

SELECT AREA FISHERY ENHANCEMENT PROJECT

FY 2009 ANNUAL REPORT

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

1. INTRODUCTION

BACKGROUND

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

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

This report primarily covers the final year of the 2007-09 proposal funding cycle, which incorporated a shift of project focus from evaluation to enhancement. Detailed project information such as history, methodologies, research and reviews are included in previous reports (North et al. 2006, Whisler et al. 2006, Whisler et al. 2009).

FISHING SITES AND FACILITIES

The four current Select Area net-pen rearing, hatchery, and fishing sites are located in the lower Columbia River (LCR) between river miles 10 and 28 (Figure 1.1). Each site provides commercial and recreational fishing opportunities, although season structure and target species differ depending on current production goals and management objectives.

Hatcheries providing production for these sites are South Fork Klaskanine (CCF); Big Creek, Cascade, Gnat Creek, Klaskanine, Oxbow, Sandy, Salmon River and Willamette (all ODFW); Cowlitz, Elochoman, Grays River and Lewis River (all WDFW), and Eagle Creek National Fish Hatchery (United States Fish and Wildlife Service (USFWS)). The SAFE project fully funds Gnat Creek, Grays River and Klaskanine hatcheries; other hatcheries are funded by a blend of state, Mitchell Act (NOAA) and other funds.

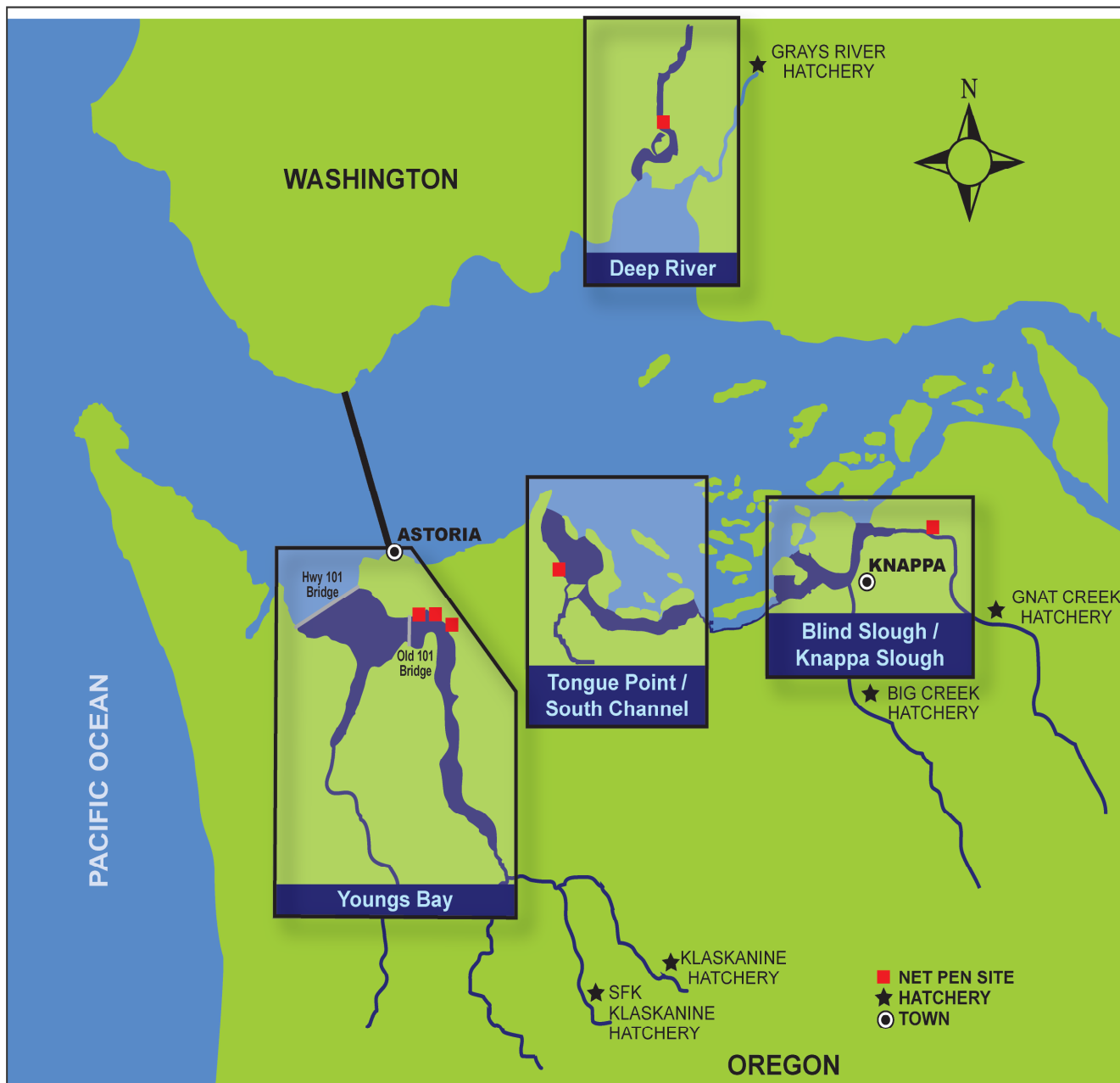


Figure 1.1. Select Area fishing locations in the lower Columbia River.

2. PRODUCTION

Salmonid species and stocks that are reared in the Select Areas were chosen because of their flesh quality, availability of gametes, timing of return, homing ability and overall value to the economy. Species currently being reared and released from Select Area sites include spring Chinook, fall Chinook (Select Area Bright (SAB) stock) and coho (early stock). Presently, source stocks of spring Chinook are obtained from the Willamette River for Oregon Select Areas and the Cowlitz or Lewis Rivers for the Washington Deep River site. The SAB fall Chinook stock originated from Rogue River stock egg transfers, but is now maintained by a local broodstock program that has progressed from ODFW's Big Creek Hatchery to Klaskanine Hatchery and is currently located at Clatsop County's South Fork Klaskanine Hatchery (beginning with 2005 brood). Early stock coho currently released from Oregon Select Areas originate from Big Creek, Bonneville and Sandy hatcheries, while Washington coho releases now originate from North Toutle Hatchery. Annual releases of salmonids from SAFE facilities between 1995-2009 have ranged from 3.9 to 6.5 million fish (Figure 2.1), exclusive of tule fall Chinook releases funded by sources other than the BPA SAFE project.

A variety of rearing strategies are utilized in the SAFE net pens; overwinter (fingerling to smolt) or short-term acclimation (smolts for about two weeks) in the case of spring Chinook and coho, and full-term net-pen rearing of SAB fall Chinook (fry to smolt in six months). Descriptions of releases by species for 2009 follow.

2007 BROOD SPRING CHINOOK

The 2007 brood spring Chinook for the Oregon side originated from Willamette Hatchery, and 900,000 eyed eggs were shipped to Gnat Creek Hatchery in the fall of 2007. Final incubation, ponding, early rearing, mass marking and coded-wire tagging occurred while at Gnat Creek in the winter through summer of 2008. The fry were also vaccinated for enteric redmouth and vibriosis with a combined immersion dip in April at 250 fish/lb.

In the fall of 2008, the over-winter fingerlings were transferred to Youngs Bay (485,000 fish) and Blind Slough (280,000 fish). The Blind Slough fish required no treatment for disease and were released in late March. The Youngs Bay fish suffered from a relatively severe outbreak of furunculosis that required a 10-day treatment with 2% TM-200[®]. Losses amounted to 26,000 fish, but diminished after treatment, and the balance of fish appeared healthy until release in late March. An additional 103,000 smolts were transferred from Gnat Creek to the Tongue Point/MERTS net pens in March of 2009, acclimated for 2 ½ weeks and released.

The 2007 brood spring Chinook for the Deep River net pens in Washington originated from Cowlitz and Lewis hatcheries, and 500,000 eyed eggs were transferred to Grays River Hatchery in the fall. Final incubation, ponding, early rearing, mass marking and coded-wire tagging occurred while at Grays River. In November of 2008, the fingerlings were trucked to the net pens for over-winter rearing. Mortality and predation losses at both the hatchery and net pens were significant, which resulted in a total release of less than 300,000. Actual release numbers, fish size and release dates for all groups are provided in Table 2.1. Annual totals of spring Chinook released and contributions from individual release sites are depicted graphically in Figure 2.2 for brood years 1993-2007.

2008 BROOD SAB FALL CHINOOK

With broodstock release program changes that led to smolts being released from CCF's SF Klaskanine Hatchery beginning with the 2005 brood, adult SAB fall Chinook returned to both ODFW's Klaskanine Hatchery (4-year olds) and the SF Hatchery (3-year olds) in the fall of 2008. A temporary picket weir was installed just upstream of the fish ladder entrance at the SF site in August to block upstream passage of returning SAB adults and divert them into the adult holding area. Significant rains in October allowed the SAB adults to migrate up to the hatchery, and the bulk of returning fish (150 females) were collected and held for broodstock (a minor breach in the temporary weir allowed a few fish to escape upstream). At Klaskanine Hatchery, greater numbers of fish (430 females) arrived on the same freshet, and between the two sites 576 females were spawned for a total of 1.78 million eggs, which were incubated at the SF site. Approximately 45,000 surplus green eggs were provided to Astoria High School's Aquatic Sciences Program for educational purposes.

In February of 2009, a total of 1.45 million fry were ponded, with 740,000 for net-pen rearing in Youngs Bay and the balance of 706,000 remaining at the SF Hatchery for broodstock release. The net-pen fish were reared at the SF Hatchery for a week to get a good start on feed before transfer to Youngs Bay where early rearing, mass marking and coded-wire tagging occurred. The fry were vaccinated for vibriosis at 200 fish/lb and also received a course of treatment with 2% TM-200® during the marking and tagging operation. Both groups of fish (net pen and broodstock) were healthy throughout the rearing period until release in July. Actual release numbers, fish size and release dates for both groups are provided in Table 2.2. Annual totals of SAB fall Chinook released and contributions from individual release sites are depicted graphically in Figure 2.3 for brood years 1994-2008.

2007 BROOD COHO

Fingerlings for Oregon's SAFE-funded coho were initially reared at ODFW's Cascade Hatchery, where they were mass-marked and coded-wire tagged before transfer of 546,000 fish to the Tongue Point MERTS net pens in late September of 2008. Also, ODFW's Oxbow Hatchery provided 840,000 Mitchell Act-funded fingerlings for the Youngs Bay net pens for over-winter rearing, with a mid-October transfer. These two groups of coho each required a 10-day treatment for Bacterial Hemorrhagic Septicemia with 0.835% Romet-30® shortly after arrival to the net pens, after which losses to disease were minimal. In addition, because of Mitchell Act program changes in Washington, approximately 240,000 coho fingerlings at Elochoman Hatchery became available, and in late October these fish were trucked to the Youngs Bay net pens for over-winter rearing. This group did not require any treatment for disease and appeared healthy throughout the rearing period until release in early May.

ODFW's Sandy Hatchery provided 300,000 Mitchell Act-funded acclimation smolts for the Blind Slough net pens, transferred on April 7 and held for four weeks. An opportunity arose for collaboration with NOAA Fisheries on their avian predation study, and in late April NOAA biologists pit tagged 2,000 smolts. The study objective was to determine the percentage of smolts that may turn up as prey victims at the Caspian tern and cormorant colonies on East Sand Island near the mouth of the Columbia River. This evaluation may continue for additional broods, and results will be reported as they become available.

On the Washington side, SAFE-funded coho for the Deep River net pens were provided by WDFW's Grays River Hatchery, where 850,000 eggs were collected and incubated. Ponding, early rearing, mass marking and coded-wire tagging occurred in the spring and summer of 2008. A significant loss to botulism was incurred while at the hatchery, and that loss combined

with the over-winter net-pen rearing loss to disease and predation resulted in a total release of 436,000 smolts. Because of programmatic changes, all of these early stock coho were transferred to the net pens, with no direct release into the West Fork of the Grays River. Additionally, because of the Mitchell Act program changes mentioned above, surplus early stock coho from Toutle River Hatchery became available, and in November 350,000 fingerlings were trucked to the Deep River net pens. Loss to predation was significant, which resulted in the release of 270,000 of these Toutle River fish in early May.

In addition to the net-pen coho production, nearly one million 2007 brood coho smolts were released into Youngs Bay from ODFW's Klaskanine and CCF's SF Klaskanine hatcheries in the spring of 2009. The second year of SAFE-funded coho production at Klaskanine Hatchery was provided by 600,000 eyed eggs from Big Creek Hatchery. Final incubation, ponding, early rearing, mass marking and coded-wire tagging occurred while at Klaskanine, and in June of 2008 the fingerlings were transferred to Clackamas Hatchery for rearing through the summer. Losses to disease while at Clackamas were minimal, and in October 500,000 fingerlings were trucked back to Klaskanine for final over-winter rearing (an additional 100,000 to SF Hatchery). A high incidence of Bacterial Kidney Disease in one of the rearing ponds resulted in the early release of 130,000 fish in February, but the balance of the fish (375,000) remained healthy until release in mid-April. At the SF Klaskanine Hatchery, a total of 475,000 fingerlings were received for over-winter rearing in early October. The second year of ODFW propagation-funded coho production was provided with 240,000 Big Creek stock eyed eggs shipped to Salmon River Hatchery for final incubation, ponding, early rearing, mass marking and coded-wire tagging. These fingerlings were transferred to the SF Klaskanine Hatchery in October for late rearing and release. Eagle Creek National Fish Hatchery provided an additional 150,000 fingerlings (Mitchell Act-funded), and as mentioned, 100,000 fingerlings from the Klaskanine/Clackamas production were also trucked into the SF Klaskanine Hatchery for over-winter rearing. All of these fish were healthy through the winter and were volitionally released beginning in mid-April. Actual release numbers, fish size and release dates for all groups are provided in Table 2.3. Annual totals of coho released and contributions from individual release sites are depicted graphically in Figure 2.4 for brood years 1993-2007.

2008 BROOD TULE FALL CHINOOK

Beginning with the 2008 brood, Mitchell Act hatchery program changes in Washington resulted in the transfer of 700,000 Elochoman fall Chinook fry to the Deep River net pens in the spring of 2009. These fish were initially reared at WDFW's Beaver Creek Hatchery, where mass marking and coded-wire tagging also occurred. The fry were trucked to the net pens during the third week of April and released the first week of June.

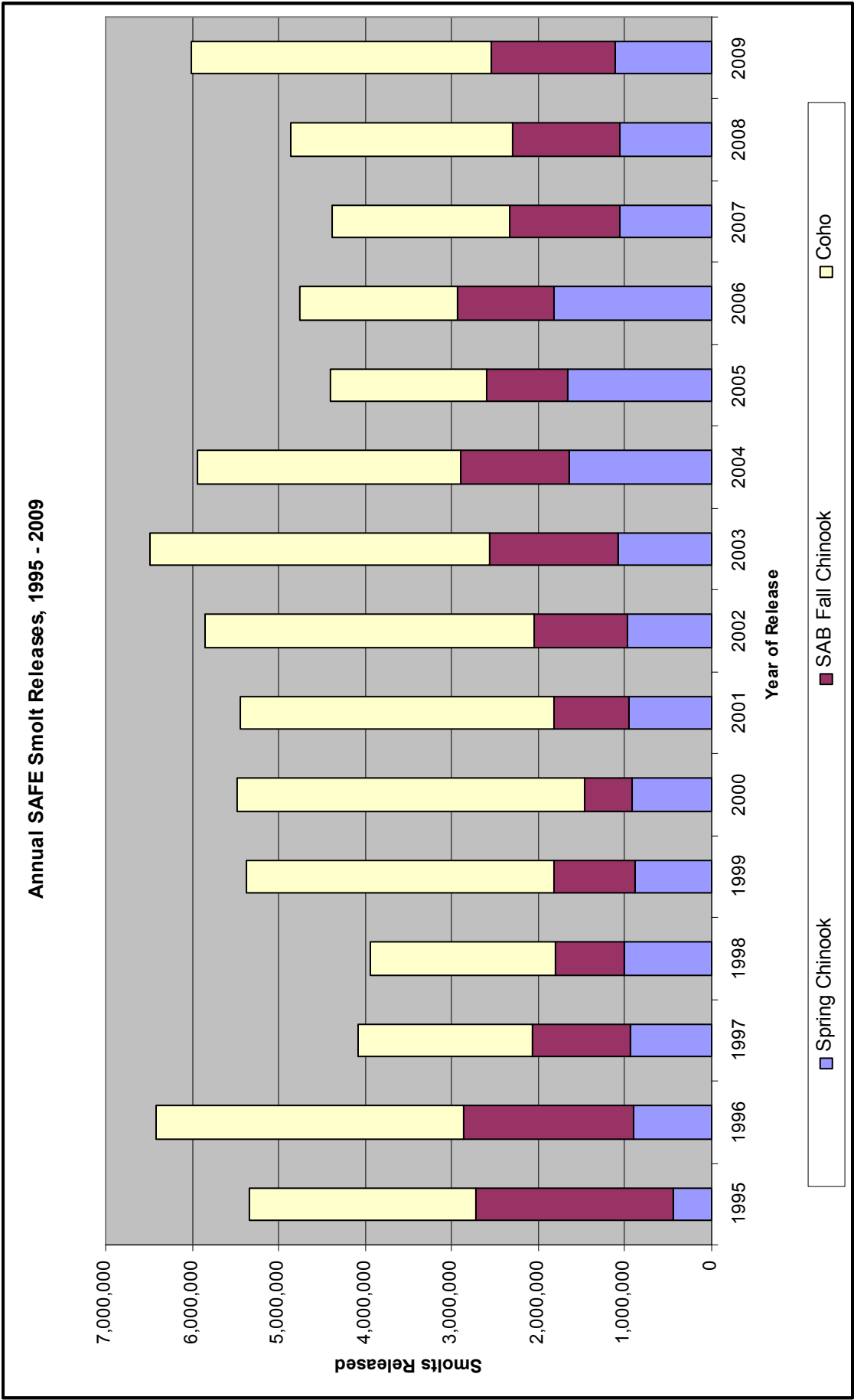


Figure 2.1. SAFE annual smolt releases, 1995 – 2009.

Table 2.1. Spring Chinook released from Lower Columbia River Select Area facilities, 1993-2007 brood years.

Brood Year	Release Date	Release Site	Number Released	Number of CWTs	Tag Code ^b	Release Size fish/lb	Funding Agency ^c and Study
1993	2/7/95	SFK	86,978	52,251	07-03-51	14.4	BPA
	2/9/95	YB	79,336	39,840	07-03-45	12.1	BPA / Feb release
	3/7/95	YB	156,519	52,872	07-03-43	8.1	BPA / Mar release
	3/30/95	YB	127,367	53,498	07-03-44	7.4	BPA / Apr release
			450,200	198,461			
1994	1/31/96	SFK	76,618	52,431	07-11-19	14.7	BPA
	2/5/96	TG	100,138	52,563	07-12-38	10.1	BPA / Feb release
	2/29/96	TG	142,181	48,635	07-12-36	10.8	BPA / Mar release
	2/29/96	BS	199,389	53,257	07-12-37	9.9	BPA / Mar release
	2/5/96	YB	142,976	53,896	07-11-21	11.9	BPA / Feb release
	2/29/96	YB	133,517	51,737	07-11-22	10.7	BPA / Mar release
	3/21/96	YB	97,945	41,085	07-11-20	10.0	BPA / Apr release
			892,764	353,604			
1995	2/1/97	YB	100,680	50,127	09-17-37	18.1	BPA / Feb release
	3/5/97	YB	96,540	49,341	09-17-38	15.2	BPA / Mar release
	4/4/97	YB	95,396	50,562	09-17-39	14.6	BPA / normal
	4/4/97	YB	94,612	50,339	09-17-40	12.7	BPA / dormancy
	3/4/97	SFK	76,821	25,149	07-13-37	15.9	BPA
	3/5/97	BS	171,229	58,220	09-17-16	15.2	BPA / Mar release
	3/5/97	TG	151,905	51,667	09-17-17	16.6	BPA / Mar release
	4/4/97	TG	149,889	50,309	09-17-18	14.6	BPA / Apr release
			937,072	385,714			
1996	3/3/98	YB	149,878	50,865	09-22-16	11.6	BPA / Mar release
	4/1/98	YB	153,265	47,495	09-22-14	12.0	BPA / dormancy
	4/1/98	YB	153,139	49,392	09-22-15	9.6	BPA / normal
	3/3/98	TG	128,314	46,710	09-22-18	13.8	BPA / Mar release
	4/1/98	TG	125,456	43,987	09-22-19	13.6	BPA / dormancy
	3/3/98	BS	198,034	45,510	09-22-17	12.6	BPA / Mar release
	4/1/98	BS	25,284	24,203	09-20-35	9.6	BPA / acc/normal
	4/1/98	BS	25,396	23,602	09-20-36	11.6	BPA / acc/dorm.
	4/22/98	DR	56,414	56,414	63-61-15	5.1	BPA
			1,015,180	388,178			
1997	3/4/99	YB	165,298	24,415	09-25-34	13.2	BPA / Mar release
	4/1/99	YB	158,574	24,437	09-25-33	11.9	BPA / dormancy
	4/1/99	YB	102,546	23,611	09-25-36	8.2	BPA / normal
	3/3/99	TG	118,291	23,969	09-25-32	10.0	BPA / Mar release
	4/1/99	TG	105,986	21,637	09-25-35	8.9	BPA / dormancy
	3/3/99	BS	148,881	24,742	09-25-30	14.0	BPA / Mar release
	4/1/99	BS	25,553	25,544	09-25-31	11.0	BPA / acc/dorm.
	4/1/99	BS	25,573	25,560	09-25-37	10.0	BPA / acc/normal
	5/13/99	DR	25,205	24,856	63-05-11	6.8	BPA
	5/13/99	DR	14,473	14,106	63-06-52	6.4	BPA
			890,380	232,877			

continued

Table 2.1. (cont.) Spring Chinook released from Lower Columbia River Select Area facilities, 1993-2007 brood years.

Brood Year	Release Date	Release Site ^a	Number Released	Number of CWTs	Tag Code ^b	Release Size fish/lb	Funding Agency ^c and Study
1998	3/1/00	YB	128,656	27,420	09-28-47	15.9	BPA / Mar release
	4/4/00	YB	180,695	24,873	09-28-46	18.7	BPA / dormancy
	4/4/00	YB	155,299	26,740	09-28-48	14.4	BPA / normal
	3/1/00	TG	132,484	29,028	09-28-50	12.6	BPA / Mar release
	4/4/00	TG	117,525	23,515	09-28-49	9.8	BPA / dormancy
	3/1/00	BS	143,507	25,703	09-28-45	17.7	BPA / Mar release
	4/4/00	BS	26,393	25,442	09-28-43	13.8	BPA / acc/dorm.
	4/4/00	BS	26,501	25,397	09-28-44	11.9	BPA /acc/normal
			911,060	208,118			
1999	3/2/01	YB	101,516	24,520	09-31-23	15.1	BPA / Mar release
	3/29/01	YB	27,310	25,950	09-31-33	13.8	BPA / 2-wk acc.
	3/29/01	YB	96,839	17,226	09-31-27	14.2	BPA / Mar release
	4/3/01	YB	146,346	25,883	09-31-26	16.2	BPA / dormancy
	4/3/01	YB	138,491	24,519	09-31-24	15.8	BPA / normal
	4/12/01	YB	27,396	23,849	09-31-29	12.3	BPA / 4-wk acc.
	3/2/01	BS	139,319	25,501	09-31-28	16.4	BPA / Mar release
	3/29/01	BS	25,384	24,707	09-31-25	12.8	BPA /acc/normal
	3/29/01	BS	27,467	23,705	09-31-32	14.4	BPA / acc/dorm.
	4/3/01	BS	27,897	13,470	09-31-31	13.4	BPA / normal
	4/3/01	BS	30,329	14,728	09-31-30	16.3	BPA / dormancy
	5/9/01	DR	119,533	25,109	63-13-10	12.0	BPA / normal
	5/9/01	DR	40,032	25,485	63-13-11	11.0	BPA / dormancy
			947,859	294,652			
2000	3/29/02	YB	212,214	24,593	09-33-30	10.4	BPA / normal
	3/29/02	YB	213,069	24,924	09-33-31	12.6	BPA / dormancy
	3/29/02	YB	26,973	25,516	09-33-32	13.4	BPA / 2-wk acc.
	4/12/02	YB	25,806	24,595	09-33-29	9.9	BPA / 4-wk acc.
	3/28/02	BS	67,981	20,790	09-33-33	12.3	BPA / subsurface
	3/28/02	BS	177,625	20,175	09-33-34	11.7	BPA / normal fed
	4/10/02	BS	24,887	21,174	09-01-20	14.8	NOAA / acclim.
	4/19/02	BS	23,871	20,090	09-01-19	13.6	NOAA / acclim.
	4/30/02	BS	24,164	20,002	09-01-21	13.7	NOAA / acclim.
	5/10/02	BS	24,441	20,992	09-01-22	13.0	NOAA / acclim.
	5/20/02	BS	23,536	19,646	09-01-23	15.7	NOAA / acclim.
	5/30/02	BS	24,403	20,798	09-01-24	13.0	NOAA / acclim.
	5/16/02	DR	83,563	12,361	63-10-87	9.0	BPA / normal
	5/16/02	DR	12,377	12,377	63-12-88	10.0	BPA / dormancy
			964,910	288,033			

continued

Table 2.1. (cont.) Spring Chinook released from Lower Columbia River Select Area facilities, 1993-2007 brood years.

Brood Year	Release Date	Release Site ^a	Number Released	Number of CWTs	Tag Code ^b	Release Size fish/lb	Funding Agency ^c and Study
2001	3/27/03	BS	302,934	25,097	09-36-01	11.5	BPA
	3/27/03	TGM	30,385	25,514	09-35-61	11.9	BPA/morpholine
	3/27/03	TGJ	27,412	26,601	09-36-02	11.4	BPA/JD acclim.
	3/28/03	YB	188,956	26,219	09-35-62	9.0	BPA / normal
	3/28/03	YB	187,097	26,342	09-35-63	12.7	BPA / dormancy
	3/28/03	YB	75,570	25,513	09-35-60	11.4	BPA / subsurface
	4/9/03	BS	18,508	17,941	09-36-19	16.6	NOAA / acclim.
	4/18/03	BS	22,353	21,958	09-36-22	15.5	NOAA / acclim.
	4/28/03	BS	21,236	20,982	09-36-20	15.6	NOAA / acclim.
	4/30/03	DR	33,113	20,052	63-15-72	10.0	BPA / Lewis
	4/30/03	DR	108,791	20,455	63-15-73	11.4	BPA / Cowlitz
	5/7/03	BS	20,801	20,395	09-36-23	16.5	NOAA / acclim.
	5/16/03	BS	20,158	19,922	09-36-21	16.6	NOAA / acclim.
	5/27/03	BS	20,319	19,925	09-36-24	14.7	NOAA / acclim.
			1,077,633	316,916			
2002	3/31/04	SFK	639,446	22,382	09-37-23	13.7	SFK production
	4/5/04	BS	261,840	26,763	09-39-01	12.1	BPA
	4/6/04	TGM	20,913	20,407	09-36-61	11.1	BPA/morpholine
	4/6/04	TGJ	27,143	26,794	09-36-63	10.4	BPA/JD acclim.
	4/8/04	BS	16,185	15,195	09-39-06	12.8	NOAA / acclim.
	4/8/04	YB	455,825	25,934	09-36-62	12.8	BPA
	4/16/04	BS	27,359	26,498	09-39-03	12.5	NOAA / acclim.
	4/26/04	BS	27,644	26,658	09-39-07	11.7	NOAA / acclim.
	5/6/04	BS	27,471	26,795	09-39-04	13.1	NOAA / acclim.
	5/17/04	BS	24,488	24,123	09-39-08	11.4	NOAA / acclim.
	5/20/04	BS	23,508	22,942	09-39-05	12.5	NOAA / acclim.
	5/1/04	DR	31,095	24,088	63-21-76	12.0	BPA / Cowlitz
	5/1/04	DR	66,223	9,867	63-21-77	11.0	BPA / Lewis
			1,649,140	298,446			
2003	3/22/05	YB	29,495	AD only		5.3	BPA/over-summer
	4/4/05	TGJ	26,955	26,226	09-39-29	12.0	BPA/JD acclim.
	3/22/05	DR	101,344	22,500	63-21-74	10.0	BPA/Cowlitz/tow
	3/23/05	DR	153,127	22,300	63-21-73	10.0	BPA/Lewis/tow
	4/4/05	TGM	26,344	25,632	09-39-30	13.0	BPA/morpholine
	4/4/05	BS	285,959	26,396	09-39-32	13.2	BPA
	4/5/05	YB	428,499	26,069	09-39-31	14.2	BPA
	4/5/05	SFK	458,659	24,264	09-37-36	12.1	SFK production
	4/6/05	BS	25,646	23,807	09-40-55	15.8	NOAA / acclim.
	4/15/05	BS	25,344	23,964	09-40-56	14.2	NOAA / acclim.
	4/25/05	BS	25,182	23,786	09-40-57	16.0	NOAA / acclim.
	5/4/05	BS	24,747	24,259	09-40-58	14.0	NOAA / acclim.
	5/13/05	BS	23,051	22,898	09-40-60	13.6	NOAA / acclim.
	5/23/05	BS	23,115	22,516	09-40-59	13.7	NOAA / acclim.
			1,657,467	314,617			

continued

Table 2.1. (cont.) Spring Chinook released from Lower Columbia River Select Area facilities, 1993-2007 brood years.

Brood Year	Release Date	Release Site ^a	Number Released	Number of CWTs	Tag Code ^b	Release Size fish/lb	Funding Agency ^c and Study
2004	9/26/05	SFK	566,030	27,373	09-37-22	24.5	SFK production ^d
	3/27/06	DR	159,300	23,841	63-22-97	13.0	BPA/Cowlitz/tow
	3/27/06	BS	287,215	23,203	09-39-33	15.7	BPA
	3/27/06	JD	25,451	24,117	09-37-06	10.8	BPA
	3/27/06	TG	57,114	24,191	09-37-08	12.5	BPA/morpholine
	3/27/06	DR	177,000	22,839	63-31-81	14.0	BPA/Lewis/tow
	3/28/06	YB	391,843	21,876	09-37-07	11.6	BPA
	4/6/06	BS	28,099	27,117	09-42-54	17.2	NOAA / acclim.
	4/17/06	BS	27,440	26,952	09-42-53	17.5	NOAA / acclim.
	4/27/06	BS	27,459	26,256	09-42-58	15.5	NOAA / acclim.
	5/5/06	BS	27,831	27,107	09-42-55	14.3	NOAA / acclim.
	5/16/06	BS	27,493	26,857	09-42-56	16.9	NOAA / acclim.
	5/24/06	BS	25,851	24,657	09-42-57	16.0	NOAA / acclim.
			1,828,126	326,386			
2005	3/15/07	DR	263,600	55,000	63-29-85	14.0	BPA/towed
	3/28/07	BS	272,226	26,944	09-44-32	11.0	BPA
	3/29/07	TGM	76,877	25,295	09-44-33	10.4	BPA
	3/29/07	TGJ	27,272	26,650	09-44-35	10.1	BPA
	3/30/07	YB	417,662	26,292	09-44-34	11.2	BPA
			1,057,637	160,181			
2006	3/25/08	BS	312,612	23,043	09-46-06	11.7	BPA
	3/25/08	TGM	79,343	26,137	09-46-07	14.2	BPA
	3/27/08	YB	543,803	25,990	09-46-08	9.4	BPA/1st year oxy. supp.
	4/3/08	DR	121,500	47,900	63-41-90	11.8	BPA/towed
			1,057,258	123,070			
2007	2/25/09	DR	279,811	37,500	63-43-81	14.0	BPA
	3/23/09	YB	457,161	27,464	09-01-52	13.6	BPA/2nd year oxy. supp.
	3/27/09	BS	280,437	24,955	09-01-53	15.1	
	3/27/09	TG	103,060	27,474	09-01-54	16.5	
			1,120,469	117,393			

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

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

^c BPA-Bonneville Power Administration; NOAA-National Oceanic & Atmospheric Administration (10-day acclimation study)

^d Early release due to high incidence of BKD and lack of funds to treat effectively

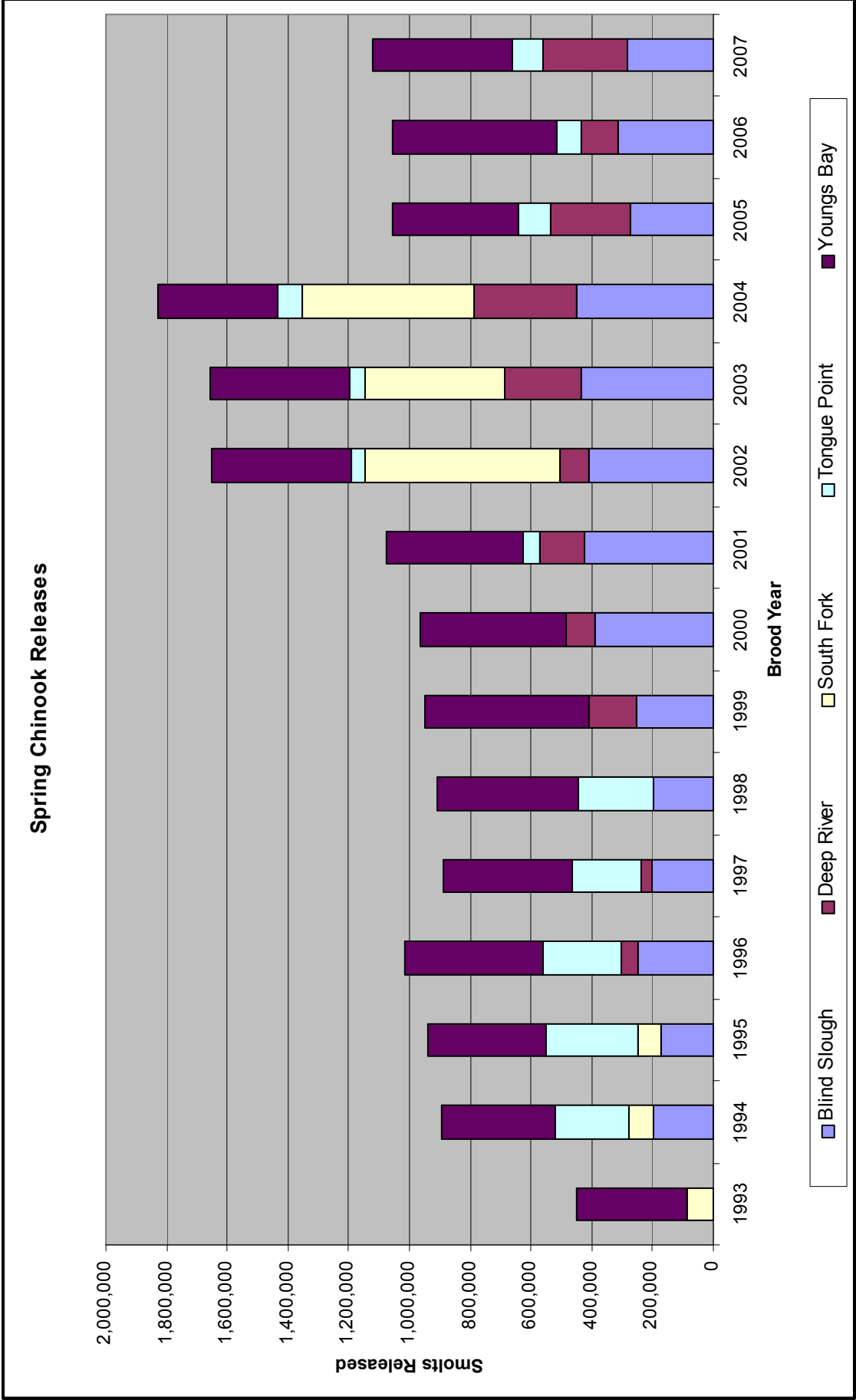


Figure 2.2. SAFE spring Chinook releases, brood years 1993 - 2007.

Table 2.2. Select Area Bright fall Chinook released from Lower Columbia River Select Area facilities, 1994-2008 brood years.

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

continued

Table 2.2. (cont.) Select Area Bright fall Chinook released from Lower Columbia River Select Area facilities, 1994-2008 brood years.

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

continued

Table 2.2. (cont.) Select Area Bright fall Chinook released from Lower Columbia River Select Area facilities, 1994-2008 brood years.

Brood Year	Study Group	Release Site	Release Date	Number Released	Number of CWTs	Tag Code	Release Size #/lb	Funding Agency ^a
2002	SAFE	YB	7/24/03	370,942	23,832	09-38-09	17.4	BPA
	R&E	YB	8/7/03	409,372	27,833	09-38-19	22.3	R&E
	KK Broodstock	KK	7/19/03	199,640	26,938	09-38-17	42.7	R&E
	KK Broodstock	KK	8/20/03	167,486	LV only		19.3	R&E
	KK Broodstock	KK	8/27/03	167,288	LV only		17.5	R&E
	KK Broodstock	KK	8/30/03	167,804	27,348	09-38-18	16.0	R&E
				1,482,532	105,951			
2003	Broodstock	SF	7/6/04	53,963	LV only		91.3	R&E ^b
	R&E	YB	7/15/04	147,467	25,327	09-39-55	16.5	R&E
	Production	YB	7/15/04	372,209	25,041	09-39-54	15.5	BPA
	KK Broodstock	KK	7/23/04	50,465	LV only		33.7	R&E
	KK Broodstock	KK	7/26/04	151,316	27,075	09-39-59	33.7	R&E
	KK Broodstock	KK	8/14/04	166,900	27,523	09-39-60	20.0	R&E
	KK Broodstock	KK	8/21/04	167,179	LV only		18.9	R&E
	KK Broodstock	KK	8/28/04	143,293	LV only		14.8	R&E
				1,252,792	104,966			
2004	Broodstock, AHS	SF	7/14/05	45,247	27,822	62-02-27	31.6	R&E
	Production	YB	7/18/05	101,987	24,971	09-39-48	15.4	BPA
	R&E	YB	7/18/05	59,250	24,909	09-39-49	13.4	R&E
	KK Broodstock	KK	8/5/05	202,285	29,012	07-05-46	31.5	R&E
	KK Broodstock	KK	8/20/05	177,836	29,420	09-21-01	21.2	R&E
	KK Broodstock	KK	8/27/05	174,838	LV only		17.6	R&E
	KK Broodstock	KK	9/6/05	180,107	LV only		16.6	R&E
				941,550	136,134			
2005	Production	YB	7/6/06	383,723	24,942	09-43-29	15.2	BPA
	R&E	YB	7/19/06	92,774	22,017	09-44-24	10.7	R&E
	Broodstock	SF	7/22/06	628,888	50,153	09-44-29	25.0	R&E/ODFW
				1,105,385	97,112			
2006	Production	YB	6/27/07	564,641	23,163	09-45-50	16.8	BPA
	Broodstock	SF	6/28/07	708,412	28,562	09-46-04	33.5	OR/FPC
				1,273,053	51,725			
2007	Production	YB	7/1/08	574,020	23,120	09-01-26	18.6	BPA
	Broodstock	SF	7/27/08	674,181	30,019	09-01-42	31.5	OR/FPC
				1,248,201	53,139			
2008	Production	YB	7/2/09	702,659	25,211	09-02-16	17.3	BPA
	Broodstock	SF	7/21/09	714,118	27,887	09-02-43	32.8	OR/FPC
				1,416,777	53,098			

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

^b Early release due to disease

Table 2.3. Early stock coho released from Lower Columbia River Select Area facilities, 1993-2007 brood years.

Brood Year	Release Date	Release Site ^a	Number Released	Number of CWT's	Tag Code ^b	Release Size (#/lb)	Funding Agency ^c and Study
1993	5/11/95	YB	138,371	29,172	07-15-44	7.8	BPA / site comparison
	5/12/95	BS	140,267	26,258	07-15-45	8.9	BPA / site comparison
	5/12/95	TG	130,623	26,426	07-53-29	8.7	BPA / site comparison
	5/12/95	DR	201,200	30,751	63-54-44	8.1	BPA / site comparison
	4/10/95	SFK	433,674	23,160	07-03-56	10.5	OR/FPC
	4/17-18/95	YB	822,185	25,886	07-07-58	9.7	Mitchell Act
	5/1-8/95	YB	467,531	22,545	07-07-43	12.6	R&E / acclimation
	5/15/95	YB	280,412	22,057	07-07-44	12.6	R&E / acclimation
			2,614,263	206,255			
1994	5/7/96	YB	216,187	26,274	07-12-22	9.5	BPA / site comparison
	5/6/96	BS	209,761	24,942	07-59-01	9.0	BPA / site comparison
	5/6/96	TG	190,032	23,942	07-12-41	8.4	BPA / site comparison
	5/7/96	DR	200,100	28,406	63-57-39	9.7	BPA / site comparison
	4/14/96	SFK	443,183	25,979	07-09-25	10.7	OR/FPC
	4/15/96	YB	808,263	28,299	07-12-42	11.7	Mitchell Act
	4/26/96	YB	829,600	26,933	07-09-61	9.6	Mitchell Act
	5/20/96	YB	341,339	22,104	07-12-23	11.3	R&E / acclimation
	5/28/96	YB	295,512	26,418	07-11-36	11.2	Mitchell Act
			3,533,977	233,297			
1995	5/5/97	YB	146,818	27,360	07-09-42	13.2	BPA / site comparison
	5/5/97	BS	196,963	25,195	09-18-18	14.4	BPA / site comparison
	5/5/97	TG	430,221	26,223	07-13-36	13.9	BPA / site comparison
	5/12/97	YB	633,310	26,703	07-13-35	14.5	Mitchell Act
	5/12/97	SFK	621,932	28,284	09-18-24	12.7	OR/FPC
			2,029,244	133,765			
1996	5/1/98	YB	133,373	26,677	09-23-02	10.4	BPA / site comparison
	5/1/98	BS	144,958	25,570	09-23-05	11.4	BPA / site comparison
	5/1/98	TG	119,611	18,641	09-23-06	11.2	BPA / site comparison
	4/23/98	DR	208,350	29,717	63-62-47	10.6	BPA / site comparison
	4/29/98	SFK	550,427	27,321	09-23-21	16.8	OR/FPC
	5/1/98	YB	268,870	52,510	05-37-32	12.2	R&E / acclimation
	5/1/98	YB	261,654	50,604	05-37-33	12.2	R&E / acclimation
	5/26/98	YB	425,634	29,525	09-23-36	13.3	Mitchell / acclimation
	5/26/98	YB	30,101	29,990	09-23-38	13.3	Mitchell /acclim/d.index
			2,142,978	290,555			

continued

Table 2.3. (cont.) Early stock coho released from Lower Columbia River Select Area facilities, 1993-2007 brood years.

Brood Year	Release Date	Release Site ^a	Number Released	Number of CWT's	Tag Code ^b	Release Size (#/lb)	Funding Agency ^c and Study
1997	4/12/99	YB	663,012	27,123	09-24-22	13.9	Mitchell
	4/28/99	YB	158,203	28,809	09-23-34	11.9	BPA / site comparison
	4/28/99	BS	197,089	26,256	09-25-28	11.3	BPA / site comparison
	4/28/99	TG	204,143	26,431	09-25-29	11.4	BPA / site comparison
	5/13/99	DR	203,284	25,003	63-05-30	11.4	BPA / site comparison
	5/13/99	DR	210,824	24,563	63-05-31	13.0	BPA / site comparison
	5/5/99	SS	210,530	24,248	63-05-32	10.4	BPA / site comparison
	4/21/99	SFK	429,652	19,730	09-24-28	13.3	OR/FPC
	5/5/99	YB	502,146	24,963	05-39-47	12.5	R&E / acclimation
	5/19/99	YB	479,662	24,974	05-39-46	11.8	R&E / acclim/d.index
	6/1/99	YB	272,656	26,215	09-26-43	13.4	Mitchell / acclimation
	6/1/99	YB	26,894	26,841	09-26-56	13.4	Mitchell / acclim/d.index
			3,558,095	305,156			
1998	5/4/00	YB	206,377	24,490	09-29-14	11.9	BPA / site comparison
	5/4/00	BS	195,645	24,624	09-29-12	11.5	BPA / site comparison
	5/4/00	TG	228,290	24,774	09-29-13	10.8	BPA / site comparison
	5/3/00	DR	217,732	25,774	63-12-01	11.8	BPA / site comparison
	5/4/00	DR	213,411	29,697	63-12-02	11.3	BPA / site comparison
	4/24/00	SS	191,543	29,937	63-11-17	11.2	BPA / site comparison
	4/12/00	YB	836,845	26,244	09-27-16	15.7	Mitchell Act
	5/1-8/00	SFK	610,658	25,514	09-27-30	12.8	OR/FPC
	5/11/00	TG	525,833	26,176	09-27-49	13.5	Mitchell Act
	5/25/00	YB	27,138	27,086	09-25-40	13.6	Mitchell / acclim/d.index
	5/25/00	YB	272,992	26,806	09-27-29	13.6	Mitchell / acclimation
	5/31/00	YB	476,148	21,731	05-39-48	15.9	R&E / acclimation
			4,002,612	312,853			
1999	5/14/01	YB	502,077	22,577	05-01-91	14.2	R&E / acclimation
	4/10/01	YB	808,735	26,482	09-30-06	15.6	Mitchell Act
	4/16/01	YB	234,032	26,011	09-31-61	14.0	BPA / control
	4/17/01	YB	179,187	26,592	09-31-59	14.7	BPA / towed
	5/7/01	SFK	344,738	26,276	09-30-13	12.5	OR/FPC
	5/24/01	BS	274,257	26,969	09-32-20	15.5	Mitchell / acclimation
	5/24/01	BS	25,154	25,104	09-32-22	15.5	Mitchell / acclim/d.index
	5/31/01	TG	482,414	25,055	05-49-08	15.3	R&E / acclimation
	4/16/01	TG	173,199	21,854	09-31-60	13.2	BPA / site comparison
	5/9/01	DR	166,087	22,468	63-03-75	12.0	BPA / site comparison
	5/9/01	DR	229,250	24,062	63-03-76	12.0	BPA / site comparison
	5/1/01	SS	208,966	29,800	63-03-69	12.0	BPA / site comparison
			3,628,096	303,250			

continued

Table 2.3. (cont.) Early stock coho released from Lower Columbia River Select Area facilities, 1993-2007 brood years.

Brood Year	Release Date	Release Site ^a	Number Released	Number of CWT's	Tag Code ^b	Release Size (#/lb)	Funding Agency ^c and Study
2000	5/6/02	YB	482,657	24,632	05-42-50	14.1	R&E / acclimation
	4/12/02	YB	837,201	26,545	09-30-15	13.0	Mitchell Act
	5/5/02	YB	177,730	24,555	09-33-39	11.9	BPA / towed
	5/3/02	YB	191,108	22,937	09-33-40	12.0	BPA / control
	5/7/02	BS	315,988	26,896	09-33-52	13.8	Mitchell / acclimation
	5/7/02	BS	27,854	27,798	09-33-56	13.8	Mitchell /acclim/d.index
	5/7/02	SFK	583,248	24,285	09-33-57	11.4	OR/FPC
	5/16/02	TG	488,866	28,068	05-42-54	14.4	R&E / acclimation
	4/25/02	TG	178,892	23,726	09-33-41	14.6	BPA / site comparison
	5/16/02	DR	229,501	24,940	63-06-64	12.0	BPA / site comparison
	5/16/02	DR	125,056	25,359	63-10-82	9.4	BPA / site comparison
	5/1/02	SS	158,598	20,585	63-07-64	12.0	BPA / site comparison
			3,796,699	300,326			
2001	5/8/03	YB	512,549	23,482	05-47-60	12.6	R&E / acclimation
	4/10/03	YB	844,653	27,009	09-19-32	11.7	Mitchell Act
	5/9/03	YB	158,476	25,201	09-36-10	10.4	BPA / control
	5/10/03	YB	171,033	27,004	09-36-11	10.3	BPA / towed
	5/7/03	BS	161,222	26,940	09-34-61	13.0	Mitchell / acclimation
	5/7/03	BS	155,582	26,452	09-36-38	13.0	Mitchell /acclim/d.index
	4/28/03	SFK	641,555	26,035	09-34-60	12.0	OR/FPC
	5/22/03	TG	477,918	23,396	05-47-59	12.8	R&E / acclimation
	4/24/03	TG	197,794	25,439	09-36-12	10.0	BPA / site comparison
	4/30/03	DR	129,545	24,506	63-15-19	12.0	BPA / site comparison
	4/30/03	DR	236,890	25,652	63-15-20	12.0	BPA / site comparison
	5/5/03	SS	239,635	29,747	63-11-74	12.0	BPA / site comparison
			3,926,852	310,863			
2002	4/6/04	TGM	186,520	24,770	09-38-62	13.0	BPA / site comparison
	4/9/04	YB	758,997	24,155	09-37-27	11.6	Mitchell Act
	4/28/04	YB	361,078	23,546	09-38-63	11.4	BPA / towed
	4/28/04	BS	298,748	26,809	09-37-32	14.4	Mitchell Act
	4/28/04	TGM	511,002	24,747	05-37-25	13.7	R&E / acclimation
	4/29/04	YB	350,839	22,364	05-37-24	12.4	R&E / acclimation
	5/1/04	DR	152,780	24,900	63-20-72	14.0	BPA / site comparison
	5/1/04	DR	204,420	25,100	63-20-77	13.0	BPA / site comparison
	4/26/04	SS	204,600	30,000	63-20-67	13.0	BPA / site comparison
			3,028,984	226,391			
2003	4/6/05	YB	723,793	28,007	09-39-44	15.4	Mitchell Act
	5/1/05	DR	144,900	20,200	63-22-94	11.0	BPA / site comparison
	5/2/05	YB	422,275	26,855	09-39-46	15.2	BPA / towed
	5/3/05	BS	309,527	26,390	09-41-14	14.5	Mitchell Act
	5/4/05	TGM	202,727	25,179	09-39-45	15.9	BPA / site comparison
			1,803,222	126,631			

continued

Table 2.3. (cont.) Early stock coho released from Lower Columbia River Select Area facilities, 1993-2007 brood years.

Brood Year	Release Date	Release Site ^a	Number Released	Number of CWT's	Tag Code ^b	Release Size (#/lb)	Funding Agency ^c and Study
2004	4/10/06	YB	744,274	25,212	09-20-44	12.7	Mitchell Act
	4/21/06	TG	194,442	28,948	09-42-41	9.1	BPA
	4/24/06	YB	381,335	28,092	09-42-42	10.5	BPA
	5/1/06	DR	201,300	28,534	63-26-97	12.3	BPA
	5/3/06	BS	305,573	24,189	09-43-06	13.8	Mitchell Act
			1,826,924	134,975			
2005	4/19/07	TG	174,547	28,031	09-43-30	12.6	BPA
	4/23/07	YB	385,825	28,566	09-43-31	12.0	BPA
	4/25/07	YB	771,921	25,960	09-44-55	12.0	Mitchell Act
	4/26/07	BS	304,558	26,069	09-45-01	15.1	Mitchell Act
	5/1/07	DR	420,000	29,500	63-37-64	13.0	BPA
			2,056,851	138,126			
2006	4/15/08	TG	597,754	28,574	09-46-23	12.0	BPA
	4/28/08	SFK	115,763	27,615	09-39-34	10.6	ODFW
	4/28/08	SFK	115,763	30,185	09-45-14	10.6	ODFW
	4/28/08	SFK	50,675	3,264	09-36-26	10.6	BPA
	5/1/08	DR	368,000	33,684	63-41-78	15.5	BPA
	5/1/08	BS	310,133	27,851	09-46-35	13.9	Mitchell Act
	5/7/08	YB	768,960	27,365	09-46-31	13.0	Mitchell Act
	5/10/08	KK	232,455	19,742	09-36-26	12.0	BPA
			2,559,503	198,280			
2007	2/25/09	KK	132,659	4,810	09-01-58	13.4	BPA (BKD, forced release)
	4/10/09	KK	377,402	13,689	09-01-58	11.8	BPA
	4/06/09	TG	477,830	28,201	09-01-59	11.8	BPA
	4/21/09	YB	786,742	26,462	09-46-59	14.8	Mitchell Act
	4/29/09	SF	99,339	4,081	09-01-58	11.4	BPA
	4/29/09	SF	225,455	52,334	09-01-79	11.4	ODFW
	4/29/09	SF	145,341	0	NA	11.4	Mitchell Act
	5/04/09	BS	300,036	26,703	09-46-61	12.9	Mitchell Act
	5/06/09	DR	435,750	22,500	63-44-74	12.0	BPA
	5/06/09	DR	270,400	0	NA	15.0	Mitchell Act
	5/06/09	YB	227,399	0	NA	11.8	Surplus, hatchery closure
			3,478,353	178,780			

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

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

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

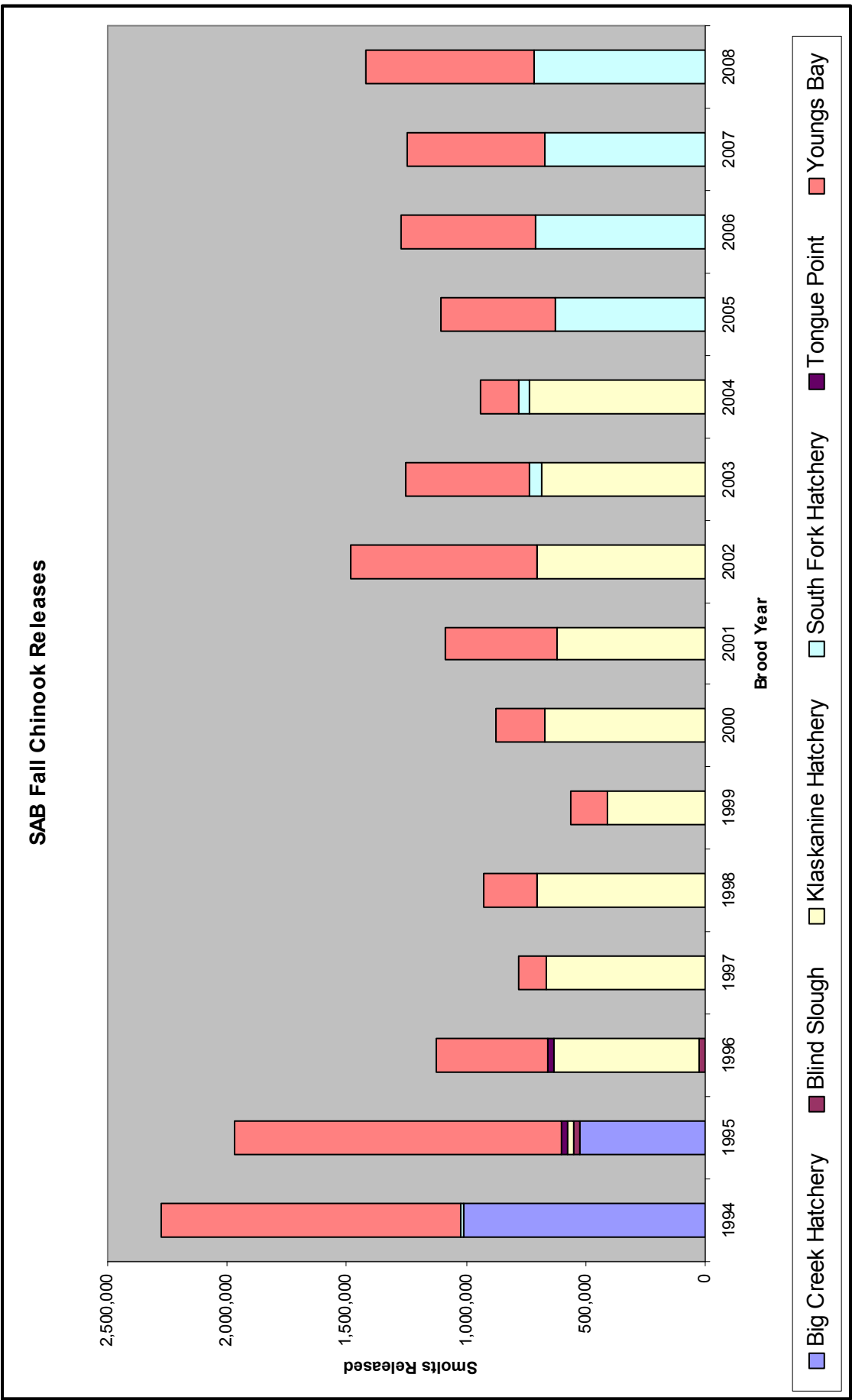


Figure 2.3. SAFE SAB fall Chinook releases, brood years 1994 - 2008.

Lower Columbia River Early Stock Coho Releases

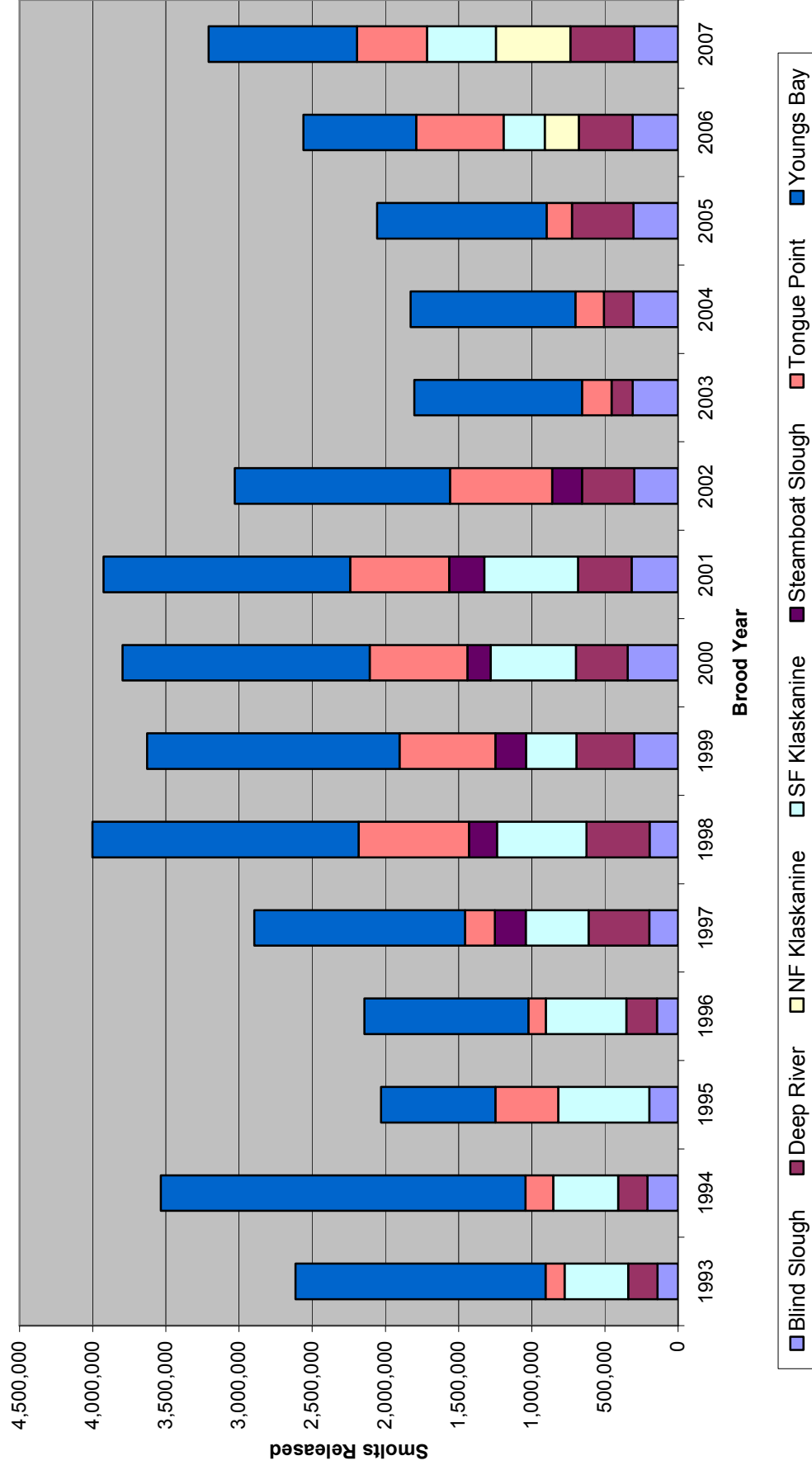


Figure 2.4. SAFE releases of lower Columbia River early stock coho, brood years 1993 - 2007.

3. HARVEST

FISHERIES AND SEASONS

Fall Season Select Area Commercial Fisheries

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

Fall Select Area fisheries primarily target hatchery coho returning to these release sites; however, SAB fall Chinook are also produced and harvested in Youngs Bay. Select Area fisheries targeting coho are typically initiated in late August or early September and continue through the end of October. In Youngs Bay, limited Chinook target fishing periods occur weekly from mid-June (summer season) through August to target late returning SAFE-produced spring Chinook and early returning SAB fall Chinook. A target Chinook fishery has occurred intermittently in Knappa Slough when surplus tule fall Chinook were expected to return to Big Creek Hatchery. Fall season commercial catch in all Select Areas since 1993 can be found in Table 3.1.

Fall Select Area 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 in the Columbia River 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.

2008 Fall Season Commercial Fisheries

Select Area commercial fisheries occurring during the fall of 2008 were managed to harvest hatchery and net-pen reared coho and SAB fall Chinook salmon with minimal impacts to listed stocks. Catch totals in the four Select Area fisheries during the fall of 2008 were above average, with landings of 13,997 Chinook (new record high), 55,151 coho (5th highest catch since 1996), and 134 white sturgeon (Table 3.1).

Youngs Bay

The fall Youngs Bay Select Area fishery began in early August with weekly 36-hour fishing periods through late August; this differed from the established pattern of 30-hour periods in early August expanding to 36-hour periods for the latter half of the month. The fishing period during the last week of August also deviated from the normal structure (a 72-hour target coho period using 6-inch maximum mesh) to continue the 36-hour Chinook target fishery (8-inch maximum mesh size) for the entire month. These modifications were implemented to provide greater consistency during the early fall season and increase harvest opportunity on abundant SABs. As normal, the upper Youngs Bay fishing boundary was moved downstream from the confluence of Youngs and Klaskanine rivers to Battle Creek Slough beginning in August to ensure adequate SAB escapement. August fishing periods were intended to harvest net-pen

produced SAB fall Chinook and early returning coho without jeopardizing SAB fall Chinook broodstock needs at the Klaskanine and SF Klaskanine hatcheries. After August, the fall season proceeded as normal with continuous fishing from September 2 through October 31. The season included 60 consecutive days of fishing with the intent of harvesting late-returning SAB fall Chinook and hatchery-origin coho whose abundance typically peaks in mid-September. The complete fall season consisted of 64 fishing days, and resulted in a catch of 10,570 Chinook, 27,203 coho, and 58 white sturgeon. The SAB Chinook catch was a record high (more than doubling the previous record set in 2003) and was greater than preseason expectations (6,000 fish). Coho harvest was also higher than preseason expectations (18,500 fish) and was much improved over 2007.

Tongue Point/South Channel

The Tongue Point/South Channel fishery opened on the first Tuesday after Labor Day. The fishery began with three nightly 12-hour fishing periods per week during September 2 – September 12, increased to four nightly 12-hour periods during the week of September 15, then increased again to four nightly 16-hour periods each week from September 22 – October 31. The 34-night season resulted in landings of approximately 1,176 Chinook, 7,753 coho, and 46 white sturgeon. The coho catch was more than twice the preseason expectation of 3,400 fish.

Blind Slough/Knappa Slough

The season structure of the Blind Slough/Knappa Slough fishery was similar to the Tongue Point/South Channel fishery. The fishery began with three, 12-hour nightly fishing periods each week during September 2 – September 12 followed by four, 12-hour nightly periods during the week of September 15. Beginning September 22, nightly fishing hours were expanded to 14 hours in an effort to maximize harvest of the net-pen reared coho. To access surplus returns of tule fall Chinook destined for Big Creek Hatchery the maximum mesh size allowed in Blind Slough/Knappa Slough was increased to 8-inch for the first week of the season and then to 9¼-inch for the remainder of the season. The 34-night season ended October 31 and resulted in landings of 2,003 Chinook, 5,366 coho, and 28 white sturgeon. The coho catch more than doubled the preseason expectation of 2,400 fish.

Deep River

The structure of the Deep River fishery was similar to that used in other Select Area fishing areas with multiple nightly fishing periods occurring each week from September 1 – October 31. The fishery consisted of four 12-hour nightly periods per week during September 1 – 19. The nightly fishing periods were lengthened to 16 hours beginning September 22 in response to decreasing daylight hours. The 36-night season resulted in landings of 248 Chinook, 14,829 coho, and 2 white sturgeon. The coho catch was a new record high, just surpassing the previous record of 14,309 caught in the fall of 2000. The 2008 harvest was over three times higher than the preseason expectation of 4,600 fish.

2009 Winter/Spring/Summer Season Commercial Fisheries

Spring Chinook commercial fisheries in Select Areas were initiated in Youngs Bay in 1992. Through 1996, fishing time was limited to less than 15 days annually with landings ranging 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 4,100–5,700 Chinook landed in 2000–2007 (excluding 2005). Table 3.2 lists Chinook harvests during winter, spring, and summer seasons for all Select Area sites since 1993. Initial seasons in Youngs Bay were

restricted to the spring fishing period with open periods occurring primarily from late April through early June.

As production increased, winter and summer seasons were added in an attempt to harvest all returning hatchery adults. Winter seasons during late February through early/mid-March were initiated in 1998 to harvest early returning 5-year old 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.

Prior to 2006, Select Area fisheries were consistently closed during mid-March through mid-April to minimize the handle of non-local spring Chinook stocks, which tend to be more abundant during this period. During 2006 through 2008, fisheries in Youngs Bay have been opened during this time period, but have been constrained to specific locations in upstream areas of Youngs Bay to reduce harvest of non-local Chinook that are known to “dip in” to lower portions of Youngs Bay in response to tidal fluctuations and river height/flow during this timeframe. Opportunity, measured in open hours, during this winter/spring interim timeframe has been expanded incrementally each year with very low impacts to non-local stocks.

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 spring season landings have ranged from 60–3,200 Chinook. In most years, fishing periods have opened concurrent with Youngs Bay and other Select Area sites to minimize congestion. The spring season fishing area was initially limited to Blind Slough but was expanded downstream to include the waters of Knappa Slough in 1999 as returns increased. A one-year trial summer season was adopted in Blind and Knappa sloughs in 1999 but resulted in a harvest of only three spring Chinook and no summer seasons have been adopted since.

Spring commercial fisheries in Tongue Point were initiated in 1998 and continued through 2003, with additional winter seasons occurring in 2000 and 2001. In most years, seasons and open hours were consistent with Blind/Knappa Slough and Youngs Bay fisheries. 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 due to higher than anticipated straying of returning adults. In response to the straying issues, a new net-pen rearing site was constructed in 2003 at the Marine and Environmental Research and Training Station (MERTS) dock approximately 1.2 miles upstream of the former site. Since then, experimental groups of 20,900–103,000 spring Chinook smolts have been released from this site each year and between 2003 and 2007 an additional 25,500–27,400 were released annually from net pens in the nearby John Day River. By relocating the rearing site higher into Cathlamet Bay, further from the mainstem Columbia River, and closer to a unique water source, the propensity for straying is expected to be reduced. In 2008 volunteer test fishing and a full-fleet test fishery occurred in Tongue Point/South Channel, and results appear promising.

Spring fisheries have been conducted in Deep River since 2003 with harvest ranging between 28–117 fish annually. Experimental winter seasons have been adopted annually since 2006 but have resulted in little effort and no salmonid catch.

Due to unresolved upriver spring Chinook allocation issues, the Compact discussed fishery options but did not adopt any non-Indian Chinook (including Select Area) or shad fisheries at the January 29, 2009 hearing. At the February 11, 2009 Compact/Joint State hearing, fisheries

were adopted, but only through April 30. This action allowed Select Area commercial fisheries to begin on time but left the remaining anticipated spring season periods from April 30 – June 15 undecided. As described in the area-specific sections below, heavily restricted fishing periods were eventually adopted for the May and June portions of the spring season.

Youngs Bay

The 2009 winter season consisted of seven 18-hour fishing periods between February 15 and March 9. The winter season extension consisted of one 12-hour period (March 11) set for the entire bay, followed by two 12-hour periods and two 4-hour periods upstream of the old Youngs Bay Bridge between March 15 and April 6. Consistent with preseason planning and public input, this structure for the winter-to-spring season “bridge” period was designed to provide opportunity with the maximum area possible. This strategy of constricting the fishery by area (with in-season flexibility) when non-local stocks may be most abundant appears to be an effective alternative to closing the fishery entirely during this timeframe. The 7-inch minimum mesh size regulation was in effect for all winter fishing periods since steelhead handle is minimal in this fishery. As is the case for all commercial fisheries in Youngs Bay, maximum net length was restricted to 250 fathoms, with no more than two pounds of leadline per fathom of net, except in the area upstream of the mouth of the Walluski River. The 12 fishing periods resulted in landings of 155 spring Chinook which is less than half the average catch of 349 Chinook observed since winter seasons began in 1998. Additionally, five white sturgeon were landed in the Youngs Bay winter season. A landing limit of five white sturgeon (per vessel per week) was in place for the entirety of the winter, spring, and summer seasons.

The 2009 spring season in Youngs Bay began on April 16 with 12-hour periods scheduled on Mondays and Thursdays through May 1. Uncertainty in the upriver spring Chinook run size, a mid-season run size downgrade, and management actions necessary to ensure non-Indian fisheries did not exceed impacts to listed stocks resulted in significant restrictions of the spring commercial fishery in Youngs Bay in 2009. Youngs Bay was closed for a two week block in early May, then reopened from May 18 through June 12 with restricted time and area (two 12-hour periods per week with the area restricted to upstream of the Old Youngs Bay Bridge for the last two weeks of May and the first week of June). In addition to the two week closure, the restricted periods adopted for Youngs Bay for May 18 – June 12 resulted in an additional reduction of fishing opportunity (measured by open hours) by 75-percent. The fishery was also constrained to the area upstream of the Old Youngs Bay Bridge for three of the four remaining weeks of the spring season, resulting in an additional loss of opportunity (area). The 2009 Youngs Bay spring fishery landed 1,985 Chinook and 103 white sturgeon. The Chinook harvest was just over one half of the ten-year average Chinook harvest (3,800). Throughout the spring season, an 8-inch maximum mesh size restriction was in effect to target Chinook instead of sturgeon.

The 2009 summer season in Youngs Bay was open 6 AM Wednesday through 6 AM Friday weekly from June 17 – July 31. As in the spring fishery, an 8-inch maximum mesh size restriction was adopted to target Chinook instead of sturgeon. The Youngs Bay summer fishery landed 983 Chinook, more than double the ten-year (1999–2008) average Chinook harvest of 422 fish and second only to last year’s record harvest. The high landings were again driven by an increased abundance of SABs returning to Youngs Bay (718 landed) primarily due to the heavily restricted ocean commercial and recreational Chinook fisheries. In addition, 106 white sturgeon were harvested.

The combined Youngs Bay winter/spring/summer fishery stock composition is based on VSI and CWT analysis with a total of 1,098 Chinook (35% of the combined catch of 3,123 Chinook) examined for fin marks and CWTs and 86 CWTs collected. The 2009 combined

winter/spring/summer catch was comprised of 63.5% spring Chinook and 23.0% SAB fall Chinook destined for Select Area sites, 2.8% upriver spring Chinook, 0.7% upper Columbia summer Chinook (after June 15), 4.9% Willamette River spring Chinook, and 5.2% spring Chinook destined for the Cowlitz, Kalama, Lewis, or Sandy rivers. Based on scale readings, which were verified with CWTs, the age composition of the catch was <1% Age-2 (all SAB jacks), 13% Age-3, 70% Age-4, 16% Age-5, and <1% Age-6 fish.

Blind Slough/Knappa Slough

Similar to 2000–2008, a winter gillnet season with a 7-inch minimum mesh restriction was adopted for Blind Slough (excluding Knappa Slough) in 2009. The adopted season consisted of thirteen 12-hour periods (7 PM – 7 AM) on Wednesday and Sunday nights during February 18–April 6 (except Wednesday April 1). The six periods (March 15–April 6) held after the normal end of the winter season represent ongoing efforts to apply adaptive management techniques to allow prudent expansion of the fishery and also to meet the goal of significant and stable opportunity in 2009. During the winter fishing periods, a total of 91 spring Chinook and one white sturgeon were landed, which is greater than the 2000–2008 average Chinook harvest (77). As described for Youngs Bay, a five white sturgeon landing limit was in place for the winter and spring seasons.

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 SAFE-stock spring Chinook. When fisheries reopened in May, only the Blind Slough area was open for the first two periods and then Knappa Slough was included beginning the last week of May. At this time, the lower deadline in Knappa Slough was extended further downstream to the western end of Minaker Island for the remainder of the spring season. This strategy of area expansion has been successfully employed for several years. An 8-inch maximum mesh size restriction was adopted to target Chinook and limit sturgeon catch. 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 2009 spring fishery consisted of twelve 12-hour (7 PM – 7 AM) fishing periods on Thursday and Monday nights between April 16 and June 12. The delay in adopting fishing periods for May resulted in the loss of five fishing periods. The restricted 2009 Blind Slough/Knappa Slough spring fishery landed 706 spring Chinook and 32 white sturgeon. The Chinook harvest was less than half of the ten-year average (1,560) and was the lowest since 2000.

The combined Blind Slough/Knappa Slough winter and spring fishery stock composition is based on VSI and CWT analysis. A total of 608 Chinook (76% of the combined catch) were examined for fin marks and CWTs and 204 CWTs were collected. The 2009 Blind Slough/Knappa Slough catch was comprised of 90.8% spring Chinook destined for Select Area sites, 0.9% upriver spring Chinook, and 8.3% Willamette River spring Chinook. Based on scale readings, which were verified with CWTs, the age composition of the catch was 3% Age-3, 21% Age-4, 76% Age-5, and <1% Age-6.

Tongue Point/South Channel

Efforts to reinstate a spring Chinook fishery in the Tongue Point/South Channel site continued in 2009. At the February 11 hearing, staff recommended a full-fleet test fishery for the end of April. Test fishing activities were also planned to precede the first scheduled period. Results of test fishing would provide data on presence of non-local stocks during this timeframe and would be used to evaluate the risk of proceeding with the full-fleet experimental test fishery. The Compact adopted a three period full-fleet commercial test fishery in the Tongue Point/South Channel site

on Monday and Thursday nights (7 PM – 7 AM) starting on April 21 and ending on April 28 (consistent with all non-Indian fisheries, no periods were initially adopted for post May 1). The initial period was scheduled for the week following the spring season opener in all of the other sites to reduce the likelihood of encountering listed upriver spring Chinook. An 8-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. As in 2008, the new lower deadline was recommended and adopted as an additional precautionary measure. This new Tongue Point deadline is described as “a line extended from the upstream (southern most) pier (#1) at the Tongue Point Job Corps facility through navigation marker #6 to Mott Island”. The deadline is approximately one mile upstream from the deadline used in 2003 and prior. Additionally, all catch was required to be sampled by ODFW staff before being transported out of the fishing area.

Two commercial fishers were contracted to make four drifts per day for five days each, encompassing the timeframe just prior to the season openers in the other sites up to the first scheduled period in Tongue Point/South Channel. All test fishing activities were conducted using live-capture methods with an ODFW biologist on-board to collect data and direct activities. Forty drifts using 4¼-inch tangle nets were made during a six day period between April 15 and 20 capturing 11 spring Chinook (nine identified via VSI as lower river stock and two as upriver) and two steelhead; all fish were tagged and released. Because the abundance of non-target fish was low relative to effort expended, the full-fleet experimental commercial fishery commenced on April 21 as scheduled.

The 2009 full-fleet experimental test fishery in Tongue Point/South Channel consisted of three 12-hour fishing periods on the nights of April 20, 23, and 27. This fishery was not reopened in late May with the rest of the Select Area commercial fisheries. Landings for the fishery totaled 133 spring Chinook and 11 white sturgeon.

The Tongue Point/South Channel spring fishery stock composition was based on VSI and CWT analysis with a total of 128 Chinook (96% of the catch) examined for fin marks and CWTs, and 22 CWTs being collected. The 2009 Tongue Point/South Channel catch was comprised of 36.1% spring Chinook destined for Select Area sites, 27.8% upriver spring Chinook, 31.6% Willamette River spring Chinook, and 4.5% spring Chinook destined for the Cowlitz, Kalama, or Lewis rivers. Based on scale readings, verified with CWTs, the age composition of the catch was 5% Age-3, 68% Age-4, 26% Age-5, and 1% Age-6 fish.

Deep River

For the fourth consecutive year, an experimental winter season was adopted for the Deep River site. The winter season was expanded to eight weekly 12-hour periods occurring primarily on Monday nights (7 PM–7AM) beginning February 16 and ending April 9 (Thursday). A spring fishery consisting of five fishing periods occurring on Wednesday and Sunday nights (7 PM–7 AM) between April 15 and April 30 was adopted at the February 11, 2009 Compact hearing. As was the case with the other Select Areas, additional fishing periods for the May-June timeframe were adopted at the May 13 Compact hearing. Those additional eight fishing periods were scheduled for Wednesday and Sunday nights (7 PM–7 AM) from May 17 to June 11. The fishing area during all periods was restricted to the area from 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 an 8-inch maximum mesh size for the spring season. As in Blind Slough and Knappa Slough, the use of additional weights or anchors was allowed. Since spring seasons have only occurred in Deep River since 2003, they are considered experimental and fishers were required to submit all landed catch for biological

sampling before harvested fish could be transported out of the fishing area. A WDFW sampling station was set up in the area for this purpose. A total of 40 Chinook and 27 white sturgeon were reported in the winter season, and 82 Chinook and 26 white sturgeon were reported landed in the spring season. Concurrent with the other Select Areas, weekly white sturgeon landing limits were in place for the winter and spring season.

The Deep River winter/spring fishery stock composition was based on VSI and CWT analysis with a total of 122 Chinook (100% of the catch) examined for fin marks and CWTs, and 12 CWTs being collected. The 2009 Deep River catch was comprised of 59.0% spring Chinook destined for Select Area sites, 13.1% upriver spring Chinook, 17.2% Willamette River spring Chinook, and 10.7% spring Chinook destined for the Cowlitz, Kalama, or Lewis rivers. Based on scale readings, verified with CWTs, the age composition of the catch was <1% Age-3, 37% Age-4, and 62% Age-5.

Select Area Recreational Fisheries

Recreational fisheries in Select Areas occurred during the period from fall 2008 to summer 2009 as per permanent regulations. No formal catch estimate was made due to the lack of resources available to adequately sample the fishery. It is likely that catches were higher than average because of the increased abundance of SAB fall Chinook. Estimates of recreational catch will be possible after harvest data become available from angler-returned harvest cards.

Table 3.1. Select Area fall commercial seasons and harvest, 1996 – 2008.

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

continued

Table 3.1. (cont.) Select Area fall commercial seasons and harvest, 1996 – 2008.

Year	Fishery	Season	Days	Chinook	Coho	Chum	White Sturgeon
2001	Youngs Bay	Aug. 6 – Aug. 30	5	1,458	170	1	21
		Sept. 4 – Oct. 31	57	582	25,299	0	0
	Tongue Point	Sept. 4 – Sept. 14	7	49	774	0	0
	Tongue Point/S. Channel	Sept. 17 – Oct. 31	26	67	1,247	0	0
	Blind/Knappa Sloughs	Sept. 4 – Oct. 31	33	793	3,764	0	0
	Deep River	Sept. 4 – Oct. 31	33	149	2,491	0	0
	Steamboat Slough	Sept. 4 – Oct. 31	33	0	26	0	0
Total			194	3,098	33,771	1	21
2002	Youngs Bay	Aug. 7 – Aug. 29	4	2,039	139	0	51
		Sept. 3 – Oct. 31	58	1,735	51,720	0	45
	Tongue Point	Sept. 3 – Sept. 13	7	1,472	9,290	0	65
	Tongue Point/S. Channel	Sept. 16 – Oct. 31	27	236	6,270	0	137
	Blind/Knappa Sloughs	Aug. 26 – Aug. 29	3	2,331	5	0	27
		Sept. 3 – Oct. 31	34	429	1,444	0	6
	Deep River	Sept. 3 – Oct. 31	34	145	303	1	3
	Steamboat Slough	Sept. 3 – Oct. 31	34	183	105	0	0
Total			201	8,570	69,276	1	334
2003 ^a	Youngs Bay	Aug. 6 – Aug. 30	5	1,703	1,576	0	13
		Sept. 2 – Oct. 31	59	2,904	88,254	0	8
	Tongue Point	Sept. 2 – Sept. 12	7	2,421	12,748	0	97
	Tongue Point/S. Channel	Sept. 15 – Oct. 31	28	30	1,850	0	0
	Blind/Knappa Sloughs	Aug. 25 – Aug. 28	3	63	0	0	9
		Sept. 2 – Oct. 31	35	1,840	3,861	0	19
	Deep River	Sept. 2 – Oct. 31	35	168	3,333	0	3
	Steamboat Slough	Sept. 2 – Oct. 31	35	44	107	0	0
Total			207	8,837	114,352	0	173
2004 ^a	Youngs Bay	Aug. 4 – Aug. 26	4	1,530	283	0	3
		Aug. 31 – Sept. 3	3	801	3,175	0	1
		Sept. 7 – Oct. 31	55	1,559	31,155	1	19
	Tongue Point/S. Channel	Aug. 31 – Oct. 29	34	2,124	10,169	0	33
	Blind/Knappa Sloughs	Aug. 24 – Aug. 27	3	1,461	63	0	28
		Aug. 31 – Oct. 29	34	4,774	1,292	0	31
	Deep River	Aug. 23 – Oct. 29	40	393	5,780	0	2
	Steamboat Slough	Aug. 31 – Oct. 29	34	0	0	0	0
Total			207	12,642	51,944	1	117

continued

Table 3.1. (cont.) Select Area fall commercial seasons and harvest, 1996 – 2008.

Year	Fishery	Season	Days	Chinook	Coho	Chum	White Sturgeon
2005 ^a	Youngs Bay	Aug. 3 – Aug. 25	4	703	63	0	25
		Aug. 30 – Sept. 2	3	1,447	3,030	0	0
		Sept. 6 – Oct. 31	56	2,139	39,268	1	12
	Tongue Point/S. Channel	Aug. 30 – Oct. 28	34	1,919	19,083	0	29
	Blind/Knappa Sloughs	Aug. 30 – Oct. 28	34	2,124	1,777	0	0
	Deep River	Aug. 30 – Oct. 28	34	364	2,586	0	8
	Steamboat Slough	Aug. 30 – Oct. 28	34	0	0	0	0
	Total		199	8,696	65,807	1	74
2006 ^a	Youngs Bay	Aug. 2 – Aug. 24	4	1,334	287	0	49
		Aug. 29 – Sept. 1	3	744	1,175	0	2
		Sept. 5 – Oct. 31	56	1,800	19,505	0	26
	Tongue Point/S. Channel	Sept. 5 – Oct. 27	30	305	11,567	0	21
	Blind Slough	Sept. 5 – Sept. 15	6	40	328	0	0
	Blind/Knappa Sloughs	Sept. 18 – Oct. 27	24	150	2,556	0	3
	Deep River	Sept. 4 – Oct. 27	32	184	2,235	0	8
	Total		155	4,557	37,653	0	109
2007 ^a	Youngs Bay	Aug. 1 – Aug. 23	4	381	1	0	26
		Aug. 28 – Aug. 31	3	1,593	133	0	12
		Sept. 4 – Oct. 31	57	2,028	3,167	0	26
	Tongue Point/S. Channel	Sept. 4 – Oct. 26	30	269	2,043	0	66
	Blind Slough	Sept. 4 – Sept. 14	6	39	374	0	1
	Blind/Knappa Sloughs	Sept. 17 – Oct. 26	24	48	2,124	0	12
	Deep River	Sept. 3 – Oct. 26	32	175	2,674	0	5
	Total		156	4,533	10,516	0	148
2008 ^a	Youngs Bay	Aug. 6 – Aug. 28	4	6,459	438	0	34
		Sept. 2 – Oct. 31	60	4,111	26,765	0	24
	Tongue Point/S. Channel	Sept. 2 – Oct. 31	34	1,176	7,753	0	46
	Blind/Knappa Sloughs	Sept. 2 – Oct. 31	34	2,003	5,366	0	28
	Deep River	Sept. 1 – Oct. 31	36	248	14,829	0	2
	Total		177	13,997	55,151	1	134

^a Preliminary landings^b Does not include Big Creek terminal CHF fishery Aug. 26-28, Sept. 3-5, and Sept. 9-11^c Does not include Big Creek terminal CHF fishery Sept. 2-4 and 9-11

Table 3.2. Select Area winter, spring, and summer commercial seasons and harvest, 1992 – 2009.

Year	Fishery	Season	Days	Chinook	White Sturgeon
1992	Youngs Bay	Apr. 27 - May 26	9	296	10
1993	Youngs Bay	Apr. 26 – May 26	9	851	32
1994	Youngs Bay	Apr. 25 - May 25	9	155	31
1995	Youngs Bay	May 1 – Jun. 7	11	201	108
1996	Youngs Bay	Apr. 29 – Jun. 14	15	789	581
1997	Youngs Bay	Apr. 28 – Jun. 13	22	1,821	351
1998	Youngs Bay	Feb. 25 – Mar. 11	3	74	6
	Youngs Bay	Apr. 23 – Jun. 12	23	2,093	251
	Tongue Point	Apr. 29 – May 27	9	31	79
	Blind Slough	Apr. 29 – Jun. 12	13	60	19
		Total	48	2,258	355
1999	Youngs Bay	Feb. 24 – Mar. 11	3	4	1
	Youngs Bay	Apr. 22 – Jun. 11	26	936	84
	Youngs Bay	Jun. 14 – Jul. 28	10	358	85
	Tongue Point/S. Channel	Apr. 28 – Jun. 9	13	199	260
	Blind/Knappa Sloughs	Apr. 28 – Jun. 11	13	450	94
	Blind/Knappa Sloughs	Jun. 24 – Jul. 2	3	8	0
		Total	68	1,955	524
2000	Youngs Bay	Feb. 23 – Mar. 9	3	33	6
	Youngs Bay	Apr. 19 – Jun. 9	23	4,494	182
	Youngs Bay	Jun. 12 – Jul. 26	11	204	78
	Tongue Point	Feb. 29 – Mar. 14	3	10	5
	Tongue Point/S. Channel	Apr. 24 – Jun. 15	15	937	220
	Blind Slough	Feb. 27 – Mar. 13	3	8	0
	Blind/Knappa Sloughs	Apr. 23 – Jun. 14	15	810	44
		Total	73	6,496	535
2001	Youngs Bay	Feb. 21 – Mar. 9	3	544	14
	Youngs Bay	Apr. 18 – Jun. 14	32	4,462	122
	Youngs Bay	Jun. 18 – Jul. 31	9	587	181
	Tongue Point	Feb. 20 – Mar. 7	3	124	2
	Tongue Point/S. Channel	Apr. 17 – Jun. 13	15	1,507	145
	Blind Slough	Feb. 19 – Mar. 6	3	14	0
	Blind Slough	Apr. 2 – Apr. 10	2	238	0
	Blind/Knappa Sloughs	Apr. 16 – Jun. 14	16	1,793	27
		Total	83	9,269	491

continued

Table 3.2. (cont.) Select Area winter, spring, and summer commercial seasons and harvest, 1992 – 2009.

Year	Fishery	Season	Days	Chinook	White Sturgeon
2002	Youngs Bay	Feb. 20 – Mar. 8	6	199	3
	Youngs Bay	Apr. 17 – Jun. 13	30	5,749	135
	Youngs Bay	Jun. 19 – Aug. 1	9	695	103
	Tongue Point/S. Channel	Apr. 18 – Jun. 12	15	3,003	354
	Blind Slough	Feb. 18 – Mar. 5	3	19	1
	Blind/Knappa Sloughs	Apr. 18 – Jun. 12	15	2,034	48
	Total		78	11,699	644
2003 ^{a,b}	Youngs Bay	Feb. 18 – Feb. 25	3	74	1
	Youngs Bay	Apr. 16 – Jun. 12	22	4,947	81
	Youngs Bay	Jun. 18 – Jul. 31	9	279	102
	Tongue Point	Apr. 17 - Apr. 18	1	348	11
	Blind Slough	Feb. 15 – Mar. 2	3	12	0
	Blind/Knappa Sloughs	Apr. 17 – Jun. 13	13	2,029	32
	Deep River	Apr. 17 – Jun. 13	20	117	24
	Total		71	7,806	251
2004 ^{a,b}	Youngs Bay	Feb. 14 - Mar. 21; Apr. 12	10	1,050	8
	Youngs Bay	Apr. 22 – Jun. 18	18	5,611	92
	Youngs Bay	Jun. 23 – Jul. 29	8	255	19
	Blind Slough	Feb. 14 – Mar. 21; Apr. 12	7	291	1
	Blind/Knappa Sloughs	Apr. 22 – Jun. 18	12	3,240	59
	Deep River	Apr. 22 – Jun. 18	12	115	5
	Total		67	10,562	184
2005 ^{a,b}	Youngs Bay	Feb. 16 – Mar. 17	9	144	6
	Youngs Bay	May 5 – Jun. 17	21	730	137
	Youngs Bay	Jun. 22 – July 28	8	95	67
	Blind Slough	Feb. 16 – Mar. 17	9	46	3
	Blind/Knappa Sloughs	May 5 – Jun. 17	13	1,331	57
	Deep River	May 5 – Jun. 17	13	60	8
	Total		73	2,406	278
2006 ^a	Youngs Bay	Feb. 15 – Mar. 23	10	82	5
	Youngs Bay	Mar. 27 – Apr. 13	6	510	3
	Youngs Bay	Apr. 17 – Jun. 16	29	4,730	242
	Youngs Bay	Jun. 21 – July 27	8	476	32
	Blind Slough	Feb. 22 – Apr. 13	14	167	1
	Blind/Knappa Sloughs	Apr. 20 – Jun. 16	17	1,252	25
	Deep River	Feb. 20 – Mar. 14	4	0	0
	Deep River	Apr. 20 – Jun. 16	17	28	9
	Total		105	7,245	317

Continued

Table 3.2. (cont.) Select Area winter, spring, and summer commercial seasons and harvest, 1992 – 2009.

Year	Fishery	Season	Days	Chinook	White Sturgeon
2007 ^a	Youngs Bay	Feb. 14 – Mar. 14	7	209	10
	Youngs Bay	Mar. 18 – Apr. 10	11	674	3
	Youngs Bay	Apr. 23 ^c – June 15	27	4,070	161
	Youngs Bay	June 20 – July 27	12	256	10
	Blind Slough	Feb. 21 – Mar. 26	8	85	1
	Blind/Knappa Sloughs	Apr. 23 ^c – June 15	16	1,451	49
	Deep River	Feb. 18 – Mar. 12	4	0	0
	Deep River	Apr. 23 ^c – Jun. 15	30	29	23
Total			115	6,774	257
2008 ^a	Youngs Bay	Feb. 13 – Mar. 12	9	61	14
	Youngs Bay	Mar. 16 – Apr. 8	11	180	7
	Youngs Bay	Apr. 17 – June 13 ^d	24	1,937	35
	Youngs Bay	June 18 – July 31	14	1,017	0
	Tongue Point/S. Channel	Apr. 28 – June 13	12	259	204
	Blind Slough	Feb. 20 – Apr. 7	13	51	1
	Blind/Knappa Sloughs	Apr. 17 – June 13 ^d	15	953	47
	Deep River	Feb. 18 – Mar. 11	4	0	17
	Deep River	Apr. 17 – June 13 ^d	15	28	22
Total			117	4,486	347
2009 ^a	Youngs Bay	Feb. 15 – Mar. 12	8	49	3
	Youngs Bay	Mar. 15 – Apr. 6	4	106	2
	Youngs Bay	Apr. 16 – June 12	13	1985	103
	Youngs Bay	June 17 – July 31	14	983	106
	Tongue Point/S. Channel	Apr. 20 – Apr. 28	3	133	11
	Blind Slough	Feb 18 – Apr. 6	13	91	1
	Blind/Knappa Sloughs	Apr. 16 – June 12	12	706	32
	Deep River	Feb. 16 – Apr. 9	8	40	27
	Deep River	Apr. 15 – June 11	13	82	26
Total			88	4,175	311

^a Landings are preliminary

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

^c Spring season openers for all sites were rescinded via in-season action due to lower than anticipated upriver returns which increased mainstem commercial impacts

^d All periods set for week 20 were rescinded via in-season action due to lower than anticipated upriver returns which increased mainstem commercial impacts

4. RUN RECONSTRUCTION and SMOLT-TO-ADULT SURVIVAL

Cohort reconstruction and SARs were calculated using data retrieved from the RMPC coded-wire tag database (www.rmpec.org) managed by the PSMFC. For each relevant tag group, all CWT recoveries reported by all agencies as of September 2009 (SABs) and March 2010 (spring Chinook and coho) were used to calculate SARs and to determine the ultimate fate of SAFE project releases (using CWT'd fish as the proxy for the entire release group). Adult returns were categorized by type of recovery (e.g. ocean or freshwater fishery, commercial or recreational fishery, hatchery or stream escapement) to determine contribution to the various regional fisheries and escapement values. Survival rates of Chinook were calculated separately for sub-adults (jacks) and adults based on age-specific CWT recoveries. Unless otherwise noted, survival rates in this report represent smolt-to-adult rates and do not include jack survival. For additional detail on methods, refer to Whisler et al. (2009).

SPRING CHINOOK

Results for spring Chinook in this report are based on 14,919 coded-wire tags recovered from 75 CWT study groups released between 1996 and 2004 (1994 – 2002 brood years) from SAFE production facilities; including 30 tag groups released from net pens in Youngs Bay, 20 tag groups from Blind Slough, 14 tag groups from Tongue Point, and 11 groups from Deep River. These same data are used for survival comparisons between SAFE sites; however, analysis is confounded somewhat since fish were not released from all sites in all years.

Smolt-to-Adult Survival Rates

Average annual survival rates of SAFE spring Chinook fluctuated widely within and between release locations (Table 4.1), but overall averaged 0.66% for the brood years 1994 – 2002 (Equation 1). The annual average brood-specific survival rates ranged between 0.11 – 1.32 %. Spring Chinook released from Blind Slough and Youngs Bay net pens had the highest overall survival at 0.78% and 0.74%, respectively. Survival of Tongue Point and Deep River net-pen fish were lower at 0.49% and 0.44%, respectively. On average, survival rates were relatively high for the 1997 – 1999 broods, likely a result of the improved ocean conditions these fish encountered after outmigration. Survival then dropped to low levels through the 2001 brood but appears to be on an increasing trend since then.

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

Run Reconstruction

As intended, the vast majority (91.3%) of SAFE-produced spring Chinook were harvested in fisheries (brood years 1992 – 2002; Table 4.2). Most of these (74.1%) were landed in Select Area commercial fisheries, but they also contributed to ocean and Columbia River mainstem commercial and recreational fisheries. The high fishery contribution rates observed for SAFE-produced spring Chinook indicate that the project is meeting one of its primary goals, i.e. to maximize harvest of local stocks in order to achieve the greatest economic value of the project, while minimizing adverse impacts of the program. Only 8.7% of returning SAFE-produced spring Chinook escaped past fisheries, and of these the majority returned to hatcheries.

Analysis of CWT recoveries indicates that homing of the 1992 – 2002 brood SAFE spring Chinook was generally good. The overall stray rate averaged 6.4%. Very few fish (0.20%) strayed to areas above Bonneville Dam. Strictly speaking, since all SAFE project spring

Chinook are released from net pens, any recovery at a hatchery or stream could be considered “straying”, but for our purposes we define straying as a recovery at a hatchery or stream other than one in the immediate vicinity of the net-pen release site (plus all recoveries above Bonneville Dam) since, by design, the fish have imprinted on the proximate water source and it would be reasonable to expect them to go somewhere if not harvested in a fishery. Also, since spring Chinook are not endemic to the lower Columbia River estuary, and return timing is separated temporally from fall Chinook, it is thought that risk of introgression with wild stocks is not an issue.

Non-natal straying of Youngs Bay and Blind Slough net-pen releases occurred at relatively low levels (4.0% and 3.1% of adult returns, respectively). Releases from the original Tongue Point net-pen site exhibited high stray rates (averaging 22.1%); the overall SAFE stray rate reported above is likely higher than the current rate since these releases are included. Analysis of CWT recoveries from the initial releases at the new net-pen sites in Tongue Point (2001 – 2002 broods) indicate that straying is significantly reduced, dropping to 4.8% overall, with zero straying observed in areas upstream of Bonneville Dam. Non-natal straying of spring Chinook releases from the Deep River net pens appears to be unacceptably high (16.4%). This finding will be further investigated to determine if the actual magnitude of strays is too high, or if the percentage is high because natal recoveries have been quite low at the Deep River site. Management and biological implications of the resultant findings will be considered, as will methods to reduce any unacceptable straying impacts.

COHO

As is the case with all SAFE project releases, each year a representative CWT group (usually 25,000 – 30,000) is included at each coho release site. Additional tag groups may have been applied to study groups at various times, but the fish reared utilizing a standard set of practices agreed to by all parties were monitored through the representative CWT groups. For 1993 – 2005 brood year coho, 44,325 CWTs representing 96 tag groups were analyzed from releases at SF Klaskanine Hatchery, and Youngs Bay, Blind Slough, Tongue Point, and Deep River net pens.

Smolt-to-Adult Survival Rates

Average annual smolt-to-adult survival of the CWT'd release groups provides a reference for relative success between years. For brood years 1993 – 2005 annual survival was highly variable, ranging from 0.71% – 4.37% (Table 4.3). A protracted range of SARs is typical of coho and is presumably influenced heavily by ocean conditions. Tongue Point net-pen and SF Klaskanine Hatchery releases exhibited the highest average survival rates (2.52% and 2.19%, respectively). Deep River and Youngs Bay net-pen groups were next with 1.73% and 1.60%, respectively. Blind Slough net-pen releases have the lowest survival (averaging 1.04%), even during periods of relatively high survival in other groups; however, the two most recent broods analyzed have shown improvement. Overall, SAFE-project coho had an average SAR of 1.83%.

Run Reconstruction

The contribution of 1993 – 2005 brood SAFE hatchery coho to fisheries and escapement is presented in Table 4.2. Select Area project coho exhibit the highest contribution to fisheries of all SAFE stocks and likely of any salmonid hatchery program in the region. Nearly all returning adults, 98.8%, are harvested in fisheries. Releases from Youngs Bay, Blind Slough, and Deep River performed similarly in that the vast majority of CWTs (74.0% – 77.1%) were recovered from Select Area commercial fisheries. For Tongue Point releases, only 45.3% of adult returns were harvested in Select Area commercial fisheries; however, this statistic is a bit misleading.

When mainstem Columbia River commercial fisheries are open, all landings from the Tongue Point/South Channel Select Area site are included in the mainstem harvest. Combining Select Area and Columbia River mainstem landings of Tongue Point fish shows a total commercial fishery contribution similar to the other sites. Very few Select Area fish escape harvest (1.2%), and the majority of escapement is comprised of returns to hatcheries as opposed to escapement to streams. Homing of SAFE-produced coho appears to be very good. Very few (0.01%) stray above Bonneville Dam, and only 0.9% stray to non-natal areas.

SELECT AREA BRIGHT FALL CHINOOK (SAB)

Results for SAB fall Chinook included here are based on recoveries from 46 CWT groups released between 1995 and 2005 (1994 – 2004 brood years) from Select Area net pens in Youngs Bay, and 25 CWT groups released from broodstock hatchery facilities. CWT recoveries from fisheries and escapement areas totaled 11,000 net-pen tags and 5,051 broodstock tags.

Smolt-to-Adult Survival Rates

Survival rates of 1994 – 2004 brood SAB fall Chinook varied substantially between release sites and year (range 0.09% - 3.14%) but overall averaged 0.77% (Table 4.4). Survival increased dramatically for the 1998 – 2000 broods, dropped to below average levels with the 2001 – 2003 broods, and has increased again with the 2004 brood (survival of the 2004 net-pen release is the second highest observed). Many factors likely affect survival including avian predation, river and ocean conditions, size at release, release timing and location, and health of released smolts. It is unclear which variable expresses the greatest influence on survival rates of SAB fall Chinook; although it appears ocean conditions may be significant. Survival rates are identical for both the net-pen reared fish and the hatchery broodstock group (0.77%).

Run Reconstruction

SAB fall Chinook contribute substantially to a variety of regional fisheries (Table 4.2). As with the other SAFE-produced salmon, the vast majority of adult SABs are harvested (97.1% of net-pen releases and 84.6% of hatchery releases). Results are presented separately for the net-pen (production) releases and hatchery (broodstock) releases since management actions are in place to escape a percentage of the broodstock release past fisheries in Youngs Bay. As a result, returning adults from the hatchery releases contribute less to harvest and more escape to the hatchery. Significant harvest occurs in the Select Area commercial fishery, but a large component of both net-pen and hatchery releases are harvested in ocean commercial fisheries (25.1% and 24.5%, respectively). The balance is harvested in ocean and Columbia River recreational (majority in the Buoy 10 fishery) and mainstem commercial fisheries. Some returning SAB adults do escape fisheries and end up in streams (<1.0% of net-pen fish and 1.3% of broodstock fish) and some return to hatcheries (1.9% of net-pen fish and 14.1% of broodstock fish).

As reported in North et al. (2006), straying of SAB fall Chinook into Oregon-side tributaries of the Columbia River estuary has been an issue in the past. Transferring the broodstock program from Big Creek Hatchery to Klaskanine Hatchery in Youngs Bay[†] in 1995 reduced straying to minimal levels, averaging 1.0% for the brood years analyzed. No CWTs from broodstock releases have been reported from areas above Bonneville Dam. SABs from the net-pen releases are observed in non-natal areas at a slightly higher rate (1.9%); of these very few (0.5%) have strayed to areas above Bonneville Dam.

[†] As reported earlier in this report, the broodstock program was transferred from Klaskanine Hatchery to CCF's SFk Klaskanine Hatchery in 2006. It is expected that stray rates will remain at low levels with this production change.

Table 4.1. Smolt-to-adult survival of SAFE project hatchery spring Chinook, brood years 1994 - 2002. Survival rates are based on CWTs collected in fisheries and escapement monitoring. Experimental release groups are not included.

Brood Year	SAFE Project Releases					Annual Average
	South Fork Klaskanine	Youngs Bay Net Pens	Blind Slough Net Pens	Tongue Point Net Pens ¹	Deep River Net Pens	
1994	0.02%	0.16%	0.11%	0.07%	--	0.11%
1995	0.04%	0.10%	0.26%	0.22%	--	0.19%
1996	--	1.48%	0.33%	0.74%	0.02%	0.64%
1997	--	1.20%	0.78%	0.94%	1.25%	1.04%
1998	--	0.92%	1.83%	1.20%	--	1.32%
1999	--	1.53%	1.62%	--	0.36%	1.17%
2000	--	0.54%	0.41%	--	1.27%	0.74%
2001	--	0.07%	0.09%	0.35%	0.18%	0.17%
2002	0.59%	1.37%	0.18%	0.61%	0.00%	0.54%

¹ Tongue Point net pen site relocated to current MERTS location in 2002. No releases of 1999 or 2000 brood spring Chinook occurred in Tongue Point during the transition.

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

		Spring Chinook	Coho	Select Area Bright Fall Chinook (net pens)	Select Area Bright Fall Chinook (Klaskanine Hatchery)
		(BY 1992- 2002)	(BY 1993- 2005)	(BY 1994- 2004)	(BY 1995- 2004)
Commercial Fisheries	Select Area	74.08%	68.15%	44.69%	31.15%
	Columbia River Mainstem	6.15%	13.68%	13.79%	9.31%
	Ocean	7.88%	0.67%	25.13%	24.52%
	subtotal	88.11%	82.50%	83.61%	64.98%
Recreational Fisheries	Ocean	0.34%	9.99%	5.26%	8.71%
	Freshwater (including Columbia River Mainstem)	2.73%	6.20%	6.80%	8.56%
	subtotal	3.07%	16.19%	12.06%	17.27%
Escapement	Hatcheries	7.21%	1.05%	1.92%	14.10%
	Streams	1.49%	0.14%	0.95%	1.30%
	subtotal	8.70%	1.19%	2.87%	15.40%
Miscellaneous	Ocean by-catch	0.13%	0.12%	1.46%	2.34%

Table 4.3. Smolt-to-Adult survival of SAFE project hatchery coho, Brood Years 1993 – 2005. Survival rates are based on CWTs collected in fisheries and escapement monitoring. Experimental release groups are not included.

Brood Year	SAFE Project Releases					Annual Average
	South Fork Klaskanine	Youngs Bay Net Pens	Blind Slough Net Pens	Tongue Point Net Pens ¹	Deep River Net Pens	
1993	0.65%	1.05%	1.95%	3.08%	1.57%	1.66%
1994	0.32%	0.52%	1.21%	0.82%	0.67%	0.71%
1995	1.67%	1.05%	0.07%	0.53%	--	0.83%
1996	0.93%	0.92%	1.55%	3.87%	1.42%	1.74%
1997	0.50%	1.65%	0.73%	1.43%	5.48%	1.96%
1998	3.88%	2.09%	2.21%	3.29%	0.60%	2.41%
1999	2.90%	1.57%	0.01%	1.80%	0.05%	1.27%
2000	7.59%	5.93%	2.34%	3.93%	2.03%	4.37%
2001	1.21%	1.95%	0.04%	2.68%	1.71%	1.52%
2002	--	2.89%	0.01%	4.07%	0.37%	1.84%
2003	--	1.27%	0.58%	3.46%	2.01%	1.83%
2004	--	0.32%	1.41%	0.65%	1.10%	0.87%
2005	--	1.03%	1.25%	0.74%	3.97%	1.75%

¹ Tongue Point Net Pen site relocated to current MERTS location in 2002.

Table 4.4. Smolt-to-Adult survival of SAFE project Select Area Bright fall Chinook, brood years 1994 - 2004. Survival rates are based on CWTs collected in fisheries and escapement monitoring.

Brood Year	SAFE Project Releases			
	Youngs Bay Pens	Net	Hatchery Broodstock ¹	Annual Average
1994	0.31%		0.31%	0.31%
1995	0.41%		0.18%	0.29%
1996	0.09%		0.35%	0.22%
1997	0.27%		0.58%	0.43%
1998	2.29%		1.15%	1.72%
1999	1.43%		3.14%	2.29%
2000	1.28%		1.22%	1.25%
2001	0.89%		0.24%	0.57%
2002	0.39%		0.40%	0.40%
2003	0.13%		0.38%	0.26%
2004	1.89%		0.75%	1.32%

¹ Big Creek Hatchery for brood year 1994, Big Creek and Klaskanine Hatcheries in 1995, Klaskanine Hatchery from 1996 – 2003, Klaskanine and South Fork Klaskanine in 2004

5. ESCAPEMENT

SPAWNING GROUND SURVEYS

Spawning ground surveys for fall Chinook and coho are conducted annually on many LCR tributaries by ODFW and WDFW staff. Surveys are conducted by SAFE project staff, as well as staff from other programs including: BPA-funded CWT Recovery project (project #198201301), WDFW's Intensively Monitored Watershed (IMW) program, WDFW's Fish-In-Fish-Out (FIFO) monitoring program, and ODFW's Oregon Adult Salmonid Inventory and Sampling project (OASIS). Each of these programs has unique project goals and survey protocols; however, all available carcasses are examined for the presence of fin marks and CWTs. Taken together, these projects provide a wide range of spawning ground survey coverage on LCR tributaries that may be susceptible to straying of SAFE-produced fish. Data from these surveys, along with SAFE-project surveys, are used to assess escapement of SAFE-produced fish into streams.

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

ODFW Surveys

Fall Chinook

Surveys targeting naturally-spawning fall Chinook are conducted in tributaries of the LCR from Youngs Bay to the Sandy River during September and October of 2008. Results from these surveys are reported via an annual ODFW whitepaper series (see Takata 2008); refer to those documents for specific survey and analytical methodology. Only results pertinent to the evaluation of the SAFE project are discussed here. A total of 9.8 miles of stream are surveyed in the Youngs Bay watershed and another 13.2 miles are surveyed in tributaries between Astoria and Clatskanie (Table 5.1). Additionally, 10.0 miles are surveyed on the mainstem Sandy River from the mouth of Gordon Creek to the Lewis and Clark boat ramp near the confluence with the Columbia River; however, surveys were only conducted in late October through early November in 2008. SAFE project-funded staff primarily conduct surveys in Youngs Bay but occasionally will assist in the other surveys.

In 2008, fall Chinook surveys in the Youngs Bay watershed observed a combined peak count of 357 fish, of these 107 (30.0%) were examined for fin marks and CWTs. The majority (86.9%) of the mark sampled fish had an LV fin-clip indicating that they were SAB stock (SAB releases are 100% fin-marked with an LV clip). The observed number of fish per mile (36.4) was greater than the recent ten-year average of 32.0 fish/mile. The surveys from Astoria to Clatskanie recorded a fall Chinook peak count of 3,522 fish; surveyors were able to examine 946 (26.9%) of these for fin marks and CWTs. Based on fin marks, none of these fish were SABs. No SABs were observed in the late Sandy River surveys either.

Table 5.1. ODFW Lower Columbia River tributary fall Chinook spawner survey areas in 2008. Adapted from Takata (2008).

Stream	Survey Description	Miles Surveyed
NF Klaskanine River	Fish hatchery to confluence with SFK	1.5
SF Klaskanine River	Clatsop County fish hatchery to confluence with NFK	3.5
Youngs River	Falls to tidewater	0.3
Lewis and Clark River	400 line bridge (aka Crown Zellerbach bridge) to tidewater	4.5
<i>Subtotal</i>		9.8
Clatskanie River	Mouth of Keystone Cr. To tidewater	2.0
Gnat Creek	Falls to tidewater	3.5
Bear Creek	Falls to tidewater	3.0
Big Creek	Hatchery to tidewater	3.0
Plympton Creek	Falls to tidewater	1.7
<i>Subtotal</i>		13.2

Coho

Since 2002, ODFW has conducted an intensive monitoring program focused on the Oregon portion of the LCR coho ESU. This project, known as OASIS, is administered from the Corvallis Research Lab and is not affiliated with the SAFE project. We have been working with OASIS project staff to obtain survey data to assist with the evaluation of SAFE project goals; also, their CWT recoveries are reported to RMIS and can be used for these purposes. Details on the OASIS project survey methodology and analyses can be found in Suring et al. (2006). The population estimation technique relies on a random sample of available coho spawning habitat and is supplemented with standard surveys.

The Oregon portion of the Lower Columbia River ESU extends from the mouth of the Columbia River to Hood River. Analysis is conducted at the population complex level, six subsets of the ESU defined during the ODFW status review (Chilcote 1999). Two of those subsets, the Astoria and Clatskanie drainages, are most likely to be affected by SAFE project fish and are the focus of discussion in this report. Astoria is defined as all Columbia tributaries from the mouth upstream to, and including, the Gnat Creek basin (this area is further subdivided into the Youngs Bay and Big Creek area watersheds for reporting and analysis). Clatskanie is defined as all Columbia tributaries upstream of Gnat Creek to, and including, the Clatskanie River basin. Table 5.2 provides data on survey effort and estimated coho spawner abundance.

The OASIS project summaries indicate that the majority of the coho observed in the tributaries of Youngs Bay and Big Creek area were not of hatchery origin in 2008. At the writing of this report, CWT data was not yet available to document the stock source of any wire-tagged hatchery spawners that may have been recovered from these areas.

Table 5.2. Estimated coho spawner abundance in the Oregon portion of the Lower Columbia ESU, 2008. (Table constructed using summaries available on ODFW website; <http://oregonstate.edu/dept/ODFW/spawn/cohoabund.htm>)

Run Year	Survey Effort		Total		Wild	
	Number Surveys	Miles	Estimate	95% Confidence	Estimate	95% Confidence
				Interval		Interval
Youngs Bay	15	11.2	86	50	63	37
Big Creek	5	4.3	197	170	131	113
Clatskanie	13	12.9	995	706	995	706

Estimates derived using EMAP protocol. Estimates are adjusted for visual observation bias.

Estimates of wild spawners derived through application of carcass fin-mark observations.

WDFW Surveys

WDFW staff surveyed a total of 33 streams in 2008 (Table 5.3). Of the 33 streams surveyed, 19 were supported by SAFE funding (denoted by an asterisk in Table 5.3). Spawner escapement is estimated by a variety of methodologies including peak count expansion, mark-recapture, and area under the curve. Spawner escapement methodologies can be found in Rawding et al. (2006) and spawner estimates and mark sample summaries by stream can be found in Grobelny (2009).

In 2008, 518 CWTs (179 Chinook and 339 coho) were recovered by WDFW staff conducting spawning ground surveys on the Columbia River and its tributaries (from Priest Rapids Dam downstream to the mouth). Of these 518 CWT recoveries, 23 were SAFE-origin CWTs (15 coho and eight Chinook). All SAFE-origin coho CWTs and the one SAFE-origin spring Chinook CWT were recovered in the Grays River watershed. The seven SAFE-origin SAB fall Chinook CWTs were recovered in the Grays River (3), White Salmon River (2), Mill Creek (1), and Germany Creek (1).

Based on CWT expansion, the estimated number of SAB stock Chinook found annually on the spawning grounds of Washington LCR tributaries between 2001 and 2008 has ranged from 41 to 151 fish, with a mean of 75. The majority (78%) of the SAB fall Chinook strays recovered in Washington tributaries over those same eight years were recovered from the Grays River basin.

Grays River Weir and Surveys

With guidance from the Hatchery Scientific Review Group recommendations, WDFW implemented a Conservation and Sustainable Fisheries Plan in 2008. This plan identified specific spawning sanctuaries by species and ESU. One of the fall Chinook spawning sanctuaries that was established by this plan was in the Grays River. Grays River fall Chinook are considered a primary population by Lower Columbia Fish Recovery Board, meaning the recovery of the population is critical for the recovery of the ESU as a whole. Due to the critically low abundance of natural spawning fall Chinook in the Grays, one specific area of concern is gene flow from hatchery-produced stocks to the local population. Accordingly, the management intent is to prevent escapement of hatchery Chinook of any stock into the spawning population to the maximum extent practicable.

To address this concern, a weir was installed in the lower Grays River during the fall Chinook adult migration period to remove adult migrants of hatchery-origin (designated by the presence of a fin clip) and to improve spawning escapement estimates within the basin. The weir was in operation from September 18, 2008 through October 29, 2008. Of the 86 Chinook handled at the weir in 2008, 67 SAB fall Chinook (designated by an LV-clip) and one AD-clipped spring Chinook (based on physical condition and coloration) were removed, and 18 unmarked Chinook (presumed naturally produced) were passed upstream. As noted below, the Chinook totals at the weir do not represent total fall Chinook escapement to Grays River, as some fish passed the weir prior to installation and during high flow events that submerged the weir panels.

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. Estimates of the escapement of fall Chinook to naturally spawn in the Grays River basin prior to 2005 were generated using a peak fish count (live and dead) methodology with an expansion factor of 3.58. Recent data suggest that Grays River fall Chinook spawn timing has become more protracted, likely resulting in inaccuracies of the peak count expansion method. Beginning in 2005, more intensive surveys have been conducted to generate estimates, utilizing area under the curve (AUC) and mark-recapture methodologies, to more accurately estimate the number of spawning salmonids. Because refinements to the mark-recapture methodology are still in development, AUC methods using live counts of Chinook spawners were used to estimate natural spawn escapement values reported here.

In 2008, 37 Chinook carcasses were examined during spawning ground surveys conducted on the Grays and West Fork Grays Rivers from September 3 to December 15. The natural spawn escapement for those was estimated to be 80 Chinook. Based on biological data collected (e.g., LV or adipose-fin clips and CWT recoveries) we estimated that 34 of these Chinook were SAB fall Chinook, 11 were spring Chinook, 13 were adipose-clipped and presumed to be hatchery tule stock strays, and 22 were unmarked and presumed to be naturally produced. Based on a single CWT recovery from each stock, the spring Chinook were tenuously assigned to Deep River origin, and the adipose-clipped tules were assigned to Elochoman stock.

Adding the 67 SAB fall Chinook removed at the weir and the 34 SABs estimated to have spawned in the Grays River above the weir, a minimum of 101 SAB fall Chinook were estimated to have escaped to the Grays River in 2008. This does not include any fall Chinook that were caught from the mark-selective sport fishery in the Grays River. Removal of unwanted adults at the weir achieved a 66% reduction in the number of SAB fall Chinook escaping to the spawning grounds in 2008, but only an 8% reduction in spring Chinook (1 of 12) and no reduction in hatchery tules (0 of 13). Steps will be taken in the future to improve weir efficiency and minimize the impact of hatchery stocks escaping to the spawning grounds. More methodology and results on the Grays River weir and spawning ground surveys can be found in Glaser et al. (2010, in prep.).

Table 5.3. WDFW spawning ground areas surveyed in 2008. Asterisks denote streams for which surveys were supported in whole or part by SAFE project funding.

Drainage	Stream	Index Area Description	River Mile – River Mile	Miles Surveyed
Columbia River	Megler Bridge Creek*	Log jam to Hwy 101 culvert	0.4-0.0	0.4
Columbia River	Coon Canyon*	Hwy 4 culvert upstream 1 mile	1.0-0.0	1.0
Columbia River	Sisson Creek*	Spur Rd 290 washout to Spur Rd 200 bridge	2.5-1.1	1.4
Columbia River	Deep River*	3rd culvert to 1st culvert	3.5-2.2	1.3
Deep River	Person Creek*	Kin Road intersection upstream 0.4 miles	0.4-0	0.4
Columbia River	Grays River	Mouth of West Fork to covered bridge	12.4-10.5	1.9
Grays River	Hull Creek*	Mouth of Fall Creek to Hwy 4	2.6-1.0	1.6
Grays River	Fossil Creek*	Fossil Cr Rd bridge upstream 0.8 miles	1.3-0.5	0.8
Grays River	West Fork Grays River*	Intake to mouth	3.6-0	3.6
WF Grays River	Crazy Johnson Creek	Source to Mouth	0.4-0	0.4
Columbia River	Crooked Creek*	Bridge at NF upstream 1.3 miles	6.0-4.7	1.3
Crooked Creek	NF Crooked Creek*	Eden Valley Rd bridge upstream 1.1 miles	8.7-7.6	1.1
Columbia River	Jim Crow Creek *	2nd bridge to Spur Road 503 bridge	4.0-2.4	1.6
Columbia River	Skamokawa Creek*	Standard/McDonald Cr. confl. to Wilson Cr.	6.8-1.9	4.9
Skamokawa Creek	Wilson Creek*	End of Middle Valley Road to white church	1.5-0.0	1.5
Skamokawa Creek	Falk Creek*	2nd bridge to 0.25 miles below 1st bridge	4.8-4.0	0.8
Skamokawa Creek	LF Skamokawa Creek*	Mouth upstream 1 mile	1.0-0.0	1.0
Columbia River	Alger Creek*	Falls to 0.25 miles upstream of Hwy 4	1.9-1.0	0.9
Columbia River	Elochoman River*	Salmon Hatchery to Foster (Risk) Rd. bridge	9.5-2.7	6.8
Elochoman River	Beaver Creek*	Flagging at RM 1.4 to mouth	1.4-0	1.4
Elochoman River	Duck Creek*	Elochoman mainline road bridge to mouth	0.6-0.0	0.6
Columbia River	Mill Creek	Mill Creek Road bridge to mouth	2.0-0	2.0
Columbia River	Abernathy Creek	Salmon hatchery to mouth	3.0-0	3.0
Columbia River	Germany Creek	Mouth to 3.5 miles upstream	3.6-0	3.6
Columbia River	Coal Creek	Mouth of Mosquito Creek to falls (pipeline)	3.5-.5	3.0
Columbia River	Cowlitz River	Barrier dam to Kelso bridge	50.4-5.1	45.3
Cowlitz River	Coweeman River	Mulholland Cr. to Libby Rd. bridge	18.4-13.1	5.3
Toutle River	South Fork Toutle River	4700 Road bridge to county road bridge	12.7-7.2	5.5
Toutle River	Green River	Weir to mouth	0.37-0	0.4
Columbia River	Kalama River	Italian Creek to I-5 bridge	9.4-1.2	8.2
Lewis River	East Fork Lewis River	Lewisville Park (ramp) to Daybreak Park	14.3-10.1	4.2
Lewis River	North Fork Lewis River	Merwin Dam to salmon hatchery	19.2-15.7	3.5
Columbia River	Washougal River	Salmon Falls to wildlife access	15.4-11.9	3.5

HATCHERY SAMPLING

Hatchery sampling of returning Chinook and coho is conducted annually from September through November, concurrent with spawning activities at WDFW and ODFW hatchery facilities. Sampling objectives are to collect CWTs and biological data, which are used for run reconstruction and future run forecasts. Sampling rates are determined based on the run size and number of scale samples needed for statistical validity of the age composition. Data collected consists of fork length, sex, scales, fin marks, and the presence of a CWT.

ODFW Hatchery Recoveries

Sampling of returning SAB fall Chinook is conducted annually during October through November, concurrent with spawning activities at ODFW's Klaskanine Hatchery and CCF's SF Klaskanine Hatchery. It is important to note that while every salmonid returning to these hatcheries is examined for the presence of a CWT, SAFE-funded staff may not always be present to sub-sample for biological data such as scale samples for age analysis.

Based on coded-wire tags collected during broodstock collection and spawning activities (Table 5.4), 97% of the Chinook returning to ODFW's Klaskanine and CCF's South Fork Hatcheries in 2008 were SABs from the hatchery broodstock production groups, and 3% were SABs from the Youngs Bay net-pen releases.

Table 5.4. ODFW's Klaskanine and CCF's South Fork Hatcheries fall Chinook CWT sampling summary, 2008.

Hatchery	Hatchery Escapement	CWTs Collected	Percent Biological Sampled
ODFW Klaskanine	919	46	60%
CCF South Fork	553	18	67%

WDFW Hatchery Recoveries

In 2008, 14,239 CWTs (1,783 Chinook and 12,456 coho) were recovered from the nine WDFW LCR hatcheries and fish collection facilities. These facilities include: Grays River, Elochoman, Toutle, Cowlitz, Fallert Creek, Kalama Falls, Lewis River, and Washougal hatcheries, and Merwin Dam Fish Collection Facility. Of these CWTs, 0.6% (85) were of SAFE origin, which included 8 spring Chinook, 1 fall Chinook (SAB), and 75 coho. All eight of the spring Chinook CWTs were recovered at the Cowlitz Hatchery, as well as the one SAB fall Chinook CWT. Of the 75 coho CWTs, 54 were recovered at Grays River Hatchery, 19 at Elochoman Hatchery, 1 at Cowlitz Hatchery, and 1 at Fallert Hatchery.

6. ENVIRONMENTAL COMPLIANCE

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

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

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

Similarly, Washington hatcheries operate under National Pollutant Discharge Elimination Systems (NPDES) permits issued by the Washington Department of Ecology.

Of the Oregon SAFE net-pen facilities, only the Youngs Bay site has a production level that requires an NPDES permit (No. 101767) issued by the Oregon DEQ. Samples of sediment and benthic macro-invertebrates are collected and analyzed to ensure that any environmental impacts are within the limits established for the permit. Sampling is conducted at the end of the growing season (summer) every other year, as directed by the permit. Results of the most recent sampling were reported by Litton (2009) and can be accessed online at:

<http://pisces.bpa.gov/release/documents/DocumentViewer.aspx?doc=P108368&session=4a8e668a-743c-4b1f-9758-5209df0944d1>

Prior to 2007, the Washington SAFE net pens were below the production thresholds that require a NPDES permit. However, consolidation of net-pen rearing from three sites to a single net-pen site in Deep River brought production levels beyond that threshold, leading to submission of an NPDES permit application to Washington Department of Ecology in the summer of 2007. Due to staffing changes at both the WDFW SAFE project and Ecology immediately after the application was submitted, there was a lapse in oversight of the permit process. Recent contact with Ecology permitting staff by new WDFW SAFE staff has now confirmed that the permit application had been received but had not been processed. The permit has now been re-assigned to current Ecology personnel, and WDFW was given permission to continue production at the Deep River site while the permit is being processed.

7. COLLABORATION AND COMMUNITY OUTREACH

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

PROJECT COORDINATION

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

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

To further promote cross training and team building among SAFE staff from the three sponsor agencies, a two-day tour of Select Area hatchery and net-pen facilities in both Oregon and Washington was conducted in September 2009. The tour fostered a broader awareness and deeper understanding of the many SAFE project facilities and their programs among the ODFW, CCF and WDFW SAFE staff and the BPA contract management staff (COTR and Supervisor) that participated in the tours.

COLLABORATIVE PROJECTS

Avian Predation

SAFE staff in Oregon continued to work with other agencies to further understanding of interactions of released smolts with the environment. Specifically, NOAA Fisheries PIT tagged tule fall Chinook from Big Creek Hatchery and SAB fall Chinook from SF Klaskanine Hatchery (at Warrenton High School) as part of an ongoing avian predation study. The purpose of this USACE-funded study is to measure avian predation on lower river fall Chinook in comparison to upriver stocks. Additionally, as a result of surplus tags becoming available, approximately 2,000 coho smolts at the Blind Slough net pens were PIT tagged.

Kelt Reconditioning

The SAFE project also collaborated on a Yakama Nation steelhead kelt reconditioning project. SAFE provided net pens in Youngs Bay that Yakama staff used to temporarily hold 20 spawned kelts from late-May to mid-June to determine if the estuarine environment would improve the success of reconditioning (survival to re-maturation) over that achieved in the Yakima basin.

COMMUNITY OUTREACH AND EDUCATION

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

CCF, Astoria and Warrenton High Schools

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

A project initiated by NOAA Fisheries to PIT tag several thousand fall Chinook from various release sites in the LCR involved Warrenton High School and CCF. Fall Chinook from CCF and coho from Big Creek Hatchery were PIT tagged by students under the supervision of NOAA staff and released in Skipanon Slough. This study (described above) evaluates the vulnerability of juvenile salmonids to avian predation while they migrate through the Columbia River estuary.

Gnat Creek Education Pavilion

Ongoing outreach and education activities conducted at Gnat Creek Hatchery got a significant boost this year with the building of a new covered outdoor education pavilion at the hatchery (Figure 7.1). Construction of the pavilion was made possible by an initial \$30,000 grant from Georgia Pacific. An additional \$10,000 was provided by Oregon Wildlife Heritage Foundation's Vittle Vendors program. This popular program generates income through feed sales at many Oregon Department of Fish and Wildlife hatcheries, wherein the public can hand feed fish in a designated vessel or pond after buying a handful of feed pellets from a coin-operated vending machine. Donated labor and materials were also instrumental in making construction of the pavilion economically feasible. Several weeks of labor were donated for the roofing of the building by The Oregon Department of Forestry's South Fork Inmate construction crew. In addition, a concrete slab was slated to be poured under the covered structure as part of a local Eagle Scout project during the summer of 2010.



Figure 7.1. New outdoor education pavilion at Gnat Creek Hatchery.

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