Kenneth Rose

11-Feb-2022

Dear Dr. Quinn (Tom):

Your manuscript entitled "Multi-decadal trends in body size of Puget Sound Chinook Salmon: Analysis of data from the Tengu Derby, a culturally unique fishery", which you submitted to Marine and Coastal Fisheries, has been reviewed. The reviewer comments are included at the bottom of this letter.

The reviews are in general very favorable and suggest that, subject to minor revisions, your paper could be suitable for publication. Please consider the suggestions offered by the reviewers; most all are editorial and will improve the readability. I point out one comment from Reviewer 2 in particular because it is not technical but rather involves authorship. I ask that you consider whether Doug Hanada should be a co-author or not. The decision is, of course, up to you and neither the reviewer nor I know the details. However, based on the comment, I just want you to be sure that the current authorship is appropriate. I look forward to receiving your revision, which I will evaluate.

To start the revision, please click on the link below:

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IMPORTANT: Your original files are available to you when you upload your revised manuscript. Please delete any redundant files before completing the submission.

Because we are trying to facilitate timely publication of manuscripts submitted to Marine and Coastal Fisheries, your revised manuscript should be uploaded by 13-Mar-2022. If it is not possible for you to submit your revision by this date, we may have to consider your paper as a new submission.

Once again, thank you for submitting your manuscript to Marine and Coastal Fisheries and I look forward to receiving your revision.

Sincerely, Kenneth Rose Editor, Marine and Coastal Fisheries [krose@umces.edu](mailto:krose@umces.edu)

Reviewer: 1

Comments to the Author

General Comments:

This is a useful contribution. The technical standards of the analysis are high and appropriate and do not impede understanding of the key message. That message is, in turn, clear: Chinook salmon that remain resident in Puget Sound have different growth experiences from animals of the same species that go somewhere else (and grow there). I compliment the authors for the work that they have done here, but suggest that they add a paragraph to their discussion making the point that Chinook marine survival is falling nearly everywhere and the evidence they present for differential (partial) migration could tie in to a better understanding of where these presumably common survival mechanisms are being manifest.

I suggest adding a final short paragraph to the Discussion, along these lines: “Our results indicate that we should put a premium on understanding the fine scale details of where different genetic groups of salmon go over their entire marine life histories, because these pathways presumably determine both their growth, as shown here, but also their survival to adult return. With salmon survival generally falling in both the Atlantic and Pacific oceans (references), understanding where specific populations go to and what their survival are in those destinations is becoming a pressing issue to resolve”.

Response:

This is a very good point. We are reluctant to copy the suggested text verbatim, but we end the MS with this point, and cite relevant papers from Atlantic as well as Pacific salmon to frame the issue at the appropriately broad scale.

Specific Comments:

Line No. Comment

18-19 I suggest dropping the keywords Pacific salmon and trends, and adding the terms Chinook salmon, size, and growth.

Response:

The words “size” and “Chinook salmon” are in the title and so do not seem necessary as keywords, but we added “growth” which is a good suggestion.

79 Change might to should.

Response:

Done.

124 “…at all months of the year”. Change to “in..”. . Add a full stop after the bracketed reference, and edit the remaining into a new sentence, “In addition, a fraction …”. On the next line delete “that”.

Response:

We see that this opening sentence was unclear and have shortened and edited in accordingly, though we did not use precisely the wording suggested by the reviewer.

194 Define the years in the later period (1970 forward?).

Response:

Correct – this is now stated.

199 In the equation, delete all brackets from subscripted terms—this is non-standard and is not used in the subsequent equations.

Response:

This was an unintended oversight on our part—thanks for catching it. We have made the suggested change.

249 “states” ==> “state”

Response:

Done

259 Suggest re-ordering this to read “reflect common underlying causes”.

Response:

Good suggestion – we have done so.

Table 1 Is the data underlying the analysis archived in a way that is accessible to the scientific community? I would suggest that it should be, and suggest use of the Dryad open access repository as one easy to use choice.

Response:

All the data are currently held in the GitHub repository, along with the code to reproduce the analyses and figures (https://github.com/mdscheuerell/tengu). In addition, we have uploaded the data to Zenodo and provide a citation to them (with a DOI) in the methods at the end of the sub-section “The Tengu Salmon Derby”.

Fig. 1 Delete “that provided data on mass of Chinook salmon” from the caption. I would also suggest adding a scale bar to the inset showing Elliot Bay, as it is difficult to assess the size (area) of the fishery from inspection of the larger figure.

Response:

The caption has been edited as suggested and we have also added a scale bar to the inset map.

Fig. 2 I suggest adding an open circle to show the mean mass in those years excluded from the analysis, perhaps with a bracketed number under it showing the sample size in those years.

Response:

We have elected to not add estimates of mean size for the excluded years because they would be based upon fewer fish (i.e., the reason those years were excluded). We also feel it would unnecessarily complicate the figure to have different symbols and text in those years, especially when the models accommodate missing data.

Fig. 3 Add “single”, so the caption reads “single largest Chinook salmon caught”.

Response:

Done.

Reviewer: 2

Thank you for the opportunity to review your manuscript. I really enjoyed reading about the Tengu derby and historical changes in body size of Chinook salmon. One thought that immediately crossed my mind was why not include Doug Hanada as a co-author. It seems that this manuscript would not be possible without the data, historical knowledge, and support from the club. In my mind, Doug Hanada deserves credit and should be listed as a co-author if not lead author. Doug may also be able to provide traditional ecological knowledge on factors affecting changes in body size that might be worthy of a paragraph in the discussion.

Response:

Guys – when we are done, I will invite Doug and based on what he says, finish this one.

Below are a few minor comments to address.

Line 46: Replace “as a whole reported previously” with “that migrate to and spend up to \_\_ years in the Pacific Ocean.”

Response:

This would not be quite correct, as the purse seine sampling reported first in Losee et al., and also here, is an amalgamation of residents and coastal migrants, not only the coastal migrants (thus the difference we show is all the more striking). Nevertheless, we edited this and the following sentence for brevity and clarity.

Line 48: Can you expand on this statement? What is the important factor? What does it imply?

Response:

Sorry that this was unclear. What we mean is that differential migration (i.e., fish going different distances, thus feeding in different places) can also affect growth trends in the cohort as a whole, in addition to the many other factors such as temperature, primary and secondary production, competition, size-selective mortality, etc. affecting actual or apparent growth trends over time. We have edited the end of the Abstract considerably to clarify this, and appreciate the comment. [Mark and James – note changes at the end of the Abstract – please check to see that this is OK with you.]

Line 64: Add more references (Siegel et al. 2017; Helle et al. 1998, 2007).”

Response:

We are reluctant to add three more references to this point, which already has five. However, we have found other places in the MS to cite the work of Siegel et al., and Helle et al., where they specifically apply to points being made. The literature on factors affecting Pacific salmon growth is enormous, and we do not intend the present MS to be a review of them. Rather, we want to give the reader enough background to understand that body size is affected by many factors, especially in Chinook salmon (the species we report on), and thus put our findings in a broader context. We hope the editors will see this as our honest effort to address the point, without adding more citations than are needed.

Siegel, J. E., McPhee, M. V., & Adkison, M. D. (2017). Evidence that marine temperatures influence growth and maturation of Western Alaskan Chinook salmon. Marine and Coastal Fisheries, 9(1), 441-456.

Helle, J. H., & Hoffman, M. S. (1998). Changes in size and age at maturity of two North American stocks of chum salmon (Onchorhynchus keta) before and after a major regime shift in the North Pacific Ocean. N. Pac. Anadr. Fish Comm. Bull, 1, 81-89.

Helle, J. H., Martinson, E. C., Eggers, D. M., & Gritsenko, O. (2007). Influence of salmon abundance and ocean conditions on body size of Pacific salmon. N. Pac. Anadr. Fish Comm. Bull, 4, 289-298.

Line 65: This sentence seems redundant. Authors listed factors in the previous paragraph.

Response:

The previous paragraph was about fishes and fishery data as a whole, and not specific to salmon, so it is not really redundant. Nevertheless, we accept the suggestion that this be shortened, and we have done so.

Line 70: Add references to this article “Increases in growth during the 1st and 2nd year at sea are also linked to earlier age at maturity in Chinook salmon (Siegel et al. 2017).”

Response:

This is really a separate point, related to hatcheries producing larger smolts than wild ones, but we fold this citation in later where it seems to fit better, linking growth with age at maturity. In truth, that point has also been made in many papers, are we do not think this Introduction needs to be a complete (if such is possible) review of the factors affecting salmon growth and age at maturity. Even just considering Chinook salmon, this is a larger literature than we can cover here, and the reviewer is suggesting citing papers on other species as well. We think we have cited the suggested papers (and others) properly, and hope this is sufficient.

Line 69-70: Add references.

Response:

See above – we have added these and other citations, but are leery of going overboard here.

Line 77: Add "prey quality and quantity".

Response:

Done

Line 77: Add references to this sentence please, see Yasumiishi et al. (2020)

Yasumiishi, E. M., Farley Jr, E. V., Maselko, J., Aydin, K. Y., Kearney, K. A., Hermann, A. J., ... & Strasburger, W. W. (2020). Differential north–south response of juvenile Chinook salmon (Oncorhynchus tshawytscha) marine growth to ecosystem change in the eastern Bering Sea, 1974–2010. ICES Journal of Marine Science, 77(1), 216-229.

Response:

This is a good paper but the sentence now has five citations and we respectfully think this is more than sufficient as background for these kinds of points in the Introduction to this paper.

Line 78, 79, and 81: Please add references at the end of these sentences.

Response:  
Done

Line 94: “as four decades” Please add the specific year period here. Years from now, readers won’t know what decades you are referring to.

Response:

Done – good point.

Line 119: The end of the Introduction is lacking a purpose statement. Why are you doing this study? What is your purpose statement? Is it to examine variation in growth due to localized or large-scale factors impacting growth? Share traditional knowledge?

Response:

Good point – we now clarify our goals.

Line 154: Can you please define the word “mooch”? Is it to take or borrow?

Response:

We apologize for thinking this word was sufficiently well-known as to need no definition. We now define it but, rather than defining it parenthetically within the quotation, we use a footnote. However, whatever the people at AFS doing the layout prefer will be acceptable to us.

Line 164: Did you correct body size for the average time of year captured? If not, why? Would that change your results? Conclusions?

Response:

Mark? My sense is that because we were interested in trends rather than absolute body size, this would not matter. Right?

Line 230: A general comment. A tipping point analysis would be interesting to show when trends changed in direction over time.

Response:

This would be a potentially interesting analysis, but here we are not trying to ascertain the precise year when trends change, nor are we trying to estimate separate trends for each potential stanza following a breakpoint.

Line 258. Add Helle et al. 2007. Helle, J. H., Martinson, E. C., Eggers, D. M., & Gritsenko, O. (2007). Influence of salmon abundance and ocean conditions on body size of Pacific salmon. N. Pac. Anadr. Fish Comm. Bull, 4, 289-298.

Response:

Actually, close examination of the Helle et al. paper on Alaska salmon, and that by Jeffery et al. (2017) for BC, shows different, not similar patterns. Thus simply adding the reference to the Helle paper would mislead readers. As we noted in our MS, the BC Chinook were at a low in terms of mean mass around 1970, and increased to a high near 2000. In contrast, the Helle paper shows, for Chinook salmon, high mean mass around 1970-1980 (depending in which of the 4 regions shown), followed by declines. We add this citation but note in our revised MS the different patterns.

Line 269. Please read and add Siegel, J. E., McPhee, M. V., & Adkison, M. D. (2017). Evidence that marine temperatures influence growth and maturation of Western Alaskan Chinook salmon. Marine and Coastal Fisheries, 9(1), 441-456.

Response:

We are aware of the Siegel paper and cite it elsewhere but do not feel that it adds anything in particular at this point, as Oke et al. (2020) reviewed many of these factors, and we cite Ricker to credit his exceptionally insightful early work.

Line 271" “related to smolt size and increased growth rates during the 1st and 2nd year at sea (Siegel. et al. 2017).” <https://www.tandfonline.com/doi/full/10.1080/19425120.2017.1353563>

Response:

We now cite this paper as requested in this context.

Line 292. Are there other possible reasons for the difference in size trends, such as environmental conditions….etc…? Please elaborate a little bit here.

Response:

We thank the reviewer for this point but here, as we are trying to close the paper to focus back on the main goals (distinct size trends for residents, and the consequences such as vulnerability to fisheries), we are reluctant to wade into the myriad factors that might affect growth opportunities in Puget Sound, and other factors affecting residents. The review by Quinn and Losee (in press in CJFAS, cited as 2021 but now 2022) considers such factors for the Salish Sea as a whole, and we respectfully feel that citing this is better than repeating the many factors in the present paper.

Figure 1. Please add reference to Area 10 in this map.

Response:

Mark?