

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

ALTERNATIVE 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: Yes an evaluation occurred in the sense that, 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 gear and types of 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 have focused on seines and tangle nets. 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.

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

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-
2014	Beach	12	6	20	1,337	44%	13.1	\$1.52	\$19.93	\$26,64
	Purse	15	4	19	1,457	33%	13.5	\$1.47	\$19.74	\$28,76
	<b>Total</b>	<b>27</b>	<b>10</b>	<b>39</b>	<b>2,794</b>	<b>38%</b>	<b>13.3</b>	<b>\$1.49</b>	<b>\$19.83</b>	<b>\$55,40</b>
2015	Beach	6	3	6	681	64%	10.9	\$1.39	\$15.21	\$10,36
	Purse	14	4	19	2,312	38%	10.4	\$1.71	\$17.77	\$41,07
	<b>Total</b>	<b>20</b>	<b>7</b>	<b>25</b>	<b>2,993</b>	<b>41%</b>	<b>10.5</b>	<b>\$1.63</b>	<b>\$17.18</b>	<b>\$51,43</b>
<b>Average</b>		<b>24</b>	<b>9</b>	<b>32</b>	<b>2,894</b>	<b>39%</b>	<b>11.9</b>	<b>\$1.56</b>	<b>\$18.51</b>	<b>\$54,42</b>

## 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.

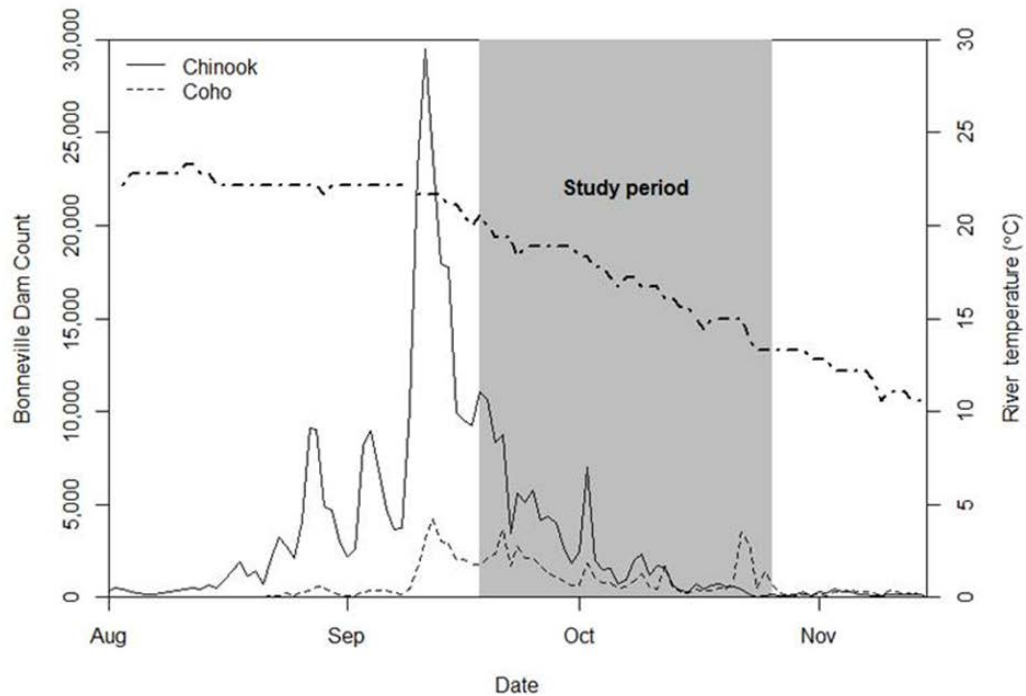
- Radio-telemetry results suggested that cumulative survival (short-term + intermediate) was high for fall Chinook (range 92-95%), however; a key assumption in this finding: that a relatively high proportion of surviving Chinook originated from areas downstream of Zone 5, conflicted with long-term coded 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	Beach	12	6	20	509	35%	7.8	\$1.22	\$9.56	\$4,864
	Purse	15	4	19	561	29%	7.7	\$1.09	\$8.43	\$4,729
	<b>Total</b>	<b>27</b>	<b>10</b>	<b>39</b>	<b>1,070</b>	<b>32%</b>	<b>7.8</b>	<b>\$1.15</b>	<b>\$8.96</b>	<b>\$9,593</b>
2015	Beach	6	3	6	58	32%	6.8	\$1.50	\$10.19	\$591
	Purse	14	4	19	529	46%	5.7	\$1.52	\$8.74	\$4,624
	<b>Total</b>	<b>20</b>	<b>7</b>	<b>25</b>	<b>587</b>	<b>44%</b>	<b>5.8</b>	<b>\$1.52</b>	<b>\$8.88</b>	<b>\$5,215</b>
<b>Average</b>		<b>24</b>	<b>9</b>	<b>32</b>	<b>829</b>	<b>38%</b>	<b>6.8</b>	<b>\$1.34</b>	<b>\$8.92</b>	<b>\$7,404</b>

<sup>1</sup> 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 <sup>1</sup>	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
<b>Avg.</b>	<b>7</b>	<b>173</b>	<b>8,019</b>	<b>76%</b>	<b>6</b>	<b>\$1.57</b>	<b>\$9.45</b>	<b>\$67,369</b>

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.