

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 relative 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, thus providing more wild fish escapement to ESA-listed areas. 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 in the mainstem Columbia River. This is referred to as “catch balance.” Because of this provision, it is possible that non-treaty fisheries could not fully take their ESA impact allocations as the catch balance provision will affect fisheries first.

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 or that limit is actually achieved, then the total number of wild mortalities allowed could be used regardless of the sport/commercial allocation. In this scenario, no conservation benefit to wild spawning escapement would occur since all ESA impacts are used; however, some pHOS changes would be possible depending on selective fishing differences caused by allocation changes.

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.

From 2013-2017, non-treaty fisheries averaged 86% of their allowable ESA impact for Snake River Wild and Upper Columbia Wild spring Chinook, compared to the 2010-2012 average of 81% prior to the Policy (Table 3).

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 could be associated with both catch balance and allocation shifts or both. 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 impacts unused by sport fisheries prior to the policy (19%) versus the average percent of the impacts 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. Thus, if all the reduction in take of ESA impacts in the sport fishery during 2013-2017 were assumed to be attributed to the Policy change in sport/commercial allocation, the conservation benefit to potential wild ESA-listed spawners would be an average of 3-16 fish per year, assuming they were not used by the commercial fishery.

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 unused (Table 2). The unused impacts in the commercial fishery during 2013-2017 decreased from 11% to -26% of the total commercial allocation. During 2015-2016, unused ESA impacts from the sport fishery were shifted to the commercial fishery, using the adaptive management provision of the Policy. This means during 2013-2017, the commercial fishery was more constrained by ESA impacts than what was allocated preseason.

Table 3 shows the combined non-treaty ESA impact allocations for upriver spring Chinook. The average percent of the allocation used was 81% prior to the Policy (2010-2012) and 86% during the Policy (2013-2017). The non-treaty ESA impact allocations did not exceed the overall non-treaty allocation during 2010-2017 (Table 3). Based on these average allocations, there was not an additional conservation benefit with the implementation of the Policy. This is partly explained by the ESA allocation shift during 2015 and 2016 from sport to commercial, and in 2011 and 2013 the commission required that a small proportion of the ESA impacts not be used and were set aside preseason.

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

	Total Impacts Used	Total ESA Impacts Allowed	% of Total Impacts Used
2010	1.96%	2.20%	89%
2011	1.52%	2.00%	76%
2012	1.40%	1.80%	78%
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 2010-2012	1.62%	2.00%	81%
Average 2013-2017	1.61%	1.86%	86%

Table 4 shows catch balance shares for non-treaty fisheries during 2010-2017. The percent of the catch balance shares used during 2010-2012 averaged 90% and averaged 88% during 2013-2017. The total non-treaty catch balance allocation used was slightly greater prior to the Policy than during the Policy.

Table 4. Upriver spring Chinook Catch Balance Allocations

	Total Catch Balance Used	Total Catch Balance Allowed	% Total Catch Balance Used
2010	37,936	34,020	112%
2011	17,658	22,170	80%
2012	18,296	23,056	79%
2013	8,087	10,217	79%
2014	20,970	24,258	86%
2015	25,909	31,212	83%
2016	16,328	17,091	96%
2017	7,779	8,107	96%
2010-2012 Average			90%
2013-2017 Average			88%

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 particularly 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. Staff did not however, do an exhaustive survey of WA, ID, OR and tribal agencies to determine if pHOS issues were occurring in their areas.

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. Thus, a conservation benefit of 19 wild winter steelhead can be attributed to implementation of the Policy during 2017.

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 in 2017. 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. The conservation benefit in 2017 would be 437 wild fish to escapement in the absence of a replacement alternative gear. Depending on the type of alternative gear that was used, the conservation benefit for wild summer Chinook would be reduced, and potential additional impacts would have accrued to sockeye and/or wild steelhead. Summer Chinook are not ESA-listed.

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. Snake River sockeye are listed as endangered under the ESA.

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 essence of the request was to provide an indication of the source of the decline in pHOS values during 2013-2017, as the reduction could be from reduced hatchery releases, operation of tributary weirs or other actions associated with implementation of the Policy, such as additional mark-selective fisheries.

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%

*Assuming 100% transfer of hatchery fish to natural spawning areas

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.

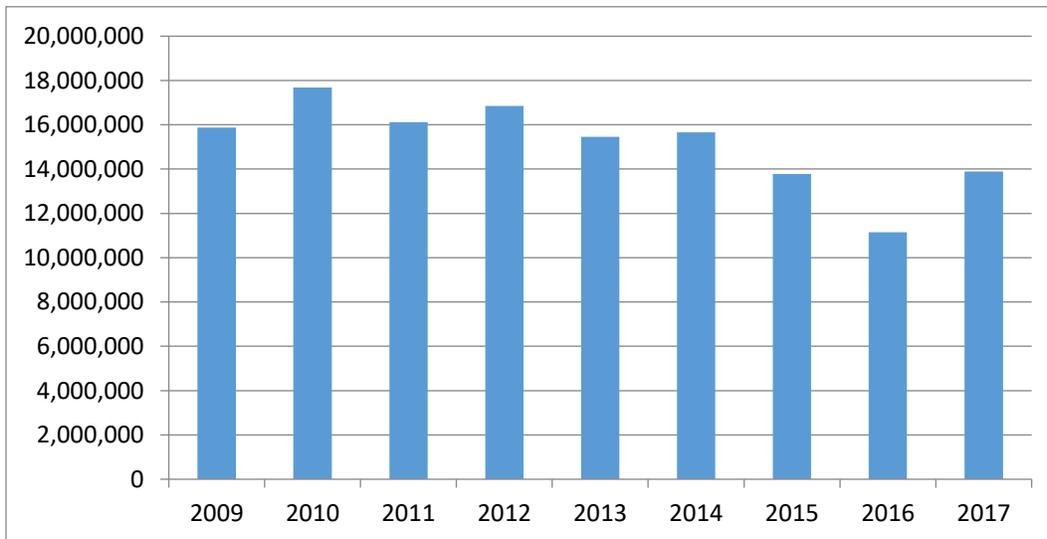
Table 5. Lower River Tule Hatchery Fish Harvest in Mark-Selective Fisheries.					
	Buoy 10	L. Col. Sport	Beach Seine	Purse Seine	Total
2013	1,630	722	-	-	2,352
2014	-	96	76	239	411
2015	1,433	287	39	477	2,236
2016	640	189	1	271	1,101

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 1% for the Elochoman River, 0% for the Coweeman River, 0% for the Green River and 0% for the Washougal River. Removing hatchery fish in Columbia River MSF contributed to reductions in pHOS values ranging from 0%-2%.

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	72%	24%	29%	49%	
	Difference	0%	0%	0%	2%	1%
Coweeman	With MSF	32%	4%	2%	6%	
	Without MSF	32%	4%	2%	6%	
	Difference	0%	0%	0%	0%	0%
Green (Toutle)	With MSF	53%	40%	27%	50%	
	Without MSF	53%	40%	28%	51%	
	Difference	0%	0%	1%	1%	0%
Washougal	With MSF	67%	35%	54%	60%	
	Without MSF	67%	35%	54%	60%	
	Difference	0%	0%	0%	0%	0%

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, the years that produced returning adults during the Policy time frame.



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 fall 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 (primarily non-treaty commercial fisheries) 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.

Recreational Advisory Group Comments:

There are conservation benefits to reduce by-catch of other species (i.e. steelhead, sturgeon) due to this policy.