW spawning ground survey effort for fall Coho populations in the estuary portion of the Columbia River for 2013-2019. Effort metrics include the number and length of unique reaches surveyed, and total miles surveyed (represents multiple replicate surveys of unique reaches within each season).

Year	Population	# of Unique Reaches Surveyed	Total Length of Unique Survey Reaches (Miles)	Total Miles Surveyed Annually
013	Grays/Chinook	68	52.16	728.29
2014	Grays/Chinook	63	47.82	552.96
2015	Grays/Chinook	55	42.55	517.09
2016	Grays/Chinook	59	46.9	576.13
2017	Grays/Chinook	61	45.61	492.03
2018	Grays/Chinook	64	47.91	620.44
2019	Grays/Chinook	58	43.73	606.41
2013	Elochoman/Skamokawa	46	47.60	542.42
2014	Elochoman/Skamokawa	45	44.83	505.4
2015	Elochoman/Skamokawa	38	39.30	454.05
2016	Elochoman/Skamokawa	42	41.96	463.69
2017	Elochoman/Skamokawa	47	44.28	565.10
2018	Elochoman/Skamokawa	49	45.97	590.18
2019	Elochoman/Skamokawa	49	44.54	574.19

Table 5.9. Estimated Coho spawner abundance and % hatchery-origin spawners (% H) in Lower Columbia River basins in Washington, 2010-2018.

	Grays River-Chinook			**Skamokawa-Elochoman**		
Year	Hatchery	% H	Wild	Hatchery	% H	Wild
2010	1320	83%	269	1644	73%	603
2011	1234	96%	53	722	57%	551
2012	284	40%	421	164	31%	367
2013	1160	63%	677	461	41%	650
2014	1535	35%	2826	1352	34%	2572
2015	294	67%	145	177	46%	204
2016	728	60%	489	398	40%	589
2017	706	80%	175	178	19%	780
2018	857	84%	165	539	36%	944
Ave:	902	68%	580	626	42%	807

Table 5.10. Broodstock goals and hatchery escapement fall Chinook to North and South Fork Klaskanine and Big Creek hatcheries, 2009-2019.

Year	Broodstock Goals[1] (female only)	Big Creek Tule Adult Hatchery Escapement		
		Female	Male	Total
2009	1,650	2,790	2,144	4,934
2010	1,650	3,769	3,886	7,655
2011	1,650	4,188	3,211	7,399
2012	1,550	2,836	2,580	5,416
2013	1,550	1,092	928	2,020
2014	1,550	2,673	3,207	5,880
2015	1,550	2,807	2,400	5,207
2016	1,700	1,122	1,338	2,460
2017	1,375	1,808	978	2,786
2018	1,300	1,322	1,228	2,550
2019	1,300	637	540	1,177

Year	Broodstock Goals[1] (female only)	South Fork and North Fork Klaskanine SAB[2] Adult Hatchery Escapement		
		Female	Male	Total
2009	550	430	251	681
2010	550	652	495	1,147
2011	550	685	515	1,200
2012	740	789	742	1,531
2013	835	997	837	1,834
2014	835	730	369	1,099
2015	835	266	194	460
2016	835	461	422	883
2017	740	144	110	254
2018[3]	550	214	187	401
2019[3]	550	140	93	233

[1] Broodstock goals are number of spawned females needed to meet egg take goal.
[2] SAB = Select Area Bright stock.
[3]2018 and 2019 SAB returning South Fork Klaskanine Hatchery were transferred to North Fork Klaskanine Hatchery.

Table 5.11. Sampling of Select Area Bright (SAB) fall Chinook at Klaskanine (NFK) and South Fork Klaskanine (SFK) Hatcheries, 2009-2019.

Year	Hatchery	Hatchery Escapement	Number Mark Sampled[1]	CWTs Collected	Number Biological Sampled[2]	Percent of Escapement Biologically Sampled
2009	NFK	274	196	11	97	35%
	SFK	493	382	13	116	24%
2010	NFK	514	442	10	86	17%
	SFK	816	728	38	120	15%
2011	NFK	453	399	16	78	17%
	SFK	913	908	20	149	16%
2012	NFK	666	345	74	82	12%
	SFK	1,377	1,426	41	254	18%
2013	NFK	642	373	31	73	11%
	SFK	1,222	1,036	50	188	15%
2014	NFK	696	404	34	106	15%
	SFK	877	541	32	146	17%
2015	NFK	524	524	21	129	25%
	SFK	170	170	3	118	69%
2016	NFK	601	399	34	399	66%
	SFK	316	247	8	247	78%
2017	NFK	216	133	6	133	62%
	SFK	38	37	3	37	97%
2018	NFK	535	372	52	372	70%
	SFK[3]	40	40	0	0	0%
2019	NFK	316	236	48	236	75%
	SFK[3]	0	0	0	0	0%

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

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

[3] SABs collected at SFK were transferred to NFK CWTs and biological samples were reported from NFK.

6. FACILITY PERMITS, PLANS, and PROJECT REVIEWS

This report gives a brief accounting and update of project environmental compliance, hatchery permits, genetic management plans, and a summary of project reviews. Federal and state regulations must be met and project performance reviews undergone for the SAFE project to continue to meet desired production levels of hatchery fish and monitor effects of project releases and returns so that high-quality commercial and sport fisheries are implemented.

HATCHERIES AND NET PENS

There are two Federal requirements that the SAFE project must meet to operate: a determination of "not likely to affect" listed salmon and steelhead by consultation with the National Marine Fisheries Service (NMFS) and Hatchery and Genetic Management Plans (HGMPs) for each hatchery, which is updated periodically and reviewed by NMFS. The state of Oregon requires a discharge permit for each hatchery and net pens above a certain level of production.

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

General fish culture and facility guidelines are provided through hatchery operating plans, and measures to maintain genetic resources of native fish populations spawned or reared in captivity, through Hatchery and Genetic Management Plans (HGMPs). Recently, several HGMPs associated with the program have been revised and updated with the most recent information and hatchery operation plans.

Big Creek Coho Salmon Program HGMP (submitted)
Big Creek Tule Fall Chinook Salmon HGMP (submitted)
Deep River Net Pen Fall Chinook Program (program discontinued as of 2017)
Deep River Net Pen (SAFE) Type-S Coho HGMP (submitted)
Deep River Net Pen Type-S Coho HGMP (submitted – program is Type-N Coho as of 2016)
Grays River Hatchery Type-N Coho HGMP (submitted)
Oregon SAFE Spring Chinook Program HGMP (submitted)
Oregon SAFE Coho Program HGMP (submitted)
Oregon SAFE Select Area Bright Fall Chinook HGMP (in process)

For current HGMPs, use the following links:
https://www.dfw.state.or.us/fish/HGMP/final.asp#1
http://wdfw.wa.gov/hatcheries/hgmp/2012_lower_columbia.html
https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/salmon-and-steelhead-hatcheries-west-coast

Oregon hatcheries 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. Requirements of the permit include sampling and analyses of benthic invertebrates, total dissolved solids, sediment cores, *Beggiotoa spp*. (mold) presence/absence, water temperature, and pH readings from three net pen sites in Youngs Bay. Clatsop County Fisheries personnel collect benthic, water, and core samples. Samples are sent to laboratories for analyses. Sediment collected near net pens monitor whether changes in benthic macro-invertebrate communities are occurring. Results from other parameters indicate that environmental impacts are within the limits established for the permit or not. 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 (2019) and can be accessed online at:

https://www.co.clatsop.or.us/fisheries/page/clatsop-county-fisheries-project-research

WDFW is in the process of acquiring a new NPDES permit for the Deep River net-pens through the Washington Department of Ecology. Ecology has reviewed and accepted the permit application, has conducted a net pen site visit and interviewed WDFW staff about current and recent history of the net pen operations. Washington Department of Ecology is continuing their work to complete the permit development process which will include details on operations and water quality sampling protocols. Once established, the monitoring protocols will provide a means to confirm that the net-pen rearing effects on Deep River habitat remain within acceptable parameters. While the process is affected by COVID-19 working constraints, WDFW is hopeful that the permit can be issued before the end of 2021.

PROJECT REVIEW

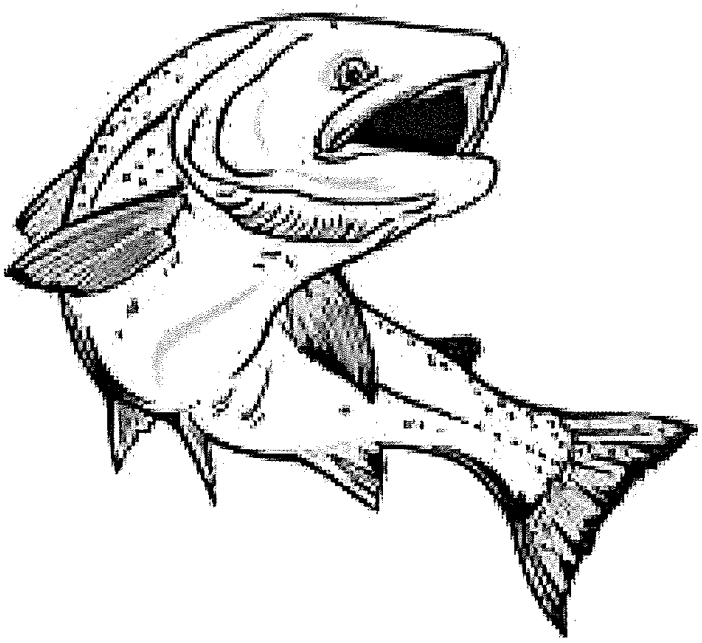
The Northwest Power and Conservation Council (NPCC) Fish and Wildlife Program's independent scientific review is accomplished by enlisting experts from academia, agencies, non-profits, tribes, and the private sector to bring to bear their broad knowledge and experience in evaluating BPA-funded projects. This review process ensures that the highest-quality science is being applied. They offer recommendations and alternate points of view so that results lead to better management and policy decisions and ultimately improvements in salmon returns. In 2005, the NPCCs Lower Columbia River and Estuary provincial review process, through the Independent Scientific Review Panel (ISRP) and Independent Economic Analysis Board (IEAB), issued an evaluation of the SAFE 1993 – 2005 report (North et al. 2006). In this review, the ISRP found that the SAFE project was successful in providing high, and relatively, stable rates of harvest with minimal impacts on non-target and listed stocks and the fishery was adjusted when negative impacts were observed or anticipated (ISRP/IEAB 2005-8, 2007-3). However, they noted some concerns and provided recommendations such as: 1) as production increases, closely monitor impacts to determine harvest and survival rates, impacts on non-target fish stocks, and stray rates of SAFE fish (they cautioned not to assume impact rates will stay relatively small); 2) determine the actual number of smolts released; 3) estimate Coho stray rates; 4) involve a statistician in project design and analyses; 5) consider using thermal otolith marking in place of or in addition to coded-wire tags; and 6) consider how this project may contribute towards understanding of effects on ocean conditions on salmon, particularly the effects of climate change and ocean conditions on salmon growth and survival and interactions between hatchery and wild salmon in estuary and ocean.

Economists were subcontracted to provide economic analyses to the IEABs 2005 review (Radke et al. 2006). Central to the response was net economic benefits and cost-effectiveness of the SAFE project as a mitigation fishery (ISRP/ISEB 2007-3, for more detailed review see Whistler et al. 2009).

The second review occurred during the 2010 NPCCs cycle for categorical reviews of Research, Monitoring, and Evaluation and Artificial Production projects (ISRP 2010). The SAFE project submitted a proposal for review, received comments and questions from the ISRP, submitted responses, and was given the rating of acceptable approach and performance, “Meets Scientific Criteria,” and the recommendation for continued funding. Many of the ISRPs concerns listed in the 2005 review were further addressed during the 2010 review. The ISRP was satisfied with additional, detailed, description of methodology, adaptive management, and responses to the following four critical questions they posed about effects of the SAFE program on harvest of local, natural-origin and non-local stocks:

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?

Given the interest of the ISRP in these questions and mixed ability to answer them due to data gaps, the SAFE program continues to focus on them for annual reports and strives to improve project outcomes and reporting.



LITERATURE CITED

Bennett, R.L. 2007. Report on Alternatives for the Clatsop County Fisheries Project. Prepared for the Clatsop Economic Development Council, Astoria, Oregon. 12 p.

Duff, C., G. Whisler, E. Ollerenshaw, P. Hulett, S. Meshke, A. Dietrichs, and A. Neys. 2013. Select Area Fishery Enhancement project. 2010-2012 Annual Report, project #199306000 prepared for the Bonneville Power Administration, Portland, Oregon. 96 p.

Columbia River Fishery Management Workgroup. 2012. Management Strategies for Columbia River Recreational and Commercial Fisheries: 2013 and Beyond. Recommendation to the Fish and Wildlife Commissions of Oregon and Washington, Nov. 21, 2012, 40 p.

Hatchery Science Review Group (HSRG). 2009. Columbia River Hatchery Reform System-Wide Report. February 2009, 272 p. http://hatcheryreform.us/

Hill, James M., Todd Olson - Clatsop Economic Development Committee Fisheries Project, Evaluation of a Low-Cost Salmon Production Facility Annual Report FY 1988, Report to Bonneville Power Administration, Contract No. 1983BP11887, Project No. 198336400, 65 electronic pages (BPA Report DOE/BP-11887-5).

Hirose, P., M. Miller, and J. Hill. 1996. Columbia River: Terminal Fisheries Research Project, 1994 Annual Report, Report to Bonneville Power Administration, Contract No's. 1993BI05409, 1993BI04982, Project No. 1993060, 161 electronic pages (BPA Report DOE/BP-05409-1).

Hirose, P., M. Miller, M. Kaufman, and J. Hill. 1998. Columbia River: Select Area Fishery Evaluation Project, 1995-1996 Annual Reports to Bonneville Power Administration, Project Number 1993-060, Contract Numbers 1993BI05409 and 1993BI04982, 212 electronic pages (BPA Report DOE/BP-05409-2).

Hulett, P., J. Wilson, G. Whisler, G. Gale, , S. Meshke, A. Dietrichs, and T. Miethe. 2010. Select Area Fishery Enhancement project. 2009 Annual Report, project #199306000 prepared for the Bonneville Power Administration, Portland, Oregon. 51 pp.

ISRP (Independent Scientific Review Panel). 2010. Final Review of 2010 Proposals for the Research, Monitoring, and Evaluation and Artificial Production Category, ISRP 2010-44B. December 16, 2010.

ISRP and IEAB. 2005. Review of the Select Area Fishery Evaluation Project, 1993-2003 Final Project Completion Report. Prepared for the Northwest Power and Conservation Council, Portland, Oregon. Report ISRP/ISAB 2005-8, 16 p.

ISRP and IEAB. 2007. SAFE Review 2007: Review of the Select Area Fishery Evaluation Project Reports, October 1993 to October 2005 (April 2006) and Economic Analysis Study (November 2006). Prepared for the Northwest Power and Conservation Council, Portland, Oregon. Report ISRP/IEAB 2007-3, 27 p.

Johnson, J. K. 2004. Regional Overview of Coded Wire Tagging of Anadromous Salmonid and Steelhead in Northwest America. Paper updated from 1989 to current year 2004. Regional Mark Processing Center, Pacific States Marine Fisheries Commission, Portland, Oregon. 40pp. http://www.rmpc.org/files/RegionalOverviewProfPaper-30May04.pdf

LCFRB (Lower Columbia Fish Recovery Board). 2010. Washington Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan. https://www.lcfrb.gen.wa.us/librarysalmonrecovery

LCRFRB and WDFW. 2015. Lower Columbia Conservation and Sustainable Fisheries Plan. For Washington Dept. of Fish and Wildlife in Partnership with the Lower Columbia River Fish Recovery Board, Olympia, WA, Dec. 4, 2015, 106 p.

Litton, R. K. 2019. Youngs Bay Benthic Invertebrate Study. Prepared for Oregon Department of Environmental Quality under Permit No. 101767. 40 electronic pages. https://www.co.clatsop.or.us/fisheries/page/clatsop-county-fisheries-project-research

Mullen, R.E. 1981. Oregon's Commercial Harvest of Coho Salmon (*Oncorhynchus kisutch*) (Walbaum) in Oregon Coastal Streams in the Oregon Production Index Area. Oregon Department of Fish and Wildlife Information Report 81-5, Fish Division, Population Dynamics and Statistical Services Section, Corvallis, Oregon. 9p.

Northwest Power and Conservation Council (NPCC). 1992a. Columbia River Basin Fish and Wildlife Program, Strategy for Salmon, Volume I. Report 92-21. Portland, OR. 43 p.

Northwest Power and Conservation Council (NPCC). 1992b. Columbia River Basin Fish and Wildlife Program, Strategy for Salmon, Volume I. Report 92-21A. Portland, OR. 98 p.

NMFS (National Marine Fisheries Service). 1998. Endangered Species Act – Section 7 consultation biological opinion. Impacts of select area fisheries enhancement project (SAFE) on salmon and steelhead species in the Columbia River Basin listed under the Endangered Species Act. NMFS, Northwest Region, Seattle, WA, 15 pp.

NMFS. 2018. Endangered Species Act Section 7(a)(2) Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation. Consultation on Treaty Indian and Non-Indian Fisheries in the Columbia River Basin Subject To the 2018-2027 *US v. Oregon* Management Agreement. NMFS, Northwest Region, Seattle, WA. 582 pp. http://www.westcoast.fisheries.noaa.gov/fisheries/salmon_steelhead/united_states_v_oregon.html.

North, J., M. Miller, J. Sewall, T. Jones, A. Dietrichs, and T. Miethe. 2006. Select Area Fishery Evaluation Project. 1993-2005 Final Project Completion Report Draft, #199306000 prepared for the Bonneville Power Administration, Portland, Oregon. 152 pp.

ODFW. 2010. Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead. Oregon Dept. Fish and Wildlife, Salem, Oregon 423 p.

Pacific Salmon Commission's Data Standards Work Group. 2017. Specifications and Definitions for the Exchange of Coded Wire Tag Data for the North American Pacific Coast, PSC Format Version 4.1. 2017. Portland (OR); Regional Mark Processing Center. http://www.rmpc.org/publications.html

Radke, H.D., S.W. Davis, and C.N. Carter. 2006. Select Area Fishery Evaluation Project Economic Analysis Study, Final Report. Prepared for Bonneville Power Administration, Washington Department of Fish and Wildlife, and Oregon Department of Fish and Wildlife. November 2006. 182 electronic pages.

Rawding, D., T. Hillson, B. Glaser, K. Jenkins, and S. VanderPloeg. 2006. Abundance and Spawning Distribution of Chinook Salmon in Germany, Abernathy, and Mill Creeks during 2005. Washington Department of Fish and Wildlife, Vancouver, Washington.

Rawding, D., B. Glaser and Thomas Buehrens (editors). 2014. Lower Columbia River Fisheries and Escapement Evaluation in Southwest Washington, 2010. Washington Department of Fish and Wildlife Fish Program, Vancouver, Washington.

Siniscal, A., C. Duff, A. Dietrichs, S. Meshke, P. Hulett, and T. Wadsworth. 2017. Select Area Fishery Enhancement Project, Fiscal Year 2013-2016 Report. Prepared for U.S. Dept. Energy, Bonneville Power Administration, Portland, Oregon. 111p.

TAC (*US v Oregon* Technical Advisory Committee). 2008. Biological Assessment of Incidental Impacts on Salmon Species Listed Under the Endangered Species Act in the 2008-2017 Non-Indian and Treaty Indian Fisheries in the Columbia River Basin. 173 pp.

Vreeland, R.R., R.J. Wahle, A.H. Arp. 1975. Homing Behavior and Contribution to Columbia River Fisheries of Marked Coho Salmon Released at Two Locations. Fishery Bulletin: Vol 73, No. 4, p. 717-725.

Vreeland, R.R. and R.J. Wahle. 1983. Homing and Fisheries Contribution of Marked Coho Salmon, Onncorhynchus kisutch, Released at Two Columbia River Locations. Fishery Bulletin: Vol 81, No 1, p. 143-148.

Weiss, E.F. 1966. The Coho Salmon Fishery of Youngs Bay, Oregon. Oregon Department of Fish and Wildlife Research Briefs 12(1): 52-57.

Whisler, G., M. Miller, T. Jones, A. Dietrichs, and T. Miethe. 2006. Select Area Fishery Evaluation Project. 2006 Annual Report, #199306000 prepared for the Bonneville Power Administration, Portland, Oregon. 27 pp.

Whisler, G., G. Gale, P. Hulett, J. Wilson, S. Meshke, A. Dietrichs, and T. Miethe. 2009. Select Area Fishery Enhancement project. 2007-2008 Annual Report, project #199306000 prepared for the Bonneville Power Administration, Portland, Oregon. 103 pp.

APPENIDX A. SAFE Releases by Tag Code, Brood Year 1993 – 2017, for Spring Chinook, SAB Fall Chinook, Coho, and Tule Fall Chinook

Table A2.1. Releases of spring Chinook from Lower Columbia River Select Area facilities, 1993-2017 brood years.

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
1993	SF	2/7/1995	86,978	52,251	070351	60.07%	14.4	BPA	
	YB	2/9/1995	79,336	39,840	070345	50.22%	12.1	BPA	Feb release
	YB	3/7/1995	156,519	52,872	070343	33.78%	8.1	BPA	Mar release
	YB	3/30/1995	127,367	53,498	070344	42.00%	7.4	BPA	Apr release
			450,200	198,461					
1994	SF	1/31/1996	76,618	52,431	071119	68.43%	14.7	BPA	
	TG	2/5/1996	100,138	52,563	071238	52.49%	10.1	BPA	Feb release
	TG	2/29/1996	142,181	48,635	071236	34.21%	10.8	BPA	Mar release
	BS	2/29/1996	199,389	53,257	071237	26.71%	9.9	BPA	Mar release
	YB	2/5/1996	142,976	53,896	071121	37.70%	11.9	BPA	Feb release
	YB	2/29/1996	133,517	51,737	071122	38.75%	10.7	BPA	Mar release
	YB	3/21/1996	97,945	41,085	071120	41.95%	10	BPA	Apr release
			892,764	353,604					
1995	YB	2/1/1997	100,680	50,127	091737	49.79%	18.1	BPA	Feb release
	YB	3/5/1997	96,540	49,341	091738	51.11%	15.2	BPA	Mar release
	YB	4/4/1997	95,396	50,562	091739	53.00%	14.6	BPA	normal
	YB	4/4/1997	94,612	50,339	091740	53.21%	12.7	BPA	dormancy
	SF	3/4/1997	76,821	25,149	071337	32.74%	15.9	BPA	
	BS	3/5/1997	171,229	58,220	091716	34.00%	15.2	BPA	Mar release
	TG	3/5/1997	151,905	51,667	91717	34.01%	16.6	BPA	Mar release
	TG	4/4/1997	149,889	50,309	091718	33.56%	14.6	BPA	Apr release
			937,072	385,714					
1996	YB	3/3/1998	149,878	50,865	092216	33.94%	11.6	BPA	Mar release
	YB	4/1/1998	153,265	47,495	092214	30.99%	12	BPA	dormancy
	YB	4/1/1998	153,139	49,392	092215	32.25%	9.6	BPA	normal
	TG	3/3/1998	128,314	46,710	092218	36.40%	13.8	BPA	Mar release
	TG	4/1/1998	125,456	43,987	092219	35.06%	13.6	BPA	dormancy
	BS	3/3/1998	198,034	45,510	92217	22.98%	12.6	BPA	Mar release
	BS	4/1/1998	25,203	24,203	092035	96.03%	9.6	BPA	acc/normal
	BS	4/1/1998	25,396	23,602	092036	92.94%	11.6	BPA	acc/dorm.
	DR	4/22/1998	56,414	56,414	636115	100.00%	5.1	BPA	
			1,015,099	388,178					
1997	YB	3/4/1999	165,298	24,415	092534	14.77%	13.2	BPA	Mar release
	YB	4/1/1999	158,574	24,437	092533	15.41%	11.9	BPA	dormancy
	YB	4/1/1999	102,546	23,611	092536	23.02%	8.2	BPA	normal
	TG	3/3/1999	118,291	23,969	092532	20.26%	10	BPA	Mar release
	TG	4/1/1999	105,986	21,637	092535	20.41%	8.9	BPA	dormancy
	BS	3/3/1999	148,881	24,742	092530	16.62%	14	BPA	Mar release
	BS	4/1/1999	25,553	25,544	092531	99.96%	11	BPA	acc/dorm.
	BS	4/1/1999	25,573	25,560	092537	99.95%	10	BPA	acc/normal
	DR	5/13/1999	25,205	24,960	630511	99.03%	6.8	BPA	
	DR	5/13/1999	14,473	14,114	630652	97.52%	6.4	BPA	
			890,380	232,989					
1998	YB	3/1/2000	128,656	27,420	092847	21.31%	15.9	BPA	Mar release
	YB	4/4/2000	180,695	24,873	092846	13.77%	18.7	BPA	dormancy
	YB	4/4/2000	155,299	26,740	092848	17.22%	14.4	BPA	normal
	TG	3/1/2000	132,484	29,028	092550	21.91%	12.6	BPA	Mar release
	TG	4/4/2000	117,525	23,515	092849	20.01%	9.8	BPA	dormancy
	BS	3/1/2000	143,507	25,703	092845	17.91%	17.7	BPA	Mar release
	BS	4/4/2000	26,393	25,443	092843	96.40%	13.8	BPA	acc/dorm.
	BS	4/4/2000	26,501	25,397	092844	95.83%	11.9	BPA	acc/normal
			911,060	208,119					

continued

Table A2.1 (spring Chinook continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
1999	YB	3/2/2001	101,516	24,520	093123	24.15%	15.1	BPA	Mar release
	YB	3/29/2001	27,310	25,950	093133	95.02%	13.8	BPA	2-wk acc.
	YB	3/29/2001	96,839	17,226	093127	17.79%	14.2	BPA	Mar release
	YB	4/3/2001	146,346	25,883	093126	17.69%	16.2	BPA	dormancy
	YB	4/3/2001	138,491	24,519	093124	17.70%	15.8	BPA	normal
	YB	4/12/2001	27,396	23,849	093129	87.05%	12.3	BPA	4-wk acc.
	BS	3/2/2001	139,319	25,501	093128	18.30%	16.4	BPA	Mar release
	BS	3/29/2001	25,384	24,707	093125	97.33%	12.8	BPA	acc/normal
	BS	3/29/2001	27,467	23,705	093132	86.30%	14.4	BPA	acc/dorm.
	BS	4/3/2001	27,897	13,470	093131	48.28%	13.4	BPA	normal
	BS	4/3/2001	30,329	14,728	093130	48.56%	16.3	BPA	dormancy
	DR	5/9/2001	119,533	24,806	631310	20.75%	12	BPA	normal
	DR	5/9/2001	40,032	25,179	631311	62.90%	11	BPA	dormancy
			947,859	294,043					
2000	YB	3/29/2002	212,214	24,593	093330	11.59%	10.4	BPA	normal
	YB	3/29/2002	213,069	24,924	093331	11.70%	12.6	BPA	dormancy
	YB	3/29/2002	26,973	25,516	093332	94.60%	13.4	BPA	2-wk acc.
	YB	4/12/2002	25,806	24,595	093329	95.31%	9.9	BPA	4-wk acc.
	BS	3/28/2002	67,981	20,790	093333	30.58%	12.3	BPA	subsurface
	BS	3/28/2002	177,625	20,175	093334	11.36%	11.7	BPA	normal feed
	BS	4/10/2002	24,887	21,174	090120	85.08%	14.8	NOAA	acclim.
	BS	4/19/2002	23,871	20,090	090119	84.16%	13.6	NOAA	acclim.
	BS	4/30/2002	24,164	20,002	090121	82.78%	13.7	NOAA	acclim.
	BS	5/10/2002	24,441	20,992	090122	85.89%	13	NOAA	acclim.
	BS	5/20/2002	23,536	19,646	090123	83.47%	15.7	NOAA	acclim.
	BS	5/30/2002	24,403	20,798	090124	85.23%	13	NOAA	acclim.
	DR	5/16/2002	83,563	12,331	631087	14.76%	9	BPA	normal
	DR	5/16/2002	12,377	12,326	631288	99.59%	10	BPA	dormancy
			964,910	287,952					
2001	BS	3/27/2003	302,934	25,097	093601	8.28%	11.5	BPA	
	TGM	3/27/2003	30,385	25,514	093561	83.97%	11.9	BPA	morpholine
	TGJ	3/27/2003	27,412	26,601	093602	97.04%	11.4	BPA	JD acclim.
	YB	3/28/2003	188,956	26,219	093562	13.88%	9	BPA	normal
	YB	3/28/2003	187,097	26,342	093563	14.08%	12.7	BPA	dormancy
	YB	3/28/2003	75,570	25,513	093560	33.76%	11.4	BPA	subsurface
	BS	4/9/2003	18,508	17,941	093619	96.94%	16.6	NOAA	acclim.
	BS	4/18/2003	22,353	21,958	093622	98.23%	15.5	NOAA	acclim.
	BS	4/28/2003	21,236	20,982	093620	98.80%	15.6	NOAA	acclim.
	DR	4/30/2003	33,113	19,129	631572	57.77%	10	BPA	Lewis
	DR	4/30/2003	108,791	20,089	631573	18.47%	11.4	BPA	Cowlitz
	BS	5/7/2003	20,801	20,395	093623	98.05%	16.5	NOAA	acclim.
	BS	5/16/2003	20,158	19,992	093621	99.18%	16.6	NOAA	acclim.
	BS	5/27/2003	20,319	19,925	093624	98.06%	14.7	NOAA	acclim.
			1,077,633	315,697					

continued

Table A2.1 (spring Chinook continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2002	SF	3/31/2004	639,446	22,382	093723	3.50%	13.7	CCF	SF production
	BS	4/5/2004	261,840	26,763	093901	10.22%	12.1	BPA	
	TGM	4/6/2004	20,913	20,407	093661	97.58%	11.1	BPA	morpholine
	TGJ	4/6/2004	27,143	26,794	093663	98.71%	10.4	BPA	JD acclim.
	BS	4/8/2004	16,185	15,195	093906	93.88%	12.8	NOAA	acclim.
	YB	4/8/2004	455,825	25,934	093662	5.69%	12.8	BPA	
	BS	4/16/2004	27,359	26,498	093903	96.85%	12.5	NOAA	acclim.
	BS	4/26/2004	27,644	26,658	093907	96.43%	11.7	NOAA	acclim.
	BS	5/6/2004	27,471	26,795	093904	97.54%	13.1	NOAA	acclim.
	BS	5/17/2004	24,488	24,123	093908	98.51%	11.4	NOAA	acclim.
	BS	5/20/2004	23,508	22,942	093905	97.59%	12.5	NOAA	acclim.
	DR	5/1/2004	31,095	24,088	632176	77.47%	12	BPA	Cowlitz
	DR	5/1/2004	66,223	9,867	632177	14.90%	11	BPA	Lewis
			1,649,140	298,446					
2003	YB	3/22/2005	29,495	AD only	N/A	0.00%	5.3	BPA	over-summer
	TGJ	4/4/2005	26,955	26,226	093929	97.30%	12	BPA	JD acclim.
	DR	3/22/2005	101,344	22,500	632174	22.20%	10	BPA	Cowlitz/tow
	DR	3/23/2005	153,127	22,300	632173	14.56%	10	BPA	Lewis/tow
	TGM	4/4/2005	26,344	25,632	093930	97.30%	13	BPA	morpholine
	BS	4/4/2005	285,959	26,396	093932	9.23%	13.2	BPA	
	YB	4/5/2005	428,499	26,069	093931	6.08%	14.2	BPA	
	SF	4/5/2005	458,659	24,264	093736	5.29%	12.1	CCF	SF production
	BS	4/6/2005	25,646	23,807	094055	92.83%	15.8	NOAA	acclim.
	BS	4/15/2005	25,344	23,964	094056	94.55%	14.2	NOAA	acclim.
	BS	4/25/2005	25,182	23,786	094057	94.46%	16	NOAA	acclim.
	BS	5/4/2005	24,747	24,259	094058	98.03%	14	NOAA	acclim.
	BS	5/13/2005	23,051	22,898	094060	99.34%	13.6	NOAA	acclim.
	BS	5/23/2005	23,115	22,516	094059	97.41%	13.7	NOAA	acclim.
			1,657,467	314,617					
2004	SF	9/26/2005	566,030	27,373	093722	4.84%	24.5	CCF	SF production
	DR	3/27/2006	159,300	23,841	632297	14.97%	13	BPA	Cowlitz/tow
	BS	3/27/2006	287,215	23,203	093933	8.08%	15.7	BPA	
	TGJ	3/27/2006	25,451	24,117	093706	94.76%	10.8	BPA	
	TG	3/27/2006	57,114	24,191	093708	42.36%	12.5	BPA	morpholine
	DR	3/27/2006	177,000	22,839	633181	12.90%	14	BPA	Lewis/tow
	YB	3/28/2006	391,843	21,876	093707	5.58%	11.6	BPA	
	BS	4/6/2006	28,099	27,117	094254	96.51%	17.2	NOAA	acclim.
	BS	4/17/2006	27,440	26,952	094253	98.22%	17.5	NOAA	acclim.
	BS	4/27/2006	27,459	26,256	094258	95.62%	15.5	NOAA	acclim.
	BS	5/5/2006	27,831	27,107	094255	97.40%	14.3	NOAA	acclim.
	BS	5/16/2006	27,493	26,857	094256	97.69%	16.9	NOAA	acclim.
	BS	5/24/2006	25,851	24,657	094257	95.38%	16	NOAA	acclim.
			1,828,126	326,386					
2005	DR	3/15/2007	263,600	54,760	632985	20.77%	14	BPA	towed
	BS	3/28/2007	272,226	26,944	094432	9.90%	11	BPA	
	TGM	3/29/2007	76,877	25,295	094433	32.90%	10.4	BPA	
	TGJ	3/29/2007	27,272	26,650	094435	97.72%	10.1	BPA	
	YB	3/30/2007	417,662	26,292	094434	6.30%	11.2	BPA	
			1,057,637	159,941					
2006	BS	3/25/2008	312,612	23,043	094606	7.37%	11.7	BPA	
	TGM	3/25/2008	79,343	26,137	094607	32.94%	14.2	BPA	
	YB	3/27/2007	543,803	25,990	094608	4.78%	9.4	BPA	1st yr. oxy. supp.
	DR	4/3/2008	121,500	47,147	634190	38.80%	11.8	BPA	towed
			1,057,258	122,317					

continued

Table A2.1 (spring Chinook continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2007	DR	2/25/2009	279,811	37,262	634381	13.32%	14	BPA	
	YB	3/23/2009	457,161	27,464	090152	6.01%	13.6	BPA	2nd yr. oxy. supp.
	BS	3/27/2009	280,437	24,955	090153	8.90%	15.1	BPA	
	TGM	3/27/2009	103,060	27,474	090154	26.66%	16.5	BPA	
			1,120,469	117,155					
2008	DR	2/25/2010	363,000	9,000	633497	4.96%	10	BPA	
	YB	3/4/2010	549,220	27,041	090255	4.92%	10.7	BPA	
	BS	3/25/2010	265,832	24,044	090256	9.04%	13.5	BPA	
	TGM	3/25/2010	101,700	27,716	090257	27.25%	12.2	BPA	
	YB	3/26/2010	124,874	N/A	N/A	0.00%	9.6	ODFW	
	YB	4/26/2010	130,571	21,356	090251	16.36%	10.3	ODFW	
			1,535,197	118,157					
2009	DR	3/3/2011	234,000	39,492	635894	16.75%	12	BPA	
	YB	3/4/2011	453,470	27,256	090339	6.01%	12.4	BPA	
	BS	3/29/2011	253,503	23,938	090340	9.44%	11.9	BPA	
	TGM	3/30/2011	100,557	27,136	090341	26.99%	13	BPA	
	YB	3/31/2011	249,139	27,174	094654	10.91%	11	ODFW	
			1,290,669	144,688					
2010	DR	3/7/2012	405,000	41,328	635871	10.20%	11.7	BPA	
	YB	3/8/2012	513,089	25,210	090451	4.91%	12.5	BPA	
	BS	3/20/2012	258,923	23,667	090452	9.14%	14.6	BPA	
	TGM	3/22/2012	253,002	27,652	090455	10.93%	12.1	ODFW	
	YB	3/29/2012	99,241	27,938	090453	28.15%	11.5	BPA	
			1,529,255	145,795					
2011	DR	2/4/2013	320,000	48,892	636186	15.28%	14.2	Mitchell Act	
	GC	3/5/2013	99,190	26,509	094149	26.73%	14.6	BPA	
	YB	3/11/2013	601,862	24,577	094202	4.08%	11.7	BPA	
	BS	3/7/2013	172,816	24,022	094157	13.90%	13.9	BPA	
	TGM	3/21/2013	246,370	33,092	090465	13.43%	12.5	ODFW	Reallocation
	BS	3/28/2013	153,674	N/A	N/A	0.00%	9.4	ODFW	Reallocation
	TGM	4/8/2013	133,990	N/A	N/A	0.00%	10.1	ODFW	Reallocation
	TGM	4/8/2013	50,630	32,687	092053	64.56%	11.8	ODFW	Reallocation
	TGM	4/8/2013	50,630	18,871	090589	37.27%	11.8	ODFW	Reallocation
			1,829,162	208,650					
2012	YB	11/27/2013	47,750	N/A	N/A	0.00%	20.6	ODFW	Emerg. Rls.
	BS	3/7/2014	130,326	22,040	090620	16.91%	13.6	BPA	
	YB	3/14/2014	187,395	31,857	090740	17.00%	11	BPA	Rplcmnts.
	YB	3/14/2014	443,942	27,581	090619	6.21%	12	BPA	
	GC	3/17/2014	150,834	27,278	090621	18.08%	13.9	BPA	
	TGM	3/18/2014	320,983	106,043	090721	33.04%	13	ODFW	Reallocation
	BS	3/27/2014	97,948	N/A	N/A	0.00%	9.9	ODFW	Reallocation
	BS	3/27/2014	142,584	N/A	N/A	0.00%	12.7	ODFW	Reallocation
	CC	3/28/2014	200,000	200,000	636492	100.00%	13.1	Mitchell Act	
	TGM	4/10/2014	172,612	46,127	090726	26.72%	11.5	ODFW	Reallocation
			1,894,374	460,926					
2013	CC	2/11/2015	140,864	140,532	636677	99.76%	12.8	Mitchell Act	
	BS	3/5/2015	130,750	22,227	090747	17.00%	11.2	BPA	
	GC	3/13/2015	142,959	25,550	090748	17.87%	10.1	BPA	
	YB	3/18/2015	560,520	21,300	090746	3.80%	11.1	BPA	
	TGM	3/19/2015	260,093	26,086	090839	10.03%	15	ODFW	Reallocation
	BS	3/26/2015	306,833	25,560	090838	8.33%	15.1	ODFW	Reallocation
	TGM	4/9/2015	205,327	26,136	090840	12.73%	15	ODFW	Reallocation
			1,747,346	287,391					

continued

Table A2.1 (spring Chinook continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2014	YB	2/22/2016	130,193	25,570	090164	19.64%	11.8	BPA	
	YB	2/22/2016	130,193	27,616	090890	21.21%	11.8	BPA	
	YB	2/22/2016	367,471	23,915	090832	6.51%	11	BPA	
	TGM	2/23/2016	192,314	29,170	090895	15.17%	14.3	ODFW	Reallocation
	BS	2/24/2016	128,700	22,999	090833	17.87%	11.3	BPA	
	KK	2/24/2016	275,973	23,549	090894	8.53%	13.1	ODFW	Reallocation
	CC	3/1/2016	107,856	106,540	636834	98.78%	14.2	Mitchell Act	
	GC	3/14/2016	380,848	26,234	090834	6.89%	10.8	BPA	
	TGM	3/23/2016	245,271	24,014	090893	9.79%	14.8	ODFW	Reallocation
			1,958,819	309,607					
2015	BS	3/13/2017	116,114	19,862	090976	17.11%	14.16	BPA	Over-winter
	GC	3/24/2017	379,653	27,804	090977	7.32%	12.36	BPA	Full-term rearing
	TGM	2/15/2017	111,948	0	N/A	0.00%	9.9	ODFW	Acclimation
	TGM	3/14/2017	103,838	24,678	091020	23.77%	13.2	ODFW	Acclimation
	TGM	4/6/2017	183,928	25,079	091031	13.64%	13	ODFW	Acclimation
	YB	3/1/2017	386,666	24,083	090975	6.23%	13.2	BPA	Over-winter
	YB	3/2/2017	219,874	27,571	091035	12.54%	13.4	BPA	Over-winter
	YB	3/29/2017	303,803	25,034	091032	8.24%	13.4	ODFW	Acclimation
	CC	3/1/2017	119,944	119,008	636962	99.22%	15.4		
			1,925,768	293,119					
2016	BS	3/16/2018	129,830	23,811	090979	18.34%	11.71	BPA	Over-winter
	GC	3/20/2018	385,563	27,472	090980	7.13%	11.84	BPA	Full-term rearing
	TGM	3/15/2018	244,138	24,585	091154	10.07%	13.81	ODFW	Acclimation
	TGM	4/12/2018	215,694	25,354	091156	11.75%	15.54	ODFW	Acclimation
	YB	2/28/2018	249,544	26,825	091143	10.75%	11.74	BPA	Over-winter
	YB	2/28/2018	383,479	25,997	090978	6.78%	12.78	BPA	Over-winter
	YB	3/27/2018	526,867	25,042	091155	4.75%	13.9	ODFW	Acclimation
	CC	3/1/2018	260,000	258,934	637190	99.59%	16.01		
			2,395,115	438,020					
2017	GC	3/19/2019	398,366	27,008	091024	6.78%	11.85	BPA	Full-term rearing
	GC	3/19/2019	248,470	28,252	091195	11.37%	14.53	BPA	Over-winter
	BS	3/21/2019	130,489	23,732	091023	18.19%	13.51	BPA	Over-winter
	TGM	3/14/2019	248,380	24,750	091207	9.96%	17.82	ODFW	Acclimation
	TGM	4/16/2019	171,228	23,586	091209	13.77%	13.33	ODFW	Acclimation
	YB	1/2/2019	49,487	0	N/A	0.00%	12.52	ODFW	Program Excess
	YB	2/28/2019	360,690	24,002	091022	6.65%	13.95	BPA	Over-winter
	YB	2/28/2019	254,628	26,550	091203	10.43%	13.92	BPA	Over-winter
	KK	3/29/2019	117,495	0	N/A	0.00%	16.62	BPA	Full-term rearing
	YB	4/11/2019	303,599	21,768	091208	7.17%	13.23	ODFW	Acclimation
	DR	11/26/2018	93,836	92,869	637366	98.97%	11.7	BPA	Acclimation
	DR	12/17/2018	76,164	75,531	637256	99.17%	11.7	BPA	Acclimation
			2,452,832	368,048					
2018	DR	4/18/2019	130,000	128,830	637518	99.10%	97.55		
	DR	12/27/2019	130,000	129,480	637519	99.60%	12.5		
	DR	12/27/2019	2,000	2,000	637531	100.00%	12.5		
			262,000	260,310					

[1]BS-Blind Slough; CC-Cathlamet Channel; DR-Deep River; GC-Gnat Creek; KK-North Fork Klaskanine; SF-South Fork Klaskanine; TG-Tongue Pt.; TGM-Tongue Pt. MERTS; TGJ-Tongue Pt. John Day; YB-Youngs Bay.

[2]BPA-Bonneville Power Administration; CCF-Clatsop County Fisheries/Fishermen Poundage Contributions; NOAA-National Oceanic & Atmospheric Administration; ODFW-Oregon Department of Fish & Wildlife.

Table A2.2 Releases of Select Area Bright Fall Chinook from Lower Columbia River Select Area facilities, 1994-2018 brood years.

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
1994	YB	6/27/1995	107,892	50,068	070742	46.41%	18.2	BPA	July 15 or 65°
	YB	7/17/1995	77,100	49,898	070928	64.72%	13.6	BPA	Aug 1 or 70°
	YB	7/17/1995	116,030	43,729	070929	37.69%	10.9	BPA	0.25 #/ft³ density
	YB	7/17/1995	127,936	44,337	070930	34.66%	11.8	BPA	0.56 #/ft³ density
	YB	7/17/1995	115,702	43,062	070931	37.22%	13.8	BPA	0.66 #/ft³ density
	YB	7/17/1995	707,127	19,954	071421	2.82%	36.5	R&E	R&E
	SF	8/15/1995	15,758	LV only	N/A	0.00%	37	ODFW/CCF	SF Raceways
	BC	8/11/1995	83,386	13,392	070541	16.06%	20.2	R&E	BC Brood stock
	BC	8/11/1995	83,302	13,281	070540	15.94%	20.4	R&E	BC Brood stock
	BC	8/11/1995	83,201	13,264	070540	15.94%	20.6	R&E	BC Brood stock
	BC	8/11/1995	83,321	13,376	070541	16.05%	20.7	R&E	BC Brood stock
	BC	8/29/1995	175,032	27,446	070542	15.68%	15.4	R&E	BC Brood stock
	BC	8/30/1995	500,356	26,916	070543	5.38%	15.6	R&E	BC Brood stock
			2,276,143	358,723					
1995	YB	7/16/1996	64,679	58,060	071342	89.77%	13.1	BPA	0.25 #/ft³ density
	YB	7/16/1996	154,593	46,336	071341	29.97%	14.5	BPA	0.67 #/ft³ density
	TG	7/15/1996	26,792	26,500	071350	98.91%	22	R&E	R&E
	YB	7/17/1996	329,976	27,243	071354	8.26%	31.8	PSMFC	PSMFC
	BS	7/15/1996	27,380	27,330	071351	99.82%	19.9	R&E	R&E
	YB	7/16/1996	389,320	LV only	N/A	0.00%	16.3	R&E	R&E
	YB	7/17/1996	428,405	LV only	N/A	0.00%	37.5	PSMFC	PSMFC
	KK	7/31/1996	26,178	25,988	071353	99.27%	22.2	R&E	KK Brood stock
	KK	8/26/1996	521,952	27,041	071352	5.18%	14.2	R&E	KK Brood stock
			1,969,275	238,498					
1996	YB	6/17/1997	53,442	52,956	071339	99.09%	38	BPA	July 15 or 65°
	YB	7/17/1997	50,868	50,371	071338	99.02%	18.1	BPA	Aug 1 or 70°
	YB	7/18/1997	116,680	52,468	092136	44.97%	21.4	BPA	0.14 #/ft³ density
	YB	7/17/1997	188,948	51,392	092135	27.20%	17.9	BPA	0.33 #/ft³ density
	YB	7/18/1997	53,765	52,618	071340	97.87%	18.4	BPA	0.46 #/ft³ density
	TG	7/19/1997	27,482	27,482	092146	100.00%	24.1	R&E	R&E
	BS	7/20/1997	27,413	27,413	092145	100.00%	31.6	R&E	R&E
	KK	10/31/1997	195,247	9,593	092143	4.91%	13.8	R&E	KK Brood stock
	KK	10/31/1997	408,713	27,327	092144	6.69%	13.8	R&E	
			1,122,558	351,620					
1997	YB	7/1/1998	25,201	24,853	092454	98.62%	19.8	BPA	July 15 or 65°
	YB	7/20/1998	25,019	24,958	092453	99.76%	16	BPA	Aug 1 or 70°
	YB	7/20/1998	25,035	24,803	092456	99.07%	14.5	BPA	0.27 #/ft³ density
	YB	7/20/1998	17,303	16,891	092457	97.62%	15.8	BPA	0.34 #/ft³ density
	YB	7/20/1998	25,024	24,962	092455	99.75%	16.5	BPA	0.47 #/ft³ density
	KK	9/23/1998	52,677	LV only	N/A	0.00%	19.4	R&E	KK Brood stock
	KK	9/25/1998	54,752	13,405	092517	24.48%	17	R&E	KK Brood stock
	KK	9/28/1998	54,472	LV only	N/A	0.00%	17.2	R&E	KK Brood stock
	KK	9/30/1998	54,734	13,402	092517	24.49%	16.9	R&E	KK Brood stock
	KK	11/4/1998	445,342	26,862	092518	6.03%	16.1	R&E	KK Brood stock
			779,559	170,136					

continued

Table A2.2 (Select Area Bright Fall Chinook continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
1998	YB	7/12/1999	25,811	25,467	092754	98.67%	17.1	BPA	July 15 or 65°
	YB	8/2/1999	26,000	25,446	092753	97.87%	12.5	BPA	Aug 1 or 70°
	YB	7/12/1999	25,992	25,746	092757	99.05%	16.6	BPA	0.24 #/ft³ density
	YB	7/12/1999	25,921	25,106	092756	96.86%	18.1	BPA	0.45 #/ft³ density
	YB	7/12/1999	32,410	25,570	092755	78.90%	17.8	BPA	0.57 #/ft³ density
	YB	7/12/1999	85,837	26,794	092758	31.21%	30.6	R&E	R&E
	KK	9/27/1999	52,546	6,676	092760	12.71%	16.4	R&E	KK Brood stock
	KK	9/27/1999	54,547	6,676	092760	12.24%	16.6	R&E	KK Brood stock
	KK	9/28/1999	51,659	6,563	092760	12.70%	16.6	R&E	KK Brood stock
	KK	9/28/1999	51,480	6,541	092760	12.71%	16.5	R&E	KK Brood stock
	KK	11/3/1999	494,968	26,402	092759	5.33%	13.9	R&E	KK Brood stock
			927,171	206,987					
1999	YB	7/5/2000	24,944	24,559	093039	98.46%	17.1	BPA	0.46 #/ft³ density
	YB	7/5/2000	25,079	23,825	093040	95.00%	17	BPA	0.46 #/ft³ density
	YB	7/5/2000	24,909	24,332	093041	97.68%	16.7	BPA	0.23 #/ft³ density
	YB	7/5/2000	24,983	24,442	093042	97.83%	14.3	BPA	0.27 #/ft³ density
	YB	7/5/2000	24,738	22,269	093043	90.02%	15.7	R&E	R&E
	YB	7/5/2000	29,275	LV only	N/A	0.00%	15.7	R&E	R&E
	KK	8/21/2000	50,409	13,787	093048	27.35%	20.4	R&E	KK Brood stock
	KK	8/21/2000	50,650	13,853	093048	27.35%	17.2	R&E	KK Brood stock
	KK	8/24/2000	51,600	LV only	N/A	0.00%	21.2	R&E	KK Brood stock
	KK	8/24/2000	50,124	LV only	N/A	0.00%	18.8	R&E	KK Brood stock
	KK	9/25/2000	51,040	LV only	N/A	0.00%	15.7	R&E	KK Brood stock
	KK	9/25/2000	51,274	LV only	N/A	0.00%	15.7	R&E	KK Brood stock
	KK	9/26/2000	51,832	LV only	N/A	0.00%	15.7	R&E	KK Brood stock
	KK	9/26/2000	51,563	27,277	093049	52.90%	15.7	R&E	KK Brood stock
			562,420	174,344					
2000	YB	7/4/2001	25,263	25,263	093258	100.00%	26.9	BPA	0.50 #/ft³ density
	YB	7/4/2001	24,658	24,466	093259	99.22%	26.5	BPA	0.50 #/ft³ density
	YB	7/4/2001	25,235	24,922	093260	98.76%	22.2	BPA	0.25 #/ft³ density
	YB	7/4/2001	25,221	24,809	093261	98.37%	20.2	BPA	0.25 #/ft³ density
	YB	7/4/2001	104,768	23,987	093262	22.90%	24.4	R&E	0.50 #/ft³ density
	KK	8/23/2001	49,309	26,898	093312	54.55%	19.3	R&E	KK Brood stock
	KK	8/23/2001	49,259	LV only	N/A	0.00%	18.3	R&E	KK Brood stock
	KK	8/24/2001	49,890	LV only	N/A	0.00%	18.7	R&E	KK Brood stock
	KK	8/24/2001	49,850	LV only	N/A	0.00%	19.3	R&E	KK Brood stock
	KK	9/20/2001	471,605	27,000	093313	5.73%	16.9	R&E	KK Brood stock
			875,058	177,345					
2001	YB	7/2/2002	125,607	24,211	093509	19.28%	22.1	BPA	0.50 #/ft³ density
	YB	7/2/2002	25,065	24,577	093510	98.05%	26.2	BPA	0.50 #/ft³ density
	YB	7/2/2002	24,775	24,225	093511	97.78%	22.9	BPA	0.25 #/ft³ density
	YB	7/2/2002	126,448	24,853	093512	19.65%	22.8	BPA	0.25 #/ft³ density
	YB	7/2/2002	165,161	24,602	093513	14.90%	27	R&E	R&E
	KK	8/1/2002	203,853	26,608	093533	13.05%	36.8	R&E	KK Brood stock
	KK	8/22/2002	416,674	21,587	093532	5.18%	23.1	R&E	KK Brood stock
			1,087,583	170,663					
2002	YB	7/24/2003	370,942	23,832	093809	6.42%	17.4	BPA	SAFE
	YB	8/7/2003	409,372	27,833	093819	6.80%	22.3	R&E	R&E
	KK	7/19/2003	199,640	26,938	093817	13.49%	42.7	R&E	KK Brood stock
	KK	8/20/2003	167,486	LV only	N/A	0.00%	19.3	R&E	KK Brood stock
	KK	8/27/2003	167,288	LV only	N/A	0.00%	17.5	R&E	KK Brood stock
	KK	8/30/2003	167,804	27,348	093818	16.30%	16	R&E	KK Brood stock
			1,482,532	105,951					

continued

Table A2.2 (Select Area Bright Fall Chinook continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2003	SF	7/6/2004	53,963	LV only	N/A	0.00%	91.3	R&E	Brood stock
	YB	7/15/2004	147,467	25,327	093955	17.17%	16.5	R&E	R&E
	YB	7/15/2004	372,209	25,041	093954	6.73%	15.5	BPA	Production
	KK	7/23/2004	50,468	LV only	N/A	0.00%	33.7	R&E	KK Brood stock
	KK	7/26/2004	151,316	27,075	093959	17.89%	33.7	R&E	KK Brood stock
	KK	8/14/2004	166,900	27,523	093960	16.49%	20	R&E	KK Brood stock
	KK	8/21/2004	169,178	LV only	N/A	0.00%	18.9	R&E	KK Brood stock
	KK	8/28/2004	143,293	LV only	N/A	0.00%	14.8	R&E	KK Brood stock
			1,254,794	104,966					
2004	SF	7/14/2005	45,247	27,822	620227	61.49%	31.6	R&E	Brood stock, AHS
	YB	7/18/2005	101,987	24,971	093948	24.48%	15.4	BPA	Production
	YB	7/18/2005	59,250	24,909	093949	42.04%	13.4	R&E	R&E
	KK	8/5/2005	202,285	29,012	070546	14.34%	31.5	R&E	KK Brood stock
	KK	8/20/2005	177,836	29,420	092101	16.54%	21.2	R&E	KK Brood stock
	KK	8/27/2005	174,838	LV only	N/A	0.00%	17.6	R&E	KK Brood stock
	KK	9/6/2005	180,107	LV only	N/A	0.00%	16.6	R&E	KK Brood stock
			941,550	136,134					
2005	YB	7/6/2006	383,723	24,942	094329	6.50%	15.2	BPA	Production
	YB	7/19/2006	92,774	22,017	094424	23.73%	10.7	R&E	R&E
	SF	7/22/2006	628,888	50,153	094429	7.97%	25	R&E/ODFW	Brood stock
			1,105,385	97,112					
2006	YB	6/27/2007	564,641	23,163	094550	4.10%	16.8	BPA	Production
	SF	6/28/2007	708,412	28,562	094604	4.03%	33.5	ODFW/CCF	Brood stock
			1,273,053	51,725					
2007	YB	7/1/2000	574,020	23,120	090126	4.03%	18.6	BPA	Production
	SF	7/27/2008	674,181	30,019	090142	4.45%	31.5	ODFW/CCF	Brood stock
			1,248,201	53,139					
2008	YB	7/2/2009	702,659	25,211	090216	3.59%	17.3	BPA	Production
	SF	7/21/2009	714,118	27,887	090243	3.91%	32.8	ODFW/CCF	Brood stock
			1,416,777	53,098					
2009	YB	7/8/2010	229,105	27,114	094151	11.83%	16.6	BPA	Production
	SF	7/25/2010	685,056	27,591	090337	4.03%	23.6	ODFW	Brood stock
			914,161	54,705					
2010	YB	6/28/2011	684,030	24,762	090368	3.62%	20.2	BPA	Production
	SF	7/15/2011	672,829	28,240	090441	4.20%	29.2	ODFW	Brood stock
			1,356,859	53,002					
2011	YB	6/29/2012	653,452	31,212	090584	4.78%	21.1	BPA	Production
	SF	7/10/2012	704,594	31,299	090595	4.44%	34.2	ODFW	Brood stock
			1,358,046	62,511					
2012	YB	7/1/2013	687,801	25,189	090711	3.66%	16.1	BPA	Production
	KK	7/16/2013	481,663	31,652	090710	6.57%	33.5	ODFW	KK Brood stock
	SF	7/19/2013	680,806	30,495	090716	4.48%	27.4	ODFW	Brood stock
			1,850,270	87,336					
2013	YB	6/23/2014	706,974	27,203	071244	3.85%	19.5	BPA	Production
	KK	7/14/2014	822,825	24,497	071250	2.98%	34.5	ODFW	KK Brood stock
	SF	7/17/2014	697,554	28,816	090821	4.13%	32.1	ODFW	Brood stock
			2,227,353	80,516					
2014	YB	6/5/2015	472,678	26,620	094155	5.63%	20.3	BPA	Production
	KK	6/26/2015	525,600	26,887	094162	5.12%	45	ODFW	KK Brood stock
	SF	6/27/2015	672,387	27,092	090885	4.03%	29.8	ODFW	Brood stock
			1,670,665	80,599					

continued

Table A2.2 (Select Area Bright Fall Chinook continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2015	SF	6/28/2016	160,487	27,726	091007	17.28%	22.8	ODFW	Brood stock
	KK	7/11/2016	461,441	25,468	091006	5.52%	34.7	ODFW	KK Brood stock
			621,928	53,194					
2016	KK	6/23/2017	599,463	108,056	091136	18.03%	77.5	ODFW	Full-term Rearing
			599,463	108,056					
2017	KK	7/7/2018	300,460	100,311	094524	33.39%	72.4	ODFW	Full-term Rearing
			300,460	100,311					
2018	KK	7/16/2019	327,986	30,603	091284	9.33%	68.94	ODFW	Full-term Rearing
	KK	8/21/2019	63,361	5,918	091284	9.34%	27.2	ODFW	Full-term Rearing
			391,347	36,521					

[1]BC-Big Creek; BS-Blind Slough; KK-North Fork Klaskanine; SF-South Fork Klaskanine; TG-Tongue Pt.; YB=Youngs Bay

[2]BPA-Bonneville Power Administration; CCF-Clatsop County Fisheries/Fishermen Poundage Contributions; ODFW-Oregon Department of Fish and Wildlife; R&E-ODFW Recreation and Enhancement Program; PSMFC-Pacific States Marine Fisheries Commission

Table A2.3 Releases of Lower Columbia River Coho from Select Area facilities, 1993-2017 brood years.

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source2	Comments
1993	YB	5/11/1995	138,371	29,172	071544	21.08%	7.8	BPA	site comparison
	BS	5/12/1995	140,267	26,258	071545	18.72%	8.9	BPA	site comparison
	TG	5/12/1995	130,623	26,426	075329	20.23%	8.7	BPA	site comparison
	DR	5/12/1995	201,200	30,751	635444	15.28%	8.1	BPA	site comparison
	SF	4/10/1995	433,674	23,160	070356	5.34%	10.5	ODFW/CCF	
	YB	4/17/1995	822,185	25,886	070758	3.15%	9.7	Mitchell Act	
	YB	5/1-8/95	467,531	22,545	070743	4.82%	12.6	R&E	acclimation
	YB	5/15/1995	280,412	22,057	070744	7.87%	12.6	R&E	acclimation
			2,614,263	206,255					
1994	YB	5/7/1996	216,187	26,274	071222	12.15%	9.5	BPA	site comparison
	BS	5/6/1996	209,761	24,942	075901	11.89%	9	BPA	site comparison
	TG	5/6/1996	190,032	23,942	071241	12.60%	8.4	BPA	site comparison
	DR	5/7/1996	200,100	28,406	635739	14.20%	9.7	BPA	site comparison
	KK	4/1/1996	837,355	24,974	075415	2.98%	10.3	ODFW	
	SF	4/14/1996	443,183	25,979	070925	5.86%	10.7	ODFW/CCF	
	YB	4/15/1996	808,263	28,299	071242	3.50%	11.7	Mitchell Act	
	GR	4/16/1996	163,000	28,237	635917	17.32%	12	Mitchell Act	
	YB	4/26/1996	829,600	26,933	070961	3.25%	9.6	Mitchell Act	
	BS	5/6/1996	141,056	28,165	070958	19.97%	14.3	Mitchell Act	
	YB	5/20/1996	341,339	22,104	071223	6.48%	11.3	R&E	acclimation
	YB	5/28/1996	295,512	26,418	071136	8.94%	11.2	Mitchell Act	
	BS	6/5/1996	402,510	27,957	070959	6.95%	12.5	Mitchell Act	
			5,077,898	342,630					
1995	BC	4/30/1997	146,067	27,589	070842	18.89%	13	Mitchell Act	
	YB	5/5/1997	146,818	27,360	070942	18.64%	13.2	BPA	site comparison
	BS	5/5/1997	196,963	25,195	091818	12.79%	14.4	BPA	site comparison
	TG	5/5/1997	430,221	26,223	071336	6.10%	13.9	BPA	site comparison
	YB	5/12/1997	633,310	26,703	071335	4.22%	14.5	Mitchell Act	
	SF	5/12/1997	621,932	28,284	091824	4.55%	12.7	ODFW/CCF	
	BC	5/30/1997	389,635	27,762	070946	7.13%	12.2	Mitchell Act	
			2,564,946	189,116					
1996	BC	4/24/1998	146,064	24,952	092254	17.08%	12.6	Mitchell Act	
	YB	5/1/1998	133,373	26,677	092302	20.00%	10.4	BPA	site comparison
	BS	5/1/1998	144,958	25,570	092305	17.64%	11.4	BPA	site comparison
	TG	5/1/1998	119,611	18,641	092306	15.58%	11.2	BPA	site comparison
	GR	4/22/1998	158,045	29,907	636248	18.92%	10.8	Mitchell Act	
	DR	4/23/1998	208,350	29,713	636247	14.26%	10.6	BPA	site comparison
	SF	4/29/1998	550,427	27,321	092321	4.96%	16.8	ODFW/CCF	
	YB	5/1/1998	268,870	52,510	053732	19.53%	12.2	R&E	acclimation
	YB	5/1/1998	261,654	50,604	053733	19.34%	12.2	R&E	acclimation
	BC	5/28/1998	355,130	26,632	092255	7.50%	11.8	Mitchell Act	
	YB	5/26/1998	425,634	29,525	092336	6.94%	13.3	Mitchell Act	acclimation
	YB	5/26/1998	30,101	29,990	092338	99.63%	13.3	Mitchell Act	acclim./d. Index
			2,802,217	372,042					

continued

Table A2.3 (Coho continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
1997	YB	4/12/1999	663,012	26,786	092422	4.04%	13.9	Mitchell Act	
	BC	4/26/1999	142,730	26,478	092420	18.55%	11.9	Mitchell Act	
	YB	4/28/1999	158,203	28,809	092334	18.21%	11.9	BPA	site comparison
	BS	4/28/1999	197,089	26,256	092528	13.32%	11.3	BPA	site comparison
	GR	5/12/1999	213,696	29,339	630830	13.73%	11	Mitchell Act	
	TG	4/28/1999	204,143	26,431	092529	12.95%	11.4	BPA	site comparison
	DR	5/13/1999	203,284	25,003	630530	12.30%	11.4	BPA	site comparison
	DR	5/13/1999	210,824	24,563	630531	11.65%	13	BPA	site comparison
	SS	5/5/1999	210,530	24,248	630532	11.52%	10.4	BPA	site comparison
	BC	5/25/1999	382,612	26,349	092419	6.89%	11.8	Mitchell Act	
	SF	4/21/1999	429,652	19,730	092428	4.59%	13.3	ODFW/CCF	
	YB	5/5/1999	502,146	24,963	053947	4.97%	12.5	R&E	acclimation
	YB	5/19/1999	479,662	24,974	053946	5.21%	11.8	R&E	acclim/d. Index
	YB	6/1/1999	272,647	26,215	092643	9.61%	13.4	Mitchell Act	acclimation
	YB	6/1/1999	26,894	26,841	092656	99.80%	13.4	Mitchell Act	acclim/d. Index
			4,297,124	386,985					
1998	YB	5/4/2000	206,377	24,490	092914	11.87%	11.9	BPA	site comparison
	BS	5/4/2000	195,645	24,624	092912	12.59%	11.5	BPA	site comparison
	TG	5/4/2000	228,290	24,774	092913	10.85%	10.8	BPA	site comparison
	GR	5/3/2000	148,563	28,774	631163	19.37%	10.9	Mitchell Act	
	DR	5/3/2000	217,732	25,725	631201	11.81%	11.8	BPA	site comparison
	DR	5/4/2000	213,411	29,690	631202	13.91%	11.3	BPA	site comparison
	BC	5/15/2000	398,106	25,995	092431	6.53%	11.7	Mitchell Act	
	BC	4/15/2000	145,353	26,285	092434	18.08%	12.3	Mitchell Act	
	SS	4/24/2000	191,543	31,929	631117	16.67%	11.2	BPA	site comparison
	YB	4/12/2000	836,845	26,244	092716	3.14%	15.7	Mitchell Act	
	SF	5/1-8/00	610,658	25,514	092730	4.18%	12.8	ODFW/CCF	
	TG	5/11/2000	525,833	26,176	092749	4.98%	13.5	Mitchell Act	
	YB	5/25/2000	27,138	27,086	092540	99.81%	13.6	Mitchell Act	acclim/d. Index
	YB	5/25/2000	272,992	26,806	092729	9.82%	13.6	Mitchell Act	acclimation
	YB	5/31/2000	476,148	21,731	053948	4.56%	15.9	R&E	acclimation
			4,694,634	395,843					
1999	YB	5/14/2001	502,077	22,577	050191	4.50%	14.2	R&E	acclimation
	YB	4/10/2001	808,735	26,482	093006	3.27%	15.6	Mitchell Act	
	BC	4/16/2001	145,147	27,026	092731	18.62%	12.3	Mitchell Act	
	YB	4/16/2001	234,032	26,011	093161	11.11%	14	BPA	control
	YB	4/17/2001	179,187	26,592	093159	14.84%	14.7	BPA	towed
	GR	4/30/2001	160,549	28,835	630370	17.96%	13	Mitchell Act	
	SF	5/7/2001	344,738	26,276	093013	7.62%	12.5	ODFW/CCF	
	BC	5/15/2001	392,038	27,067	092732	6.90%	12.4	Mitchell Act	
	BS	5/24/2001	274,257	26,969	093220	9.83%	15.5	Mitchell Act	acclimation
	BS	5/24/2001	25,154	25,104	093222	99.80%	15.5	Mitchell Act	acclim/d. Index
	TG	5/31/2001	482,414	25,055	054908	5.19%	15.3	R&E	acclimation
	TG	4/16/2001	173,199	21,854	093160	12.62%	13.2	BPA	site comparison
	DR	5/9/2001	166,087	22,468	630375	13.53%	12	BPA	site comparison
	DR	5/9/2001	229,250	24,062	630376	10.50%	12	BPA	site comparison
	SS	5/1/2001	208,966	29,800	630369	14.26%	12	BPA	site comparison
			4,325,830	386,178					

continued

Table A2.3 (Coho continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2000	YB	5/6/2002	482,657	24,632	054250	5.10%	14.1	R&E	acclimation
	BC	4/1/2002	144,690	26,833	093242	18.55%	12.8	Mitchell Act	
	YB	4/12/2002	837,201	26,545	093015	3.17%	13	Mitchell Act	
	BC	5/1/2002	396,208	27,141	093243	6.85%	12.3	Mitchell Act	
	YB	5/5/2002	177,730	24,555	093339	13.82%	11.9	BPA	towed
	YB	5/3/2002	191,108	22,937	093340	12.00%	12	BPA	control
	BS	5/7/2002	315,988	26,896	093352	8.51%	13.8	Mitchell Act	acclimation
	BS	5/7/2002	27,854	27,798	093356	99.80%	13.8	Mitchell Act	acclim/d. Index
	SF	5/7/2002	583,248	24,285	093357	4.16%	11.4	ODFW/CCF	
	GR	5/15/2002	154,107	29,971	631097	19.45%	10.5	Mitchell Act	
	TG	5/16/2002	488,866	28,068	054254	5.74%	14.4	R&E	acclimation
	TG	4/25/2002	178,892	23,726	093341	13.26%	14.6	BPA	site comparison
	DR	5/16/2002	229,501	24,940	630664	10.87%	12	BPA	site comparison
	DR	5/16/2002	125,056	25,359	631082	20.28%	9.4	BPA	site comparison
	SS	5/1/2002	273,108	41,716	630764	15.27%	12	BPA	site comparison
			4,606,214	405,402					
2001	YB	5/8/2003	512,549	23,482	054760	4.58%	12.6	R&E	acclimation
	BC	4/1/2003	143,574	27,165	091929	18.92%	12.9	Mitchell Act	
	YB	4/10/2003	844,653	27,009	091932	3.20%	11.7	Mitchell Act	
	BC	5/1/2003	393,511	27,052	091930	6.87%	12.3	Mitchell Act	
	GR	5/1/2003	153,000	26,059	631569	17.03%	12	Mitchell Act	
	YB	5/9/2003	158,476	25,249	093610	15.93%	10.4	BPA	control
	YB	5/10/2003	171,033	27,004	093611	15.79%	10.3	BPA	towed
	BS	5/7/2003	288,931	27,775	093461	9.61%	13	Mitchell Act	acclimation
	BS	5/7/2003	27,873	27,824	093638	99.82%	13	Mitchell Act	acclim/d. Index
	SF	4/28/2003	641,555	26,035	093460	4.06%	12	ODFW/CCF	
	TG	5/22/2003	477,918	23,396	054759	4.90%	12.8	R&E	acclimation
	TG	4/24/2003	197,794	25,439	093612	12.86%	10	BPA	site comparison
	DR	4/30/2003	129,545	24,506	631519	18.92%	12	BPA	site comparison
	DR	4/30/2003	236,890	25,652	631520	10.83%	12	BPA	site comparison
	SS	5/5/2003	239,635	29,747	631174	12.41%	12	BPA	site comparison
			4,616,937	393,394					
2002	TGM	4/6/2004	186,520	24,770	093862	13.28%	13	BPA	site comparison
	BC	4/1/2004	144,839	26,959	093424	18.61%	11.8	Mitchell Act	
	YB	4/9/2004	758,997	24,155	093727	3.18%	11.6	Mitchell Act	
	SF	4/29/2004	131,185	0	N/A	0.00%			
	YB	4/28/2004	631,078	23,546	093863	3.73%	11.4	BPA	towed
	BS	4/28/2004	298,748	26,809	093732	8.97%	14.4	Mitchell Act	acclimation
	TGM	4/28/2004	511,002	24,747	053725	4.84%	13.7	R&E	acclimation
	YB	4/29/2004	350,839	22,364	053724	6.37%	12.4	R&E	
	GR	5/1/2004	157,000	29,200	632076	18.60%	10	Mitchell Act	
	BC	5/1/2004	372,103	26,803	093725	7.20%	11.6	Mitchell Act	
	DR	5/1/2004	152,780	24,900	632072	16.30%	14	BPA	site comparison
	DR	5/1/2004	204,420	25,100	632077	12.28%	13	BPA	site comparison
	SS	4/26/2004	204,600	29,460	632067	14.40%	13	BPA	site comparison
			4,104,111	308,813					

continued

Table A2.3 (Coho continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2003	YB	4/6/2005	723,793	28,007	093944	3.87%	15.4	Mitchell Act	
	BC	4/1/2005	142,898	26,158	094125	18.31%	12.1	Mitchell Act	
	BC	5/1/2005	363,274	27,134	094126	7.47%	11.8	Mitchell Act	
	DR	5/1/2005	144,900	19,806	632294	13.67%	11	BPA	site comparison
	GR	5/1/2005	146,000	25,688	632293	17.59%	11.8	Mitchell Act	
	YB	5/2/2005	422,275	26,855	093946	6.36%	15.2	BPA	towed
	BS	5/3/2005	309,527	26,390	094114	8.53%	14.5	Mitchell Act	
	TGM	5/4/2005	202,727	25,179	093945	12.42%	15.9	BPA	site comparison
			2,455,394	205,217					
2004	YB	4/10/2006	744,274	25,212	092044	3.39%	12.7	Mitchell Act	
	BC	4/1/2006	142,120	28,588	093703	20.12%	12.6	Mitchell Act	
	TGM	4/21/2006	194,442	28,948	094241	14.89%	9.1	BPA	
	YB	4/24/2006	381,335	28,092	094242	7.37%	10.5	BPA	
	BC	5/1/2006	385,511	27,283	093704	7.08%	11.8	Mitchell Act	
	GR	5/1/2006	156,302	28,009	632698	17.92%	12	Mitchell Act	
	DR	5/1/2006	201,300	28,369	632697	14.09%	12.3	BPA	
	BS	5/3/2006	305,573	24,189	094306	7.92%	13.8	Mitchell Act	
			2,510,857	218,690					
2005	TGM	4/19/2007	174,547	28,031	094330	16.06%	12.6	BPA	
	BC	4/15/2007	144,007	26,817	094431	18.62%	11.9	Mitchell Act	
	YB	4/23/2007	385,825	28,566	094331	7.40%	12	BPA	
	YB	4/25/2007	771,921	25,960	094455	3.36%	12	Mitchell Act	
	BS	4/26/2007	304,558	26,069	094501	8.56%	15.1	Mitchell Act	
	BC	5/8/2007	385,690	26,539	094430	6.88%	12.3	Mitchell Act	
	DR	5/1/2007	29,200	29,200	633698	100.00%	13	Mitchell Act	
	GR	5/1/2007	157,500	28,716	633699	18.23%	12	Mitchell Act	
	DR	5/1/2007	420,000	29,500	633764	7.02%	13	BPA	
			2,773,248	249,398					
2006	TGM	4/15/2008	597,754	28,574	094623	4.78%	12	BPA	
	BC	4/15/2008	141,789	26,147	094555	18.44%	11.8	Mitchell Act	
	SF	4/28/2008	139,472	27,615	093934	19.80%	10.6	ODFW	
	SF	4/28/2008	139,472	30,185	094514	21.64%	10.6	ODFW	
	GR	5/1/2008	132,188	33,758	634177	25.54%	11.5	Mitchell Act	
	BC	5/1/2008	417,928	25,969	094554	6.21%	12	Mitchell Act	
	DR	5/1/2008	368,000	32,982	634178	8.96%	15.5	BPA	
	BS	5/1/2008	310,133	27,851	094635	8.98%	13.9	Mitchell Act	
	YB	5/7/2008	768,960	27,365	094631	3.56%	13	Mitchell Act	
	KK	5/10/2008	232,455	19,742	093626	8.49%	12	BPA	
			3,248,151	280,188					

continued

Table A2.3 (Coho continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2007	KK	2/25/2009	132,659	4,810	090158	3.63%	13.4	BPA	BKD @ release
	KK	4/10/2009	377,402	13,689	090158	3.63%	11.8	BPA	
	TGM	4/6/2009	477,830	28,201	090159	5.90%	11.8	BPA	
	B C	4/15/2009	145,738	27,130	094648	18.62%	12.2	Mitchell Act	
	YB	4/21/2009	786,742	26,462	094659	3.36%	14.8	Mitchell Act	
	SF	4/29/2009	99,339	4,081	090158	4.11%	11.4	BPA	
	SF	4/29/2009	225,455	52,334	090179	23.21%	11.4	ODFW	
	SF	4/29/2009	145,341	0	N/A	0.00%	11.4	Mitchell Act	
	BC	5/2/2009	394,431	27,149	094530	6.88%	12.3	Mitchell Act	
	GR	5/4/2009	158,000	30,000	634475	18.99%	12.8	Mitchell Act	
	BS	5/4/2009	300,036	26,783	094661	8.93%	12.9	Mitchell Act	
	DR	5/6/2009	435,750	22,419	634474	5.14%	12	BPA	
	DR	5/6/2009	270,400	0	N/A	0.00%	15	Mitchell Act	
	YB	5/6/2009	227,399	0	N/A	0.00%	11.8	Surplus	hatchery closure
			4,176,522	263,058					
2008	TGM	4/9/2010	483,412	28,080	090254	5.81%	10.6	BPA	
	BC	4/1/2010	144,188	25,478	090252	17.67%	12	Mitchell Act	
	BS	4/20/2010	417,506	27,470	090258	6.58%	13.6	Mitchell Act	
	SF	4/24/2010	195,348	33,604	090272	17.20%	9.8	ODFW	
	SF	4/24/2010	152,146	24,678	054370	16.22%	9.8	ODFW	
	YB	4/26/2010	783,092	27,358	094655	3.49%	11.8	Mitchell Act	
	BC	4/27/2010	372,018	25,180	090253	6.77%	12.1	Mitchell Act	
	GR	5/3/2010	153,000	27,726	634880	18.12%	11	Mitchell Act	
	DR	5/3/2010	747,000	25,948	634881	3.47%	11	BPA	
	KK	5/7/2010	561,968	23,808	090229	4.24%	11.9	BPA	
			4,009,678	269,330					
2009	TGM	4/15/2011	479,365	24,760	090345	5.17%	11.3	BPA	
	BC	4/12/2011	160,512	27,077	094131	16.87%	11.4	Mitchell Act	
	BS	4/26/2011	388,505	27,184	090360	7.00%	14.7	Mitchell Act	
	SF	4/27/2011	368,980	26,571	090344	7.20%	10.4	ODFW	
	YB	4/27/2011	796,443	24,953	090250	3.13%	11.8	Mitchell Act	
	BC	4/30/2011	377,890	27,446	094130	7.26%	11.5	Mitchell Act	
	GR	5/3/2011	155,000	25,000	632768	16.13%	11.5	Mitchell Act	
	DR	5/2/2011	692,000	26,500	634599	3.83%	11.9	BPA/Mitchell	
	KK	5/3/2011	392,314	14,501	090336	3.70%	11.9	BPA	
			3,811,009	223,992					
2010	BS	4/16/2012	372,265	25,686	090461	6.90%	14.6	Mitchell Act	
	BC	4/13/2012	148,082	27,247	094203	18.40%	12.7	Mitchell Act	
	YB	4/17/2012	757,474	25,754	090460	3.40%	142	Mitchell Act	
	SK	4/18/2012	390,610	26,604	090450	6.81%	12.6	ODFW	
	TGM	4/20/2012	491,330	25,058	090454	5.10%	14	BPA	
	BC	4/30/2012	384,000	27,264	094204	7.10%	12	Mitchell Act	
	KK	4/30/2012	489,060	26,275	094642	5.37%	11.7	BPA	
	GR	5/1/2012	163,000	28,884	635795	17.72%	11.8	Mitchell Act	
	DR	5/2/2012	800,000	28,650	635793	3.58%	14.8	BPA/Mitchell	
			3,995,821	241,422					

continued

Table A2.3 (Coho continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2011	SF	4/7/2013	386,668	24,846	094201	6.43%	11.6	ODFW/CCF	
	BC	3/27/2013	166,100	28,071	094311	16.90%	15.1	Mitchell Act	
	TGM	4/18/2013	475,019	23,192	094205	4.88%	12.2	BPA	
	BS	4/18/2013	385,814	26,802	070150	6.95%	14.1	Mitchell Act	
	YB	4/22/2013	769,971	26,744	093919	3.47%	12.7	Mitchell Act	
	BC	4/23/2013	405,516	28,035	094310	6.91%	14.1	Mitchell Act	
	KK	4/24/2013	607,824	24,869	094236	4.09%	14	BPA	
	GR	5/1/2013	165,000	30,500	635981	18.48%	15.7	Mitchell Act	
	DR	5/1/2013	600,000	29,949	635980	4.99%	14	BPA/Mitchell	
	BS	5/6/2013	200,463	23,641	093902	11.79%	14.8	ODFW	Reallocation
	TGM	5/7/2013	374,362	N/A	N/A	0.00%	14.8	ODFW	Reallocation
			4,536,737	266,649					
2012	BS	4/18/2014	402,187	51,535	090728	12.81%	15.2	Mitchell Act	
	TGM	4/23/2014	498,856	22,794	090622	4.57%	13.7	BPA	
	BC	4/24/2014	537,811	26,712	090369	4.97%	13.6	Mitchell Act	
	YB	4/24/2014	774,533	25,382	090623	3.28%	12.6	Mitchell Act	
	KK	4/25/2014	705,070	27,132	090462	3.85%	13.6	ODFW	
	SF	4/25/2014	336,856	27,035	090618	8.03%	11.7	ODFW/CCF	
	GR	5/1/2014	155,000	29,940	636548	19.32%	17	Mitchell Act	
	DR	5/1/2014	725,000	29,940	636549	4.13%	16.8	BPA/Mitchell	
	BS	5/8/2014	221,462	N/A	N/A	0.00%	13	ODFW	Reallocation
	TGM	5/12/2014	429,733	56,483	090727	13.14%	14.9	ODFW	Reallocation
			4,786,508	296,953					
2013	SF	4/10/2015	260,289	29,673	090745	11.40%	10.8	ODFW/CCF	
	KK	4/13/2015	154,147	N/A	N/A	0.00%	13.3	ODFW	
	BC	4/13/2015	537,661	25,679	090270	4.78%	15	Mitchell Act	
	KK	4/14/2015	748,972	24,910	090617	3.33%	14	BPA	
	TGM	4/14/2015	493,359	24,668	090749	5.00%	15.1	BPA	
	BS	4/15/2015	407,545	27,713	090624	6.80%	15.1	Mitchell Act	
	YB	4/16/2015	684,306	21,898	090625	3.20%	13.2	Mitchell Act	
	DR	4/23/2015	654,000	30,000	636686	4.59%	11.5	BPA/Mitchell	
	GR	4/27/2015	300,000	29,940	636693	9.98%	15.5	Mitchell Act	
	BS	5/12/2015	162,376	22,408	090750	13.80%	13.8	ODFW	Reallocation
	TGM	5/13/2015	441,664	54,766	090850	12.40%	15.3	ODFW	Reallocation
			4,844,319	291,655					
2014	TGM	4/13/2016	396,447	18,055	090836	4.55%	11.5	BPA	
	KK	4/13/2016	1,047,816	25,577	090743	2.44%	15.4	ODFW	
	KK	4/13/2016	504,642	32,482	090842	6.44%	15.1	BPA	
	BC	4/13/2016	568,328	26,542	090456	4.67%	15.2	Mitchell Act	
	BS	4/14/2016	417,874	26,863	090751	6.43%	15.6	Mitchell Act	
	SF	4/15/2016	209,923	25,978	090835	12.38%	10.9	ODFW/CCF	
	YB	4/18/2016	766,193	23,697	090892	3.09%	12	Mitchell Act	
	GR	4/26/2016	156,000	39,916	636845	25.59%	15.3	Mitchell Act	
	DR	5/2/2016	600,000	42,000	636846	7.00%	16	Mitchell Act	
	DR	5/2/2016	320,000	44,000	636841	13.75%	16	BPA	
	BS	5/4/2016	156,369	18,475	090831	11.82%	14.5	ODFW	Reallocation
	TGM	5/5/2016	445,864	26,201	090742	5.88%	15.9	ODFW	Reallocation
			5,589,456	349,786					

continued

Table A2.3 (Coho continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2015	BS	4/19/2017	349,156	24,301	091021	6.96%	16.7	Mitchell Act	Acclimation
	BC	4/20/2017	536,144	26,618	090605	4.96%	14.89	Mitchell Act	Full-term rearing
	TGM	4/20/2017	230,789	21,839	091029	9.46%	12.4	BPA	Over-winter
	TGM	4/20/2017	120,221	22,848	090841	19.00%	12.4	BPA	Over-winter
	TGM	5/8/2017	396,047	25,654	091027	6.48%	15	ODFW	Acclimation
	KK	4/24/2017	689,066	26,425	090616	3.83%	14.96	BPA	Full-term rearing
	KK	4/24/2017	267,886	25,251	091025	9.43%	14.96	BPA	Full-term rearing
	KK	4/24/2017	530,410	32,445	091036	6.12%	15.1	ODFW	Full-term rearing
	SF	4/24/2017	209,745	26,554	091030	12.66%	11.6	ODFW/CCF	Full-term rearing
	YB	4/24/2017	550,062	23,573	091028	4.29%	13	BPA	Over-winter
	GR	5/1/2017	53,000	53,000	637077	100.00%	14.93	Mitchell Act	
	DR	5/1/2017	419,000	37,504	637055	8.95%	15.92		Over-winter
	DR	5/1/2017	436,000	40,659	637076	9.33%	15.92		Over-winter
			4,787,526	386,671					
2016	BC	4/17/2018	567,394	55,479	090908	9.78%	13.53	Mitchell Act	Full-term rearing
	BS	4/19/2018	340,123	24,183	091146	7.11%	16.32	ODFW	Acclimation
	BS	5/14/2018	169,112	24,097	091149	14.25%	15.5	ODFW	Acclimation
	TGM	4/12/2018	449,841	15,654	091158	3.48%	14.57	BPA	Over-winter
	TGM	5/21/2018	472,614	25,936	091147	5.49%	17.08	ODFW	Acclimation
	KK	4/25/2018	736,029	26,908	091144	3.66%	14.7	BPA	Full-term rearing
	KK	4/25/2018	522,469	27,235	091153	5.21%	14.9	ODFW	Over-winter
	KK	4/25/2018	435,481	22,332	091017	5.13%	14.9	BPA	Over-winter
	SF	4/16/2018	198,623	25,523	091145	12.85%	14.65	ODFW	Full-term rearing
	SF	4/16/2018	218,068	7,740	091158	3.55%	14.74	ODFW	Full-term rearing
	SF	4/16/2018	70,724	3,749	091017	5.30%	14.74	ODFW	Full-term rearing
	YB	4/10/2018	761,511	24,483	091151	3.22%	14.53	BPA	Over-winter
	DR	5/1/2018	723,000	42,000	636995	5.81%	16.59	BPA	Over-winter
			5,664,989	325,319					
2017	BC	4/18/2019	733,835	54,568	090909	7.44%	15.04	Mitchell Act	Full-term rearing
	BS	4/30/2019	426,637	25,737	091193	6.03%	16.07	ODFW	Acclimation
	TGM	4/24/2019	424,659	22,764	091201	5.36%	13.12	BPA	Over-winter
	KK	4/16/2019	586,436	26,566	091192	4.53%	14.35	ODFW	Full-term rearing
	KK	4/16/2019	366,291	25,793	091204	7.04%	14.01	BPA	Full-term rearing
	KK	4/16/2019	364,680	27,570	091199	7.56%	14.01	BPA	Full-term rearing
	SF	4/24/2019	384,452	27,006	091194	7.02%	14.37	ODFW	Full-term rearing
	YB	4/25/2019	632,021	25,861	091198	4.09%	13.85	BPA	Over-winter
	DR	5/6/2019	700,000	43,124	637453	6.16%	16.59	BPA	Over-winter
			4,619,011	278,989					

[1]BC-Big Creek; BS-Blind Slough; DR-Deep River; GR-Grays River; KK-North Fork Klaskanine; SF-South Fork Klaskanine; SS-Steamboat Slough; TG-Tongue Pt.; TGM-Tongue Pt. MERTS; YB=Youngs Bay.

[2]BPA-Bonneville Power Administration; CCF-Clatsop County Fisheries/Fishermen Poundage Contributions; ORFW-Oregon Department of Fish and Wildlife; R&E-ODFW Restoration and Enhancement Program

Table A2.4 Releases of tule fall Chinook from Lower Columbia River Select Area facilities, 2008-2018 brood years.

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2008	DR	6/1/2009	700,000	54,670	634772	7.81%	78	Mitchell Act	
	BC	5/20/2009	5,666,218	225,552	090199	3.98%	77.2	Mitchell Act	
			6,366,218	280,222					
2009	KK	5/3/2010	2,093,575	52,298	092047	2.50%	78.2	Mitchell Act	
	BC	5/13/2010	3,598,214	225,945	090323	6.28%	80.3	Mitchell Act	
	DR	6/24/2010	700,000	83,033	635198	11.86%	79.2	Mitchell Act	
			6,391,789	361,276					
2010	KK	5/16/2011	1,932,616	53,783	092050	2.78%	81.3	Mitchell Act	
	BC	5/16/2011	389,606	229,840	090366	58.99%	80.3	Mitchell Act	
	BC	5/17/2011	2,865,514	229,462	090437	8.01%	80.3	Mitchell Act	
	DR	6/23/2011	862,000	88,263	635592	10.24%	82	Mitchell Act	
			6,049,736	601,348					
2011	KK	5/8/2012	1,954,732	54,729	092213	2.80%	77	Mitchell Act	
	BC	5/7/2012	339,958	226,519	090566	66.63%	82.5	Mitchell Act	
	BC	5/7/2012	2,527,817	221,574	090582	8.77%	82.5	Mitchell Act	
	BC	5/7/2012	346,015	220,822	090583	63.82%	82.5	Mitchell Act	
	BC	5/7/2012	400,957	224,969	090567	56.11%	82.5	Mitchell Act	
	DR	6/18/2012	893,000	95,309	636198	10.67%	74.4	Mitchell Act	
			6,462,479	1,043,922					
2012	KK	4/29/2013	1,986,471	53,037	090367	2.67%	77.6	Mitchell Act	
	BC	5/15/2013	227,524	225,678	090377	99.19%	80.9	Mitchell Act	
	BC	5/15/2013	2,728,544	209,170	090702	7.67%	80.9	Mitchell Act	
	DR	5/24/2013	550,000	N/A	N/A	0.00%	77.9	Mitchell Act	
	DR	6/13/2013	430,000	87,939	636471	20.45%	76.8	Mitchell Act	
	DR	6/13/2013	1,035,000	N/A	N/A	0.00%	82.8	Mitchell Act	
	DR	6/25/2013	605,000	N/A	N/A	0.00%	98	Mitchell Act	
			7,562,539	575,824					
2013	KK	4/26/2014	805,247	53,629	090715	6.66%	79.1	Mitchell Act	
	KK	4/26/2014	839,727	N/A	N/A	0.00%	81.1	Mitchell Act	
	BC	5/16/2014	213,423	212,081	090449	99.37%	74	Mitchell Act	
	BC	5/16/2014	2,624,478	212,422	090712	8.09%	74	Mitchell Act	
	DR	6/10/2014	930,000	92,805	636473	9.98%	86	Mitchell Act	
			5,412,875	570,937					
2014	KK	5/1/2015	2,047,136	51,476	090822	2.51%	83.5	Mitchell Act	
	BC	5/11/2015	3,120,715	220,563	090823	7.07%	78.4	Mitchell Act	
	DR	5/28/2015	975,000	104,790	636797	10.75%	85	Mitchell Act	
	KK	6/26/2015	2,071,656	95,296	636796	4.60%	82.8	Mitchell Act	
			8,214,507	472,125					
2015	BC	5/11/2016	3,090,605	224,466	090824	7.26%	75.5	Mitchell Act	Full-term rearing
	KK	5/2/2016	1,839,769	55,009	090596	2.99%	78.5	Mitchell Act	Acclimation
	KK	5/31/2016	963,212	96,129	636922	9.98%	92.8	Mitchell Act	Acclimation
	DR	6/6/2016	875,000	79,840	636787	9.12%	81.7	Mitchell Act	Full-term rearing
			6,768,586	455,444					
2016	BC	5/19/2017	2,312,352	452,517	091012	19.57%	77.7	Mitchell Act	Full-term rearing
	DR	6/22/2017	910,000	97,432	637155	10.71%	77.14	Mitchell Act	Full-term rearing
			3,222,352	549,949					
2017	BC	5/15/2018	2,250,280	462,393	091186	20.55%	77.3	Mitchell Act	Full-term rearing
	KK	5/14/2018	1,686,452	53,180	091008	3.15%	79.7	Mitchell Act	Acclimation
			3,936,732	515,573					

continued

Table A2.3 (tule fall Chinook continued)

Brood Year	Release Site[1]	Date Released	Number Released	Number of CWTs	Tag Code	Percentage of CWT	Size @ Release (Fish/Lb.)	Funding Source[2]	Comments
2018	BC	5/20/2019	1,848,665	456,811	090569	24.71%	77.1	Mitchell Act	Full-term rearing
	KK	5/16/2019	2,447,240	54,084	090597	2.21%	81.4	Mitchell Act	Acclimation
			4,295,905	510,895					

[1]BC-Big Creek; DR-Deep River; KK-North Fork Klaskanine

[2]BPA-Bonneville Power Administration; CCF-Clatsop County Fisheries/Fishermen Poundage Contributions; ORFW-Oregon Department of Fish and Wildlife; R&E-ODFW Restoration and Enhancement Program