

July 24, 2017

To: Mike Murray
David Allan
Matthew Child

From: Dale Phenicie

Subject: Comments regarding the draft report Assessment of Fertilizer and Manure Application in the Western Lake Erie Basin.

Thank you for the opportunity to review the draft IJC SPC fertilizer/manure project report. A few comments regarding emphasis and content follow. They include those of a member of the agri-business community I have consulted with.

1. Overall, the report appears well written and well organized.
2. The point, regarding trends made in the Exec Summary, page xvi at Line 491, is important.

"Important agricultural trends include gradually increasing yields with gradually decreasing fertilizer application, and an overall reduction of fertilizer application to equal or fall slightly below crop needs; legacy soil P from prior years of excess application has made up the difference where deficits between current-year application and crop needs exist."

3. The following bullet on page xvi at Line 495 is an important issue.

"An increasing trend of bioavailable dissolved phosphorus loading from study area tributaries, which began in approximately 1995-2000 and has since plateaued somewhat, may be contributing to larger algal blooms in western Lake Erie and large hypoxic areas in central Lake Erie that have been observed in recent years. This increasing trend is coincident with and possibly driven by increasing rates of drainage tile installation (limited data are available to quantify this), as well as less intensive tillage practices and wetter spring climate conditions."

It is accurate to say that this trend is coincident with tile installation and less intensive tillage. However, more study and research is needed to definitively draw conclusions. Until something more definitive is known, the phrase 'possibly driven' should be dropped in the reference to the roles of drainage, tillage and climate, as this is significant speculation and, as the report points out, there are significant research gaps that need to be filled. Of particular importance is the fact that other portions of the report document the possible role of the legacy P. This could turn out to be a very significant source. Legacy P should be mentioned here in this context. When all of the coincidental factors are recognized as possible sources, it really drives home the point that you cannot imply

that we know how to rank each of the potential “drivers” of the problematic P loading to Lake Erie at this time.

4. The description of the status of water quality models on page xvi at line 502 is somewhat inconsistent.

“Regional-scale water quality models have been developed or are currently being developed for most of the study area at varying degrees of resolution, but these models are handicapped by gaps in watershed characterization, monitoring data, and process understanding. Numerous numerical modeling programs exist that capture agricultural and lake processes reasonably well.”

Given the acknowledged gaps in the opening sentence of this bullet and the widespread recommendations contained in the “recommendations related to modeling” section, the statement “capture agricultural and lake processes reasonably well,” seems to be subjective and overly positive. The preference for using monitoring data over modeling whenever possible should be highlighted. When modeling is needed for system function analysis it is important to identify the gaps and needs for improving the modeling process so the dynamics of different watersheds, including those within the same region, and differences in responses in each waterbody can be identified and reflected.

5. The statement on the top of page xvi at Line 485 is an overgeneralization that is not true.

“a trend toward higher concentrations of animals per farm has increased the potential for excessive application of manure near large farms.”

When an animal production operation increases in concentration and size, management techniques and processes as well as additional technologies are applied that decrease the potential for excessive application of manure. It is not simply a matter of determining manure production as shown on pg 45. If large manure production materials are properly applied, there is no problem. Large CAFOs, which dominate animal and manure production in the region, are permitted under state and federal laws and are therefore subject to mandatory agronomic requirements regarding manure application locations and rates.

There can be challenges if high animal numbers concentrate in a geographical area such that land is lacking for land application. However, page 45 doesn't indicate this is the case, except perhaps in poultry. Page 48 provides a good description of the challenges of quantifying manure application geographically. These challenges, and the resulting inability to quantify ‘problems’ to CAFOs or lesser regulated animal production facilities should be recognized. Again, the general inference that large is bad should be avoided. Concurrent provision of management controls is the need and generally has been the norm.

6. Recognizing the knowledge gaps as noted on page XVI at Line 515 is critical and needs to be highlighted.

“Important knowledge gaps include the detailed characteristics and dynamics of legacy phosphorus pools (soils, stream sediment, lake sediment); the extent, evolution, and basin-scale impacts of tile drainage networks on P transport (especially in the U.S.); the full influence of manure management and both field-applied and unrecovered manure on local and regional P loading on surface water quality (especially in Canada); the spatial variability of commercial fertilizer application and management (especially in Canada); and the actual efficiency of best management practices in reducing P loss over the full life cycles of practices.”

7. The recommendation on page xvii at Line 534 is also extremely important and should be highlighted.

“Support time-limited and localized programs of research monitoring (watershed and lake) and method development to improve process understanding and characterization of agricultural practices, to inform the geographic focus of watershed management actions, and to increase the accuracy and reduce the cost of monitoring and characterization over time.”

8. The farm fertilizer expenditure discussion on page 8, starting at Line 706, suggests potential data limitations by indicating that the numbers are not adjusted for inflation. However, another factor is pricing. As explained later on page 21, these expenses are a function of both usage rate and prices, over time. This is particularly important for the period 2009-2012 when prices “spiked.” This relationship should be included in the page 8 discussion section.

9. The discussion of the 4R fertilizer use program on page 21 and 31-36 is extremely important. It is suggested that the authors seek comments from the Fertilizer Institute regarding the information presented.

10. The primary “findings” reported on page 66 at lines 2008 through 2022 appear more concrete than supported by the discussion provided in the preceding pages. At the least, the “findings” should be qualified with the caveat that the challenges identified in pages 45-48 make determining the relative contribution of commercial fertilizer and manure difficult – and carry large margins of error.

DKP