Comprehensive Review of the Columbia River Basin Salmon
Management Policy C-3620
2013-2017
ECONOMICS
QUESTIONS: 2, 8, 15, 20, 21, 37, 38, and 39

Question 2

Question paraphrase: What economic enhancements were expected to occur for the recreational and commercial fisheries and did they occur?

Policy citation: The objectives of this Policy are to …, and…enhance the economic well-being and stability of the fishing industry in the state (pg. 8)

Specific question: Were there specific economic enhancement goals or targets that were anticipated to be achieved for sport and commercial fisheries over the course of the Policy, and if so, have they been achieved?

Analysis: Answering the second part of this question requires more analysis than could be conducted in time for this presentation. Preliminary analyses have provided somewhat conflicting assessments, requiring more in-depth examinations than the catch tables that are provided. The material provided below is responsive to the first part of this question.

There were several expectations in the "Decision Support Document for Columbia River Basin Salmon Management Policy, Draft January 12, 2013" regarding this question. Basically, the Policy was expected to increase recreational angler trips and increase economic impacts to the commercial fishery through increased production in off-channel areas and implementation of alternative gears.

Shown below are several excerpts from the "Decision document":

"Recreational angler trips in the transition period (2013-2016) are projected to increase by about 13% and in the long term by about 22% across the spring Chinook, summer Chinook, and fall Chinook fisheries."

"Key assumptions include:
1) Alternative selective commercial fishing gear is implemented and catches are consistent with CWG expectations. For example, the CWG analysis expects a catch of 27,441 fall Chinook by alternative selective commercial fishing gear in 2017.
2) Off-channel artificial production programs are implemented as recommended by the CWG."

"Ex-vessel Value of Commercial Fishery (revised from CWG report16). The ex-vessel value of the commercial fishery in the transition period is projected to increase by ~18,805 (0.5%) in 2013 to ~ $761,009 (~20%) in 2016. For the period 2017 through 2021, the annual ex-vessel value of

commercial fisheries is projected to increase by ~$231,755 (6%) in 2017 to ~519,022 (14%) in 2021.
2) Recreational Angling Trips (from CWG report). The total number of angler trips in the transition period (2013-2016) is projected to increase by about 13% and in the long term by about 22%."

"Synopsis. The draft Policy supports the development and implementation of fisheries using alternative selective-fishing gear and techniques to provide commercial fishing opportunities to catch hatchery salmon in the mainstem of the Columbia River while limiting impacts to wild stocks of conservation concern. Implementation of alternative selective gears is essential to achieve the economic expectations for commercial fishers and is expected to provide conservation benefits."

As stated in the answer to Question #1, implementation of alternative gear fisheries as a replacement for gill nets did not occur as planned. Increased production in Select Areas did occur in some areas (See Table 2A).

Table 2B and Table 2C show recreational angler trips and catch during 2010-2017. Angler trips ranged from a high of 459,700 trips in 2014 to a low of 313,200 trips in 2017 for all seasons combined. Sport harvest of all species ranged from a high of 146,500 fish in 2015 to a low of 71,700 fish in 2010. Figure 2.1 shows spring season angler trips relative to upriver spring Chinook run size. Table 2D shows commercial catch by species from 2010-2017. Commercial catch ranged from a high of 179,100 fish in 2014 to a low of 20,300 fish in 2017.

Table 2A /B: Mainstem Recreational Angler Trips in the Columbia River Below Bonneville Dam

Year	Spring	Summer	Fall-Mainstem	Fall-Buoy 10	Total
2010	186,132	70,661	114,285	52,300	423,378
2011	154,895	75,818	147,343	49,409	427,465
2012	127,919	80,733	128,831	65,070	402,553
2013	109,655	52,037	141,481	65,767	368,940
2014	145,642	53,661	143,946	107,522	450,771
2015	151,173	50,555	131,374	108,213	441,315
2016	126,826	58,067	133,300	94,950	413,143
2017	63,303	41,595	114,721	93,547	313,166
Average 2010-2012	156,315	75,737	130,153	55,593	417,799
Average 2013-2017	119,320	51,183	132,964	94,000	397,467

NOTE: Angler trips do not reflect differences in run sizes each year.

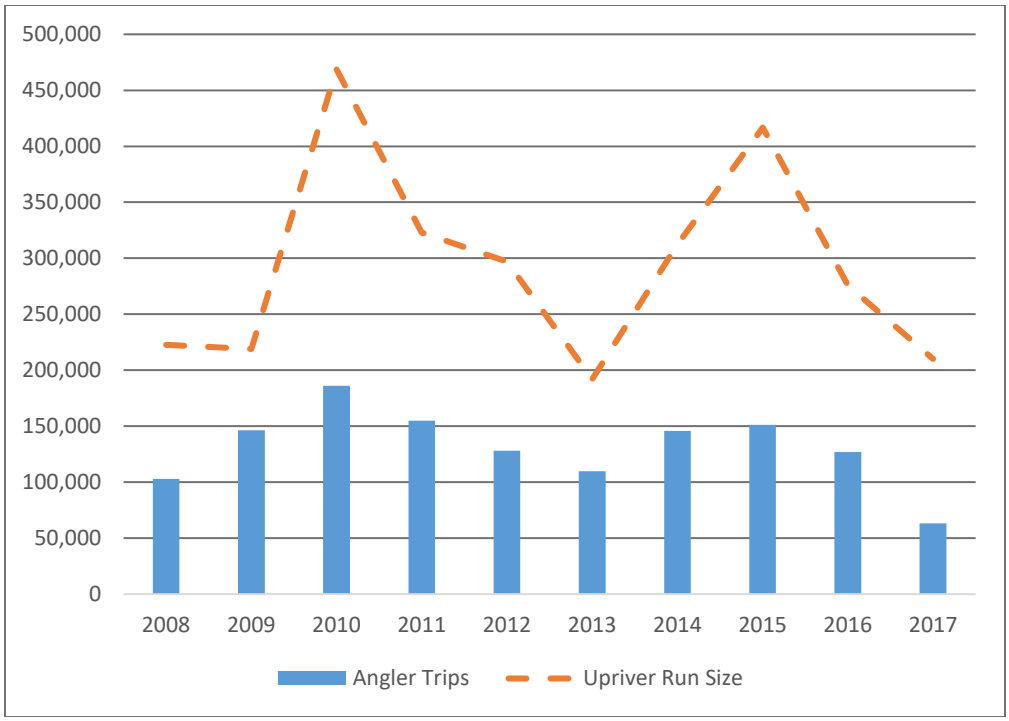


Figure 2.1: Mainstem Spring Chinook Angler Trips versus Upriver Run Size

Table 2B: Actual vs. Expected Recreational Angler Trips <Bonn

Modeled						
	"Baseline"		2013-2016		2017+	
Spring	165,362		175,376		180,453	
Summer	25,000		33,746	45,047	70,000	
Fall	160,000		175,000		175,000	
Actual Results						
	2013	2014	2015	2016	2017	Average
Spring	109,655	145,642	151,173	126,826	63,303	119,320
Summer	52,037	53,661	50,555	58,067	41,595	51,183
Fall	207,248	251,468	239,587	228,238	208,268	226,962
Actual versus Modeled						
	2013	2014	2015	2016	2017	Average 2013-2016
Spring	(65,721)	(29,734)	(24,203)	(48,550)	(112,073)	(42,052)
Summer	18,291	19,915	5,508	13,020	(28,405)	14,184
Fall	32,248	76,468	64,587	53,238	33,268	56,635

Table 2C: Expected vs. Actual Recreational Season

Expected [1]

Chinook Season	2013	2014	2015	2016	2017	Avg
Spring (Pre-Update) [2]	44	44	44	44	45	44
Spring (Post-Update) [3]	37	37	37	37	37	37
Summer [4]	18	18	26	26	46	27
Buoy 10 [5]	34	34	34	34	34	34
Mainstem (Below Lewis) [6]	45	45	45	45	45	45
Mainstem (Above Lewis) [7]	92	92	92	92	92	92

	Actual [1]						% of Expected
Chinook Season	2013	2014	2015	2016	2017	Avg	Avg
Spring (Pre-Update) [2]	40	45	43	39	50	43	98%
Spring (Post-Update) [3]	22	32	31	23	0	22	58%
Summer [4]	15	40	46	46	40	37	140%
Buoy 10 [5]	51	32	28	61	35	41	122%
Mainstem (Below Lewis) [6]	45	45	45	45	45	45	100%
Mainstem (Above Lewis) [7]	92	92	92	82	92	90	98%

[1]Open fishing days were expected to be consecutive; however, actual open days were not always consecutive due to the need for in-season management.
[2] March 1-May 9; assumes run update occurs on May 10.
[3]May 10-June 15
[4]June 16-July 31
[5]Expected open days based on August 1-September 3 (average date for Labor Day). Actual open days include any days open for Chinook retention August 1-September 30. In 2014, the fishery still met the Labor Day objective as Labor Day fell on September 1 that year. For Buoy 10, the Policy does not distinguish between open days that are Chinook MSF or non-MSF.
[6]August 1-September 14, including one week of Chinook MSF September 8-14.
[7]August 1-October 31

Table 2D: Modeled Fishery Ex-Vessel Values from Workgroup Report Table C5.

Fishery	Stock	Status	Ex-Vessel Value (Modeled)					
			Current	Transition				Long-Term
				2013	2014	2015	2016	2017
Mainstem Gillnet	Spring Chinook	Existing	$395,911	$205,272	$205,272	$205,272	$205,272	$0
Mainstem Gillnet	Summer Chinook	Existing	$151,719	$121,332	$121,332	$90,999	$90,999	$0
Mainstem Gillnet (Zone 4-5)	Fall Chinook	Existing	$1,272,247	$772,926	$772,926	$772,926	$772,926	$0
Mainstem Gillnet (2S)	Fall Chinook	New	$0	$353,526	$353,526	$353,526	$353,526	$0
Mainstem Gillnet	Coho	Existing	$316,682	$270,442	$270,442	$270,442	$261,582	$0
Select Area Gillnet	Spring Chinook	Expanded	$316,415	$394,493	$395,519	$503,300	$605,566	$631,805
Select Area Gillnet	Fall Chinook	Expanded	$436,943	$436,943	$436,943	$457,237	$481,779	$484,139
Select Area Gillnet	Coho	Expanded	$743,337	$765,362	$912,914	$912,914	$912,914	$912,914
Mainstem (Gear to be Determined; Zone 4-5)	Fall Chinook	New?	$0	$0	$0	$0	$0	$772,926
Mainstem (Gear to be Determined; 2S)	Fall Chinook	New	$0	$0	$0	$0	$0	$353,526
Mainstem Seine	Lower River Hatchery Chinook	New	$0	$190,851	$190,851	$190,851	$467,868	$467,868
Mainstem Seine	Coho	New	$0	$73,562	$73,562	$73,562	$175,901	$175,901
Mainstem Tangle-net	Coho	New	$0	$246,713	$246,713	$246,713	$246,713	$246,713
Totals			$3,633,254	$3,831,422	$4,119,764	$4,217,507	$4,714,810	$4,185,556
Difference from Current			$0	$198,168	$486,510	$584,253	$1,081,556	$552,302
% Difference from Current			0%	5%	13%	16%	30%	15%

Table 2E: Actual Fishery Ex-Vessel Values.

Fishery	Stock	Status	Ex-Vessel Value (Actual)					
			Current	Transition				Long-Term
				2013	2014	2015	2016	2017
Mainstem Gillnet	Spring Chinook	Existing	$395,911	$202,405	$322,675	$580,660	$415,641	$0
Mainstem Gillnet	Summer Chinook	Existing	$151,719	$144,962	$172,266	$206,307	$275,108	$0
Mainstem Gillnet (Zone 4-5)	Fall Chinook	Existing	$1,272,247	$2,812,736	$2,575,129	$2,515,140	$2,799,595	$908,770
Mainstem Gillnet (2S)	Fall Chinook	New	$0	$0	$0	$0	$0	$0
Mainstem Gillnet	Coho	Existing	$316,682	$39,486	$460,466	$78,612	$0	$0
Select Area Gillnet	Spring Chinook	Expanded	$316,415	$747,281	$353,896	$925,104	$926,477	$1,448,119
Select Area Gillnet	Fall Chinook	Expanded	$436,943	$779,085	$497,362	$378,842	$301,281	$323,253
Select Area Gillnet	Coho	Expanded	$743,337	$569,780	$1,622,922	$297,190	$428,588	$554,719
Mainstem (Gear to be Determined; Zone 4-5)	Fall Chinook	New?	$0	$0	$0	$0	$0	$0
Mainstem (Gear to be Determined; 2S)	Fall Chinook	New	$0	$0	$0	$0	$0	$0
Mainstem Seine	Lower River Hatchery Chinook	New	$0	$0	$0	$51,434	$26,894	$0
Mainstem Seine	Coho	New	$0	$0	$0	$5,215	$6,392	$0
Mainstem Tangle-net	Coho	New	$0	$86,085	$0	$49,624	$0	$0
Totals			$3,633,254	$5,381,820	$6,004,715	$5,088,127	$5,179,976	$3,234,861

Table 2F: Actual versus Modeled Fishery Ex-Vessel Values.

Fishery	Stock	Status	Ex-Vessel Value (Actual vs Modeled)					
			Current	Transition				Long-Term
				2013	2014	2015	2016	2017
Mainstem Gillnet	Spring Chinook	Existing	$395,911	($2,867)	$117,403	$375,388	$210,369	$0
Mainstem Gillnet	Summer Chinook	Existing	$151,719	$23,630	$50,934	$115,308	$184,109	$0
Mainstem Gillnet (Zone 4-5)	Fall Chinook	Existing	$1,272,247	$2,039,810	$1,802,203	$1,742,214	$2,026,669	$908,770
Mainstem Gillnet (2S)	Fall Chinook	New	$0	($353,526)	($353,526)	($353,526)	($353,526)	$0
Mainstem Gillnet	Coho	Existing	$316,682	($230,956)	$190,024	($191,830)	($261,582)	$0
Select Area Gillnet	Spring Chinook	Expanded	$316,415	$352,788	($41,624)	$421,804	$320,911	$816,314
Select Area Gillnet	Fall Chinook	Expanded	$436,943	$342,142	$60,419	($78,395)	($180,498)	($160,886)
Select Area Gillnet	Coho	Expanded	$743,337	($195,582)	$710,008	($615,724)	($484,326)	($358,195)
Mainstem (Gear to be Determined; Zone 4-5)	Fall Chinook	New?	$0	$0	$0	$0	$0	($772,926)
Mainstem (Gear to be Determined; 2S)	Fall Chinook	New	$0	$0	$0	$0	$0	($353,526)
Mainstem Seine	Lower River Hatchery Chinook	New	$0	($190,851)	($190,851)	($139,417)	($440,974)	($467,868)
Mainstem Seine	Coho	New	$0	($73,562)	($73,562)	($68,347)	($169,509)	($175,901)
Mainstem Tangle-net	Coho	New	$0	($160,628)	($246,713)	($197,089)	($246,713)	($246,713)
Totals			$3,633,254	$1,550,398	$1,884,951	$870,620	$465,166	($950,695)

Table 2G /37A: Comparison of expected (pre-reform) and actual (post-reform) ex-vessel value for the non-treaty commercial fishery during the Harvest Reform

Fishery	Stock	2013			
		Expected Pre-Policy	Actual	Difference ($)	Difference (%)
Mainstem Gillnet	Spring Chinook	$262,673	$202,405	($60,269)	-23%
	Summer Chinook	$192,223	$144,962	($47,260)	-25%
	Zone 4-5 Fall Chinook	$3,475,916	$2,812,736	($663,179)	-19%
	Coho	$28,742	$39,486	$10,744	37%
Select Area Gillnet	Spring Chinook	$730,514	$747,281	$16,766	2%
	Fall Chinook	$779,085	$779,085	$0	0%
	Coho	$569,780	$569,780	$0	0%
Mainstem Seine	Chinook	$0	$0	--	--
	Coho	$0	$0	--	--
Mainstem Tangle Net	Coho	$0	$86,085	$86,085	--
Total Commercial		$6,038,933	$5,381,820	($657,113)	-11%

Fishery	Stock	2014			
		Expected Pre-Policy	Actual	Difference ($)	Difference (%)
Mainstem Gillnet	Spring Chinook	$550,820	$322,675	($228,145)	-41%
	Summer Chinook	$204,169	$172,266	($31,903)	-16%
	Zone 4-5 Fall Chinook	$2,868,149	$2,575,129	($293,020)	-10%
	Coho	$534,392	$460,466	($73,926)	-14%
Select Area Gillnet	Spring Chinook	$336,492	$353,896	$17,404	5%
	Fall Chinook	$497,362	$497,362	$0	0%
	Coho	$1,456,864	$1,622,922	$166,058	11%
Mainstem Seine	Chinook	$0	research	--	--
	Coho	$0	research	--	--
Mainstem Tangle Net	Coho	$0	$162,732	$162,732	--
Total Commercial		$6,448,248	$6,167,447	($280,801)	-4%

Fishery	Stock	2015			
		Expected Pre-Policy	Actual	Difference ($)	Difference (%)
Mainstem Gillnet	Spring Chinook	$777,035	$580,660	($196,374)	-25%
	Summer Chinook	$289,034	$206,307	($82,727)	-29%
	Zone 4-5 Fall Chinook	$3,547,915	$2,515,140	($1,032,775)	-29%
	Coho	$102,809	$78,612	($24,197)	-24%
Select Area Gillnet	Spring Chinook	$737,727	$925,104	$187,376	25%
	Fall Chinook	$359,096	$378,842	$19,746	5%
	Coho	$252,187	$297,190	$45,003	18%
Mainstem Seine	Chinook	$0	$51,434	$51,434	--
	Coho	$0	$5,215	$5,215	--
Mainstem Tangle Net	Coho	$0	$49,624	$49,624	--
Total Commercial		$6,065,803	$5,088,127	($977,676)	-16%

Fishery	Stock	2016			
		Expected Pre-Policy	Actual	Difference ($)	Difference (%)
Mainstem Gillnet	Spring Chinook	$567,787	$415,641	($152,146)	-27%
	Summer Chinook	$385,105	$275,108	($109,997)	-29%
	Zone 4-5 Fall Chinook	$2,799,595	$2,799,595	$0	0%
	Coho	$0	$0	--	--
Select Area Gillnet	Spring Chinook	$752,673	$926,477	$173,804	23%
	Fall Chinook	$240,414	$301,281	$60,866	25%
	Coho	$371,363	$428,588	$57,226	15%
Mainstem Seine	Chinook	$0	$26,894	$26,894	--
	Coho	$0	$6,392	$6,392	--
Mainstem Tangle Net	Coho	$0	$0	--	--
Total Commercial		$5,147,470	$5,179,976	$32,506	1%

Fishery	Stock	2017			
		Expected Pre-Policy	Actual	Difference ($)	Difference (%)
Mainstem Gillnet	Spring Chinook	$302,776	$0	($302,776)	-100%
	Summer Chinook	$238,012	$0	($238,012)	-100%
	Zone 4-5 Fall Chinook	$922,305	$922,305	$0	0%
	Coho	$0	$0	$0	-
Select Area Gillnet	Spring Chinook	$1,222,604	$1,463,829	$241,224	20%
	Fall Chinook	$283,192	$323,253	$40,061	14%
	Coho	$432,625	$581,649	$149,024	34%
Mainstem Seine	Chinook	--	--	--	--
	Coho	--	--	--	--
Mainstem Tangle Net	Coho	$0	$0	0	--
Total Commercial		$3,401,514	$3,291,036	($110,478)	-3%

Fishery	Stock	2013-2017 Average			
		Expected Pre-Policy	Actual	Difference ($)	Difference (%)
Mainstem Gillnet	Spring Chinook	$492,218	$304,276	($187,942)	-38%
	Summer Chinook	$261,709	$159,729	($101,980)	-39%
	Zone 4-5 Fall Chinook	$2,722,776	$2,324,981	($397,795)	-15%
	Coho	$133,189	$115,713	($17,476)	-13%
Select Area Gillnet	Spring Chinook	$756,052	$883,317	$127,265	17%
	Fall Chinook	$431,830	$455,965	$24,134	6%
	Coho	$616,564	$700,026	$83,462	14%
Mainstem Seine	Chinook	$0	$15,666	$15,666	-
	Coho	$0	$2,321	$2,321	-
Mainstem Tangle Net	Coho	$0	$59,688	$59,688	-
Total Commercial		$5,414,337	$5,021,681	($392,656)	-7%

Question 8

Question paraphrase: What progress has been made on achieving overall economic well-being and stability of both commercial and recreational fisheries?

Policy citation: …seek to enhance the overall economic well-being and stability of Columbia River fisheries. (pg. 10)

Specific question: See question/footnote 2 as a cross-referenced question.

Analysis: See Question #2 and Question #37

Question 15

Question paraphrase: Have the off-channel areas been economically enhanced compared to before the Policy was implemented?

Policy citation: Enhance the economic benefits of off-channel commercial fisheries. (pg. 10)

Specific question: Have the economic benefits of off-channel commercial fisheries been enhanced over the course of the Policy in comparison to the period prior to the Policy?

Analysis: No, in Washington. Yes, in Oregon. The following information provides a good summary of efforts to enhance off-channel fisheries on the Washington side of the river. Efforts on the Oregon side have been more successful, but are not analyzed or incorporated in this review, so the analysis is incomplete.

WDFW began the Cathlamet Channel Net Pen (CCNP) program with the intent of providing an additional off-channel area for spring Chinook fisheries. From 2014-2017, an average of 142,200 spring Chinook were released from the net pens, compared to a goal of 250,000 fish (Table 15A). All of the fish released had a coded-wire tag implanted, but the recoveries of these fish over all of the years was only 12 fish in the Columbia River, and 4 in ocean fisheries. No recoveries have occurred in Cathlamet Channel. WDFW conducted test fishing from 2013 to 2017 (test fishing is ongoing for 2018). Results from test fishing are shown in Table 15B. ODFW increased releases into their Select Areas beginning 2013 (Table 2A, Question #2).

Currently, the only off-channel fishery in Washington waters is in Deep River. Spring Chinook were released until 2013 and then discontinued. Fall Chinook releases averaged 1.1 million smolts from 2010-2017 (Figure 15.1). Fall Chinook releases have been discontinued due to implementation of the Mitchell Act Biological Opinion (BIOP). Coho releases averaged 750,000 smolts from 2010-2017 (Figure 15.2). Commercial harvest of coho averaged 12,800 during 2010-2012 and 11,500 during 2013-2017 (Table 15C). Staff was unable to conduct the analysis necessary to answer this question. The tables in this review do not fully answer the question.

Table X. Select Area Harvest During the Winter, Spring, Summer Fisheries

	SAFE Spring Chinook	Lower River Spring Chinook	Upriver Spring Chinook	Total Spring Chinook	Summer Chinook	SAB Fall Chinook	Total
2010	21,139	1,801	1,507	24,447	20	425	24,892
2011	8,523	1,176	305	10,004	35	1,062	11,101
2012	8,493	788	329	9,610	1	446	10,057
2013	5,067	1,331	260	6,658	11	1,395	8,064
2014	2,236	730	260	3,226	47	1,370	4,643
2015	11,121	1,533	804	13,458	147	62	13,667
2016	8,694	1,094	348	10,136	94	266	10,496
2017	15,389	1,668	468	17,525	47	24	17,596
2010-2012 Avg	12,718	1,255	714	14,687	19	644	15,350
2013-2017 Avg	8,501	1,271	428	10,201	69	623	10,893

Table X. Fall Chinook Harvest in Select Areas.

	Youngs Bay	Tongue Point	Blind Slough	OR Total	Deep River	SAFE Total
2010	8,048	1,402	10,205	19,655	1,011	20,666
2011	12,339	2,527	5,768	20,634	2,295	22,929
2012	16,197	2,466	3,366	22,029	1,691	23,720
2013	14,360	5,828	2,362	22,550	1,592	24,142
2014	11,830	5,460	4,666	21,956	2,161	24,117
2015	6,765	3,614	3,405	13,784	4,303	18,087
2016	6,398	2,007	2,027	10,432	1,999	12,431
2017	6,277	2,251	1,636	10,164	1,870	12,034
2010-2012 Avg	12,195	2,132	6,446	20,773	1,666	22,438
2013-2017 Avg	9,126	3,832	2,819	15,777	2,385	18,162

Table X. Coho Harvest in Select Areas.

	Youngs Bay	Tongue Point	Blind Slough	OR Total	Deep River	SAFE Total
2010	27,564	6,734	5,201	39,499	19,260	58,759
2011	26,538	6,504	1,388	34,430	15,083	49,513
2012	5,986	3,902	1,534	11,422	3,932	15,354
2013	14,254	14,165	3,882	32,301	10,002	42,303
2014	65,937	50,752	24,620	141,309	27,188	168,497
2015	11,463	9,721	1,698	22,882	4,519	27,401
2016	15,784	11,284	1,493	28,561	6,162	34,723
2017	13,603	12,534	2,460	28,597	9,382	37,979
2010-2012 Avg	20,029	5,713	2,708	28,450	12,758	41,209
2013-2017 Avg	24,208	19,691	6,831	50,730	11,451	62,181

Table X. Select Area Harvest by Species

	Spring Chinook	Summer Chinook	Fall Chinook	Coho	Total
2010	24,447	20	21,091	58,759	104,317
2011	10,004	35	23,991	49,513	83,543
2012	9,610	1	24,166	15,354	49,131
2013	6,658	11	25,537	42,303	74,509
2014	3,226	47	25,487	168,497	197,257
2015	13,458	147	18,149	27,401	59,155
2016	10,136	94	12,697	34,723	57,650
2017	17,525	47	12,058	37,979	67,609
2010-2012 Avg	14,687	19	23,083	41,209	78,997
2013-2017 Avg	10,201	69	18,786	62,181	91,236

Table 15A /2A: Summary of Select Area production goals and actual releases

Species/Stock	Period	Release Year	Total Release Goals	Total Actual Releases	% of Goal	First Adult Return Year
Spring Chinook	Pre-Transition	2010[a]	1,550,000	1,535,200	99%	2012
		2011[a]	1,550,000	1,290,700	83%	2013
		2012[a]	1,550,000	1,529,300	99%	2014
	Transition	2013	2,050,000	1,829,200	89%	2015
		2014[b]	1,950,000	1,846,600	95%	2016

		2015[b]	1,950,000	1,747,300	90%	2017
		2016[b]	1,950,000	1,958,800	100%	2018
	Long Term	2017[b]	2,200,000	1,925,700	86%	2019
Coho	Pre-Transition	2010[a]	4,290,000	4,009,700	93%	2011
		2011[a]	4,290,000	3,811,000	89%	2012
		2012[a]	4,290,000	3,995,800	93%	2013
	Transition	2013	5,090,000	4,536,700	89%	2014
		2014	5,090,000	4,814,400	95%	2015
		2015[c]	5,090,000	4,709,300	93%	2016
		2016	5,090,000	5,589,500	110%	2017
	Long Term	2017	6,090,000	4,787,500	79%	2018
SAB Fall Chinook	Pre-Transition	2010	1,450,000	914,200	63%	2012
		2011	1,450,000	1,356,900	94%	2013
		2012	1,450,000	1,358,000	94%	2014
	Transition	2013	1,950,000	1,850,300	95%	2015
		2014	1,950,000	2,227,400	114%	2016
		2015	1,950,000	1,670,700	86%	2017
		2016	1,950,000	621,900	32%	2018
	Long Term	2017	2,200,000	599,500	27%	2019

[a] Includes additional 250,000 spring Chinook and 120,000 Coho production specified as part of 2008 OFWC Allocation Policies.

[b] 350,000 spring Chinook production from WDFW (Deep River) was discontinued in 2014.

[c] 200,000 Coho production from WDFW scheduled for release beginning in 2015 was discontinued due to budget cuts.

Table 15B: Modeled Fishery Ex-Vessel Values from Workgroup Report Table C5.

Fishery	Stock	Status	Ex-Vessel Value (Modeled)					
			Current	Transition				Long-Term
				2013	2014	2015	2016	2017
Select Area Gillnet	Spring Chinook	Expanded	$316,415	$394,493	$395,519	$503,300	$605,566	$631,805
Select Area Gillnet	Fall Chinook	Expanded	$436,943	$436,943	$436,943	$457,237	$481,779	$484,139
Select Area Gillnet	Coho	Expanded	$743,337	$765,362	$912,914	$912,914	$912,914	$912,914
Totals			$1,496,695	$1,596,798	$1,745,376	$1,873,451	$2,000,259	$2,028,858
Difference from Current			$0	$100,103	$248,681	$376,756	$503,564	$532,163
% Difference from Current			0%	7%	17%	25%	34%	36%

Table 15C: Actual Fishery Ex-Vessel Values.

Fishery	Stock	Status	Ex-Vessel Value (Actual)					
			Current	Transition				Long-Term
				2013	2014	2015	2016	2017
Select Area Gillnet	Spring Chinook	Expanded	$316,415	$747,281	$353,896	$925,104	$926,477	$1,448,119
Select Area Gillnet	Fall Chinook	Expanded	$436,943	$779,085	$497,362	$378,842	$301,281	$323,253
Select Area Gillnet	Coho	Expanded	$743,337	$569,780	$1,622,922	$297,190	$428,588	$554,719
Totals			$1,496,695	$2,096,146	$2,474,179	$1,601,136	$1,656,346	$2,326,091

Table 15D: Actual versus Modeled Fishery Ex-Vessel Values.

Fishery	Stock	Status	Ex-Vessel Value (Actual vs Modeled)					
			Current	Transition				Long-Term
				2013	2014	2015	2016	2017
Select Area Gillnet	Spring Chinook	Expanded	$316,415	$352,788	($41,624)	$421,804	$320,911	$816,314
Select Area Gillnet	Fall Chinook	Expanded	$436,943	$342,142	$60,419	($78,395)	($180,498)	($160,886)
Select Area Gillnet	Coho	Expanded	$743,337	($195,582)	$710,008	($615,724)	($484,326)	($358,195)
Totals			$1,496,695	$499,348	$728,803	($272,315)	($343,913)	$297,233

Table 15E /A: Releases of Spring Chinook in Cathlamet Channel Net Pens

Number of Spring Chinook Planted				
2014	2015	2016	2017	2018
200,000	140,864	107,856	119,944	260,000

Table 15F /B: Cathlamet Channel Research Test Fishing, 2013 – 2017

	Days of Test Fishing	Adult Chin Handled		
		Total	Lower River	Upriver
2013	17	104	52	52
2014	20	184	83	101
2015	21	315	60	255
2016	20	282	108	174
2017	18	649	177	472

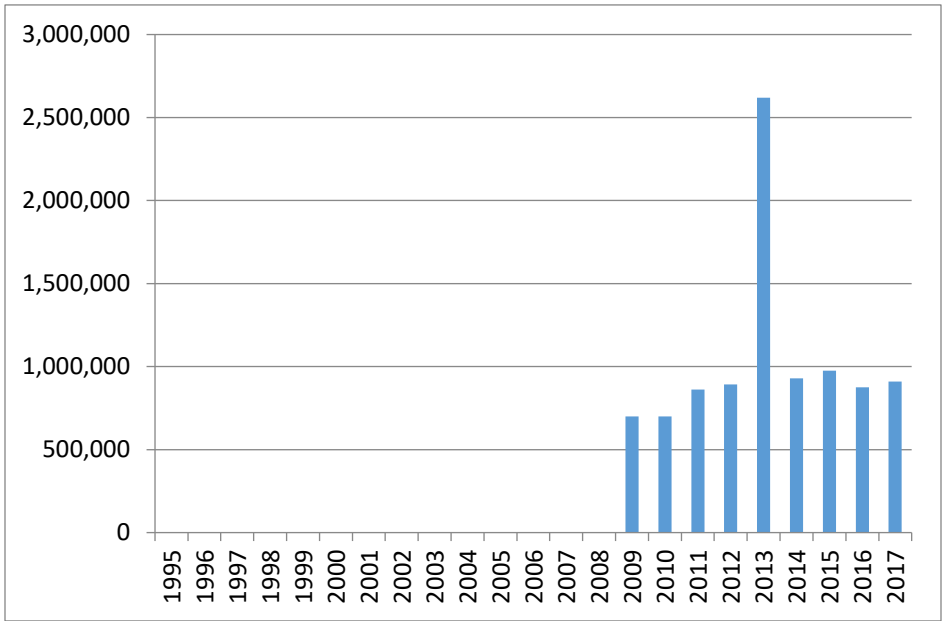


Figure 15.1: Fall Chinook Releases in Deep River

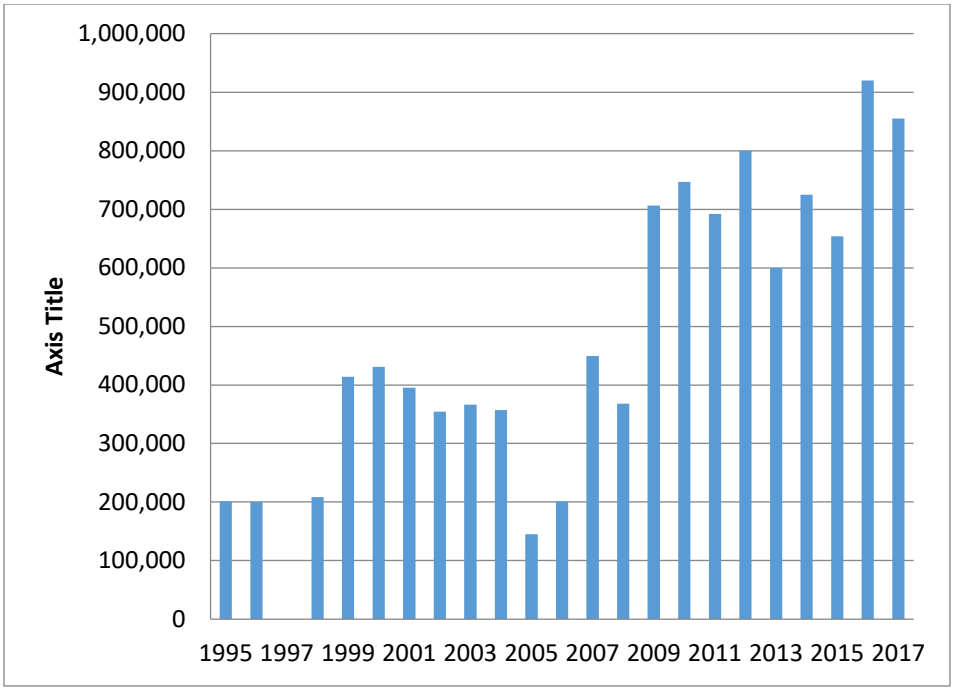


Figure 15.2: Coho Releases in Deep River

Table 15G /C: Commercial Coho Harvest in Deep River Select Area

Year	Coho Harvest
2010	19,260
2011	15,083
2012	3,932
2013	10,002
2014	27,255
2015	4,519
2016	6,162
2017	9,382
2010-2012 Average	12,758
2013-2017 Average	11,464

Additional economic information is included in Appendix Table 37A, Table 37B, Table 37C, and Table 37D.

Question 20

Question paraphrase: Were additional opportunities for the commercial fishery provided during the transition phase?

Policy citation: Additional opportunities for mainstem commercial fisheries in the transition period. (pg. 12)

Specific question: Were additional opportunities provided over the course of the Policy, and if not, why not?

Analysis: Staff was unable to conduct the analysis necessary to answer this question adequately. It is unclear to staff whether the large mesh gillnet fisheries upstream of the Lewis River that are directed at URB Chinook constitute the kind of "additional opportunity" meant by the Policy. This fishery is directed at harvestable wild Chinook that cannot be caught using other gears, and can be considered both as selective for exclusion of steelhead and non-selective for Chinook.

Question 21

Question paraphrase: Were additional opportunities for the commercial fishery provided during in the long term?

Policy citation: Additional opportunities for mainstem commercial fisheries in the long term. (pg. 12)

Specific question: Were additional opportunities provided over the course of the Policy, and if not, why not?

Analysis: Not analyzed in this document.

Question 37

Question paraphrase: What were the catches and economic expectations of the sport and commercial fisheries and were they achieved when compared to different run sizes?

Policy citation: (Adaptive Management). State-managed fisheries pursuant to this Policy will be adaptive and adjustments may be made to mainstem fisheries if policy objectives, including catch or economic expectations for commercial or recreational fisheries, are not achieved consistent with the principles of this plan. (pg. 20).

Specific question: What were the catch and economic expectations for commercial and recreational fisheries by year, and were they achieved when the results are adjusted or normalized for differences in run sizes?

Analysis: Staff was unable to conduct the analysis necessary to completely answer this question, but the tables and graphs in the Appendix provide some economic information. Most of the economic tables and graphs are included in this section in the Appendix. Generally, the

data presented is not normalized for differences in run sizes, meaning that increases or decreases in harvest may be more related to the salmon abundance than the Policy itself.

Table 37A /2C: Mainstem Sport Catch of Salmon and Steelhead by Season

Year	Spring	Summer		Fall-Mainstem			Fall-Buoy 10		Total
	Chinook	Chinook	Sockeye	Chinook	Coho	Steelhead	Chinook	Coho	
2010	29,247	2,539	218	17,326	1,584	6,034	6,807	7,980	71,735
2011	11,694	5,160	1,427	28,169	1,667	12,053	10,919	7,614	78,703
2012	13,332	2,897	3,948	22,438	884	5,618	18,550	7,385	75,052
2013	6,950	1,832	502	31,879	951	6,139	22,594	7,620	78,467
2014	15,728	1,980	938	26,336	5,761	6,375	26,788	57,744	141,650
2015	19,586	5,928	958	41,525	995	4,212	36,422	36,859	146,485
2016	12,666	3,080	744	25,133	1,317	1,862	17,780	9,181	71,763
2017	9,047	3,516	264	26,138	3,114	237	28,398	18,834	89,548
Average 2010-2012	18,091	3,532	1,864	22,644	1,378	7,902	12,092	7,660	75,163
Average 2013-2017	12,795	3,267	681	30,202	2,428	3,765	26,396	26,048	105,583

NOTE: Harvest does not reflect differences in run sizes each year.

Table 37B: Actual vs. Expected of Sport Catch

	Assumptions/Expected		
	2013-2016		2017+
Spring	17,701		18,442
Summer	2,604	3,142	3,772
Fall	33,800		33,800
Total	54105 - 54,643		56,014

	Actual Results					
	2013	2014	2015	2016	2017	Average
Spring	6,950	15,728	19,586	12,666	9,047	12,795
Summer	1,832	1,980	5,928	3,080	3,516	3,267
Fall	54,473	53,124	77,947	42,913	54,536	56,599
Total	63,255	70,832	103,461	58,659	67,099	72,661

	% Actual versus Expected					
	2013	2014	2015	2016	2017	Average 2013-2017
Spring	39%	89%	111%	72%	49%	72%
Summer	70%	76%	189%	98%	93%	105%
Fall	161%	157%	231%	127%	161%	167%

Table 37C: ODFW- Active vs. Exp for Sport Fisheries

Angler Trips	Expected Pre-Policy					
(<Bonn)	2013	2014	2015	2016	2017	Average
Spring	109,655	134,854	140,852	120,329		126,422
Summer	52,037	53,661	50,555	58,067		53,580
Fall	200,218	248,188	228,278	228,250		226,233
Angler Trips	Actual Results					
(<Bonn)	2013	2014	2015	2016	2017	Average
Spring	109,655	145,642	151,173	126,826	63,303	119,320
Summer	52,037	53,661	50,555	58,067	41,595	51,183
Fall	207,248	251,468	239,587	228,250	208,268	226,964
Angler Trips	Actual versus Expected Pre-Policy					
(<Bonn)	2013	2014	2015	2016	2017	Average 2013-2017
Spring	0	10,788	10,321	6,497		18,182
Summer	0	0	0	0		8,319
Fall	7,030	3,280	11,309	0		45,977
Angler Trips	% Gain in Angler Trips					
(<Bonn)	2013	2014	2015	2016	2017	Average 2013-2017
Spring	0%	8%	7%	5%		
Summer	0%	0%	0%	0%		
Fall	4%	1%	5%	0%		

Table 37D /2D: Mainstem Commercial Catch by Species[1]

Year	Spring Chinook	Summer Chinook	Fall Chinook	Coho	Total Salmon
2010	9,041	4,684	31,141	18,920	63,786
2011	4,539	5,010	51,419	13,482	74,450
2012	6,118	1,692	36,871	2,615	47,296
2013	2,213	1,868	84,906	9,766	98,753
2014	4,074	2,743	101,762	70,531	179,110
2015	7,231	3,944	84,238	4,479	99,892
2016	3,613	2,990	59,055	1,269	66,927
2017	-	-	19,398	931	20,329
Average 2010-2012	6,566	3,795	39,810	11,672	61,844
Average 2013-2017	3,426	2,309	69,872	17,395	93,002

[1] *Catch for all mainstem gears. Include adults and jacks.*

Table 37E: Summary of modeled current mainstem commercial fishery harvest (numbers of fish) compared to expected harvest for potential alternative fisheries by year and fishery, 2013-2021

Fishery	Stock	Status	Numbers of Fish (Modeled Values)					
			Current	Transition				Long-Term
				2013	2014	2015	2016	2017
Mainstem Gillnet	Spring Chinook	Existing	5,051	2,714	2,714	2,714	2,714	0
Mainstem Gillnet	Summer Chinook	Existing	2,831	2,264	2,264	1,698	1,698	0
Mainstem Gillnet (Zone 4-5)	Fall Chinook	Existing	37,990	23,080	23,080	23,080	23,080	0
Mainstem Gillnet (2S)	Fall Chinook	New	-	13,570	13,570	13,570	13,570	0
Mainstem Gillnet	Coho	Existing	25,881	22,099	22,099	22,099	21,375	0
Select Area Gillnet	Spring Chinook	Expanded	5,000	6,234	6,250	8,805	9,951	10,000
Select Area Gillnet	Fall Chinook	Expanded	18,528	18,528	18,528	19,173	19,953	20,028
Select Area Gillnet	Coho	Expanded	56,700	58,380	69,580	69,580	75,954	75,954
Mainstem (Gear to be Determined; Zone 4-5)	Fall Chinook	New?	0	0	0	0	0	23,080
Mainstem (Gear to be Determined; 2S)	Fall Chinook	New	0	0	0	0	0	13,570
Mainstem Seine	Lower River Hatchery Chinook	New	0	11,194	11,194	11,194	27,441	27,441
Mainstem Seine	Coho	New	0	6,010	6,010	6,010	14,374	14,374
Mainstem Tangle-net	Coho	New	0	20,160	20,160	20,160	20,160	20,160

Table 37E: Continued

Fishery	Stock	Status	Numbers of Fish (Actual Values)					
			Current	Transition				Long-Term
				2013	2014	2015	2016	2017
Mainstem Gillnet	Spring Chinook	Existing	5,051	937	1,624	2,881	1,316	0
Mainstem Gillnet	Summer Chinook	Existing	2,831	1,868	2,743	3,944	2,990	0
Mainstem Gillnet (Zone 4-5)	Fall Chinook	Existing	37,990	78,549	94,962	74,603	57,940	19,398
Mainstem Gillnet (2S)	Fall Chinook	New	-					
Mainstem Gillnet	Coho	Existing	25,881	569	2,018	2,255	0	0
Select Area Gillnet	Spring Chinook	Expanded	5,000	8,064	4,643	13,667	10,496	17,596
Select Area Gillnet	Fall Chinook	Expanded	18,528	25,537	25,487	18,149	12,697	12,058
Select Area Gillnet	Coho	Expanded	56,700	42,303	168,497	27,401	34,723	37,979
Mainstem (Gear to be Determined; Zone 4-5)	Fall Chinook	New?	0	0	0	0	0	0
Mainstem (Gear to be Determined; 2S)	Fall Chinook	New	0	0	0	0	0	0
Mainstem Seine	Lower River Hatchery Chinook	New	0	0	2,794	2,993	1,115	0
Mainstem Seine	Coho	New	0	0	1,070	587	604	0
Mainstem Tangle-net	Coho	New	0	4,831	18,234	993	0	0

Table 37E: Continued

Fishery	Stock	Status	Numbers of Fish (Actual vs Modeled Values)					
			Current	Transition				Long-Term
				2013	2014	2015	2016	2017
Mainstem Gillnet	Spring Chinook	Existing	5,051	(1,777)	(1,090)	167	(1,398)	0
Mainstem Gillnet	Summer Chinook	Existing	2,831	(396)	479	2,246	1,292	0
Mainstem Gillnet (Zone 4-5)	Fall Chinook	Existing	37,990	55,469	71,882	51,523	34,860	19,398
Mainstem Gillnet (2S)	Fall Chinook	New	-	(13,570)	(13,570)	(13,570)	(13,570)	0
Mainstem Gillnet	Coho	Existing	25,881	(21,530)	(20,081)	(19,844)	(21,375)	0
Select Area Gillnet	Spring Chinook	Expanded	5,000	1,830	(1,607)	4,862	545	7,596
Select Area Gillnet	Fall Chinook	Expanded	18,528	7,009	6,959	(1,024)	(7,256)	(7,970)
Select Area Gillnet	Coho	Expanded	56,700	(16,077)	98,917	(42,179)	(41,231)	(37,975)
Mainstem (Gear to be Determined; Zone 4-5)	Fall Chinook	New?	0	0	0	0	0	(23,080)
Mainstem (Gear to be Determined; 2S)	Fall Chinook	New	0	0	0	0	0	(13,570)
Mainstem Seine	Lower River Hatchery Chinook	New	0	(11,194)	(8,400)	(8,201)	(26,326)	(27,441)
Mainstem Seine	Coho	New	0	(6,010)	(4,940)	(5,423)	(13,770)	(14,374)
Mainstem Tangle-net	Coho	New	0	(15,329)	(1,926)	(19,167)	(20,160)	(20,160)

Table 37F: Modeled and Actual Price per Pound for Commercial Fisheries.

Fishery	Stock	Price Per Pound					
		Modeled	Actual				
			2013	2014	2015	2016	2017
Mainstem Gillnet	Spring Chinook	$5.42	$7.39	$6.67	$6.61	$8.65	--
Mainstem Gillnet	Summer Chinook	$3.08	$4.69	$3.85	$3.37	$5.55	--
Mainstem Gillnet (Zone 4-5)	Fall Chinook	$1.81	$2.18	$1.57	$2.03	$2.81	$2.90
Mainstem Gillnet	Coho	$1.32	$1.83	$1.28	$1.73	--	--
Select Area Gillnet	Spring Chinook	$5.23	$6.65	$5.39	$6.04	$7.15	$8.69
Select Area Gillnet	Fall Chinook	$2.28	$2.93	$2.15	$2.53	$3.25	$3.10
Select Area Gillnet	Coho	$1.38	$1.81	$1.13	$1.58	$1.64	$2.04
Mainstem Tangle-net	Coho	$1.32	$1.87	$1.20	$1.65	--	--

Table 37G. Relationship of Recreational Catch and Effort to Runsize (per 1,000) below Bonneville Dam.

Year	Spring Chinook		Summer Chinook		Fall Chinook		Coho	
	Catch/Run Size	Effort/Run Size	Catch/Run Size	Effort/Run Size	Catch/Run Size	Effort/Run Size	Catch/Run Size	Effort/Run Size
2010	62	397	35	977	37	254	17	112
2011	36	479	64	941	63	317	20	131
2012	45	431	50	1,385	78	369	48	427
2013	36	571	27	770	43	163	30	260
2014	50	467	25	686	46	217	57	105
2015	47	363	47	398	60	184	217	638
2016	46	460	34	638	67	355	45	463
2017	43	301	52	610	114	437	80	397
2010-2012 Average	48	436	50	1,101	59	313	29	223
2013-2017 Average	45	432	37	620	66	271	86	373

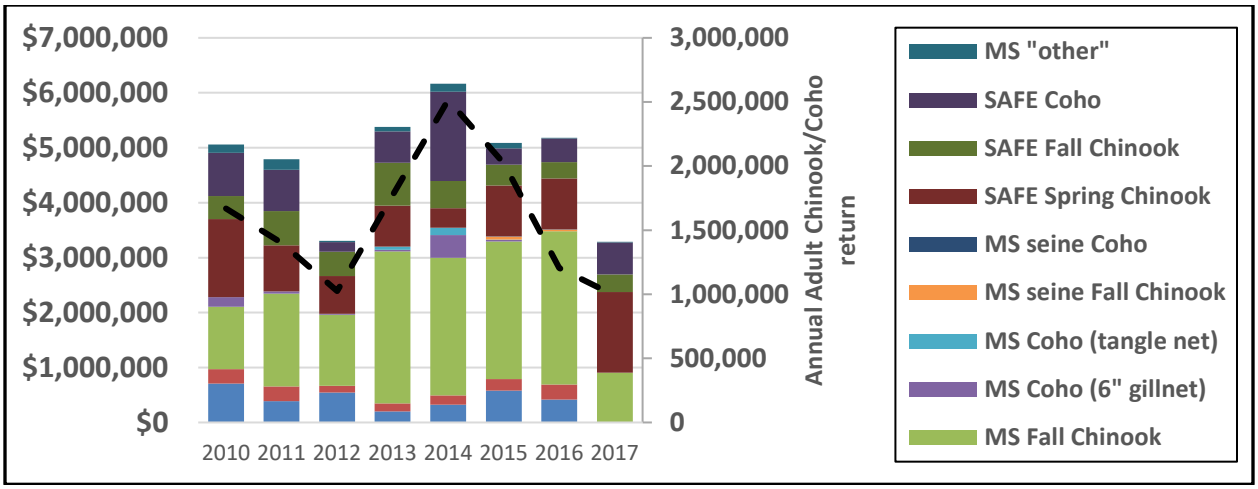


Figure 37.1: Annual ex-vessel value of non-Indian mainstem (MS) and Select Area (SAFE) commercial salmon fisheries in the lower Columbia River compared to total adult Chinook and Coho returns, 2010-2017

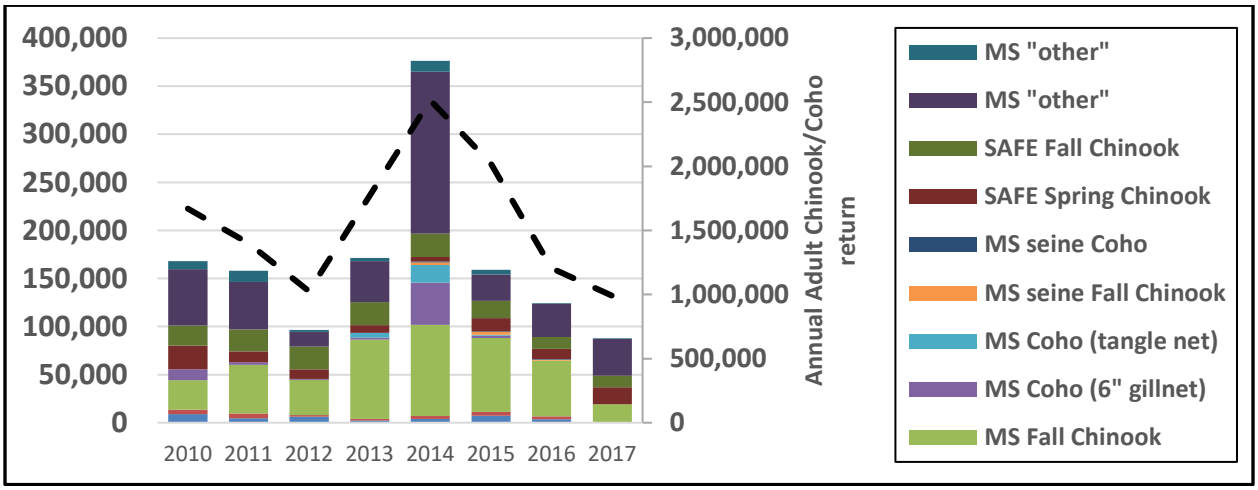


Figure 37.2: Number of salmon landed in non-treaty commercial mainstem (MS) and Select Area (SAFE) fisheries in the lower Columbia River, and annual adult salmon returns, 2010-2017

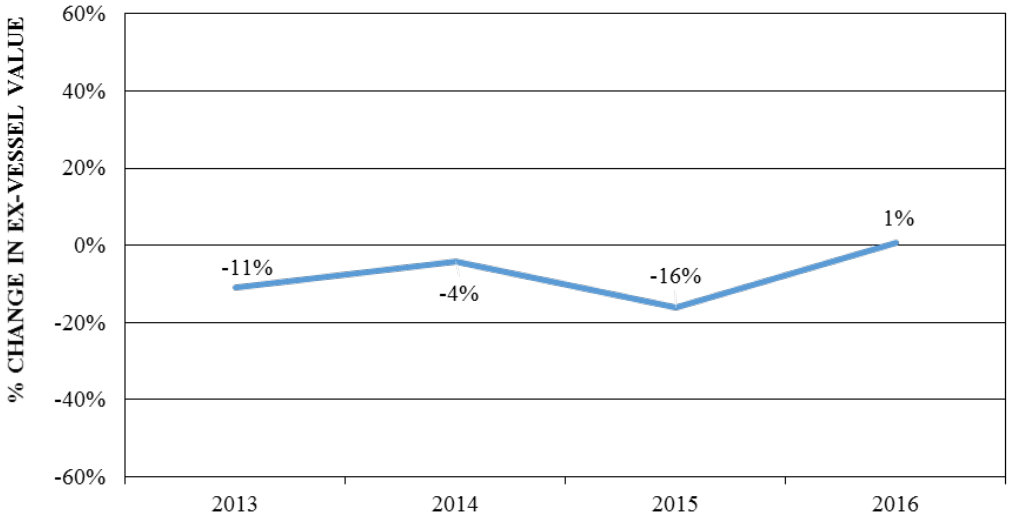


Figure 37.3: Comparison of percent difference in actual ex-vessel values during the transition period (2013-16)

This was Figure 10 from Oregon Department of Fish and Wildlife's Exhibit Agenda Item Summary Updated 1-12-17.

Table 37K /E: Summary of gains in fishing days and angler-trips due to allocation changes for lower Columbia River recreational Chinook fisheries, by year and season, 2013-16

			2013	2014	2015	2016
Spring		Fishing Days Gained	0	5	2	1
		Angler-Trips Gained	0	10,788	10,321	6,497
Summer		Fishing Days Gained	0	0	0	0
		Angler-Trips Gained	0	0	0	0
Fall	Buoy 10	Non-MSF Days Gained	5	6	2	0
		Angler-Trips Gained	4,560	1,015	907	0
	Below Lewis River	Non-MSF Days Gained	3	6	5	0
		Angler-Trips Gained	2,470	2,265	10,402	0
	Fall Total	Non-MSF Days Gained	8	12	7	0
		Angler-Trips Gained	7,030	3,280	11,309	0
All Seasons Total		Fishing Days Gained	8	17	9	1
		Angler-Trips Gained	7,030	14,068	21,630	6,497

The above table was Table 22 from Oregon Department of Fish and Wildlife's Exhibit Agenda Item Summary Updated 1-12-17.

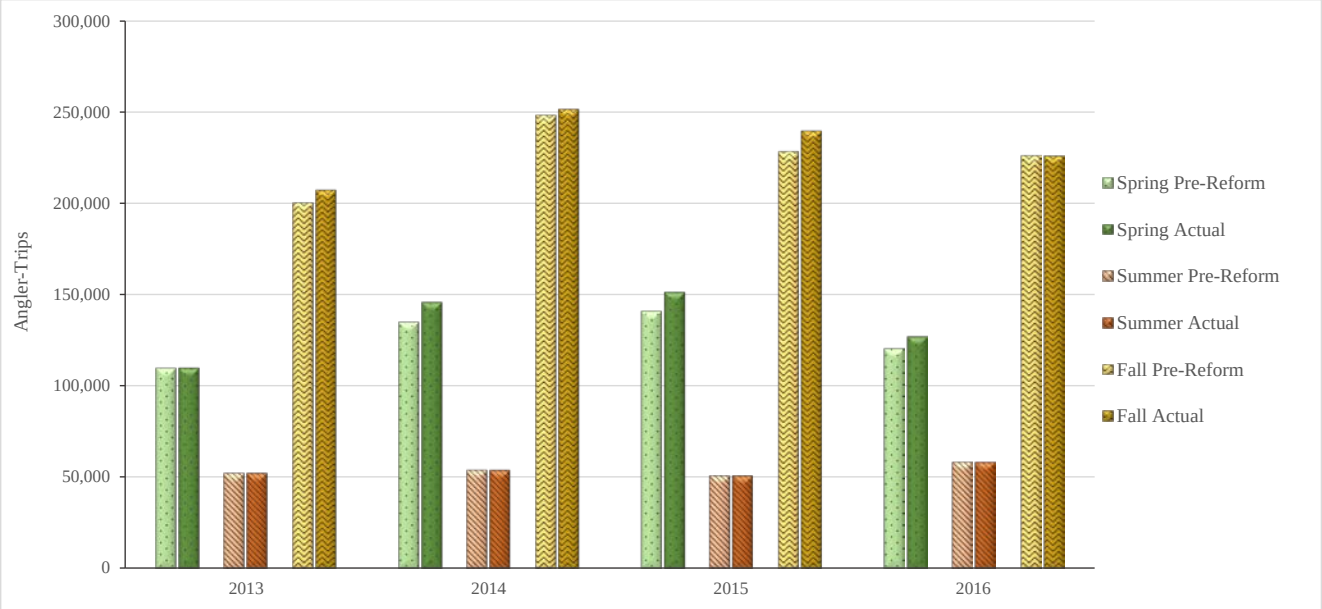


Figure 37.4: Changes in seasonal angler effort due to Harvest Reform-related allocation increases for the 2013-16 lower Columbia recreational fisheries

This was Figure 6 from Oregon Department of Fish and Wildlife's Exhibit Agenda Item Summary Updated 1-12-17.

Question 38

Question paraphrase: If the catches and economic expectations were not achieved what was done to determine why and were corrections made?

Policy citation: If these (catch and economic) expectations are not achieved, efforts will be made to determine why and to identify actions necessary to correct course. (pg. 20)

Specific question: Were there instances of this happening? If so, describe when and what efforts were made.

Analysis: Staff was unable to conduct the analysis necessary to answer this question.

Question 39

Question paraphrase: Did any of the expectations regarding catch, economics, off-channel limitations, legal/financial issue, conservation objectives or other circumstances occur that would require the Department to reconsider the fishery management strategy of the Policy and if so what changes occurred?

Policy citation: Reconsideration of state-managed mainstem fisheries may take place under the following circumstances: (pg. 20)

1. Lower than anticipated catch and economic expectations to the commercial salmon fishing industry, or
2. Insufficient space within off-channel sites to accommodate the commercial fleet, or
3. Biological, fiscal and/or legal circumstances that delay or preclude implementation of alternative selective gear, buyback of commercial fishing permits, and/or additional off-channel hatchery investments, or
4. Management objectives are not achieved for commercial or recreational fisheries, or
5. Conflicts with terms of U.S. v Oregon management agreements with Columbia River Tribes, or
6. Failure to meet conservation objectives.

Specific question: Did any of the circumstances above occur, were fisheries reconsidered in a regulatory forum, and what changes were adopted?

Analysis: Staff was unable to conduct the full analysis necessary to answer this question. Adaptive management provisions were used in most of the years under review primarily in reference to mainstem commercial fisheries in the spring season. Appendix A in the Policy for spring Chinook shows tangle nets may be used in the mainstem during 2014-2016. However, under the adaptive management provision, gill nets were allowed for the May fisheries when the catch of shad in tangle nets becomes an obstacle to using those nets.

Comprehensive Review of the Columbia River Basin Salmon Management Policy C-3620
2013-2017
ALT GEAR

QUESTIONS: 10, 11, 12, 13, 14, 19, and 33

Question 10

Question paraphrase: Have gill nets been phased out of the mainstem? Did a thorough evaluation occur?

Policy citation: Subject to the adaptive management provisions of this Policy, and after thorough evaluation, seek to phase out the use of non-selective gill nets (pg. 10)

Specific question: *Did this evaluation occur? If so, attach in the submission for the March 2018 Commission meeting; if not, what has stalled this evaluation?*

Analysis: The phase out of gillnet gear for fall Chinook fisheries directed at healthy and harvestable URBs has been constrained by the lack of suitable gear alternatives. This issue was the subject of substantial analysis and Commission review in 2016/2017, and resulted in a Commission decision to modify the Policy to support an additional two years (2017-2018) of large mesh gillnet mainstem fisheries directed at URB fall Chinook.

Supplemental Staff Analysis

Purse seines and other small mesh gears have high encounter rates for steelhead, so even though the long-term mortality rate for steelhead released from these gears is low, the high encounter rates result in allowable steelhead mortalities being exceeded while substantial numbers of harvestable URBs remain. In contrast, the very low encounter rate of wild steelhead in large mesh gillnets, even though it is coupled with a higher long-term mortality rate, supports considerably more URB commercial harvest opportunity. In the last three years, the only alternative to scheduling large mesh gillnet fisheries above the Lewis River for harvest of URBs is to forego a large part of the nontreaty share of URBs. Recreational harvesters would not be able to make up for enough of the foregone harvest, thereby compromising the objective of maintaining and enhancing the economic well-being and stability of the commercial fishing industry.

The Commission only supported use of large mesh gillnets in the mainstem for URB harvest through 2018. Despite ongoing efforts there still are not any viable alternatives to large mesh gillnet that will be ready by 2019. The Commission will likely need to revisit this aspect of the Policy prior to 2019 pre-season planning.

Question 11

Question paraphrase: What is the definition of non-selective gill nets?

Policy citation: Seek to phase out the use of non-selective gill nets. (pg. 10)

Specific question: *In the development and implementation of this Policy, what was the working definition of non-selective given the selectivity differences between large mesh gillnets used in the fall Zone 4 and 5 fisheries and the smaller mesh gillnets that have been used for coho or sockeye salmon? If non-selectivity between hatchery and wild salmon of the same size is the concept of this provision, what is the purpose of the "non-selective" adjective?*

Analysis: Non-selective gill nets were not specifically defined in the Policy. Guiding Principle 8 of the Policy states: "subject to the adaptive management provisions of this Policy, and after thorough evaluation, seek to phase out the use of non-selective gill nets in non-tribal fisheries in the mainstem Columbia River, and transition gillnet use to off-channel areas." This guiding principle was developed through the bi-state Columbia River Fishery Management Workshop.

Supplemental Staff Analysis

The Policy elaborates on this guiding principle in subsequent sections and staff have generally relied upon the greater specificity of these latter sections in the application of the Policy. This resulted in an interpretation of "non-selective gill nets" as gill nets that target salmon of the size appropriate for gilling salmon. Generally, salmon gill nets are 8-inch minimum mesh for Chinook and 6-inch mesh for coho. The current fall commercial fishery occurring in Zones 4-5 uses a 9-inch minimum mesh net and, by this interpretation, is a non-selective fishery for hatchery and wild Chinook salmon and a selective fishery providing protection for steelhead because most of the steelhead pass through the large mesh and are not caught. This fishery is also considered a selective fishery for specific stocks of fall Chinook in that most of the lower river stocks have turned into the tributaries before reaching the Zone 4-5 fishing area. This is the reason that both commercial and sport fisheries have recently been focused in this area of the Columbia River, to protect ESA-listed lower river fall Chinook stocks.

Staff have provided a supplemental document titled "Description of Selective Fisheries" that presents descriptions of selective fisheries and explains differences in selectivity in fisheries.

Question 12

Question paraphrase: What alternative gears have been developed and what were the performance characteristics?

Policy citation: In a manner consistent with the Department's licensing authorities, develop… alternative selective-fishing gear and techniques for commercial mainstem fisheries. (pg. 10)

Specific question: *What alternative gears have been developed over the course of the Policy and what are their performance characteristics compared to selective-fishing gear and techniques used prior to the Policy?*

Additional commissioner question: In Table J of the appendix, related to the development of alternative gear types, the final column is titled "Chance of Success." Can you footnote the factors that you considered in coming to the ranking? In particular, I was surprised by the "high" ranking of the fall fishery beach seine. Isn't it possible that steelhead encounters would be unacceptably high for this gear?

Analysis: Numerous alternative gears have been tested to measure and evaluate the feasibility of providing sufficient catch and the ability to release non-targeted fish unharmed. Table Q12.A shows types of gears tested with initial assessment of potential success based upon perceived catch rates, gear cost and mortality rates. Table Q12.A compares the fishery type with an assessment of each major metric. The high success rate shown in the table for beach seines in the fall were likely based on the high catch rates, good fish condition and moderate cost. Most of the testing and evaluations of have focused on seines and tangle nets.

Beginning in 2016, the Wild Fish Conservancy (WFC) has worked with a Columbia River commercial fisher to install and test a pound net at a traditional pound net site in the lower Columbia, under a Scientific Collectors Permit issued by WDFW. The initial results, reported to the Commission in fall 2017, appear promising in terms of Chinook and coho catch rates, as well as short-term mortality of steelhead and unmarked Chinook and coho, however; the long-term mortality rates for this gear has yet to be established. The WFC staff are continuing to analyze their data, and will submit them to a peer review process.

For 2018, WDFW and the WFC are in the planning process to transition the pound net operation to a test-fishing mode, to provide additional information on the commercial viability of this tool for fall fisheries. If that is not successful, WFC will operate the pound net under the terms of a Scientific Collectors Permit. The pound net concept is still in feasibility testing, and is several years away from implementation assuming that the feasibility tests are successful.

Table Q12.A: Comparison of fishery type with an assessment of each major metric

Gear	Pre/Post 2013 Policy	Catch Rates	Bycatch	Released Fish Condition	Gear Investment Cost	Chance of Success
Merwin Trap	Pre	Low	Low	Moderate	High	Low
Tangle Net	Post	Low	Low	Fair	Low	High
Purse Seine – Summer	Post	Moderate	High	Good	High	Low
Beach Seine – Summer	Post	Low	High	Good	Moderate	Low
Purse Seine - Fall	Both	High	Moderate	Good	High	High
Beach Seine - Fall	Both	High	High	Good	Moderate	High
Purse Seine – Shad	Post	High	Moderate	Good	High	High
Pound Net – Fall	Post	Moderate	High	Good	High	Moderate

Supplemental Staff Analysis
The analysis of gear success was conducted several years ago. Currently, the beach and purse seines have a low chance of success as a complete replacement gear in the commercial fishery because of the high bycatch of steelhead, the high release mortality rate for Chinook and the low mark rates (adipose fin-clip rates) for Chinook.

Question 13

Question paraphrase: What alternative gears have been implemented into permanent rules?

Policy citation: In a manner consistent with the Department's licensing authorities …Implement alternative selective-fishing gear and techniques for commercial mainstem fisheries. (pg. 10)

Specific question: *What alternative gears/techniques have been implemented (into "permanent" allowable regulation) over the course of the Policy?*

Analysis: Tangle nets are not specifically defined in permanent rule but are written into the Washington Administrative Code (WAC) language for emergency rules. The rules associated with tangle nets are clearly defined and are written the same each year.

Seine fisheries have operated under the "emerging commercial fishery rule" in the Columbia River as described in RCW 77.70.180. Purse seines are a legal gear in Washington and are codified in WAC 220.350.120. Drag seines (beach seines) are under WAC 220.350.040. Seines would have to be authorized for use in the Columbia River through a change to RCW 77.50.030.

See response to Question 19 for a more comprehensive evaluation of the development of alternative gear fisheries.

Question 14

Question paraphrase: What incentives have been provided to commercial fishers to implement alternative gears?

Policy citation: Provide incentives to commercial fishers to develop and implement these gear and techniques. (pg. 10)

Specific question: *What incentives have been provided to commercial fishing license holders over the course of the Policy?*

Analysis: To date, the Department has invested over $8 million in the development of alternative selective fishing gear, including substantial grants and contracts with commercial fishers to develop, deploy and test gear, some of which has supported individual acquisition of alternative gears. In addition, on occasion fishing periods and locations have been open for alternative gear and not open to the gillnet fishery.

Question 19

Question paraphrase: What has occurred regarding alternative gear funding, development, testing and implementation?

Policy citation: Development and Implementation of Alternative Selective Gear: The Department will investigate and promote the funding, development, testing, and implementation of alternative selective gear. Work with Oregon to develop incentives for those commercial fishers who agree to use these gear and techniques. (pg. 11)

Specific question: *What has been done over the course of the Policy with regard to this paragraph?*

Analysis:

Funding

- NMFS provided $1.9 million during the initial phase of testing alternative gear in 2009 to WDFW.

Development

- Thirteen combinations of alternative commercial fishing gears and seasons were evaluated during 2009- 2016 to determine feasibility for implementation in live-capture mark-selective fisheries (MSF) in the mainstem Columbia River between WDFW and ODFW.
- Alternative gears evaluated on:
    - Catch rate and mark rate of target species.
    - Handle of non-target species and condition at release.
    - Economic and social/regulatory considerations for fishery implementation
- Gears with high catch rates for target species (e.g. fall purse and beach seines; late spring purse and beach seines targeting American Shad) were considered to have a better chance for implementation, even though ratings in other categories such as non-target fish handle and economic issues were not as favorable. Fall purse and beach seines were implemented in limited entry fisheries during 2014-2016. ODFW also issued an experimental gear permit for a purse seiner to harvest shad in 2016.

Testing

- Post-release mortality studies were conducted for the three alternative gear types with the most promising prospects for fisheries implementation: fall purse seine, fall beach seine, and Coho tangle net.
- WDFW conducted a post-release mortality study for fall Chinook, Coho, and steelhead caught in Zone 5 by purse and beach seines during 2011-2013.
- ODFW conducted a post-release mortality study for Coho salmon captured in tangle nets during 2013- 2015.

- ODFW conducted a stock composition study during 2015 using DNA samples and CWTs obtained from Chinook caught by purse seines, beach seines, and gill nets in Zone 5.
- In autumn 2017, WDFW implemented a control-treatment holding study to estimate short-term survival of Chinook and Coho salmon captured by purse seines.

Implementation

- Utilized "emerging commercial fishery rule" in the Columbia River as described in RCW 77.70.180 and scientific collection permits to test and implement fisheries.
- Fall commercial seine fisheries were conducted in the lower Columbia River in 2014 through 2016. The seine fishery was mark-selective for fin-clipped hatchery Chinook and Coho salmon, and was conducted on a limited entry basis, with individual fisher quotas (IFQ) assigned to each permit holder (Table Q19.A).
- Full implementation of alternative gear has not occurred

Incentives – see answer to Question 14.

Table Q19.A: Seine fishery ex-vessel value for fall Chinook

Year	Gear	Days Fished	Permits Fished	Deliveries	Chinook Landed	Mark Rate	Avg. Wt(lb)	Avg. $/lb	Avg. Value/Fish	Total Ex-Vessel
2014	Beach	12	6	20	1,337	44%	13.1	$1.52	$19.93	$26,647
	Purse	15	4	19	1,457	33%	13.5	$1.47	$19.74	$28,760
	Total	27	10	39	2,794	38%	13.3	$1.49	$19.83	$55,407
2015	Beach	6	3	6	681	64%	10.9	$1.39	$15.21	$10,360
	Purse	14	4	19	2,312	38%	10.4	$1.71	$17.77	$41,075
	Total	20	7	25	2,993	41%	10.5	$1.63	$17.18	$51,434
2014-15	Avg.	24	9	32	2,894	39%	11.9	$1.56	$18.51	$54,420

Supplemental Staff Analysis

WDFW conducted a post-release mortality study for fall Chinook, Coho, and steelhead caught in commercial fishing Zone 5 by purse and beach seines during 2011-2013.

- Steelhead survival estimates derived from a Ricker-Two-Release (RTR) study design were high (range 95-99%), and presumed to be valid.
- Intermediate-term survival estimates for fall Chinook were also high (range 95-100%), and also presumed to be valid, however; short-term survival estimates for Chinook and Coho using the RTR method may have been confounded by differential migratory behavior of treatment and control fish. Therefore, a radio-telemetry study was conducted for these species in 2013 to determine migratory behavior of treatment fish, and produce an alternative short-term survival estimate.
- Radio-telemetry results suggested that cumulative survival (short-term + intermediate) was high for fall Chinook (range 92-95%), however; a key assumption in this finding: that a relatively high proportion of surviving Chinook originated from areas downstream of Zone 5, conflicted with long-term coded wire tag (CWT) data collected from commercial gillnet fisheries in Zone 5.

- Violation of study assumptions (in both RTR and radio-telemetry methods) precluded valid post-release mortality estimates for Coho salmon.
- TAC modified the Chinook and Coho mortality rates to take into account historical CWT data. Chinook mortality rates currently used for seine fisheries are 33% for beach seines and 21% for purse seines. Coho mortality rates are 38% for beach seines and 29% for purse seines.

To determine whether the key assumption in the radio-telemetry based seine survival estimate for fall Chinook was valid, ODFW conducted a stock composition study during 2015 using DNA samples and CWTs obtained from Chinook caught by purse seines, beach seines, and gill nets in Zone 5.

- Stock composition results for Chinook caught in Zone 5 showed that both DNA and CWT analyses indicated very few ($\leq$ 3%) of the seine-caught Chinook had origins below Zone 5.
- There was not a significant difference in stock composition between Chinook caught in purse seines, beach seines, and gill nets ($p > 0.05$).
- Results from the 2015 stock composition study were consistent with long-term CWT data from Zone 5 commercial gillnet fisheries, but did not support assumptions from the 2013 seine mortality study.

In autumn 2017, WDFW implemented a control-treatment holding study to estimate short-term survival of Chinook and Coho salmon captured by purse seines.

- Our follow-up study utilized holding tanks to monitor short-term mortality rates over 48 hours during 2017 (Figure Q19.1).
- The purse seine fishery and Bonneville Dam provided the treatment and control groups, respectively, to assess short-term mortality over 48 hours and measure recapture probability at dams.
- Short-term mortality rates appear to be lower for Chinook than Holowatz (2014), but similar for steelhead when compared with Rawding et al. 2016.
- Survival rates are likely higher than what would occur in actual fisheries due to low catches. The study occurred after the peak of the run when the river begins to cool and study was conducted further upstream (Zone 5) of seine fisheries (Zone 1-3).

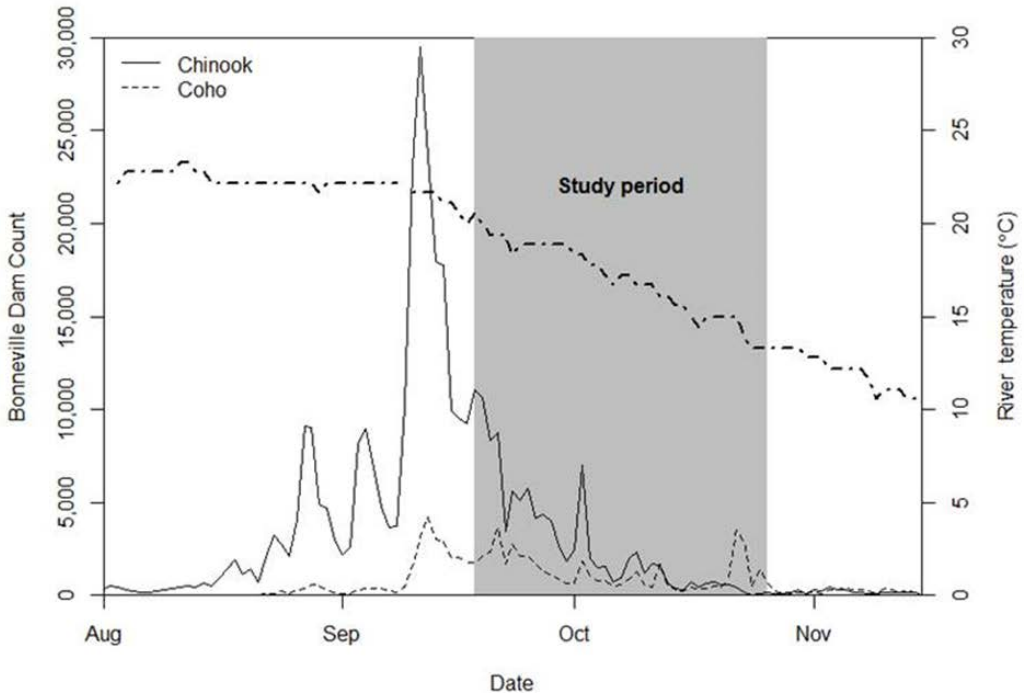


Figure Q19.1: Purse seine study (2017) timeline to assess short-term mortality rates

ODFW conducted a post-release mortality study for Coho salmon captured in tangle nets during 2013- 15.

- The 2013-2014 study used the Ricker-Two-Release (RTR) method, similar to the seine mortality study. The same issues were encountered with mortality estimates likely confounded by differential migratory behavior of treatment and control fish.
- In 2015, the study design was changed to net-pen holding, with all Coho treatment groups held for at least two days (short-term holding), and a subset of treatment groups held for an additional six days (long-term holding).
- Short and long-term holding tests resulted in mortality rate estimates of 7.5% and 4.9%, respectively.
- The cumulative mortality estimate for Coho tangle nets was 22.3% (including an immediate mortality rate of 11.6% from the 2013-2015 Coho tangle net fisheries).
- ODFW repeated the net-pen holding study in 2016.

Table Q19.B: Seine fishery ex-vessel value for coho

Year	Gear	Days Fished	Permits	Deliveries	Coho Landed	Mark Rate	Avg. Wt(lb	Avg. $/lb	Avg. Value/F	Total Ex-Vessel
2014	Beac	12	6	20	509	35%	7.8	$1.22	$9.56	$4,864
	Purs	15	4	19	561	29%	7.7	$1.09	$8.43	$4,729
	Total	27	10	39	1,070	32%	7.8	$1.15	$8.96	$9,593
2015	Beac	6	3	6	58	32%	6.8	$1.50	$10.19	$591
	Purs	14	4	19	529	46%	5.7	$1.52	$8.74	$4,624
	Total	20	7	25	587	44%	5.8	$1.52	$8.88	$5,215

2014-	Avg.	24	9	32	829	38%	6.8	$1.34	$8.92	$7,404

1 Includes adults and jacks.

The above table was Table 9 from Oregon Department of Fish and Wildlife's Exhibit Agenda Item Summary Updated 1-12-17

Table Q19.C: Coho tangle net fishery ex-vessel value

Year	Days Fished	Deliveries	Coho Landed [1]	Mark Rate	Avg. Wt (lb)	Avg. $/lb	Avg. Value/Fish	Total Ex-Vessel Value
2013	8	174	4,831	77%	6.1	$1.87	$11.44	$55,251
2014	9	242	18,234	83%	6.3	$1.20	$7.54	$137,556
2015	3	102	993	67%	5.7	$1.65	$9.36	$9,299
Avg.	7	173	8,019	76%	6	$1.57	$9.45	$67,369

The above table was Table 14 from Oregon Department of Fish and Wildlife's Exhibit Agenda Item Summary Updated 1-12-17.

References

Holowatz, J., M. Zimmerman, A. Stephenson, D. Rawding, K. Ryding, E. Kinne. 2014. Lower Columbia River alternative commercial fishing gear mortality study: 2011 and 2012. Washington Department of Fish and Wildlife, Olympia, WA.

Rawding, D, A. Stephenson, J. Holowatz, B. Warren, M. Zimmerman. 2016. Survival of summer steelhead caught and released from an experimental seine fishery in the lower Columbia River. Washington Dept of Fish and Wildlife, Olympia, WA.

Comprehensive Review of the Columbia River Basin Salmon Management Policy C-3620
2013-2017
ALLOCATION

QUESTIONS: 30, 31, 32, 33, 34, 35, and 36

Question 30

Question paraphrase: What was the actual allocation sharing of spring Chinook between sport and commercial fisheries and how did it compare to the Policy?

Policy citation: The presumptive path for the management of spring Chinook salmon fisheries is summarized in Appendix Table A (pg. 14)

Specific question: *In comparison to the values in Appendix A, what were the actual impact sharing values beginning in 2013, and what was the actual commercial fishing gear usage in the years involved?*

Analysis: Policy Appendix Table A refers to allocation of ESA impacts to the various fisheries. With spring Chinook management, the Catch Balance provision in the *U.S. v Oregon* Management Agreement are usually more constraining than ESA impacts and this results in ESA impacts not being achieved. Catch Balance shares were 88% for sport fisheries and 95% for commercial fisheries (Table 30A).

Table 30A: Spring Chinook Catch Balance Shares

	Mainstem Gear Used	SAFE Gear Used	Comm Catch Balance		% Comm Catch Balance Used	Sport Catch Balance Used	Sport Catch Balance Allowed	% Sport Catch Balance Used
			Used	Allowed				
2013	TN/GN	GN	1,757	2,624	67%	6,330	7,593	83%
2014	TN/GN	GN	3,621	4,911	74%	17,349	19,347	90%
2015	TN/GN	GN	6,528	6,376	102%	19,381	24,836	78%
2016	TN/GN	GN	3,285	3,335	99%	13,043	13,756	95%
2017	No Season	GN	463	347	133%	7,316	7,760	94%
Average					95%			88%

Question 31

Question paraphrase: Did the spring Chinook management buffer keep the non-treaty fisheries from exceeding the ESA guidelines?

Policy citation: Fishery Management Buffer (spring Chinook) (pg. 14)

Specific question: *Did the management buffer approach work over the course of the Policy, or were ESA impacts exceeded since 2012?*

Analysis: Yes, the management buffer was effective in maintaining non-Indian ESA impacts within the overall non-Indian guidelines. Non-Indian ESA impact rates were not exceeded during 2013-2015 and averaged 87% of the total during that period (Table 31A).

Table 31A: Comparison of Upriver Spring Chinook Impacts Used Versus Allowed.

	Total Impacts Used	Total ESA Impacts Allowed	% of Total Impacts Used
2013	1.40%	1.70%	82%
2014	1.66%	2.00%	83%
2015	1.91%	2.20%	87%
2016	1.70%	1.90%	89%
2017	1.40%	1.50%	93%
Average	1.61%	1.86%	87%

Question 32

Question paraphrase: What was the actual allocation sharing of spring Chinook within the sport fishery and how did it compare to the Policy?

Policy citation: The Department will provide to the Commission each year a briefing on the effectiveness of fishery management actions in meeting spring Chinook recreational fishery allocation objectives throughout the Columbia River basin. The Commission may consider changes to the recreational allocation in this Policy in the future to balance recreational fishery objectives in the areas below Bonneville Dam, above Bonneville Dam, and in the Snake River. (pg. 15)

Specific question: *Was this accomplished with the agenda item presented by Bill Tweit at the September Commission meeting in Port Angeles?*

Analysis: The Commission has not changed guidance on upriver/downriver recreational allocation. They did receive a briefing on several aspects of the allocation in September 2017. Following that briefing, and in preparation for meetings with stakeholders in eastern WA who have expressed concerns about the allocation and about management performance, staff have continued to work on this issue. Preliminary results are that achieving this has been problematic (Table 32A), but a full analysis must examine whether the opportunity to harvest 25% was precluded. And if so, what factors were responsible. In 2017, an in-season reduction in the run size resulted in little real fishing opportunity upstream of Bonneville Dam, ven though the final run size was close to the forecast. This was an unusual circumstance; other factors

have had more influence on harvest management decisions in other years under the Policy. Summaries by year are included in the **Additional Reference Materials**.

Table 32A: Sport Allocation of Upriver spring Chinook Between Geographic Areas

	Below Bonneville				Bonneville to WA/OR				Upper Columbia/Snake			
	Preseason Allowed	Postseason Allowed	Actual Harvest	% of Allowed	Preseason Allowed	Postseason Allowed	Actual Harvest	% of Allowed	Preseason Allowed	Postseason Allowed	Actual Harvest	% of Allowed
2013	7,829	6,168	5,343	87%	1,044	822	613	75%	575	603	374	62%
2014	14,717	15,682	13,572	87%	1,962	2,091	2,231	107%	1,414	1,574	1,546	98%
2015	14,960	19,316	15,689	81%	1,995	2,615	1,696	65%	1,613	2,904	1,996	69%
2016	10,877	10,767	10,167	94%	1,450	1,436	1,480	103%	1,493	1,561	1,397	89%
2017	11,089	6,334	7,198	114%	1,479	845	18	2%	1,419	582	101	17%
Avg.				92%				70%				67%

Summaries by year are included in the Additional Reference Materials.

Question 33

Question paraphrase: What was the actual allocation sharing of summer Chinook between sport and commercial fisheries and how did it compare to the Policy? What were the results of testing alternative gears?

Policy citation: The presumptive path for the management of summer Chinook salmon fisheries is summarized in Appendix Table B (pg. 15)

Specific question: *In comparison to the values in Appendix B, what were the actual impact sharing values beginning in 2013? Were alternative gears tested and if so, what were the results in comparison to the gill net fishery option?*

Analysis: Staff was unable to conduct the analysis necessary to answer this question. Some information is provided in Table 33A (summer Chinook harvest sharing between sport and commercial fisheries). Sport fisheries averaged 82% of their allocation and commercial averaged 84% of their allocation.

Table 33A : Summer Chinook Harvest Sharing

	Commercial			
	Preseason Allowed	Postseason Allowed	Actual Harvest	% of Allowed
2013	2,585	2,145	1,954	91%
2014	1,893	2,601	2,790	107%
2015	1,646	4,068	3,938	97%
2016	2,633	2,513	3,050	121%
2017	781	949	47	5%
Average				84%

Table 33A continued: Summer Chinook Harvest Sharing

	Below Priest Rapids Sport			
	Preseason Allowed	Postseason Allowed	Actual Harvest	% of Allowed
2013	3,160	2,621	2,068	79%
2014	2,840	3,901	2,944	75%
2015	3,842	9,492	6,938	73%
2016	6,142	5,864	4,271	73%
2017	3,125	3,797	4,115	108%
Average	613	811	436	82%

See Question 12 for more information on alternative gears tested during the summer Chinook fisheries as they pertain to ESA-impacts on Snake River sockeye. No alternative gear fisheries were implemented for summer Chinook. Annual harvest sharing tables can be found in the **Additional Reference Materials**.

Question 34

Question paraphrase: What was the actual allocation sharing of summer Chinook above and below Priest Rapids Dam and how did it compare to the Policy?

Policy citation: Percent of non-treaty allocation assigned to fisheries above Priest Rapids Dam (summer Chinook) (pg. 16)

Specific question: *How do these allocation targets compare to actual values for the years in question?*

Analysis: During 2013-2017, fisheries below Priest Rapids Dam averaged 92% of their allocation. The fisheries above Priest Rapids Dam averaged 63% of their allocation (Table 34A). Staff was unable to conduct the analysis necessary to answer this question. The tables in this review do not fully answer the question. An in-depth analysis of the performance at meeting recreational allocation objectives requires an examination of whether or not the opportunity to harvest the allocation was provided. Harvest alone is not the best measure of achieving recreational allocation objectives, as sufficient fish may have been present and other factors such as water condition or lack of effort may have reduced harvest. Fisheries below Priest Rapids Dam include sport and commercial. Those above Priest Rapids Dam include sport, Wanapum tribal and Colville tribal fisheries. Annual haravest sharing tables can be found in the **Additional Reference Materials**.

Table 34A: Summer Chinook Harvest Sharing Above and Below Priest Rapids Dam

	Below Priest Rapids Dam			
	Preseason Allowed	Postseason Allowed	Actual Harvest	% of Allowed
2013	10,005	8,684	7,940	91%
2014	8,733	11,142	10,374	93%
2015	10,488	22,251	19,567	88%
2016	15,275	14,720	13,661	93%
2017	8,406	9,246	8,662	94%
Average				92%

Table 34A continued: Summer Chinook Harvest Sharing Above and Below Priest Rapids Dam

	Above Priest Rapids Dam			
	Preseason Allowed	Postseason Allowed	Actual Harvest	% of Allowed
2013	10,906	9,884	6,355	64%
2014	9,830	12,882	6,647	52%
2015	10,512	20,340	15,517	76%
2016	13,900	13,553	7,973	59%
2017	8,694	9,768	6,061	62%
Average				63%

Question 35

Question paraphrase: What was the actual allocation sharing below Priest Rapids Dam and how did it compare to the Policy?

Policy citation: Nontreaty Sharing Below Priest Rapids Dam (summer Chinook) (pg. 16)

Specific question: *How do the allocation targets in this section compare to actual values for the years in question?*

Analysis: See response to Question #34 above. Staff was unable to conduct the analysis necessary to answer this question. The tables in this review do not fully answer the question. Annual harvest sharing tables can be found in the **Additional Reference Materials**.

Question 36

Question paraphrase: What was the actual allocation sharing of sockeye, fall Chinook and coho between sport and commercial fisheries and how did it compare to the Policy?

Policy citation: Sockeye, Fall Chinook and Coho Salmon (pg. 17)

Specific question: *For each of the species sections remaining in the report, the retrospective analysis/evaluation should be done in a similar manner as to the questions posed in this document for spring and summer Chinook. In comparison to the values on page 10, what were the actual impact sharing values beginning in 2013 (**for sockeye salmon**)?*

Analysis: Sockeye sport fisheries in the lower Columbia (below Priest Rapids Dam) occur at a lower level than in the upper Columbia and are mostly caught incidentally to Chinook or steelhead fisheries. During 2013-2017, sport fisheries used 36% of their allocation and commercial fisheries used 23% of their allocation (Table 36A).

Table 36A: Sockeye Allocation

	Comm impacts used	Comm impact allocation	Comm Share Allocated	% Comm Share Used	Sport impacts used	Sport impact allocation	Sport Share Allocated	% Sport Share Used
2013	0.08%	0.30%	30%	27%	0.31%	0.70%	70%	44%
2014	0.05%	0.30%	30%	16%	0.18%	0.70%	70%	25%
2015	0.09%	0.30%	30%	29%	0.22%	0.70%	70%	32%
2016	0.10%	0.30%	30%	34%	0.27%	0.70%	70%	39%
2017	0.02%	0.20%	20%	8%	0.32%	0.80%	80%	40%
Average	0.07%	0.28%	28%	23%	0.26%	0.72%	72%	36%

In comparison to the values in Appendix C, what were the actual impact sharing values beginning in 2013 (**for tule fall Chinook salmon**)?

Table 36B: Preseason and Post-Season Summary of Tule Fall Chinook

	Comm Used	Comm Allowed	% Comm Used	Sport Used	Sport Tule Allowed	% Sport Tule Used
2013	2.81%	2.48%	113%	6.47%	5.50%	118%
2014	1.55%	2.39%	65%	5.80%	5.57%	104%
2015	2.90%	2.61%	111%	4.50%	6.09%	74%
2016	5.29%	3.39%	156%	5.14%	7.85%	65%
2017	0.66%	2.86%	23%	6.33%	6.27%	101%
Average			94%			92%

In comparison to the values in Appendix D, what were the actual impact sharing values beginning in 2013 (**for Upriver Bright fall Chinook salmon**)?

Table 36C: Preseason and Post-Season Summary of URB Fall Chinook

	Comm URB Used	Comm URB Allowed	% Comm URB Used	Sport URB Used	Sport URB Allowed	% Sport URB Used
2013	6.07%	8.39%	72%	4.95%	6.61%	75%
2014	7.79%	7.39%	105%	4.44%	4.62%	96%
2015	4.70%	5.62%	84%	6.50%	6.83%	95%
2016	8.14%	7.32%	111%	6.48%	7.31%	89%
2017	4.27%	4.32%	99%	7.73%	7.69%	101%
Average			94%			91%

In comparison to the values in Appendix E, what were the actual impact sharing values beginning in 2013 (**for coho salmon**)?

Table 36D: Coho Allocation for Mainstem Columbia River Fisheries

	Commercial				Sport			
	Preseason Allowed	Postseason Allowed	Actual Harvest	% of Allowed	Preseason Allowed	Postseason Allowed	Actual Harvest	% of Allowed
2015	118,947	32,626	3,938	12%	55,858	41,890	6,938	17%
2016	46,744	36,095	3,050	8%	24,267	11,975	4,271	36%
2017								
Average				10%				26%

Summary of Alternative Commercial Gear Testing in the Lower Columbia River, 2009-2012

All Data Preliminary

					Effort			Adult Chinook				Adult Coho				Other Catch					
Gear	Season	Year	Date Range	State	# Fishers	Fisher days	# Sets	Catch	Mark Rate	Marked Catch	Average Marked Catch / Set	Catch	Mark Rate	Marked Catch	Average Marked Catch / Set	Steel-head	Sockeye	Chum	Pink	White Sturgeon	Adult Shad
Purse	**Late-Spring**	2011	5/31-6/15	OR	2	8	29	269	60%	161	5.6	0	0	0	0.0	5	116	0		7	6668
		2012	5/31-6/10	OR	1	9	40	324	64%	207	5.2	0	0	0	0.0	69	388	0	1	14	18839
				Sum	**3**	**17**	**69**	**593**	**62%**	**368**	**5.3**	**0**		**0**	**0.0**	**74**	**504**	**0**	**1**	**21**	**25507**
Purse	**Summer**	2011	6/17-7/13	OR	3	30	120	364	55%	202	1.7	0	0	0	0.0	71	495			18	4195
		2012	6/16-6/29	OR	1	12	48	298	60%	178	3.7	0	0	0	0.0	63	3148	0	0	13	1735
				Sum			**168**	**662**	**57%**	**380**	**2.3**	**0**		**0**	**0.0**	**134**	**3643**	**0**	**0**	**31**	**5930**
Beach	**Summer**	2011	6/16-7/25	OR	2	22	84	172	59%	102	**1.2**	0	0	0	0.0	107	141	0		13	245
		2012	6/16-7/11	OR	3	28	110	166	76%	126	**1.1**	0	0	0	0.0	79	921	0	1	1	16
				Sum			**194**	**338**	**67%**	**228**	**1.2**	**0**		**0**	**0.0**	**186**	**1062**	**0**	**1**	**14**	**261**
Purse	**Fall**	2009	8/25-10/20	WA	1	15	70	163	29%	48	0.7	372	58%	215	3.1	54	0	1	1	21	0
		2010	8/18-11/4	WA	5	151	481	6900	40%	2760	5.7	6085	59%	3590	7.5	975	0	26	0	373	0
		2011	8/17-10/30	WA	6	181	858	8503	39%	3333	3.9	7667	63%	4838	5.6	1164	1	2	25	80	2
		2011	9/21-10/31	OR	1	15	60	83	29%	24	0.4	170	80%	136	2.3	7	0	0	1	13	11
		2012	8/7-Ongoing	OR	2	26	108	557	41%	228	2.1	110	45%	50	0.5	82		Not Yet Available			
				Sum	**15**	**388**	**1577**	**16206**	**39%**	**6394**	**4.1**	**14404**	**61%**	**8829**	**5.6**	**2282**	**1**	**29**	**27**	**487**	**13**
Beach	**Fall**	2009	8/26-9/26	WA	1	11	44	32	34%	11	0.3	110	61%	67	1.5	17	0	0	0	0	0
		2010	8/21-10/27	WA	6	181	557	4717	57%	2689	4.8	2724	62%	1689	3.0	1315	0	21	0	3	0
		2011	8/20-11/4	WA [1]	10	263	1246	5999	51%	3029	2.4	4327	57%	2475	2.0	1728	2	7	17	56	0
		2011	9/7-10/28	OR	3	30	101	144	41%	59	0.6	117	73%	85	0.8	14	1	4	1	28	3
		2012	8/7-Ongoing	OR	4	52	217	1509	49%	739	3.4	548	52%	285	1.3	269		Not Yet Available			
				Sum	**24**	**537**	**2165**	**12401**	**53%**	**6528**	**3.0**	**7826**	**59%**	**4601**	**2.1**	**3343**	**3**	**32**	**18**	**87**	**3**
Tangle Net	**Fall**	2009	10/13-10/27	OR	2	14	56	4	0%	0	0.0	292	79%	232	4.1	2	0	7		5	8
		2010	10/7-10/30	OR	5	50	204	16	19%	3	0.0	617	76%	467	2.3	5	0	26		51	13
		2011	10/3-10/22	OR	4	40	155	25	24%	6	0.0	304	76%	231	1.5	7	0	1			4
				Sum	**11**	**104**	**415**	**45**	**20%**	**9**	**0.0**	**1213**	**77%**	**930**	**2.2**	**14**	**0**	**34**	**0**	**56**	**25**
Trap	**Fall**	2009	8/29-10/25	WA/OR	1	15	15	1	0%	0	0.0	34	78%	26	1.8	0	0	0		0	0
		2010	8/12-10/29	WA/OR	2	60	100	25	56%	14	0.1	61	74%	45	0.5	4	0	1	0	1	0
				Sum	**3**	**75**	**115**	**26**	**54%**	**14**	**0.1**	**95**	**75%**	**72**	**0.6**	**4**	**0**	**1**	**0**	**1**	**0**
Troll	**Fall**	2010		OR	**2**	**30**	**55**	**18**	**76%**	14	0.2	**21**	**71%**	**15**	**0.3**	**1**	**0**	**0**	**0**	**0**	**0**

[1] Some 2011 Oregon beach seine data included in Washington totals

Question 1. What conservation benefits have occurred as a result of the Policy?

Additional information was requested at the June 13, 2018 Fish Committee meeting, regarding conservation benefits to wild spring Chinook, summer Chinook and steelhead from potential increases in selectivity and survival rates due to allocation shifts in the policy. In addition, the commission requested that the analysis regarding fall Chinook pHOS include the contributions to pHOS (proportion of natural spawning escapement that are hatchery origin fish) from weir removals, mark-selective fisheries and hatchery production. This information will be incorporated into the analysis for Question 1 in the complete package, but was separated out here in order to focus on the specific questions and requests from the June 13 meeting.

Spring Chinook

There were expectations from the Workgroup (Columbia River Fishery Management Workgroup) in their report to the commission in 2012, for conservation benefits for Upriver spring Chinook from shifting of ESA impact rates. Some of the benefit is from allocation differences and some is because the catch balance provisions are more constraining than ESA limits. The amount of unused spring Chinook impacts on wild fish could increase due to the interplay between catch balancing requirements and the recreational/commercial allocation. It is also possible that the number of hatchery fish caught per wild impact used could increase when allocations are shifted, as increased hatchery fish removal could benefit pHOS objectives, assuming it does not impact hatchery escapement requirements. Both potential benefits are analyzed below.

Beginning in 2010, modifications to spring Chinook fishery management were implemented, which required non-treaty fisheries to meet the catch balance provisions in the *U.S. v Oregon* Management Agreement for upriver spring Chinook. Under these provisions, non-treaty fisheries are managed to remain within ESA impacts and to not exceed the total allowable catch available for treaty fisheries. This is referred to as "catch balance." Because of this provision, non-treaty fisheries are not likely to achieve their ESA impact allocations as the catch balance provision will affect fisheries first. From 2013-2017, non-treaty fisheries averaged 87% (range 82%-93%) of their allowable ESA impact for Snake River Wild and Upper Columbia Wild spring Chinook.

The Policy changed the allocation of Upriver spring Chinook from 60/40 sport/commercial to 63/35, 70/30 and 80/20 over the course of the past five years. The non-treaty fisheries have an allowable total ESA limit on Upriver spring Chinook. If catch balancing did not apply and that limit is actually achieved, then total number of wild mortalities allowed would be used regardless of the sport/commercial allocation, but the conservation result would be unchanged if all impacts are used.

Prior to implementation of the Policy (2010-2012), the sport fishery had an average of 19% of the ESA allocation that was not used (Table 1). When the Policy was implemented (2013-2017), a greater proportion of the non-treaty allocation was shifted from the commercial fishery to the sport fishery, from 60% in 2012 to 80% in 2017. The unused impacts in the sport fishery

during 2013-2017 increased from 19% to 28% of the total sport allocation, primarily due to the allocation shift itself but also due to the higher ratio of hatchery fish retained to wild impact in the sport fishery. This higher ratio results in a non-treaty catch total that reaches the catch balance limit sooner while using fewer wild fish impacts than a commercial tangle net fishery would.

Table 1. ESA Impacts for Upriver Spring Chinook in Non-Treaty Sport Fisheries.

Year	Sport Impacts Unused	% of Total Sport Impacts
2010	0.02%	2%
2011	0.38%	32%
2012	0.27%	24%
2013	0.26%	25%
2014	0.36%	26%
2015	0.68%	44%
2016	0.39%	29%
2017	0.20%	17%
Average 2010-2012	0.22%	19%
Average 2013-2017	0.38%	28%

The conservation benefit associated with the unused ESA impacts can be associated with both catch balance and allocation shifts. It is not possible to identify how much is associated with each one, however; an example of a potential analysis was completed.

For this exercise, it was assumed that the savings related to the Policy allocation shift was the difference between the average percent of the allocation unused prior to the policy (19%) versus the average percent of the allocation unused during the policy (28%). This is a difference of 9% of the ESA impacts. Applying 9% of the 2013-2017 average impacts unused in 2013-2017 (0.38%) equates to a savings of 0.03% ESA impacts (Table 1). Applying this impact rate (0.03%) to the ESA-listed populations results in a savings of 2-14 Snake River Wild spring Chinook and a savings of 1-2 Upper Columbia River Wild spring Chinook.

Table 2. ESA Impacts for Upriver Spring Chinook for Non-Treaty Commercial Fisheries.

Year	Comm Impacts Unused	% of Total Comm Impacts
2010	0.11%	11%
2011	0.00%	0%
2012	0.14%	21%
2013	-0.04%	-7%
2014	-0.02%	-3%
2015	-0.36%	-55%
2016	-0.19%	-33%
2017	-0.10%	-33%

Average 2010-2012	0.08%	11%
Average 2013-2017	-0.14%	-26%

Table 2 shows the unused ESA impacts from the commercial fishery from 2010-2017. Prior to implementation of the Policy (2010-2012), the commercial fishery had an average of 11% of the ESA allocation that was used (Table 2). The unused impacts in the commercial fishery during 2013-2017 decreased from 11% to -26% of the total commercial allocation. This means during 2013-2017, the commercial fishery used more ESA impacts than what was allocated preseason.

Combined sport and commercial fisheries did not exceed the overall non-treaty allocation during 2013-2017 (Table 3).

Table 3. Total Non-Treaty ESA Allocation for Upriver Spring Chinook.

	Total Impacts Used	**Total ESA Impacts Allowed**	**% of Total Impacts Used**
2013	1.40%	1.70%	82%
2014	1.66%	2.00%	83%
2015	1.91%	2.20%	87%
2016	1.70%	1.90%	89%
2017	1.40%	1.50%	93%
Average	1.61%	1.86%	87%

The other potential benefit is created by the higher ratio of hatchery fish caught to wild fish impacts in the sport fishery, which results in the removal of a few more hatchery fish for an equivalent number of wild fish impacts. This is only a benefit if managers are having difficulty meeting pHOS objectives.

Staff are not aware of any areas where achieving pHOS objectives is currently problematic, with the exception of the upper Columbia where the issue is caused by hatchery release location and cannot be fixed by a slight increase in hatchery fish harvest; however, staff did not do an exhaustive survey of WA, ID, OR and tribal facilities.

Steelhead

Wild winter steelhead mortalities in spring Chinook commercial fisheries averaged 37 fish during 2013-2016. There was no fishery in 2017. If a fishery would have occurred in 2017, the estimated number of wild winter steelhead mortalities is 19 fish based on the wild winter steelhead wild run size was 9,400 compared to the 2013-2016 average of 18,300 fish.

Summer Chinook and Sockeye

Summer Chinook fisheries occurred during 2013-2016 with gillnets, and averaged 3,300 fish harvested. The Policy provides an allocation for summer Chinook, but precludes the use of gillnets beginning in 2017. There is currently no viable net gear alternative to large mesh gillnets during the summer Chinook fishery. Because of this provision, beginning in 2017, there

was not a commercial fishery for summer Chinook. Wild summer Chinook would be expected to comprise about 46% of the run size based on the July mark rates at Bonneville Dam.

Based on the 2017 run size, mark rate and Policy allocation, the estimated number of wild summer Chinook that would have been harvested in 2017 by the commercial fishery was 949 total fish including 437 wild fish. Snake River wild sockeye harvest is estimated to have been one fish or less in 2017, based on the average harvest during 2010-2016 of less than one fish. Summer Chinook are not ESA-listed and Snake River sockeye are listed as endangered.

Fall Chinook pHOS

Additional information was requested to estimate the relative contribution of weirs, mark-selective fisheries (MSF) and hatchery production to achieving pHOS objectives.

The effect on pHOS of not having weir removals is shown in Table 4 for four selected populations. Average differences in pHOS values during 2013-2016 were 45% for the Elochoman River, 9% for the Coweeman River, 39% for the Green River and 34% for the Washougal River. Removing hatchery fish at these weirs contributed to reductions in pHOS values ranging from 9%-45%.

Table 4. Difference in Fall Chinook pHOS Values With and Without a Weir.

		2013	2014	2015	2016	Average
Elochoman	With Weir	72%	23%	29%	47%	
	Without Weir	87%	89%	90%	87%	
	Difference	14%	66%	61%	39%	45%
Coweeman	With Weir	32%	4%	2%	6%	
	Without Weir	35%	20%	15%	11%	
	Difference	3%	16%	13%	4%	9%
Green (Toutle)	With Weir	53%	40%	27%	50%	
	Without Weir	82%	86%	80%	76%	
	Difference	29%	46%	53%	26%	39%
Washougal	With Weir	67%	35%	54%	60%	
	Without Weir	83%	89%	91%	88%	
	Difference	16%	54%	37%	28%	34%

Mark-selective fisheries (MSF) occurred in 2013-2016 focusing on fall Chinook, although the commercial MSF were pilot fisheries with modest participation. The estimated harvest of lower river tule hatchery fall Chinook from MSF is shown in Table 5. Lower River tule fall Chinook return to tributaries downstream of Bonneville Dam.

Table 5. Lower River Tule Hatchery Fish Harvest in Mark-Selective Fisheries.

	Buoy 10	L. Col. Sport	Beach Seine	Purse Seine	Total
2013	1,630	722	-	-	2,352
2014	-	96	76	239	411
2015	1,433	287	39	477	2,236
2016	640	189	1	271	1,101

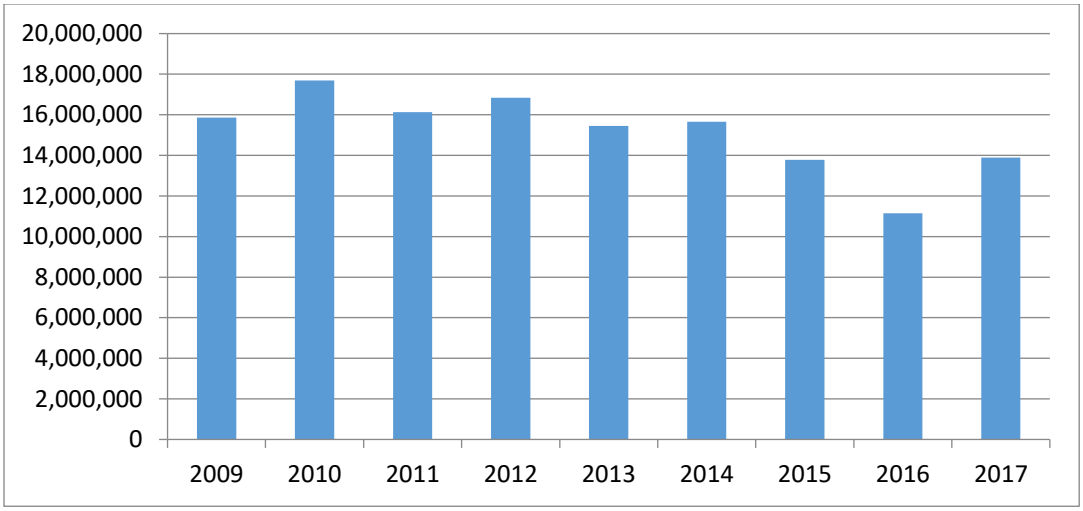
The effect on pHOS of not having MSF removals is shown in Table 6 for four selected populations. For this exercise, it was assumed that the harvest of hatchery fish in MSF was equally distributed across all populations, including Oregon populations. Average differences in pHOS values during 2013-2016 were 5% for the Elochoman River, 1% for the Coweeman River, 6% for the Green River and 2% for the Washougal River. Removing hatchery fish in Columbia River MSF contributed to reductions in pHOS values ranging from 1%-6%.

Table 6. Difference in Fall Chinook pHOS Values With and Without MSF.

		2013	2014	2015	2016	Average
Elochoman	With MSF	72%	23%	29%	47%	
	Without MSF	76%	25%	38%	55%	
	Difference	3%	2%	8%	8%	5%
Coweeman	With MSF	32%	4%	2%	6%	
	Without MSF	35%	4%	3%	7%	
	Difference	3%	0%	0%	1%	1%
Green (Toutle)	With MSF	53%	40%	27%	50%	
	Without MSF	58%	41%	36%	56%	
	Difference	6%	1%	10%	6%	6%
Washougal	With MSF	67%	35%	54%	60%	
	Without MSF	70%	35%	57%	63%	
	Difference	3%	0%	3%	3%	2%

Hatchery Production

Releases of hatchery fall Chinook have decreased over time from an average of 23.5 million during 1995-1999 to 14.5 million during 2012-2017. Figure 1 shows numbers of Lower River tule fall Chinook releases from Washington hatcheries during 2009-2017.



Hatchery fish that are not caught in fisheries or removed at weirs/hatcheries will return to tributary spawning grounds. These levels of hatchery production are generally regarded as the largest contributor to pHOS on the spawning grounds.

It should be noted that Oregon hatchery programs are significant contributors to pHOS in many of the Washington populations in the coastal strata (downstream of the Cowlitz River). Another important point to understand when reviewing pHOS rates is the number of natural origin fish in these populations. Some have fewer than 100 natural origin fish so it does not require a large number of hatchery fish in the population to have a high pHOS value.

Conclusion

As can be seen from the analysis above, weirs can be highly effective at reducing pHOS, but as was discussed earlier regarding this question, there are a number of challenges to operating weirs effectively and it is rare when there is a year with no complications.

MSF can also be effective at reducing pHOS, but as shown above, the level of MSF that have operated in the Columbia River during 2013-2016 were not significant enough to have a large contribution to reducing pHOS. The Columbia River policy was predicated on additional amounts of MSF, through widespread deployment of alternative commercial fishing gears.

Hatchery production can obviously reduce pHOS levels, if hatchery fish releases are reduced or eliminated there will be fewer or none in the tributaries. Reducing hatchery production also reduces or eliminates fisheries. Further reductions in hatchery production will erode the fisheries that are primarily dependent on Columbia River stocks, in particular the Buoy 10 and Washington ocean fisheries.

The continuing problems with meeting pHOS objectives in several lower Columbia Chinook spawning areas highlights the importance of continuing to develop tools for removal of hatchery origin fish, as the alternative of further reductions in hatchery production is problematic.

Summer Chinook conservation objectives are aided by transfer of harvest from non-MSF to MSF gears, although the gains are not large as the amount of harvest in non-MSF was already comparatively small. Any spring Chinook gains in conservation are essentially imperceptible, as the numbers that are calculated in this review are well within the boundaries of management imprecision.

One stated purpose of the Policy is to "advance the conservation and recovery of wild salmon and steelhead." The Policy addresses this in the "Guiding Principles" that include; operating within ESA limits, continuing to support recovery actions in an "All H" approach and meeting the terms of the *U.S. v. Oregon* agreement (which includes escapement goals and harvest rate limits).

This review finds that the only significant conservation measure was to reduce the pHOS values for fall Chinook and coho by increasing mark-selective fisheries, and that there is a smaller, but still measurable, conservation measure for summer Chinook. For the other species, the Policy changed the allocations of ESA impacts from commercial fisheries to sport fisheries, but the overall ESA impact limits did not change. The assumption in the 2012 workgroup report of potential conservation benefits for spring chinook does not appear to have been borne out. Stringent conservation measures were already in place for these fisheries in the Columbia River and are included in the ESA consultation documents adopted by the National Marine Fisheries Service.

Synopsis of Columbia River Fisheries Management in the Context of the Columbia River Compact and Concurrent Jurisdiction with the State of Oregon

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June 7, 2018

Disclaimer

This report was developed by the Fish Program and Enforcement staff. A review should be requested from the Attorney General's Office if a legal opinion is desired.

Background – Columbia River Compact

Excerpts from "The Columbia River Compact" by Fronda Woods, former Assistant Attorney General dated March 2007. Author's note: "The opinions expressed herein are solely those of the author, and are not necessarily shared by the Washington Attorney General's Office, the Oregon Department of Justice, the Washington or Oregon Departments of Fish and Wildlife, or any other person or entity"[1].

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- The Columbia River Compact is a Congressionally-ratified interstate agreement between Oregon and Washington. In the Columbia River Compact, the two states promised each other in 1915 to adopt or amend laws for the conservation of fish in the Columbia River where it forms their common boundary only with both states' mutual consent. The procedures for implementing the Columbia River Compact have evolved over time, and today they reflect a mix of statute, court order, policy, and custom. The Columbia River Compact has proven to be a durable agreement that continues to work well today as a framework for fisheries management in the Columbia River.

- The legislatures of Oregon and Washington began enacting fishing season and gear regulations in the 1870s. Their regulations were not always consistent, however. After a federal court ruled in 1895 that someone fishing legally under Washington law on the Washington side could not be prosecuted for violating an Oregon closure, it became clear that conservation was possible only if the two states had similar laws that could be enforced on both sides of the river.

- Because the United States Constitution forbids states from entering into compacts without the consent of Congress,[2] Oregon and Washington asked Congress to approve the Columbia River Compact, which it did in 1918.

[1] Woods, F. 2007. The Columbia River Compact. Assistant Attorney General, Washington Attorney General's Office, Olympia, WA. March 2007.

[2] The Compacts Clause of the United States Constitution provides: "No state shall, without the consent of congress, . . . enter into any agreement or compact with another state . . . ." U.S. Const. art. I, § 10, ¶ 3.

- By legislation, Oregon and Washington have specified that the waters subject to the two states' concurrent jurisdiction are those that coincide with the states' boundaries, effectively the Columbia River mainstem from its mouth to the Wallula Gap.

- By custom, Oregon and Washington have applied the Columbia River Compact only to commercial fisheries. In my opinion, the Compact contains no such limitation.[3] The legislative history of the Columbia River Compact does suggest that the Compact applies only to "food fish," however. Thus, in my opinion, the proper distinction is between "food fish" and "game fish," not "commercial" and other fisheries.

- As a practical matter, Oregon and Washington today do work together in adopting regulations for non-commercial fisheries. So, whether the Columbia River Compact applies to them or not, the two states behave as if it does.

- The Columbia River Compact does not specify any particular procedure for adopting laws for protecting fish, so long as they are adopted "with the mutual consent and approbation of both States." Over the past century, the customs and laws that govern the states' interactions have evolved. Today, one person from each state's fish and wildlife administrative agency (the "Compact agencies") represents that state in most negotiations under the Columbia River Compact. Sometimes, people call those two persons the "Columbia River Compact." Legally, however, there is no rule-making entity, administrative body, or process called the "Columbia River Compact."

- In 1937, the Washington Legislature conferred on the Director of Fisheries the authority to work with Oregon to change fishing seasons under the Columbia River Compact.

- Today, that authority is exercised through the Washington Fish and Wildlife Commission, which has generally delegated it to the Director of Fish and Wildlife.

- The Oregon Director of Fish and Wildlife has emergency authority to adopt temporary rules, subject to the Commission's approval.

- According to Oregon law, Compacts must be held in Oregon or Washington within 25 miles of the Columbia River where commercial fishing is permitted.

- No law requires that a record be kept of the hearings.

[3] My opinion is contrary to an official opinion of the Oregon Attorney General's Office. 45 OR. ATT'Y GEN. OP. 137, 138, 157-59 (No. 8182) (Nov. 13, 1986).

Revised Code of Washington
RCW 77.75.010
Columbia River Compact—Provisions.
There exists between the states of Washington and Oregon a definite compact and agreement as follows:
All laws and regulations now existing or which may be necessary for regulating, protecting or preserving fish in the waters of the Columbia river, or its tributaries, over which the states of Washington and Oregon have concurrent jurisdiction, or which would be affected by said concurrent jurisdiction, shall be made, changed, altered and amended in whole or in part, only with the mutual consent and approbation of both states.

Result of Non-Concurrent Rules in Columbia River
As can be seen from the commentary above, the two states strive for concurrency in regulations. Currently, there are still many areas where the two states do not have the same regulations, but in most cases – and in most of the important areas – the two states have been the same. One example of non-concurrency is the regulation regarding the daily limit for jack salmon; Washington rules say up to six in most cases and Oregon rules say five fish. Additionally, Oregon does not require recording of jacks on a catch record card (tag) whereas Washington does. Most of the non-concurrent rules in place prior to the Policy have not compromised the ability to manage or enforce fisheries.

One interpretation of the language from RCW 77.75.010 that says "shall be made, changed, altered and amended in whole or in part, only with the mutual consent and approbation of both states" is that unless both states agree, regulations cannot be changed. The legislature determined "the waters subject to the two states' concurrent jurisdiction are those that coincide with the states' boundaries, effectively the Columbia River mainstem from its mouth to the Wallula Gap." A legal interpretation would be needed to determine if one state could set fisheries that the other state does not agree with.

Another interpretation if fishery regulations are not concurrent in the Columbia River would be that the state boundary line becomes the line of enforcement for the respective jurisdiction. The definition of the state boundary on the Columbia River is contained in RCW 43.58.050, created by the Washington-Oregon Boundary Commission, and is a list of points defined by specific latitude and longitude. For reference purposes, in the lower river most of the waters are in Oregon (Figure 1) but in the upper river (just below Bonneville Dam) more of the waters are in Washington (Figure 2).

Figure 1. Map of Lower Columbia showing state boundary line.

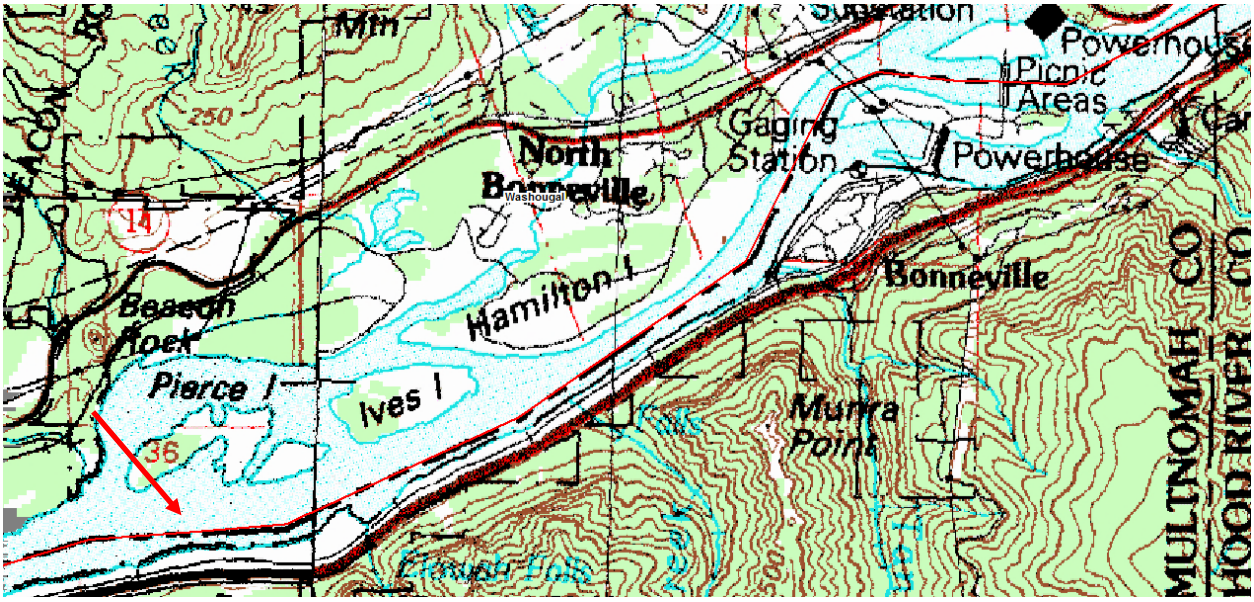

Figure 2. Map of Columbia River downstream of Bonneville Dam showing state boundary line.

If fisheries regulations were different between the states, fishers would need to understand the regulations for the state they are fishing in and adhere to their requirements. Enforcement would also lack proper jurisdiction to enforce another States' non-concurrent rule. A real world example follows:

> Oregon does not allow night fishing for salmon or steelhead, Washington does. If Washington Officers contact a Washington or Oregon fisher fishing at night within the territorial boundaries of Oregon, they lack the jurisdiction to address the violation except to refer information to the Oregon State Police. The same applies for Oregon Officers attempting to enforce a non-concurrent rule in Washington waters. This makes little sense.

The above example is akin to the circumstances in a Federal Court Opinon, Nielsen v. Oregon, in which "… the Court observed that when two states have concurrent jurisdiction, the one first acquiring jurisdiction over a crime may prosecute and punish for an act punishable by the laws of both states. The Court noted however that the rule is inapplicable when the act is prohibited in only one of the States, and went on to hold that a State cannot prosecute for a violation of its laws when the act not only occurs within the territory of another State but is also permitted by that State."[4]

State v. Svenson [5], a court case from Pacific County in 1980 where two Washington licensed gillnetters were charged for violating Washington State law while fishing within the territorial boundaries of Oregon, the Washington Supreme Court ruled:

> We affirm the trial court's dismissal of the cases against Svenson and Nelson. The Compact permits the States to enact legislation which limits fishing activity but it does not permit enforcement by one state of its own laws in the physical territory of the other absent similar legislation by the other state. When the State of Washington is enforcing its law in Oregon territory, it is the State's burden to prove how its jurisdiction extends from the (Washington) boundary line … to the high tide on the Oregon side.

This is a large burden for Officers and prosecutors to overcome, to understand and know the intricacies of another States regulations and laws when non-concurrency exists. Loopholes created by such a regulatory landscape make enforcement near the border between the states near impossible. The public also suffers harm in that they have to navigate an unfamiliar regulation landscape and take a risk to participate in a recreational or commercial fishery. Concurrent fishing rules and regulations on the concurrent waters of the Columbia River are paramount to effective multi-agency operations and an informed, law abiding fishing public.

American Jurisprudence, a law encyclopedia which has a section focusing on Fish and Game[6], had this to say about the Columbia River Compact:

> The Compact, as written and interpreted, restricts the right of either state to expand fishing beyond that permitted in 1918, but does not restrict the right of

[4] Nielsen v. Oregon, 212 U.S. 315, 53 L. Ed. 528, 29 S. Ct. 383 (1909)

[5] State v. Svenson, 104 Wn.2d 533 (1985), 707 P.2d 120

[6] 35 Am.Jur.2d Fish and Game § 33 (1967); 81A C.J.S. States § 12 (1977)

either state to limit fishing. The purpose of the Compact is to assist in preserving the fish in the Columbia and gives both states the authority to act accordingly. The reference to concurrent jurisdiction does require concurrence by the other state, however, when there is to be enforcement by both states on the entire river. In any event, each state may enforce its own laws with respect to its own citizens on its own side of the river absent concurrence in the law by the other state. However, for a person to be convicted of a Washington crime on the Oregon side of the river, Oregon must have similar legislation.

As outlined above, differences in commercial and recreational fishing laws and regulations between states that result in non-concurrence ensure non-effective regulatory presence and limited enforcement jurisdiction.

Non-Concurrent Allocations

Allocation differences can result in non-treaty impacts/shares not being fully utilized or fishing that occurs only in one state's waters. In the past, there have been instances of non-concurrent allocation guidance between the two states. The fishery managers have tried to meet both of the guidelines, with the result that some of the overall non-treaty share of fish has gone unharvested. This has happened with spring Chinook in the past.

Example – Summer Chinook Allocation

- Washington applies the unused commercial share to sport fisheries above Bonneville Dam or to spawning escapement. Oregon applies the unused share to escapement.
- Result – unused commercial share goes to escapement. Since Oregon's rule is more restrictive we would follow this rule. We could not allow unused commercial share to go the sport fisheries because that would violate the Oregon rules.

Example – 2019 Fall Chinook Commercial Fishery in Zones 4-5

- Washington Policy states that commercial fisheries would not be able to use gillnets in the fall fishery beginning in 2019, while Oregon rules allow for the use of gillnets in this fishery.
- Washington Policy allocates up to 80% to sport fisheries and Oregon rules allocates 70% to sport fisheries.
- Commercial fishers with an Oregon or Washington license would be able to fish in this fishery on the Oregon side of the river with gill nets. Fishing would be closed to gillnets in Washington waters.
- The allocation would be 70% to sport fisheries as this does not violate either policy. The commercial fishery would occur with 30% of the allocation.

Summary

The Columbia River Compact provides a necessary venue for ensuring that the needs of both states and conservation of the fishery resources are considered. In 1914, "the two states

promised each other…" to manage fisheries jointly in the Columbia River. Maintaining this relationship is good for the fisheries and the fishing public.

Description of Selective Fisheries
Prepared for Washington Fish and Wildlife Commission

What is selective fishing?

- Selective fishing is the ability of a fishing operation to avoid non-target species or stocks, OR when encountered, to release those animals alive and unharmed.
    - No fishery can operate with 100% live release
    - Goal is to use best fishing practices with low release mortality rates
- The two components of selective fishing, avoidance, and live release, are managed very differently.

Goals of Selective Fisheries

- Minimize take/mortality of wild or ESA-listed fish
- Minimize by-catch
- Maximize harvest of hatchery/target stocks

Avoidance Selective Fisheries

- Time, Area, Gear selective (TAG)
- Fisheries using time, area, and/or gear regulations to minimize by-catch while targeting a specific species/stock

Examples of Time Selective Fisheries

- Spring Chinook sport and commercial fisheries prior to 2001
    - Closed March 31 to avoid upriver Chinook
- Fall commercial coho fisheries
    - Focused on peak of coho run in October
    - Most of Chinook and steelhead past fishing area
    - Closes prior to major chum migration time frame
- Sturgeon sport fishing sanctuaries

Examples of Area Selective Fisheries

- Spring Chinook sport and commercial fisheries prior to 2001
    - Closed below I-5 Bridge to avoid upriver Chinook
- Commercial shad fishery
    - Focused on small area downstream of Bonneville where shad are abundant and easily harvested
- SAFE fisheries – sport and commercial
    - Terminal areas with mostly hatchery fish present
- Mainstem fall fishery – commercial
    - Focused above Lewis River to avoid lower river tules

Examples of Gear Selective Fisheries

- Various mainstem sport fisheries

    - Gear use associated with target species
- Commercial coho fishery
    - 6 inch mesh targets coho and avoids Chinook
- Commercial summer/fall Chinook fisheries
    - Large mesh nets avoid steelhead and sockeye
- Sport and commercial sturgeon fisheries
    - Specific gear to target sturgeon (bait on bottom and 9 inch gillnets)

Examples of Gear Selective Fisheries

- Mesh size is a common tool for selective fishing
    - 4 1/2 inch mesh targets sockeye
    - 6 inch mesh targets coho
    - 8 inch mesh targets Chinook
    - 9 inch mesh targets Chinook and sturgeon

Success Story Commercial shad fishery

- Gear restrictions were changed in 1996 based on information from monitoring
- Regulations currently are:
- Mesh size – 5.75 – 6.25 inches
    - 10 lb breaking strength
    - 40 meshes in depth
    - 150 fathoms in length
- The shallow and shorter nets substantially reduces the handle of salmonids compared to gear used prior to 1996

Time, Area, and Gear Selectivity

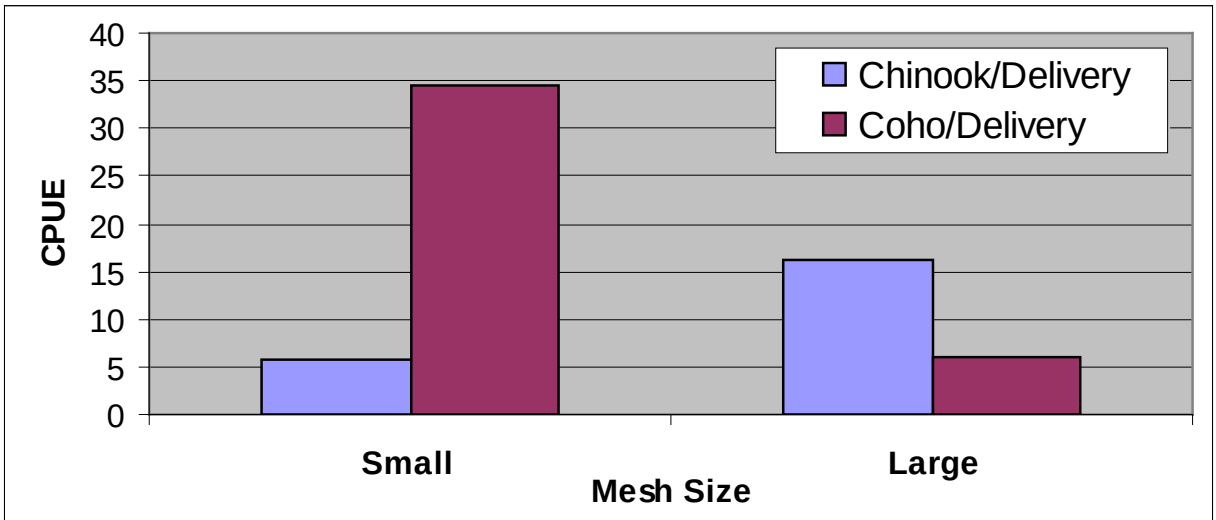

Figure X. Average catch per delivery by mesh size during mainstem late fall commercial fishing periods, 2006-2007

Live Release or Mark-Selective Fisheries (MSF)

- Live release fisheries release non-target fish alive or with low mortality rate
- MSF target fin-marked hatchery fish and release non-marked fish
- MSF are most effective when the mark rate is high and the release mortality rate is low

Live Release or Mark-Selective Fisheries (MSF)

- The number of mortalities associated with a MSF is a product of the number of fish handled and the release mortality rate
- The same number of mortalities can result from two different gear types
- Example:
    - Purse seine handles 1,000 steelhead at 2% mortality rate = 20 mortalities
    - Large mesh gillnet handles 52 steelhead at 38.3% mortality rate = 20 mortalities

Examples of Mark-Selective/Live Release Fisheries

- Mainstem spring/summer Chinook sport fisheries
- Tributary spring Chinook sport fisheries
- Mainstem and tributary coho sport fisheries
- Mainstem and tributary steelhead sport fisheries
- Commercial spring Chinook tangle net fishery
- Commercial coho tangle net fishery
- Experimental seine fisheries

Historical Selective Fishery Management

- Time, area and gear management has been used in the Columbia River for decades in the commercial fishery
- 1878 – Oregon Fish Commission established its first gear regulation
- 1917 – Purse seines prohibited in the Columbia River
- 1923-1949 – whip seines, fish wheels, haul seines, traps, set nets prohibited
- 1938 – area closures around Bonneville Dam

Conclusions

- Many types of selectivity exist
- Regardless of selectivity, all mixed stock fisheries impact ESA-listed stocks to some degree
- The cumulative affect (total ESA impact) is more important than the incremental (release mortality rate) affect when determining total impact of a gear/fishery on listed stocks
- Need to consider harvest/value of fish per impact and efficiency of gear
    - Fishery needs to be economically feasible
- Gear can be selective for one species but not another
    - Large mesh gillnets avoid steelhead but target Chinook, so the gear is selective for avoiding steelhead but is non-selective for releasing wild Chinook
- Refining time, area, gear selectivity is a trial and error process