US Army Corps of Engineers ®
Portland District

June 6, 2016

MEMORANDUM FOR THE RECORD

SUBJECT: Response to NMFS' and ODFW's Recommendation to Continue Full Season Recycling of Chinook at Cougar Trap in 2016

TO: WATER Fish Passage Operation and Maintenance Team and Hatchery Management Team

The Corps provided a memorandum of coordination (MOC 16CGR02) to WFPOM on May 18, 2016 proposing to recycle adult Chinook entering Cougar Trap after September 1, based on results from OSU pedigree analysis and ODFW spawner abundance data, 2012-2015, showing goals established for Cougar Trap would be achieved. The NMFS and ODFW reviewed this MOC and recommended all unmarked (natural-origin) adult Chinook returning (NOR) to Cougar Trap should continue to be recycled downstream in 2016 throughout the entire run, and that more pedigree data is needed to evaluate the effects of this protocol. The AA's disagree with this recommendation for the following reasons:

- NMFS and ODFW have decided not to apply the previously determined goal (≤2% mining of lower river NOR adults) for transporting Chinook originating from below Cougar Dam.
- Four consecutive years of data demonstrate NMFS and ODFW's 2% mining goal can be met when Chinook returning to Cougar Trap are recycled downstream after September 1st.
- Full-season recycling increases O&M resource needs and subjects NOR adults to additional handling and tagging stress.
- The outcome of repeating the full season recycling protocol is predictable based on analysis of prior years.
- The need and management implications for additional pedigree analysis has not been identified.
- Corps investments for natural origin Chinook will be better realized if sound, scientifically-based goals and assessment approach are followed.

NMFS and ODFW have chosen, without providing justification, not to apply the goal they set for transporting Chinook originating from below Cougar Dam. A goal was established in 2015 per the 15CGR02 MOC that no more than 2% of natural-origin Chinook salmon returns to the McKenzie (excluding those from above Cougar Dam) should be transported above Cougar Dam

annually. This goal was based on recommendations from NMFS and ODFW, prepared at the Corps request. Four years of data indicate the 2% mining goal was essentially met when recycling Chinook after September 1st (see 16CGRMOC). However, instead of acknowledging this goal when reviewing the MOC and data provided, the NMFS comments on the 16CGR02 MOC appear to provide a new and different goal. Their comments state:

- "*Our assessment of the data indicates salmon production in the McKenzie River population will likely be higher from recycling all salmon compared to only recycling after September 1st.*"
- "*Maximizing successful spawning of salmon below Cougar Dam is a higher priority than outplanting salmon above Cougar Dam (given the poor productivity rates above the dam). The management priority should be to minimize impacts on salmon that would spawn below Cougar Dam*."
- "*Our assessment of the data indicates salmon production in the McKenzie River population will likely be higher from recycling all salmon compared to only recycling after September 1st.*" Stated in support of their conclusion for full season recycling.

It is not clear why NMFS and ODFW did not acknowledge the 2% mining goal they recommended last year, or why they now perceive risks differently for McKenzie River Chinook salmon associated with Cougar Dam trap operations. The risks below were the same in 2010 when NMFS and ODFW recommended putting natural-origin Chinook above Cougar Dam:

1) Poor productivity above Cougar due to poor downstream fish passage conditions at Cougar Dam was recognized when NMFS and ODFW recommended transporting unmarked Chinook above Cougar Dam in 2010 (e.g. NMFS 2008 Biop).
2) The trend in adult returns to the McKenzie apparent today was also apparent in 2010 (Figure 1). This trend is influenced by good returns in 2002 driven by very good ocean conditions (NWFSC 2015).
3) Trapping of returning adults originating from below Cougar Dam could be fully anticipated. This is especially true for those spawned in the tailrace of Cougar Dam (i.e. in close proximity to the trap).

Biological significance of the full season recycling compared to the September 1st protocol needs to be considered. Full season vs September 1st recycling reduced the percentage mined from the lower river from about 2% to 1%; conversely full season vs September 1st recycling increased the percentage of Chinook not reaching their natal spawning reach above Cougar Dam from 3-8% to 29% (based on data provided by N. Sard to R. Piaskowski, 5/20/16).

Effects on sub-basin pHOS. Although not mentioned in NMFS' or ODFW's comments on the 16CGR02 MOC, another outcome of recycling adult Chinook below Cougar Dam is to reduce the proportion of hatchery origin Chinook spawners (pHOS) for the primary spawning population.

The pHOS, along with poor passage conditions at Cougar Dam, are the primary limiting factors for the McKenzie Chinook population described in NMFS 2008 Biological Opinion. Full season recycling in theory would reduce pHOS for the McKenzie Chinook population since many (29% in 2015) of the above Cougar-origin adults will not return to the trap after being recycled, and will then spawn in the McKenzie River and S.F. McKenzie below Cougar Dam. Assuming all of the Cougar-origin adults that did not return to the trap spawned above Leaburg Dam, and accounting for migrants transported above Cougar, then the estimated number of natural origin spawners for this reach was increased by 36 from 1553 to 1589. In 2015, pHOS was estimated as 35% (871/(871+1589); if recycling had not occurred it would have been 36% (871/871+1553). Given this minimal change, pHOS does not appear to be a substantial biological consideration for conducting full season recycling.

The outcome of full season recycling is predictable. It is highly likely that about 1% of migrants would be transported when full season recycling is employed. Full season recycling in 2015 resulted in <1% of migrants being transported above Cougar Dam (see 16CGR02 MOC). If you apply the return rate observed in 2015 for migrants recycled in 2013 and 2014, then 1% of migrants would be estimated to be transported above Cougar Dam in those years as well (Table 1). This is further supported by the consistency in return timing of migrants across the last four years, 2012-2015 (16CGR 02 MOC Figure 1).

The need for additional pedigree analysis has not be identified. The efficacy of the reintroduction of Chinook salmon above Cougar Dam has been evaluated from 2007 to 2015 using genetic techniques (Banks et al. 2013; Banks et al. 2014; Sard 2016). The current management regime is now well understood, and we believe NMFS concerns and data needs have been addressed: the latest results (Sard, 2016; 16CGR02) provide managers a clear comparison upon which to base a decision for how to reduce mining; the results document consistently low CRR's, which means hatchery supplementation above Cougar Dam will continue, impacting local adaptation; and the results show fitness differences among hatchery and natural-origin Chinook, but none significant enough to trigger ODFW and NMFS to propose changes to the reintroduction approach.

The Corps cannot be confident benefits from our investments for natural origin Chinook will be realized if goals and the agreed upon approach to assess those goals is not followed. Unless goals and a management framework are established and adhered to for adult trap operations, the Corps cannot be confident benefits from our investments for ESA listed Chinook and steelhead will be realized. The Corps has worked hard with NMFS in the last year to establish goals for major actions to address NMFS 2008 BiOp. The Corps fully supports a sound scientifically-based decision process guided by adaptive management principles. If new information suggests the 2% goal established in 2015 should be reconsidered, we recommend

that information be brought forward through WATER to inform refining the Cougar trapping protocols.

Closing

The Corps is respectfully implementing the full season recycling protocol at Cougar Trap this year as requested by NMFS and ODFW, despite our concerns. It is critical that we establish specific goals and a decision framework to adaptively manage reintroduction efforts and adult trap and haul programs for facilities associated with Corps dams in the Willamette. Most reintroduction programs establish plans before the reintroduction efforts begin which include specific goals, adaptable implementation strategies, and monitoring approaches. The Willamette is lacking such plans, with the exception of a draft plan for above Cougar, and this is impeding progress due to differences among agencies in perceived goals and approaches. We suggest plans be developed through WATER which consider pre- and post-passage improvement phases, and draw from relevant literature and examples (e.g. Anderson et al. 2014; Peters et al. 2014). It does not make sense to invest funds for additional pedigree studies, or other studies until we have a common understanding of the reintroduction and trap and haul program goals, monitoring data needs, and how that information will be used to make decisions. We request NMFS and ODFW engage with WATER on these issues beginning with Cougar and Detroit dams, as soon as possible.

Table 1. Estimated percentage of population of natural origin spawners (NOS) in the McKenzie (excluding spawners above Cougar Dam) that were transported above Cougar Dam, assuming the full season recycling in 2013 and 2014. Since Chinook in these years were only recycled below the trap after September 1st in 2013 and 2014, the estimated percent of NOS transported above Cougar Dam assumes all unmarked Chinook returns to Cougar Trap recycled before September 1st returned to the trap at a rate of 24%[1], and were then transported above the dam. Unassigned refers to adult progeny that did not assign to parents which spawned above Cougar Dam based on genetic pedigree analysis, and are assumed to have originated from below Cougar Dam in the McKenzie Sub-basin.

	Transported above Cougar before Sep1 (estimated[1,2])	Transported above Cougar after Sep1 (actual[2])	Total	NOS[3] (excluding above CGR)	% of NOS transported above CGR
2013	5	7	12.28	1202	1.0%
2014	5	6	10.56	1031	1.0%

1. The estimated number transported before September 1st was calculated by multiplying the number of Chinook originating from below Cougar Dam (migrants) that entered Cougar Trap in 2013 and 2014 by the highest return rate observed for recycled migrants. The highest return rate of unassigned recycled Chinook observed among 2013 to 2015 was 24%, where 12 out of 51 unassigned Chinook recycled after September 1st in 2015 returned to Cougar Trap.
2. Data provided by Nick Sard, OSU, Personal Communication, May 2016.
3. Data provided by Cameron Sharpe, ODFW, Personal Communication, April 2016.

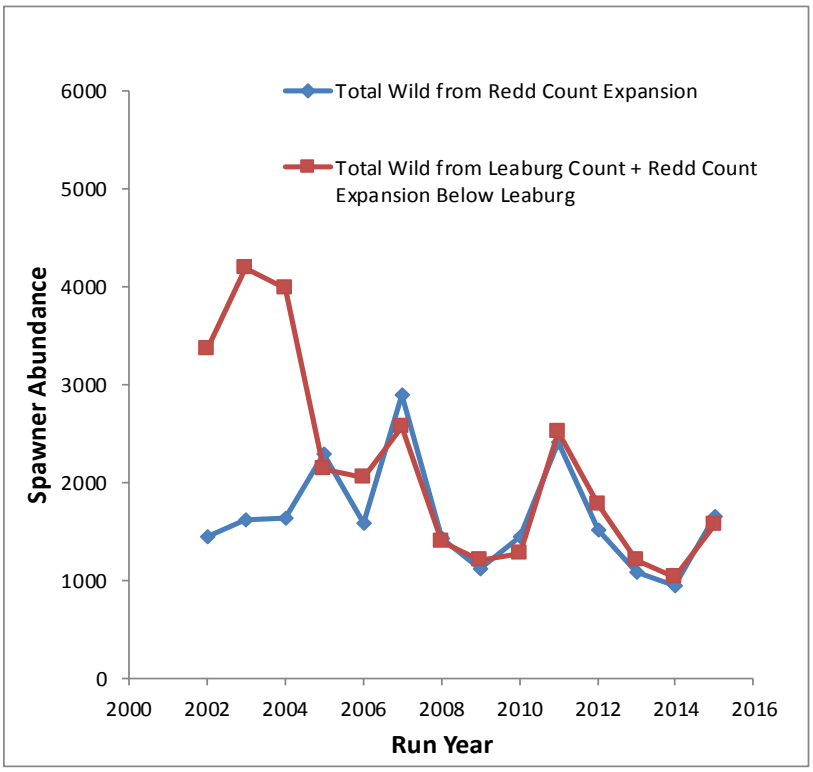

Figure 1. Estimated abundance of natural origin Chinook salmon spawners in the Mckenzie. Data provided by C. Sharpe, April 2016.

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