The Big List of Revisions

1. ~~Push back on making it more than a simple accounting, would it still get published? If not, don’t keep trying here.~~
   1. ~~Answers our research question~~
   2. ~~Compared to other papers, more context~~
   3. ~~Not a lot known about larger scale processes so hard to add any more context?!~~
2. ~~Replace all “population trends” with “haulout abundance as an index for population trends” or similar~~
3. Present haulout abundances as necessary for calculating entanglement rates and interesting on their own, but remove language looking for links between local abundance and local entanglement occurrence. Clearly state that they are just haulout abundances for a section of the population, and that the value comes in comparing them to numbers for the larger population and making these data available for comparison with other areas/contribution to understanding of variability within the range
   1. Still relevant to highlight that we have high entanglement and high growth, higher than whole populations, so not an issue
4. ~~Separate language referring to marine debris and active or derelict fishing gear – probably just need to replace most instances of “marine debris” with “entangling materials”~~
5. ~~Comment more on which sources might need to be targeted for mitigation first. Emphasize that understanding sources is how effective mitigation is born.~~
6. Fix file names on text docs
7. ~~Add sample sizes on plots~~
8. ~~Add HO coordinates~~
9. ~~Compare entanglement rate for adult males between species instead of the overall rate~~, and state clearly that the reasoning is to look for potential behavioral differences/habitat partitioning (or whatever that phrase is?)
10. ~~Call the entanglement rates in the stranding section rates not proportions to prevent confusion~~
11. ~~Add back short discussion of relative bias in rates from different materials due to observability, length of entanglement/speed of death, etc. Eg if flashers cause quick death/shed, they probably cause more entanglements that we miss than a long-lasting packing band~~
    1. ~~Explain that materials could not be linked to severity because the most severe wounds obscure the material~~
12. ~~Figure out how to interpret our scarring rate. Is it as high as we thought? Should it be higher to be able to make the assumptions we did? Reviewer 2 thought it was maybe smaller than expected, and therefore would indicate the opposite of what we thought. Think about how the fact that all scars were neck collars complicates this analysis~~
    1. ~~Talk about observability of scars, thin lines, not a high wound, all could contribute to lower scarring rates.~~
    2. ~~Just use it to rebut the serious injury determination from NOAA – if that were right then we wouldn’t have any scars.~~
13. ~~Do we have sex/age composition data for any overlapping years?~~
    1. ~~2010-2013~~
    2. ~~Cite to report, check out what that says~~
14. Look at why Stellers, spring, females(?) all have higher rubber bands?
15. ~~Check that discussion about growth phase made it into final~~
16. ~~Add stranding entanglement rate expectations and explanations~~
17. Rebut addition of Warlick and Hogan paper
18. ~~Add sentence about entanglement observations vs entangled individual~~

PONE-D-20-11389  
Entanglement rates and population trends of Steller (*Eumetopias jubatus*) and California (*Zalophus californianus*) sea lions on the north coast of Washington state  
PLOS ONE  
  
Dear Dr. Allyn,  
  
Thank you for submitting your manuscript to PLOS ONE. After careful consideration, we feel that it has merit but does not fully meet PLOS ONE’s publication criteria as it currently stands. Therefore, we invite you to submit a revised version of the manuscript that addresses the points raised during the review process.  
  
Please submit your revised manuscript by Jul 17, 2020 11:59PM. If you will need more time than this to complete your revisions, please reply to this message or contact the journal office at plosone@plos.org. When you're ready to submit your revision, log on to https://www.editorialmanager.com/pone/ and select the 'Submissions Needing Revision' folder to locate your manuscript file.  
  
Please include the following items when submitting your revised manuscript:

* A rebuttal letter that responds to each point raised by the academic editor and reviewer(s). You should upload this letter as a separate file labeled 'Response to Reviewers'.
* A marked-up copy of your manuscript that highlights changes made to the original version. You should upload this as a separate file labeled 'Revised Manuscript with Track Changes'.
* An unmarked version of your revised paper without tracked changes. You should upload this as a separate file labeled 'Manuscript'.

If you would like to make changes to your financial disclosure, please include your updated statement in your cover letter. Guidelines for resubmitting your figure files are available below the reviewer comments at the end of this letter.  
  
If applicable, we recommend that you deposit your laboratory protocols in protocols.io to enhance the reproducibility of your results. Protocols.io assigns your protocol its own identifier (DOI) so that it can be cited independently in the future. For instructions see: <http://journals.plos.org/plosone/s/submission-guidelines#loc-laboratory-protocols>  
  
We look forward to receiving your revised manuscript.  
  
Kind regards,  
  
Brian Wells  
Academic Editor  
PLOS ONE  
  
Journal Requirements:

When submitting your revision, we need you to address these additional requirements.

1. Please ensure that your manuscript meets PLOS ONE's style requirements, including those for file naming. The PLOS ONE style templates can be found at https://journals.plos.org/plosone/s/file?id=wjVg/PLOSOne\_formatting\_sample\_main\_body.pdf and https://journals.plos.org/plosone/s/file?id=ba62/PLOSOne\_formatting\_sample\_title\_authors\_affiliations.pdf

2. In your Methods section, please provide additional location information of the study sites, including geographic coordinates for the data set if available.

3. Thank you for stating the following in the Competing Interests section:

'EA and JS both work for the Makah FIsheries Management Department of the Makah Tribe. Furning for this project was provided by the Species Recovery Grant to Tribes that is administered by the National Marine Fisheries Service. EA and JS also receive funding from the Bonneville Power Administration Tribal Capacity Building Grant, the National Science Foundation through a subaward granted to the University of Chicago, and the John H. Prescott Marine Mammal Rescue Assistance Grant administered by the National Marine Fisheries Service. Author JS has also received funding support through the Saltonstall-Kennedy Grant Program, the Bycatch Reduction Engineering Program, the Preserve America Grant, and a NOAA Cooperative Research Grant which are all administered by the National Marine Fisheries Service; the Bureau of Indian Affairs; Washington SeaGrant; and the North Pacific Coast Marine Resource Committee. Funders played no role in the development, implementation, or analysis of the work completed for this manuscript.'

Please confirm that this does not alter your adherence to all PLOS ONE policies on sharing data and materials, by including the following statement: "This does not alter our adherence to  PLOS ONE policies on sharing data and materials.” (as detailed online in our guide for authors [http://journals.plos.org/plosone/s/competing-interests](about:blank)).  If there are restrictions on sharing of data and/or materials, please state these. Please note that we cannot proceed with consideration of your article until this information has been declared.

Please include your updated Competing Interests statement in your cover letter; we will change the online submission form on your behalf.

Please know it is PLOS ONE policy for corresponding authors to declare, on behalf of all authors, all potential competing interests for the purposes of transparency. PLOS defines a competing interest as anything that interferes with, or could reasonably be perceived as interfering with, the full and objective presentation, peer review, editorial decision-making, or publication of research or non-research articles submitted to one of the journals. Competing interests can be financial or non-financial, professional, or personal. Competing interests can arise in relationship to an organization or another person. Please follow this link to our website for more details on competing interests: [http://journals.plos.org/plosone/s/competing-interests](about:blank)

Additional Editor Comments (if provided):  
  
Thank you for this submission. The reviewers we split. Reviewer 2 was largely commenting on editorial issue and in my review I agree with these comments. Please consider/address them in your response.  
  
Reviewer 1 provided a substantial list of considerations and ultimately suggested Major Revision. I am in support of this Decision and provide my own Major Revision as well. In any response to the reviewers please give close attention to these comments and address them appropriately.  
  
I agree generally as well with both reviewers that the paper can at times overstate the results.  
  
As a last comment, I gave serious thought about whether this paper was sufficient to meet the level of publication in PLOS 1. Top be clear, what is here in the MS is good research and a great effort. My concern was that it ultimately was a simple accounting of entanglements. Please take the opportunity in any future drafts to put the findings more solidly in the context of environment, human dimensions, and/or potential mitigation. This wold provide a better context regarding the value of these findings. Again, while it is a good accounting of the situation, the paper needs to be elevated.  
  
Here are few specific edits I noted:  
  
Equation Line 99: The assumption being that differences related to entaglements?  
  
Line 124: What is the value in testing directly between these species? Is there an associated hypothesis? Seems may be better to just examine them and not compare them.  
  
Line 161: NICE. So, to potentially mitigate any of these materials a first step is to see if they get entangled in them. BUT, to measure the relative potential of entanglement one would need a measure of their prevalence. In other words, mitigation measures will require probabilities.  
  
Line 192: LMH? Forage inshore? Later fishery dynamics that lead to issues?  
  
Line 244: The percentages seem pretty random. The question is do those stranded ones have a higher rate of entanglement? Perhaps I missed this.  
  
Line 255: This has not been shown. Rather, the populations are growing despite entanglements. BUT, they may have grown even more without entanglements.  
  
Line 277: This answers a previous question on line 244 I had and perhaps should be put in results.  
  
  
[Note: HTML markup is below. Please do not edit.]  
  
Reviewers' comments:  
  
Reviewer's Responses to Questions  
  
**Comments to the Author**  
  
1. Is the manuscript technically sound, and do the data support the conclusions?  
  
The manuscript must describe a technically sound piece of scientific research with data that supports the conclusions. Experiments must have been conducted rigorously, with appropriate controls, replication, and sample sizes. The conclusions must be drawn appropriately based on the data presented.   
  
Reviewer #1: Partly  
  
Reviewer #2: Yes

2. Has the statistical analysis been performed appropriately and rigorously?   
  
Reviewer #1: Yes  
  
Reviewer #2: Yes

3. Have the authors made all data underlying the findings in their manuscript fully available?  
  
The [PLOS Data policy](http://www.plosone.org/static/policies.action#sharing) requires authors to make all data underlying the findings described in their manuscript fully available without restriction, with rare exception (please refer to the Data Availability Statement in the manuscript PDF file). The data should be provided as part of the manuscript or its supporting information, or deposited to a public repository. For example, in addition to summary statistics, the data points behind means, medians and variance measures should be available. If there are restrictions on publicly sharing data—e.g. participant privacy or use of data from a third party—those must be specified.  
  
Reviewer #1: Yes  
  
Reviewer #2: Yes

4. Is the manuscript presented in an intelligible fashion and written in standard English?  
  
PLOS ONE does not copyedit accepted manuscripts, so the language in submitted articles must be clear, correct, and unambiguous. Any typographical or grammatical errors should be corrected at revision, so please note any specific errors here.  
  
Reviewer #1: Yes  
  
Reviewer #2: Yes

5. Review Comments to the Author  
  
Please use the space provided to explain your answers to the questions above. You may also include additional comments for the author, including concerns about dual publication, research ethics, or publication ethics. (Please upload your review as an attachment if it exceeds 20,000 characters)  
  
Reviewer #1: This well-written manuscript presents a nice use of a photographic survey time series of sea lion haulouts along the northern Washington coast to study an important and poorly quantified issue - the prevalence and effects of entanglements in marine wildlife populations, including both marine debris and fisheries interactions. The authors find some interesting patterns in their data, such as seasonal and annual correspondence between prevalence of and entanglements with particular debris types, and potential correspondence between entanglement of California sea lions and failure to migrate south to their rookeries during the summer breeding season. Prior to publication, however, the manuscript requires some further attention to language to clearly distinguish between marine debris and active fishing gear, and a reframing of the population-level inferences drawn. Further discussion of potential biases in the observations of entanglement rates by different materials is also warranted.  
  
Major comments:  
  
(1) The introduction sets up a conflation of entanglements in marine debris and in active fishing gear, which continues throughout the paper. Fishing gear is generally only considered marine debris once it has become derelict, and has different management implications, so a reframing of the introduction and rewording throughout is needed to "disentangle" these sources of entanglement, even though the animals affected by each source may not always be visually distinguishable in photographs.  
  
(2) The paper should spend less space and emphasis on the population growth rate observations to leave more space for discussion of the more interesting entanglement observations. For both species studied, the study region only contains a fraction of a demographically independent population. The abundance of animals hauling out in this region will therefore not be driven primarily by processes occurring within the region. This is particularly true for California sea lions, of which only males occur in the study region. The manuscript needs to set up this context from the abstract onward, rather than attempting to directly link local sources of mortality to local population index counts, and discuss how observed growth rates in abundance based on partial counts might be expected to be biased relative to the dynamics of the populations as a whole (Holmes 2001). To what extent might local mortality affect overall population growth rates, and what magnitude of lags might be expected in the response of local abundance to changes in local mortality rates?  
  
(3) The authors draw the conclusion that entanglements do not have "population-level consequences." What would they consider a consequential impact to be - only a source of mortality that causes negative population growth? More useful insight could be provided by utilizing - and reporting! - any data on duration of entanglements that might be available through mark-recapture in this or other studies, as well as observed entanglement rates. These numbers could be used to estimate a maximum mortality rate that might be expected within the study region as a result of entanglement. Estimates of the fraction of the total population of each species occurring locally would also provide important context.  
  
(4) While stranding records indeed include only a small number of entanglement-related deaths, the paucity of entanglement scars relative to active entanglements suggest either entanglements are very long-lasting, post-removal scars disappear rapidly, or entangled animals are winnowed from the population quickly whether through direct mortality or increased susceptibility to other mortality sources such as predation. The apparent correspondence between entanglement and failure to migrate to rookeries in the breeding season also suggests either serious implications of entanglement to individuals (or greater susceptibility of non-migrating animals to entanglement?). On what basis do the authors conclude that entanglements are mostly not deadly? This conclusion should either be reconsidered or further evidence provided to bolster it.  
  
Additional comments:  
  
Abstract: The abstract could be substantially shortened.  
  
Line 25: Specify temporal correlation.  
  
Lines 68-70: This sentence is a key point and could be highlighted elsewhere in the manuscript too: "Understanding the patterns behind entanglement occurrence will enable the development of more targeted prevention and response efforts"  
  
Line 93: The authors should note that this trend is for the population of animals using the area, not a demographically independent unit, and that this is a minimum estimate, as some proportion of individuals are in the water at any given time.  
  
Lines 114-119: All entanglement and animal counts should be pooled over a full survey before calculating a survey rate, rather than using a daily rate. Based on some simple simulations I ran, this approach should tend to be less biased even if individuals move among sites between days.  
  
Lines 123-124: Averaging entanglement rates within month and then year and using annual averages for paired comparison should provide greater independence among samples, though this hardly matters since it would likely further decrease statistical power and the authors already did not detect a difference between species. The authors could explore patterns among species, with season, etc with something like an auto-regressive logit-link GLM at the individual month level, to deal with both autocorrelation and proportions. Personally, though, I think descriptive stats would suffice here.  
  
Line 187: It would be more correct to say "entanglement observation" as they may not represent independent individual entanglements.  
  
Lines 230-232: "and the remaining adult males exhibited entanglements in the same proportions as what was seen for California sea lions overall in the survey area" can be omitted - this is self-evident based on the first part of the sentence.  
  
It would be helpful to know how the age-sex composition of entanglements compare to that of all hauled-out animals - are those data available?  
  
In Figs. 3-5 it would be helpful to add sample sizes to the tops of the proportion plots.  
  
The discussion would be improved by touching on some additional key points:  
- how the growth phase of an animal may influence the eventual severity of an entanglement  
- whether any entanglement materials are associated with more severe entanglements, lead to mortality more or degrade or break off animal sooner, etc, to inform how observations of relative rates among materials may be biased. For example, the authors discuss that salmon flashers are more deadly and/or shed more quickly. If that is the case, they must also cause a higher proportion of the entanglements than observed in photo surveys.  
- the association of rubber band entanglements with Steller's and spring months - does this reflect a difference in foraging habitat from California sea lions?  
- in reference to Table 2, how dates (i.e., years) of entanglement studies potentially affect estimated rates. When all else is equal (particularly region), might more recent years be expected to correspond to higher entanglement rates?  
  
Line 257: "second highest rate" - of entanglement or growth?  
  
Line 284: What was the expectation for the entanglement rate in the stranding record, and what was it based on?  
  
Lines 310-312: Wouldn't the authors expect more scarred individuals than active entanglements if most shed and survive? How quickly do such scars disappear?  
  
Lines 340-345: This pattern is an important observation and should be highlighted, perhaps in the abstract.  
  
A key reference that is missing and should be incorporated reports on packing band entanglements of pinnipeds globally (Hogan and Warlick 2017). Are other important references missing? Conduct another search for recent relevant literature.  
  
  
References:  
  
Hogan E and Warlick A. 2017. Packing Bands Entangling Pinnipeds Around the World: Global Review and Policy, Journal of International Wildlife Law & Policy, 20:1, 75-83, DOI: 10.1080/13880292.2017.1309869  
  
Holmes EE. 2001. Estimating risks in declining populations with poor data. Proc Natl Acad Sci USA 98(9):5072-5077. doi:10.1073/pnas.081055898  
  
Reviewer #2: The manuscript is well written and well structured.  
My main comments are:  
- Recommend toning down the language around the claim that this study assesses entanglement rates for sea lions in relation to population trends. The trend data from this study are based on haulouts and so recommend that the language around ‘population trends’ is changed to ‘haulout abundance’ throughout manuscript. Particularly given the geographic range of these species, haulout counts provide an index of abundance but not a robust assessment of population size or population dynamics.  
- Suggest commenting on whether there may be a delay in any observed population impacts from the high rates of entanglement observed for these two species in this study. e.g. individuals may be entangled for a number of years, the impacts of entanglement may occur over a long time period and the effect of entanglement on individuals and populations may not be apparent in the short term.  
- Suggest commenting on different potential impacts relating to the sex bias in entanglement, particularly for California sea lions where you reported almost all entanglements were adult males e.g. less likely to have impacts on population dynamics (if this was measured) compared to a bias towards adult, breeding females.  
Specific comments:  
- Suggest title change to “Entanglement rates and haulout abundance trends of…”  
- Line 14-15: “...determine whether there was any indication that entanglements caused population impacts.”  
- Line 30: change “did” to “may”. Again, need to tone down the conclusions relating to population trends impacts or population level consequences.  
- Line 79: suggest change ‘surveyors’ to ‘observers’ or ‘researchers’  
- Line 92: Change to “Haulout abundance trends”  
- Line 93: “Trends in haulout abundance, as an index of population abundance, were calculated…”  
- Line 165: remove comma from 1980s  
- Line 180: “Haulout abundance trends”  
- Line 233: suggest “….Steller sea lion juveniles (both sexes), adult females…”  
- Line 255: “…exhibited high rates of growth, using haulout counts as an index of abundance, in northern…”  
- Line 255-256: Haulout counts provide an index of abundance but not a robust assessment of population size or population dynamics and, particularly given the geographic range of these two species, there needs to be more caution in drawing conclusions based on non-robust population indices. Deducing that “…suggesting entanglements did not affect the population dynamics of either species…” is stretching the conclusions a bit much.  
- Line 257: “…highest entanglement rate…”  
- Line 259: “…observed rate of increase in haulout counts…”  
- Line 260: “…growth rate estimates for 1975-2014 (7%) using more robust population estimates based on pup counts”  
- Line 261: “…and the haulout count increase rate…”  
- Line 262: “…double the population growth rate (using population estimates based on pup counts)…”  
- Line 290: suggest adding caveat that the “…little to no impact on survival” was on short-term survival. i.e. entanglement may have a longer term impact?  
- Line 364: Rearrange so that the sentence doesn’t start with a number: “2014 and 2015…”  
- Line 371: “While our study showed that entanglements may not currently affect haulout abundance as an index of population size for Steller or California sea lions in Washington,…”

6. PLOS authors have the option to publish the peer review history of their article ([what does this mean?](https://journals.plos.org/plosone/s/editorial-and-peer-review-process#loc-peer-review-history)). If published, this will include your full peer review and any attached files.  
  
  
If you choose “no”, your identity will remain anonymous but your review may still be made public.  
  
  
**Do you want your identity to be public for this peer review?** For information about this choice, including consent withdrawal, please see our [Privacy Policy](https://www.plos.org/privacy-policy).  
  
Reviewer #1: No  
  
Reviewer #2: No  
  
  
  
[NOTE: If reviewer comments were submitted as an attachment file, they will be attached to this email and accessible via the submission site. Please log into your account, locate the manuscript record, and check for the action link "View Attachments". If this link does not appear, there are no attachment files.]  
  
While revising your submission, please upload your figure files to the Preflight Analysis and Conversion Engine (PACE) digital diagnostic tool, <https://pacev2.apexcovantage.com/>. PACE helps ensure that figures meet PLOS requirements. To use PACE, you must first register as a user. Registration is free. Then, login and navigate to the UPLOAD tab, where you will find detailed instructions on how to use the tool. If you encounter any issues or have any questions when using PACE, please email PLOS at [figures@plos.org](mailto:figures@plos.org). Please note that Supporting Information files do not need this step.