Specific Comments/Questions (May 24, 2007 draft)

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| page | line | |
|---|---|---|
| 7 | 6-7 | delete phrase “through off-target migration of fertilizers”; it is not clear nor consistent with descriptions of other listed sources |
| 7 | 9 | insert “in surface waters” after Excessive nutrients” |
| 7 | 12 | insert “can” before “deplete dissolved oxygen” |
| 7 | 19 | define or clarify what is meant by “oxygen minimal” |
| 8 | 8 | do “Prevailing” currents not change during the year? |
| 11 | 26-27 | or vice-versa? |
| 17 | 19-13 | eliminate equations – not useful, or in keeping with rest of the report |
| 17 | 35 | ditto |
| 22 | 1 | “engineer” is a noun |
| 26 | 9 | how is “Excessive” defined? |
| 26 | 39 | which reference applies to the “13%” number? |
| 56 | 8 | in figure caption and x-axis label, define “crop land” as corn and soybeans |
| 57 | 4 | substitute “affects” for “determines” |
| 57 | 10 | substitute “they” for “he” |
| 61 | fig 16 | what are the red lines, and can ’06 data be added? |
| 62 | 3 | can any degree of statistical confidence be ascribed to the word “appears”? |
| 63 | fig 18 | is there any explanation for the extreme values (i.e. about 48 and 14) in the N:P ratios? |
| 69 | tab 3 | add “(%)” values after both “Area” and “Flow” too |
| 69 | tab 4 | ditto |
| 70 | 18 | add “of total-N and total-P” after “yields” |
| 70 | 19 | change “reflects” to “reflect” |
| 71 | 15 | define “Net N Inputs” at beginning of this section |
| 72 | fig 24 | caption should read “fluxes or yields” |
| 73 | 5 | not clear what “50 to 70%” means; if it is a range, then why a range? |
| 74 | 5-11 | what about denitrification too? |
| 74 | 16 | where are the data/reference for “Fall fertilization . . .(is?) has increased”? |
| 74 | 18 | ditto for temperature data? |
| 77 | 14-15 | will not this cropping system be “leaky” under any realistic management system? |
| 77 | 44 | insert “about” before “equal” |
| 78 | 16 | should it be “minus” or “plus”? |
| 78 | 20 | should “volatilization” also be mentioned? |
| 79 | 11 | need to be clear that NANI does not represent a complete mass balance |
| 80 | 6 | insert “row-crop” before “agriculture” |
| 83 | 22 | could also reference Iowa DNR’s negative mass balances for N and P for the state here |
| 89 | 11 | define “TPC” |
| 90 | 7 | how is “excess” defined? |

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| 91 | 3-4 | more detail is needed to understand what “strongly reflect the effects of seasonal pulses” mean |
| 95 | 19 | insert “because of less erosion” after “tile drainage” |
| 113 | 7 | “40 to 45%” relative to when? |
| 115 | 14 | “some”? |
| 115 | 18 | does “P” represent probability |
| 115 | 29 | need to better define “pristine P loads” |
| 115 | 33-35 | does “criteria” refer to standing and/or flowing waters? |
| 115 | 39 | change last phrase after “NGOM” to “of a 40% P reduction will be difficult, but less so than one of 80%” |
| 117 | 8 | what is the reference for these cost estimates? |
| 123 | tab 10 | in last box, state amount of “reduce fertilization rate” |
| 126 | 26 | “farms”? |
| 131 | 9 | where in the report are nutrient ”crop needs” as a function of time given in order to determine an “excess”? |
| 131 | 13 | need to list (or refer to a Table) the practices considered |
| 146 | 26 | need reference for these rates |
| 151 | 12-13 | availability to crops of nutrients in soil is as important as amounts |
| 151 | 42-43 | product and application costs need to be considered |
| 152 | 9 | insert “physical” before “technological” |
| 152 | 20 | delete “acre” |
| 152 | 29 | add “)” |
| 154 | 12 | why “but”? |
| 158 | 10 | what does “can control” mean? |
| 159 | 36 | subscript “3” |
| 160 | 33-38 | if catalytic converters on cars result in N emissions as ammonia, should not this be considered “new” N? |
| 164 | 39 | define “small” in terms of kg/ha/yr and relate that to <u>both</u> N inputs, <u>and</u> to kg/ha/yr load of N to the Gulf of Mexico |
| 167 | 24-32 | here (and in Table 13) errors arise in calculations because of incorrect use of English and metric units |
| 167 | 37-38 | note that corn yields also are decreased with continuous corn versus corn-soybeans |
| 167 | 44 | beyond CRP, what lands are “currently idle”? |
| 169 | 15-20 | it would seem a <u>shift</u> in dairy production, not <u>new</u> production might result from use of “distiller grains” |
| 169 | 24 | are there current data to justify use of the term “insurance” N? |
| 169 | 41-44 | if the price-of-corn/cost-of-N ratio stays the same as the energy costs of N fertilizer also go up, the optimum N rate on corn will not change |
| 171 | 7 | could insert additional reference on relationship between N fertilization and soil organic matter here (i.e. Barber, S. A. 1979. Corn residue management and soil organic matter. Agronomy Journal 71:625-627) |
| 171 | 15 | what is missing after “micro-“? |
| 171 | 15 | to what does “505” refer? |
| 171 | 40 | how much is “some”? |

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| 173 | 1 | what water quality benefits would be expected for a “buffer on non-HEL land”? |
| 173 | 43 | this report assumes that “cellulosic ethanol production” is a given (?) |
| 176 | tab 14 | need to reconcile some optimistic reduction values in this table with information in papers from the UMRSHNC workshop (e.g., on N rate and timing) |
| 186 | 1-2 | is there a reference for this statement? |

General Comments/Questions (May 24, 2007 draft)

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- The impact of management on crop yield/profitability must not be taken lightly; e.g., on page 152, lines 19-20, it is stated that: "Overall, it appears that substantial reductions in N application to corn, even from the average of 142 kg/ha/yr, are possible with only minor yield reductions; and on page 169, lines 34-35, reference is made of "limited impacts on yield" from reduced application of N. Two points: 1) use of a single study versus a summary of several studies (i.e. the UMRSHNC workshop proceedings) can be misleading; and 2) when profit is the difference between the two large numbers of costs and gross sales, a "minor" or "limited" yield reduction can have a major effect on net income.
- Although logical, the conclusion that (page 119, lines 12-13) "it is reasonable to expect relatively small reductions in N fertilizer rates to result in proportionally higher reductions in N losses (repeated on page 169, lines 33-35), this is not supported by the data. Although the relationship for data on nitrate concentrations in tile drainage as affected by N rate is often curvilinear, the intercept for concentration at zero N rate is significantly greater than zero, often 5-8 mg/L. Thus only at unrealistically high N rates would this conclusion begin to hold.
- More practice-based cost accounting information is needed to help with later policy making relative to potential management changes (as also noted in the last paragraph on page 195, continuing on page 196). The assessments on pages 117-121 are not adequate.
- Another important issue in making assessments is the background knowledge about the current system. If data are not available or sufficient, this report should call for resources and more effort in this regard.
- "Co-benefits" of increased "on-farm productivity," that are considered "likely" (e.g., on page 118, lines 19-20) with some policies, imply that win-win situations exist for producers. Without financial incentives for changing practices, it is hard to imagine how producers will be able to improve their "productivity" (or profitability).
- On page 126, lines 14-15, it is stated that "Deciding who pays is not a question that should be addressed by science." This statement exemplifies that the purpose of this report is to provide the science to others who will make policy. As such, policy statements, such as those on page 130, lines 28-31 and page 134, lines 7-9 (plus several others) should be stricken from the report.
- In addition, the negative view of "voluntary programs" (pages 126-127) is based on non-agricultural studies, while one positive agricultural study cited elsewhere in the report (page 159, lines 22-24) was ignored in this discussion. Furthermore, (unless "voluntary programs" are unrealistically defined as those <u>without</u> financial incentives), resources to promote the changes suggested in the first action plan never became available to test whether "voluntary agreements are not likely to be adequate…."

- On page 12 (lines 25-26), it is noted that "recent models suggest that a 45% nitrogen load reduction may be required . . . . .;" and on page 50 (lines 17-24), the model of Scavia et al. (2003) is discussed specifically relative to the 45% (to 55%) goal. The question was asked at the June 2007 New Orleans meeting by one panel member if this model had been verified (because it is so important in the re-assessment). No one else on the panel responded, but someone in the audience said "yes." It is important that how this verification was performed be made available in the report. Based on the paper by Hetland and DiMarco (2007), flow alone explains more of the annual variability in the extent of hypoxia that does this model.
- In more than one place (one being page 16, lines 12-14), it is stated that there is "increased hypoxia," but that data are insufficient "to determine whether increases in the spatial extent have occurred." This seems inconsistent when the degree of hypoxia has been measured in terms of area (what are the units that are being used in the "increased hypoxia" statement?).
- This brings up the issue of the need for increased (more sites) and improved (more certainty) monitoring, not only for duration and extent of the hypoxic zones in different areas of the Gulf, but in the nutrient loads coming down the rivers and into the Gulf. With the potential costs of watershed and waterway practices needed to reach the action plan goal (that could be in the billions of dollars), it seems that the influx of any new dollar resources should first go to strengthening our knowledge of what is actually happening now under current conditions. Additional large needs for support of monitoring relative to "adaptive management" are discussed two bullets down.
- In promoting "adaptive management," care must be taken in considering proposed "management actions" that may not work and need to be "revised" (page 13, lines 18-29). Not only the cost of implementing those actions must be carefully calculated in light of possible failure, but the impact on customer confidence must be weighed. Producers continually ask: "Is the problem real, and if so, if I do what is being requested, will it be solved?"
- In addition, the evaluation or assessment that goes with "adaptive management" is critical and requires intensive monitoring efforts in space and time (page 111, bullet two). The problem is made even more difficult, if not impossible, on the "medium and broad basin scale" (page 111, bullet four) when practices are "applied in suites or systems (page 111, bullet three). Therefore, significant resources must be available for monitoring if "adaptive management" is to work. Modeling is useful for planning, but it is not useful for assessment as it will give the same answer for a plan before <u>and after</u> implementation.
- Use of an accurate and complete mass balance provides irrefutable evidence. It needs to be made clear that if more N is removed from any area than is added, the only source of N to balance that difference is from storage in soil organic matter. This has ramifications not only for soil quality, but for water and air quality as well. The key is in the accuracy and completeness of the mass balance, and reducing the uncertainty in the important parameters making up the balance is deserving of more attention and should be emphasized.