1 June 2017

Dr. Daugherty,

Enclosed is a modified version of our manuscript (ID UJFM-2017-0045) entitled “Estimating Age at a Specified Length from the von Bertalanffy Growth Function.” We modified the manuscript based on the constructive suggestions by your Associate Editor and two anonymous reviewers for the journal. In addition, we have provided responses to the reviewer’s concerns or suggestions in the attached pages, with the reviewer’s specific comments followed, in bold, by our response. We believe that all concerns were adequately addressed in the new manuscript or in our responses.

**Thank you for your continued consideration of our manuscript. We look forward to your response regarding the suitability of the revised manuscript for publication as a management brief in the *North American Journal of Fisheries Management*. Please contact me if you have any questions or concerns related to the manuscript or our responses to the reviewer’s suggestions.**

**Respectfully,**

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Dr. Derek H. Ogle

Professor of Mathematical Sciences and Natural Resources

**Reviewer: 1**

Comments to the Author: Well-written paper on novel parameterization of von Bertalanffy fish growth model that allows estimating Age|Length or Length|Age for any chosen age or length of interest to the user. These estimates are actual model parameters, so standard model outputs or other frequentist inference methods (e.g., profile likelihood) can be used for inference. I recommend this manuscript be accepted with minor edits. David F. Staples 5/3/17

- line 25: instead of 'some' statistical methods, perhaps note that use of standard frequentist methods

**AUTHOR’S RESPONSE: Done.**

- line 28: make clear that the re-parameterization of the model includes the L\_r or t\_r of interest as model parameters so inference on them is based on standard model output; abstract does say these are 'directly estimated', which is basically the same thing, but I think explicitly stating these are parameters in the model would be more clear.

**AUTHOR’S RESPONSE: Done, though we focused only on t\_r as that is the focus of the manuscript.**

- line 78: as discussed with Dr. Ogle in email pasted below, this equation has a typo

Email correspondence with Dr. Ogle:

You are right about the equation on line 78. The plus after L\_inf should be a minus. Thus, it should be L\_t = L\_inf – (L\_inf-L\_0)e^(-Kt). This can be seen in von B’s (see attached) equation 6 (where his l is my L\_t, his L is my L\_inf, and his l\_0 is my L\_0). In addition, the algebra then works out:

New line 78 (expanded): L\_inf - L\_inf\*e^(-Kt) + L\_0\*e^(-Kt)

Line 80 (expanded): L\_0 + L\_inf - L\_inf\*e^(-Kt) – L\_0 + L\_0\*e^(-Kt) =

L\_inf - L\_inf\*e^(-Kt) + L\_0\*e^(-Kt)

**AUTHOR’S RESPONSE: Corrected.**

- line2 87-91: I recommend using some of model parameter discussion from email below to further clarify the derivation of the model.

Email correspondence with Dr. Ogle:

Regarding the other discussion. I was trying to take the two most prevalent parameterizations of the VBGF and show, with judicious zeroes, that they are the same functional form. However, to fit the model, a point on the line that the model goes through must be chosen. Von B chose for the model to go through the y-intercept (i.e., the point (0,L\_0)) and Beverton and Holt chose for the model to go through the x-intercept (i.e., the point (t\_0,0)). So, von B estimated the mean length when the age is zero (L\_0) and B&H estimated the age when the mean length is zero (t\_0). I am arguing that you can choose any other point (i.e., (t\_r,L\_r)) such that if you specify t\_r you estimate L\_r, but if you specify L\_r then you estimate t\_r. In this way, you fit the same model (i.e,. same predictions, etc.), but you can estimate a third parameter (L\_r or t\_r) that may be of more interest than either L\_0 or t\_0.

**AUTHOR’S RESPONSE: We made additions to this section of the manuscript. However, we feel that the salient points of the e-mail discussion are already in the manuscript. For example, the last sentence of the first paragraph in the Theoretical Developments section notes that the two original parameterizations were parameterized to estimate the x- or y-intercept and the first sentence of the next paragraph (now slightly modified) indicates that another point could have been chosen (and we are allowing the user to choose that point). Perhaps the only part of the e-mail communication that is missing in the manuscript is that a point must be chosen so that the model can be fit. We feel that this is at least implicit in the current manuscript and that an explicit statement of such does not add much clarity.**

- lines 100-102: perhaps this would be better before the paragraph starting at line 92

**AUTHOR’S RESPONSE: We did not change the order of the second and third paragraphs of the Theoretical Developments section (as this comment suggests). The second paragraph discusses how the user can choose either L\_r or t\_r to estimate the other. We feel that it is important to make this point immediately after “deriving” the new parameterization and noting that the original parameterizations simply chose L\_r=0 and t\_r=0. Specifically, the topic sentence of the second paragraph is likely going to be a question the reader has after reading the paragraph before it. We want to answer that question immediately. In addition the third paragraph (the one suggested to be moved here) makes more sense after noting that the user must choose a value for L\_r or t\_r.**

- line 143: perhaps note why profile likelihood may be useful. I think it is better than standard Wald-type CI's for inference on a single parameter from a multi-parameter model because it accounts for effects of maximizing the likelihood across the nuisance parameters as the parameter of interest varies. This can be especially useful for sparse data sets, e.g., I've used this approach to find multi-modal profiles or even distinct regions of support for parameters in a bi-phasic growth model (Honsey et al 2017, Eco Apps 27(1)); however, I would note that I'm not sure how the confint() function would handle such a situation with distinct likelihood modes.

**AUTHOR’S RESPONSE: We feel that addressing this suggestion is beyond the scope of our paper, which is to simply provide the alternative parameterization and show how standard statistical methods can be used with it. Suggesting why the profile likelihood method is useful would likely require describing the method in more detail, describing other alternative methods (e.g., Wald CIs as this reviewer did), etc. We feel that this (a) would distract from our core message and (b) is not needed for a brief. We do provide references when first mentioning the likelihood profile method. The interested reader could follow-up with these.**

**Reviewer: 2**

Comments to the Author: This paper presents a method for estimating age at a given length, along with its uncertainty, from a von Bertalanffy growth model. While the idea is quite simple, I've not seen it done before and it is "neater" than the alternative bootstrapping method. The paper is well written and presented, and I have just a couple of suggestions.

1) The authors should mention the similarity of their new VB parameterization with the so-called "Schnute parameterization" (Quinn and Deriso 1999). The Schnute model is in terms of two length and age pairs (L1, t1) and (L2, t2), but taking (Lr, tr) in eq 3 to be (L1, t1) and t2=infinity such that L2=Linf, yields the same result. Presumably, one could use the Schnute parameterization with L1 and L2 assumed fixed instead of t1 and t2, and estimate t1 and t2 as parameters.

**AUTHOR’S RESPONSE: Done. Also added reference to Francis parameterization.**

2) This is minor, but very few results are given for the second example in terms of the stepwise model selection and the chosen model (e.g., the parameter estimates for males and females for the final model are not specified). While these results aren't really necessary, I think readers might still like to see them.

**AUTHOR’S RESPONSE: The step-wise results are contain in the (F=#, df=#, P=#) results. We had included (and kept) confidence intervals for the two parameters that did differ between the sexes. We have added the best-fit equations for each sex. We have kept the results concise because (a) this is a brief and (b) we want the focus on the new parameterization and its use in these examples, not so much the specific results in these examples.**

**Associate Editor**

Comments to the Author: This manuscript was well written and should be of interest to fisheries managers. The typo on line 78 has been recognized by the author and presumably will be fixed. The reviewers had some minor issues that should be addressed. I think management staff are likely to use this method for calculating (and more importantly, comparing) age for a specified length. However, I can also see it being misused in terms of people wanting to ignore the goodness of fit for the VBGF model. As such, I would like to see some general guidelines for minimum data requirements, such as the distribution of age classes, minimum sample sizes of aged fish, a minimum goodness of fit for the VBGF. If the overall fit to the VBGF model is poor, I assume we would get wide CI for tr, which should be a good reason for managers to collect better data. But, it still would be nice to have some general guidelines for data requirements.

**AUTHOR’S RESPONSE: This statement is true – the results will only be as good as the data from which they are computed. We have included this caveat in the new final paragraph. However, we did not provide general guidelines for data requirements as (a) that is not the focus of this paper, (b) we do not provide any new insight into this matter, and (c) they are the same for our parameterization as for any other VBGF parameterization.**