Responses to Comments by Reviewer #3:
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Reviewer comments are pasted in their entirety in black font. Responses are in blue font.

1. This is an important and generally well-written modeling paper which moves the discussion of nutrient loading and Gulf hypoxia further along. In addressing the question of ultimate vs. proximate limiting nutrient, which I don't object to, probably the major point to make is that there would be no P limitation on the Louisiana shelf without the excessive loading of N from the Mississippi River, which the authors refer to as "saturating", an appropriate and significant term.

Response: We are grateful for the positive assessment and appreciate the careful review.

With regard to the comment that there would be no P limitation without the excessive N loading: We absolutely agree and should make this point clearly in the manuscript. In fact, our Figure 3 illustrates this point very well. We propose to add the following text in our revised manuscript:

> "The results in Figure 3 illustrate that reductions in P load would have a much smaller effect on system-wide primary production, than reductions in N load. In other words, P might be limiting temporarily, but that has little bearing on the overall system productivity. N is the ultimate limiting nutrient in this system. These results also imply that there would be little or no P limitation without the excessive N loads. As shown in Figure 3, at high N loads reductions in P load have a small effect on overall primary production, but this effect is much reduced for decreasing N loads and practically disappears for the 80% N load reduction."

2. Though the 2008 Hypoxia Task Force Action Plan, which is still the current goal though delayed in time, is mentioned on page 3 line 12, its load reduction goals (45% N and P) are not listed in Table 2 nor discussed in the text other than as a dual nutrient strategy, and the 2007 EPA Science Advisory Report, cited by another reviewer, which is the basis for these reduction goals, is not mentioned or cited. This SAB report was a 300-page major review of the science status at the time and the authors cite some of the papers important to this SAB review, but not the document itself.

Response: We are grateful that Reviewers 1 and 3 have pointed out this report and would like to include the reference in the Introduction (also see response to Reviewer 1) and in Table 2.

3. Unless I am reading it wrong, there is an inconsistency between the written legend to Fig. 2 and the labeled legend in the hypoxic area graph. The label says -60% P is light orange, and the written legend says that light orange is the -60% TN. The labeled legend in the figure appears to be correct and consistent with the following text, while the written legend appears incorrect. This labeling should be confirmed to be consistent throughout or it will prove very confusing.

Response: Indeed. We are glad the Reviewer noticed this. The figure legend is correct, but the caption is not and has to be corrected.

4. I agree that the use of TN and DIP river load reductions is confusing and probably has more of a historic rather than scientific origin. That said, much of the river Total P load is particulate

which then is solubilized when reaching the Gulf.

Response: As indicated in our response to Reviewer 1, we would like to add our rationale for this choice. We would like to add the following explanation:

> "We chose to reduce TN because we assume the Task Force goals of reducing N load are referring to the sum on inorganic and organic N. It should be noted that a reduction in the organic N load implies also a slight reduction in organic P. Conversely a reduction of organic P would imply a much larger reduction in N (by a factor of 16 if Redfield stoichiometry is assumed). Hence we reduced only the inorganic P fraction in the DIP-reduction experiments."