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Kate Brown, Governor

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Joyce Casey, Chief
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Dear Ms. Casey:

ODFW appreciates the opportunity to review research proposals and reports through the ongoing WATER teams and RME review process. This process strengthens the quality of research and fosters a collaborative relationship among partners. The USACE provided the report titled 'Ecological Interactions between Hatchery Summer Steelhead and Wild *Oncorhynchus mykiss* in the Willamette River Basin, 2014' to the WATER Hatchery Management Team on January 22, 2015. The USACE did not provide a formal request for comments, but respecting the general procedures followed by the WATER teams, ODFW has reviewed the report and offers the following comments:

- Section 1.1 Background – The description of the summer steelhead hatchery program should acknowledge that the program is implemented primarily as mitigation for the USACE Willamette Project dams and their impacts to the winter steelhead and spring Chinook populations and fisheries in the upper Willamette basin. The Willamette Project dams block passage to the majority of historic winter steelhead and spring Chinook habitat, resulting in population declines and the loss of fisheries opportunity. The hatchery program is funded through a cooperative agreement between ODFW and USACE, with USACE providing over 85% of funding for the hatchery program implementation as mitigation for the construction and operation of the Willamette Project dams. The last sentence of the second paragraph describing timing of angling conditions is not relevant to this study and should be removed.
- Section 1.2 Study Objectives – This section describes null hypotheses being tested and uses a timeframe of 30 days to describe 'extended periods'. Why was this timeframe chosen? Is it likely that interactions within 30 days would trigger population-level effects? Or was this based on study constraints such as tag life?

- Section 2.1 Radio Telemetry, page 2.4 – Please describe the detection range of the fixed receivers. Assumptions are made about fish passing receivers undetected ('if a fish passed three or more receivers without being detected, the subsequent detections were voided', page 2.4; 'we assumed that the probability of a radio-tagged smolt swimming by all four of these stations without being detected was 0.0', page 2.5), but there is little discussion about any tests of these assumptions based on detection range of the receivers.
- Section 2.2 Direct Observations – Please include the distance of the reach between South Santiam Hatchery and Waterloo County Park. Also, while there are several maps in the report, a map depicting the referenced sites would be helpful (for example, Foster Dam, Waterloo County Park, Andrew Wiley Park, Pleasant Valley Boat Launch, McDowell Creek, etc).
- The report should include some description of the flow conditions during the release period. Flow conditions are described for the snorkel survey dates, but not for the release period, nor the subsequent outmigration period. A discussion of potential effects of discharge on residualization rates would be helpful.
- Section 3.1 Radio Telemetry, page 3.2, 1st paragraph –
    - Included in the number of fish remaining in the S. Santiam are 14 fish that were never detected after leaving the hatchery. Since the location of these fish was unknown for the duration of the study, they should not be included in the "remaining in the S. Santiam River" group. These fish would be in their own category (e.g. Undetected Fish). Including these fish in study results as non-migrants misrepresents the study data and biases the results.
    - Data should be in table format rather than (or in addition to) the distribution percentages so the findings are presented clearly.
    - Authors assume that the 50 fish last detected at Foster tailrace and the 14 fish never detected either residualized or perished. There is no evidence for this claim, and thus, this suggestion should not be included in the Results section of the report.
- Section 3.1 Radio Telemetry, page 3.4 – Because tagged study fish did not leave the hatchery at a rate 15 times that of non-tagged fish, and therefore likely had a higher potential to not emigrate from the river, a residualization rate should not be calculated, as it is misleading (comment also applies to Summary section). In addition, ODFW does not support the use of the minimum residualization rate for the radio-tagged steelhead to extrapolate potential residualization to the broader hatchery summer steelhead population. This paragraph should acknowledge the difference in the percent of fish that volitionally left the hatchery between these two populations in both study years (16.8% of radio-tagged fish vs. ~1% of the broader hatchery population in 2014), and the extrapolation should be removed, as it is misleading.
- Section 3.2 Direct Observations, page 3.9 – Are the snorkel survey locations representative of habitat conditions downstream of Foster Dam? Can these interaction rates be extrapolated to a broader area, or are they likely location-specific?

- Section 3.2 Direct Observations, page 3.9, paragraph 2, 1st sentence - Please clarify if the higher densities of hatchery steelhead juveniles observed were higher than previous surveys or higher than wild *O.mykiss* densities.
- Section 3.2 Direct Observations, page 3.11 – Does the author feel that the sample size of interactions is adequate to characterize reach-level or basin-level rates of interaction? In some cases, interaction rates were based on two and five interactions, which seems like quite a small sample size. How do the calculated interaction rates compare to other studies with fish at similar densities?
- Section 3.2 Direct Observations, page 3.13 –
    - Putting the interaction rate into a more accessible context would have been helpful. For example, the lowest and highest interaction rates for hatchery vs wild juveniles were 0.00 and 7.87. This means there were 0.00 to 0.008 interactions per fish per minute, or zero to a half an interaction per hour.
    - The number of fish observed for each time/location was provided in last year's report, and should have been provided this year as well.
- Section 4.0 Discussion, page 4.1, 3rd paragraph - Results from the study that are extrapolated to non-tagged fish are not supported, and instead lend weight to the argument that the study's tagged fish behaved differently from untagged fish and emigrated at a lower rate. For example, if only ¼ of S. Santiam hatchery juveniles emigrated every year as the authors' state, then the smolt-to-adult return rate for the past twelve years would have averaged 13% with a high of 20% and a low of 6%. Actual smolt-to-adult return rates to Foster trap for the past twelve years using S. Santiam smolt release numbers are between 1% - 5%, which is within a typical range for steelhead hatchery programs.
- Section 4.0 Discussion, page 4.2 – The authors reference other studies that found subordinate fish being displaced into areas that are energetically less favorable. In the observations that were made during the present study, was there any evidence that this was occurring?
- Section 4.0 Discussion, page 4.2, 4th paragraph - The phrase, "although we cannot confirm that residual hatchery steelhead are causing density-dependent mortality" implies that the study addressed an issue that it didn't examine. This statement suggests that density-dependent mortality was evaluated by this study but that results were not significant. This study was not about density-dependent mortality, the authors do not have results that contribute to this topic, and therefore this and the preceding paragraph should be removed.
- Section 4.0 Discussion, page 4.2 and 4.5 – Discussion of the carrying capacity and limiting factors for the *O.mykiss* population in the South Santiam basin needs to be in the context of basin-wide limiting factors, including potential impacts of reduced access to primary winter steelhead spawning and rearing habitat above Foster and Green Peter dams. While there is the potential for negative interactions in portions of the habitat below the dam, it is likely that a more limiting factor for the population as a whole is the lack of access to habitat and juvenile mortality through the Willamette Project dams. Similarly, while Kostow and Zhou (2006) modeled potential impacts of summer steelhead on Clackamas winter steelhead populations, likely other limiting factors are impacting the Clackamas winter steelhead

population since the population has not rebounded as expected with the exclusion of summer steelhead.

- Section 4.0 Discussion, page 4.5 – The study results are again wrongly extrapolated to the S. Santiam hatchery juvenile population as a whole rather than noting the shortcomings of the study and its inability to make definitive conclusions regarding residualization of hatchery juveniles. The scope of the residualization concern should not be characterized using results of the radio-tagged population without more discussion of the obvious tag burden or handling impacts that are occurring.
- The authors suggest further study of pre-release feed reductions to encourage fish to migrate from the system. ODFW supports further studies to reduce the potential negative interactions between summer steelhead and wild *O.mykiss*; however, the influence of the tag burden/handling effect needs to be resolved prior to those studies so that the potential efficacy of those actions can be accurately assessed.

The study describes potential for negative interactions and documents that hatchery summer steelhead are present in the system below Foster Dam, but ODFW does not find the study design and results adequate to assess any population-level effects on wild *O.mykiss*. ODFW supports efforts to focus on reducing potential interaction and looks forward to working with USACE to design and fund more focused studies to evaluate potential actions to reduce summer steelhead residualization.

ODFW looks forward to collaborating with the USACE on future RME efforts in the Willamette Basin. Please let me know if you have any questions about these comments.

Sincerely,

Bernadette Graham Hudson

cc: (sent electronically)
Dave Leonhardt, USACE
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