Response to Comments Provided on the Draft of the Iowa Nutrient Reduction Strategy Annual Progress Report

17 October 2017

Introduction

This is a summary of the comments received on the September 20, 2017, draft of the Iowa Nutrient Reduction Strategy Annual Progress Report. The Annual Progress Report, revised and published each year, provides updates on point source and nonpoint source efforts related to specific action items listed in the elements of the Iowa Nutrient Reduction Strategy. The Annual Progress Report also provides updates on statewide efforts and activities that aim to achieve reductions in nitrogen and phosphorus loads. The NRS documents, including each year's Annual Progress Report, can be accessed at www.nutrientstrategy.iastate.edu.

This comments summary document contains responses to comments and identifies areas of the Annual Progress Report that were modified.

The draft of the Annual Progress Report was available to member organizations of the Water Resources Coordinating Council and the Watershed Planning Advisory Committee, and comments were received over a two week period from September 20 to October 4, 2017.

The following organizations submitted comments on the draft report:

- Collectively, Iowa Environmental Council, Center for Rural Affairs, Environmental Law & Policy Center, Iowa Conservation Alliance, Iowa Rivers Revival, and Izaak Walton League of America (page 2)
- Iowa Soybean Association (page 10)
- Environmental Protection Agency Region 7 (page 13)

Page numbers referenced in the following comments and responses were adjust to reflect the final, published version of the Annual Progress Report.

Summary of comments from representatives of
Iowa Environmental Council
Center for Rural Affairs
Environmental Law & Policy Center
Iowa Conservation Alliance
Iowa Rivers Revival
Izaak Walton League of America

Comment: Under "Current challenge: The capacity for acceleration," the report includes a strong message that sustainable, consistent funding is needed to implement the INRS --though the message is buried on page 14 We appreciate this realistic and critical message and strongly recommend that it be included in the Executive Summary.

Response: Thank you for your suggestion. The NRS annual progress report is intended to provide updates on point source and nonpoint source efforts related to specific action items listed in the elements of the strategy. The Annual Progress Report also provides updates on statewide efforts and activities that aim to achieve reductions in nitrogen and phosphorus loads. In certain cases, specific challenges, future needs, or next steps are discussed to provide perspective or inform progress in certain implementation efforts of the NRS. Options for how to best capture, summarize, and highlight this information will be evaluated for next year's report.

Comment: The report credits USDA "base" conservation spending, including the Conservation Reserve Program, for a significant part (58% from the CRP alone) of Iowa's nonpoint source nutrient reduction funding (pages 9-10). However, the CRP and other federal programs that provide cost share to incentivize nutrient reduction efforts may face cuts in the upcoming Farm Bill. This significant threat to implementation of the INRS should also be included in the Executive Summary, which emphasizes the importance of sustainable state funding support.

Response: The NRS annual progress report is intended to provide updates on point source and nonpoint source efforts related to specific action items listed in the elements of the strategy. The Annual Progress Report also provides updates on statewide efforts and activities that aim to achieve reductions in nitrogen and phosphorus loads. Analysis of unknown future influences is outside the scope of the NRS annual report.

Comment: Regarding Staff on page 15, the report acknowledges the "persistent need for administrative support, researchers and technical staff, including agricultural, conservation, and engineering specialists" for the technical assistance to deliver and implement programs. The report compares FTE staffing from 2016 to 2017 in agencies and private organizations involved with nutrient reduction efforts, showing that staffing has not increased since last year, despite increased funding of $32 million for nutrient reduction efforts. That appears to represent a significant increase in funds being spent out on the landscape with virtually no increase in technical assistance. This suggests efficiencies that are

worthy of applause, even as it raises questions about the burden this is placing on personnel in federal and state conservation offices that are downsizing and disappearing across the state. It would be very helpful to show technical assistance staff over a longer time period to gain perspective on our capacity to deliver conservation programs.

Response: There are no current efforts to look retrospectively at technical assistance at this time. However a clearer picture will likely emerge as improvements in continued data collection and subsequent analyses occur in this topic area moving forward. For instance, in the last year, NRCS has worked to provide staff data that better capture the extent of their on-the-ground conservation FTEs, which includes their employees that provide technical assistance. This effort is the main driver for the significant difference between staff estimates in the 2015 and 2016 Annual Reports.

There is still a gap in understanding contracted providers; efforts are underway to establish an efficient method for estimate the extent of contracted conservation assistance.

Comment: Under "Progress of point source facility permits," the Report should describe how the NRS is being applied to point sources—both major and minor—through Antidegradation rules. According to the NRS, Iowa's antidegradation rules and review procedures will play a key role in implementing the provisions of the Strategy applicable to point sources. Section 3 of the Strategy provides that when conducting an alternatives analysis pursuant to an antidegradation review, any facility proposing a new or increased discharge of nutrients must consider Total Nitrate and Total Phosphorus as pollutants of concern when evaluating non-degrading and less-degrading alternatives (Sec. 3, p.3); and that any time increases in plant design capacity or new construction are planned the evaluation of nutrient removal feasibility will be conducted as part of the construction permitting process through current antidegradation rules and procedures (Sec. 3, p.6). However, the 2017 Annual Report does not include information about how point source provisions of the NRS are being implemented through antidegradation procedures. The Report also only addresses major sources (i.e., the WWTPs on the Affected Facilities List). Yet the NRS provisions concerning antidegradation apply to both major and minor facilities, as DNR has emphasized in the fact sheet "Nutrient Reduction Strategy"(at www.iowadnr.gov/Portals/idnr/uploads/water/npdes/Nut_Strat_factsheet.pdf).

Response: The following text will be added on to the Blank section on page 19:

"Municipal and industrial wastewater facilities are required to evaluate nutrient reduction prior to constructing new or expanded facilities under Iowa's antidegradation policy. There were 22 alternatives analyses approved this reporting cycle for minor municipal and industrial facility upgrade projects (21 municipal, 1 industry). More thorough analyses will be needed to determine if the alternatives analyses resulted in nutrient reduction alternatives being selected. In one example it was determined that the City of Central City constructed a new Submerged Aquatic Growth Reactor (SAGR) that included a recycle component to achieve additional nitrogen removal. Improvements are being structured to account for this type of information on a larger scale moving forward."

Comment: Also, under "Progress of point source facility permits, the 2017 INRS Report discussion of major sources that have submitted feasibility studies does not include information about proposed construction schedules or facilities' projected timelines to address nutrient pollution through biological nutrient removal. In order to assess the progress that Iowa is making in reducing nutrient loading from point sources, the report should provide some sort of projected timeline for when nutrient removal technology will actually be implemented pursuant to the Strategy. In the one Feasibility Study that IEC has reviewed, the construction schedule proposed does not install biological nutrient removal until 2027, and does not achieve the NRS target limits for technologically achievable reductions in TP and TN until 2028. Is this result typical? What is the average planned attainment date of the target limits in the Strategy? Now that a significant number of facilities have completed feasibility studies, DNR should include in its report some kind of information (either a summary or average) about projected timelines for achieving the TN and TP reduction goals of the NRS for point sources.

Response: The report will be revised to include information regarding the projected timelines. For the first time the annual report included a listing of facilities that were able to meet the percent reduction goals of the NRS for point sources. Additionally, reporting of facilities commitments to construct upgrades to meet NRS targets was reported generally at 13 total (up from 2 last year). This information is reported once NPDES permits are amended with the construction schedule in place. The average time frame for construction completion for the 10 municipalities is 3.5 years from 2017 with a date range for completion from 2018 to 2025. The average time frame for the 5 industries is 2.4 with a date range for completion from 2018 to 2021.

Human

Comment: Partners' reporting on outreach and education shows impressive expanded efforts by agencies and partner organizations to create awareness and understanding about the nutrient reduction strategy and its menu of conservation practices (page 21). We applaud the efforts represented to virtually double outreach efforts from 2016-17 and are encouraged that this has resulted in a 9 percent increase in awareness of survey respondents (who farm at least 150 acres of row crops in NRS priority watersheds).

It is disappointing, however, that despite these expanded efforts, farmers' attitudes remained statistically unchanged regarding their intentions "to improve conservation practices on the land they farm to help meet the NRS goals." There was also little change in their level of agreement with statements, "I am concerned about agriculture's impacts on water quality" and "The nutrient management practices I use are sufficient to prevent loss of nutrients into waterways" (page 23). This finding did not make it into the Executive Summary, though it may be the most critical issue buried in the 2017 report for all the partners who want the INRS to succeed. What are implications for further action and outreach if the voluntary approach is really going to work to move farmers from awareness to action? Considering the public's increasing concerns over the public health and environmental consequences of this problem, we should not wait to take next steps. Itis encouraging, however, that

more research is being done to better understand these findings, the results of which are expected in fall 2018 (page 23).

Response: The Annual Progress Report highlights the important role of positive shifts in awareness and attitudes as conditions for behavior change and adoption of innovation (e.g. conservation practices). The significant increase in awareness in selected watersheds has been highlighted as a promising, positive result. However, expectations of finding a widespread increase in attitudes, affected by increased knowledge and awareness, may be premature. With ongoing examination of the third year of the NRS Farmer Survey underway, the lack of significant findings in attitude change during preliminary analysis highlights the need for continued tracking, but does not yet warrant conclusions about a shift in attitudes.

In addition, drawing a direct link between statewide outreach efforts and farmer attitudes may be problematic at this point due to the nature of the different data sources. On one hand, outreach is conducted and recorded at a local level, and outreach events may tend to cluster around specific geographic areas (e.g. watershed projects). The NRS Farmer Survey, on the other hand, gathers responses from farmers across large watershed areas, including areas that have received less targeted programming. In addition, the impacts of recent doubling in outreach events (2016 to 2017) would not be reflected in farmers' survey responses that were collected in Spring 2017. Thus, due to a "lag time" after conducting increased outreach, the affected changes in awareness and attitudes may not be measured until the following year. However, these issues are noted, and efforts are ongoing to assess the impacts of outreach on conservation adoption in surrounding areas.

Land

Comment: The documented acreage of cover crops in 2016, based on participation in state and federal government cost share programs is reported to be 300,000, up 40,000 acres (15%) over 260,000 in 2015. The estimated acreage for cover crops credited and shown in charts, however, is 600,000. This estimate assumes that the cover crops are being planted on twice the acres receiving cost share. This guestimate (still a drop in the bucket of the INRS scenarios of 10-14 million acres of cover crops needed) seems quite optimistic and it is not clear if there is any documentation (such as GIS-based data) to support it. Additionally, the report should also emphasize the urgent need to dramatically ramp up the amount of cover crop acres necessary in order to make a measurable difference in nutrient loss if Iowa is expected to meet the strategy's goals. This, too, should be mentioned in the executive summary.

Response: Current data availability limits analysis to cover crop acres funded by cost-share programs; however, general estimates through surveys suggest that there were approximately 600,000 acres after the 2016 growing season. The survey information was reported by Iowa Learning Farms, in which more information can be gathered at Iowa Learning Farms 2016 Evaluation Report, http://www.extension.iastate.edu/ilf/content/ilf-reports. For clarity, the footnote describing this data source has been moved to page 43 from a different section of the report.

The NRS annual progress report is intended to provide updates on point source and nonpoint source efforts related to specific action items listed in the elements of the strategy. The Annual Progress Report also provides updates on statewide efforts and activities that aim to achieve reductions in nitrogen and phosphorus loads. It is understood and implicit that more cover crops are needed to help achieve the goals of the NRS. To provide this context, this Annual Progress Report states on page 43 that, "to correspond with the NRS scenarios that present cover crops as part of a suite of practices implemented to meet the 45 percent reduction goal, cover crops need to be adopted on a scale of 10 to 14 million acres. This would require a significant acceleration of adoption rates in subsequent years."

Comment: With regard to bioreactors, the report acknowledges that "the level of acres treated by bioreactors needs to increase significantly to address the goals of the NRS based on various scenarios," and gives a "conservative assumption" that land treated by bioreactors averages 50 acres. During several recent field days attended by IEC, landowners have reported their bioreactors filtered far fewer acres than 50. Thus, we recommend that next year's report reflect the actual estimates from installed projects. With relatively few bioreactors installed, that seems like a realistic task.

Response: This estimate of 50 acres treated per bioreactor is used based on professional judgement of collaborating researchers and based on general siting criteria. The intention is to improve these assumptions as data collection methods improve. Considerations for acres treated will be reevaluated for next year's report and as data collection methods are improved.

Comment: The reduction in the extent of CRP buffers (a 9 percent decline since 2013) and the estimated treated acres is of concern (pages 32-33). Though the efficacy of buffers to reduce nitrogen and phosphorus varies widely depending on location and the extent of subsurface drainage that bypass the buffer.

Response: This point is noted and understood.

Water

Comment: The review of monitoring efforts provided in the report are valuable, and we will look forward to future reporting of results of the studies mentioned. It is notable that the bulleted findings under "Monitoring at the edge-of-field and delivery scale" on pages 43-45 only address nitrate issues. We appreciate that this year's INRS report does at least acknowledge concerns related to dissolved phosphorus and the need to better account for it in monitoring. Iowa needs more data on role of dissolved phosphorus in overall P losses, which likely is related to the extent we are allowing some land areas to be overloaded with phosphorus from fertilization and manure applications that are not based on the P Index. One Iowa monitoring effort that the report does not mention supports concerns about dissolved phosphorus coming from tile drained cropland, based on monitoring of CREP wetlands

(presentation at Soil and Water Conservation Society Conference, 2017,"Linking Agricultural Practices to Water Quality Improvement" by William Crumpton and Matt Helmers, online at https://www.slideshare.net/SWCSevents/crumpton-linking-agriculture-practices-to-water-quality-improvement?qid=07b42b76-d1d6-4ae6-aae0-a2b44e7898dc&v=&b=&from_search=2)

Response: Additional efforts are underway to help understand the role of dissolved phosphorus in overall P loss.

One example is this Iowa Nutrient Research Center study below that was approved to begin this year.

> **Amounts and Forms of Dissolved Phosphorus Lost with Surface Runoff as Affected by Phosphorus Management and Soil Conservation Practices. (**Mallarino, A. P., M. U. Haq).
>
> Management practices seem to have considerably different effects on dissolved and particulate P loss, and dissolved reactive P (DRP) underestimates the amount of dissolved P and its impacts on water quality by a small or large margin depending on largely unknown reasons. Better knowledge of amounts and forms of dissolved P in runoff for a range of management practices is critical to improve the understanding and prediction of runoff P loss impacts on water quality. This type of data is needed for better consideration of dissolved P by both the Iowa P Index and the Nutrient Reduction Strategy.
>
> ***Objectives:***
>
> The general goal is to study dissolved P in runoff for a wide range of soil P levels, fertilizer and manure P management practices, and soil conservation practices. Specific objectives are:
>
> 1) Determine the amount of runoff dissolved P not measured by the commonly used DRP method that erroneously is being considered particulate P for a variety of management practices and conditions.
>
> 2) Study how the amounts of DRP and TDP in runoff can be estimated by routine soil-test P methods recommended for crops (and included in the Iowa P Index), water-extractable soil P, and an index of soil P saturation."

Dissolved phosphorus is addressed in calculations of phosphorus reductions (page 50-51). These estimates are based on the P-Index, which includes a dissolved phosphorus component.

Comment: Overall the report does not put enough emphasis on the need for changes that could have more significant promise for nutrient reduction over time. This could include long-term easements or land acquisition programs that retire cropland in strategic locations for water protection and public use. The report acknowledges the potential benefits of land use changes to perennials and crop rotations (p 39). However, the discussion on practice effectiveness overemphasizes costs of land use changes (page

41), with language that is too broad and depends on many factors. In fact, some Iowa research, such as a study that looks at the economics of crop rotations by ISU's Matt Liebman et. al. (2013) shows that rotations can be economically competitive with profits from a corn-soybean rotation (at http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=2877&context=farms_reports).

Response: The NRS annual progress report is intended to provide updates on point source and nonpoint source efforts related to specific action items listed in the elements of the strategy. The Annual Progress Report also provides updates on statewide efforts and activities that aim to achieve reductions in nitrogen and phosphorus loads which include accounting for implementation of practices listed in the NRS Science Assessment. Land use and cropping systems are accounted for on a statewide basis is through FSA cropland datasets and CRP data. Long-term easements would likely be captured in these datasets, but could be lost when aggregated to a statewide level. Improved methods for collecting information on practices/land use will be assessed for subsequent reports.

Comment: The report discusses source water protection program and planning, which could be a vital part of our overall nutrient reduction efforts and a way to help farmers better appreciate how nutrient reduction efforts might improve their local wells and public drinking water supplies. However, the report provides little information to suggest expectations in improvements and how the plans will be implemented, timescale, etc. (page 16).

Response: The annual report focuses on practice implementation that will achieve reductions in nitrogen and phosphorus loads. Source water protection plans, if and when implemented, may result in the installation or operation of some of the practices listed in NRS Science Assessment. As a result and consistent with the goals of the NRS, the annual report currently focuses on practice implementation as a result of source water protection efforts and higher level accounting of efforts that may lead to practice implementation.

Comments: We applaud the water monitoring conducted by ISA and additional partners, responsible for collecting and analyzing more than 2,000 water samples from 272 locations in 2016 (page 43-45). We continue to hope that if this data effort is publicly funded in whole or part that it is transparently reported (as aggregate data) and entered into a database that public agencies and scientists can access.

Response: Recent results of this data collection efforts is provided on page 45, as reported by ISA representatives for the purposes of this Annual Progress Report. Questions regarding the availability of these data should be directed toward the ISA Environmental Programs and Services Team.

Comment: Finally, a major purpose of the nutrient reduction strategy reporting in the future should be to show the state's progress or lack of progress with regard to nutrient loading of our waterways and export of nutrients from the state. It is encouraging that we are making progress in establishing a

baseline and showing the results of estimates of annual nitrate export from 2000 (page 48). Although it is true that weather variation makes quantification difficult, as stated and illustrated, nevertheless the trend deserves greater attention in the report and better interpretation in Figure 23 and Table 9 (page 48). This is the crux of our situation and more attention to it could help farmers and others better grasp the urgent importance of the Iowa Nutrient Reduction Strategy.

Response: The report outlines the commitment to look more closely at this dataset on pg. 49. "The technical work group will continue efforts over the next year to better understand the patterns presented in this new dataset and will evaluate options for potential metrics that best capture trend information for concentration and loads in Iowa's surface waters."

Summary of comments from representatives of the Iowa Soybean Association

Comment: (Page 27) We suggest clarifying what the main bars represent (average percent reduction) and adding a description of what the error bars represent (+/- one standard deviation from the mean) in the figure caption. You may also consider acknowledging that the combination of large standard deviations and lesser average load reductions results in the average minus one standard deviation values of less than 0% reduction (negative reductions) for some practices.

Response: Clarification on the representation of the main bars and error bars has been added to the caption of this figure.

Comment: (page 33) Include a timeframe for bioreactor installation. To be consistent, we suggest using the 2011-2016 timeframe since there were at least seven bioreactors installed prior to 2011.

Response: Clarification has been added that the figure showing bioreactor installation represents cost-share bioreactors. An addition also clarifies that an estimated 950 acres are treated by bioreactors installed since 2011, consistent with the 2011-2016 timeline. Efforts to determine the installation date of non-cost share bioreactors will be conducted during the 2017-2018 reporting period; these efforts will include continued coordination with ISA representatives.

Comment: (page 33) You may want to include estimates of saturated buffers that have been installed in addition to bioreactors. ISA was involved with 9 saturated buffers that were installed during the reporting period. You may want to inquire with Dan Jaynes and/or Tom Isenhart for accurate numbers of saturated buffers that they had direct involvement with.

Response: Efforts to account for the extent of saturated buffer installation, especially those installed without cost-share assistance, will be conducted during the 2017-2018 reporting period.

Comment: (page 33) "It may be assumed that saturated buffers and bioreactors are synonymous in terms of siting and implementation due to similar characteristics necessary for proper installation and function." We agree with the concept. However, since saturated buffers have more stringent siting constraints, we suggest rewording the sentence to clarify that the practices are very similar in terms of role and function but that individual site characteristics may favor one practice over the other.

Response: Clarification has been added to highlight the distinctions between bioreactor and saturated buffer site characteristics.

Comment: Next, we offer the following general comments that may be beyond your ability to address in this report, and we encourage you and the WRCC to be thinking about how to handle consideration of these ideas in future reports.

While the logic model captures the net activities, inputs and outputs relative to implementing the INRS, we wonder how the report can capture the net effect of using a watershed implementation approach? The Iowa Soybean Association and several other partners are supporting the development and use of watershed-based implementation strategies designed as a pathway to scale-up implementation of INRS practices. In most cases, these plans are being supported via grants from IDALS, as well as others, and these plans directly support local partners who are leading implementation activities. In most of the locations the watershed plan is being used to transition from the demonstration phase to implementation scale-up of practices and projects. It is probable that the current logic model reporting is capturing some of the inputs such as funding, practice adoption etc. However, we believe the annual progress report is not capturing the true value of using the watershed implementation approach. We speculate the benefits of using the watershed implementation approach, particularly where we have dedicated staffing resources, can generate social value via greater awareness and local buy-in for acceptance of which practices can be optimally deployed into the landscape. Of notable mention is a July 11th Iowa Learning Farms article documenting Higher Adoption of Cover Crops in Watershed project Areas, available here: https://iowalearningfarms.wordpress.com/2017/07/11/higher-adoption-of-cover-crops-in-watershed-projects-areas/

Further, we believe having a watershed plan, with outcomes, goals and timelines articulated with a budgetary needs assessment, provides a methodical roadmap and business-case. This further enables local partnerships the ability to capture additional funding to support plan implementation. We believe this would be interesting information to track. Watershed based implementation projects are likely already tracking this implementation information to be accountable to local partners and sponsors. Ideally, it would be desirable to consider a method to roll-up small scale watershed efforts and activities into the statewide report using the logic model parameters.

Finally, one last comment to consider for future year reports: perhaps it is now time to consider including a cost effectiveness metric, i.e. $/lb of reduction for installed practices. This would lend further credibility for projects that are targeting practice implementation to areas with the greatest opportunity to reduce nutrient loading. The information to do this type of analysis should be readily available and could be an analytical exercise to advance continuous improvement of the INRS and demonstrate to the public that we are using limited dollars in a cost-effective manner.

Response: The Annual Progress Report provides an aggregate evaluation of statewide efforts; this statewide view potentially dilutes any localized progress. Efforts are currently underway to develop a Logic Model-based evaluation of watershed-based efforts, in order to assess whether these localized areas are experiencing higher rates of NRS implementation. This analysis of the effectiveness of watershed projects will include assessment of the use of watershed plans for reaching project goals.

Methods are being developed for calculating cost effectiveness of selected conservation practices. During the 2016-2017 reporting period, three steps made this analysis more feasible to conduct for next annual report. First, the models for estimating N and P loss reduction from installed practices were developed further to improve usability. Second, integration of the federal and state cost-share databases allowed for improved accounting of conservation practice implementation. Finally, data-sharing partnerships between IDALS, NRCS, and ISU resulted in increased sharing of financial information attached to cost-share practice data. These three developments will greatly improve the capacity to estimate cost-per-pound of nutrient reduction, and these results are expected to be available in 2018.

Summary of comments from representatives of the Environmental Protection Agency, Region 7

Comment: (page 4) You might want to add another paragraph that says something to the effect of: "A sufficient period of record is also needed evaluate progress. In an open environment, it can be difficult to distinguish trends over a short period of time. For instance, in a very wet year, nutrients in water may appear be overly elevated due to exceptional runoff. Conversely, in a drought year, nutrients may appear to be well controlled due to minimal runoff. It will take a multi-year period of time to get an accurate handle on progress by detecting an overall downward trend in what can be very noisy data."

Response: A clarifying paragraph has been added to the overview of measurement challenges to address this point.