

**Van Manen et al. doth protest too much: new analyses of the Yellowstone grizzly
population confirm the need to re-evaluate past population trends**

Daniel F. Doak*

Environmental Studies Program
Attn. 215
University of Colorado, Boulder 80309
303.492.3665; fax: 303-492-5207
daniel.doak@colorado.edu

Kerry Cutler

Environmental Science, Policy & Management
130 Mulford Hall, UC Berkeley 94720
510.499.7157

* Author to whom correspondence should be addressed

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Grizzly bears are an essential part of healthy, fully functioning ecosystems in western North America. Understanding how grizzlies have responded through time to management and habitat changes is therefore key to understanding and protecting not only this one species, but also entire ecosystems. Our purpose in examining Yellowstone grizzly population growth (Doak and Cutler 2013; henceforth D&C) was to evaluate the potential for problems with analyses that underlie the perceived rate of increase of this population. By doing so, we hoped to prompt members of the IGBST, who control the data sets on this population, to test for and deal with these potential issues. It is therefore disappointing that, in our view, van Manen et al. (2014; henceforth VMEA) focus mostly on refuting details in our specific methods— criticisms that we find largely without merit and respond to in detail in Appendix S1 -- rather than on the larger substance of these concerns.

Two aspects of VMEA's article are particularly puzzling. First, they concentrate on refuting many of the particular simulations that we explicitly presented as examples of general issues. VMAE show, for example, that one particular simulation of observation effort effects doesn't *completely* explain the full rise in Chao2 estimates of population size (i.e., it explains only up to 77% of estimated annual growth: Appendix S1). VMAE's analysis does not invalidate that observer bias can be a significant effect and is a distraction from the general problem being addressed.

More importantly, there is a perplexing inconsistency between VMEA's blanket rejection of our concerns and the largely confirming results presented on senescence effects in VMEA's manuscript, and on estimation of population growth from survey data by three of these same authors in Higgs et al. 2013. VMEA suggest that their models show that senescence has trivial impacts on population growth estimates; in fact, their results show that incorporating

senescence sharply reduces previously estimated population growth from 1983 to 2001 (see Appendix S1). Higgs et al (2013), an excellent effort to improve analysis of this population, is exactly the type of approach we support, and is predicated on dealing with many of the observation issues that also motivated our work. This study shows that there is so much uncertainty in population estimates that inferences about population trends are very weak. This is precisely our basic conclusion. The only serious difference between our view and theirs is that they only look forward in time, but their results reinforce our view that past population changes inferred from less sophisticated analyses must also be reexamined.

We stand by our concerns over what the Yellowstone grizzly data really can and do tell us about this population. As with many conservation controversies, the most productive way forward would be collaborative examination of alternative interpretations of the data by all parties. Alternative, a National Academy of Sciences review, or reanalysis of the various contended issues by some other independent team with access to all of the data, would go a long way towards promoting the best assessment of this population.

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