

Interactive comment on “The competing impacts of climate change and nutrient reductions on dissolved oxygen in Chesapeake Bay” by Isaac D. Irby et al.

Anonymous Referee #1

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This manuscript reports on the effect of reduced nutrient loads and climate change scenarios on the degree of hypoxia in Chesapeake Bay using watershed and estuarine models. Such studies can rapidly blow out in complexity and become very hard to communicate concisely. However, the authors skilfully undertook a very nice study that that was well written and structured and broke down some of the likely effects of climate change on hypoxia and compared this to improvements from nutrient load reductions. I found these questions very pertinent based on my recent interactions with coastal management authorities and I think this manuscript will probably a very well cited one in the field.

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The model has already been published and was slightly modified for the purposes of this study. I think it was adequately referenced and described.

It was particularly interesting to note that sea level rise could lead to a slight increase in ventilation, and hence increase in DO. As expected, however the overwhelming effect was the reduction in O₂ solubility. I also found it interesting and important that the nutrient reductions proved to be worthwhile in the face of climate change (this is a novel and important part of the study). Such modelling exercises have a high degree of uncertainty, but I think this was well addressed in the discussion. The figures were well presented and struck a good balance between clarity and the overwhelming amount of data that such a study invariably produces. It was a pleasure to read such a well written and organised manuscript on a complex topic. I have only some very minor editorial comments.

A little more information on the amount of nutrient reduction occurring for the TMDL scenarios would be useful. % reduction is fine.

Line 183 effects Line 335, I would not say the decrease in hypoxic duration was large except in a few specific instances. Perhaps moderate would be a better word?

Line 483 'made a first order assessment' might sound a bit less casual than 'took a first order look'

Table A2, no caption, chapter 4 needs to be defined here.

Table A3, Total, A,B,C and D need to be defined in the caption

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